User Guide for the Cisco Mobile Wireless Transport Manager 6.1.5

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CONTENTS

Preface

This preface describes the objectives, audience, organization, and conventions of the *User Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*. It refers you to related publications and describes online sources of technical information.

The Cisco Mobile Wireless Transport Manager (MWTM) is a network management software product that enables you to discover, manage, and troubleshoot the following networks:

- IP Transfer Point (ITP)
- IP Radio Access Network (IPRAN), which includes:
  - Radio Access Network Optimization (RAN-O)
  - Pseudowire Emulation Edge to Edge (PWE3)
- Cisco Mobile Internet (MI) / mobile Services Exchange Framework (mSEF), which includes:
  - Cisco Gateway GPRS Support Node (GGSN)
  - Cisco Content Services Gateway (CSG)
  - Cisco Home Agent (HA)
  - Cisco Broadband Wireless Gateway (BWG)
  - Cisco Packet Data Node Gateway (PDNGW)
  - Cisco Serving Gateway (SGW)
  - Cisco Policy and Charging Rules Function (PCRF)
  - Cisco Packet Data Serving Node (PDSN)

For a more detailed description of the MWTM, see Chapter 1, "Overview." For the latest MWTM information and software updates, go to http://www.cisco.com/go/mwtm.

This preface includes:

Document Objectives

This guide describes the architecture, supporting hardware and software, and management procedures for the MWTM. Using the information provided in this guide, you can complete the tasks that are necessary to use the MWTM in your ITP, IPRAN, and/or mSEF network.

Document Audience

This guide is for network administrators or operators who use the MWTM software to manage ITP, RAN-O, and/or mSEF networks. Network administrators or operators should have:

- Basic network management skills
- Basic Solaris system administrator skills
- Basic ITP, RAN-O, and/or mSEF knowledge

Document Organization

This guide is divided into the following chapters and appendixes:

- "Overview" provides brief descriptions of ITP, IPRAN, and mSEF, the MWTM, the MWTM's client-server architecture, and an overview of how to use the MWTM to manage your network.
- "Configuring Security" provides information about configuring MWTM security and limiting access to the MWTM.
- "Setting Up Your Server" provides procedures to set up your MWTM server, which includes enabling traps, configuring a backup server, setting up TFTP, configuring SNMP settings and credentials, and creating new troubleshooting commands.
- "Getting Started" provides basic information and procedures for using the MWTM.
- "Basic Operations" provides information about basic operations you can perform using the MWTM, including navigating windows, exporting data, and performing basic server operations.
- "Understanding Basic Object Functions" provides information about basic object functions found within the Summary Lists section of the navigation tree.
- "Managing Views" provides information about using the MWTM to create, change, and load views and subviews, and view basic and detailed information for views and subviews.
- "Understanding Detailed Object Functions" provides information about more detailed object functions you can perform on specific types of objects.
- "Managing Alarms and Events" provides information about using the MWTM to view basic and detailed information for events, and change the way the MWTM processes events.
- "Viewing Network Topology" provides procedures for viewing the topology of your network, changing the way the MWTM shows the topology, and saving customized topology displays.
- "Accessing Data from the Web Interface" describes how to access MWTM data from the MWTM web interface.
- "Managing Reports" provides procedures for creating and viewing MWTM accounting and statistics reports for your ITP network.
- "Editing an ITP Route Table File" provides procedures for viewing and editing ITP route table files.

- "Editing an ITP Global Title Translation Table" provides procedures for viewing and editing ITP GTT files.
- "Editing ITP MLR Address Table Files" provides procedures for viewing and editing ITP MLR address table files.
- "Client Object Map Reference" provides an overview of the tabs available for each MWTM object within a view.
- "Command Reference" describes the commands used to set up and operate the MWTM.
- "FAQs" provides a list of frequently asked questions and troubleshooting tips for the MWTM.
- "Troubleshooting the MWTM and the Network" provides information for troubleshooting basic MWTM and network problems, including how to verify network discovery, clearing a locked-up MWTM display, and using the MWTM to diagnose typical network problems.
- "Status Definitions" defines the default status settings for all MWTM network objects.
- "MIB Reference" lists the MIBs used by the MWTM.
- "Trap Reference" lists and describes the traps that the MWTM supports.
- "Configuring MWTM to Run with Various Networking Options" describes communication between the MWTM client and the MWTM server in different networking environments, including Virtual Private Network (VPN), Network Address Translation (NAT), firewall, port-forwarding, and Secure Sockets Layer (SSL).
- "MWTM Ports" lists MWTM services ports, port type, and descriptions.

Document Conventions

This guide uses basic conventions to represent text and table information.

Command descriptions use the following conventions:

- Commands and keywords are in **boldface** font.
- Arguments for which you supply values are in *ialic* font.
- Elements in square brackets ([ ]) are optional.
- Alternate but required keywords are grouped in braces ({ }) and separated by a vertical bar (|).

Examples use the following conventions:

- Terminal sessions and information that the system displays are printed in `screen` font.
- Information that you enter is in **`boldface screen`** font. Variables for which you enter actual data are printed in *italic screen* font.
- Nonprinting characters, such as passwords, are shown in angle brackets (< >).
- Information that the system displays is in `screen` font, with default responses in square brackets ([ ]).

This publication also uses the following conventions:

- Menu items and button names are in **boldface** font.
- Directories and filenames are in *italic* font.
- If items such as buttons or menu options are dimmed on application windows, it means that the items are not available either because you do not have the correct permissions or because the item is not applicable at this time.

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in the manual.

Caution Means *reader be careful*. You are capable of doing something that might result in equipment damage or loss of data.

Tip Means *the following are useful tips*.

Related Documentation

Related MWTM documentation includes:

- Additional MWTM Documentation, page iv
- ITP Documentation, page iv
- IPRAN Documentation, page v
- mSEF Documentation, page v

Additional MWTM Documentation

Additional MWTM documentation can be found on Cisco.com:

http://www.cisco.com/en/US/products/ps6472/tsd_products_support_series_home.html

The MWTM includes a browser-based online help system that is searchable and supports bookmarking of favorite content.

Note When you access online help for the first time, there might be a slight pause while your client browser loads the online help.

ITP Documentation

Cisco IP Transfer Point (ITP)

Information about Cisco IP Transfer Point (ITP) software, including procedures for configuring ITP nodes, can be found on Cisco.com:

http://www.cisco.com/en/US/products/sw/wirelssw/ps1862/products_feature_guides_list.html

Information about the Cisco ITPs can be found in the documentation that shipped with the ITP.

IPRAN Documentation

Cisco IP Radio Access Network (IP-RAN)

For information about IP-RAN, visit these websites:

http://www.cisco.com/en/US/netsol/ns675/networking_solutions_solution_category.html

http://www.cisco.com/en/US/products/hw/routers/ps368/tsd_products_support_series_home.html

Information about Cisco IPRAN nodes, including procedures for configuring IPRAN objects, can be found on Cisco.com:

- Cisco MWR 1900 Series:

  http://www.cisco.com/en/US/products/hw/routers/ps4062/tsd_products_support_install_and_upgrade.html

- Cisco MWR 2900 Series:

  http://www.cisco.com/en/US/products/ps9395/prod_installation_guides_list.html

- Cisco 3800 Series:

  http://www.cisco.com/en/US/products/ps5855/products_installation_and_configuration_guides_list.html

- Cisco ME 3400 Series:

  http://www.cisco.com/en/US/products/ps6580/products_installation_and_configuration_guides_list.html

- Cisco ONS 15400:

  http://www.cisco.com/en/US/products/hw/optical/ps2006/products_installation_and_configuration_guides_list.html

- Cisco 7600 Series:

  http://www.cisco.com/en/US/products/hw/routers/ps368/products_installation_and_configuration_guides_list.html

CiscoWorks LMS Documentation

Information about the CiscoWorks LAN Management Solution (LMS) 3.1 products, which can be integrated with the MWTM, can be found on Cisco.com:

- http://www.cisco.com/en/US/products/sw/cscowork/ps2425/tsd_products_support_series_home.html

mSEF Documentation

Information about mSEF documentation can be found on Cisco.com:

Cisco Gateway GPRS Support Node (GGSN)

For information about GGSN, visit these websites:

http://www.cisco.com/en/US/products/sw/wirelssw/ps873/index.html

Cisco Home Agent (HA)

For information about HA, visit these websites:

http://www.cisco.com/en/US/products/ps6506/index.html

http://www.cisco.com/en/US/products/ps5940/tsd_products_support_series_home.html

Cisco Content Services Gateway (CSG)

For information about CSG, visit these websites:

http://www.cisco.com/en/US/products/sw/wirelssw/ps779/index.html

Cisco Broadband Wireless Gateway (BWG)

For information about BWG, visit these websites:

http://www.cisco.com/en/US/products/ps8738/index.html

Cisco Packet Data Serving Node (PDSN)

For information about PDSN, visit these websites:

http://www.cisco.com/en/US/products/sw/wirelssw/ps4341/index.html

Server Load-Balancing/Exchange Director

http://www.cisco.com/en/US/products/hw/modules/ps2706/products_installation_and_configuration_guides_list.html

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

CHAPTER 1

Overview

This chapter describes the Cisco Mobile Wireless Transport Manager (MWTM) and contains:

What Is MWTM?

Using the MWTM, you can discover, manage, and troubleshoot objects in your ITP, IPRAN, and/or mSEF network. The MWTM provides:

Server and Network Features

The MWTM:

- Uses client/server architecture. See What Is Client/Server Architecture?, page 1-11 for more details.
- Supports Windows and Solaris clients and Solaris and Linux servers, and provides data access through a web browser.
- Supports large networks and is verified to work with a network containing up to 200 managed ITP nodes, or 10,000 managed IPRAN nodes, or 10,000 managed mSEF nodes, and 50 clients connected to the server. See the "Server System Requirements" section in the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information.
- Allows multiple MWTM servers to monitor the network simultaneously, providing data redundancy. Clients have server failure recognition and automatic failover capabilities. MWTM clients will automatically switch to a backup server when the primary server is not available (in network problems or hardware failures, for example).
- Discovers the entire Cisco ITP network and displays the ITP nodes, neighboring SS7 equipment, and linksets in tables and in a network topology drawing that you can customize.
- Discovers the entire Cisco IPRAN network. Displays the RAN-O network element, neighboring equipment, and physical and logical connections in a network topology drawing that you can customize.
- Discovers the mobile Services Exchange Framework (mSEF), including:
  - Cisco Gateway GPRS Support Node (GGSN)
  - Cisco Content Services Gateway (CSG)
  - Cisco Home Agent (HA)
  - Cisco Broadband Wireless Gateway (BWG)
  - Cisco Packet Data Serving Node (PDSN)
  - Cisco Packet Data Node Gateway (PDNGW)
  - Cisco Serving Gateway (SGW)
  - Cisco Policy and Charging Rules Function (PCRF)
- Lets you create custom views and subviews for grouping similar nodes together, where the state of the subview is the aggregation of the states of the contained nodes.
- Provides a command-line interface (CLI) on the server.
- Allows clients to connect to a server through the IP network; clients work across a Virtual Private Network (VPN) connection through a firewall that supports port forwarding or Network Address Translation (NAT), and through a Secure Sockets Layer (SSL) connection.
- (ITP only) Supports concurrent network indicators and variants; ANSI, China, ITU, NTT, and TTC point code variants; three- and four-octet point code formats; multiple secondary point codes; SS7 instance translation; and virtual linksets.

Graphical User Interface and Web Features

The MWTM:

- Provides a Java-based, easy-to-use GUI on the client with an easy-to-navigate *tree* display of all network objects as well as extensive web-based online help.

- Provides an extensive HTML-based web interface. Most of the primary GUI client features are also available on the web interface. See Browser Questions, page C-6 for more information about the differences between the Java client and the web interface.

Event Monitoring Features

The MWTM:

- Displays a real-time event list that supports acknowledgement, annotation, customized filtering, and field viewing.
- Receives native traps from nodes in the Cisco IPRAN, Cisco mSEF and Cisco ITP solutions and uses SNMP polling to identify the status of each managed node, including interfaces, links, and circuits. The MWTM uses easy-to-recognize, color-coded icons to report the status.
- Monitors Cisco ITP nodes running Message Transfer Part Level 3 (MTP3) User Adaptation (M3UA) or Signaling Connection Control Part (SCCP) User Adaptation (SUA) application servers, as well as servers with multiple signaling points or variants acting as gateways.
- Provides web-based status monitoring, alarm viewing, sorting, filtering, archiving, online documentation, and client download.
- Provides external script execution on the server and sound playing on the client; both are triggered by events or alarms, and you can also customize them.

Performance Features

The MWTM:

- Provides extensive web-based accounting and network statistics reports for:
  - **Cisco RAN-O nodes**—Network and detailed interface-level statistics
  - **Cisco ITP nodes**—Network efficiency, detailed interface-level statistics, Q.752-based statistics reports, and point code inventory reports, including MTP3, GTT, M3UA/SUA, MSU, and multilayer routing reports
  - **mSEF**—See Viewing Reports, page 13-4 for more information.
  - **PWE3**—See Viewing Reports, page 13-4 for more information
- Displays real-time data rate and usage line graphs
- Supports options to configure collection intervals, record aging and statistics export via comma-separated values (CSV) format files

Provisioning Features

The MWTM provides provisioning for ITP, IPRAN, GGSN, CSG, and HA.

The MWTM:

- ITP—Assists in provisioning destination point code (DPC) route tables, global title translation (GTT) tables, multilayer routing (MLR) address tables, links and linksets by providing GUI-based editing; reduces errors by checking syntax and semantics before deploying the tables to the Cisco ITP node.

- ITP—Provides revision management and archiving of DPC route, GTT, and MLR address tables; can re-deploy a known good configuration in the event of a misconfiguration. Stores time of change, user ID, and comments for each change.
- ITP—Provides a deployment wizard that simplifies the process of transferring and activating GTT and DPC route-table configuration files onto Cisco ITP nodes. The wizard takes you through deployment step-by-step and learns along the way to speed up future deployments.
- IPRAN—Provides a deployment wizard for PWE3 circuits, ATM cell switching, and TDM drop and insert provisioning.
- GGSN—Provides a deployment wizard for APNs, interfaces, VLANs, and VRFs. These features are available for GGSN 8 and later software.
- CSG—Provides a deployment wizard for Maps, Content, Service, Billing, and Policies. These features are available for CSG2 R1 and later software.
- HA—Provides a deployment wizard for HA.

See *MWTM Provision Attributes* chapter of the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information on the attributes for MWTM 6.1.5 provision feature.

Security Features

The MWTM provides:

- Management of SSL certificates via the GUI
- Multi-level password-protected access for multiple users
- Multiple user authentication methods (OS-based and standalone)
- Passwords that users can change using the GUI
- Password enforcement policies (aging, minimum length, and lockouts)
- Audit trails of all user actions and all access via the web interface
- Security logs
- Optional access via VPN, Secure Shell (SSH), and SSL

Topology Features

The topology features are available for the ITP and RAN-O solutions.

The MWTM:

- Automatically discovers the network from any node, with links to unsupported nodes, and creates topological (graphical) and tabular (text) views of the network.
- Shows network objects as color-coded glyphs on a topology map, with right-click menus and layout, zoom, find, grid, hide, show, and save-as-JPEG functions. The topology map can be organized into one or more submaps, with a single object representing groups of network objects on the main topology map.
- Shows detailed data (including alarm and node data) in columns that can be resized, sorted, or hidden, depending on your preferences.

Troubleshooting Features

The MWTM provides:

- Troubleshooting tools that you can customize to help reduce the total time to resolution of network or node problems
- Integrated, online, context-sensitive help

Customization Features

The MWTM:

- Automatically saves your preferences, such as the size of specific windows or the order of columns in a window, and automatically applies those preferences whenever you launch the MWTM client.
- Polls the nodes on demand and at user-defined intervals, and reports the real-time status of all network objects and events, including the reason for any changes in status.
- Receives SNMP traps natively to drive alarms, and accurate and up-to-date status displays.

You can:

- Customize MWTM network(s) to show menus, options, and tools that are specific to the types of network that you are managing. You customize your network preferences during installation. You can change the network type later, if required, through the command line.
- Customize the GUI, topology, and tabular views to meet your specific needs. You can save customized views and subviews for future use and reference, and share them with other network users.
- Annotate network objects and events, attaching important information such as detailed descriptions, locations, service history, what triggered the event, and how often it has occurred.
- Customize the display category, severity, color, and message that you see with events. You can even have the MWTM play unique sounds for different types of events.
- Automate events, calling UNIX scripts to drive automatic paging, e-mail, and so on.
- Forward SNMP traps, and MWTM events in the form of SNMP traps, to other hosts, such as the Cisco Info Center (CIC) and the Micromuse Netcool suite of products.
- (ITP only) Load destination point code (DPC) route tables, GTT tables, and MLR address tables from files or from ITPs, configure the tables in the MWTM client, and deploy and activate the tables on ITPs. Supports GTT file format versions 3.1, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, and 4.6. Supports cross-instance GTT files. Provides command-line verification of route tables and GTT tables.

Integration Features

The MWTM can integrate with:

- CiscoWorks LAN Management Solution (LMS) portal, which provides a suite of CiscoWorks products, including:
  - Resource Manager Essentials, which provides network management for Cisco ITP, RAN-O, and mSEF nodes.
  - CiscoView Element Manager, which provides dynamic status, monitoring, and configuration information for a broad range of Cisco internetworking products.

- CiscoView element manager and the CiscoWorks Device Center, which you can launch from the:
  - Main window when you right-click a node in the navigation tree.
  - Topology map for quick drill-down network analysis.
- The Cisco Transport Controller (CTC) on the Cisco Optical Networking System (ONS) 15454 for managing alarms and provisioning circuits on the SONET or SDH traffic cards. You can launch the CTC from a right-click menu in the MWTM client.

The MWTM:

- Receives SNMP traps and generates Cisco MWTM-specific traps for forwarding to external SNMP-based network management applications such as Cisco Info Center or IBM Tivoli/NetCool.
- Stores statistics in CSV format files for extracting performance and key performance indicators.
- Provides northbound Cisco ITP, mSEF, and IPRAN events, inventory, and provisioning XML/SOAP APIs, allowing 3rd-party OSSs to programmatically manage:

What Is ITP?

Events	• Retrieving all or filtered list of events (based on time, event ID, severity, category, message text) • Clearing event alarms • Changing event severity • Acknowledging events • Attaching text notes to events
Inventory	• Retrieving all inventory objects • Retrieving a specific inventory object • Walking the MWTM inventory tree • Attaching text notes to an inventory object
Provisioning (ITP only)	• Customizing the MWTM templates when necessary • Configuring: – linksets – links – application servers – application server processes

The Cisco hardware and software SS7-over-IP (SS7oIP) solution includes the ITP, which provides a reliable, cost-effective medium for migrating Signaling System 7 (SS7), the telecommunications network signaling technology, to the mobile wireless industry IP environment. The ITP off-loads SS7 traffic onto the IP network, replacing the mobile service provider's signaling network with a redundant IP cloud.

In the ITP, and in the MWTM, a *node* is a Cisco ITP or a legacy SS7 device (SSP, SCP, or STP).

A Cisco ITP node can have multiple *signaling points*. Signaling points are identified with unique addresses called *point codes*. Point codes are carried in signaling messages that are exchanged between signaling points to identify the source and destination of each message.

Signaling points and legacy SS7 nodes are connected by *links*, and multiple links are grouped in a *linkset*. Each link is assigned to a single linkset, but each linkset can have multiple links. Links within the same linkset must be parallel between the same signaling points or nodes.

In the MWTM, a linkset is a representation of *two* linksets that are associated with two signaling points or nodes, one for each side of a logical connection.

An *application server* is a logical entity serving a specific routing key.

The application server implements a set of one or more unique *application server processes*, of which one or more is normally actively processing traffic. An application server process is an IP-based instance of an application server, such as Call Agents, HLRs, SMSCs, and so on. An application server process can implement more than one application server.

An *application server process association* is the ITP virtual view of an application server process. The application server process association resides and is defined on the ITP.

A *signaling gateway-mated pair* is a pair of signaling gateways that exchange necessary state information by using the Signaling Gateway Mate Protocol (SGMP).

Collectively, nodes, signaling points, linksets, links, application servers, application server processes, application server process associations, and signaling gateway-mated pairs are known as *managed objects*.

For more information about ITP, including procedures for configuring ITP objects, see the *IP Transfer Point (ITP)* feature module for Cisco IOS software release 12.2(25)SW5 or later.

What Is CDT?

The Cisco Database for Telecommunications (CDT) is a per subscriber routing solution that supports SS7/C7 and IP-based addressing services. Alarming is provided by the master server (monitored by MWTM). An alarm event consists of a component (service or facility) name, class, and severity level, as well as detailed message information. System events include resource thresholds (throughput, database capacity, thread, etc.), network connectivity, user authentication, system availability, etc.

You can use the MWTM to discover CDT nodes and provide basic monitoring functions such as alarm status, polling information, and recent events. From the MWTM, you can launch the CDT login web page.

Note MWTM 6.1.5 supports CDT 2.0. For SNMP traps to be handled properly CDT must be configured to use SNMPv2 traps.

What Is IPRAN?

The Cisco IP Radio Access Network (IPRAN) delivers standards-based end-to-end, IP connectivity for RAN transport. The Cisco solution converts RAN voice and data frames into IP packets at the cell site, and transports them seamlessly over a backhaul network. At the central site, the RAN frames are extracted from IP packets, and the ATM or TDM streams are rebuilt. The result is a transparent, radio vendor-agnostic, RAN IP transport solution.

The Cisco IPRAN solution is also known as Mobile Transport over Pseudowires, or MToP. For more information about MToP, see:

http://www.cisco.com/en/US/netsol/ns732/networking_solutions_solution.html

There are two families of pseudowire protocols used within the Cisco IPRAN: PWE3 and RAN-O.

What Is PWE3?

Pseudowire Emulation Edge to Edge, or PWE3, is the emulation of an ATM or TDM service over IP, MPLS, or L2TPv3 transport. The PWE3 protocol family is used to encapsulate RAN voice and data frames at the cell site for transport over a backhaul network.

Cisco nodes that support PWE3 and are managed by MWTM include:

- Cell Site Router (CSR):
  - Cisco MWR1941-DC-A and MWR 2941-DC routers
  - Cisco 3825 Integrated Services router
- Cisco 7600 router

What Is RAN-O?

Radio Access Network Optimization (RAN-O) delivers standard-based, end-to-end, IP connectivity for GSM and UMTS RAN transport. The solution Cisco offers frames RAN voice and data frames into IP packets at the cell-site, and transports them seamlessly over an optimized backhaul network. At the central site, the RAN frames are extracted from IP packets and the Abis or Iub data streams are rebuilt. The result is a transparent, radio vendor-agnostic, RAN IP transport and optimization solution that delivers nominal optimization efficiency of 50% without any impact on voice quality.

In RAN-O and in the MWTM, a *node* is a Cisco RAN-O device. A RAN node can be one of the following:

- Cell Site Router (CSR):
  - Cisco MWR 1941-DC-A and MWR 2941-DC routers
  - Cisco 3825 Integrated Services Router
- Cisco ONS 15454 SONET multiplexer
- RAN Service Module (card in the Cisco ONS 15454 SONET multiplexer)
- Unmanaged RAN node (BSC, RNC, BTS, or Node B)

Note The MWTM does not manage BSC, BTS, RNC, or Node B objects but displays them in the topology window to help you visualize the network.

RAN interfaces that are available on the nodes interconnect nodes in a RAN-O network. A Cisco RAN-O node can have multiple *RAN interfaces*.

Cards are the modules that reside in the Cisco ONS 15454 SONET multiplexer.

IP backhauls are the trunks that transport optimized voice and data traffic between a remote cell-site RAN-O node and an aggregation RAN-O node at a central site.

RAN shorthauls are the interfaces that transport GSM or UMTS voice and data traffic between the Base Transceiver Station (BTS) or Node-B and the RAN-O node at the cell site. At the aggregation site, RAN shorthauls exist between the RAN-O node and the BSC or RNC.

RAN backhauls describe the end-to-end RAN connections between the BTS or Node-B at the cell site and the BSC or RNC at the aggregation site.

Collectively, nodes, interfaces, cards, and RAN backhauls and shorthauls are known as *managed objects*.

For more information about RAN-O objects, see:

- *Cisco MWR 1941-DC-A Mobile Wireless Edge Router Software Configuration Guide*:

  http://www.cisco.com/en/US/products/hw/routers/ps4062/products_installation_and_configuration_guides_list.html

- *Cisco MWR 2941-DC Mobile Wireless Edge Router Software Configuration Guide*

  http://www.cisco.com/en/US/products/ps9395/products_installation_and_configuration_guides_list.html

- *Cisco ONS 15454 RAN Service Module Software Configuration Guide*:

  http://www.cisco.com/en/US/products/hw/optical/ps2006/products_installation_and_configuration_guides_list.html

What Is mSEF?

The Cisco Mobile Internet, also known as mobile Services Exchange Framework (mSEF), provides standards-based framework to enable the mobile Internet that links the RAN to IP networks and the services they provide. The mSEF provides:

- Access and service activation
- Easy mobility
- Packet inspection

The mSEF gateways that the MWTM manages include:

- Cisco Content Services Gateway (CSG)
  - CSG1 provides CSG features on the CSG card
  - CSG2 provides the latest CSG features on the Service and Application Module for IP (SAMI)
- Cisco Gateway GPRS Support Node (GGSN) on the SAMI and Multiprocessor WAN Application Module (MWAM)
- Cisco Home Agent (HA) on the SAMI and Cisco 7301
- Cisco Broadband Wireless Gateway (BWG) on the SAMI and Cisco 7301
- Cisco Packet Data Serving Node (PDSN) on the SAMI and Cisco 7613
- Cisco Packet Data Node Gateway (PDNGW)
- Cisco Serving Gateway (SGW)

- Cisco Policy and Charging Rules Function (PCRF)

What is LTE?

Long Term Evolution (LTE) is the next generation (4G) mobile wireless system expected to revolutionize mobile broadband usage. It is the next step beyond the current, 3G UMTS technology. LTE provides:

- All-IP flat network
- Higher throughput (up to 150 Mbps per user)
- Lower latency
- Higher spectral efficiency
- Seamless mobility between heterogeneous mobile technologies

Cisco is focused on developing the PDN Gateway (PDNGW), a Mobility Anchor gateway for inter-access technology mobility, and the Serving Gateway (SGW), a Mobility Anchor gateway for intra-3GPP mobility, for the LTE market.

The PDNGW provides connectivity to the UE to external packet data networks by being the point of exit and entry of traffic for the UE. The PDNGW performs authentication, IP address allocation, policy enforcement, packet filtering for each user, charging support, lawful interception, and packet screening.

The SGW is the gateway that terminates the interface towards the E-UTRAN (Enhanced Universal Terrestrial Radio Access Network) (S1). It acts as the local mobility anchor for inter-e Node B and inter-3GPP handovers (relaying traffic between 2G/3G networks and PDN GW).

The MWTM:

- Uses the existing device discovery infrastructure of the server to implement support for the PDNGW and SGW platforms.
- Uses the existing troubleshooting framework to add support for commands related to PDNGW and SGW troubleshooting.
- Uses the existing real time and historical statistics framework to poll for and displays real time and historical statistics for the PDNGW and SGW platforms.
- Uses existing event/alarm infrastructure of the MWTM server to generate events/alarms for the PDNGW and SGW platforms.

How Do I Identify My Network Type?

The MWTM can manage one or more types of networks. To determine the type of network that the MWTM is managing, launch the MWTM (by using either the MWTM client or web interface), and observe the network type or types in the title bar.

You can also click on a node in the left tree of the MWTM main window to view detailed information about the node in the right pane. The Node Type and other information provide enough details to determine the type of network you are managing.

If you are using the MWTM to manage multiple network types, you can uniquely identify node types by the DNS host names that you assign to them. For example, you can incorporate the string *itp* into the hostname of an ITP node (as in itp-75). Similarly, IPRAN nodes can employ a unique host naming

scheme (for example, rano-34). In addition, you can segregate the nodes of different network types into different management subviews with, for example, one subview for ITP and another subview for IPRAN nodes. For more information about creating views and subviews, see Chapter 6, "Managing Views".

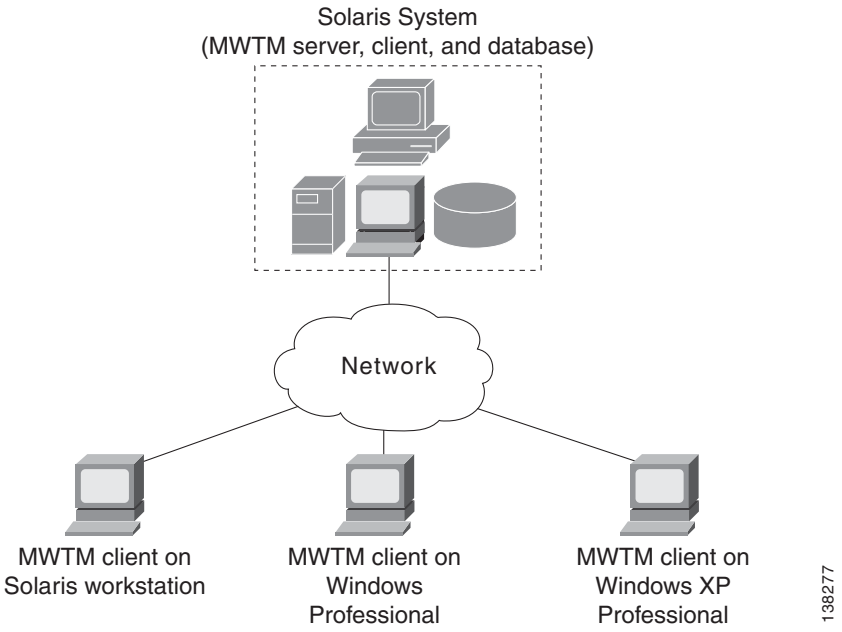
What Is Client/Server Architecture?

The MWTM provides central services and database functions on an MWTM server, which communicates through a messaging interface with multiple MWTM clients.

The MWTM supports a maximum of 50 clients per MWTM server.

The MWTM comprises server and client software components that can be installed on the same workstation or on different workstations. The MWTM server is currently available on Solaris and Linux. The MWTM client is available on Solaris and Windows XP Professional.

Figure 1-1 MWTM Client/Server Architecture



Note The MWTM client is also available on Linux, but is not a supported feature of the MWTM. Use it under advisement.

The client/server architecture is cross-platform compatible, with which you can run the client and server software in mixed operating system environments. For example, you can run the MWTM server on a Solaris or Linux workstation, and access it from an MWTM client running on Windows XP Professional.

The MWTM server software comprises a group of functional services that manage the data among the network, client workstations, and the centralized database. The MWTM server manages the exchange of data between the MWTM database and the network nodes. The MWTM process manager launches and manages all of the MWTM server processes, providing a robust and reliable launching platform for the MWTM.

The MWTM client software communicates with the MWTM server. You can install the MWTM client software on the same workstation as the MWTM server software, or on a different workstation on the same network as the MWTM server. After you install the MWTM server, you can download the MWTM client software from the web, for easy distribution to users and easier access to important information.

Note For detailed information on installing the MWTM server and client software, see the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

CHAPTER 2

Configuring Security

Before you set up your server for discovering, monitoring, and configuring your Cisco network, you need to make some decisions about the level of security you desire in your network management. With the Cisco Mobile Wireless Transport Manager (MWTM), you can determine how you want users to authenticate, whether you want encrypted data between the application client and the server, and if you want to limit client access to specific IP addresses.

This chapter provides information about configuring MWTM security and limiting access to the MWTM. This chapter contains:

Configuring User Access

You can use the MWTM to control who is allowed to do what in the MWTM, beyond simply specifying root and non root users. The MWTM calls this ability user-based access.

User-based access provides multilevel, password-protected access to MWTM features. Each user can have a unique username and password. You can also assign each user to one of five levels of access, which control the list of MWTM features accessible by that user.

To configure MWTM user access, perform the tasks in the following sections. Required and optional tasks are indicated:

Required:

Optional:

Implementing Secure User Access (Server Only)

Before you can access the full suite of security commands in the MWTM, you must enable MWTM user access, configure the type of security authentication you want, and add users to your user lists.

After you implement user access for the MWTM, users must log in to the system to access the:

- MWTM client interface
- MWTM web interface
- Event Editor
- Global Title Translation (GTT) Editor (ITP only)
- Address Table Editor (ITP only)

Note After you implement MWTM user access, if a user logs in on one client, then logs in on a second client, the MWTM closes the first client and records the event in the system security log.

Security Authentication

Two types of security authentication are possible:

- *Local authentication*: You can create user accounts and passwords that are local to the MWTM system. When using this method, you can use MWTM user access commands to manage usernames, passwords, and access levels.
- *Solaris/Linux authentication*: Uses standard Solaris- or Linux-based user accounts and passwords, as specified in the */etc/nsswitch.conf* file. You can provide authentication using the local */etc/passwd* file; a distributed Network Information Services (NIS) system; or any other type of authentication tool (for details, see Additional Authentication Tools, page 2-4). You can use all MWTM user access commands except:
  - mwtm disablepass
  - mwtm passwordage
  - mwtm userpass

In addition, if you have enabled Solaris/Linux authentication, you must be logged in as the root user, not as a superuser, to use:

- mwtm adduser
- mwtm updateuser
- mwtm authtype

PAM Setup to Check Library Version and JVM Versions

- To ensure Java Virtual Machine (JVM) version and available Pluggable Authentication Modules (PAM) library matches:
  - If your Operating System only has 32-bit version of the PAM library, then you need to make sure to use 32-bit JVM.
  - If your Operating System only has 64-bit version of the PAM library, then you need to make sure to use 64-bit JVM.
  - If your Operating System has both 32-bit and 64-bit versions of PAM libraries, then you can use either 32-bit or 64-bit JVM.
- To check the available PAM authentication module versions:
  - To check PAM authentication module version on Solaris:

    ```
    file /usr/lib/security/pam_radius_auth.so
    file /usr/lib/security/sparcv9/pam_radius_auth.so
    ```

  - To check PAM authentication module version on Linux:

    ```
    file /lib/security/pam_radius_auth.so
    file /lib64/security/pam_radius_auth.so
    ```

- To check JVM versions, go to:

  /opt/CSCOsgm/j2re/jre/bin/java -version

- To change the JVM version on Solaris:

  On Solaris, MWTM has both 32-bit and 64-bit JVM versions. By default, the MWTM 6.1.5 and above enables 64-bit JVM on Solaris. To change JVM to 32-bit version, enter the following commands:

  ```
  % cd /opt/CSCOsgm/j2re/jre/bin
  % mv java.sgm java.64
  % mv java.32 java.sgm
  % /opt/CSCOsgm/bin/mwtm restart
  ```

  To check if the JVM version is changed successfully, go to:

  /opt/CSCOsgm/j2re/jre/bin/java -version

- To check the JVM version on Linux:

  For Linux, you cannot change JVM versions. MWTM installation program installs 64-bit JVM if the Linux runs 64-bit kernel. MWTM installation program installs 32-bit JVM if the Linux runs 32-bit kernel.

  You need to ensure that proper version of PAM library is available on Linux that matches the kernel version.

Additional Authentication Tools

With the introduction of Pluggable Authentication Modules (PAM) in MWTM 6.1, you can use additional authentication tools, such as Remote Authentication Dial In User Service (RADIUS) or Terminal Access Controller Access-Control System (TACACS+).

For example, if you want to use RADIUS, follow these steps:

Step 1 Ensure that you have:

- Selected Solaris or Linux authentication, either during installation or using the **mwtm authtype** command (see mwtm authtype, page B-8)
- Download and compile the PAM radius module from the internet (http://freeradius.org/).

Note Check the install subdirectory of the MWTM installation CD image for the notes - INSTALL.pam_radius.txt (for PAM RADIUS module) or INSTALL.pam_tacplus.txt (for TACPLUS module) and precompiled PAM modules.

Step 2 On the MWTM server, copy the PAM radius file (*pam_radius_auth.so*) you downloaded to the /usr/lib/security directory.

Step 3 For Solaris authentication:

a. On the MWTM server, using a text editor, open this file:

```
/etc/pam.conf
```

b. Modify these lines:

```
mwtm-jpam auth required pam_unix_auth.so
mwtm-jpam account required pam_unix_account.so
```

to:

```
mwtm-jpam auth required pam_radius_auth.so
mwtm-jpam account required pam_radius_auth.so
```

For Linux authentication:

a. On the MWTM server, using a text editor, open this file:

```
/etc/pam.d/mwtm-jpam
```

b. Modify these lines (for 32 or 64-bit, respectively):

```
auth required /lib/security/pam_unix_auth.so
account required /lib/security/pam_unix_auth.so
or
auth required /lib64/security/pam_unix_auth.so
account required /lib64/security/pam_unix_auth.so
```

to:

```
auth required /lib/security/pam_radius_auth.so
account required /lib/security/pam_radius_auth.so
or
auth required /lib64/security/pam_radius_auth.so
account required /lib64/security/pam_radius_auth.so
```

Step 4 Enter:

```
cd /etc
```

Step 5 Create the following directory: *raddb*.

Step 6 You should have a PAM configuration file named pam_radius_auth.conf. Copy this file as *server* in the */etc/raddb/* directory.

Step 7 Configure the *server* file you just created with the actual Radius server, port number, and the secret password. For example:

```
172.16.24.60:1812 secret  3
```

Note If a MWTM superuser is defined, user access is enabled with authtype set to solaris or linux, and user accounts for accessing MWTM are maintained locally on the host running the MWTM server, then */etc/shadow* must be readable by the MWTM superuser account:
chown superuser /etc/shadow where *superuser* is the name of the MWTM superuser account.

Note See http://sourceforge.net/projects/tacplus for the details on PAM_TACPLUS module.

Configuring User Levels

You can configure one of seven account levels for each user. Valid levels are:

1. Basic User (Level 1) Access
2. Power User (Level 2) Access
3. Network Operator (Level 3) Access
4. Network Administrator (Level 4) Access
5. System Administrator (Level 5) Access
6. Custom User Level 1 (Level 11) Access
7. Custom User Level 2 (Level 12) Access

For more information about account levels, see Configuring MWTM User Account Levels (Server Only), page 2-7.

Configuring User Passwords

The method that you use for setting user passwords depends on the type of authentication that you configure on the MWTM system (local or solaris).

Local Authentication

If **mwtm authtype** is set to local, the MWTM prompts you to:

- Enter the user password. When setting the password, follow the rules and considerations in Creating Secure Passwords, page 2-7.
- Force the user to change the password at the next login. The default is to not force the user to change the password.

Whenever a user must change a password, the MWTM issues an appropriate message, and prompts for the username and new password.

Solaris/Linux Authentication

If **mwtm authtype** is set to solaris or linux, users cannot change their passwords by using the MWTM client. Instead, they must manage their passwords on the external authentication servers by using Solaris or Linux commands, such as *passwd*.

All new passwords take effect the next time the MWTM automatically synchronizes local MWTM passwords with Solaris or Linux. You can manually synchronize passwords at any time by using the **mwtm syncusers** command. For more information, see mwtm syncusers, page B-86.

Enabling Secure User Access

To enable secure user access for the MWTM:

Step 1 Log in to the MWTM server as the root user (see Starting the MWTM Client, page 3-3).

Step 2 To enable MWTM security, the following prerequisites must be met:

- User access must be enabled.
- The authentication type must be set.
- Users must be added.

The **mwtm useraccess** enable command takes you through all three stages, checking the status of:

1. **mwtm useraccess**—Enabled or disabled.
2. **mwtm authtype**—If you have not already set the mwtm authentication type, you must do so now.
3. **mwtm adduser**—If you have already assigned users, the MWTM asks if you want to use the same user database, or create a new one. If you have not assigned users, you must do so now.

Tip For details on the **mwtm useraccess**, **mwtm authtype**, and **mwtm adduser** commands, see Appendix B, "Command Reference".

Run the mwtm useraccess enable command:

```
cd /opt/CSCOsgm/bin
./mwtm useraccess enable
~text elided~
```

Step 3 To activate your security changes on the MWTM client, restart the MWTM server with the mwtm restart command (see mwtm restart, page B-58). To activate your security changes on the MWTM web interface, clear the browser cache and restart the browser.

Use the remaining procedures in this chapter to further customize your MWTM security system.

Creating Secure Passwords

When setting passwords in the MWTM, the:

- Password must be at least 6 characters, up to 15 characters.
- Password cannot be identical to the username.
- New password cannot be the same as the old password.
- MWTM does not allow users to switch back and forth between two passwords.
- Password cannot be a commonly used word. The MWTM server uses the system dictionary at */usr/share/lib/dict/words* (Solaris) or */usr/share/dict/words* (Linux) to determine whether a word is a commonly used word.

  To use your own dictionary, add a line to the *System.properties* file:

  - To disable the MWTM dictionary and allow common words, add:

    DICT_FILE=/dev/null

  - To use a custom dictionary, add:

    DICT_FILE=*/new-dictionary*

    where *new-dictionary* is the path and filename of the custom dictionary file, such as */users/usr11/words*. Each line in the custom dictionary must contain a single word, with no leading or trailing spaces.

Configuring MWTM User Account Levels (Server Only)

This section describes the user account levels, and the MWTM client and web interface actions that are available at each level:

The account level that includes an action is the *lowest* level with access to that action. The action is also available to all higher account levels. For example, a System Administrator also has access to all Network Administrator actions.

Account levels are based on the action to be performed, not on the target network element. Therefore, if a user can perform an action on one MWTM network element (such as deleting a node), the user can perform the same action on all similar MWTM network elements (such as deleting an interface, signaling point, or linkset).

Note Access to MWTM information and downloads on Cisco.com is already protected by Cisco.com, and is not protected by the MWTM.

To configure the account level for a user, use the **mwtm adduser** command, as described in Implementing Secure User Access (Server Only), page 2-2, or the **mwtm updateuser** or **mwtm newlevel** commands, as described in Enabling and Changing Users and Passwords (Server Only), page 2-13.

Basic User (Level 1) Access

Basic users can view MWTM data, load MWTM files, and use MWTM drill-down menus.

The following MWTM actions in the client and web interfaces are available to basic users:

MWTM Client Interface Actions	MWTM Web Interface Actions
• View the MWTM web interface homepage • Connect to a new server • Apply changes to views • Load the DEFAULT view and existing views, but cannot save them • View and edit preferences • View and manipulate the topology map, save it as a JPEG, but cannot save icon locations • View network elements, events, details, and notes • Load existing event filters, but cannot save them • Print MWTM windows • Launch CiscoWorks	• View the MWTM web interface homepage • View the following administrative pages: – System Information – System Status • View and edit web preferences • View reports

Power User (Level 2) Access

The following MWTM actions in the client and web interfaces are available to power users:

MWTM Client Interface Actions	MWTM Web Interface Actions
• Access all basic (Level 1) user client actions • Acknowledge events • View, change, and save event configurations, but cannot deploy changes • View real-time data and graphs • Edit network elements, events, and views • Unignore network elements and views • Save preferences files, event filters, and views	• Access all basic (Level 1) user web actions • Acknowledge events • View event configurations • View real-time statistics • Delete alarms • Modify alarm severity • Edit groups • Edit notes

Network Operator (Level 3) Access

The following MWTM actions in the client and web interfaces are available to network operators:

MWTM Client Interface Actions	MWTM Web Interface Actions
• Access all basic (Level 1) user and power (Level 2) user client actions • Access troubleshooting features • Ignore/Unignore network elements and views • Poll nodes • Access nodes through Telnet or SSH • (ITP only) View route table files and GTT files, but cannot edit them	• Access all basic (Level 1) user and power (Level 2) user web actions • Access troubleshooting features • Access provisioning features • Access all features on Administrative pages

Network Administrator (Level 4) Access

The following MWTM actions in the client and web interfaces are available to network administrators:

MWTM Client Interface Actions	MWTM Web Interface Actions
• Accessing all basic (Level 1) user, power (Level 2) user, and network operator (Level 3) client actions • Modify and view SNMP configuration • Perform network discovery • Delete network elements • Unmanage nodes • (ITP only) Edit and save route table files, GTT files, and address table files • (ITP only) Use the deployment wizard	• Accessing all basic (Level 1) user, power (Level 2) user, and network operator (Level 3) web actions • Automatically log into SSH terminal in enable mode (if enable password is set)

System Administrator (Level 5) Access

The following MWTM actions in the client and web interfaces are available to system administrators:

MWTM Client Interface Actions	MWTM Web Interface Actions
• Accessing all basic (Level 1) user, power (Level 2) user, network operator (Level 3), and network administrator (Level 4) client actions • Access and modify trap settings • Manage/Unmanage nodes • Deploy saved event configuration changes	• Accessing all basic (Level 1) user, power (Level 2) user, network operator (Level 3), and network administrator (Level 4) web actions • Access and modify trap settings • Enable and disable reports (MSU Rates)

Custom User Level 1 (Level 11) Access

The following MWTM actions in the client and web interfaces are available for custom user level 1 users:

MWTM Client Interface Actions	MWTM Web Interface Actions
• Customizing all basic (Level 1) user, power (Level 2) user, network operator (Level 3), network administrator (Level 4), and system administrator (Level 5) client actions.	• Customizing all basic (Level 1) user, power (Level 2) user, network operator (Level 3), network administrator (Level 4), and system administrator web actions.

Custom User Level 2 (Level 12) Access

The following MWTM actions in the client and web interfaces are available for custom user level 2 users:

MWTM Client Interface Actions	MWTM Web Interface Actions
• Customizing all basic (Level 1) user, power (Level 2) user, network operator (Level 3), network administrator (Level 4), and system administrator (Level 5) client actions.	• Customizing all basic (Level 1) user, power (Level 2) user, network operator (Level 3), network administrator (Level 4), and system administrator (Level 5) web actions.

Automatically Disabling Users and Passwords (Server Only)

After you have implemented the basic MWTM security system, you can customize the system to automatically disable users and passwords when certain conditions are met (for example, a series of unsuccessful login attempts or a specified period of inactivity).

Tip To view a list of current users and the status of user accounts, use the **mwtm listusers** command (see mwtm listusers, page B-43).

To automatically disable users and passwords:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Becoming the Root User (Server Only), page 3-2
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Enter the following command:

```
cd /opt/CSCOsgm/bin
```

Step 3 (Optional) To configure the MWTM to generate an alarm after a specified number of unsuccessful login attempts by a user, enter:

./mwtm badloginalarm *number-of-attempts*

where *number-of-attempts* is the number of unsuccessful login attempts allowed before the MWTM generates an alarm.

The valid range is 1 unsuccessful attempt to an unlimited number of unsuccessful attempts. The default value is 5 unsuccessful attempts.

To disable this action (that is, to prevent the MWTM from automatically generating an alarm after unsuccessful login attempts), enter:

```
./mwtm badloginalarm clear
```

Step 4 (Optional) To configure the MWTM to disable a user's account automatically after a specified number of unsuccessful login attempts, enter:

```
# ./mwtm badlogindisable number-of-attempts
```

where *number-of-attempts* is the number of unsuccessful login attempts allowed before the MWTM disables the user's account. The MWTM does not delete the user from the user list, the MWTM only disables the user's account.

The valid range is 1 unsuccessful attempt to an unlimited number of unsuccessful attempts. The default value is 10 unsuccessful attempts.

To re-enable the user's account, use the mwtm enableuser command.

To disable this action (that is, to prevent the MWTM from automatically disabling a user's account after unsuccessful login attempts), enter:

```
# ./mwtm badlogindisable clear
```

Step 5 (Optional) The MWTM keeps track of the date and time each user last logged in. To configure the MWTM to disable a user's log in automatically after a specified number of days of inactivity, enter:

```
# ./mwtm inactiveuserdays number-of-days
```

where *number-of-days* is the number of days that a user can be inactive before the MWTM disables the user's account. The MWTM does not delete the user from the user list, the MWTM only disables the user's account.

The valid range is 1 day to an unlimited number of days. There is no default setting.

To re-enable the user's account, use the mwtm enableuser command.

This action is disabled by default. If you do not specify the mwtm inactiveuserdays command, user accounts are never disabled as a result of inactivity.

If you have enabled this action and you want to disable it (that is, to prevent the MWTM from automatically disabling user accounts as a result of inactivity), enter:

```
# ./mwtm inactiveuserdays clear
```

Step 6 (Optional) If **mwtm authtype** is set to local, you can configure the MWTM to force users to change their passwords after a specified number of days.

To configure the MWTM to force users to change their passwords after a specified number of days, enter:

```
# ./mwtm passwordage number-of-days
```

where *number-of-days* is the number of days allowed before users must change their passwords.

Note You must have changed your password at least once for the **mwtm passwordage** command to properly age the password.

The valid range is 1 day to an unlimited number of days. There is no default setting.

Note The MWTM starts password aging at midnight on the day that you set the value. For example, if you use the **mwtm passwordage** command to set the password age to 1 day (24 hours), the password begins to age at midnight and expires 24 hours later.

This action is disabled by default. If you do not specify the mwtm passwordage command, users never need to change their passwords.

If you have enabled this action and you want to disable it (that is, prevent the MWTM from forcing users to change passwords), enter:

```
# ./mwtm passwordage clear
```

Note If **mwtm authtype** is set to solaris or linux, you cannot use the **mwtm passwordage** command. Instead, you must manage passwords on the external authentication servers.

Step 7 (Optional) To configure the MWTM to automatically disconnect a client (this includes the MWTM client, the GTT editor, and the address table editor) after a specified number of minutes of inactivity, enter:

```
# ./mwtm clitimeout number-of-minutes
```

where *number-of-minutes* is the number of minutes a client can be inactive before the MWTM disconnects the client.

The valid range is 1 minute to an unlimited number of minutes. There is no default value.

This action is disabled by default. If you do not specify the mwtm clitimeout command, clients are never disconnected as a result of inactivity.

If you have enabled this action and you want to disable it (that is, never disconnect a client as a result of inactivity), enter the following command:

```
# ./mwtm clitimeout clear
```

Manually Disabling Users and Passwords (Server Only)

As described in the Automatically Disabling Users and Passwords (Server Only), page 2-10, you can customize the MWTM to automatically disable users and passwords when certain conditions are met. However, you can also manually disable MWTM users and passwords whenever you suspect a security breech has occurred.

To disable MWTM users and passwords:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
```

Step 3 (Optional) To delete a user entirely from the MWTM user access account list, enter:

```
# ./mwtm deluser username
```

where *username* is the name of the user.

If you later decide to add the user back to the account list, you must use the **mwtm adduser** command.

Step 4 (Optional) If **mwtm authtype** is set to local, you can disable a user's password. To disable a user's password, enter:

```
# ./mwtm disablepass username
```

where *username* is the name of the user. The MWTM does not delete the user from the account list, the MWTM only disables the user's password.

Note If **mwtm authtype** is set to solaris or linux, you cannot use the **mwtm disablepass** command. Instead, you must manage passwords on the external authentication servers.

The user must change the password the next time he or she logs in.

You can also re-enable the user's account with the same password, or with a new password:

- To re-enable the user's account with the same password as before, use the **mwtm enableuser** command.
- To re-enable the user's account with a new password, use the **mwtm userpass** command.

Step 5 (Optional) To disable a user's account, but not the user's password, enter:

```
# ./mwtm disableuser username
```

where *username* is the name of the user.

Note If **mwtm authtype** is set to solaris or linux, you must be logged in as the root user, not as a superuser, to enter this command.

The MWTM does not delete the user from the account list; the MWTM only disables the user's account. The user cannot log in until you re-enable the user's account:

- To re-enable the user's account with the same password as before, use the **mwtm enableuser** command.
- To re-enable the user's account with a new password, use the **mwtm userpass** command.

Enabling and Changing Users and Passwords (Server Only)

Of course, the MWTM also enables you to re-enable users and passwords, and change user accounts. To enable and change users and passwords:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Enter the following command:

```
# cd /opt/CSCOsgm/bin
```

Step 3 (Optional) To re-enable a user's account, which had been disabled either automatically by the MWTM or by a superuser, enter the following command:

```
# ./mwtm enableuser username
```

where *username* is the name of the user. The MWTM re-enables the user's account with the same password as before.

Note If **mwtm authtype** is set to solaris or linux, you must be logged in as the root user, not as a superuser, to enter this command.

Step 4 (Optional) If **mwtm authtype** is set to local, you can change a user's password, or re-enable the user's account with a new password, if the user's account had been disabled either automatically by the MWTM or by a superuser. To change a password or to re-enable a user's account with a new password, enter:

```
# ./mwtm userpass username
```

where *username* is the name of the user.

The MWTM prompts you for the new password. When setting the password, follow the rules and considerations in the Creating Secure Passwords, page 2-7.

If the user's account has also been disabled, the MWTM re-enables the user's account with the new password.

Note If **mwtm authtype** is set to solaris or linux, you cannot use the **mwtm userpass** command. Instead, you must manage passwords on the external authentication servers.

Step 5 (Optional) To change a user's account level and password, enter the following command:

```
# ./mwtm updateuser username
```

where *username* is the name of the user.

Note If **mwtm authtype** is set to solaris or linux, you must be logged in as the root user, not as a superuser, to enter this command.

The MWTM prompts you for the new account level. Valid levels are described in Configuring User Levels, page 2-5:

If **mwtm authtype** is set to local, the MWTM also prompts you for the user's new password. When setting the password, follow the rules and considerations in Creating Secure Passwords, page 2-7.

Step 6 (Optional) To change a user's account level, but not the user's password, enter the following command:

```
# ./mwtm newlevel username
```

where *username* is the name of the user.

The MWTM prompts you for the new account level. Valid levels are described in Configuring User Levels, page 2-5.

Displaying a Message of the Day

You can use the MWTM to display a user-specified MWTM system notice called the message of the day. You can use the message of the day to inform users of important changes or events in the MWTM system. The message of the day also gives users an opportunity to exit the MWTM client, Event Editor, GTT Editor (ITP only), or Address Table Editor (ITP only) before starting them.

If you enable the message of the day, it appears whenever a user attempts to launch a client. If the user accepts the message, the client launches. If the user declines the message, the client does not launch.

To display the Message of the Day dialog, use one of the following procedures:

- Launch a client. If there is a message of the day, the Message of the Day dialog appears.
- Launch MWTM web client. Choose **Administrative > System Information > Message of the Day**. This link appears only after enabling message of the day using the command mwtm motd.
- Choose **View > Message of the Day** from the MWTM main menu (in case of Java client).
- Select the MWTM server name in the lower-right corner of the MWTM main window.

The Message of the Day dialog contains the following fields:

Field or Button	Description
Message of the Day Last Updated	Date and time the message of the day was last updated. If there is no message of the day, the MWTM displays Unknown.
Message Field	Text of the message of the day. If there is no message of the day, the MWTM displays `There is no message of the day`.
Accept	Closes the Message of the Day dialog and launches the client. If you do not click Accept, you cannot launch the client. This button is available when there is a message of the day and you launch a client.
Decline	Closes the Message of the Day dialog and exits the client. This button is available when there is a message of the day and you launch a client.
OK	Closes the Message of the Day dialog without exiting the client. This button is available if you displayed the Message of the Day dialog by choosing **View > Message of the Day** from the MWTM main menu. The OK button is not available in web client.

To configure the MWTM to display a message of the day:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Enter the following commands:

```
cd /opt/CSCOsgm/bin
./mwtm motd enable
```

The MWTM displays:

```
Enter location of the message of the day file: [/opt/CSCOsgm/etc/motd]
```

Step 3 To accept the default value, press **Enter**; or type a different location and press **Enter**.

The MWTM displays:

```
Setting Message of the Day File to: [/opt/CSCOsgm/etc/motd]
Message of the Day File set to: [/opt/CSCOsgm/etc/motd]
MWTM server must be restarted for changes to take effect.
```

Step 4 To create the message text (the first time) or edit the existing text, enter:

```
./mwtm motd edit
```

Step 5 To display the contents of the message of the day file, enter:

```
./mwtm motd cat
```

Step 6 To disable the message of the day file, enter:

```
./mwtm motd disable
```

Manually Synchronizing Local MWTM Passwords (Server Only)

If **mwtm authtype** is set to solaris or linux, the MWTM automatically synchronizes local MWTM passwords with the operating system at 1:30 a.m. each night (this setting can be changed using the root crontab). However, you can also manually synchronize passwords at any time.

To manually synchronize local MWTM passwords:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Change to the */bin* directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Synchronize the MWTM passwords:

```
./mwtm syncusers
```

The MWTM synchronizes the passwords with Solaris.

Listing All Currently Defined Users (Server Only)

To list all currently defined users in the MWTM User-Based Access account list:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Change to the */bin* directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 List all users:

```
./mwtm listusers
```

The MWTM displays the following information for each user:

- Username
- Last time the user logged in
- User's account access level
- User's current account status, such as Account Enabled or Password Disabled

Step 4 To list information for a specific user, enter:

```
./mwtm listusers username
```

where *username* is the name of the user.

Note You can also view user account information on the MWTM User Accounts web page.

Displaying the Contents of the System Security Log (Server Only)

To display the contents of the system security log with PAGER:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Change to the */bin* directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Display the security log contents:

```
./mwtm seclog
```

The following security events are recorded in the log:

- All changes to system security, including adding users
- Login attempts, whether successful or unsuccessful, and logoffs
- Attempts to switch to another user's account, whether successful or unsuccessful
- Attempts to access files or resources of higher account level
- Access to all privileged files and processes
- Operating system configuration changes and program changes, at the Solaris level
- MWTM restarts
- Failures of computers, programs, communications, and operations, at the Solaris level

Step 4 To clear the log, enter:

```
./mwtm seclog clear
```

The default path and filename for the system security log file is */opt/CSCOsgm/logs/sgmSecurityLog.txt*. If you installed the MWTM in a directory other than */opt*, then the system security log file is located in that directory.

Note You can also view the system security log on the MWTM System Security Log web page. For more information, see Viewing the Security Log, page 12-11.

Restoring Security-Related MWTM Data (Server Only)

If you inadvertently delete your user accounts, or make other unwanted changes to your MWTM security information, the MWTM can restore the security-related parts of the MWTM data files from the previous night's backup.

To restore the security-related MWTM data files:

Step 1 Log in as the root user (for details see Starting the MWTM Client, page 3-3).

Step 2 Change to the */bin* directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Restore the security-related data:

```
./mwtm restore security
```

The MWTM restores the data.

Disabling MWTM User-Based Access (Server Only)

To completely disable MWTM User-Based Access:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Starting the MWTM Client, page 3-3
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Change to the */bin* directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Disable user-based access:

```
./mwtm useraccess disable
```

The MWTM user access is disabled the next time you restart the MWTM server (using the mwtm restart command).

Specifying a Super User (Server Only)

You can use the MWTM to specify a *superuser*. A superuser can perform most actions that otherwise require the user to be logged in as the root user. (The root user can still perform those actions, too.) If you specify a superuser, the server also runs as the superuser and not as the root user.

Caution As a superuser, you can adversely affect your operating environment if you are unaware of the effects of the commands that you use. If you are a relatively inexperienced UNIX user, limit your activities as a superuser to the tasks described in this document.

When you specify a superuser, remember that:

- The user must exist in the local */etc/passwd* file. You cannot specify a user that is defined in a distributed Network Information Services (NIS) system.
- The superuser does not have access to all MWTM commands; you must still be logged in as the root user to enter certain commands. You must still be logged in as the root user to enter the following commands:
  - mwtm authtype
  - mwtm backup
  - mwtm backupdir
  - mwtm browserpath
  - mwtm certgui
  - mwtm certtool
  - mwtm clean
  - mwtm cleanall
  - mwtm cleandb
  - mwtm cwsetup
  - mwtm evilstop
  - mwtm jspport
  - mwtm keytool
  - mwtm killclients
  - mwtm reboot
  - mwtm restore
  - mwtm restoreprops
  - mwtm setpath, if you are specifying a *username*
  - mwtm sounddir
  - mwtm ssl

  - mwtm stopclients
  - mwtm superuser
  - mwtm syncusers
  - mwtm termproxy
  - mwtm trapsetup
  - mwtm uninstall
  - mwtm webport
  - mwtm xtermpath
- If the **mwtm authtype** is set to solaris or linux, you must still be logged in as the root user to enter the following commands:
  - mwtm adduser
  - mwtm disablepass
  - mwtm passwordage
  - mwtm updateuser
  - mwtm userpass
- If the SNMP trap port number on the MWTM server is less than 1024, you cannot use the **mwtm superuser** command. To correct this situation, you must specify a new SNMP trap port number that is greater than 1024:
  - To change the SNMP trap port number in the nodes in your network, use the snmp-server host command. By default, the MWTM listens for traps from trap multiplexing nodes and NMS applications on port 44750, so that is a good port number to choose. The SNMP trap port number must be the same on all nodes in your network.
  - For more information, see the description of the snmp-server host command in the "Node Requirements" section of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.
  - Use the **mwtm trapsetup** command to change the SNMP trap port number in the MWTM server to match the port number in the nodes in your network. For more information, see mwtm trapsetup, page B-89.

To specify a superuser on the MWTM server:

Step 1 Log in as the root user (see Becoming the Root User (Server Only), page 3-2).

Step 2 Change to the */bin* directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Specify the superuser:

```
./mwtm superuser username
```

where *username* is the name of the user.

Implementing SSL Support in the MWTM

Note If you chose the Solaris or Linux authentication options (during installation or through the **mwtm authtype** command) you must enable SSL. For details on the **mwtm authtype** command, see mwtm authtype, page B-8.

You can implement Secure Sockets Layer (SSL) support in your MWTM system. When you do, the MWTM uses secure sockets to encrypt all communication between the MWTM clients and server.

This section includes the following information:

Enabling SSL Support on the MWTM Server

To enable SSL support in the MWTM, perform the following:

Step 1 Install an SSL key/certificate pair in the MWTM by using one of the following procedures:

- To install a new SSL key and a self-signed certificate, generate the key and certificate by logging in as the root user on the MWTM server and entering the **mwtm keytool genkey** command.

  The MWTM stops the MWTM server and these prompts appear:

```
Country Name (2 letter code) []:
State or Province Name (full name) []:
Locality Name (eg, city) []:
Organization Name (eg, company) []:
Organizational Unit Name (eg, section) []:
Common Name (your hostname) []:
Email Address []:
Certificate Validity (number of days)? [min: 30, default: 365]
```

  Enter the requested information.

  The MWTM generates the following files:

  - */opt/CSCOsgm/etc/ssl/server.key* is the MWTM server's private key. Ensure that unauthorized personnel cannot access this key.
  - */opt/CSCOsgm/etc/ssl/server.crt* is the self-signed SSL certificate.
  - */opt/CSCOsgm/etc/ssl/server.csr* is a certificate signing request (CSR). It is not used if you are using a self-signed SSL certificate.

- To install a new SSL key and a certificate signed by a certificate authority (CA), generate the key and a CSR by logging in as the root user on the MWTM server and entering the **mwtm keytool genkey** command.

  The MWTM stops the MWTM server and issues the following prompts:

  ```
  Country Name (2 letter code) []:
  State or Province Name (full name) []:
  Locality Name (eg, city) []:
  Organization Name (eg, company) []:
  Organizational Unit Name (eg, section) []:
  Common Name (your hostname) []:
  Email Address []:
  Certificate Validity (number of days)? [min: 30, default: 365]
  ```

  Enter the requested information.

  The MWTM generates the following files:

  - */opt/CSCOsgm/etc/ssl/server.key* is the MWTM server's private key. Ensure that unauthorized personnel cannot access this key.
  - */opt/CSCOsgm/etc/ssl/server.csr* is a CSR.
  - */opt/CSCOsgm/etc/ssl/server.crt* is the self-signed SSL certificate. It is not used if you are using a CA-signed SSL certificate; the CA-signed certificate overrides the self-signed certificate.

  Print the CSR in X.509 format, by logging in as the root user on the MWTM server and entering the **mwtm keytool print_csr** command.

  Send the CSR to a CA to be signed.

  After the CA signs the certificate, log in as the root user on the MWTM server and enter the following command:

  ./mwtm keytool import_cert *cert_filename*

  where *cert_filename* is the name of the signed certificate.

  The MWTM stops the MWTM server and imports the certificate in X.509 format.

- To use an existing signed key/certificate pair, log in as the root user on the MWTM server and enter the following command:

  ./mwtm keytool import_key *key_filename cert_filename*

  where *key_filename* is the name of the existing SSL key and *cert_filename* is the name of the existing signed certificate.

  The MWTM stops the MWTM server and imports the SSL key in OpenSSL format and the signed SSL certificate in X.509 format.

Step 2 Enable SSL support in the MWTM, by logging in as the root user on the MWTM server and entering the **mwtm ssl enable** command.

Step 3 Restart the MWTM server.

Step 4 Set up the MWTM client-side SSL certificate trust relationship by downloading and importing the self-signed or CA-signed certificate on every remote MWTM client, Windows as well as Solaris, that connects to the MWTM server.

a. (Self-signed certificate only) Download the self-signed certificate (*server.crt*) by using the procedure in Downloading the Self-Signed SSL Certificate from the MWTM Server, page 2-23.

b. Import the self-signed or CA-signed certificate by using the procedure in Launching the MWTM Certificate Tool for SSL, page 2-24.

Step 5 Restart the MWTM client.

The MWTM clients can now connect to the MWTM server by using SSL. All communication between the server and clients is encrypted.

If an MWTM client, GTT editor (ITP only), or Address Table editor (ITP only) that is not SSL-enabled attempts to connect to an SSL-enabled MWTM server, the MWTM displays an appropriate warning message and opens the MWTM Client for Windows page. You can then download and install a new MWTM SSL module for the client to use to connect to that MWTM server.

If the client is SSL-enabled but does not have the correct certificate, the MWTM displays an appropriate warning message and opens the MWTM Server SSL Certificate page. You can then download the signed SSL certificate in X.509 format to the client.

Downloading the MWTM SSL Module for Windows Using the Web Interface

To install the MWTM SSL module on a Windows system from the MWTM web interface:

Step 1 From your browser, go to the URL for the MWTM Homepage:

`http://your_mwtm_server:1774`

where *your_mwtm_server* is the name or IP address of the MWTM server and *1774* is the web port being used by the MWTM (**1774** is the default port number.) If you do not know the name or web port of the MWTM server, contact the system administrator who installed the MWTM server software.

The MWTM web interface home page appears.

Step 2 Click **Download Windows Client**. Ensure that your browser is pointed to an MWTM, SSL-enabled server.

Step 3 Right-click **Download SSL Module for MWTM Client on Windows XP** and choose the **Save Link As** or **Save Target As** option.

Note If you are using Internet Explorer, change the *.zip* extension to *.jar* during the Save Target As option.

Step 4 When queried, save the file under *<Installed Drive>:\Program Files\Cisco Systems\MWTMClient\lib* where *<Installed Drive>* is the disk on which the MWTM client is installed.

Step 5 You are prompted to launch the client, then download the self-signed SSL certificate (follow the subsequent procedures).

Downloading the Self-Signed SSL Certificate from the MWTM Server

If you have implemented Secure Sockets Layer (SSL) support in your MWTM system, you can download the MWTM server's signed SSL certificate to all remote MWTM clients that connect to the server using SSL.

To download the certificate from the MWTM Server SSL Certificate page, use the following procedure on each remote MWTM client:

Step 1 In a web browser, enter the following URL:

```
https://server_name:1774
```

where *server_name* is the name or IP address of the server on which the MWTM server is running and *1774* is the Web port being using by the MWTM (**1774** is the default port number.) If you do not know the name or Web port of the MWTM server, contact the system administrator who installed the MWTM server software.

The Server SSL Certificate page appears.

Step 2 Right-click **Download Server SSL Certificate**.

Step 3 Select **Save Link As** (or **Save Target As**) from the right-click menu.

Step 4 Select a directory in which to save the certificate (*server.crt*), and click **Save**.

The MWTM downloads the *server.crt* file into the specified directory.

Launching the MWTM Certificate Tool for SSL

If you have implemented Secure Sockets Layer (SSL) support in your MWTM system, you can launch the MWTM Certificate Tool for SSL. The MWTM Certificate Tool dialog box lists all SSL certificates that the MWTM client imported. In this dialog box, you specify whether to import, export, and display detailed information about SSL certificates.

To launch the MWTM SSL Certificate Tool, use one of the following procedures:

- In Solaris, log in as the root user and enter the following commands:

```
cd /opt/CSCOsgm/bin
./mwtm certgui
```

  For more information, see mwtm certgui, page B-13.

- In Windows, choose **Start > Programs > Cisco MWTM Client > MWTM SSL Certificate Tool**.

The MWTM displays the MWTM Certificate Tool dialog box.

For each SSL certificate, the MWTM Certificate Tool dialog box displays:

Field or Button	Description
Issued to	Hostname of the MWTM server to which the SSL certificate was issued.
Issued by	Certificate authority (CA) that issued the SSL certificate. Self-signed SSL certificates display the hostname of the MWTM server.
Expiration Date	Date on which the SSL certificate expires.
Import	Displays the Open dialog box for an SSL certificate, which you use to import SSL certificates (for details, see Importing an SSL Certificate to an MWTM Client, page 2-25).
Export	Displays the Save dialog box for an SSL certificate, which you use to export the selected SSL certificate.
Remove	Removes the selected SSL certificate from the table.
Details	Displays the Certificate Information dialog box, which provides detailed information about the selected certificate.

Field or Button	Description
Exit	Closes the MWTM Certificate Tool dialog box.
Help	Displays online help for the current window.

Importing an SSL Certificate to an MWTM Client

If you have implemented Secure Sockets Layer (SSL) support in your MWTM system, you can import the MWTM server's self-signed SSL certificate, or a CA-signed SSL certificate, to all remote MWTM clients that connect to the server using SSL.

Note If you are using a Solaris client, you can import by using the MWTM SSL Certificate Tool as described in this section, or the CLI command **mwtm certtool** (for details, see mwtm certtool, page B-14). If you are using a Windows client, you must use the MWTM SSL Certificate Tool.

To import an SSL certificate, launch the MWTM SSL Certificate Tool, as described in Launching the MWTM Certificate Tool for SSL, page 2-24, then click **Import**. The MWTM displays the Open dialog box for SSL certificates.

Use the Open dialog box to locate the SSL certificate that you want to import. The Open dialog box contains:

Field or Button	Description
Look In	Click to select the directory in which you want to find the SSL certificate. Accept the default directory, or select a new directory from the drop-down list box. For a self-signed certificate, locate the directory in which you downloaded the certificate.
File Name	Enter a name for the SSL certificate, or select a file from those listed in the "Open" field. The MWTM displays the name of the certificate in the "File Name" field.
Files of Type	Specifies the type of file to display, and displays all files of that type in the selected directory. For SSL certificates, this field displays "All files," which means files of all types appear in the table.
 Up One Level	Displays the subfolders and files that are in the folder that is up one level from the currently visible folder.
 Desktop	Displays the subfolders and files that are on your workstation desktop.
 Create New Folder	Creates a new subfolder in the visible folder.
 List	Displays only icons for subfolders and files.
 Details	Displays detailed information for subfolders and files, including their size, type, date they were last modified, and so on.
Open	Imports the file, closes the Open dialog box for an SSL certificate, and populates the MWTM Certificate Tool dialog box with the SSL certificate's information.
Cancel	Closes the Open dialog box for an SSL certificate without importing the file.

Exporting an SSL Certificate

If you have implemented Secure Sockets Layer (SSL) support in your MWTM system, you can export SSL certificates that have been imported to the MWTM client.

To export a SSL certificate, launch the MWTM SSL Certificate Tool, as described in Launching the MWTM Certificate Tool for SSL, page 2-24, select a certificate from the list, then click **Export**. The MWTM displays the Save dialog for SSL certificates.

Use the Save dialog box to export the SSL certificate to another directory. The Save dialog box contains:

Field or Button	Description
Save In	Click to select the directory in which you want to save the SSL certificate. Accept the default directory, or select a new directory from the drop-down list box. For a self-signed certificate, locate the directory in which you downloaded the certificate.
File Name	Enter a name for the SSL certificate, or select a file from those listed in the "Save In" field. The MWTM displays the name of the certificate in the "File Name" field.
Files of Type	Specifies the type of file to save, and displays all files of that type in the selected directory. For SSL certificates, this field displays "All files," which means files of all types.
 Up One Level	Displays the subfolders and files that are in the folder that is up one level from the currently visible folder.
 Desktop	Displays the subfolders and files that are on your workstation desktop.
 Create New Folder	Creates a new subfolder in the visible folder.
 List	Displays only icons for subfolders and files.
 Details	Displays detailed information for subfolders and files, including their size, type, date they were last modified, and so on.
Save	Saves the file, closes the Save dialog box for an SSL certificate, and returns to the MWTM Certificate Tool dialog box. Click **Exit** to close the MWTM Certificate Tool dialog box and export the self-signed SSL certificate in X.509 format.
Cancel	Closes the Save dialog for an SSL certificate without saving the file.

Related Topics

Launching the MWTM Certificate Tool for SSL, page 2-24

Viewing Detailed Information About a SSL Certificate

If you implemented Secure Sockets Layer (SSL) support in your MWTM system, you can view detailed information about SSL certificates that were imported to the MWTM client.

To view detailed information about an SSL certificate, use one of the following procedures:

- Click the locked padlock icon in the lower-left corner of any MWTM window.
- Launch the MWTM SSL Certificate Tool, as described in Launching the MWTM Certificate Tool for SSL, page 2-24, select an SSL certificate from the list and click **Details**.

The MWTM displays the Certificate Information dialog.

For the selected SSL, the Certificate Information dialog box displays:

Field or Button	Description
Subject	Node to which the SSL certificate was issued. This field always includes the Common Name (CN) of the subject, which must match the fully qualified hostname of your MWTM server, such as *xxxx.company.com*. This field might also contain other information, such as the Country (C), Organizational Unit (OU), or Organization (O) of the subject.
Issuer	CA that issued the SSL certificate. This field might include the Common Name (CN) of the issuer, as well as the Country (C), Organizational Unit (OU), or Organization (O) of the issuer.
Version	Version of the SSL certificate, such as "V1."
Serial number	Serial number associated with the SSL certificate.
Signature algorithm	Asymmetric algorithm ensures that the digital signature is secure, such as "MD5withRSA."
Valid from	Date and time on which the SSL certificate was created or became valid.
Valid to	Date and time on which the SSL certificate expires.
Public key	Public key associated with the SSL certificate, used for encryption and for verifying signatures.
OK	Closes the Certificate Information dialog box. When you are ready to close the dialog box, click **OK**. The MWTM closes the Certificate Information dialog. If necessary, click **Exit** to close the MWTM Certificate Tool dialog.

Related Topic

Launching the MWTM Certificate Tool for SSL, page 2-24

Managing SSL Support in the MWTM

You use the MWTM to manage SSL support. To:

- Display the current status of SSL support in the MWTM, including whether SSL support is enabled or disabled and which SSL keys and certificates exist, use either the **mwtm ssl status** or **mwtm sslstatus** command.
- Print the MWTM server's SSL certificate in X.509 format, use the **mwtm keytool print_crt** command.
- List the SSL key/certificate pair on the MWTM server, use the **mwtm keytool list** command.
- List all SSL certificates on the MWTM client, launch the MWTM SSL Certificate Tool. The MWTM lists each imported certificate, including to whom the certificate was issued, who issued the certificate, and when the certificate expires.

For more information on the use of these commands, see Appendix B, "Command Reference".

For more information on launching the MWTM SSL Certificate Tool, see Exporting an SSL Certificate, page 2-26.

See Enabling SSL for the Firefox Web Client, page 2-28 for information on using Firefox 3.

Enabling SSL for the Firefox Web Client

If you are using Firefox 3 to connect to an MWTM server that has SSL enabled, you must add an exception to allow the connection to the server.

The first time you attempt to connect to an SSL-enabled MWTM server using Firefox 3, you get an error saying that you're speaking plain HTTP to an SSL-enabled server port. Follow these steps to add an exception to allow the connection:

Step 1 On the Server Connection Failed page, click the link at the bottom to add an exception.

Step 2 In the Add Security Exception form, in the Location field, enter the MWTM server in the form of **https://***<server_name>:1774*/ where *server_name* is the name or IP address of the server on which the MWTM server is running and *1774* is the Web port being using by the MWTM (1774 is the default port number.)

Step 3 Click **Get Certificate**.

Step 4 Click **Confirm Security Exception**.

You can now use Firefox 3 to connect to an SSL-enabled MWTM server.

Disabling SSL Support in the MWTM

You use the MWTM to disable SSL support in the MWTM, and to remove SSL keys and certificates from the MWTM server and clients. To:

- Disable SSL support in the MWTM, use the **mwtm ssl disable** command.

  For more information, see mwtm ssl, page B-75.

- Remove all SSL keys and certificates from the MWTM server, use the **mwtm keytool clear** command. The MWTM stops the MWTM server, if necessary, and removes the keys and certificates. Before restarting the server, you must generate new SSL keys by using the **mwtm keytool genkey** command, or you must completely disable SSL using the **mwtm ssl disable** command.

  For more information on the use of these commands, see Appendix B, "Command Reference".

- Remove an SSL certificate from the MWTM client, launch the MWTM SSL Certificate Tool. The MWTM lists each imported certificate. Select the certificate that you want to remove, and click **Remove**. The MWTM deletes the certificate from the list.

  For more information on launching the MWTM SSL Certificate Tool, see Exporting an SSL Certificate, page 2-26.

Limiting MWTM Client Access to the MWTM Server (Server Only)

By default, when you first install the MWTM, all MWTM client IP addresses can connect to the MWTM server. However, you use the MWTM to limit client access to the server by creating and maintaining the *ipaccess.conf* file.

You can create the *ipaccess.conf* file and populate it with a list of MWTM client IP addresses that can connect to the MWTM server. The MWTM allows connections from only those clients, plus the local host. If the file exists but is empty, the MWTM allows connections only from the local host. (The MWTM always allows connections from the local host.)

When you first install the MWTM, the *ipaccess.conf* file does not exist and the MWTM allows all client IP addresses to connect to the MWTM server.

To create the *ipaccess.conf* file and work with the list of allowed client IP addresses:

Step 1 Log in to the MWTM server as the root or superuser:

- Root user—See Becoming the Root User (Server Only), page 3-2
- Super user—See Specifying a Super User (Server Only), page 2-19

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Create the *ipaccess.conf* file:

- To create the *ipaccess.conf* file and add a client IP address to the list, enter:

  ```
  ./mwtm ipaccess add
  ```

- To create the *ipaccess.conf* file and open the file to edit it directly, enter:

  ```
  ./mwtm ipaccess edit
  ```

The default directory for the file is located in the MWTM installation directory:

- If you installed the MWTM in the default directory, */opt*, then the default directory is */opt/CSCOsgm/etc*.
- If you installed the MWTM in a different directory, then the default directory is located in that directory.

In the *ipaccess.conf* file, begin all comment lines with a pound sign (#).

All other lines in the file are MWTM client IP addresses, with one address per line.

Wildcards (*) are allowed, as are ranges (for example, 1-100). For example, if you input the address ***.*.*.*** then all clients can connect to the MWTM server.

Step 4 After you create the *ipaccess.conf* file, you can use the full set of mwtm ipaccess keywords to work with the file:

- clear—Remove all client IP addresses from the *ipaccess.conf* file, and allow connections from any MWTM client IP address.
- list—List all client IP addresses currently in the *ipaccess.conf* file. If no client IP addresses are listed (that is, the list is empty), connections from any MWTM client IP address are allowed.
- rem—Remove the specified client IP address from the *ipaccess.conf* file.
- sample—Print out a sample *ipaccess.conf* file.

For more information, see mwtm ipaccess, page B-41.

Any changes you make to the *ipaccess.conf* file take effect when you restart the MWTM server.

You can also use the MWTM to limit the IP addresses that can send traps to the server by creating and maintaining the *trapaccess.conf* file. For more information, see the Limiting Traps by IP Address.

Backing Up or Restoring MWTM Files (Server Only)

The MWTM automatically backs up all MWTM data files to the MWTM installation directory daily at 2:30 a.m.

To change the time at which the MWTM automatically backs up files, log in as the root user and change the *root crontab* file:

- **crontab -l** lists cron jobs.
- **crontab -e** opens up an editor so you can make changes and save them.

Note The MWTM performs a database integrity check during the backup. If the check fails, the previous backup is not be overwritten, and the MWTM creates a new failed file (for example: *mwtm61-server-backup-failed.tar.Z*).

This section contains these topics:

Backing Up MWTM Data Files

To manually back up the MWTM data files at any time on a Solaris or Linux server:

Step 1 Log in as the root user. See Becoming the Root User (Server Only), page 3-2.

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Back up the MWTM files:

```
./mwtm backup
```

The MWTM backs up the data files in the installation directory.

If you installed the MWTM in the default directory, */opt*, then the default backup directory is also */opt*. If you installed the MWTM in a different directory, then the default backup directory is that directory.

Changing the Backup Directory

To change the directory in which the MWTM stores its nightly backup files:

Step 1 Log in as the root user. See Becoming the Root User (Server Only), page 3-2.

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Change the backup directory location:

./mwtm backupdir *directory*

where *directory* is the new backup directory.

If the new directory does not exist, the MWTM does not change the directory, but issues an appropriate warning message.

Setting the Number of Backup Days

To set the number of days that the MWTM saves backup files:

Step 1 Log in as the root user. See Becoming the Root User (Server Only), page 3-2.

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Change the number of backup days (default is 1):

```
./mwtm backupdays

Current value is: 1

Enter number of days to save backup files (1-30): [1]
```

Step 4 Enter a value for the number of days from 1 to 30. For example:

```
Enter number of days to save backup files (1-30): [1] 5

Setting number of days to save backup files to 5 days.
```

The MWTM will save backup files for the number of days that you entered. In this example, the MWTM saves backup files for the last five days, and deletes backup files that are older than five days.

Restoring MWTM Data Files

You can restore data files on the same Solaris or Linux server, or on a different Solaris or Linux server running the MWTM 6.1.5.

To restore the MWTM data files from a previous backup:

Step 1 Log in as the root user. See Becoming the Root User (Server Only), page 3-2.

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Restore the MWTM data files:

```
./mwtm restore
```

The MWTM restores the data files.

Note If the number of backup days has been set to more than one day (see Setting the Number of Backup Days, page 2-31), the MWTM will prompt you for a server or client backup file to restore from (because there would be more than one backup file to choose from).

Warning **Do not interrupt this command. Doing so can corrupt your MWTM data files.**

The **mwtm restore** command provides optional keywords that you use to restore only selected MWTM data files, such as GTT files (ITP only), route table files (ITP only), log files, report files, or security files. For more information, see mwtm restore, page B-58.

Removing MWTM Data from the MWTM Server

If you ever want to remove all MWTM data from the MWTM server without uninstalling the product, you can do so in one of two ways. Both ways restore the MWTM server to a state that would exist after a new installation of the MWTM.

Method 1

To remove all MWTM data from the MWTM server, *excluding* message log files, backup files, and report files:

Step 1 Log in as the root user (see Becoming the Root User (Server Only), page 3-2).

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Remove the MWTM data:

```
./mwtm clean
```

Data removed includes all MWTM data, notes, preferences, security settings, route files (ITP only), GTT files (ITP only), address table files (ITP only), seed files, event filters, report control files, and views, as well as any user-created files stored in the MWTM directories.

Method 2

To remove all MWTM data from the MWTM server, including all view files, notes that are associated with network elements, and event filters and preferences, excluding message log files, backup files, report files, configuration settings, and security settings:

Step 1 Log in as the root user. See Becoming the Root User (Server Only), page 3-2.

Step 2 Change to the bin directory:

```
cd /opt/CSCOsgm/bin
```

Step 3 Enter:

```
# ./mwtm cleandb
```

This command restores the MWTM server to a state that would exist after a new installation of the MWTM, except for the presence of the retained files. Data removed includes all MWTM data, notes, preferences, route files (ITP only), GTT files (ITP only), address table files (ITP only) and views, as well as any user-created files stored in the MWTM directories.

To remove all MWTM data from the MWTM server, **including** message log files, backup files, and report files, log in as the root user, as described in the Becoming the Root User (Server Only), page 3-2, then enter the following commands:

```
# cd /opt/CSCOsgm/bin
# ./mwtm cleanall
```

Data removed includes all MWTM data, notes, preferences, security settings, route files (ITP only), GTT files (ITP only), address table files (ITP only), seed files, event filters, report control files, views, message log files, backup files, and report files, as well as any user-created files stored in the MWTM directories.

CHAPTER 3

Getting Started

This chapter provides information about starting and stopping the Cisco Mobile Wireless Transport Manager (MWTM), and an overview of how to use the MWTM to manage your network.

This chapter contains:

For detailed information about the MWTM-supported platforms, and hardware and software requirements, see the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

Note The default directory for installing the MWTM is */opt*. In commands that call for the default directory, if you installed the MWTM in a different directory, you must specify that directory instead of */opt*.

Starting the MWTM Server

Before starting an MWTM server, verify that:

- Each node uses a supported IOS image
- The MWTM server has IP connectivity to each node
- SNMP is enabled on each node
- (Optional, but recommended) Traps are enabled on each node

- (Optional, but recommended) A trap host is defined on each node

Tip For a definition of MWTM nodes, see , page 1-6, What Is IPRAN?, page 1-8, and What Is mSEF?, page 1-9.

Because the MWTM application comprises a server component and a client component, you must start both components to run the application.

To start the MWTM server on a Solaris or Linux system:

Step 1 You must be logged in as the root user or as a superuser, or your login must have administrator privileges. To log in as the root user, see the Becoming the Root User (Server Only), page 3-2.

Note For details on setting up administrator privileges, see Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm start
```

Note If the database has an exception during start up, the server will fail to start.

Becoming the Root User (Server Only)

Some MWTM procedures require that you log in as the root user.

Caution As the root user, you can adversely affect your operating environment if you are unaware of the effects of the commands that you use. If you are a relatively inexperienced UNIX user, limit your activities as the root user to the tasks described in this manual.

If you are not logged in, log in as the root user:

```
> login: root
> Password: root-password
```

If you are already logged in, but not as the root user, use the **su** command to change your login to root:

```
# su
# Password: root-password
```

Starting the MWTM Client

This section contains:

Before Starting the MWTM Client

When you start an MWTM client, the version and release of the client must match that of the MWTM server.

If there is a client-server mismatch, the MWTM displays a warning message when you try to start the client. If you have a web browser installed, the MWTM optionally opens a web page from which you can download an allowed, matching client. For more information about downloading the MWTM client, see Downloading the MWTM Client from the Web, page 11-15.

Setting the DISPLAY Variable for Solaris or Linux Clients

If you see the following message upon client startup, you must set the DISPLAY variable:

```
Could not launch client: Can't connect to X11 window server using <x> as the value of the
DISPLAY variable.
```

The DISPLAY variable is set as part of your login environment on Solaris or Linux. However, if you use Telnet or SSH to access a workstation, you must set the DISPLAY variable to local display by using this command:

```
# setenv DISPLAY local_ws:0.0
```

where *local_ws* is your local workstation.

If your shell does not support the **setenv** command, enter:

```
# export DISPLAY=local_ws:0.0
```

Starting the MWTM Client on Solaris or Linux

To start the MWTM client on a Solaris or Linux system on which the MWTM server is installed, ensure that the MWTM server is running, then enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm client
```

To start the MWTM client on a Solaris or Linux system other than the one on which the MWTM server is installed, ensure that the MWTM server is running, then enter:

```
# cd /opt/CSCOsgmClient/bin
# ./mwtm client
```

To start the MWTM client on a Solaris or Linux system other than the one on which the MWTM server is installed, and connect to an MWTM server other than the default server, enter:

```
# cd /opt/CSCOsgmClient/bin
# ./mwtm client server_name_or_ip_address
```

where *server_name_or_ip_address* is the name or IP address of the Solaris or Linux system on which the MWTM server is running.

Access the Node

You use the MWTM to link to the node by using the connection protocol (Telnet or SSH) that you set in the Node SNMP and Credentials dialog box (see Credentials Fields, page 5-20).

To access the node, right-click a node in a window, then choose **Node Connect** from the right-click menu.

Note If your client workstation does not have network access to the IP address of the node (that is, if the node is behind a firewall or NAT device), you might be unable to access the node.

Starting the MWTM Client on Windows

To start the MWTM client on a Windows system, choose **Start > Programs > Cisco MWTM Client > Launch MWTM Client**, or double-click the MWTM Client icon on the Windows desktop.

Note You can change the amount of memory used by the Windows MWTM client, GTT Editor, and Address Table Editor by adding the following entries to the *C:\Program Files\Cisco Systems\MWTM Client\properties\System.properties file*:
JVM_CLIENT_HEAP=1200
JVM_ATBL_HEAP=1200
JVM_GTT_HEAP=1200
JVM_CLIENT_HEAP=1200
JVM_ATBL_HEAP=1200
JVM_GTT_HEAP=1200

This reserves 1,200 megabytes (MB) of memory for each application. The default is 768 MB.

Discovering Your Network

This section provides details on using the MWTM to discover your networks. It includes:

Discovery Overview

The MWTM uses a Discovery process to populate the MWTM database, discovering the objects in your network.

You can run Discovery if MWTM User-Based Access is disabled; or, if it is enabled, and you are a Network Administrator or System Administrator. (For more information about user authorization levels in the MWTM, see Configuring MWTM User Account Levels (Server Only), page 2-7.)

To discover your network:

Step 1 Start the MWTM client, as described in Starting the MWTM Client, page 3-3.

Step 2 If you want to change SNMP settings, do so *before* running Discovery. See Configuring SNMP Settings, page 5-15 for more information.

Step 3 If you want to discover ONS nodes and did not choose the option to discover your network during installation, you must add the ONS nodes and set the credentials before running discovery (see Adding Nodes, page 5-21 for more information.)

Step 4 Choose **Network > Network Discovery** from the MWTM main menu. The MWTM displays the Discovery dialog box. See Launching the Discovery Dialog, page 3-6 for more information.

Step 5 Select the **Seed Settings** tab, if it is not already chosen. You use the Seed Settings tab to create, save, load, and delete MWTM seed files. Load one or more seed nodes, or an existing seed file, by using the procedures in Loading Seed Nodes and Seed Files, page 3-7.

Step 6 Select the **Discovery** tab, or click **Next**. You use the Discovery tab to discover the objects in your network. See Running Discovery, page 3-12 for more information.

- To specify the extent of the network discovery, check the **Entire Network** check box. See the description of the Entire Network check box in Running Discovery, page 3-12 for more information.
- To specify whether the MWTM should keep or delete the existing database when discovering the network, check the **Delete Existing Data** check box. See the description of the Delete Existing Data check box in Running Discovery, page 3-12 for more information.
- To specify the maximum number of hops for discovering objects in your network, enter a value in the **Max. Hops** text box. For more information, see the description of the Max. Hops text box in the Running Discovery, page 3-12.

Step 7 Click the **Discover Network** button.

When the "Discovery In Progress" message disappears, discovery is running. The Discovered Nodes table in the Discovery tab lists all nodes that the MWTM discovered (all nodes, including new and excluded nodes, not just the nodes in the current view). See Discovered Nodes, page 3-14 for more information.

Note Event processing in the MWTM might experience congestion when discovering very large networks. If the number of events exceeds the capacity of the event queue, the event congestion icon  appears in the lower left of the MWTM client and web windows. If the icon appears, the presentation of event information in the MWTM will lag behind the actual state of the network objects until the congestion clears. No user action is necessary.

Step 8 Examine the Discovered Nodes table to verify that the MWTM discovered all of the nodes in the network. If you suspect that the MWTM did not discover all of the nodes, see Verifying Discovery, page 3-14 for troubleshooting information. You might need to add more seed nodes and run discovery again.

Step 9 When you are satisfied that the MWTM discovered all of the nodes in the network, save the list of seed nodes in a seed file. See Saving a Seed File, page 3-8 for more information.

Note (ITP only) You can run discovery multiple times to attempt to discover additional nodes based on the IP addresses defined in the Stream Control Transmission Protocol (SCTP) links. If you are using a separate management VLAN to manage your nodes, but private or unreachable IP addresses for your SCTP connectivity, uncheck the **Entire Network** check box in the Discovery dialog box. Otherwise, discovery attempts to reach those nodes continuously. Instead, enter all nodes to be discovered directly into the seed list and do a nonrecursive discovery.

Related Topics

- Configuring SNMP Settings, page 5-15
- Backing Up or Restoring MWTM Files (Server Only), page 2-30
- Investigating Data Problems, page D-1

Launching the Discovery Dialog

To launch the Discovery dialog box and begin the Discovery process, choose **Network > Network Discovery** from the MWTM main menu. The MWTM displays the Discovery dialog box.

You use the Discovery dialog box to load and configure seed nodes, and use those seed nodes to discover the objects in your network.

If you start the MWTM client and the MWTM database is empty (including the very first time you start the MWTM client), the MWTM automatically opens the Discovery dialog box so you can run Discovery and populate the database.

The Discovery dialog box contains:

- Discovery Dialog Menu, page 3-6
- Discovery Dialog Tabs, page 3-7

Discovery Dialog Menu

The menu on the Discovery dialog box contains:

Menu Command	Description
File > Load Seeds (Ctrl-L)	Opens the Load File Dialog: Seed File List, enabling you to load a seed file into the MWTM: • Enter the name of the seed file, and click **OK** to load it. • Click **Cancel** to return to the Seed Settings tab without loading a seed file.
File > Save Seeds (Ctrl-S)	Opens the Save File Dialog: Seed File List, which you use to save changes you have made to the chosen seed file.
File > Save As	Opens the Save File Dialog: Seed File List, which you use to save changes you have made to the chosen seed file with a new name, or overwrite an existing seed file.

Menu Command	Description
File > Close (Ctrl-W)	Closes the current window.
Edit > Node SNMP and Credentials Editor (Alt-D)	Opens the Node SNMP and Credentials Editor dialog box. If you have implemented MWTM User-Based Access, this option is available to users with authentication-level Network Administrator (level 4) and higher.
Help > Topics (F1)	Displays the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Displays online help for the current window.
Help > About (F3)	Displays build date, version, SSL support, and copyright information about the MWTM application.

Discovery Dialog Tabs

The Discovery dialog box contains these tabs:

Tab	Description
Seed Settings	Displays the Seed Settings tab in the Discovery dialog box.
Discovery	Displays the Discovery tab in the Discovery dialog box.

Loading Seed Nodes and Seed Files

You use the MWTM to load one or more new seed nodes; or, to create, save, load, and delete existing MWTM seed files.

This section includes:

- Loading a Seed Node, page 3-7
- Loading a Seed File, page 3-8
- Saving a Seed File, page 3-8
- Creating a New Seed File, page 3-10
- Creating a New Seed File, page 3-10
- Creating and Changing Seed Files Using a Text Editor, page 3-11

Loading a Seed Node

To load a seed node, enter the name or IP address of the seed node in the IP Address, Address range, Subnet, CIDR, or DNS Hostname field, and click **Add Node** (or press **Enter**).

Note Follow the guidelines for IP addresses in SNMP Configuration Table, page 5-15.

The MWTM displays details of the SNMP settings for the seed nodes in the Seed Details pane. Continue adding seed nodes until you are certain that the MWTM will be able to discover the entire network.

Loading a Seed File

If you have already created and saved one or more seed files, you can load a seed file, change the list of seed files, and select one seed file to be loaded automatically when the MWTM client is started or the Discovery dialog box is opened.

To load an existing seed file, choose **File > Load Seeds** from the Discovery Dialog menu. The MWTM displays the Load File Dialog: Seed File List dialog box.

The Load File Dialog: Seed File List contains:

Field or Button	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the seed file or folder.
Last Modified	Date and time the seed file or folder was last modified.
Size (bytes)	Size of the seed file or folder, in bytes.
Make this my preferred start option	Specifies whether the chosen seed file should be loaded automatically whenever this MWTM client is started or the Discovery dialog box is opened. By default, this check box is unchecked for all seed files. That is, no seed file is loaded automatically when the MWTM client is started or the Discovery dialog box is opened.
Number of Files (appears in bottom-left corner)	Total number of seed files and folders.
OK	Loads the chosen seed file, saves any changes you made to the list of files, and closes the dialog box. To load a seed file, double-click it in the list, select it in the list and click **OK**, or enter the name of the file and click **OK**. The MWTM saves any changes you made to the list of files, closes the Load File Dialog: Seed File List dialog box, loads the seed file, and returns to the Discovery dialog box. The MWTM lists all of the seed nodes in the seed file in the Seed Nodes pane, and displays details of the SNMP settings for the seed nodes in the Seed Details pane.
Delete	Deletes the chosen file from the seed file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without loading a seed file or saving any changes to the seed file list.
Help	Displays online help for the dialog box.

Saving a Seed File

You use the MWTM to save a specific seed file, change the list of seed files, and select one seed file to be loaded automatically when the MWTM client is started or the Discovery dialog box is opened.

When you are satisfied that the MWTM has discovered all of the nodes in the network, save the list of seed nodes in a seed file by using one of these procedures:

- To save the changes you made to the seed file without changing the name of the file, choose **File > Save** from the Discovery Dialog menu.
- To save the changes you have made to the seed file with a new name, choose **File > Save As** from the Discovery Dialog menu. The MWTM displays the Save File Dialog: Seed File List dialog box.

The MWTM stores the seed file in the seed file directory on the MWTM server:

- If you installed the MWTM in the default directory, */opt*, then the MWTM seed file directory is */opt/CSCOsgm/seeds*.
- If you installed the MWTM in a different directory, then the MWTM seed file directory is located in that directory.

Note If another user modifies and saves the seed file before you save your changes, the MWTM asks if you want to overwrite that user's changes. If you choose to do so, the other user's changes are overwritten and lost. If you choose not to do so, your changes are lost, unless you save the seed file to a different filename.

The Save File Dialog: Seed File List contains:

Field or Button	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the seed file or folder.
Last Modified	Date and time the seed file or folder was last modified.
Size (bytes)	Size of the seed file or folder, in bytes.
Filename	Name by which you want to save the seed file. If you create a new seed filename, you can use any letters, numbers, or characters in the name that are allowed by your operating system. However, if you include any spaces in the new name, the MWTM converts those spaces to hyphens. For example, the MWTM saves file *a b c* as *a-b-c*.
Make this my preferred start option	Specifies whether the chosen seed file should be loaded automatically whenever this MWTM client is started or the Discovery dialog box is opened. By default, this check box is unchecked for all seed files. That is, no seed file is loaded automatically when the MWTM client is started or the Discovery dialog box is opened.
Number of Files (visible in bottom left corner)	Total number of seed files and folders.
OK	Saves the seed file and any changes you made to the seed file list and closes the dialog box. To save the seed file with a new name, you can either save the file with: • A completely new name. Enter the new name and click **OK**. • An existing name, overwriting an old seed file. Select the name in the list and click **OK**. The MWTM: • Saves the seed file with the new name • Saves any changes you made to the list of files • Closes the Save File Dialog: Seed File List dialog • Returns to the Discovery dialog box
Delete	Deletes the chosen file from the seed file list. The MWTM issues an informational message containing the name and location of the deleted file.

Field or Button	Description
Cancel	Closes the dialog box without saving the seed file or saving any changes to the seed file list.
Help	Displays online help for the dialog box.

Creating a New Seed File

To create a new seed file in the MWTM, launch the Discovery dialog box, as described in Launching the Discovery Dialog, page 3-6, then click the **Seed Settings** tab, if it is not already chosen.

You use the Seed Settings tab in the Discovery dialog box to create, save, load, and delete MWTM seed files.

The Seed Settings tab on the Discovery dialog box contains:

Field or Button	Description
Seed Nodes	Lists the seed nodes currently defined in the MWTM.
IP Address Range or Hostname	IP address of the seed node. The default value is *.*.*.*. **Note** Follow the guidelines for IP addresses in SNMP Configuration Table, page 5-15.
Retries	Number of times the MWTM attempts to connect to the seed node. The valid range is 0 to 99. The default value is 2.
Timeout (sec)	Time, in seconds, the MWTM waits for a response from the seed node. The valid range is 0 (no timeout) to 9999. The default value is 1 second.
Read Community	SNMP community name for read access to the information maintained by the SNMP agent on the node. This value can be up to 32 characters in length. Do not include special characters such as the opening single quote ('), at symbol (@), dollar sign ($), caret (^), closing single quote ('), double quote ("), ampersand (&), or pipe (|). This value is usually set to **public** (the default).
Poll Interval (mins)	Time, in minutes, between polls. The valid range is 0 to 9999. The default value is 15 minutes.
IP Address, Address range, Subnet, CIDR, or DNS Hostname	Address or name of the chosen seed node. To create a new seed file, enter the name or address of a seed node in this field. Examples of acceptable input include: • IP Address: 1.2.3.4 (see the guidelines for IP addresses in SNMP Configuration Table, page 5-15). • Address Range: 1.2.3.2-15 • Subnet, CIDR: 1.2.3.0/24, 1.2.3.0/255.255.255.0 • DNS Hostname: mwtm.cisco.com The MWTM displays details of the SNMP settings for the seed node in the Seed Details pane. Continue to add as many seed nodes as necessary to discover your entire network. When you are ready to save the list of seed nodes in a new seed file, choose **File > Save As** from the Discovery Dialog menu. The MWTM displays the Save File Dialog: Seed File List dialog box. See Saving a Seed File, page 3-8, for more information about saving seed files.
Add Node	Adds a new seed node to the MWTM.

Field or Button	Description
Delete	Deletes the chosen seed node. The MWTM deletes the seed node without asking for confirmation.
Next	Displays the Discovery tab in the Discovery dialog box. If you enter a seed node IP address or name in the IP Address, Address range, Subnet, CIDR, or DNS Hostname field, then click **Next**, MWTM automatically adds the seed node before displaying the Discovery tab.

Changing an Existing Seed File

To modify an existing seed file in MWTM:

Step 1 Load the seed file as described in Loading a Seed File, page 3-8.

Step 2 To add another seed node to the seed file, enter the name or IP address of the seed node in the IP Address, Address range, Subnet, CIDR, or DNS Hostname field, and click **Add Node**.

Step 3 To delete a seed node from the seed file, select the seed node and click **Delete Node**.

Step 4 To save the modified seed file, use the procedure described in Saving a Seed File, page 3-8.

Creating and Changing Seed Files Using a Text Editor

A seed file is simply an unformatted list of seed node names. To create a seed file by using a text editor, simply create a file and list the seed node names, one on each line, with no other formatting:

```
new-york-a
new-york-b
chicago-c
```

When you save and name the seed file, remember:

- You can use any letters, numbers, or characters in the name that your operating system allows, except blanks.
- The MWTM saves the seed file with a *.see* file extension.
- The MWTM saves the seed file in the MWTM server's seed file directory, *seeds*:
  - If you installed the MWTM in the default directory, */opt*, then the seed file directory is */opt/CSCOsgm/seeds/*.
  - If you installed the MWTM in a different directory, then the seed file directory resides in that directory.

When the MWTM loads the seed file, it verifies the syntax of the file, deleting blank lines and extraneous leading and trailing spaces as needed. The MWTM also verifies that each seed node name resolves to a valid IP address. If a name does not resolve to a valid IP address, the MWTM logs the erroneous entry and ignores it.

For example, given this seed file:

```
new-york-a<space>
<space>new-york-b
zzzzzzzzzzz
<blank line>
<tab>chicago-c<tab>
```

The MWTM loads these entries:

```
new-york-a
new-york-b
chicago-c
```

Running Discovery

Click the Discovery tab in the Discovery dialog box to discover the objects in your network.

To display the Discovery tab, launch the Discovery dialog box, as described in Launching the Discovery Dialog, page 3-6, then select the **Discovery** tab in the Discovery dialog box, or click **Next** in the Seed Settings tab. (If you enter a seed node IP address or name in the IP Address, Address range, Subnet, CIDR, or DNS Hostname field, then click **Next**, MWTM automatically adds the seed node before displaying the Discovery tab.)

The Discovery tab comprises:

- Discovery Settings, page 3-12
- Discovered Nodes, page 3-14

Related Topics

- Discovery Overview, page 3-5
- Polling Nodes, page 7-50

Discovery Settings

The Discovery Settings pane of the Discovery tab contains:

Field or Button	Description
Entire Network	Check box used to specify the extent of the network discovery: • To discover the entire network, check this check box. This is called *recursive discovery*, and it is the default setting. With this check box checked, the MWTM discovers all seed nodes and attempts to manage them; then attempts to discover and manage all nodes that are adjacent to those seed nodes (unless the nodes are connected by serial links only); then attempts to discover and manage all nodes that are adjacent to *those* nodes; and so on, until the Max Hops limit is reached. • To rediscover only seed nodes, uncheck this check box. This is called *nonrecursive discovery*. With this check box unchecked, the MWTM discovers all seed nodes and attempts to manage them, then labels all nodes that are adjacent to those seed nodes as Unmanaged.
Delete Existing Data	Check box used to keep or delete the existing MWTM database when discovering the network: • To keep all existing network data in the MWTM database before rediscovering the network, uncheck this check box. This is the default setting. • To delete all existing network data from the MWTM database before rediscovering the network, check this check box. Choose this option if you know that network elements have been deleted from your network since the last Discovery. If you discover the network with Delete Existing Data chosen, the MWTM stops any real-time polls that are running and issues appropriate messages.

Field or Button	Description
Max Hops	The maximum number of hops from the seed node to search for other nodes to discover. Default is 3.
Discover Network	Begins discovering the network. Click **Discover Network** to begin Discovery. If you have not defined at least one seed node in the Seed Settings tab, the MWTM prompts you to do so. When Discovery begins: • The **Discover Network** button changes to **Stop Discovery**. • The `Discovery In Progress` message appears in the title bar of all MWTM client windows. Discovery progresses in bursts. You might see a number of updates, followed by a pause, followed by more updates. The information that MWTM windows displays is not fully updated until Discovery is complete. By default, Discovery times out after 600 seconds (10 minutes). To change the Discovery timeout, change the value of the DISCOVERY_TIMELIMIT entry in the *Server.properties* file: • If you installed the MWTM in the default directory, */opt*, then the location of the *Server.properties* file is */opt/CSCOsgm/properties/Server.properties*. • If you installed the MWTM in a different directory, then the *Server.properties* file resides in that directory. Because the MWTM is an asynchronous system, with the MWTM server contacting clients one at a time, and because clients might run at different speeds, the information that MWTM clients display during Discovery might not always be synchronized. All other MWTM windows (Node, topology, and so on) are also populated with the newly discovered network data.
Stop Discovery	Stops the Discovery process. For example, if you click Discover Network, then you realize that you loaded a seed node that you did not intend to load, you can click Stop Discovery to stop the Discovery process. **Note** If you stop the Discovery process, the information in the MWTM database is incomplete and unreliable. To generate a new, complete, and reliable MWTM database, check the **Delete Existing Data** check box and run Discovery again. This button replaces the Discover Network button when the Discovery process begins, and changes back to the Discover Network button when the Discovery process ends.

If you run Discovery with the Entire Network check box unchecked, and then you run Discovery with the Entire Network check box checked, any Unmanaged nodes in the first Discovery are not rediscovered by the second Discovery.

To recover from this situation and generate a new, complete, and reliable MWTM database, you must perform one of these procedures:

- Run Discovery again, with **Entire Network** and **Delete Existing Data** checked.
- Change the Unmanaged nodes to managed status. See Unmanaging and Managing Nodes or ITP Signaling Points, page 8-58, for more information.
- Poll the nodes that were Unmanaged in the first Discovery. See Polling Nodes, page 7-50, for more information.

Discovered Nodes

The table in the Discovery tab lists all nodes that the MWTM discovered (all nodes, including new and excluded nodes, not just the nodes in the current view). By default, this table is sorted by Status.

- To see a tooltip for each column in the table, place the cursor over a column heading.
- If a cell is too small to show all of its data, place the cursor over the cell to see the full text in a tooltip.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Discovered Nodes section except Internal ID, Uptime, Reboot Reason, Process Traps, and Last Status Change.

- To display hidden columns, right-click in the table heading and select the check boxes for the columns that you want to display.
- To hide columns, right-click in the table heading and uncheck the check boxes for the columns that you want to hide.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

See Nodes Table, page 8-8, for descriptions of the columns and check boxes of the discovered nodes table.

Verifying Discovery

After you discover the network (see Discovery Overview, page 3-5), examine the Discovered Nodes table to verify that the MWTM discovered all of the nodes in the network. If you suspect that the MWTM did not discover all of the nodes, verify that:

- No nodes are excluded from your current view.
- The MWTM server can ping the nodes.
- The nodes are running images that are compatible with the MWTM server.
- SNMP is enabled on the nodes.
- The MWTM is configured with the correct SNMP community name. See Launching the Discovery Dialog, page 3-6 for details.
- (ITP only) The missing nodes are connected to the seed nodes by SCTP connections, not just serial connections. If they are not connected by SCTP connections, you must add the missing nodes to the seed file as seed nodes. See Changing an Existing Seed File, page 3-11 for more information.
- You chose Entire Network when you ran Discovery. If you suspect that you did not, run Discovery again with Entire Network chosen.

Displaying the MWTM Main Window

The MWTM main window is the primary MWTM client window. It is the first window to appear when you launch the MWTM client.

The MWTM main window displays information about the events and objects that the MWTM discovers. The MWTM main window is divided into two primary areas: the navigation tree in the left pane and the content area in the right pane. When you select an item in the navigation tree, MWTM displays detailed information about the item in the content area in the right pane, such as configuration details and real-time data.

The MWTM main window contains:

Element	Description
Title bar	MWTM main window title bar that displays: MWTM main window <(*networks*)> - <*server name*>.
Main menu	Main menu on the MWTM main window. For details, see Using the MWTM Main Menu, page 3-18.
Toolbar	Toolbar options on the MWTM main window. For details, see Using the MWTM Toolbar, page 3-23.
Navigation tree	Contains lists of objects and views. For details, see MWTM Client Navigation Tree, page 3-16.
Content area	Contains content for the object chosen in the navigation tree. For details, see MWTM Client Content Area, page 3-17.

When you start the MWTM for the first time, the MWTM displays the Discovery dialog box and the MWTM main window.

If you have already run Discovery, the events and objects that the MWTM discovered appear in the navigation tree and content area.

When you start the MWTM for the first time, if you did not configure the MWTM server to automatically discover your network the first time the server starts after installation, the Discovery dialog comes up automatically. Until you perform a discovery, the MWTM database contains no information, and the navigation tree and content area are blank. For details on the Discovery dialog, see Discovering Your Network, page 3-4.

Navigational Features

To help you keep track of which view you are currently using, as well as other important information, most MWTM windows display the name of the system on which the MWTM server is running in the title bar.

On the MWTM toolbar, there is a Location object that shows where you are currently in the MWTM navigation. For more information, see Using the MWTM Toolbar, page 3-23.

At the bottom of the MWTM main window, the following information might appear:

Information	Description
 Locked padlock icon	Appears if the MWTM server has a security certificate. To see the certificate, click the symbol.
 Unlocked padlock icon	Appears if the MWTM server does not have a security certificate.
 Number of objects	(Applicable for Active Alarms, Event History, and all Summary Lists) Shows the number of objects currently visible in the window, if any.
 Number of files	(Only for load or save dialog boxes) Shows the number of files currently visible in the load or save files dialog box, if any.

Information	Description

Updated Node sgm-75-93b
Status messages
	• Informational messages are visible in black. For example:
	`Discovery running`
	• Messages that indicate successful actions are visible in green. For example:
	`View Saved`
	• Error messages are visible in red. For example:
	`Node does not have a note`
	• The MWTM contains many fields into which you can enter information, such as a new node name or IP address. If you enter an incorrect value in the field, such as an IP address that contains letters or is too long, the MWTM alerts you of the incorrect value and retains the current value of the field. Check the message bar at the bottom of the window for information and assistance.

CHANGED Changed	Appears if you have changed but not yet saved a view. You must save the view if you want to save your changes. For details, see Saving a View, page 6-5.
NEW! New icon	Appears if there is at least one newly discovered object in the network that has not been included or excluded to any view. To add or exclude the object to your current view, see New on the Network, page 6-11. **Note** Clicking the **New** icon in the topology window opens the New Objects pane in the left pane. Clicking the **New** icon in any other window opens the Edit View tab of the View Editor window.
View: AutoInstanceView View	Shows the name of the current view. **Note** If your personal default view has been deleted, then the next time you launch the client, the MWTM informs you that your default view has been deleted and that your view has been reset to the DEFAULT view. To choose another view as your default view, use the Load Dialog: View List. For details, see Loading a Client-Specific View, page 6-14.
dhcp-64-102-82-102-cisco-com Name	Shows the name of the current user, or the name of the node the user is using.
System Admin: n n n Authentication level	If you have implemented MWTM user access security, the authentication level of the user appears.

MWTM Client Navigation Tree

The MWTM client navigation tree displays objects in a variety of formats and views. The DEFAULT view, and other views that you can create, display a hierarchy of the objects that the MWTM manages. By default, the navigation tree is sorted by alarm severity, with objects having the most severe alarms appearing at the top of the tree.

Note To learn more about alarm severity, see Chapter 9, "Managing Alarms and Events".

The client navigation tree contains:

Object	Description
Active Alarms	Displays a summary of all currently active alarms in your network, including the current status of the associated network object. For details, see Chapter 9, "Managing Alarms and Events".
Event History	Displays information about the events that the MWTM event logger and event processor deliver for all objects in the current network view. For details, see Chapter 9, "Managing Alarms and Events".
Summary Lists	Displays basic summary alarm information about all discovered network objects, including alarm severity and the total number of objects in each severity level. For details, see Displaying Summary Lists Alarms, page 3-17.
DEFAULT View (or named view)	Displays the view name and all objects in that view. For details about views, see Chapter 6, "Managing Views".

Note For additional features that appear only in the navigation tree of the web interface, see MWTM Web Interface Navigation Tree, page 11-3.

MWTM Client Content Area

The content area in the right pane displays detailed information about your network, such as configuration and historical data. To view detailed information for an object, click the object in the navigation tree. The content area in the right pane shows the details about the chosen object.

The content area formats the information in a way that is easy to interpret. Descriptive information is usually organized into subpanes. Tabs along the top of the content area organize more complex sets of information. Large amounts of information are organized into tables with labeled columns and multiple rows of data.

For additional features that appear only in the content area of the MWTM web interface, see MWTM Web Interface Content Area, page 11-5.

Displaying Summary Lists Alarms

Summary Lists provides basic summary alarm information about all discovered network objects, including alarm severity and the total number of objects for each severity level.

Note If you click to expand the turner beside Summary Lists, all discovered object types in your network appear. For detailed information, see Displaying Object Windows, page 8-3.

To view the summary lists, click Summary Lists in the navigation tree in the MWTM main window. The Summary Lists table has two columns: Severity, Total and Percentage. You can resize each column, or sort the table based on the information in one of the columns. By default, this table is sorted by Severity, with the highest severity (Critical) at the top. The Total column lists the total number of discovered objects for each severity level.

Note For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The summary list table contains:

Column	Description
Severity	Alarm severity of the object. Possible values are:  Critical  Major  Minor  Warning  Informational  Indeterminate
Total	Total number of network objects with the indicated severity.

Note See Managing Alarms and Events for information on alarm management.

Right-Click Menu for the Summary Lists

To see the right-click menu for the summary lists, select Summary Lists or any of the objects under Summary Lists in the navigation tree and press the right mouse button. The menu provides:

Menu Command	Description
Show In New Window	Opens the current window in a new window.
Back > List of Windows	Navigates back to a window viewed in this session. The MWTM maintains a list of up to 10 Back windows.
Forward > List of Windows	Navigates forward to a window viewed in this session. The MWTM maintains a list of up to 10 Forward windows.

Using the MWTM Main Menu

The MWTM main menu appears in the menu bar of most MWTM windows.

Some menu items do not appear on some windows. In addition, menu items that are dimmed are not available on that window.

For detailed information about the menu options provided by other windows, see the descriptions of those windows.

The MWTM main menu contains:

Menu Command	Description
File > Load DEFAULT View (Ctrl-D)	Loads the DEFAULT view, which is the view into which the MWTM places all discovered objects when discovering the network. The DEFAULT view is stored on the MWTM server and shared by all MWTM clients, but the clients cannot modify it.
File > Load View (Ctrl-L)	Loads an already existing view. The MWTM prompts you for the name of the view you want to load: • Select the name of the view, or accept the default view name, then click **OK** to load the view. • Click **Cancel** to close the prompt window without loading a view.
File > Save View (Ctrl-S)	Saves the current view: • If you have not already saved the current view, opens the Save File dialog box: View List, in which you enter or select a filename under which to save the current view. • If you have already saved the current view, saves the view to that filename. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
File > Save View As	Opens the Save File Dialog: View List, which you use to enter or select a filename under which to save the current view. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
File > Connect to New Server (Ctrl-O)	Connects to a new server. The MWTM prompts you for the new server's name or IP address, and UDP port number. The MWTM stops the MWTM client, then restarts the client connected to the new server. The MWTM stops the MWTM client, then restarts the client connected to the new server.
File > Print (Ctrl-P)	Opens the Print window where you can: • Specify options for printing • Print the current window • Save the current window to a file The MWTM printing options require that you define a printer on your system. If you choose **File > Print** and the Print window does not appear, ensure you have defined a printer on your system.
File > Exit (Ctrl-Q)	Exits the MWTM application, after prompting you for confirmation. If you are working in a custom view (that is, not the DEFAULT view), the MWTM automatically saves any changes you made to the view.
Edit > Views (Ctrl-M)	Opens the View Editor window to allow you to edit any views that you have created.
Edit > Clear All Events (Ctrl-E)	Deletes the event icon (orange triangle) from MWTM displays for all known objects. The actual events are not deleted from the MWTM, only the event icon for all known objects. **Note** During Discovery, the MWTM might flag most objects with an event icon. If the event icons are too distracting, use the **Edit > Clear All Events** menu option to remove them.

Menu Command	Description
Edit > Find (Ctrl-F)	Opens the Find dialog box, in which you find a specific object, event, or text in the window. If you select an object in the navigation tree in the MWTM main window, this option is dimmed and cannot be chosen.
Edit > Delete (Delete)	Deletes the currently chosen element or elements from the MWTM database. The MWTM displays the Confirm Deletion dialog box. To: • Delete the chosen elements, click **Yes**. The items are deleted from the MWTM database and the Confirm Deletion dialog box is closed. • Retain the chosen elements, click **No**. The items are kept in the MWTM database and the Confirm Deletion dialog box closes. • Prevent the MWTM from displaying the Confirm Deletion dialog box, select the **Do not show this again** check box. **Note** If you select the **Do not show this again** check box, and you later decide you want the MWTM to begin displaying the Confirm Deletion dialog box again, you must select the Confirm Deletions check box in the General GUI settings in the Preferences window. For more information, see the description of the Confirm Deletions check box in Startup/Exit Settings, page 4-3. To permanently delete all elements marked for deletion from the MWTM database, you can also run the **mwtm purgedb** command (see mwtm purgedb, page B-55). If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Edit > Preferences (Ctrl-H)	Opens the Preferences window.
Network> Node SNMP and Credentials Editor (Alt-S)	Opens the SNMP Configuration dialog box. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Network > Network Discovery (Ctrl-Y)	Opens the Discovery dialog box. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Network > Poll Nodes > Normal Poll (Alt-L)	Polls all chosen nodes. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Network > Poll Nodes > Clean Poll (Alt-C)	Polls all chosen nodes and removes any **Unknown** objects after the completion of the poll. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Network > ITP Node Archive Management	Opens the Archive Management dialog box, allowing you to view archived GTT files, route table files, or MLR address table files and perform various functions on the files. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Network > ITP Node File Management	Opens the Node File Management dialog box, allowing you to view GTT files, route table files, or MLR address table files and perform various functions on the files. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

Menu Command	Description
View > Topology (Ctrl-T)	Opens the topology window.
View > MWTM Server > Connect via Telnet (Ctrl+Shift-T)	Opens a Telnet window to the server.
View > MWTM Server > Connect via SSH (Ctrl+Shift-S)	Opens a Secure Shell (SSH) window to the server. **Note** The key size on the SSH server must be a minimum of 512 bits and a maximum of 2048 bits.
View > MWTM Server > Server Status	Displays the MWTM web status page in a web browser.
View > MWTM Web Links > Home	Displays the MWTM web interface home page in a web browser.
View > MWTM Web Links > Administrative	Displays the MWTM web administrative page in a web browser.
View > MWTM Web Links > Groups	Displays the MWTM web groups page in a web browser.
View > MWTM Web Links > Tools	Displays the MWTM web tools page in a web browser.
View > MWTM Web Links > Reports	Displays the MWTM web reports main page in a web browser.
View > MWTM Web Links > CSV File Archive	Displays the MWTM web file archive page in a web browser.
View > MWTM Web Links > Archived Event Logs > Status Changes	Displays the archived status changes in a web browser.
View > MWTM Web Links > Archived Event Logs > SNMP Traps	Displays the archived SNMP traps in a web browser.
View > MWTM Web Links > Archived Event Logs > Status Changes and SNMP Traps	Displays both the archived status changes and archived SNMP traps in a web browser.
View > MWTM Web Links > Software Version Inventory	Displays the MWTM software versions for the server you are connected to, and which is currently running the MWTM server, in a web browser.
View > MWTM Web Links > Point Code Inventory	Displays the point codes inventory reports page which shows all point codes that are currently being used by all nodes that the MWTM detected, in a web browser.
View > MWTM Web Links > IP Address Inventory	Displays the report of IP addresses of the nodes that the MWTM manages, in a web browser.
View > Message of the Day	Opens the Message of the Day dialog box.
View > Cisco.com	Displays the Cisco.com Home Page in a web browser.
Go > Back (Alt-Left Arrow) [1]	Navigates back to the last window viewed in this session.
Go > Forward (Alt-Right Arrow) [1]	Navigates forward to the last window viewed in this session.

Menu Command	Description
Go > Back > *List of Windows*	Navigates back to a window viewed in this session. The MWTM maintains a list of up to 10 Back windows.
Go > Forward > *List of Windows*	Navigates forward to a window viewed in this session. The MWTM maintains a list of up to 10 Forward windows.
Tools > Route Table Editor > From Archive (Alt-J) (ITP only)	Opens the Load Route Table from Archive wizard. If you select an Unmanaged node, this option is dimmed and cannot be chosen. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Tools > Route Table > From Node (Alt-O) (ITP only)	Opens the Route Table dialog box by using a route table from an ITP node. If you select an Unmanaged node, this option is dimmed and cannot be chosen. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Tools > Route Table > From File (Alt-I) (ITP only)	Opens the Route Table dialog box by using a route table from a file. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Tools > Global Title Translator Editor (Ctrl-G) (ITP only)	Launches the GTT client. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Tools > Address Table Editor (Alt-A) (ITP only)	Launches the Address Table Editor, which you use to create new address table files, load existing address table files, perform semantic checks, save address table files, and deploy address table files to an ITP. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Tools > Event Editor (Alt-B)	Launches the Event Editor, which you use to: • Customize the visible category, severity, color, and message associated with events • Configure sounds for the MWTM to play for different types of events • Load, save, and deploy customized event configurations. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Tools > Event Sounds (Ctrl-U)	Opens the Event Sound Filters dialog box, which you use to define sounds that the MWTM client should play when specific events are logged.
Tools > Virtual RAN Backhaul Editor (Ctrl-B) (IP-RAN only)	Launches the Virtual RAN Backhaul Editor, which you use to create a virtual RAN backhaul by grouping real backhauls.

Menu Command	Description
Launch > CiscoView <*machine name*>	Launches CiscoView, which provides a real-time, color-coded, graphical representation of Cisco objects. You can use CiscoView to quickly identify an incorrect status on a port or interface. This option is dimmed if the chosen node is: not a recognized node; in Unmanaged status; or has a Device Type of Unknown. (CiscoWorks cannot monitor Unmanaged, Unknown, or unrecognized nodes.) This option is not visible if you did not specify a CiscoWorks server during installation. See the "Installing MWTM on Solaris" and "Installing MWTM on Windows" chapters of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information.
Launch > CiscoWorks LMS Portal <*machine name*>	Launches CiscoWorks LMS Portal, which provides a dashboard of tools and utilities such as CiscoView, Resource Manager Essentials, and Device Center.
Launch > Device Center <*machine name*>	Launches the CiscoWorks Device Center, which provides a number of web-based functions, including reachability trends, response time trends, interface status, syslog browsing, and detailed inventory. The MWTM prompts you for a CiscoWorks user ID and password before linking to CiscoWorks. The link to CiscoWorks has these prerequisites. CiscoWorks must: • Be installed somewhere in the network. • Monitor the specific device. This option is dimmed if the chosen node is: not an recognized node; in Unmanaged status; or has a Device Type of Unknown. (CiscoWorks cannot monitor Unmanaged, Unknown, or unrecognized nodes.) This option is not visible if you did not specify a CiscoWorks server during installation. See the "Installing MWTM on Solaris" and "Installing MWTM on Windows" chapters of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information.
Help > Topics (F1)	Displays the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Displays online help for the current window.
Help > About (F3)	Displays build date, version, SSL support, and copyright information about the MWTM application.

1. In the UNIX environment (Solaris or Linux), this key combination can be mapped to a different function based on the Common Desktop Environment (CDE) that a user might have. For example, in Solaris CDE, Alt-Left Arrow and Alt-Right Arrow combinations are typically mapped to move back and forward through the different desktops. To remap the keys for use with the MWTM, see your UNIX Desktop Environment guide.

Using the MWTM Toolbar

The MWTM toolbar appears under the menu bar in the MWTM client windows, and above the navigation tree in the MWTM web interface.

The MWTM toolbar contains:

Element	Description
 Sort tree by name	Sorts all content in the navigation tree alphabetically by name.
 Sort tree by status	Sorts all content in the navigation tree by status, from the highest alarms to the lowest.
 Go back or forward one navigation change	(Only in MWTM client) Click to browse forward or backward in your navigation changes. In the MWTM web interface, click the browser's back and forward buttons.
 Location	Shows your current location in MWTM. Some locations are clickable links to which you can navigate directly.

Accessing the MWTM Through a Web Browser

You can manage network nodes through one of two graphical user interfaces:

- **MWTM client interface**—The standard interface for accessing MWTM data. (This interface is described in Displaying the MWTM Main Window, page 3-14)
- **MWTM web interface**—A browser interface for accessing MWTM data. (This interface is introduced here and fully described in Chapter 11, "Accessing Data from the Web Interface")

A comparison of the GUI features supported in each interface is shown in this matrix:

GUI Features	Web Interface	Client Interface	Notes
Main window	X	X	Slight differences exist between the interfaces (in the navigation tree and content area displays).
Discovery window	X	X	Exists in both client and web interface.
Historical Data	X		You enter a start and stop time for the data you are interested in, and the MWTM retrieves the data from its database. You can access the web interface display from the right-click menus in the client interface.
Real-time Data	X	X	The MWTM periodically polls the node for real-time data, and updates the graphs as new data is received.
Topology		X	Client-only feature.

GUI Features	Web Interface	Client Interface	Notes
High-level editors		X	These editors appear under the Tools menu of the MWTM main window: • Route Table Editor • GTT Title Editor • Address Table Editor • Event Editor
Provisioning	X		Web-only feature for ITP, IPRAN, CSG, GGSN, and HA objects. To launch web provisioning from the MWTM client, select the object in the navigation tree and click the Provision button in the web interface toolbar.

You access the web interface using one of two methods:

- Open a browser and enter **`http://`***`server_name`***`:1774`** in the Address field.
- From the MWTM client interface, choose **View > MWTM Web Links > Home**.

The web interface window opens in the browser window.

For detailed information about the MWTM web interface, see Chapter 11, "Accessing Data from the Web Interface".

Loading and Saving MWTM Files

You use the MWTM to quickly and easily load and save MWTM files. The files are on the MWTM server and you can load them on any connected MWTM client.

To display a Load File dialog box, use one of these procedures:

Launched From	Choose	Window Launched	Notes
Address Table Editor (ITP only)	**File > Load > Load from File**	Load File Dialog: Address Table File List	See Loading an Existing Address Table File, page 16-6.
Discovery dialog box	**File > Load Seeds**	Load File Dialog: Seed File List	See Loading Seed Nodes and Seed Files, page 3-7.
Event Filter dialog box	**Load**	Load File Dialog: Load Filter	See Loading Existing Filters, page 9-19.
GTT Editor (ITP only)	**File > Load**	Load File Dialog: GTT File List	See Loading an Existing GTT File, page 15-29.
Preferences window	**File > Load System Default Prefs**	None	See Displaying the Preferences Menu, page 4-2.
Route Table dialog box (ITP only)	**File > Load**	Load File Dialog: Route Table File List	See Loading an Existing Route Table File, page 14-11.
View Editor window	**File > Load**	Load File Dialog: View List	See Loading a Client-Specific View, page 6-14.

Note To load the DEFAULT network view, choose **File > Load DEFAULT View** from the MWTM main menu. The MWTM loads the DEFAULT view.

To display a Save File dialog box, use one of these procedures:

Launched From	Choose	Window Launched	Notes
Address Table Editor (ITP only)	**File > Save As**	Save File Dialog: Address Table File List	See Saving an Address Table File, page 16-18.
Discovery dialog box	**File > Save As**	Save File Dialog: Seed File List	See Saving a Seed File, page 3-8.
Event Filter dialog box	**File > Save As**	Save File Dialog: Save Filter	See Saving Filter Files, page 9-20.
GTT Editor (ITP only)	**File > Save As**	Save File Dialog: GTT File List	See Saving a GTT File, page 15-38.
Route Table dialog box (ITP only)	**File > Save As**	Save File Dialog: Route Table File List	See Saving a Route Table File, page 14-12.
View Editor window	**File > Save As**	Save File Dialog: View List	See Closing the View Editor Window, page 6-13.

Using the Windows Start Menu

This section includes:

Changing the Default MWTM Server Name

If the IP address or hostname to which your MWTM client is bound fails, you can change the default MWTM server name from the Windows Start menu.

To change the default MWTM server name:

Step 1 Close all open MWTM windows.

Step 2 Choose **Start > Programs > Cisco MWTM Client > Modify Default MWTM Server Name**. The MWTM opens a DOS window, and asks you to enter the name of the new default MWTM server.

Step 3 Enter the name of the new default MWTM server, and press **Enter**. The MWTM sets the default server to the new name that you entered.

Tip See Connecting to a New Server, page 4-40 for more information about changing the default MWTM server name.

Launching the MWTM Client

To launch the MWTM Client, choose **Start > Programs > Cisco MWTM Client > MWTM Client** from the Windows Start menu, or double-click the MWTM icon on the desktop. The MWTM launches the MWTM Client.

Launching the MWTM DOS Prompt

To launch a DOS prompt for the MWTM from the Windows Start menu, choose **Start > Programs > Cisco MWTM Client > MWTM DOS Prompt**. The MWTM opens a DOS window, starting in the *\bin* directory:

- If you installed the MWTM client in the default directory, *C:\Program Files*, then the DOS prompt starts at *C:\Program Files\MWTMClient\bin*.
- If you installed the MWTM client in a different directory, then the *\bin* directory is located in that directory.

Launching the MWTM Event Editor

To launch the MWTM Event Editor, choose **Start > Programs > Cisco MWTM Client > Launch MWTM Event Editor** from the Windows Start menu. The MWTM launches the MWTM Event Editor.

Note The MWTM Event Editor is available to power users (level 2) and higher.

Launching the MWTM SSL Certificate Tool

To launch the MWTM SSL Certificate Tool from the Windows Start menu, choose **Start > Programs > Cisco MWTM Client > MWTM SSL Certificate Tool**.

Displaying the MWTM README File

The MWTM README file contains late-breaking information about the MWTM that might not be found in the other product documentation. To open the MWTM README file from the Windows Start menu, choose **Start > Programs > Cisco MWTM Client > Readme**.

Uninstalling the MWTM

You can uninstall the MWTM from the Windows Start menu. For details, see the "Uninstalling the MWTM Client" section of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

Locating Technology Specific Information

To help you locate information specific to a technology, the following table lists where to find information based on the specified technology.

Technology	Topic and Location
Managing ITP	• *User Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – Managing and Deploying ITP Files, page 4-24 – Naming Information, page 7-14 – Status Information, page 7-23 – Viewing Data Specific for ITP Signaling Points, page 7-123 – Editing an ITP Route Table File, page 14-1 – Appendix E, “Status Definitions.” • *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – ITP Provisioning Attributes • *Alarm Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – ITP Alarms
Managing the Cisco mSEF Infrastructure	• *User Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – Displaying CSG2 Real-Time Statistics, page 11-41 – Displaying BWG Real-Time Statistics, page 11-54 – Displaying HA Real-Time Statistics, page 11-65 – Displaying GGSN Real-Time Statistics, page 11-68 – Displaying PDSN Real-Time Statistics, page 11-80 – Displaying SGW Real-Time Statistics, page 11-86 – Displaying PDNGW Real time statistics, page 11-100 – Appendix E, “Status Definitions.” • *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – CSG2 Provisioning Attributes – GGSN Provisioning Attributes – HA Provisioning Attributes • *Alarm Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – BWG Alarms – CSG1 Alarms – CSG2 Alarms – GGSN Alarms – HA Alarms – PDSN Alarms – PDNGW Alarms – SGW Alarms – PCRF Alarms

Technology	Topic and Location
Managing IPRAN and RAN-O	• *User Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – Displaying RAN-O Statistics, page 11-35 – Displaying PWE3 Real-Time Statistics, page 11-113 – Displaying QoS Statistics, page 11-109 • *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – RAN Provisioning Attributes • *Alarm Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – IP-RAN Alarms
Managing all domains	• *Alarm Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:* – Common Alarms

Exiting the MWTM Client

When you are finished monitoring network performance statistics, you can exit the MWTM client:

Step 1 From the MWTM main menu, choose **File > Exit**. The Exit MWTM confirmation window appears.

Step 2 Click **Yes** to close the MWTM client application.

CHAPTER 4

Basic Operations

This chapter provides information about basic operations that you can perform in the Cisco Mobile Wireless Transport Manager (MWTM), and contains:

Note The default directory for installing the MWTM is */opt*. In commands that call for the default directory, if you installed the MWTM in a different directory, you must specify that directory instead of */opt*.

Changing Client and Web Preference Settings

This section contains this information:

Changing Client Preference Settings

When a user changes some aspect of the MWTM client, such as the size of a window, or the order of columns in a window, the MWTM makes note of the user's preferences on the MWTM client and server. The MWTM saves the user's preferences to the MWTM server when the MWTM client exits.

Thereafter, whenever the user launches the MWTM client, the MWTM searches for the user's preferences. If the MWTM finds the user's preferences on the MWTM server, the MWTM launches the MWTM client with those preferences. Otherwise, the MWTM launches the MWTM client with the default preferences file.

In addition to the user preferences that the MWTM automatically saves, you use the MWTM to change many GUI, data, topology, and table settings that affect the way the MWTM presents its information.

Note Anyone who uses the MWTM client can change its preference settings, and the changes affect all views running on this client.

To change overall MWTM preference settings, choose **Edit > Preferences** from the MWTM client main menu. The MWTM displays the Preferences window.

In the Preferences window, you can:

Displaying the Preferences Menu

The menu on the Preferences window contains:

Option	Description
File > Load System Default Prefs	Restores all preference settings to the original system default settings.
File > Save (Ctrl-S)	Saves the preference changes.

Option	Description
File > Close (Ctrl-W)	Closes the Preferences window. To close the Preferences window at any time, choose **File > Close**. If you have changed any preferences, the MWTM asks if you want to apply the changes before leaving the window: • Click **Yes** to apply the changes and close the prompt window and the Preferences window. • Click **No** to close the prompt window and the Preferences window without applying or saving any changes. • Click **Cancel** to close the prompt window without applying any changes. The Preferences window remains open.
Help > Topics (F1)	Displays the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Displays online help for the current window.
Help > About (F3)	Displays build date, version, SSL support, and copyright information about the MWTM application.

Changing General GUI Settings

You use the General GUI settings in the Preferences window to change general display settings for the MWTM, including which window to display first when starting the MWTM, and whether to display values in bits or bytes.

To display the General GUI settings, choose General GUI in the left pane of the Preferences window.

In the General GUI area you can change:

- Startup/Exit Settings, page 4-3
- General Display Settings, page 4-4
- Node Name Settings, page 4-5
- Poller Settings, page 4-5
- Troubleshooting, page 4-6
- Connection Settings, page 4-6
- Repaint Priority, page 4-6

Startup/Exit Settings

Use the Startup/Exit Settings pane of the General GUI settings to specify whether you want to display the topology window when you launch the MWTM client, and whether you want the MWTM to prompt you for confirmation when you exit the MWTM client.

The Startup/Exit Settings pane contains:

Check Box	Description
MWTM: Topology Window	If checked, causes the topology window to appear when you start the MWTM. The default setting for this check box is unchecked.
Confirm Exit	If checked, the MWTM prompts you for confirmation when you exit the MWTM client. The default setting for this check box is checked.
Confirm Deletions	If checked, the MWTM prompts you for confirmation when you delete an object. The default setting for this check box is checked. **Note** If you check the Do not show this again check box in a Confirm Deletion dialog box, and you later decide that you do want the MWTM to display the Confirm Deletion dialog box, you must check the Confirm Deletions check box.
Confirm In Band Polls	If checked, the MWTM prompts you for confirmation when you access a function that requires the MWTM to perform in-band polling of the object.

General Display Settings

Use the General Display pane of the General GUI settings to specify whether the MWTM should:

- Display node domain names.
- Show details in bits instead of bytes.
- Show receive and send utilization as percentages.
- Show the point code mask in bits instead of dotted notation.

The General Display pane contains:

Check Box	Description
Show Node Domain Names	If checked, the MWTM shows node domain names in its displays. The default setting for this check box is unchecked (do not show node domain names).
Show Details in Bits Instead of Bytes	If checked, the MWTM displays data and data rates in bits instead of bytes: • Check if you want the MWTM to display data in bits, and data rates in bits per second. This is the default setting. • Uncheck if you want the MWTM to display data in bytes, and data rates in bytes per second.
Show Utilization as Percentage	If checked, the MWTM displays receive and send for linksets and links as a percentage: • Check if you want the MWTM to display as a percentage. This is the default setting. • Uncheck if you want the MWTM to display in Erlangs.
Show Point Code Mask in Bits (ITP only)	If checked, the MWTM displays point code masks as a number of bits instead of dotted-decimal format. The MWTM applies this setting to all point code masks in the MWTM client, including those in the Route Table dialog box, in messages, and so on. • Uncheck if you want the MWTM to display point code masks in dotted-decimal format (octets separated by periods). This is the default setting. • Check if you want the MWTM to display point code masks as a number of bits. For more information about point code masks, see Route Table, page 14-7.

Node Name Settings

Use the Node Name pane of the General GUI settings to specify how the MWTM should display node names.

The Node Name pane contains these radio buttons:

Radio Buttons	Description
Show DNS or User Defined Names	Indicates whether the MWTM should identify nodes by their DNS or user-defined names. The default setting for this radio button is checked.
Show IP Address in Name Field	Radio button used to indicate whether the MWTM should identify nodes by their IP addresses. The default setting for this radio button is unchecked.
Show SysName	Indicates whether the MWTM should identify nodes by their System Name. The default setting for this radio button is unchecked.

Poller Settings

Use the Poller pane of the General GUI settings to change the MWTM poller and counter settings.

The Poller pane contains:

Field or Radio Button	Description
Fast Poller Default (secs)	Default interval, in seconds, for the fast poller. The valid range is 5 to 60 seconds. The default setting is 15 seconds. The fast poller appears in these MWTM client windows: • MWTM Real-Time Statistics: CPU Statistics window • (ITP only) Details window for an Application Server • (ITP only) Details window for a Linkset • (ITP only) Details window for a Signaling Gateway Mated Pair You can change the valid range and default setting in the *Server.properties* file. For more information, see Changing MWTM Server Poller Settings, page 5-2.
Slow Poller Default (secs)	Default interval, in seconds, for the slow poller. The valid range is 60 seconds to 300 seconds. The default setting is 60 seconds. The slow poller is used in all the MWTM client windows except those listed previously that use the fast poller. **Note** You can change the valid range and default setting in the *Server.properties* file. For more information, see Changing MWTM Server Poller Settings, page 5-2.
Show Counters Since Reboot	Radio button used to configure the MWTM client to clear all counters in MWTM web pages whenever the node reboots. The default setting for this radio button is checked.
Show Counters Since Last Poll	Radio button used to configure the MWTM client to clear all counters whenever an MWTM web page is polled. The default setting for this radio button is unchecked.
Show Counters Since User Reset	Radio button used to configure the MWTM client to clear all MWTM counters whenever the user resets the counters on an MWTM web page. The default setting for this radio button is unchecked.

Troubleshooting

Use the Troubleshooting pane of the General GUI settings to specify whether the MWTM clears the display window upon command execution.

The Troubleshooting pane contains:

Field	Description
Clear Display upon Execution	Clears the output display each time you execute a command.

Connection Settings

Use the Connection Settings pane of the General GUI settings to set the Telnet or SSH path and arguments for accessing nodes using one of these methods.

Note To connect to a node using SSH, the key size on the node must be configured to a minimum of 768 bits and a maximum of 2048 bits.

The Connection Settings pane contains:

Field	Description
Telnet path	Use to modify the default MWTM Telnet path to an executable file (for example, *putty.exe*). Click **Find** to choose a Telnet path on your local machine. **Note** Choosing a non-GUI file might not yield the expected results.
Telnet arguments	Optional arguments that the MWTM passes to the Telnet executable when the MWTM invokes it. For example, to set the hostname and port number for the connection, specify **-telnet** *$host $port*. [1]
SSH path	Use to modify the default MWTM SSH path to an executable file (for example, putty.exe). Click **Find** to choose an SSH path on your local machine. **Note** Choosing a non-GUI file might not yield the expected results.
SSH arguments	Optional arguments that the MWTM passes to the SSH executable when the MWTM invokes it. For example, to set the hostname and port number for the connection, specify **-ssh** *$host $port*. [1]

1. When you right-click a node in the navigation tree and choose Connect To, the variables $host and $port are replaced with the hostname and port number of the node.

Repaint Priority

Use the Repaint Priority pane of the General GUI settings to balance the responsiveness versus efficiency of the MWTM client. This setting controls how quickly the MWTM client repaints its displays.

The Repaint Priority pane contains a sliding control: 

Field	Description
Repaint Priority	Balances the MWTM client's responsiveness versus efficiency. The valid range is 0 through 10, with 0 representing a high repaint priority (high responsiveness, low efficiency) and 10 representing a high communication priority (high efficiency, low responsiveness): • To maximize repainting (responsiveness) over communication (efficiency), slide the selector toward High Repaint Priority. • To maximize communication (efficiency) over repainting (responsiveness), slide the selector toward High Comm. Priority. • The default setting is 2 (the third mark from the left).

Changing Alarm and Event Settings

Use the Alarms / Events settings in the Preferences window to:

- Change the default background color for each type of alarm or event
- Specify whether to display acknowledged alarms or events
- Specify the types of events the MWTM should display in the alarms and events tables, including the:
  - Category and severity
  - Whether the event is acknowledged
  - Other properties

To display the preference settings for alarms and events, select Alarms / Events in the left pane of the Preferences window.

In the right pane you can change:

- Colors, page 4-8
- Alarm-specific Colors, page 4-8
- Time Format, page 4-8
- Date Format, page 4-8
- Categories, page 4-9
- Severities, page 4-9
- Other, page 4-10

Colors

The Alarm / Event Colors pane contains:

Field	Description
Change Color	Opens the Select Event Color dialog box from which you select a color for an alarm or event type. For more details, see Customizing Colors, page 4-16.
Critical	Indicates the background color for Critical alarms or events. The default is red.
Major	Indicates the background color for Major alarms or events. The default is orange.
Minor	Indicates the background color for Minor alarms or events. The default is yellow.
Warning	Indicates the background color for Warning alarms or events. The default is blue.
Informational	Indicates the background color for Informational alarms or events. The default is white.
Indeterminate	Indicates the background color for Indeterminate alarms or events. The default is cyan.
Normal	Indicates the background color for Normal alarms or events. The default is light green.

Alarm-specific Colors

The Alarm-specific Colors pane contains:

Field	Description
Change Color	Opens the Select Event Color dialog box from which you select a color for alarms and events of unmanaged objects. For more details, see Customizing Colors, page 4-16.
Unmanaged	Indicates the background color for unmanaged alarms or events. The default is gray.

Time Format

The Time Format pane contains:

Button	Description
12 Hour	Click this radio button to configure alarm or event time stamps to use 12-hour format (for example, 07:10:09).
24 Hour	Click this radio button to configure alarm or event time stamps to use 24-hour format (for example, 19:10:09).

Date Format

The Date Format pane contains:

Button	Description
Month-First	Click this radio button to configure alarm or event date stamps with the month appearing first (for example, 8/16/09).
Day-First	Click this radio button to configure alarm or event date stamps with the day appearing first (for example, 16/8/09).

Categories

In the Categories pane, you specify which event categories to display in the Event History window.

The Categories pane contains:

Field or Button	Description
Status	Indicates whether Status events should appear in the Event History window. The default is checked.
Trap	Indicates whether Trap events should appear in the Event History window. The default is checked.
Create	Indicates whether Create events should appear in the Event History window. The default is checked.
Delete	Indicates whether Delete events should appear in the Event History window. The default is checked.
Discover	Indicates whether Discover events should appear in the Event History window. The default is checked.
Edit	Indicates whether Edit events should appear in the Event History window. The default is checked.
Ignore	Indicates whether Ignore events should appear in the Event History window. The default is checked.
Login	Indicates whether Login events should appear in the Event History window. The default is checked.
LoginDisable	Indicates whether LoginDisable events should appear in the Event History window. The default is checked.
LoginFail	Indicates whether LoginFail events should appear in the Event History window. The default is checked.
Logout	Indicates whether Logout events should appear in the Event History window. The default is checked.
OverWrite	Indicates whether OverWrite events should appear in the Event History window. The default is checked.
Poll	Indicates whether Poll events should appear in the Event History window. The default is checked.
Purge	Indicates whether Purge events should appear in the Event History window. The default is checked.
Provision	Indicates whether Provision events should appear in the Event History window. The default is checked.
LaunchTerminal	Indicates whether LaunchTerminal events should appear in the Event History window. The default is checked.
Performance	Indicates whether Performance events should appear in the Event History window. The default is checked.
Select All	Checks all event category check boxes.
Deselect All	Unchecks all event category check boxes.

Note The fields in the previous table are default categories; however, the MWTM system administrator might define additional categories. For information about custom categories, see Changing Event Categories, page 9-31.

Severities

In the Severities pane, you specify which alarm or event severities to display in the Event History and Active Alarms windows.

The Severities pane contains these default fields:

Field	Description
Critical	Indicates whether alarms and events of severity Critical should appear in the window. The default is checked.
Major	Indicates whether alarms and events of severity Major should appear in the window. The default is checked.
Minor	Indicates whether alarms and events of severity Minor should appear in the window. The default is checked.
Warning	Indicates whether alarms and events of severity Warning should appear in the window. The default is checked.
Informational	Indicates whether alarms and events of severity Informational should appear in the window. The default is checked.
Indeterminate	Indicates whether alarms and events of severity Indeterminate should appear in the window. The default is checked.
Normal	Indicates whether alarms and events of severity Normal should appear in the window. The default is checked.

Other

Use the Other pane to further define the filter for the Event History and Active Alarms windows. These settings apply to all event displays in the current view.

The Other pane contains:

Check Box or Field	Description
Acknowledged	Indicates whether only acknowledged alarms and events should appear in the window. The default is checked.
Unacknowledged	Indicates whether only unacknowledged alarms and events should appear in the window. The default is checked.
Time Before	Indicates whether only alarms and events that the MWTM logs prior to a specified date and time should appear in the window. The default is checked.
Time Before Field	Specifies the date and time prior to which alarms and events that the MWTM logs should appear in the window. This field is dimmed unless the Time Before check box is checked.
Time After	Indicates whether only alarms and events that the MWTM logs after a specified date and time should appear in the window. The default is checked.
Time After Field	Specifies the date and time after which alarms and events that the MWTM logs should appear in the window. This field is dimmed unless the Time After check box is checked.
Message Contains	Indicates whether only alarms and events that contain the specified message text should appear in the window. The default is checked.
Match Case	Indicates whether only alarms and events that match the case of the text in the Message Contains field should appear in the window. This field is dimmed unless the Message Contains check box is checked. If the Message Contains check box is checked, the default setting for this check box is checked.
Suppress Events for unmanaged nodes	Suppresses all alarms and events from nodes that are unmanaged. The default setting for this check box is unchecked.

Changing Charts Settings

Use the Charts pane in the Preferences window to change default settings for the elements in real-time data charts for application servers, application server process associations, links, and linksets.

To display the Charts pane, click **Charts** in the left pane of the Preferences window.

The Charts pane contains:

Field or Button	Description
Series	Indicates the time series being defined. A time series is a set of data collected sequentially at a fixed interval of time. The default values for series are: • Series 0: Dot, Solid, Red • Series 1: Box, Solid, Green • Series 2: Triangle, Solid, Blue • Series 3: Diamond, Solid, Black • Series 4: Star, Solid, Pink • Series 5: Cross, Solid, Orange • Series 6: Circle, Solid, Gray • Series 7: Square, Solid, Light Green • Series 8: Vertical Line, Solid, Red • Series 9: Horizontal Line, Solid, Green • Series 10: Dot, Solid, Blue • Series 11: Box, Solid, Black • Series 12: Triangle, Solid, Pink • Series 13: Diamond, Solid, Orange • Series 14: Star, Solid, Gray • Series 15: Cross, Solid, Light Green • Series 16: Circle, Solid, Red
Symbol Style	Drop-down list box used to define the symbol associated with a series. To change the symbol for a series, select a new value: Dot, Box, Triangle, Diamond, Star, Vertical Bar, Horizontal Line, Cross, or Circle.
Line Style	Drop-down list box that you use to define the style of line that connects data points in the chart. To change the line style for a series, select a new value: Solid, Long Dash, Long-Short-Long (LSL) Dash, Short Dash, Dash Dot, or None.
Color	Indicates the current color for the series.
Change Color	Opens the Select Series Color dialog box in which you select a color for a series. For more details, see Customizing Colors, page 4-16.

Changing Status Settings

You use the MWTM to customize the sort order for status settings, as well as the color of each status setting.

When you change the sort order or the color of a status setting, most MWTM client windows reflect the new sort order or color immediately. All other windows reflect the new sort order or color at the next poll.

When you change the color of a status, most MWTM client windows reflect the new color immediately. All other windows reflect the new color at the next poll.

To display the Status settings, click **Status** in the left pane of the Preferences window.

The Status pane contains:

Field or Button	Description
Status Sort Order	Indicates the status setting being defined. The default status sort order and colors are: • Unknown: Red • Unavailable: Red • Inactive: Red • Failed: Red • Down: Red • Blocked: Red • Pending: Red • Warning: Yellow • Shutdown: Blue • Inhibited: Blue • InhibitLoc: Blue • InhibitRem: Blue • Discovering: Cyan • Polling: Cyan • Waiting: Gray • Unmanaged: Gray • Active: Green • NotPresent: Gray
Move Up	Moves the chosen status setting up in the Status Sort Order list.
Change Color	Opens the Select Status Color dialog box in which you select a color for a status. For more details, see Customizing Colors, page 4-16.
Move Down	Moves the chosen status setting down in the Status Sort Order list.
Reset Order	Restores the status settings to the default sort order.
Reset Colors	Restores the status settings to the default colors.

Changing CiscoWorks Server Settings

You can configure the CiscoWorks server name and port numbers for all connected MWTM clients:

- During MWTM installation. See the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.
- After installation by running the **mwtm cwsetup** command. See mwtm cwsetup, page B-23.

All clients connected to the MWTM server retain the CiscoWorks settings that were made during installation or the last time you ran the **mwtm cwsetup** command. However, you can overwrite the CiscoWorks settings for a particular client by using the preferences window.

To change the CiscoWorks server settings for a particular client:

Step 1 From the main window, choose **Edit > Preferences > CiscoWorks**.

Step 2 Click **CiscoWorks** in the left pane of the Preferences window.

The CiscoWorks server settings contain:

Check Box or Field	Description
IP Address or DNS Host Name[1]	The IP address or the DNS hostname of the CiscoWorks server.
Port[1]	The access port on the CiscoWorks server. The default setting is 1741.
Secure Port[1]	The port number on the CiscoWorks server that is used for secure access, for example, SSL access. The default setting is 443.
Secure Connection	Indicates if the connection to the CiscoWorks server is secure.

1. Changing this setting affects only the MWTM client you are using. All other MWTM clients retain the CiscoWorks settings that were made during installation or the last time you ran the **mwtm cwsetup** command.

Step 3 From the Preferences window menu bar, choose **File > Save**.

Note To do this procedure from the MWTM web interface, see Changing Web Preference Settings, page 4-18.

Changing Topology Settings

Use the Topology pane in the Preferences window to change default settings for the topology window.

To display the topology settings, select Topology in the left pane of the Preferences window.

The Topology pane contains:

Check Box or Field	Description
Spring Layout Spacing Factor (1-10)	Indicates how far to space nodes when the MWTM draws the Spring Layout topology map. Valid values are 1 through 10, with 1 being closer together and 10 being farther apart. The default spacing factor is 5. Even if you apply preferences and close the Preferences window, the topology map does not show the new spacing factor until you choose **Topology Tools > Layout > Spring**, or click the **Spring Layout** button.
Show Mouse Overs	Specifies whether tooltips are enabled in topology maps. Checked is the default.
Draw Connections When Dragging a Node	Specifies whether the MWTM draws connection lines in the topology map as you move nodes: • Check if you want the MWTM to draw the associated connection lines dynamically as you move a node. • Uncheck if you do not want the MWTM to draw the associated connection lines until after you have finished moving a node. Unchecked is the default.
Show Small SS7 Icons (ITP only)	Specifies the size of the SS7 icons in the topology map: • Uncheck if you want the MWTM to display large SS7 icons. Unchecked is the default. • Check if you want the MWTM to display small SS7 icons. This setting can save space in the topology map, making it easier to read.
Show Non-ITP Nodes (ITP only)	Specifies whether the MWTM should display non-ITP nodes and linksets in the topology map: • Check if you want the MWTM to display non-ITP nodes and linksets in the topology map. Checked is the default. • Uncheck if you want the MWTM to hide non-ITP nodes and linksets in the topology map. (The navigation tree still shows the hidden signaling points and linksets.)
Show Point Code and Node Name (ITP only)	Specifies whether the MWTM should display point codes as well as node names in the topology map: • Uncheck if you want the MWTM to display point codes but not node names. Unchecked is the default. • Check if you want the MWTM to display both point codes and node names.
X Performance Enhancer (AntiAliasing Off)	Specifies whether antialiasing is turned on in the topology map. Antialiasing, which is on by default, improves the appearance of the icons and connections in the map. However, antialiasing can impact the performance of the MWTM client on a remote workstation (that is, a Solaris or Linux workstation by using xhost, or a Windows workstation using an X-Window system emulator such as eXceed or Reflection X). • Uncheck if you want to turn on antialiasing in the topology map. Unchecked is the default. • Check if you want to turn off antialiasing. Remember that performance is always better if you access the MWTM by installing the MWTM client on the remote workstation.

Changing Deploy Settings

Note Deploy settings are only for ITP networks. If you configure the MWTM to manage ITP networks, the deploy settings will appear in the Preferences window. You customize the MWTM to manage ITP networks during installation. You can also do this later by command (see mwtm manage, page B-46).

Use the Deploy settings to change the way the Deployment Wizard works.

To display the Deploy settings, select Deploy in the left pane of the Preferences window.

The Deploy settings contain:

Check Box or Field	Description
Turn On Term Monitor During File Activation	Indicates whether the MWTM should turn on the terminal monitor before activating a route table file or GTT file on the ITP, and turn it off after activation (whether or not the activation was successful). If you turn on the terminal monitor during activation, detailed activation error messages appear in the connection log. These messages can be useful if activation fails. However, all node console logging messages also appear in the connection log; so, many nonactivation messages might also appear. The default is checked.
Turn Off All Debug Output Before Turning On Term Monitor	Indicates whether debug messages should appear in the connection log. The default is checked. If you check the Turn On Term Monitor During File Activation check box, all node console logging messages appear, including all debug messages that are currently enabled on the node. You can then check the Turn Off All Debug Output Before Turning On Term Monitor check box to turn off all debug messages. This setting can reduce the number of nonactivation messages in the connection log. The default is checked. **Note** The MWTM does not turn the debug messages back on after activation. Ensure that other users are not debugging on the node before checking this check box. This check box is dimmed unless you check the Turn On Term Monitor During File Activation check box.
Synchronize Active and Standby Storage If Node Is Configured as Redundancy Mode	Cisco 7507, 7513, and 7600 series routers support redundancy, which requires synchronization of the active and all standby storage devices. If you want the MWTM to use a node's *configured* redundancy mode to determine whether the MWTM should replicate storage operations (such as creating files, uploading, deleting, and so on) among the active and all standby storage devices, click this radio button. **Note** This radio button is mutually exclusive with the Synchronize Active and Standby Storage If Node Is Operating in Redundancy Mode and Do Not Synchronize Active and Standby Storage radio buttons.
Synchronize Active and Standby Storage If Node Is Operating in Redundancy Mode	If you want the MWTM to use a node's *operating* redundancy mode to determine whether the MWTM should replicate storage operations (such as creating files, uploading, deleting, and so on) among the active and all standby storage devices, in the right pane click this radio button. The default is checked. **Note** This radio button is mutually exclusive with the Synchronize Active and Standby Storage If Node Is Configured as Redundancy Mode and Do Not Synchronize Active and Standby Storage radio buttons.

Check Box or Field	Description
Do Not Synchronize Active and Standby Storage	If you want the MWTM to perform storage operations only on the active storage device (that is, no automatic synchronization of active and standby storage devices), click this radio button. Clicking this radio button requires you to manually synchronize the active and standby storage devices. This radio button is mutually exclusive with these radio buttons: • Synchronize Active and Standby Storage If ITP Is Configured as Redundancy Mode • Synchronize Active and Standby Storage If ITP Is Operating in Redundancy Mode
Enable Auto Refresh Node Storage In Node File Management Dialog	Indicates whether the Node File Management dialog box should refresh storage device content automatically at user-defined intervals. Clicking this check box enables the Node File Management dialog box to detect any updates made to the file system. In addition, you can configure the node to disconnect idle connection sessions. If you check this check box, the MWTM automatically generates node operations at the user-defined interval, which prevents disconnection of the session by the node. The default is unchecked. To enable the automatic refresh, check this check box, then specify a Refresh Interval. The valid range is 1 seconds to an unlimited number of seconds. The default interval is 60 seconds.
Always Overwrite Existing File In Deployment Wizard	Indicates whether the Deployment Wizard should overwrite an existing file with the same filename automatically, without prompting the user. The default is unchecked.
Always Skip Archive Comments	Indicates whether the Deployment Wizard should skip archive comments. The default is unchecked. This check box appears only if deploy comments are set to optional. For details, see mwtm deploycomments, page B-106. If deploy comments are set to required, this check box does not appear.
Always Activate Deployed File In Deployment Wizard	Indicates whether the Deployment Wizard should activate the deployed file automatically, without prompting the user. By default, this option is not selected.
Command Timeout in Seconds	Indicates how long, in seconds, an MWTM client with a session to a node should wait for a response from the node before closing the session. The valid range is 1 second to an unlimited number of seconds. The default is 90 seconds.

Customizing Colors

You use the MWTM to customize the colors for these settings:

Setting	Menu Selection	Color Dialog
Alarm or event severity	Click **Alarms / Events** in the left pane of the Preferences window, then click **Change Color** in the Alarm / Event Colors section.	Select Event Color
Series in real-time charts	Click **Charts** in the left pane of the Preferences window then click **Change Color** in the Series Colors section.	Select Series Color
Status	Click **Status** in the left pane of the Preferences window, select a status setting, then click **Change Color**.	Select Status Color

The Select Color dialog box contains:

- Swatches Tab (Recommended), page 4-17
- HSB Tab, page 4-17
- RGB Tab, page 4-17
- Select Color Field and Buttons, page 4-18

Related Topics

- Changing Alarm and Event Settings, page 4-7
- Changing Charts Settings, page 4-11
- Changing Status Settings, page 4-11

Swatches Tab (Recommended)

You use the Swatches tab of the Select Color dialog box to select a color from a set of color swatches. This is the recommended method for selecting a color.

To display the Swatches tab, click the **Swatches** tab in the Select Color dialog box.

To select a color, select a swatch. The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

HSB Tab

You must also choose hue, saturation, and brightness (HSB) variables to select a color.

To display the HSB tab, click the **HSB** tab in the Select Color dialog box.

To select a color, you can either:

- Select a color range on the vertical color bar, then select a specific color by moving the cursor around on the color square.
- Enter specific values in the (hue), S (saturation), and B (brightness) fields.

The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

RGB Tab

You then select the red, green, and blue (RGB) content of the color.

To display the RGB tab, click the **RGB** tab in the Select Color dialog box.

To select a color, select values for the Red, Green, and Blue fields. The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

Select Color Field and Buttons

The Select Color dialog box contains:

Field or Button	Description
Preview	Displays a preview of the current chosen color. Whichever method you choose to select a color, the chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.
OK	Sets the color as shown in the Preview field, and closes the Color dialog box.
Cancel	Closes the Color dialog box without selecting a color.
Reset	Resets the color to its initial setting.

Restoring Default Preference Settings

If you decide you do not like your modified preference settings, you can use the MWTM to restore all preference settings to the original system default settings. To do so:

Step 1 Display the Preferences window, as described in Changing Client Preference Settings, page 4-2.

Step 2 Select the **File > Load System Default Prefs** menu option.

The MWTM restores the default settings.

Changing Web Preference Settings

Access the web preference settings by clicking the Preferences link in the title bar of any web interface window. Web preferences include a subset of the preferences that are available in the client interface.

To change web preferences settings:

Step 1 Click **Preferences** in the title bar of any MWTM web page.

Step 2 In the Preferences window, to display the:

a. General GUI settings, click the **General GUI** tab.

b. CiscoWorks server settings, click the **CiscoWorks** tab.

Step 3 Change the settings you want to modify (see the table following this procedure for descriptions of the settings).

If you enter a new value in a text field, press **Enter** or **Tab** to activate the change.

Note For any user, common preferences between the web and client interfaces are shared. However, if the web and client interfaces are active at the same time, and you exit the client interface, any changes you made to the web preferences are overwritten by the client preferences.

You can now exit the web preferences window.

The Web Preferences window contains:

Check Box, Radio Button, or Field	Description
Help	Displays online help for the current window.
General GUI tab	
Node Name Settings: Show DNS or User-Defined Names	Indicates whether the MWTM should identify nodes by their DNS or user-defined names. The default setting for this radio button is checked.
Node Name Settings: Show IP Address in Name Field	Indicates whether the MWTM should identify nodes by their IP addresses. The default setting for this radio button is unchecked.
Node Name Settings: Show SysName	Indicates whether the MWTM should identify nodes by their System Name. The default setting for this radio button is unchecked.
General Display Settings: Show Node Domain Names	If checked, the MWTM shows node domain names in its displays. The default setting for this check box is unchecked (do not show node domain names).
General Display Settings: Show Details in Bits instead of Bytes	If checked, the MWTM displays data and data rates in bits instead of bytes: • Check if you want the MWTM to display data in bits, and data rates in bits per second. This is the default setting. • Uncheck if you want the MWTM to display data in bytes, and data rates in bytes per second.
General Display Settings: Show Utilization as Percentage	If checked, the MWTM displays receive and send for linksets and links as a percentage: • Check if you want the MWTM to display as a percentage. This is the default setting. • Uncheck if you want the MWTM to display in Erlangs.
General Display Settings: Show Point Code Mask in Bits	If checked, the MWTM displays point code masks as a number of bits instead of dotted-decimal format. The MWTM applies this setting to all point code masks in the MWTM client, including those in the Route Table dialog box, in messages, and so on. • Uncheck if you want the MWTM to display point code masks in dotted-decimal format (octets separated by periods). This is the default setting. • Check if you want the MWTM to display point code masks as a number of bits. For more information about point code masks, see Route Table, page 14-7.
Troubleshoot: Clear Display upon Execution	Clears the output display each time you execute a command.
Poller Settings: Fast Poller Interval (secs)	Default interval, in seconds, for the fast poller. The valid range is 5 seconds to 60 seconds. The default setting is 15 seconds. **Note** You can change the valid range and default setting in the *Server.properties* file. For more information, see Changing MWTM Server Poller Settings, page 5-2.
Poller Settings: Slow Poller Interval (secs)	Default interval, in seconds, for the slow poller. The valid range is 60 seconds to 300 seconds. The default setting is 60 seconds. **Note** You can change the valid range and default setting in the *Server.properties* file. For more information, see Changing MWTM Server Poller Settings, page 5-2.
Poller Settings: Status Refresh Interval (secs)	Specifies the default setting for how frequently the MWTM refreshes the web pages on the web interface. The valid range is 180 seconds to 900 seconds. The default setting is 180 seconds. (You can change the valid range and default setting in the *Server.properties* file. For more information, see Changing MWTM Server Poller Settings, page 5-2.)

Check Box, Radio Button, or Field	Description
Popup Dialogs: Show Batch Provision Service Interrupt Warning	Shows the batch provision service interrupt warning.
CiscoWorks tab[1]	
IP Address or DNS Host Name	The IP address or the DNS hostname of the CiscoWorks server.
Port	The access port on the CiscoWorks server. The default setting is 1741.
Secure Port	The port number on the CiscoWorks server that is used for secure access, for example, SSL access. The default setting is 443.
Secure Connection	Indicates if the connection to the CiscoWorks server is secure.

1. Changing these settings affects only the MWTM client you are using. All other MWTM clients retain the CiscoWorks settings that were made during installation or the last time you ran the mwtm cwsetup command.

Changing Real-Time Poller and Counter Settings

The MWTM provides three pollers for use in the MWTM client GUI and web pages: a fast, a slow, and a status refresh. You use the MWTM to change settings for those pollers, and also to specify how you want to aggregate the visible counter values.

To change the MWTM poller refresh and counter display settings, use one of these methods:

- The *Server.properties* file specifies minimum, maximum, and default settings for the fast, slow, and status refresh pollers. To change those settings, see Changing MWTM Server Poller Settings, page 5-2.
- To change the MWTM poller refresh and counter display settings for the GUI in the MWTM Preferences window, see Poller Settings, page 4-5.
- To change the MWTM poller refresh and counter display settings for the MWTM web pages by using the MWTM Web Preferences web page, see PDSN Reports, page 13-159.
- To change the MWTM counter display settings for the GUI from any Real-Time Data and Charts window in the GUI, click **Reset Counters** in any of these MWTM windows:
  - Poll Settings dialog box in any network object's MWTM Details window
  - Node Details: MTP3 Errors table
  - Signaling Point Details: GTT MAP Status table
  - Signaling Point Details: GTT Statistics table
  - Signaling Point Details: MLR Details table
  - Linkset: Statistics table
  - Link: Statistics tab and SCTP Assoc. Config Stats table
  - Interface: Interface Performance tab and Interface Errors table
  - SGMP: SCTP Assoc. Stats Details table

  The MWTM displays the MWTM Reset Counters dialog box

The MWTM Reset Counters dialog box contains:

Field or Button	Description
Show Counters Since Reboot	Click to configure the MWTM client to clear all counters in MWTM web pages whenever the node reboots. The default is checked.
Show Counters Since Last Poll	Click to configure the MWTM client to clear all counters whenever an MWTM web page is polled. The default is unchecked.
Show Counters Since User Reset	Click to configure the MWTM client to clear all MWTM counters whenever the user resets the counters on an MWTM web page. The default setting for this radio button is unchecked.
Submit	Applies any changes you made to the counter settings, reflects the changes throughout the MWTM GUI, and closes the MWTM Reset Counters dialog box.
Cancel	Closes the MWTM Reset Counters dialog box.
Help	Displays online help for the current window.

Viewing Online Help

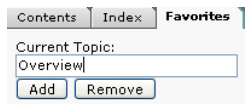
You can view web-based online help from either the MWTM client or the MWTM web interface.

From the MWTM client, select the menu options described in the following table:

Content	In the MWTM client, choose:
Table of contents	**Help > Topics**
Context-sensitive online help for the current window	**Help > Window**
MWTM information (build date, version, SSL support, copyright content)	**Help > About**

From the MWTM web interface, click **Help**.

The MWTM online help is searchable and supports bookmarking of favorite topics:

Feature	In the MWTM web interface, choose:
Search	
Favorites	

Finding Information in a Window

Sometimes, finding information, such as a node name or event text, in a long list can be difficult. You can use the MWTM client to search for a specific character string in windows that contain lots of information.

Note To find a specific object in the topology window, see Finding an Object, page 10-14.

To find a character string, choose **Edit > Find** from the MWTM main menu. This menu option is available when you select from the navigation tree:

- Active Alarms
- Event History
- Any object under Summary Lists

The MWTM displays the Find dialog box.

Note The Find dialog box also appears when you choose **File > Find** from the Route Table Editor dialog box (Chapter 14, "Editing an ITP Route Table File").

The Find dialog box contains:

Field or Button	Description
What	Character string for which the MWTM should search in the window. This can be any character string: all or part of a node name, event text, status, and so on.
Match Case	Check box used to indicate whether the MWTM should search for only character strings that match the case of the text in the What field. To search with: • Case-matching on, select this check box. • Case-matching off, clear this check box. This is the default setting.
Search Forward	Indicates whether the MWTM should search forward (down and to the right) in the window. This radio button is mutually exclusive with the Search Backward button. The default is checked.
Search Backward	Indicates whether the MWTM should search backward (up and to the left) in the window. This radio button is mutually exclusive with the Search Forward button. The default is unchecked.
Find	Launches the search. If: • It finds a matching character string in the window, the MWTM highlights the first line that contains the string. To find the next occurrence of the string, click **Find** again. You can continue to click Find until you find no more matches in the window. At that time, the MWTM displays an appropriate message in the dialog box, such as: `Bottom of table reached.` • No matching character string is found, the MWTM displays an appropriate message in the dialog box.
Close	Closes the Find dialog box when you finish searching.

Navigating Table Columns

You can resize, sort, or hide the columns in some tables in the MWTM to meet your specific needs. The MWTM client automatically saves your new settings and, thereafter, launches the client with the new settings.

Note Hiding table columns is possible in the MWTM client and web interfaces. Resizing table columns is possible only in the client interface. In the web interface, you can search for specific information and page through long tables by using its search and paging features (see MWTM Web Interface Content Area, page 11-5).

- To view a tooltip for each column in the table, place the cursor over a column heading. If a cell is too small to show all of its text, place the cursor over the cell to see the full text of the tooltip.
- To make a column wider or narrower in the MWTM client interface, click the column divider in the heading and move the divider to the right or left while holding down the left or right mouse button.

  All Components or Recent Events tables in the MWTM main window reflect changes that you make to any object's Components or Recent events table. The Show in New window or Real-Time Data and Charts windows do not reflect the changes, however.

  Depending on your system, as well as other factors, MWTM windows can sometimes appear so small that text is illegible, and columns and text entry fields too narrow to be usable. If this happens, resize the window and widen the individual columns until the information is again legible and the columns and text entry fields are usable.
- By default, the MWTM displays most of the columns in tables, but some columns may be hidden. To:
  - Display hidden columns, right-click in the table heading and select the check boxes for the columns you want to display. If you are using the web interface, click the **Apply** button.
  - Hide columns, right-click in the table heading and clear the check boxes for the columns you want to hide. If you are using the web interface, click the **Apply** button.

  All Components or Recent Events tables in the MWTM main window reflect changes that you make to any object's Components or Recent events table. The Show in New window or Real-Time Data and Charts windows do not reflect the changes, however.
- To sort a table based on the data in a column, left-click in the column heading. The MWTM alpha-numerically sorts the table from top to bottom, based on the data in the chosen column. To sort the table in reverse order, left-click in the column heading a second time. If two entries in the chosen column are identical, the MWTM sorts those rows based on the data in the remaining table columns, moving left to right.
- The tables in the web interface display an icon in the column heading to indicate the column on which the table is sorted, and the direction of the sort. The icon displays a triangle() if the sort order is ascending (1-9, A-Z), and an inverted triangle () if the sort order is descending (Z-A, 9-1).
- If you sort a table in the web interface based on the Nodes column, the MWTM sorts the table based on the DNS names of the nodes, as the MWTM discovers nodes. However, if you modified your preferences to identify nodes by their user-defined names, then the MWTM sorts the table based on the user-defined names of the nodes. For more information, see Node Name Settings, page 4-5.
- To customize the sort order for status settings in the Status column of tables, use the Status settings section of the Preferences window. For more information, see Changing Status Settings, page 4-11.

- (ITP only) To sort a route table, click **Sort Table**. The MWTM sorts the entries in the route table field-by-field, beginning with Dest. Point Code, then Mask, Cost, Dest.Linkset, and finally QoS.

Printing Windows

You can print most MWTM windows, as well as the topology map, for those times when you need hardcopy.

To print an MWTM window, choose **File > Print** from most MWTM windows (for example, the MWTM main window or topology window).

The MWTM displays the Print dialog box.

You use the Print dialog box to specify print settings, such as which printer to print to, whether to send output to a file (the default location for the print file is your home directory), and whether to print duplex.

Note You can send output to a file only in the file formats that your printer drivers support. Sending output to files can result in large file sizes that you will need to monitor and manage.

When you are satisfied with your print settings, click **Print**. The MWTM prints the window or map.

To exit the Print dialog box at any time without printing, click **Cancel**.

Managing and Deploying ITP Files

You use the MWTM to manage GTT files, route table files, and MLR address table files. The MWTM provides a Node File Management dialog box and a Node Archive Management dialog box:

- Node File Management, page 4-24
- Node Archive Management, page 4-31
- Deploying ITP Files, page 4-33

Node File Management

You use the Node File Management dialog box to:

- View:
  - GTT files
  - Route table files
  - MLR address table files
- Check these files for semantics and syntax
- Delete, rename, and upload the files to a remote node
- Activate the files

The Node File Management dialog box can handle GTT and route table files up to 512 KB in size (the maximum size supported by the MWTM and ITP) and up to 100,000 MLR address table entries.

To launch the Node File Management dialog box, choose **Network > Node File Management** from the MWTM main menu. The MWTM displays the Node File Management dialog box.

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

The Node File Management dialog box contains:

- Node File Management Menu, page 4-25
- Node File Management MWTM Pane, page 4-28
- Node File Management Node Pane, page 4-29

Node File Management Menu

The menu on the Node File Management dialog box contains:

Command	Description
File > Connect (Ctrl-N)	Opens the Pick Node dialog box in which you select a node and connect to that remote node. **Note** The remote node might be configured to disconnect idle sessions. To prevent disconnection of sessions by the node, enable the MWTM to refresh storage device content automatically by selecting the **Enable Auto Refresh Node Storage In Node File Management Dialog** check box in the Deploy settings section of the Preferences window, then specify a Refresh Interval. For more information, see Changing Deploy Settings, page 4-15. To avoid entering username and password information each time, you can set up credentials (see Configuring Login Credentials, page 5-19).
File > Disconnect (Ctrl-D)	Disconnects from the node. This option is dimmed if you are not connected to a remote node.
File > Close (Ctrl-W)	Closes the Node File Management dialog box.
Local > Open File	Opens the chosen route table file in the Route Table dialog box or the GTT file in the GTT Editor window or the MLR address table file in the Address Table Editor.
Local > Check File	Checks the semantics and syntax of the chosen file on the MWTM client.
Local > Cut	Cuts the chosen local file from the MWTM client.
Local > Copy	Copies the chosen local file from the MWTM client.
Local > Paste	Pastes a cut or copied local file into the MWTM client.
Local > Delete	Deletes the chosen file from the MWTM client. **Note** If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message.
Local > Rename	Renames the chosen file on the MWTM client. You can use any letters, numbers, or characters in the new name that your operating system allows. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*.

Command	Description
Local > Refresh	Refreshes the list of files in the MWTM pane. If you have added or modified route table files, GTT files, or MLR files on the MWTM client since you launched the Node File Management dialog box, the MWTM pane reflects those changes.
Local > Go Up	Displays the subdirectories and files that are in the directory that is up one level from the currently visible directory on the MWTM client. This option is dimmed if this is the highest directory level.
Local > Create Directory	Creates a new subdirectory in the directory that the MWTM client currently is displaying.
Remote > Activate	Activates the chosen route table file, GTT file, or MLR file on the remote node. That is, the MWTM replaces the currently running route table file, GTT file, or MLR file on the remote node with the chosen file. **Note** You cannot activate the *MWTM-LAST-ACTIVE-filename.rou*, *MWTM-LAST-ACTIVE_filename.gtt, MWTM-LAST-ACTIVE-filename.mlr,* or *MWTM-LAST-ACTIVE-filename.sms* files. These are backup files. If you need to revert to one of these files, copy it, rename it, and upload and activate the renamed file on the remote node. This option is dimmed if you are not connected to a remote node.
Remote > Cut	Cuts the chosen remote file from the remote node.
Remote > Copy	Copies the chosen remote file from the remote node.
Remote > Paste	Pastes a cut or copied remote file into the remote node.
Remote > Delete	Deletes the chosen file from the remote node. If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message. Some Cisco routers support redundancy, which requires synchronization of the active and all standby storage devices. If you delete a file in the node pane from an active storage device, and you then try to undelete the file before the standby storage devices have been synchronized, the file will have different IDs on the active and standby storage devices. If this occurs, the MWTM issues this error message and cancels the undelete: `Invalid ID` You must then undelete the file on the standby storage devices. This synchronization problem does not occur in the MWTM pane. This option is dimmed if you are not connected to a remote node.
Remote > Rename	Renames the chosen file on the remote node. **Note** You can rename files on the remote node for only Class C devices on the disk drives. You can use any letters, numbers, or characters in the new name that your operating system allows. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*. This option is dimmed if you are not connected to a remote node.
Remote > Undelete	Recovers the chosen file on the remote node. This option is dimmed if you are not connected to a remote node.

Command	Description
Remote > Refresh	Refreshes the list of files in the node pane. If route table files, GTT files, or MLR files have been added or modified on the remote node since you launched the Node File Management dialog box, those changes appear in the node pane. This option is dimmed if you are not connected to a remote node.
Remote > Go Up	Displays the subdirectories and files that are in the directory that is up one level from the directory that is currently visible on the remote node. This option is dimmed if this is the highest directory level or if you are not connected to a remote node.
Remote > Create Directory	Creates a new subdirectory in the directory that the remote node currently is displaying. **Note** You can create folders on the remote node for only Class C devices on the disk drives. This option is dimmed if you are not connected to a remote node.
Remote > Squeeze Node	Optimizes Flash memory on the remote node so that the space used by the files marked as *deleted* or *error* can be reclaimed. For more information, see the description of the **squeeze** command in the Cisco IOS Release 12.2 *Configuration Fundamentals Command Reference*. **Note** After performing the squeeze process you cannot recover deleted files using Undelete. This option is dimmed if you are not connected to a remote node.
Remote > Format Node	Formats the Flash memory file system on the remote node. For more information, see the description of the **format** command in the Cisco IOS Release 12.2 *Configuration Fundamentals Command Reference*. This option is dimmed if you are not connected to a remote node.
Help > Topics (F1)	Displays the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Displays online help for the current window.
Help > About (F3)	Displays build date, version, SSL support, and copyright information about the MWTM application.

Node File Management MWTM Pane

The MWTM pane on the left side of the Node File Management dialog box displays all of the files that the MWTM currently defines on the MWTM client. To populate the MWTM pane with all of the:

- Route table files currently defined on the MWTM client, select **Route Tables** from the drop-down list box.
- GTT files currently defined on the MWTM client, select **GTT Files** from the drop-down list box.
- MLR address table files currently defined on the MWTM client, select **MLR Address Tables** from the drop-down list box.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM sorts this table by Name, and displays all of the columns in the MWTM pane.

See Navigating Table Columns, page 4-23 for more information about resizing, sorting, displaying, or hiding columns.

The MWTM pane contains:

Column	Description
Type	Indicates whether the chosen name is a directory or a file.
Name	Name of the route table, GTT, or MLR file.
Size	Size of the file in bytes.
Modified	Date and time the file was last modified.

The MWTM pane provides these right-click menu options for files:

Command	Description
Open File	Opens the chosen route table file in the Route Table dialog box or the chosen GTT file in the GTT Editor window or the chosen MLR address table file in the Address Table Editor window.
Check File	Checks the semantics and syntax of the chosen file on the MWTM client.
Cut	Cuts the chosen file from the MWTM client.
Copy	Copies the chosen file from the MWTM client.
Paste	Pastes a cut or copied file into the MWTM client.
Delete	Deletes the chosen file from the MWTM client. **Note** If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message.
Rename	Renames the chosen file on the MWTM client. You can use any letters, numbers, or characters in the new name that your operating system allows. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*.
Refresh	Refreshes the list of files in the MWTM pane. If you have added or modified route table, GTT, or MLR files on the MWTM client since you launched the Node File Management dialog box, the MWTM pane reflects those changes.

Command	Description
Go Up	Displays the subdirectories and files that are in the directory that is up one level from the currently visible directory on the MWTM client. This option is dimmed if this is the highest directory level.
Create Directory	Creates a new subdirectory in the currently visible directory on the MWTM client.
Upload	Uploads the chosen file from the MWTM client to the remote node. You can also upload a file by selecting it in the MWTM pane and clicking the arrow pointing to the node pane. This option, and the arrow, is dimmed if you are not connected to a remote node.

Node File Management Node Pane

The node pane on the right side of the Node File Management dialog box displays all of the files that the MWTM currently defines on the remote node. To populate the node pane with all of the:

- Route table files currently defined on the remote node, select **Route Tables** from the drop-down list box.
- GTT files currently defined on the remote node, select **GTT Files** from the drop-down list box.
- MLR address table files currently defined on the remote node, select **MLR Address Tables** from the drop-down list box.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM sorts this table by Name, and displays all of the columns in the node pane.

See Navigating Table Columns, page 4-23 for more information about resizing, sorting, displaying, or hiding columns.

The node pane contains:

Column	Description
Type	Indicates whether the chosen name is a directory or a file.
Name	Name of the route table, GTT, or MLR file.
Size	Size of the file in bytes.
Modified	Date and time the file was last modified.

The node pane provides these right-click menu options for files:

Right-click Option	Description
Activate	Activates the chosen route table file, GTT file, or MLR file on the remote node. That is, the MWTM replaces the currently running route table file, GTT file, or MLR file on the remote node with the chosen file. **Note** You cannot activate the *MWTM-LAST-ACTIVE-filename.rou*, *MWTM-LAST-ACTIVE_filename.gtt, MWTM-LAST-ACTIVE-filename.mlr,* or *MWTM-LAST-ACTIVE-filename.sms* files. These are backup files. If you need to revert to one of these files, copy it, rename it, and upload and activate the renamed file on the remote node. This option is dimmed if you are not connected to a remote node.

Cut	Cuts the chosen file from the remote node.
Copy	Copies the chosen file from the remote node.
Paste	Pastes a cut or copied file into the remote node.
Delete	Deletes the chosen file from the remote node. If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message. Some Cisco routers support redundancy, which requires synchronization of the active and all standby storage devices. If you delete a file in the node pane from an active storage device, and you then try to undelete the file before the standby storage devices have been synchronized, the file will have different IDs on the active and standby storage devices. If this occurs, the MWTM issues the following error message and cancels the undelete: `Invalid ID` You must then undelete the file on the standby storage devices. This synchronization problem does not occur in the MWTM pane.
Rename	Renames the chosen file on the remote node. **Note** You can rename files on the remote node for only Class C devices on the disk drives. You can use any letters, numbers, or characters in the new name that your operating system allows. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*.
Undelete	Recovers the chosen file on the remote node.
Refresh	Refreshes the list of files in the node pane. If route table files, GTT files, or MLR files have been added or modified on the remote node since you launched the Node File Management dialog box, those changes appear in the node pane. This option is dimmed if you are not connected to a remote ITP.
Go Up	Displays the subdirectories and files that are in the directory that is up one level from the currently visible directory on the remote node. This option is dimmed if this is the highest directory level.
Create Directory	Creates a new subdirectory in the currently visible directory on the remote node. **Note** You can create folders on the remote node for only Class C devices on the disk drives.
Squeeze Node	Optimizes Flash memory on the remote node so that the space used by the files marked as *deleted* or *error* can be reclaimed. For more information, see the description of the **squeeze** command in the Cisco IOS Release 12.2 *Configuration Fundamentals Command Reference*. **Note** After performing the squeeze process you cannot recover deleted files using Undelete.
Format Node	Formats the Flash memory file system on the remote node. For more information, see the description of the **format** command in the Cisco IOS Release 12.2 *Configuration Fundamentals Command Reference*.
Download	Downloads the chosen file from the remote node to the MWTM client. You can also download a file by selecting it in the node pane and clicking the arrow pointing to the MWTM pane.

Node Archive Management

You use the Archive Management dialog box to view the contents of the archive, open a version with its corresponding editor, and delete all versions of a file.

To launch the Archive Management dialog box, choose **Edit > Node Archive Management** from the MWTM main menu. The MWTM displays the Archive Management dialog box.

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

The Archive Management dialog box contains:

- Node Archive Management Menu, page 4-31
- Node Archive Management Selector Pane, page 4-31
- Node Archive Management Display Pane, page 4-32

Node Archive Management Menu

The menu on the Archive Management dialog box contains:

Command	Description
File > Open File	Opens the chosen route table file in the Route Table dialog box or the chosen GTT file in the GTT Editor window or the chosen MLR address table file in the Address Table Editor window.
File > Delete	Deletes all versions of the chosen file from the MWTM client. **Note** If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message.
File > Refresh	Updates data for the currently visible entries.
File > Close (Ctrl-W)	Closes the Archive Management dialog box.
Help > Topics (F1)	Displays the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Displays online help for the current window.
Help > About (F3)	Displays build date, version, SSL support, and copyright information about the MWTM application.

Node Archive Management Selector Pane

The selector pane on the left side of the Archive Management dialog box displays all of the files that the MWTM currently defines on the MWTM client. To populate the selector pane with all of the:

- Route table files currently defined on the MWTM client, select **Route Tables** from the drop-down list box.
- GTT files currently defined on the MWTM client, select **GTT Files** from the drop-down list box.
- MLR address table files currently defined on the MWTM client, select **MLR Address Tables** from the drop-down list box.

To see the tooltip for each button in the selector pane, place the cursor over the button.

The selector pane contains:

Button or Object	Description
Open File for Editing	Opens the chosen route table file in the Route Table dialog box or the chosen GTT file in the GTT Editor window or the chosen MLR address table file in the Address Table Editor window.
Delete	Deletes all versions of the chosen file from the MWTM client. **Note** If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message.
Refresh	Updates data for the currently visible files.
Nodes	To see the nodes, signaling points, and archived files associated with a specific node, click the turner beside the node or signaling point. Clicking on an archived file displays the file in the right pane.
Signaling Points	To see the signaling points and archived files associated with a specific signaling point, click the turner beside the signaling point. Clicking on an archived file displays the file in the right pane.

The selector pane provides these right-click menu options for files:

Command	Description
Open File	Opens the chosen route table file in the Route Table dialog box or the chosen GTT file in the GTT Editor window or the chosen MLR address table file in the Address Table Editor window.
Delete	Deletes all versions of the chosen file from the MWTM client. **Note** If you try to delete a file, and you do not have permission to delete the file, the MWTM issues an appropriate error message.

Node Archive Management Display Pane

The Archive Management pane displays all of the versions that currently exist on the chosen file in a table. To navigate to a chosen file, click the turner beside Nodes or Signaling Points in the selector pane (in the left pane), and click on the file. All versions appear in the right pane.

If a cell is too small to show all of its comments, place the cursor over the cell to see the full text in a tooltip.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM sorts this table by Rev and displays all of the columns in the display pane.

See Navigating Table Columns, page 4-23 for more information about resizing, sorting, displaying, or hiding columns.

The display pane contains:

Column or Button	Description
Rev	Revision number.
Date	Date of archival.
Comments	Archival comments.

Column or Button	Description
Author	User or client hostname or IP address from which the deployment or archiving occurred.
Adjust row height	You can adjust the row height to make comments readable.

The display pane provides this right-click menu option for files:

Command	Description
Open File	Opens the chosen route table file in the Route Table dialog box or the chosen GTT file in the GTT Editor window or the chosen MLR address table file in the Address Table Editor window.

Deploying ITP Files

Tip Before you can use the Deployment Wizard, you must set up TFTP (for details, see Setting Up TFTP on Your Server (ITP Only), page 5-11).

You use the Deployment Wizard to validate a route table file, GTT file, or MLR address table file, upload it to an ITP, archive the file, and activate it on the ITP. The Deployment Wizard can handle route table and GTT files up to 512 KB in size (the maximum size the MWTM and ITP support) and up to 100,000 MLR address table entries.

To launch the Deployment Wizard, choose **File > Deploy** from the route table menu, GTT menu, or Address Table Editor menu. The MWTM displays the Deployment Wizard for the currently visible file.

The left pane of the Deployment Wizard contains:

Step	Description
Select File	Indicates that the file is chosen for deployment. The name of the file to deploy appears in the Deployment Wizard title bar.
Select Node/SP	If you are deploying a GTT file or address table file, you use this option to select the signaling point to deploy the file. You can optionally check the **Filter by Node** check box, which limits signaling point selection to a specific node. Select a signaling point and node (optional) from the drop-down list boxes in the right pane, then click **Next >**. If you are deploying a route table file, the MWTM proceeds directly to the Validate step.
Validate	Validates the file for deployment. Validation messages and error messages, if any, appear in the right pane.
Login	You can log in to the signaling point. If required, enter the: • Login username, if required. • Login password, if required. • Enable username, if required. • Enable password, if required. **Note** To avoid entering username and password information each time, you can set up credentials (see Configuring Login Credentials, page 5-19).

Step	Description
Upload	Uploads the file to the signaling point. If the file uploads with no errors, the MWTM proceeds to the Activate step. If the specified file already exists on the ITP, the MWTM displays the name of the duplicate file and the Overwrite and Always Overwrite check boxes. Check the: • **Overwrite** check box to overwrite the file on the ITP with the file being deployed. This is the default setting. • **Always Overwrite** check box if you want the MWTM to always overwrite the file on the ITP with the file being deployed, without prompting you for confirmation. The default setting for this check box is unchecked (prompt for confirmation). If you have set your preferences so that the MWTM client identifies nodes by their DNS names (the default setting) instead of by their IP addresses, then the ITP must be able to resolve the DNS names. Otherwise, the MWTM issues an appropriate error message and does not deploy the file. To enable the ITP to resolve DNS names, enter the **ip domain-lookup** command on the ITP. For more information about this command, see the *Cisco IOS IP Command Reference, Volume 1 of 4: Addressing and Services*, Release 12.3 or later. For more information about the Show DNS or User-Defined Names and Show IP Address in Name Field preference settings, see Node Name Settings, page 4-5.
Archive	You use to enter archive comments, if required. If archive comments are not required, the MWTM displays the Always Skip Archive Comments check box. For details on setting archive comments to required or optional, see mwtm deployarchive, page B-105.
Activate	Activates the file on the signaling point (replaces the currently running route table file, GTT file, or address table file with the deployed file). The MWTM displays the Activate File and Always Activate File check boxes. You can: • Check the **Activate File** check box to activate the deployed file on the ITP. This is the default setting. • Uncheck the **Activate File** check box if you do not want to activate the deployed file on the ITP yet. • Check the **Always Activate File** check box if you want the MWTM to always activate the deployed file on the ITP, without prompting you for confirmation. The default setting for this check box is unchecked (prompt for confirmation).
Done	Displays any status messages, such as errors or successful completion.

The bottom line of the Deployment Wizard contains:

Field or Button	Description
Progress Bar	Indicates that the MWTM is validating or uploading the file.
Show Log/Hide Log	Displays or hides the log file for the Deployment Wizard.
Next >	Advances to the next step in the Deployment Wizard.
Finish	Closes the Deployment Wizard. The **Finish** button appears when deployment ends successfully, or when the MWTM encounters errors and cancels the process.
Cancel	Closes the Deployment Wizard without deploying the file.
Help	Displays online help for the Deployment Wizard.

Exporting Data

You use the MWTM to export its data for use by other products, such as CiscoWorks or Microsoft Excel. This section includes:

Exporting Current Data for Network Objects

You can use the MWTM CLI to export all MWTM data, or to export only chosen MWTM data.

To export all current MWTM data, with fields separated by vertical bars (|; this is the default setting), enter the **mwtm export all** command with the **-d bar** keywords:

mwtm export all -d bar

To export all MWTM data with fields separated by commas (,), specify the **-d comma** keywords:

mwtm export all -d comma

To export all MWTM data with fields separated by tabs, specify the **-d tab** keywords:

mwtm export all -d tab

To export only object-specific MWTM data, specify one of these keywords:

- **as**—(ITP only) Export only application server data.
- **asp**—(ITP only) Export only application server process data.
- **aspa**—(ITP only) Export only application server process association data.
- **links**—(ITP only) Export only link data.
- **linksets**—(ITP only) Export only linkset data.
- **nodes**—Export only node data.
- **sgmp**—(ITP only) Export only signaling gateway-mated pair data.
- **sps**—(ITP only) Export only signaling point data.

You can also specify the **-d comma** or **-d tab** keywords on any of these object-specific **mwtm export** commands.

Here is sample output for the **mwtm export nodes** command:

```
# ./mwtm export nodes
# v6.1.0.15
# t1168093931311|Sat Jan 06 09:32:11 EST 2009
#
# Total 2 nodes
# name|displayname|sgmid|old_description|cllicode|ipaddress|old_pointcode|old_se
condary|old_capability|state|statetimestamp|ioslevel|devicetype|usericonname|sys
descr|lastpolltimestamp|lastpolltime|avgpolltime|old_lasterrormsg|old_lasterrort
ime|notesexist|old_variant|sysuptime|rebootreason|statereason|discoveredtime|eve
ntRcvd|connectTo|ignore|customName|processTraps|nsoconfig|mtp3offload|rfpeerstat
e|trapPollingEnabled|reportPollingEnabled|sysName|nodeType

ems1941ka.cisco.com|ems1941ka.cisco.com|1253|not_used|not_used|[172.18.156.20][2
0.1.1.105]|not_used|not_used|not_used|Warning|1168092733287|7|CiscoMWR-1941-DC|n
ull|sysDescr|1168093830179|328|634|not_used|not_used|false|not_used|248128063|re
load|62|1168092732082|false|null|false|null|true|not_used|not_used|not_used|true
|true|ems1941ka|RAN-O
```

```
sgm-26-91c-2.cisco.com|null|1350|not_used|clli_2691c|[172.18.17.132,172.18.17.4]
[]|not_used|not_used|not_used|Unmanaged|1168093760605|31|Cisco2651XM|null|sysDes
cr|1168092856198|12984|18729|not_used|not_used|false|not_used|731561022|reload|1
|1168092734928|false|null|false|null|true|1|1|2|false|false|sgm-26-91c.cisco.com
|ITP
```

For more information about the use of the **mwtm export** command, see mwtm export, page B-33.

Exporting Current Node Names and SNMP Community Names

To export current MWTM node names and read and write SNMP community names, in CiscoWorks v2 and CiscoWorks v3 import formats, with fields separated by commas (,), specify **cw** or **cwv3** keywords respectively:

mwtm export cw

You can export this data to a file, then use the file to import the nodes into the CiscoWorks database.

For more information about the use of the **mwtm export cw** command, see mwtm export cw, page B-34.

mwtm export cwv3

You can export this data to a file, then use the file to import the nodes into the CiscoWorks database.

For more information about the use of the **mwtm export cwv3** command, see mwtm export cwv3, page B-34.

Integrating the MWTM with Other Products

The MWTM does not require CiscoWorks or the Cisco Info Center (CIC), but the MWTM does integrate with those products to provide added value. See these sections for more information:

- Integrating the MWTM with CiscoWorks, page 4-36
- Forwarding Traps to Other Hosts (Server Only), page 4-38

Integrating the MWTM with CiscoWorks

The MWTM can integrate with CiscoWorks during installation, registering with CiscoWorks as an installed application. In this scenario, CiscoWorks and MWTM are running on the same server. See the "Installing the MWTM on Solaris" and "Installing the MWTM on Windows" chapters of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information.

You can also integrate the MWTM with CiscoWorks after installation by using:

- Preference settings. See Changing CiscoWorks Server Settings, page 4-13.
- The **mwtm cwsetup** command. See mwtm cwsetup, page B-23, for more information.

Note If you are using CiscoWorks with the MWTM, do *not* install the CiscoWorks Device Fault Manager or CiscoWorks Campus Manager applications. These applications are not needed in service provider mobile wireless networks and cause contention for key ports (for example, the default SNMP trap port 162) in addition to consuming valuable CPU and memory resources on the server.

To uninstall the CiscoWorks Device Fault Manager and CiscoWorks Campus Manager applications, use the following commands:

```
/opt/CSCOpx/bin/uninstall.sh
```

then specify to uninstall the following applications:

- Campus Manager 5.1
- Device Fault Manager 3.1

Once you have integrated the MWTM with CiscoWorks, you can:

- Launch CiscoWorks Applications from the MWTM Client, page 4-37
- Launch Integrated Applications from the MWTM Web Interface, page 4-38
- Launch the MWTM Web Interface from the CiscoWorks Dashboard, page 4-38

Launch CiscoWorks Applications from the MWTM Client

When you integrate the MWTM with CiscoWorks, you can launch, from the MWTM client **Launch** menu, the:

- CiscoView
- CiscoWorks LMS Portal
- CiscoWorks Device Center

To launch CiscoWorks applications from the MWTM client:

Step 1 Ensure that CiscoWorks is installed in the network.

Step 2 To launch the appropriate CiscoWorks application:

CiscoWorks Application	Description	Steps to Launch from MWTM
CiscoView	Provides a real-time, color-coded, graphical representation of Cisco devices. You can use CiscoView to quickly identify an incorrect status on a port or interface. If you are running CiscoWorks on UNIX or Windows, you can access CiscoView through the link to the web version of CiscoWorks.	Choose **Launch > CiscoView** from the MWTM main menu. Or, right-click a node in the navigation tree and choose **Launch > CiscoView**.
CiscoWorks LMS Portal	Provides a dashboard of CiscoWorks tools and utilities such as Resource Manager Essentials.	Choose **Launch > CiscoWorks LMS Portal** from the MWTM main menu.
Device Center	Provides useful web-based device-monitoring functions, including reachability trends, response time trends, interface status, Syslog browsing, and a detailed inventory.	Choose **Launch > Device Center** from the MWTM main menu. Or, right-click a node in the navigation tree and choose **Launch > Device Center**.

Step 3 At the prompt, enter a CiscoWorks user ID and password.

Depending on your selection in Step 2, the MWTM links to the:

- Device Center dashboard, which displays information about the chosen node.

- CiscoView, which shows a graphical representation of the chosen node.

Launch Integrated Applications from the MWTM Web Interface

To launch integrated applications from the MWTM web interface:

Step 1 From the MWTM web interface, click the **Tools** link in the navigation tree (left pane).

Note If CiscoWorks does not appear in the navigation tree of the MWTM web interface, CiscoWorks is not integrated with the MWTM. Use the mwtm cwsetup, page B-23, to integrate CiscoWorks with the MWTM.

Step 2 In the right pane, in the Launch pane, click:

- CiscoView (*server_name*)
- CiscoWorks LMS Portal (*server_name*)
- Device Center (*server_name*)

The chosen application launches.

Launch the MWTM Web Interface from the CiscoWorks Dashboard

To launch the MWTM web interface from the CiscoWorks dashboard:

Step 1 Log in to your CiscoWorks dashboard.

Step 2 In the Mobile Wireless Transport Manager box, click the **MWTM Server Home Page** link.

Note If the Mobile Wireless Transport Manager box does not appear, CiscoWorks is not integrated with the MWTM. Use the mwtm cwsetup, page B-23, to integrate CiscoWorks with the MWTM.

The MWTM web interface opens to the home page.

Forwarding Traps to Other Hosts (Server Only)

You use the MWTM to forward SNMP traps to other SNMP servers, or hosts. The MWTM can then function as a trap multiplexer, integrating with high-level event- and alarm-monitoring systems such as the Cisco Info Center and IBM's Netcool/Tivoli suite of products. These systems can provide a single high-level view of all alarm monitoring in your network, making it easier to detect and resolve problems.

To enable the MWTM to forward SNMP traps to other hosts, specify the list of hosts in the *TrapForwarder.properties* file. The default file resides in the MWTM */properties* directory. If you installed the MWTM in:

- The default directory, */opt*, then the default file resides in */opt/CSCOsgm/properties/TrapForwarder.properties*.
- A different directory, then the default file resides in that directory.

In the *TrapForwarder.properties* file, begin all comment lines with a pound sign (#).

All other lines in the file are host definition lines using this format:

SERVER*xx*=*dest-address*[**:***portno*]

where:

- *xx* is the user-defined server number.
- *dest-address* is the hostname, or the IP address in dotted-decimal format.
- *portno* is the optional port number. The default port number is 162.

For example, this host definition line:

SERVER02=64.102.86.104:162

enables the MWTM to forward traps to Server 02, with IP address 64.102.86.104, on port 162.

Any changes you make to the *TrapForwarder.properties* file take effect when you restart the MWTM server. Thereafter, the MWTM forwards all traps from the listed hosts except traps:

- That the MWTM cannot parse.
- From hosts listed in the *trapaccess.conf* file. For more information, see Limiting Traps by IP Address, page 5-8.

The MWTM modifies Version 2c traps that do not have the agent IP address already specified in the varbind list by including the agent IP address in the varbind list.

You can also forward MWTM events to other hosts, in the form of SNMP traps. For more information, see Forwarding Events as Traps to Other Hosts, page 9-37.

Running Simultaneous Client Sessions

You can run multiple sessions of the MWTM client simultaneously because the MWTM uses a client-server architecture. The MWTM server provides central services and database functions and communicates with multiple MWTM clients. You can install the MWTM client software on the same system as the MWTM server, or on a different system on the same network as the MWTM server.

Note Running more than one MWTM client on the same workstation can degrade the workstation performance.

The MWTM recommends a maximum of 20 clients per MWTM server. If you connect more than 20 clients to a single server, the server requires additional memory and a more powerful CPU.

Performing Basic Server Operations

This section contains this information:

- Connecting to a New Server, page 4-40

- Viewing Server Status Information, page 4-40

Connecting to a New Server

You use the MWTM to connect the client to a new MWTM server. For example, you can monitor two or more networks from the same MWTM client, simply by switching servers. Or, if you have two MWTM servers monitoring the same network, and one server fails, the MWTM client automatically switches to the secondary server.

If you want to determine the default hostname before you connect to the new server, it appears in the SERVER_NAME entry in the *System.properties* file. If you installed the MWTM in:

- The MWTM in the default directory, */opt*, then the location of the *System.properties* file is */opt/CSCOsgm/properties/System.properties*.
- A different directory, then the *System.properties* file resides in that directory.

To connect the client to a new server, choose **File > Connect to New Server** from the MWTM main menu. The MWTM displays the Connect to New Server dialog box.

The Connect to New Server dialog box contains:

Field or Button	Description
Server Name or IP Address	Name or IP address of the new server. Select the name of the new server, or its IP address from the Server Name or IP Address drop down list. You can also enter the server name or the IP address in this field manually. **Note** Server names get populated in the Server Name or IP Address drop down menu, only after adding the server names using mwtm servername command.
Name Server Port	UDP port number for the new server. Select the MWTM Naming Server UDP port number for the new server in the Name Server Port field. You can also enter the port number in this field manually. The default value is 44742. **Note** On selection of Server Name or IP Address from the drop-down box, the configured port number for that selected Server Name or IP Address is displayed in the Port Number field
OK	Stops the MWTM client, then restarts the client connected to the specified server. When you have entered the name of the new server, or its IP address, and its UDP port number, click **OK**. The MWTM stops the client, then restarts the client connected to the new server.
Cancel	Closes the Connect to New Server dialog box without connecting to the new server.
Help	Displays online help for the Connect to New Server dialog box.

Viewing Server Status Information

You use the MWTM to view detailed information about the processes, pollers, tasks, and clients for the server to which you are connected.

To display server status information, choose **View > MWTM Server > Status** in the MWTM main menu. The MWTM displays the Server Status Information window.

The Server Status Information window contains:

Server Status Information: Fields and Buttons

The Server Status Information window contains:

Command	Description
Poll Interval	Poll interval used to collect data for the table.
Last Poll	Time the last poll was run. This field initially displays a message that the MWTM is polling the device. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Update	Forces an immediate poll, and refreshes the Server Status Information window with the latest data.
Close	Closes the Server Status Information window.
Help	Accesses the online help for this window.

Server Status Information: Processes

The Server Status Information: Processes section lists the processes that make up the MWTM server, and contains:

Field	Description
Name	Name of the process, such as sgmNameServer.
Process ID	Number to uniquely identify the process.
Is Running	Indicates whether the process is running (true) or not (false).

Server Status Information: Pollers

The Server Status Information: Pollers table lists the detail and demand pollers that the MWTM server is currently processing, and contains:

Field	Description
Poller ID	Number to uniquely identify each MWTM detail poller that is currently active. MWTM detail pollers collect detailed data (such as real-time data, statistics, route detail, and so on) that the regular MWTM poller did not collect.
Client Host	Name of the MWTM client that started the detail poller.
Interval	Poll interval for the detail poller, in hours, minutes, and seconds.

Field	Description
Iteration	Number of times the detail poller should poll. If this field displays Forever, the detail poller will never stop polling, until the MWTM client requests that it stops.
Next Poll	Time until the next poll, in hours, minutes, and seconds.
Time Limit	Time remaining, in hours, minutes, and seconds, until the poller times out. When the poller times out, the MWTM automatically stops the poller to prevent unnecessary traffic on the network and sends an appropriate error message to the client. By default, the MWTM allows pollers to run up to 8 hours. To change that setting, see the description of the **mwtm pollertimeout** command in mwtm pollertimeout, page B-53.
Description	Description of the detail poller.

Server Status Information: Tasks

The Server Status Information: Tasks table lists long-running services that the MWTM server performs, and contains:

Field	Description
Task ID	Number to uniquely identify the task.
Interval	Time between runs for the task, in hours, minutes, and seconds.
Iteration	Number of times the task should run. If this field displays Forever, the task will never stop polling.
Next Execution	Time until the next run for the task, in hours, minutes, and seconds.
State	Current state of the task. Valid values are: • **None**—Task is stopped. • **Waiting**—Task is waiting to transition to Ready or Running state. • **Ready**—Task is ready to execute but is not yet in Running state. • **Running**—Task is started and is currently executing. • **Pending**—Task was in Ready state when a user canceled it. The task is pending final removal from the scheduler. • **Error**—Task encountered an error. • **Dying**—Task was in Running state when it was canceled by a user. The task continues to run in Dying state until it ends. The server then removes the task from the scheduler.
Description	Description of the task.

Server Status Information: Clients

The Server Status Information: Clients table contains:

Field	Description
Process Name	Name of an MWTM client that is currently connected to the server.
User Name	If you have implemented MWTM User-Based Access, this field displays the name of an MWTM client user who is currently logged in and connected to the server. If you have not implemented MWTM User-Based Access, this field displays the name of the node that the user is using.
Message Mask	Mask that indicates which messages can be sent to the client.
Sleeping?	Indicates whether the thread that is responsible for delivering messages is sleeping (yes) or not (no). The normal setting for this field is no.
Sleep Time	Time in seconds the thread that is responsible for delivering messages has been sleeping. The normal setting for this field is 0.
Queue Size	Number of messages waiting to be sent to the MWTM client. The normal setting for this field is 0, but it could be higher if the MWTM server or client is very busy, as during Discovery.

Using the Command Line Interface

The MWTM provides a command line interface that you use to interact with the MWTM and with the Cisco IOS software operating system by entering commands and optional arguments. For more information, see Appendix B, "Command Reference."

CHAPTER 5

Setting Up Your Server

This chapter contains:

Importing SNMP Community Names from CiscoWorks (Solaris Only)

You can use the Cisco Mobile Wireless Transport Manager (MWTM) to store all SNMP community names in a single database in CiscoWorks Common Services (CS), and to export those names for use by the MWTM.

To export the database from CiscoWorks CS to the MWTM:

Step 1 Log in to CiscoWorks. From the Common Services tab, choose **Device and Credentials > Device Management**.

Step 2 Click the **Export** button.

Step 3 In the tree in the left pane, select the device(s) for export. To choose all devices, click the box next to CS@<*your_server_name*>. To choose an individual device:

- Expand the hierarchy

- Drill-down to find an individual device
- Click the box next to the corresponding device

Step 4 In the fields in the right pane, enter:

```
File Name = mwtm
Format = CSV
```

CiscoWorks creates the *mwtm* file in the default export directory, */opt/CSCOpx/objects/dmgt*. When you start the MWTM server, the MWTM looks for this file. If the file exists, the MWTM merges the file with its own community name database, and the exported SNMP community names will appear in the SNMP tab of the Node SNMP and Credentials dialog box (see Configuring Nodes, page 5-14.)

Tip For more information about SNMP, see "Configuring SNMP Support" in the Cisco IOS Release 12.2 *Configuration Fundamentals Configuration Guide*, Part 3, System Management.

Changing MWTM Server Poller Settings

Note For details on changing poller settings using the MWTM client or MWTM web interface, see Changing Client and Web Preference Settings, page 4-1.

The MWTM provides four pollers for use in the MWTM client GUI and web pages: a fast poller, a slow poller, a status refresh poller, and a memory poller. Using the MWTM, you can change the settings (such as minimum, maximum, and default) for each poller. However, the only setting you can modify for the memory poller is the timeout value.

To change server poller settings:

Step 1 Edit the *Server.properties* file:

- If you installed the MWTM in the default directory, */opt*, then the location of the *Server.properties* file is */opt/CSCOsgm/properties/Server.properties*.
- If you installed the MWTM in a different directory, then the *Server.properties* file is located in that directory.

Step 2 To change fast poller settings, change one or more of these lines in the file:

```
# Fast poller default polling interval in seconds
FAST_POLLER_DEFAULT = 15

# Fast poller minimum polling interval in seconds
FAST_POLLER_MIN = 5

# Fast poller maximum polling interval in seconds
FAST_POLLER_MAX = 60
```

For example, to change the fast poller default to 30 seconds, change the FAST_POLLER_ DEFAULT line to:

```
FAST_POLLER_DEFAULT = 30
```

Step 3 To change slow poller settings, change one or more of these lines in the file:

```
# Slow poller default polling interval in seconds
SLOW_POLLER_DEFAULT = 60

# Slow poller minimum polling interval in seconds
SLOW_POLLER_MIN = 60

# Slow poller maximum polling interval in seconds
SLOW_POLLER_MAX = 300
```

For example, to change the slow poller default to 180 seconds, change the SLOW_POLLER_DEFAULT line to:

```
SLOW_POLLER_DEFAULT = 180
```

Step 4 To change status refresh poller settings, change one or more of these lines in the file:

```
# Status refresh default interval in seconds
STATE_REFRESH_DEFAULT = 180

# Status refresh minimum interval in seconds
STATE_REFRESH_MIN = 180

# Status refresh maximum interval in seconds
STATE_REFRESH_MAX = 900
```

For example, to change the status refresh poller default to 300 seconds, change the STATE_REFRESH_DEFAULT line to:

```
STATE_REFRESH_DEFAULT = 300
```

Step 5 To change memory poller settings, update the following value:

```
MEMORY_POLLER_TIMEOUT_INCREMENT = 5000
```

Step 6 Save your changes and restart the MWTM server.

Any changes you make take effect when you restart the MWTM server, and are reflected throughout the MWTM client GUI and web pages at that time.

For each of these pollers, remember that, if you set the:

- Minimum interval for a poller to less than 0 seconds, the MWTM overrides that setting and resets the minimum interval to 0 seconds.
- Maximum interval for a poller to less than the minimum interval, the MWTM overrides that setting and resets the maximum interval to be equal to the minimum interval.
- Default interval for a poller to less than the minimum interval, the MWTM overrides that setting and resets the default interval to be equal to the minimum interval.
- Default interval for a poller to more than the maximum interval, the MWTM overrides that setting and resets the default interval to be equal to the maximum interval.

Tip Due to potential timeouts during memory polling, we do not recommend that you set the memory timeout add-on value to anything less than the default of 5000 milliseconds. If the MWTM encounters memory timeouts during normal day-to-day operations, you can increment this value to alleviate the problem.

Changing the Message Display

These sections contain information about changing the way the MWTM displays and stores messages:

Changing the Location of MWTM Message Log Files

By default, all MWTM system message log files are located on the MWTM server at */opt/CSCOsgm/logs*. To change the location of the system message log directory, use the **mwtm msglogdir** command. For more information, see mwtm msglogdir, page B-50.

Changing the Size of the MWTM Message Log Files

To change the size of the message log files, use the **mwtm logsize** command. For more information, see mwtm logsize, page B-44.

Changing the Time Mode for Dates in Log Files

To change the time mode for dates in log files, use the **mwtm logtimemode** command. For more information, see mwtm logtimemode, page B-45.

Changing the Age of the MWTM Message Log Files

To change the number of days the MWTM archives system message log files before deleting them from the MWTM server, use the **mwtm msglogage** command. For more information, see mwtm msglogage, page B-50.

Setting the ITP Point Code Format

You can use the MWTM to set a new point code format for an MWTM server. The MWTM server and all associated MWTM clients use the new point code format. Normally, you need to do this only once, after installation.

Note When setting the ITP Point Code Format, if a discovery has already occurred, some node and signaling point objects will have been named using the old format. These names will not be affected by the new format. To force the objects to be recreated using the new point code format, you must perform an **mwtm cleandb**.

After you perform the **mwtm cleandb**, the network will need to be discovered again to populate the device names based on the new signaling point format.

The point code format configuration is contained in the *PointCodeFormat.xml* file.

To set the new point code format, log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19. Then enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm pcformat [edit | list | master | restore]
```

Where:

- edit—Opens the *PointCodeFormat.xml* file for editing, using $EDITOR environment variable if set, otherwise uses vi.
- list—Displays the current contents of the *PointCodeFormat.xml* file.
- master—Restores the *PointCodeFormat.xml* file to the default settings.
- restore—Restores the *PointCodeFormat.xml* file to the last saved copy.

The *PointCodeFormat.xml* file provides these default point code formats:

- <Variant value=”ANSI” format=”8.8.8”/>—Formats point codes using the 24-bit American National Standards Institute (ANSI) standard format, *xxx.yyy.zzz*, where:
  - *xxx* is the 8-bit network identification
  - *yyy* is the 8-bit network cluster
  - *zzz* is the 8-bit network cluster member
- <Variant value=”China” format=”8.8.8”/>—Formats point codes using the 24-bit China standard format, *xxx.yyy.zzz*, where:
  - *xxx* is the 8-bit network identification
  - *yyy* is the 8-bit network cluster
  - *zzz* is the 8-bit network cluster member
- <Variant value=”ITU” format=”3.8.3”/>—Formats point codes using the 14-bit International Telecommunication Union (ITU) standard format, *x.yyy.z*, where:
  - *x* is the 3-bit zone identification
  - *yyy* is the 8-bit region identification
  - *z* is the 3-bit signal-point
- <Variant value=”NTT” format=”5.4.7” readBits=”rightToLeft”/>— Formats point codes using the 16-bit Nippon Telegraph and Telephone Corporation (NTT) standard format, *xx.yy.zzz*, where:
  - *xx* is the 5-bit zone identification
  - *yy* is the 4-bit area/network identification
  - *zzz* is the 7-bit identifier
- <Variant value=”TTC” format=”5.4.7” readBits=”rightToLeft”/>— Formats point codes using the 16-bit Telecommunication Technology Committee (TTC) standard format, *xx.yy.zzz*, where:
  - *xx* is the 5-bit zone identification
  - *yy* is the 4-bit area/network identification
  - *zzz* is the 7-bit identifier

As shown previously, the standard point code format for each variant is three octets. (For example, 3.8.3 for ITU) However, you can also specify a four-octet format for any of the variants. (For example, 4.3.4.3 for ITU) The total number of bits must still equal 24 for ANSI and China, 14 for ITU, and 16 for NTT and TTC.

For information about customizing the point code formats, including setting a new three-octet or four-octet format, see the detailed instructions in the *PointCodeFormat.xml* file.

Any changes that you make take effect when you restart the MWTM server.

The MWTM preserves customized point code formats when you upgrade to a new version or release of the MWTM.

Connecting a Single-Instance ITP to a Multiple-Instance ITP

You can configure the MWTM to recognize a single-instance ITP connecting to multiple instances on a multiple-instance ITP. In effect, the MWTM views the multiple networks as a single all-encompassing network.

To connect single-instance ITPs to multiple-instance ITPs:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm pcformat edit
```

The mwtm pcformat edit command opens the *PointCodeFormat.xml* file for editing. For more information about using this command, see Setting the ITP Point Code Format, page 5-4.

Step 3 Add these lines to the *PointCodeFormat.xml* file:

```
<NetworkConfig>
    <Network value="Big-Network">
        <Include value="Network-1"/>
        <Include value="Network-2"/>
        <Include value="Network-3"/>
    </Network>
</NetworkConfig>
```

Where:

- *Network-1*, *Network-2*, and *Network-3* are the names of your subnetworks. (This example assumes that you are combining three subnetworks into one.)
- *Big-Network* is the name of the combined network that includes *Network-1*, *Network-2*, and *Network-3*.

  In the MWTM, the signaling point Instance Name field displays the subnetwork name (for example, Network-1), and the Point Code field displays the name of the combined network (for example, Big-Network).

  During Discovery, the MWTM assigns a default name to each discovered signaling point. The assigned default name consists of the point code and the combined network name (for example, 3.8.3:Big-Network).

Step 4 Save your changes to the *PointCodeFormat.xml* file.

Step 5 Restart the MWTM server. Any changes you made to the *PointCodeFormat.xml* file take effect when you restart the MWTM server.

The MWTM preserves the customized network configuration when you upgrade to a new version or release of the MWTM.

Enabling SNMP Traps

By default, the MWTM cannot receive SNMP traps. To use SNMP traps with the MWTM, you must first configure the MWTM to receive traps.

To view the current trap reception configuration for the MWTM:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm trapstatus
```

The MWTM displays the current trap reception configuration for the MWTM, including:

- Whether receiving traps is enabled or disabled
- Which UDP port the MWTM trap receiver is listening on

To configure the MWTM to receive traps:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm trapsetup
```

The MWTM displays:

```
The MWTM server must also be stopped to perform this operation.
Do you wish to continue? [n]
```

Step 3 Type **y** and press **Enter**.

The MWTM stops the MWTM Process Manager and all managed processes and displays:

```
Would you like to configure MWTM to receive SNMP traps? [yes]
```

Step 4 Press **Enter**.

The MWTM displays:

```
MWTM can receive traps natively on the standard UDP port number 162
or on any other UDP port chosen. If another application is already
bound to the SNMP standard trap reception port of 162, an alternate
port number for MWTM to receive traps must be specified.
```

```
UDP port number 44750 is the default alternate port.

Enter trap port number? [ 162 ]
```

Step 5 By default, nodes send traps to port 162. To accept the default value, press **Enter**.

Step 6 If your nodes have been configured to send traps to a different port, type that port number and press **Enter**.

Step 7 By default, the MWTM listens for traps from trap-multiplexing nodes and NMS applications on port 44750. If you want the MWTM to monitor that port, and port 162 is not available on the MWTM server host, type **44750** and press **Enter**.

Step 8 If trap multiplexing nodes and NMS applications in your network have been configured to send traps to a different port, type that port number and press **Enter**.

Step 9 If you are a superuser, you must specify a port number that is greater than 1024, then press **Enter**.

Do not enter a non numeric port number. If you do, you are prompted to enter a numeric port number.

When you select an SNMP trap port number for the MWTM server, ensure your nodes use the same SNMP trap port number. See the description of the snmp-server host command in the "Preparing to Install the MWTM" chapter of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information.

Step 10 To accept the default value, press **Enter**; or, type a different location and press **Enter**.

The MWTM confirms your choices and restarts the MWTM Process Manager and all managed processes.

You can change all aspects of MWTM event processing, including the size of the MWTM event database, the maximum length of time the MWTM is to retain events, and the default severity and color associated with each type of event. If a new trap becomes available that is of interest to the MWTM, you can add it to the MWTM event database, enabling the MWTM to recognize and process the new trap. For more information about changing MWTM event processing, see Changing the Way the MWTM Processes Events, page 9-24.

Related Topics

Integrating the MWTM with Other Products, page 4-36

Limiting Traps by IP Address

By default, when you first install the MWTM, all IP addresses are allowed to send traps to the MWTM server. However, you can use the MWTM to limit the IP addresses that can send traps to the server by creating and maintaining the *trapaccess.conf* file.

You can create the *trapaccess.conf* file and populate it with a list of IP addresses that can send traps to the MWTM server. The MWTM receives traps from only those IP addresses, plus the local host. If the file exists but is empty, the MWTM receives traps only from the local host. (The MWTM always receives traps from the local host.)

When you first install the MWTM, the *trapaccess.conf* file does not exist and the MWTM allows all IP addresses to send traps to the MWTM server.

To create the *trapaccess.conf* file and work with the list of allowed IP addresses:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
```

Step 3 Create the *trapaccess.conf* file:

- To create the *trapaccess.conf* file and add a client IP address to the list, enter:

```
# ./mwtm trapaccess add

   Enter address to add: 1.2.3.4
   IP Address 1.2.3.4 added.
   MWTM server must be restarted for changes to take effect.
   Use the following command to restart the server:
      mwtm restart
```

- To create the *trapaccess.conf* file and open the file to edit it directly, enter:

```
# ./mwtm trapaccess edit
```

The default directory for the file is located in the MWTM installation directory. If you installed the MWTM:

- In the default directory, */opt*, then the default directory is */opt/CSCOsgm/etc*.
- In a different directory, then the default directory resides in that directory.

In the *trapaccess.conf* file, begin all comment lines with a pound sign (#).

All other lines in the file are MWTM client IP addresses, with one address per line.

Wildcards (*) are allowed, as are ranges (for example, 1-100). For example, the address *.*.*.* allows all clients to send traps to the MWTM server.

After you create the *trapaccess.conf* file, you can use the full set of mwtm trapaccess keywords to work with the file. For more details, see mwtm trapaccess, page B-87.

Any changes that you make to the *trapaccess.conf* file take effect when you restart the MWTM server.

Configuring a Backup MWTM Server

You can use the MWTM to configure a second MWTM server as a backup for the primary MWTM server. For best results, Cisco recommends that you configure the primary server and the backup server as backups for each other.

To configure a backup MWTM server:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm secondaryserver hostname naming-port webport
```

where:

- *hostname* is the optional name of the host on which the backup MWTM server is installed.
- *naming-port* is the optional MWTM Naming Server port number for the backup MWTM server. The default port number is 44742.
- *webport* is the optional MWTM web port number for the backup MWTM server. The default port number is 1774.

Note If you use the **mwtm secondaryserver** command to configure a backup MWTM server, but the primary MWTM server fails before you launch the MWTM client, then the MWTM client has no knowledge of the backup server.

Step 3 (Optional) To list the backup MWTM server that has been configured for this primary MWTM server, enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm secondaryserver list
```

Step 4 (Optional) To configure whether or not a prompt appears on the client in the event of server failover, see mwtm clientfailoverprompt, page B-19.

Configuring an MWTM Client Connection Timer

You can use the MWTM to specify how long an MWTM client is to wait for the MWTM server before exiting.

To configure an MWTM client connection timer:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
# ./mwtm cliconntimer number-of-seconds
```

where *number-of-seconds* is the time the MWTM client is to wait for a message from the MWTM server before exiting. The valid range is 10 seconds to an unlimited number of seconds. The default value is 60 seconds.

If the timer expires, the client attempts to contact the server and takes one of these actions. If the server:

- Responds to the client, the client reconnects to the server.
- Does not respond to the client, but a backup server is configured, the client attempts to connect to the backup server.
- Does not respond to the client, and no backup server is configured, the client displays a dialog box with this message:

  ```
  Connection to the server has timed out.
  Client could not establish 2-way communications with the server.
  If you are running through a VPN you may have entered the wrong client IP address.
  ```

  Click **OK** to exit the client. The MWTM writes this message to the client console log:

  - Solaris or Linux client—*/opt/CSCOsgmClient/logs/sgmConsoleLog.txt*

– Windows client—*C:\Program Files\Cisco Systems\MWTM Client\logs\consoleLog.txt*

The timer takes effect when you restart the MWTM server.

Step 3 (Optional) To restore the default timeout of 60 seconds, enter:

```
# ./mwtm cliconntimer clear
```

The timer is reset to 60 seconds when you restart the MWTM server.

Enabling the Terminal Server Proxy Service

The MWTM provides the capability to function through firewalls, where the server is located behind the firewall and the client is outside the firewall. To use this feature, enable the terminal proxy service by the **mwtm termproxy** command (see mwtm termproxy, page B-86).

Setting Up TFTP on Your Server (ITP Only)

Before deploying or loading route table, GTT, or MLR address table files, the TFTP daemon must be running on the Solaris or Linux server.

Tip For more information about questions regarding TFTP, see When I try to deploy routes, GTT files, or address table files from the MWTM, why does TFTP fail or time out?, page C-16.

This section contains:

Setting Up TFTP on Solaris

To set up TFTP on your Solaris server:

Step 1 Verify that the tftp-server package is installed:

```
pkginfo -l | grep tftp
```

If the tftp-server package is not installed, install it from your Solaris CD or distribution.

Step 2 If you are not logged in, log in as the root user:

```
> login: root
> Password: root-password
```

If you are already logged in, but not as the root user, use the **su** command to change your login to root:

```
# su
# Password: root-password
```

Caution As the root user, you can adversely affect your operating environment if you are unaware of the effects of the commands that you use. If you are a relatively inexperienced UNIX user, limit your activities as the root user to the tasks described in this manual.

Step 3 Using a UNIX editor, open the *inetd.conf* file:

```
/etc/inetd.conf
```

Step 4 In the *inetd.conf* file, ensure that this line appears:

```
tftp dgram udp6 wait root /usr/sbin/in.tftpd -s /tftpboot
```

If the line begins with a # sign, delete it, and save the changes.

Step 5 Ensure that this directory exists:

```
/tftpboot
```

If not, then create this directory. Also ensure the directory has write permissions (777).

Step 6 If you will be accessing more than one type of file (route, GTT, or MLR address table files,) you must create subdirectories, for example:

```
/tftpboot/route
/tftpboot/gtt
/tftpboot/atbl
```

Step 7 Restart the inetd process:

a. As the root user, enter:

```
# ps -ef | grep inetd
```

Output should be similar to:

```
root   157     1  0   Oct 21 ?        0:00 /usr/sbin/inetd -s
```

b. To find the process ID for inetd, enter:

```
# ps -e -o pid,comm | grep inetd
```

Output should be similar to:

```
157 /usr/sbin/inetd
```

c. To restart the inetd process, enter:

```
# kill -HUP 157
```

Where 157 corresponds to the output integer returned in Step b.

Step 8 Within the */opt/CSCOsgm/bin* directory, set the staging directory with these commands. For:

- Route table files, use the **mwtm routedir** command (see mwtm routedir, page B-124).
- GTT files, use the **mwtm gttdir** command (see mwtm gttdir, page B-111).
- MLR address table files, use the **mwtm atbldir** command (see mwtm atbldir, page B-101).

Setting Up TFTP on Linux

To set up TFTP on your Linux server:

Step 1 Verify that the tftp-server package is installed:

```
rpm -q tftp-server
```

If the tftp-server package is not installed, install it from your RedHat Enterprise CD or distribution.

Step 2 If you are not logged in, log in as the root user:

```
> login: root
> Password: root-password
```

If you are already logged in, but not as the root user, use the "su" command to change your login to root:

```
# su
# Password: root-password
```

Caution As the root user, you can adversely affect your operating environment if you are unaware of the effects of the commands that you use. If you are a relatively inexperienced UNIX user, limit your activities as the root user to the tasks described in this manual.

Step 3 Using a UNIX editor, open the *tftp* file:

```
/etc/xinetd.d/tftp
```

Step 4 Edit the file:

a. Change the line:

```
user = nobody
```

to

```
user = root
```

b. Change the line:

```
disable = yes
```

to

```
disable = no
```

c. If you want to specify a different TFTP directory, replace */tftpboot* in the line *server_args = -s /tftpboot* with the name of your directory.

Step 5 Save the changes.

Step 6 Enter:

```
/etc/init.d/xinetd restart
```

Step 7 Set the staging directory:

- For route table files, use the **mwtm routedir** command (see mwtm routedir, page B-124).
- For GTT files, use the **mwtm gttdir** command (see mwtm gttdir, page B-111).

- For MLR address table files, use the **mwtm atbldir** command (see mwtm atbldir, page B-101).

Configuring Nodes

If MWTM User-Based Access is disabled, or if it is enabled and you are a Network Administrator or System Administrator, you can use the MWTM to view and change SNMP settings and configure login credentials.

For more information about user authorization levels in the MWTM, see Configuring MWTM User Account Levels (Server Only), page 2-7.

To access SNMP and credentials configuration, choose **Network > Node SNMP and Credentials Editor** from the MWTM main menu. The MWTM displays the Node SNMP and Credentials Editor dialog box.

The Node SNMP and Credentials Editor dialog box contains:

- Node SNMP and Credentials Menu, page 5-14
- Configuring SNMP Settings, page 5-15
- Configuring Login Credentials, page 5-19

Node SNMP and Credentials Menu

The menu on the Node SNMP and Credentials Editor dialog box contains:

Menu Command	Description
File > Save (Ctrl-S)	Saves any SNMP configuration changes. When you are satisfied with all of your changes to the SNMP settings, choose the **File > Save** menu option. The MWTM saves the changes and updates the SNMP information on the MWTM server in real time. **Note** If another user modifies and saves the SNMP configuration before you save your changes, the MWTM asks if you want to overwrite that user's changes. If you choose to do so, the other user's changes are overwritten and lost. If you choose not to do so, your changes are lost.
File > Close (Ctrl-W)	Closes the current window. You may be prompted to save the current changes.
Help > Topics (F1)	Displays the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Displays online help for the current window.
Help > About (F3)	Displays build date, version, SSL support, and copyright information about the MWTM application.

Configuring SNMP Settings

Note If you want to change SNMP settings, do so *before* running discovery.

For more information about SNMP, see "Configuring SNMP Support" in the Cisco IOS Release 12.2 *Configuration Fundamentals Configuration Guide*, Part 3, System Management.

To change SNMP settings in the MWTM, start the MWTM client, as described in Starting the MWTM Client, page 3-3, then choose:

- From the MWTM main window—**Network > Node SNMP and Credentials Editor** from the MWTM main menu.
- From the Discovery Dialog—**Edit > Node SNMP and Credentials Editor** from the menu bar.

Note (If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator [level 4] and higher).

The MWTM displays the SNMP tab.

The SNMP tab of the Node SNMP and Credentials Editor dialog box contains:

- SNMP Settings Table, page 5-15
- SNMP Configuration Table, page 5-15
- SNMP Configuration Buttons, page 5-17

The MWTM also provides a set of commands that you can use to configure SNMP settings (see SNMP Configuration Commands, page 5-17).

SNMP Settings Table

The SNMP settings table displays current SNMP information for nodes in the MWTM. You can edit these fields in the SNMP Configuration Table, page 5-15.

The SNMP configuration table contains:

Column	Description
IP Address Range or Hostname	IP address or DNS name of a node or range of nodes. An asterisk (*) indicates a wildcard value.
Read Community	SNMP community name used by the node for read access to the information maintained by the SNMP agent on the node.
Timeout (secs)	Time, in seconds, the MWTM waits for a response from the node.
Retries	Number of times the MWTM attempts to connect to the node.
Poll Interval (mins)	Time, in minutes, between polls for the node.

SNMP Configuration Table

In the SNMP configuration table, you can change SNMP settings for a node.

The SNMP configuration table contains:

Field	Description
IP Address Range or Hostname	IP address or DNS name of a node. To change the IP address or DNS name of a node, select the node, enter the new address or name in the IP Address Range or Hostname field, then click **Update**. IP addresses use the format *x.x.x.x*, where each *x* has one of these values: • An integer in the range 0 through 255. • A range of integers separated by a hyphen (-), such as 10-60. • An asterisk (*), which is equivalent to specifying 0-255. The default value for this field is the IP address *.*.*.*, which the MWTM uses for all nodes not covered by other IP address ranges or names. When entering an IP address: • Use Class A, B, or C addressing: – Class A—The first octet value is within the range of 1-126. A valid IP address is from 1.0.0.1 to 126.255.255.254. – Class B—The first octet value is within the range of 128-191. A valid IP address is from 128.1.0.1 to 191.254.255.254. – Class C—The first octet value is within the range of 192-223. A valid IP address is from 192.0.1.1 to 223.255.254.254. • Do not use 0 or 255 for the last octet (*x.x.x.*0 is reserved for subnet addresses or network addresses; *x.x.x.*255 is reserved for subnet broadcast addresses). • Do not use IP addresses that fall within these ranges: 127.0.0.1-127.255.255.254, 128.0.0.1-128.0.255.254, 191.255.0.1-191.255.255.254, 223.255.255.1-223.255.255.254, and so on. • Do not use 0 for the first octet. Unlike IP addresses, you cannot specify a range of node names or use wildcards in node names. Each node name corresponds to a single node in the network.
Read Community	SNMP community name to be used by the node for read access to the information maintained by the SNMP agent on the node. To change the SNMP community name for a node, select the node and enter the new name in the Read Community field, then click **Update**. This new SNMP community name must match the name used by the node. The default name is *public*. For information about exporting SNMP community names from CiscoWorks Resource Manager Essentials (RME), see Importing SNMP Community Names from CiscoWorks (Solaris Only), page 5-1.
Timeout (secs)	Time, in seconds, the MWTM waits for a response from the node. If you determine that the MWTM waits too long for a response from a node, or does not wait long enough, you can change the timeout value. To change the time that the MWTM waits for a response from a node, select the node and enter the new timeout value in the Timeout (secs) field, then click **Update**. The valid range is 1 to 60 seconds. The default value is 3 seconds.

Field	Description
Retries	Number of times the MWTM attempts to connect to the node. If you determine that the MWTM retries a node too many times, or not enough times, you can change the number of retries. To change the number of times the MWTM attempts to connect to a node, select the node and enter the new number in the Retries field, then click **Update**. The valid range is 0 to 99. The default value is 2 retries.
Poll Interval (mins)	Time, in minutes, between polls for the node. If you determine that the MWTM polls a node too often, or not often enough, you can change the poll interval. To change the time, in minutes, between polls for a node, select the node and enter the new interval in the Poll Interval (mins) field, then click **Update**. The valid range is 5 to 1440. The default value is 15 minutes.

SNMP Configuration Buttons

The SNMP tab of the Node SNMP and Credentials Editor dialog box contains:

Button	Description
Add	Adds the new SNMP settings to the MWTM database. To add a new node or range of nodes, enter the SNMP information in the appropriate fields and click **Add**. The new SNMP settings are added to the MWTM database.
Update	Applies the values in the SNMP configuration fields to the selected node or range of nodes.
Delete	Deletes the selected node or range of nodes. To delete a node, select it and click **Delete**. The MWTM deletes the node without asking for confirmation.

SNMP Configuration Commands

This section contains:

MWTM Commands for SNMP

The MWTM provides these SNMP-related commands:

Command	Description
mwtm addsnmpcomm	Adds an SNMP configuration.
mwtm deletesnmpcomm	Deletes an SNMP configuration.
mwtm modifysnmpcomm	Modifies an existing SNMP configuration.
mwtm showsnmpcomm	Shows SNMP configuration(s).
mwtm snmpcomm	Sets a new default SNMP read community name.
mwtm snmpconf	Changes the file used for SNMP parameters, such as community names, timeouts, and retries.
mwtm snmpget	Queries a host using an SNMP GET request.
mwtm snmpnext	Queries a host using an SNMP GETNEXT request.
mwtm snmpsetup	Sets up SNMP configuration(s).
mwtm snmpwalk	Queries a host using an SNMP GETNEXT request or an SNMP GETBULK request to "walk" through the MIB.
mwtm snmpmaxrows	Sets the value of maximum rows for SNMP walk.
mwtm snmphelp	Prints SNMP utilities usage information.

Tip For more information on the use of these commands, see Appendix B, "Command Reference".

Required SNMP Configuration for RAN-O Nodes

Configure these SNMP statements on the RAN-O nodes that you would like to manage by using the MWTM:

```
ipran-mib snmp-access <inBand | outOfBand>
ipran-mib location <cellSite | aggSite>
logging traps informational

snmp-server enable traps syslog
snmp-server community <SNMP_COMMUNITY_STRING> RO 1
snmp-server trap link ietf snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran snmp-server enable traps cpu threshold
snmp-server host <SNMP_SERVER_HOST_IP_ADDRESS> version 2c v2c
```

Tip For more information about these commands, see the *Cisco MWR 1941-DC-A Mobile Wireless Edge Router Software Configuration Guide* or the *Cisco MWR 2941-DC Mobile Wireless Edge Router Software Configuration Guide.*

Configuring Login Credentials

This section contains:

You can use the MWTM to set up log in credentials, which you can use for:

Action	Description	Related Content
Troubleshooting	All networks	Viewing Troubleshoot
Discovery	ONS nodes only **Note** Only ONS nodes require login credentials during discovery; all other node types only require an SNMP community string.	Discovery Overview
Deployment	ITP only	Deploying ITP Files
Provisioning	All networks	About Provisioning
Launching an SSH terminal to a node	All networks In the MWTM client navigation tree, right-click on an object and choose **Node Connect**.	Viewing the Right-Click Menu for an Object
Establishing a low-level connection to a node	ITP only In the MWTM client, choose **Network > Node File Management**, then choose **File > Connect** or In the Route Table Editor, choose **File > Deploy** or In the Global Title Translator Editor or Address Table Editor, choose **File > Load from Node** or **File > Deploy**.	Node File Management Deploying ITP Files Loading a GTT File from a Node Loading an Address Table File from a Node

Setting Up Login Credentials

The MWTM enables a system administrator to configure the login credentials using the Node SNMP and Credentials Editor dialog box. Login credentials are stored in an encrypted file on the server, eliminating the need for users to login before running commands.

To set up login credentials in the MWTM, start the MWTM client, as described in Starting the MWTM Client, page 3-3, then choose **Network > Node SNMP and Credentials Editor** from the MWTM main menu, and select the Credentials tab.

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

For detailed information on the SNMP tab, see Configuring SNMP Settings, page 5-15.

Tip A check mark appears beside nodes or default credentials that are configured.

A system administrator can set up credentials:

- Globally on all nodes of all types—Click **Default** and complete the fields in the right pane.
- All nodes of a specific node type only—Under Default, click the node type and complete the fields in the right pane.

Note Configuring default Cell Site Router (CSR) credentials applies to these CSRs: Cisco MWR and Cisco 3825.

- On a specific node—Under Nodes, click the node name and complete the fields in the right pane. Configuring credentials on a specific node overrides any Default credentials for that particular node.

The Credentials tab of the Node SNMP and Credentials dialog box contains:

- Credentials Fields, page 5-20
- Credentials Buttons, page 5-21

The MWTM also provides a set of commands that you can use to configure SNMP settings (for details, see the Credentials Commands, page 5-21).

Credentials Fields

Under the Credentials tab of the Node SNMP and Credentials dialog box, you can configure these login credentials for node(s):

Note Ensure that each user has sufficient privileges to run all commands.

Field	Description
IP Address or DNS Hostname	See Adding Nodes, page 5-21.
User name	Enter the login username, if required.
Password	Enter the login password, if required.
Enable User name	Enter the login enable username (not required for ONS nodes).
Enable Password	Enter the login enable password (not required for ONS nodes).
Connection Protocol	Choose the protocol to use when connecting to the node, either SSH or Telnet. **Note** The key size on the node must be configured to a minimum of 768 bits and a maximum of 2048 bits.

Note Username and password requirements vary according to your security configuration. For more information, see the *Cisco IOS Security Configuration Guide, Release 12.2*, Part 1 and Part 5.

Credentials Buttons

The Credentials tab of the Node SNMP and Credentials dialog box contains:

Button	Description
Apply	Applies specified usernames and passwords to the selected node or Default credentials.
Clear	Removes credentials. To clear usernames and passwords on a selected object, click **Clear** to remove the credentials, then click **Apply**.
Test	You can test the credentials you have configured on the corresponding node or the default credentials against a selected node type (not available for all node types).
Add	(Button only available when you click Nodes) Adds a specified node.

Adding Nodes

In the Credentials tab, you can add a node. If you are working with ONS nodes, you must add the ONS node and set the credentials for the node before running discovery.

Step 1 Click **Nodes** in the navigation tree.

Step 2 Enter the IP address or DNS hostname.

Step 3 Add the username and password credentials.

Step 4 Specify the connection protocol (Telnet or SSH).

Step 5 Click **Add**.

Credentials Commands

The MWTM also provides credentials-related commands:

- To add credentials for a given IP address, or for the Default credentials, use the **mwtm addcreds** command.
- To show credentials for a given IP address, or for the Default credentials, use the **mwtm showcreds** command.
- To delete credentials for a given IP address, or for the Default credentials, use the **mwtm deletecreds** command.

Tip For more information on the use of these commands, see Appendix B, "Command Reference".

Creating New Troubleshooting Categories and Commands

A system administrator can use the MWTM to create user-specific categories and commands:

Step 1 On the server machine, if you are not logged in, log in as the root user:

```
> login: root
> Password: root-password
```

If you are already logged in, but not as the root user, use the "su" command to change your login to root:

```
# su
# Password: root-password
```

Caution As the root user, you can adversely affect your operating environment if you are unaware of the effects of the commands that you use. If you are a relatively inexperienced UNIX user, limit your activities as the root user to the tasks described in this manual.

Step 2 Using a UNIX editor, open the *UserCommands.ts* file:

```
/opt/CSCOsgm/etc/UserCommands.ts
```

Step 3 Create new categories and commands, following the instructions in the *UserCommands.ts* file. Sample categories and commands are provided, which may be directly useful in your network.

Step 4 Save changes. The new categories and commands now appear in the Troubleshooting tabs.

Related Topics

- Viewing Troubleshoot, page 7-39
- mwtm tshootlog, page B-90
- Customizing MWTM GUI Troubleshooting Commands

CHAPTER 6

Managing Views

Note The web interface does not support the views feature. You can create customized views only in the Cisco Mobile Wireless Transport Manager (MWTM) client interface.

This chapter contains:

Overview

This chapter describes how to create and manage multiple views of your network from the MWTM client. Before creating or managing a view, you must understand the basic concepts of a default view, a custom view (and its associated subviews), and the navigational features available in each view:

Initial View Selection

Initially at client start-up, a new dialog ‘Initial View Selection’ is displayed which gives the user the ability to select different view options. ‘Use Default View’ loads the DEFAULT view. When the Cisco Mobile Wireless Transport Manager (MWTM) discovers your network, all discovered objects are placed in a DEFAULT view, which is stored on the MWTM server and shared by all MWTM clients. Clients cannot modify the DEFAULT view that is stored on the MWTM server. This view is always available for users who need to view the entire network.

‘Create an Empty View option used to start the client when there is a large number of nodes discovered on the server. ‘Open Existing View’ option lists all the existing views. ‘Open Last Used View’ option opens the view which was used last.

You can use the MWTM to create your own, client-specific views and subviews, which are subsets of the DEFAULT view, to meet your individual needs.

Note A java client view supports a maximum of 1,000 nodes. This can be configured by the mwtm clientviewsize command.

Custom View and Subviews

You can choose the nodes you are interested in managing, exclude all other nodes from your view, and change the layout of the topology map in the topology window. You can save all of this customized information in a custom view and set that view as the new *default* view for the MWTM client.

You can use the MWTM client from then on to manage only the part of the network you are interested in, with the settings you prefer. When you modify the DEFAULT view in any way (except for modifying the layout of the topology map in the topology window), the MWTM prompts you to name the new, custom view.

You can also create many different views and subviews on a given MWTM client, with each view devoted to a different aspect of the network. You can then load a different view to manage a different part of the network, or switch to the DEFAULT view to see the entire network. For details on creating views, see Creating a New View, page 6-7.

If more than one person uses a certain MWTM, each user can create a personal view.

Also, you can create subviews in any custom view. The custom view becomes the parent view of one or more subviews. When you load a custom view that has subviews, the MWTM displays the Views label under Summary Lists in the navigation tree. When you click Views, the Views table appears in the right pane and lists all subviews of the custom (parent) view (see Views Summary List Table, page 6-3).

Note You can not create subviews for the DEFAULT view. Subviews are valid only for custom views. Also, you can not delete a subview from the main client window. You can delete the subviews by using View Editor.

Viewing Basic Information for Custom Views

To see all subviews currently configured in a custom view:

Step 1 Load a custom view by choosing **File > Load View**.

Step 2 Choose a custom view from the View List in the Load File dialog box and click **OK**.

If the chosen custom view has associated subviews, the Views label appears under Summary Lists in the navigation tree.

Step 3 Click the turner beside **Summary Lists**, then click **Views**.

The View Summary List window appears.

The View Summary List window provides information about all subviews that have been defined for this custom view, including their status and other important information.

The View Summary List window contains these sections:

- Right-Click Menu for Views, page 6-3
- Views Summary List Table, page 6-3

Related Topics

- Viewing Detailed Information for Views, page 6-5
- Navigating Table Columns, page 4-23

Right-Click Menu for Views

To see the right-click menu for views, under Summary Lists, select **Views** and right-click the mouse. For details on menu options, see Viewing the Right-Click Menu for an Object, page 7-2.

Note If the Views label does not appear under Summary Lists, you have loaded the DEFAULT view or a custom view that has no subviews.

Views Summary List Table

The views table shows information about the subviews that have been defined for a custom view. If a custom view has no subviews, this option is not available.

You can resize each column, or sort the table based on the information in one of the columns. By default, this table is sorted by Parent View, and the MWTM shows all of the columns in the view table except Internal ID.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The view table contains:

Column	Description
Internal ID	Internal ID of the view. The internal ID is a unique ID for every object, assigned by the MWTM for its own internal use. It can also be useful when the TAC is debugging problems.
Name	Name of the subview that belongs to the custom (parent) view.
Parent View	Name of the custom or parent view to which the subview belongs.
Ignored	Indicates whether the subview should be included when aggregating and displaying MWTM status information: • Check the check box to ignore the subview. • Uncheck the check box to include the subview. This is the default setting. Users with authentication level Power User (level 2) and higher can edit this field.

Column	Description
Notes	Indicates whether a note is associated with the subview.
Events	Indicates whether a recent event associated with a network object in the subview. (Even if the server purges all of the events associated with objects in the subview, the MWTM continues to display the event icon in this field.) To delete the event icon (orange triangle) from MWTM displays for: • A specific subview, select the subview and click the icon. • All subviews, choose **Edit > Clear All Events** from the MWTM main menu. **Note** During Discovery, the MWTM might flag most views with an event icon. If the event icons are too distracting, use the **Edit > Clear All Events** menu option to remove them. Changing a view (for example, by ignoring it or attaching a note to it) does not generate an event, and therefore does not cause an event icon to appear in this field. Deleting an application server process, node, or signaling point with the Delete menu option does not generate an event, and therefore does not cause an event icon to appear in this field. However, if the MWTM rediscovers a deleted application server process, node, or signaling point, events are generated and logged for the deletion and the rediscovery, and the event icon appears in this field.
Last Status Change	Date and time that the status of the subview last changed.
Severity	This is the worst severity of the network objects in the view or any subview.
Status	Current status of the subview. Possible values are: • Active • Unmanaged • Warning For detailed definitions of each status, see Appendix E, "Status Definitions".
Status Reason	Reason for the current status of the subview. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file resides at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file reside in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference".

Viewing Detailed Information for Views

The MWTM can display detailed information about a chosen view, including its associated objects, status, and other information.

Updates for the view that are received from the MWTM server are reflected automatically in this window.

To display the Details tab for a view, click the name of the view in the MWTM main window navigation tree. For example, to see detailed information for the DEFAULT view in the right pane, click DEFAULT View in the navigation tree.

The View Details window contains:

Function or Tab	For More Information
Right-click menu (MWTM client only)	Viewing the Right-Click Menu for an Object, page 7-2.
Status Contributors	Viewing Status, page 7-36
Details	Viewing Details, page 7-7
Notes (MWTM client only)	Viewing Notes, page 8-55
Recent Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Editing a View

For details on editing a view, see Editing Properties, page 8-49.

Saving a View

You use the MWTM to save a specific view, change the list of views, and select one view to be loaded automatically when the associated preferences file is saved.

When you are satisfied with the changes you made to a view, use one of these procedures to save the view:

- To save the changes you made to the view without changing the name of the file, choose **File > Save** from the View Editor window menu.

Note You cannot save changes to the DEFAULT view. If you are currently using the DEFAULT view and you choose **File > Save**, the MWTM shows the Save File Dialog: View List dialog box.

- To save the changes you made to the view with a new name, choose **File > Save As** from the Discovery Dialog menu. The MWTM shows the Save File Dialog: View List dialog box.

The MWTM stores the view in the view file directory on the MWTM server:

- If you installed the MWTM in the default directory, */opt*, then the MWTM view file directory is */opt/CSCOsgm/views*.

- If you installed the MWTM in a different directory, then the MWTM view file directory resides in that directory.

Note If another user modifies and saves the view before you save your changes, the MWTM asks if you want to overwrite that user's changes. If you choose to do so, the other user's changes are overwritten and lost. If you choose not to do so, your changes are lost, unless you save the view to a different filename.

The Save File Dialog: View List contains:

Field or Button	Description
Create New Folder	Click this icon to create a new folder in the current directory. This action opens the Input dialog box. Enter a folder name and click **OK**. The new folder appears in the Save File dialog box. Double-click the folder to open it. You can save files in this folder or create another folder at this level.
Go Up One Folder	Click this icon to go up one folder in the directory structure.
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the view file or folder.
Last Modified	Date and time the view file or folder was last modified.
Size (bytes)	Size of the view file or folder, in bytes.
Filename	Name by which you want to save the view. You must specify a name other than DEFAULT view. You cannot save changes to the DEFAULT view. When you create a new view filename, you can use any letters, numbers, or characters in the name that are allowed by your operating system. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*.
Make this my preferred startup option	Specifies whether the chosen view should be loaded automatically whenever the associated preferences file is loaded. To load the: • Saved view, select the view, then check this check box. • Last-used view, uncheck the check box. This is the default setting.
OK	Saves any changes you made to the current named view or to the list of views and closes the dialog box. To save the view with a new name, use one of these procedures. To save the file with: • A completely new name, enter the new name and click **OK**. • An existing name, overwriting an old view, select the name in the list and click **OK**. The MWTM saves the view with the new name, closes the Save File Dialog: View List dialog box, and returns to the Discovery dialog box. To save any changes you made to the list of files, click **OK**. The MWTM saves the changes and closes the Load File Dialog: View List dialog box.
Delete	Deletes the chosen file from the view list. The MWTM issues an informational message containing the name and location of the deleted file.

Field or Button	Description
Cancel	Closes the dialog box without saving the view or any changes to the view list.
Help	Shows online help for the dialog box.
Number of Files (visible in bottom left corner)	Total number of view files and folders.

Creating a New View

You use the MWTM to specify the nodes and objects you want to see in MWTM displays. This view is called a client-specific network view. All changes you make are reflected in topology tables and maps as soon as you make the changes.

Before creating a client-specific network view, ensure that Discovery has been run at least once, and data appears in the server's MWTM database. See Discovery Overview, page 3-5, for details.

To create a client-specific network view, choose **Edit > Views** from the MWTM main menu. The Create New View window appears. Enter a name for the new view in the 'Enter name for new view' text box and then click **OK.** The View Editor window appears. Click **Cancel** to close the window.

You use the View Editor window also to move objects into and out of the current view. All changes that you make in this window are reflected in the MWTM client, and in the topology tables and maps as soon as you make the changes.

The View Editor window contains:

- View Editor Window Menu, page 6-8
- Objects In Current View, page 6-9
- View Objects Pane, page 6-10
- Excluded/New Objects Pane, page 6-11
- Filter pane, page 6-12
- View Editor Buttons, page 6-13
- Closing the View Editor Window, page 6-13

Related Topics

- Choosing a View, page 6-13
- Viewing Network Topology

View Editor Window Menu

The menu on the View Editor window contains:

Menu Command	Description
File > Load (Ctrl-L)	Loads an already existing view. If you have already saved a view and you want to change it, choose the **File > Load** menu option. The MWTM prompts you for the name of the view you want to load: • Select the name of the view, or accept the default view name, then click **OK** to load the view. • Click **Cancel** to close the prompt window without loading a view.
File > Create Views by SP Instances (Ctrl-P)	Creates views based on signaling point's network names. A confirmation window is displayed asking for the confirmation of replacement of current set of views.
File > Create Views by Aggregation Node (Ctrl-P)	Creates views based on aggregation nodes. A confirmation window is displayed asking for the confirmation of replacement of current set of views.
File > Save (Ctrl-S)	Saves the current view. If you have: • Not already saved the current view, opens the Save File Dialog: View List, which you use to enter or select a filename under which to save the current view. • Already saved the current view, saves the view to that filename. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
File > Save As	Opens the Save File Dialog: View List, which you use to save changes you made to the chosen view with a new name, or overwrite an existing seed file. The view is updated immediately in the MWTM client. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
File > Apply View (Alt-P)	Updates the entire client to use the changes from the View Editor.
File > Load This View at Startup (Alt-T)	Loads the new view on startup. Once a user sets the Load This View on Startup, the Load a View popup is never seen again.
File > Close (Ctrl-W)	Closes the View Editor window. If you have modified the view, the MWTM asks if you want to save your changes. Click: • **Yes** to save your changes to the current view. • **No** to keep the current view as-is, without applying any changes. The MWTM closes the View Editor window. • **Cancel** to close the prompt window and return to the View Editor window without applying any changes to the current view.
Edit > Create Subview (Ctrl-N)	Creates a new subview for the chosen view or subview. Enter a name for the new subview.

Menu Command	Description
Edit > Rename View (Ctrl-R)	Renames the chosen view. The new name can be from 1 to 30 characters, and can contain any letters, numbers, or special characters.
Edit > Include In View (Ctrl-I)	Includes the chosen object in the view.
Edit > Exclude From View (Alt-X)	Excludes the chosen object from the view. The MWTM also excludes the object and associated objects from the topology map. If you exclude all of the objects associated with a node, the node is excluded, too.
Edit > Exclude All From View (Alt-A)	Allows the user to remove all the items from the selected view in one click.
Edit > Delete View (Ctrl-D)	Deletes the chosen view.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

Objects In Current View

The navigation tree in the left pane of the View Editor window lists nodes that the current view contains.

To see the objects that are associated with a node, and that are in the current view, click the turner beside the node.

To exclude any of these objects from the current view, select them in the navigation tree, then choose **Edit > Exclude From View** from the View Editor window to move them to the Excluded From View pane of the View Editor window.

Note If you are using an MWTM client with the DEFAULT view set, the MWTM automatically adds all newly discovered objects to the navigation tree as soon as they are discovered.

If you delete an object, the MWTM removes it from the navigation tree. If the MWTM then discovers the object, the MWTM places it in the New on the Network pane. To see this object again in your current view, you must move it into the navigation tree using Edit > Include In View from the View Editor window.

The navigation tree in the View Editor window provides these right-click menus:

- Right-Click Menu for a View, page 6-10
- Right-Click Menu for a Subview, page 6-10
- Right-Click Menu for an Object, page 6-10

Right-Click Menu for a View

The right-click menu for a view in the navigation tree of the View Editor window provides these options:

Menu Command	Description
Create Subview	Creates a new subview for the chosen view. Enter a name for the new subview.
Rename View	Renames the chosen view. The new name can be from 1 to 30 characters, and can contain any letters, numbers, or special characters.

Right-Click Menu for a Subview

The right-click menu for a subview in the navigation tree of the View Editor window contains:

Menu Command	Description
Create Subview	Creates a new subview for the chosen subview. Enter a name for the new subview.
Rename Subview	Renames the chosen subview. The new name can be from 1 to 30 characters, and can contain any letters, numbers, or special characters.
Open Subview	Opens the chosen subview.
Delete Subview	Deletes the chosen subview.

Right-Click Menu for an Object

The right-click menu for an object in the navigation tree of the View Editor window provides this option:

Menu Command	Description
Exclude From View	Excludes the chosen object, and any lower-level associated objects, from the view or subview. This action also excludes the object from the topology map.

View Objects Pane

The View Objects pane lists the nodes that the current view contains. To exclude any of these objects from the current view, right click the object, then choose **Exclude From View** in the right click menu or chose **Edit > Exclude From View** from the menu.

The View Objects pane provides:

Field	Description
View Object	Lists the objects that the current view contains.
View Parent	Lists the parent objects of the entries in the View Object column.
Severity	Indicates the alarm severity for the chosen signaling point. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information.
View Type	Type of the object listed in the View Object column.

The right-click menu for an object in the View Objects pane provides this option:

Menu Command	Description
Exclude From View	Excludes the chosen object, and any lower-level associated objects, from the view or subview. This action also excludes the object from the topology map.

Excluded/New Objects Pane

The Excluded/New Objects pane contains the following tabs:

- Excluded from View, page 6-11
- New on the Network, page 6-11

Excluded from View

The Excluded from View tab lists the objects that have been excluded from the current view. To add these objects to the current view, select them from the table under Excluded from View tab, then choose **Edit > Include In View** from the MWTM main menu or right click on them and choose **Include In View** from the right click menu.

The Excluded from View tab contains:

Field	Description
Exclude Object	Lists the objects that are excluded from the view.
View Parent	Parent objects of the entries in the View Object column of the Excluded from View tab.
Severity	Indicates the alarm severity for the chosen signaling point. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information.
View Type	Type of the object listed in the View Object column of the Excluded from View tab.

The Excluded from View tab provides this right-click option for an object:

Menu Command	Description
Include In View	Includes the chosen object, and any lower-level associated objects, in the chosen view or subview.

New on the Network

The New on the Network tab shows newly discovered objects, based on these criteria. If you are using an MWTM client with:

- The DEFAULT view set, this table never contains any objects. In the DEFAULT view, the MWTM adds all newly discovered objects to the navigation tree in the View Editor window as soon as they are discovered.

- A custom view set, this table contains all objects discovered since the View Editor window was opened in this session that have *not* been excluded in the Excluded from View pane or that are not in the current view.

When the MWTM discovers one or more new objects in the network, the MWTM also:

- Broadcasts the discovery of the new objects to all MWTM clients.
- Shows a **New** icon in the bottom of most MWTM windows. Clicking the **New** icon in the topology window opens the New Objects pane in the left pane. Clicking the **New** icon in any other window opens the Edit View tab of the View Editor window.
- Adds graphical elements for the newly discovered objects to the New Objects pane in the left pane of the topology window. For more information, see Printing the Topology Map, page 10-16.

To add a newly discovered object to the current view, select one or more objects in the table under New on the Network tab, then choose **Edit > Include In View** from the MWTM main menu or right click on them and choose **Include In View** from the right click menu.

To exclude a newly discovered object from the current view, select one or more objects in the New on the Network pane, then choose **Edit > Exclude From View** from the MWTM main menu or right click on them and choose **Include In View** from the right click menu.

The New on the Network tab provides:

Field	Description
New Object	Lists the objects that are newly added to the current view.
View Parent	Parent objects of the entries in the New Object column of the New on the Network tab.
Severity	Indicates the alarm severity for the chosen signaling point. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information.
View Type	Type of the object listed in the New Object column of the New on the Network tab.

The New on the Network tab provides these right-click options for an object:

Menu Command	Description
Include In View	Includes the chosen object, and any lower-level associated objects, in the chosen view or subview.
Exclude From View	Excludes the chosen object, and any lower-level associated objects, from the view or subview. The MWTM also removes the object from the topology map.

Filter pane

The Filter pane provides an option to filter the list of objects which are necessary when there are thousands of items in the editor. The Filter pane contains this text field:

Field	Description
Name or Parent Name or Type	Enter the name or the parent name or the type of the object in this text box. Based on your entry in this field, the content of the View Editor window gets filtered.

View Editor Buttons

The View Editor window provides the following buttons:

Field	Description
OK	Applies the changes you made to the editor and closes the View Editor window.
Cancel	Closes the View Editor window without saving the changes.

Closing the View Editor Window

To close the View Editor window at any time, click **File > Close**. If you have modified the view, the MWTM asks if you want to apply the changes before leaving the window. Click:

- **Yes** to apply the changes to the current view. The MWTM applies the changes to all MWTM windows immediately. The MWTM then asks if you want to make this the default view. Click:
  - **Yes** to make this view the new default view. In the future, when this client is started, this will be the default view.
  - **No** to retain your old default view.

  The MWTM closes the View Editor window.
- **No** to keep the current view unchanged, without applying any changes. The MWTM closes the View Editor window.
- **Cancel** to close the prompt window and return to the View Editor window without applying any changes to the current view.

If you are working in a custom view (that is, not in the DEFAULT view) and you exit the MWTM client, the MWTM automatically saves any changes you made to the view.

Choosing a View

If you are performing an action and have multiple views from which to choose, the Choose a View dialog box appears. Use it to choose the view you wish to apply.

The Choose a View dialog box contains:

Field or Button	Description
View List	Shows a list of views available for this action.
OK	Confirms the view you have chosen.

Field or Button	Description
Cancel	Cancels the dialog without choosing a view.
Help	Shows help for this dialog box.

Loading the DEFAULT View

To load the DEFAULT network view, choose **File > Load DEFAULT View** from the MWTM main menu. You might be prompted to save the view in which you currently are. Once you have chosen whether to save your current view, the MWTM loads the DEFAULT view.

Note Any custom views are saved in the View Editor window (Import Views tab) under the Edit > Views option in the MWTM main window.

Loading a Client-Specific View

You use the MWTM to load a specific view, change the list of views, and select one view to be loaded automatically when the associated preferences file is loaded.

To load a client-specific network view, choose **File > Load View** or choose **Edit > Views** from the MWTM main menu. The View Editor window appears. Then choose **File > Load** from the View Editor window menu. The MWTM shows the Load File Dialog: View List dialog box.

The Load File Dialog: View List contains:

Field or Button	Description
Go Up One Folder	Click this icon to go up one folder in the directory structure.
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the view file or folder.
Last Modified	Date and time the view file or folder was last modified.
Size (bytes)	Size of the view file or folder, in bytes.
Make this my preferred start option	Specifies whether the chosen view should be loaded automatically whenever the associated preferences file is loaded. To load the: • Chosen view, select the view, then check this check box. • Last-used view, uncheck the check box. This is the default setting.
Number of Files (visible in bottom left corner)	Total number of view files and folders.

Field or Button	Description
OK	Loads the chosen view, saves any changes you made to the list of views, closes the dialog box, and returns to the View Editor window. To load a view, double-click it in the list, select it in the list and click **OK**, or enter the name of the view and click **OK**. **Note** If the network elements belonging to a client-specific view have been removed from the network, a message appears when you load the view. The message warns you that the network elements have been removed from the view. To prevent the warning from being issued the next time you load the view, save the view using the same name (File > Save from the View Editor window).
Delete	Deletes the chosen file from the view list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without loading a view or saving any changes to the view list.
Help	Shows online help for the dialog box.

CHAPTER 7

Understanding Detailed Object Functions

You can use the Cisco Mobile Wireless Transport Manager (MWTM) to view detailed information about any discovered MWTM object, including its associated objects, status, notes, alarms and events, and so on.

To display detailed information for an object:

Step 1 In the navigation tree of the MWTM main window, click the turner beside a view.

Step 2 Click a node. The Details tab appears in the content pane (see Viewing Details, page 7-7).

This chapter contains:

Note For details on viewing notes, see Viewing Notes, page 8-55.

The MWTM displays detailed tabular information in the content area for the chosen object. Tabs will vary depending on the chosen object.

Note The tabs automatically reflect updates for the object from the MWTM server.

Viewing the Right-Click Menu for an Object

From the MWTM client, you can right-click on any object in an MWTM view, summary list, or topology map to view numerous menu options.

Example:

To see the right-click menu for a node, from the MWTM client, select a node in the navigation tree and right-click the mouse button.

These right-click menu options might be available on a given MWTM object:

Menu Command	Description
Show In New Window	Opens the Details window for the chosen object in a new window.
Edit > Properties	Opens the Edit Properties dialog box for the chosen node or ITP signaling point. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
Edit > Notes	Opens the Edit Notes dialog box for the chosen object. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
Edit > SNMP IP Addresses	Opens the Edit SNMP IP Addresses dialog box for the chosen node. This option is dimmed if the chosen node has no associated SNMP IP addresses. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Edit > Route Table (ITP signaling points only)	Opens the Route Table dialog box, using a route table from the signaling point. This option is not available if the node associated with chosen signaling point is in Unknown or Unmanaged status. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Clear Event Icon	Deletes the event icon from MWTM displays for the chosen object, for this MWTM client only. The MWTM does not delete the actual events, but deletes only the event icon for the chosen object for this MWTM client. This option is dimmed if the chosen object has no associated event icon.

Menu Command	Description
Delete	Deletes the currently chosen object from the MWTM database. The MWTM displays the Confirm Deletion dialog box. To: • Delete the chosen object, click **Yes**. The MWTM deletes the object from the MWTM database and closes the Confirm Deletion dialog box. • Retain the chosen object, click **No**. The MWTM retains the object in the MWTM database and closes the Confirm Deletion dialog box. **Note** (ITP only) If you delete all linksets to an Unmanaged node, the MWTM does not automatically delete the node. Instead, you must manually delete the node. See Deleting Objects, page 8-56 for more information. • Prevent the MWTM from displaying the Confirm Deletion dialog box, check the **Do not show this again** check box. **Note** If you check the Do not show this again check box, and later you decide you want the MWTM to begin displaying the Confirm Deletion dialog box again, you must check the Confirm Deletions check box in the General GUI settings in the Preferences window. For more information, see the description of the Confirm Deletions check box in Startup/Exit Settings, page 4-3. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Go to > *Object*	Navigates to the parent or peer (if applicable) window(s) for the chosen object.
Back > *List of windows*	Navigates back to a window viewed in this session. The MWTM maintains a list of up to 10 Back windows.
Forward > *List of windows*	Navigates forward to a window viewed in this session. The MWTM maintains a list of up to 10 Forward windows.
Show Peer	Shows the peer of the selected object when a peer exists.
View > Status Contributors	Displays the Status Contributors pane for the chosen object. Objects in this pane contribute to the status of the chosen object.
View > Details	Displays the Details pane for the chosen object.
View > Notes	Displays the Notes pane for the chosen object. If no notes are associated with the chosen object, this option is dimmed.
View > Troubleshooting	Displays the Troubleshooting pane for the chosen object. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
View > Recent Events	Displays the Recent Events pane for the chosen object and any associated network objects.
View > Alarms	Displays the Alarms pane for the chosen view.
View > Real-Time Data and Charts	Displays the MWTM Real-Time Statistics window for the chosen object. This option is not available if the object has no real-time charts or if the object status is Unknown or Unmanaged.
View > Center in Topo	Opens the topology window and displays the object in the center of the topology map.
View > Advanced Details (Web)	Opens the MWTM web client to display the Statistics tab for the selected object. This option appears only for those objects that have advanced details.

Menu Command	Description
Archived Events > Status Changes	Displays the archived status changes in a web browser.
Archived Events > SNMP Traps	Displays the archived SNMP traps in a web browser.
Archived Events > Status Changes and SNMP Traps	Displays both the archived status changes and archived SNMP traps in a web browser.
Ignore	Ignores the chosen object at the next polling cycle. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Unignore	Stops ignoring the chosen object at the next polling cycle. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
Performance History (RAN-O backhauls and shorthauls only)	Displays historical performance charts for the chosen RAN-O backhaul or shorthaul in a web browser.
Error History (RAN-O backhauls and shorthauls only)	Displays historical error charts for the chosen RAN-O backhaul or shorthaul in a web browser.
Create Virtual RAN Backhaul (RAN-O backhauls only)	Opens the Virtual RAN Backhaul Editor. For details, see Creating Virtual RAN Backhauls, page 7-143.
Drill-Down > *List of windows*	Opens a specific tab for the chosen object. Tabs listed start a poller. This option is not available if the node is in Unknown or Unmanaged status.
Latest Reports	Opens the latest reports for the object in a web browser. This option launches the web client's Report tab for object types of ITP and non-ITP nodes. For details on reports, see Chapter 13, "Managing Reports." This option is not available if the node is in Unknown or Unmanaged status.
Provision	Opens the web interface to the Provision tab of the chosen object (see Using the Provisioning Wizard, page 7-48).
Launch	Use it to launch: • CiscoView • CiscoWorks LMS Portal • Device Center • Node Home Page (This option is displayed based on the CiscoWorks user configuration) **Note** You must first integrate these applications with the MWTM. See Integrating the MWTM with CiscoWorks, page 4-36.
Node Connect > Web Home Page	Displays the home page of the node in a new web browser window. This option does not appear in the right-click menu for Cisco Optical Networking System (ONS) nodes or nodes that are unknown. For a Cisco Data for Telecommunications (CDT) node, this option launches the CDT login web page.

Menu Command	Description
Node Connect > CLI via Telnet/SSH	Links to the node via Telnet or SSH. This option is dimmed if the chosen node has no IP addresses. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
Node Connect > Launch CTC (ONS nodes only)	Launches the Cisco Transport Controller (CTC) for managing ONS nodes. For more information about using the CTC, see the *CTC Launcher Application Guide* (http://www.cisco.com/en/US/products/hw/optical/ps2006/products_installation_and_configuration_guides_list.html). This option appears only for ONS nodes.
Poll Node > Normal Poll	Polls all chosen nodes or ITP signaling points, retaining all currently known objects. Normal Poll retains all objects associated with polled nodes or signaling points, even objects that have been deleted and are, therefore, in Unknown status. This option is dimmed if the chosen node has no IP addresses. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher. See Performing a Normal Poll, page 7-51 for more information.
Poll Node > Clean Poll	Polls all chosen nodes or ITP signaling points and removes any Unknown network objects after the completion of the poll. Clean Poll removes all network objects from the node or signaling point at the completion of the poll. This option is dimmed if the chosen node has no IP addresses. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher. See Performing a Clean Poll, page 7-51 for more information.
Allow Trap Processing	Enables the MWTM to process traps from the chosen node. This is the default setting. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 4) and higher. See Allowing and Disallowing Trap Processing for a Node, page 7-52 for more information.
Disallow Trap Processing	Prevents the MWTM from processing traps from the chosen node. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 4) and higher. See Allowing and Disallowing Trap Processing for a Node, page 7-52 for more information.

Menu Command	Description
Unmanage	Labels the chosen node or signaling point Unmanaged. **Note** If you change a node to the Unmanaged status, the MWTM removes adjacent legacy nodes from the topology map. You cannot label a node or signaling point Unmanaged if it has a Node Type of Unknown. If you select a node or signaling point with a Node Type of Unknown, then this menu option is dimmed and cannot be chosen. This option is dimmed if the chosen node has no IP addresses. Events for unmanaged objects will continue to appear in the Events window. To suppress events for unmanaged objects, set this option using an event filter (Setting Alarm or Event Filters, page 9-12). If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Manage	Removes the Unmanaged status from the chosen node or signaling point. **Note** If you change a node to the Managed status, the MWTM adds adjacent legacy nodes back to the topology map. You cannot remove the Unmanaged status from a node with a Node Type of Unknown. If you select a node with a Node Type of Unknown, then this menu option is dimmed. This option is dimmed if the chosen node has no IP addresses. If you have implemented MWTM User-Based Access, this option is available to users with authentication level System Administrator (level 5).
Exclude from View	Excludes the chosen node or signaling point from the current view. See Creating a New View, page 6-7 for more information about excluding objects.
Deploy *Object* > From Archive (ITP only)	Launches the Deployment Wizard for the chosen node or ITP signaling point. See Deploying a File Associated with an ITP Node or Signaling Point, page 7-6 for more information about deploying to nodes or ITP signaling points.
Deploy *Object* > From File (ITP only)	Launches the Deployment Wizard for the chosen node or ITP signaling point. See Deploying a File Associated with an ITP Node or Signaling Point, page 7-6 for more information about deploying to nodes or ITP signaling points.

Deploying a File Associated with an ITP Node or Signaling Point

You use the MWTM to deploy a GTT file or route table file associated with an ITP node or signaling point. To do so, right-click the ITP node or signaling point in a window, then choose **Deploy** *Object* **> From Archive** or **From File** in the right-click menu. The MWTM launches the Deployment Wizard for the chosen ITP node or signaling point. See Deploying a Route Table File, page 14-12 and Deploying a GTT File, page 15-34 for more information.

Viewing Management Interfaces and Physical Folders

ITP, IPRAN, and mSEF nodes can contain:

- **Management Interfaces**—A folder that contains a list of interfaces that the MWTM uses to manage the node.
- **Physical**—A folder that contains a list of the physical interfaces and ONS cards that belong to the node. Slot numbers precede ONS card objects (for example, *15 - RAN_SVC* or *02 - E1-42*).

All objects in the Physical folder are ignored *unless* they also appear outside of the Physical folder. The status of Physical folder-only objects do not contribute to the status of the parent node. These objects also do not appear in the Active Alarms list, but they do appear in the Event History. You can un-ignore the Physical folder, then re-ignore the objects you do not want to monitor. For more information, see Why are objects in the Physical folder ignored?, page C-8).

Viewing Details

The Details section displays information such as naming and status details for the chosen object.

To view the Details section, select a view in the navigation tree, select an object, then click the Details tab in the right pane.

Note If the chosen object is a link, linkset, signaling gateway-mated pair, RAN-O backhaul or shorthaul, PWE3 backhaul, or PWE3 Virtual Circuit, the Details tab displays both peers of the chosen object in adjacent panes for easy comparison.

The Details tab contains these sections (in alphabetical order):

Section	Applicable Object(s)	Applicable Network Type(s)
Address Information	Interfaces	All networks
Advanced Details (Web)	Nodes	BWG, CSG2, HA, and GGSNs on card
Association Information	Application Servers	ITP only
Bandwidth Information	Backhauls	RAN-O only
Capability Point Code	Signaling Points	ITP only
Description	Linksets, Signaling Points	
Descriptive Information	Cards, Nodes	All networks
General Information	Application Servers, Application Server Process Associations, Interfaces, Linksets, Shorthauls	
Interface Information	Links, Signaling Gateway Mated Pairs	ITP only
IP Addresses for SNMP or IP Addresses Not for SNMP	Nodes	All networks

Section	Applicable Object(s)	Applicable Network Type(s)
Links Information	Linksets	ITP only
Local IP Address Information	Application Server Processes, Application Server Process Associations, Links, Signaling Gateway Mated Pairs	
Naming Information	All objects	All networks
Point Code	Signaling Points	ITP only
Polling Information	Nodes	All networks
Protection Information	Cards, ONS Nodes	RAN-O only
PWE3 Information	PWE3 virtual circuits	RAN-O only
QoS Information	Signaling Points	ITP only
RAN Information	Interfaces, Shorthauls	RAN-O only
Remote IP Address Information	Application Server Process Associations, Links, Signaling Gateway Mated Pairs	ITP only
Status Information	All objects	All networks
Threshold Information (RAN-O Only)	Backhauls, Nodes	RAN-O only
Uptime Information	Nodes	All networks

Tip If the pair of a link, linkset, or signaling gateway-mated pair is Unknown, and if the peer of a backhaul or shorthaul is Unknown, `Unknown` appears for the pair or peer fields in the Details tab.

Address Information

The Address Information section for interfaces contains:

Field	Description
IP Address	List of IP addresses that are assigned to the interface.
Subnet Mask	Subnet mask information of the interface.

Advanced Details (Web)

The Advanced Details (Web) link appears in the MWTM client and launches the MWTM web interface to display the Statistics tab for the selected node. The Advanced Details (Web) link enables you to access advanced statistics that are available only for these nodes:

- CSG2 (see Displaying CSG2 Real-Time Statistics, page 11-41)
- BWG (see Displaying BWG Real-Time Statistics, page 11-54)
- HA (see Displaying HA Real-Time Statistics, page 11-65)
- GGSN on a SAMI card (see Displaying GGSN Real-Time Statistics, page 11-68)

- APN (see APN, page 11-75)

Association Information

The Association Information section for ITP application servers contains:

Field	Description
Number of ASPAs	Number of application server process associations associated with this application server.
Number of Active ASPAs	Number of active application server process associations associated with this application server.

Bandwidth Information

The Bandwidth Information section for RAN-O backhauls (and virtual backhauls) contains:

Field	Description
User Send Bandwidth (bits or bytes/sec) User Receive Bandwidth (bits or bytes/sec)	Bandwidth that the user specifies for the backhaul. Send and receive bandwidth values will be different if the interface is asymmetrical. By default, the user bandwidth is the same as the system bandwidth. **Note** When you change the User Bandwidth (see Editing Properties for a RAN-O Backhaul, page 8-53), you are changing the scale of the Y axis of the backhaul real-time chart in the Performance tab (see Displaying Backhaul Performance Statistics, page 11-36). The X and Y values of the data do not change. The threshold ranges resize because they are percentages of User Bandwidth.
System Send Bandwidth (bits or bytes/sec) System Receive Bandwidth (bits or bytes/sec)	Bandwidth that the system specifies (as defined on the node) for the backhaul. Send and receive bandwidth values will be different if the interface is asymmetrical. You cannot edit this field.

Capability Point Code

The Capability Point Code section for ITP signaling points contains:

Column	Description
Point Code	Capability point code of the signaling point.
Variant	SS7 protocol variant. Valid variants are: • ANSI • China • ITU • NTT • TTC

Column	Description
Network Indicator	Determines the type of call. Valid values are: • **National**—National-bound call. The MWTM routes national calls through the national network. • **NationalSpare**—National-bound call, used in countries in which more than one carrier can share a point code. In those countries, the **Network Indicator** differentiates networks. • **International**—International-bound call. The MWTM forwards international-bound calls to an STP pair that acts as an international gateway. • **InternationalSpare**—International-bound call, used in countries in which more than one carrier can share a point code. In those countries, the **Network Indicator** differentiates networks.
Network Name	Name of the network associated with the signaling point.

Description

The Description section contains a description of the ITP signaling point or linkset. If the signaling point or linkset has no description, this section is blank. If the linkset is unknown, `Unknown` appears in the Description section.

Descriptive Information

The Descriptive Information section for nodes and ONS cards contains:

Field	Description
Contact	The textual identification of the contact person for the managed node along with the information on how to contact this person. If the contact details are not available for the node, then this field displays Unknown.
Software Version	Version of software (for example, the ONS package or IOS version) that is installed on the node.
Software Description	Comprehensive information about the software that is installed on the node.
Description *(only for ONS cards)*	Full description of the ONS card (for example, RAN_SVC_LINE_CARD).
Hardware Version *(only for ONS cards)*	Version of the hardware of the ONS card (for example, VID=000, HwRev=29).
Firmware Version *(only for ONS cards)*	Version of the firmware on the ONS card, if applicable (for example, 12.2(24)St).

General Information

The General Information section applies to these objects:

- Interfaces, page 7-11
- ITP Application Servers, page 7-11
- ITP Linksets, page 7-12

Interfaces

The General Information section for interfaces contains:

Field	Description
Maximum Packet Size	Maximum packet size on the interface in bytes.
Send Speed (bits/bytes per second)[1]	Interface send speed in bits per second.
Receive Speed (bits/bytes per second)[2]	Interface receive speed in bits per second.

1. The preferences you specify control what is displayed.
2. The preferences you specify control what is displayed.

ITP Application Servers

The General Information section for ITP application servers contains:

Field	Description
Protocol	Protocol associated with the application server. Possible values are: • **M3UA**—MTP3-User Adaptation. • **SUA**—SCCP-User Adaptation.
QoS	Quality of service (QoS) class of the application server.
Routing Key	Routing key associated with the application server. The routing key is the value that determines the routing decisions that the application server makes.
Traffic Mode	Method by which the application server forwards requests to its active application server processes. Possible values are: • **overRide**—One application server process takes over all traffic for the application server, possibly overriding any currently active application server process in the application server. • **broadcast**—Every active application server process receives the same message. • **loadBind**—Each application server process shares in the traffic distribution with every other currently active application server process, based on application server process bindings. • **loadRndRobin**—Each application server process shares in the traffic distribution with every other currently active application server process, using a round-robin algorithm. • **undefined**—The traffic mode is not defined. The first application server process that becomes active defines the traffic mode.

ITP Linksets

The General Information section for ITP linksets contains:

Field	Description
Linkset Type	Type of linkset, which the MWTM determines by examining the links defined in the linkset. Possible linkset types are: • **HSL**—The links in this linkset use the SS7-over-ATM (Asynchronous Transfer Mode) high-speed protocol. • **SCTPIP**—The links in this linkset use the Stream Control Transmission Protocol (SCTP) IP transport protocol. • **Serial**—The links in this linkset use the serial SS7 signaling protocol. • **Mixed**—The links in this linkset are of two or more types. (This configuration is not recommended.) • **Virtual**—The links in this linkset are virtual links, which connect signaling point instances running on the same node. The MWTM does not poll virtual linksets, nor does it display real-time data or accounting statistics for virtual linksets. **Note** Prior to IOS release 12.2(23)SW1, the user manually created virtual linksets on multi-instance nodes. In and after that release, the system automatically creates virtual linksets. • **Other**—No links have been defined for this linkset.
Inbound ACL	Inbound IP access control list (ACL) number for the linkset. If no inbound ACL exists for the linkset, this field displays **0**. If the linkset is a Virtual linkset, this field displays N/A.
Outbound ACL	Outbound ACL number for the linkset. If no outbound ACL exists for the linkset, this field displays **0**. If the linkset is a Virtual linkset, this field displays N/A.

Interface Information

The Interface Information section for ITP links and application server process associations contains:

Field	Description
Interface Name	(HSL, Serial, and Virtual links only) Name of the interface.
Interface Index	(HSL, Serial, and Virtual links only) Index into the SNMP interface table.
QoS	(SCTP links only) Quality of service (QoS) class of the link.
Configured Local Port	(SCTP links only) Local port for which the link was configured.
Local Port	(SCTP links only) If the link is active, local port that the link is currently using. If the link is not active, **0** appears.
Configured Remote Port	(SCTP links only) Remote port for which the link was configured.

Field	Description
Actual Remote Port	(SCTP links only) If the link is active, remote port that the link is currently using. If the link is not active, **0** appears.
Protocol	Protocol associated with the application server process association. Possible values are: • **M3UA**—MTP3-User Adaptation. • **SUA**—SCCP-User Adaptation.

IP Addresses for SNMP

The IP Addresses for SNMP section for nodes contains:

Field	Description
IP Address	IP addresses associated with this node, including the primary SNMP address and all backup IP addresses, that are intended for SNMP.
Last Regular Poll Time	Date and time of the last full poll of the node. If the IP address has never been polled, the MWTM displays the description `Never Polled`.
SNMP Pollable	Whether or not the IP address is used for SNMP polling.

If there are no IP addresses defined for the node that are intended for SNMP, this field displays the description:

```
There are no other IP addresses defined for this node.
```

IP Addresses Not for SNMP

The IP Addresses Not for SNMP section for nodes contains:

Field	Description
IP Address	IP addresses associated with this node that are *not* intended for SNMP.

If no IP addresses are defined for the node that are not intended for SNMP, this field displays the description:

```
There are no other IP addresses defined for this node.
```

Links Information

The Links Information section for ITP linksets contains:

Field	Description
Links	Total number of links in the linkset.

Field	Description
Active Links	Number of links in the linkset that are Active.
Congested Links	Number of links in the linkset that are Congested.

Local IP Address Information

The Local IP Address Information section for ITP application server processes, application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description

IP Address	Local IP address that the object is using, or the primary IP address that is configured for the object, or both.
	The primary IP address is the first CS7 local IP address you configure in the node. For example, if you configure these IP addresses in the node:
	`cs7 local-peer 4180`
	`  local-ip 128.3.0.77`
	`  local-ip 128.3.0.254`
	then the MWTM uses `128.3.0.77` as the primary IP address. If someone deletes this IP address from the node configuration, or adds a new IP address to the beginning of the list, the MWTM detects the change and automatically updates this field to reflect the new primary IP address.

Interface Name	Name of the interface to which the IP address is assigned. If the object has no interface name, this field is blank.
Status	Current status of the IP address. Possible values are: **Active**—The IP address is currently fully functional. **Inactive**—The IP address is not currently functional.
Cfg	Indicates whether this local IP address was configured for the object. Possible values are: • **Yes**—This is the configured local IP address, and the object is currently using it. • **(blank)**—This is not the configured local IP address.
Actual	Indicates whether this local IP address is currently being used by the object. Possible values are: • **Yes**—The object is currently using this IP address. • **(blank)**—The object is not using this IP address.

Naming Information

The Naming Information section applies to these objects:

- Nodes, page 7-15
- Cards, page 7-16
- Interfaces, page 7-16 (including RAN backhauls and shorthauls)
- ITP Application Servers, page 7-17
- ITP Application Server Processes, page 7-17

- ITP Application Server Process Associations, page 7-17
- ITP Links, page 7-17
- ITP Linksets, page 7-18
- ITP Signaling Gateway-Mated Pairs, page 7-18
- ITP Signaling Points, page 7-18

Nodes

The Naming Information section for nodes contains:

Field	Description
Display Name	Name of the node.
Custom Name	Custom name of the node. The field displays custom name of the node when defined and displays Unknown when the custom name is not defined.
IP Address or DNS Hostname	IP address or DNS name of the node, as the MWTM discovered it. However, if you modified your preferences to identify nodes by their IP addresses, then this is method of node identification in this field. For more information, see Node Name Settings, page 4-5.
SysName	Name set on the router and returned via the SNMP variable sysName. It can never be changed inside the MWTM.
Node Type	Type of node. See Nodes Table, page 8-8, for a list of the available node types.
Feature	Primary function performed by the node type. See Nodes Table, page 8-8, for a list of the available features.
Chassis Type (ONS only)	Description of the chassis hardware type (for example, ONS 15454 SDH ETSI). **Note** This field appears only for the ONS chassis.
Serial Number	Serial number of the node. This field is not displayed for PCRF nodes.
CLLI Code (ITP only)	COMMON LANGUAGE Location Identification Code for the node. A CLLI code is a standardized 11-character identifier that uniquely identifies the geographic location of the node. If the node has no CLLI code configured, this field is blank.
SNMP Access (IP-RAN only)	Indicates the type of SNMP access: • **In-band**—Access is through the backhaul interface (cell site). • **Out of band**—Access is external to the backhaul interface (aggregation site). • **Undefined**—Access is not defined.
Location	The physical location of this node. If the location details are not available for the node, then this field displays Unknown.

Cards

The Naming Information section for ONS cards contains:

Field	Description
Name	Name of the card.
Card Type[1]	Type of card. Card types for ONS include: • **TCC**—Control • **E1**—Ethernet • **STM1**—Synchronous Transport Module • **DS1**—Digital Signal • **OC3**—Optical • **XC**—Cross-connect • **RAN_SVC**—RAN Service • **ALM_PWR**—Alarm and Power • **CRFT_TMG**—Craft Terminal • **AICI**—Alarm Interface Controller
Model Name	Model name of the card (for example, PartNum=800-26651-01).
Slot Number	Slot number of the card in the ONS chassis.
Serial Number	Serial number of the card.

1. See the *Cisco ONS 15454 Product Overview* for information about ONS cards: http://www.cisco.com/univercd/cc/td/doc/product/ong/15400/45431po.htm

Interfaces

The Naming Information section for interfaces (which includes RAN backhaul and shorthaul interfaces) contains:

Field	Description
Name	Name of the interface.
Node	Name of the node to which the interface belongs.
Physical Address	Physical address of the interface.
Interface Index	Interface index number.
Interface Type	Interface type.
Interface Description	Interface description.
RAN Connection To	RAN connection that is associated with the interface. **Note** Not visible for RAN backhauls.
Virtual RAN Backhaul	Whether the RAN backhaul is a virtual backhaul. For more information about virtual RAN backhauls, see Creating Virtual RAN Backhauls, page 7-143. **Note** Visible only for RAN backhauls.

ITP Application Servers

The Naming Information section for ITP application servers contains:

Field	Description
Name	Name of the application server.
Node	Name of the node associated with the application server.
Signaling Point	Name of the signaling point associated with the application server.

ITP Application Server Processes

The Naming Information section for ITP application server processes contains:

Field	Description
Name	Name of the application server process.
Node	Name of the node associated with the application server process.
Local Port	Local port number that the application server process is currently using.

ITP Application Server Process Associations

The Naming Information section for ITP application server process associations contains:

Field	Description
Name	Name of the application server process association.
Node	Name of the node associated with the application server process association.
Signaling Point	Name of the signaling point associated with the application server process association.
Application Server	Name of the application server associated with the application server process association.
Application Server Process	Name of the application server process associated with the application server process association.
Slot	Slot number. This field is displayed only when the ASPA is offloaded to a PA line card or a SAMI line card.
Bay	Bay number. This field is displayed only when the ASPA is offloaded to a PA line card.
Processor	Processor number. This field is displayed only when the ASPA is offloaded to a SAMI line card.

ITP Links

The Naming Information section for ITP links contains:

Field	Description
Node	Name of the node associated with the link.
Signaling Point	Name of the signaling point associated with the link.

Field	Description
Linkset	Name of the linkset associated with the link.
SLC	Signaling link code (SLC) ID for the link.
Type	Type of link. Possible link types are: • **HSL**—The link uses the SS7-over-ATM (Asynchronous Transfer Mode) high-speed protocol. • **SCTPIP**—The link uses the Stream Control Transmission Protocol (SCTP) IP transport protocol. • **Serial**—The link uses the serial SS7 signaling protocol. • **Virtual**—The link is a virtual link, which connects signaling point instances running on the same node. The MWTM does not poll virtual links, nor does it display real-time data or accounting statistics for virtual links.
Slot	Slot number. This field is displayed only when the link is offloaded to a PA line card or a SAMI line card.
Bay	Bay number. This field is displayed only when the link is offloaded to a PA line card.
Processor	Processor number. This field is displayed only when the link is offloaded to a SAMI line card.

ITP Linksets

The Naming Information section for ITP linksets contains:

Field	Description
Name	Name of the linkset.
Node	Node associated with the linkset.
Signaling Point	Signaling point associated with the linkset.
Local Point Code	Point code of the primary signaling point for the linkset.
Adj Point Code	Point code of the adjacent signaling point for the linkset.

ITP Signaling Gateway-Mated Pairs

The Naming Information section for ITP signaling gateway-mated pairs contains:

Field	Description
Name	Name of the signaling gateway-mated pair.
Node	Name of the node associated with the signaling gateway-mated pair.
Is Passive	Indicates whether the signaling gateway-mated pair can initiate the connection to the mate: • **Yes**—The signaling gateway-mated pair is passive, and cannot initiate the connection to the mate. • **No**—The signaling gateway-mated pair is not passive, and can initiate the connection to the mate.

ITP Signaling Points

The Naming Information section for ITP signaling points contains:

Column	Description
Name	Name of the signaling point.
Node	Name of the node associated with the signaling point.
Network Name	Name of the network associated with the signaling point.
Instance Number	Number of the instance associated with the signaling point.

Point Code

The Point Code section for ITP signaling points contains:

Column	Description
Point Code	Primary and secondary point codes of the signaling point.
Variant	SS7 protocol variant. Valid variants are: • ANSI • China • ITU • NTT • TTC
Network Indicator	Determines the type of call. Valid values are: • **National**—National-bound call. The MWTM routes national calls through the national network. • **NationalSpare**—National-bound call, used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates networks. • **International**—International-bound call. The MWTM forwards international-bound calls to an STP pair that acts as an international gateway. • **InternationalSpare**—International-bound call, used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates networks
Network Name	Name of the network associated with the signaling point.

Polling Information

The Polling Information section for nodes contains:

Field	Description
Process Traps	Indicates whether traps are processed. To change this setting, check or uncheck the check box in the Process Traps column of the Nodes table.
Trap Polling	Indicates whether or not trap polling is enabled for this node. By default, trap polling is enabled for all nodes except for IP-RAN nodes. This field is read only. For IP-RAN nodes, you can modify this setting by using the following commands: • To enable trap polling for this node, set ipran-mib snmp-access to inBand on the node. • To disable trap polling for this node, set ipran-mib snmp-access to outOfBand on the node. **Note** For information about in-band and out-of-band management, see IP-RAN Specific FAQs, page C-19.
Report Polling	Indicates whether or not report polling is enabled for this node. This field is read-only for the web client, but editable in the Java client for ITP nodes. For IP-RAN nodes, you can modify this setting by using the following commands: • To enable report polling for this node, set ipran-mib location to aggSite on the node. • To disable report polling for this node, set ipran-mib location to cellSite on the node. For all other nodes, this field is not editable.
First Discovered	Date and time that the MWTM first discovered the node.
Last Poll IP Address	Last IP address that was polled for this node. For an unmanaged node, this field is blank.
Last Full Poll Time	Date and time of the last full poll of the node for node-related MIBs (as opposed to a demand poll for just one associated object's data). For a node that is not an ITP, IPRAN, or mSEF node, this field is blank.
Last MWTM Poll Response (secs)	Time, in seconds, taken by this node to respond to the last MWTM poll request. For a node that is not an ITP, IPRAN, or mSEF node, this field is blank.
Avg. MWTM Poll Response (secs)	Average time, in seconds, taken by this node to respond to MWTM poll requests. For a node that is not an ITP, IPRAN, or mSEF node, this field is blank.

Protection Information

The Protection Information section for ONS nodes and cards contains:

Column	Description
Card Type	The type of card. This column appears only when you select the ONS node in the navigation tree.
Protected Slot	Slot number of the protected card, which is configured for protection.[1]
Protecting Slot	Slot number of the card that is protecting one or more cards.
Configured State	The configured state of the chosen card: Working or Protecting. The card is working normally or protecting another card.
Current State	The current state of the chosen card: Active or Standby.

1. See the *Cisco ONS 15454 Product Overview* for information about protection schemes for ONS cards: http://www.cisco.com/univercd/cc/td/doc/product/ong/15400/45431po.htm

PWE3 Information

The PWE3 Information section for PWE3 virtual circuits contains:

Column	Description
Type	Type of service card carried over.
PSN Type	PSN type on which the virtual circuit is carried.
Virtual Circuit ID Is Primary	The virtual circuit identifier.
Is Primary	Indicates whether the object is a primary or backup.
Remote Interface String	Remote interface string for the virtual circuit ID
Description	Description of the virtual circuit

QoS Information

The QoS Information section for ITP signaling points contains:

Column	Description
QoS	Quality of service (QoS) class of the signaling point. Valid QoS classes range from **1** through **7**. ALL indicates that the signaling point accepts all QoS classes.
ToS	Type of service (ToS) of the signaling point.
DSCP	IP differentiated-services-code-point (DSCP) of the signaling point.

RAN Information

Note This subsection appears only for configured RAN interfaces (GSM Abis and UMTS Iub interfaces).

The RAN Information section contains:

Field	Description
Protocol	Protocol of the interface (GSM-Abis or UMTS-Iub).
Local IP Address	IP address of the local node.
Local Port	Local port that the interface uses.
Remote IP Address	IP address of the remote (peer) node.
Remote Port	Remote port that the interface uses.

Remote IP Address Information

The Remote IP Address Information section for ITP application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description
IP Address	Remote IP address associated with the object.
Type	Indicates whether this designated primary IP address is for the object (Primary), or is the IP address currently being used by the object (Effective), or both (Primary and Effective). Usually, the same IP address is Primary and Effective. However, if the primary IP address is down for some reason, the object uses a different IP address and is labeled Effective.
Status	Current status of the IP address. Possible values are: • **Active**—The IP address is currently fully functional. • **Inactive**—The IP address is not currently functional.
Cfg	(12.2(4)MB10 and later) Indicates whether this remote IP address was configured for the object. Possible values are: • **Yes**—This is the configured remote IP address, and the object is currently using it. • **(blank)**—This is not the configured remote IP address. • **N/A**—The MWTM cannot determine whether this is the configured remote IP address. For Cisco IOS software releases prior to 12.2(4)MB10, this field always displays N/A.
Actual	Indicates whether the object is currently using this remote IP address. Possible values are: • **Yes**—The object is using the IP address. • **(blank)**—The object is not using the IP address.

Uptime Information

The Uptime Information section for nodes contains:

Field	Description
Uptime	Time the node is up, in days, hours, minutes, and seconds.
Reboot Reason	Reason for the last reboot of the node. This field is not displayed for PCRF nodes.

Status Information

The Status Information section applies to these objects:

- Nodes, page 7-23
- Interfaces and Cards, page 7-24 (includes RAN backhauls and shorthauls)
- ITP Application Servers, page 7-27
- ITP Application Server Processes, page 7-29
- ITP Application Server Process Associations, page 7-29
- ITP Links, page 7-31
- ITP Linksets, page 7-32
- ITP Signaling Gateway Mated Pairs, page 7-33
- ITP Signaling Points, page 7-34

Nodes

The Status Information section for nodes contains:

Field	Description
Is Ignored	Indicates whether the node is Ignored (that is, whether to include the node when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
MTP3 Offload (ITP only)	Indicates whether MTP3 offload is configured for the node. Possible values are: • **Main**—The MTP3 management function operates only on the main processor. • **Offload**—The MTP3 management function operates on the main processor and on other available processors. • **N/A**—MTP3 offload cannot be determined.

Field	Description
NSO Status (ITP only)	Current NSO status of the node, with a color-coded background. Possible values are: **Local**—NSO is configured and the secondary peer is in the appropriate status for failover support. **Local**—NSO is configured, but the secondary peer is *not* in the appropriate status for failover support. **None**—The node and MIB support NSO, but NSO is not configured on the ITP. **N/A**—The node and MIB do not support NSO, or the MWTM cannot determine the NSO status.
Status	Current status of the node. Possible values are: • Active • Discovering • Polling • Unknown • Unmanaged • Waiting • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Last Status Change	Date and time that the status of the node last changed.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. If: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

Interfaces and Cards

The Status Information section for interfaces (including RAN backhaul and shorthaul interfaces) and cards contains:

Field	Description
Is Ignored	Indicates whether the interface or card is Ignored (that is, whether the interface or card should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
Admin Status	Displays the administrative status of the interface. Status can be: Unknown—Unknown administrative status. Up—Administratively up. Shutdown—Administratively down. Testing—Administrator is testing the interface.
Operational Status	Displays the operational status of the interface. Status can be: Unknown—Unknown operational status. Up—Interface is up. Down—Interface is down. Testing—Interface is in test mode. Dormant—Interface is dormant. Not Present—An interface component is missing. Lower Layer Down—An interface is down because of a lower-layer interface.
Connect State (for GSM Abis)	Displays the connection state of a GSM interface. States can be: Connected—The node is monitoring local and remote alarm status. Disconnected—The system ignores the local alarm status. The local transmitter on the shorthaul is disabled. Capability messages are transmitted to the remote describing the provisioning. The system stays disconnected until the remote capabilities are known and the peer state is transitioning to connected. Send Connect—One or more attempts have been made to connect to remote peer. Receive Connect—The local-peer has received a connect request from the remote-peer. Connect Rejected—Connection was rejected. ACK Connect—The initial connect request was sent and acknowledged by remote-peer. The local-peer is now waiting for a connect request from the remote-peer. Check Connect—The local peer has reason to believe its remote peer has failed. Additional tests are being processed to verify peer's state.

Field	Description
Connect State (for UMTS Iub)	Displays the connection state of a UMTS interface. States can be: Initialized—The connection is starting initialization. Starting—The shorthaul interface is administratively active, but the backhaul interface is down. Closed—The backhaul interface is active, but the shorthaul is administratively closed. Stopped—Unable to connect to peer in specified time interval. Additional attempts will be tried based on peer request or restart timers. Closing—Connection closed by administration request. Stopping—Connection shut down by peer's Term-Request. Will transition to stopped state. Connect Sent—Connection request sent to peer. ACK Received—Connection request sent and acknowledgement is received from peer. Now waiting for peer's connection request. ACK Sent—Connection request received and acknowledgement is sent to peer. Connection request sent and waiting for peer's acknowledgement. Open—Connection open and available for traffic.
Local Receive Alarm State Local Transmit Alarm State Remote Receive Alarm State Remote Transmit Alarm State (for UMTS Iub)	Displays alarm states for UMTS Iub interface. States can be: Remote Alarm—Indicates a problem at the remote end. The remote interface in the E1/T1 data stream generates and sends the alarm, and no other action is required. No Alarm—No alarm is present. Local Alarm—Indicates local interface problem. The interface has not received synchronization from the GSM node. The node stops transmitting backhaul samples. Received Alarm—Indicates receive problem in the local node. The remote node stops transmitting backhaul data and indicates a blue alarm. Alarm State Unavailable—Indicates the alarm state is not available. This state only applies to the remote and occurs when the peer connection is inactive.
Local State Remote State (for GSM Abis)	Displays alarm states for GSM Abis interface. States can be: Remote Alarm—Indicates a problem at the remote end. The remote interface in the E1/T1 data stream is generates and sends the alarm, and no other action is required. No Alarm—No alarm is present. Local Alarm—Indicates local interface problem. The interface has not received synchronization from the GSM node. The node stops transmitting backhaul samples. Received Alarm—Indicates receive problem in the local node. The remote node stops transmitting backhaul data and indicates a blue alarm. Alarm State Unavailable—Indicates the alarm state is not available. This state only applies to the remote and occurs when the peer connection is inactive.
Redundancy State	Displays information about the GSM Abis or UMTS Iub interface redundancy state. States can be: • Active—Active owner of interface. • Standby—Active owner of interface.

Field	Description
Status	Current status of the interface or card. Possible values are: • Active • Discovering • Down • Polling • Unknown • Unmanaged • Waiting • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Last Status Change	Date and time of last change to status.
Status Reason	Reason for the current status of the interface or card. For a full list of possible reasons, see the *stateReasons.html* file. If: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

ITP Application Servers

The Status Information section for ITP application servers contains:

Field	Description
Is Ignored	Indicates whether the application server is Ignored (that is, whether the application server should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."

Field	Description
Mate Status	Current status of the application server on the signaling gateway mate. Possible values are: • Active • Down • Inactive • Pending • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Last Status Change	Date and time that the status of the application server last changed.
Status	Current status of the application server. Possible values are: • Active • Down • Inactive • Pending • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file.To: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

ITP Application Server Processes

The Status Information section for ITP application server processes contains:

Field	Description
Is Ignored	Indicates whether the application server process is Ignored (that is, whether to include the application server process when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
Last Status Change	Date and time that the status of the application server process last changed.
Status	Current status of the application server process. Possible values are: • Unknown • Unmanaged For detailed definitions of each status, see Appendix E, "Status Definitions."
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. To: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

ITP Application Server Process Associations

The Status Information section for ITP application server process associations contains:

Field	Description
Is Ignored	Indicates whether the application server process association is Ignored (that is, whether the application server process association should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."

Field	Description
Congestion Level	Indicates the level of congestion on the application server process association. An application server process association is congested if it has too many packets waiting to be sent. This condition could be caused by the failure of an element in your network. Possible values for the Congestion Level field are None, indicating no congestion, and **1** to **7**, indicating levels of congestion from very light (**1**) to very heavy (**7**).
Instance Status	Current status of the protocol associated with the application server process, with a color-coded background. Possible values are: Active—The protocol is available. Shutdown—An administrator has forced the protocol to an unavailable state. Unknown—The MWTM cannot determine the current status of the protocol.
Status	Current status of the application server process association. Possible values are: • Active • Blocked • Down • Inactive • Pending • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Last Status Change	Date and time that the status of the application server process association last changed.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. To: • You installed the MWTM in the default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

ITP Links

The Status Information section for ITP links contains:

Field	Description
Is Ignored	Indicates whether the link is Ignored (that is, whether the link should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
Last Status Change	Date and time that the status of the link last changed.
Status	Current status of the link. Possible values are: • Active • Blocked • Failed • InhibitLoc • InhibitRem • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Status Reason	Reason for the current status of the link. For a full list of possible reasons, see the *stateReasons.html* file. To: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.
Congestion Level	Indicates the level of congestion on the link. A link is congested if it has too many packets waiting to be sent. This condition could be caused by the failure of an element in your network. Possible values for the Congestion Level field are None, indicating no congestion, and **1** to **7**, indicating levels of congestion from very light (**1**) to very heavy (**7**).

Field	Description
Receive Utilization	Indicates whether, on average, the link is under its configured receive utilization threshold (UnderThreshold) or over the threshold (OverThreshold).
Send Utilization	Indicates whether, on average, the link is under its configured send utilization threshold (UnderThreshold) or over the threshold (OverThreshold).

ITP Linksets

The Status Information section for ITP linksets contains:

Field	Description
Is Ignored	Indicates whether the linkset is ignored (that is, whether the linkset should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
Last Status Change	Date and time that the status of the linkset last changed.
Status	Current status of the linkset. Possible values are: • Active • Shutdown • Unavailable • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. To: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons appear(s) in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

ITP Signaling Gateway Mated Pairs

The Status Information section for ITP signaling gateway mated pairs contains:

Field	Description
Is Ignored	Indicates whether the signaling gateway-mated pair is Ignored (that is, whether the signaling gateway-mated pair should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
Congestion Level	Indicates the level of congestion on the signaling gateway-mated pair. A signaling gateway-mated pair is congested if it has too many packets waiting to be sent. This condition could be caused by the failure of an element in your network. Possible values for the Congestion Level field are None, indicating no congestion, and **1** to **7**, indicating levels of congestion from very light (**1**) to very heavy (**7**).
Instance Status	Current status of the protocol associated with the signaling gateway-mated pair, with a color-coded background. Possible values are:  Active—The protocol is available.  Shutdown—An administrator has forced the protocol to an unavailable state.  Unknown—The MWTM cannot determine the current status of the protocol.
Status	Current status of the signaling gateway-mated pair. Possible values are: • Active • Blocked • Down • Inactive • Pending • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."

Field	Description
Last Status Change	Date and time that the status of the signaling gateway-mated pair last changed.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. To: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

ITP Signaling Points

The Status Information section for ITP signaling points contains:

Column	Description
Is Ignored	Indicates whether the signaling point is Ignored (that is, whether the signaling point should be included when aggregating and displaying MWTM status information).
Alarm Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events."
Last Status Change	Date and time that the status of the signaling point last changed.

Column	Description
Status	Current status of the signaling point. Possible values are: • Active • Unknown • Unmanaged • Warning For detailed definitions of each status, see Appendix E, "Status Definitions."
Status Reason	Reason for the current status of the signaling point. For a full list of possible reasons, see the *stateReasons.html* file. To: • You installed the MWTM in the default directory, */opt*, then the file is in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

Threshold Information (RAN-O Only)

The Threshold Information section for RAN-O nodes contains:

Field	Description
Acceptable	The percentage threshold setting below which the backhaul utilization is considered acceptable. The default Acceptable threshold is 60 percent.[1]
Warning	The percentage threshold setting beyond which the backhaul utilization issues a warning. Subsequent warnings are issued only if the utilization falls below the Acceptable threshold. The default Warning threshold is 70 percent.[1]
Overloaded	The percentage threshold setting beyond which the backhaul utilization is considered overloaded. Subsequent overload messages are issued only if the utilization falls below the Acceptable threshold. The default Overloaded threshold is 80 percent.[1]

1. To change the default setting, see Editing Properties for a RAN-O Backhaul, page 8-53.

Viewing Status

The Status section displays information about conditions that contribute to the overall status of the chosen object. To view the Status section, select an object in the navigation tree and click the Status tab in the right pane.

The content pane lists all objects contributing to the status of the object you have chosen in the navigation tree. A tooltip in the content pane lists the fully qualified domain name (FQDN) for the object.

To see which object types pertain to the Status tab, see Appendix A, "Client Object Map Reference" If the object does not have any associated objects, the Status tab will not appear.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns except Internal ID.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Status table contains:

Column	Description
Internal ID	Internal ID of the object. The internal ID is a unique ID for every object, assigned by the MWTM for its own internal use. It can also be useful when the TAC is debugging problems.
Name	Name of the object.
Object Type	Type of network object.
Ignored	Indicates whether the object should be included when aggregating and displaying MWTM status information: • Uncheck the check box to include the object. This is the default setting. • Check the check box to exclude the object. This field can be edited by users with authentication level Power User (level 2) and higher.
Notes	Indicates whether a note is associated with the object.
Severity	Indicates the alarm severity of the object. See Chapter 9, "Managing Alarms and Events".
Last Status Change	Date and time that the status of the object last changed.
Events (MWTM Client only)	Indicates whether the object has an associated recent event. (Even if the server purges all of the events associated with the object, the MWTM continues to display the event icon in this field.) To: • Delete the event icon (orange triangle) from MWTM displays for a specific object, select the object and click the icon. • Delete the event icon from MWTM displays for all objects, choose **Edit > Clear All Events** from the MWTM main menu. **Note** During Discovery, the MWTM might flag objects with an event icon. If the event icons are too distracting, use the **Edit > Clear All Events** menu option to remove them.

Column	Description
Status	Current status of the object. Possible values are: • Active • Blocked • Discovering • Down • Failed • Inactive • Inhibited • InhibitLoc • InhibitRem • Not Present
Status (continued)	• Pending • Polling • Shutdown • Unavailable • Unknown • Unmanaged • Waiting • Warning For detailed definitions of each status, see Appendix E, "Status Definitions".
Status Reason	Reason for the current status of the object. For a full list of possible reasons, see the *stateReasons.html* file. If: • You installed the MWTM in the default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • You installed the MWTM in a different directory, then the help directory and file are in that directory. If the cell is too small to show all of the status reasons, place the cursor over the cell to see the full text in a tooltip. The MWTM lists status reasons in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see the Command Reference, page B-1.

Editing SNMP IP Addresses for a Node

You use the MWTM to determine which IP addresses to use for SNMP polling.

To edit a node's SNMP IP addresses, right-click a node in a window, choose **Edit > SNMP IP Addresses** in the right-click menu. The MWTM displays the Edit SNMP IP Addresses dialog box.

To edit a node's SNMP IP addresses in the web interface, select **Edit SNMP IP Addresses** from the Actions menu on the Details tab. For more information, see MWTM: Edit SNMP IP Addresses Dialog.

The Edit SNMP IP Addresses dialog box contains:

Field or Button	Description
Available IP Addresses	List of all IP addresses associated with this node that users could not or do not want the MWTM to use for SNMP polling. The MWTM does not send SNMP queries to IP addresses in this list. This option appears only for ITP, IPRAN, or mSEF nodes.
IP Addresses for SNMP	List of all IP addresses associated with this node that the MWTM can use for SNMP polling: • By default, the MWTM places all discovered IP addresses in this list, in the order in which they are discovered. The MWTM uses the IP address at the top of the list as the primary SNMP address for the node. During SNMP polling of the node (status polling and demand polling), the MWTM first tries the primary SNMP address. If the primary is unavailable, the MWTM tries the other IP addresses, one-by-one, in descending order. • To assign a new primary SNMP address, or to change the order of the secondary IP addresses, click the **Raise Priority** and **Lower Priority** buttons to move the IP addresses up and down in the list. • You can also select IP addresses that you do not want the MWTM to use for SNMP polling. This feature is useful, for example, to separate management traffic from SMS traffic. To remove an IP address from the list, click **Remove**. The MWTM removes the IP address from the IP Addresses for SNMP list, places it in the Available IP Addresses list, and no longer uses it for SNMP polling. To enable an IP address for SNMP polling again, select the address in the Available IP Addresses list and click **Add**. The IP address moves back into the IP Addresses for SNMP list and is again available for SNMP polling. If you remove all IP addresses from the IP Addresses for SNMP list, you remove the node from the network, and the MWTM automatically labels the node Unmanaged in all MWTM windows. When you click **Save**, all MWTM windows are updated automatically to reflect the changes. This option appears only for ITP, IPRAN, or mSEF nodes.
Add	Enables one or more chosen IP addresses for SNMP polling. All chosen IP addresses in the Available IP Addresses list are moved to the IP Addresses for SNMP list where the MWTM uses them again for SNMP polling.
Remove	Disables one or more chosen IP addresses for SNMP polling. All chosen IP addresses in the IP Addresses for SNMP list are moved to the Available IP Addresses list, and are no longer used by the MWTM for SNMP polling.
Raise Priority	Moves the chosen IP addresses up in the IP Addresses for SNMP list. If you move an IP address to the top of the list, the MWTM uses that IP address as the new primary SNMP address for the node.
Lower Priority	Moves the chosen IP addresses down in the IP Addresses for SNMP list. If you remove an IP address from the top of the list, the MWTM no longer uses that IP address as the primary SNMP address for the node.

Field or Button	Description
Save	Saves changes that you made to the node information and exits the dialog box. When you are satisfied with your changes, click **Save**. The MWTM saves your changes and updates all MWTM windows to reflect your changes.
Cancel	Exits the dialog box without saving any changes. At any time, you can click **Cancel** to exit the dialog box without saving any changes.
Help	Displays online help for the dialog box.

Viewing Troubleshoot

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

Tip For more information about troubleshooting, see the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

You can run commands and view output in the Troubleshooting section available from the MWTM client or MWTM web interface.

To view the Troubleshoot section, in a view in the navigation tree, select an object, then click on the Troubleshoot tab in the right pane.

Note To see which object types pertain to this tab, see Appendix A, "Client Object Map Reference".

Tip To save the output of all executed commands to a log file, see mwtm tshootlog, page B-90.

Before you can run commands and view output, you must properly configure credentials. You can configure credentials by using the CLI command (see mwtm addcreds, page B-6) or through the MWTM client (see Configuring Login Credentials, page 5-19). If credentials are not configured, the output pane displays this message:

```
No credentials are available for this node
```

Troubleshoot Menu and Toolbar

The Troubleshoot section displays these menus and toolbar buttons for the chosen object:

Menu or Toolbar Button	Description
Category	A grouping of related commands. The MWTM provides default categories that you cannot modify. Additional categories are user-defined. You can execute all commands in a category at once by using the Execute Category button. **Note** To define additional categories and create new commands in categories, see Creating New Troubleshooting Categories and Commands, page 5-22
Command	A command or task within the chosen category. The MWTM provides commands for default categories that you cannot modify. You can execute a chosen command by using the Execute Command button.
Suffix	Filters the output of troubleshooting commands. For example: • | include—Includes the lines matching the specified regular expression • | exclude—Excludes the lines matching the specified regular expression • | begin—Starts the printout at the line matching a regular expression • | section—Outputs only the matching sections of the printout **Note** The suffixes allowed here are those supported by the IOS version.
 Execute Command	Executes the chosen command only. **Note** If you are using Microsoft Internet Explorer, the scroll bar may change position.
 Execute Category	Executes all commands in the chosen category. **Note** If you are using Microsoft Internet Explorer, the scroll bar may change position.
 Cancel Execution	Stops any execution process.
 Save Output	Saves output on screen to a file. **Note** This option is available only in Java client.
 Copy Output	Copies output on screen to the clipboard. **Note** This option is available only in Java client.
 Print Output	Prints output on screen. **Note** This option is available only in Java client.
 Clear Output	Clears all output from the screen.
Output Pane	Pane where command output appears.

Commands That Require Additional User Input

After you click the Execute Command or Execute Category button, some commands prompt you for additional input. Commands that prompt you for additional input have an ellipsis (...) at the end of the command. You must enter valid data, which appears in green as you type. Invalid data appears in red. The MWTM will not execute a command with invalid data. Once you have entered the additional input, you must click one of these buttons:

Button	Description
OK	Executes the chosen command or category of commands. **Note** If you do not provide input but leave the fields blank, and then click OK, the MWTM skips the command or commands and this message appears: `Skipping command.` The MWTM lists the commands that you skipped, but executes other commands for which you provided input.
Clear	Removes entered data from all input fields.
Cancel	Removes the input fields from the right pane.

Note Save, Copy, Print, and Output options are available in the MWTM client interface only.

Related Topics

- Configuring Login Credentials, page 5-19
- Troubleshooting IOS Commands on the Web, page D-4
- mwtm addcreds, page B-6
- mwtm tshootlog, page B-90

Viewing Alarms and Recent Events

To view alarms for an object, in the navigation tree, select the object (for example, a node), then click the Alarms tab in the content area.

To view recent events for an object, in the navigation tree, select the object (for example, an interface), then click the Events tab in the content area.

The table in the content pane displays information about the alarms or recent events associated with the chosen object. The content pane also provides tools to perform tasks, such as setting filters and acknowledging alarms or events.

Note For managed objects that have peers (RAN backhauls and shorthauls, ITP links and linksets, and signaling-gateway mated pairs), the MWTM displays subtabs to distinguish alarms and recent events for each peer object.

- For descriptions of the table columns, see Right-click Menus, page 9-11.

- For descriptions of alarms and events tools, see Toolbar Buttons, page 9-8.
- To understand the difference between alarms and events, see Basic Concepts and Terms, page 9-1.

About Provisioning

To provision the objects, select an object from the navigation tree of the MWTM web interface and select **Provision** from the Actions menu. The Provisioning option is available only in web client. This section describes how to provision objects using the MWTM web interface and provides examples.

For further information, see the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

http://www.cisco.com/en/US/docs/net_mgmt/mobile_wireless_transport_manager/6.1.5/developer/guide/mwtm614ossig.html

Using provisioning through the MWTM web interface, you can add, modify, and/or delete ITP, PWE3, CSG2, GGSN, or HA objects, as follows:

Personality	Objects	Add	Modify	Delete
ITP	Linksets	Yes	Yes	Yes
	SCTP Links	Yes	Yes	Yes
	MTP2 Links	Yes	Yes	Yes
	HSMTP2 Links	Yes	Yes	Yes
	HSL Links	Yes	Yes	Yes
	Application servers, including m3ua and sua	Yes	Yes	Yes
	Application server processes, including m3ua and sua	Yes	Yes	Yes
	Local peer objects	Yes	Yes	Yes
	m3ua objects	Yes	Yes	Yes
	sua objects	Yes	Yes	Yes
	Channelized serial interfaces (under T1/E1 controllers)	Yes	Yes	Yes
	Physical serial interfaces	No	Yes	No
	Physical T1/E1 controllers	No	Yes	No
	Physical ATM interfaces	No	Yes	No
	Physical Ethernet, FastEthernet, or GigabitEthernet interfaces	No	Yes	No
	DCS	Yes	Yes	Yes
	SGMP and Mated SG [1]	Yes	Yes	Yes
	Signaling Point [1]	Yes	Yes	Yes

Personality	Objects	Add	Modify	Delete
IPRAN (PWE3)	ATM Connect	Yes	Yes	Yes
	CEM Class	Yes	Yes	Yes
	CEM Connect	Yes	Yes	Yes
	CEM Group	Yes	Yes	Yes
	FastEthernet Sub Interface, GigabitEthernet Sub Interface, TenGigabitEthernet Sub Interface [1]	Yes	Yes	Yes
	Interface ATM, ATM IMA, ATM Sub Interface [2]	Yes	Yes	Yes
	Interface BITS	No	Yes	No
	Interface CEM [1]	No	Yes	No
	Interface E1, T1 [1]	No	Yes	No
	Interface FastEthernet, GigabitEthernet, TenGigabitEthernet [1]	No	Yes	No
	Interface Loopback [1]	Yes	Yes	Yes
	Interface Serial [1]	Yes	Yes	Yes
	Interface SONET [1]	No	Yes	No
	Interface ADSL, SHDSL	No	Yes	No
	Interface Tunnel [1]	Yes	Yes	Yes
	Interface Virtual CEM [1]	No	Yes	No
	Interface Port Channel [1]	Yes	Yes	Yes
	Interface Multilink [1]	Yes	Yes	Yes
	Interface Vlan	Yes	Yes	Yes
	IP Access List	Yes	Yes	Yes
	IP Route VRF	Yes	Yes	Yes
	Node [1]	No	Yes	No
	OSPF [1]	Yes	Yes	Yes
	PVC [1]	Yes	Yes	Yes
	PVP [1]	Yes	Yes	Yes
	Policy Map, Class Map [1]	Yes	Yes	Yes
	Pseudowire Class	Yes	Yes	Yes
	Recovered Clock [1]	Yes	Yes	Yes
	Sonet AU4 Tug [1]	No	Yes	No
	Sonet AU4 [1]	No	Yes	No
	Sonet Serial [1]	Yes	Yes	Yes
	Sonet STS [1]	No	Yes	No
	Sonet Tug [1]	No	Yes	No
	Sonet VTG [1]	No	Yes	No

Personality	Objects	Add	Modify	Delete
	Sonet CEM Group, Sonet IMA Group	Yes	Yes	Yes
	TDM Connect	Yes	Yes	Yes
	TDM Group	Yes	Yes	Yes
	Virtual CEM Group	Yes	Yes	Yes
	VRF	Yes	Yes	Yes
CSG2	CSG2	Yes	Yes	Yes
	CSG Map	Yes	Yes	Yes
	CSG Policy	Yes	Yes	Yes
	CSG Content	Yes	Yes	Yes
	CSG Service	Yes	Yes	Yes
	CSG Billing Plan	Yes	Yes	Yes
	CSG2 User Profile	Yes	Yes	Yes
	VRF	Yes	Yes	Yes
	IP Route VRF	Yes	Yes	Yes
	IP Access List [1]	Yes	Yes	Yes
	Interface GigabitEthernet	No	Yes	No
	Interface GigabitEthernet Sub Interface	Yes	Yes	Yes
	MPCC Profile	Yes	Yes	Yes
Supervisor of GGSN	L2VLAN [3]	Yes	Yes	Yes
	VRF [1]	Yes	Yes	Yes
	Interface, Loopback [1]	Yes	Yes	Yes
	Interface, VLAN [1, 2]	Yes	Yes	Yes
	Interface, Tunnel [1]	Yes	Yes	Yes
	Interface, GigabitEthernet [1]	No	Yes	No
	SVCLC	Yes	Yes	Yes
	IP VRF routes	Yes	Yes	Yes

Personality	Objects	Add	Modify	Delete
GGSN R8 and above	APN	Yes	Yes	Yes
	GPRS Charging Profile	Yes	Yes	Yes
	GPRS Charging Profile Defaults	Yes	Yes	Yes
	GPRS Global Commands	Yes	Yes	Yes
	Service Mode	Yes	Yes	Yes
	Test by IMSI	Yes	Yes	Yes
	Maximum PDP Contexts	Yes	Yes	Yes
	QoS Default Response Requested	Yes	Yes	Yes
	VRF [1]	Yes	Yes	Yes
	Interface, Loopback [1]	Yes	Yes	Yes
	Interface, Tunnel [1]	Yes	Yes	Yes
	Interface, GigabitEthernet [1]	No	Yes	No
	IP Access List [1]	Yes	Yes	Yes
	IP Local Pools	Yes	Yes	Yes
GGSN R8 and above	IP Route VRF	Yes	Yes	Yes
	AAA Authentication PPP	Yes	Yes	Yes
	AAA Authorization Network	Yes	Yes	Yes
	AAA Group Server RADIUS	Yes	Yes	Yes
	AAA Accounting Network	Yes	No	Yes
	OSPF [1]	Yes	Yes	Yes
	Node [1]	No	Yes	No
Home Agent	Node	No	Yes	No
	DHCP Pool	Yes	Yes	Yes
	HA Foreign Agent	Yes	Yes	Yes
	Hotline, Non-Hotline Profile	Yes	Yes	Yes
	IP Local Pool	Yes	Yes	Yes
	IP Access List [1]	Yes	Yes	Yes
	Mobile Host IP	Yes	Yes	Yes
	Mobile Host NAI	Yes	Yes	Yes
	Mobile Realm	Yes	Yes	Yes
	Node [1]	No	Yes	No
	Security Association Home Agent	Yes	Yes	Yes
	Security Association Foreign Agent	Yes	Yes	Yes
	Security Association Host IP	Yes	Yes	Yes
	Security Association Host NAI	Yes	Yes	Yes
	VRF	Yes	Yes	Yes
	Virtual Network	Yes	Yes	Yes

Personality	Objects	Add	Modify	Delete
PDNGW	Node	No	Yes	No
	AAA_Accounting_Network	Yes	Yes	Yes
	AAA_Authorization_Network	Yes	Yes	Yes
	IP_Route	Yes	Yes	Yes
	IP_Local_Pool	Yes	Yes	Yes
	GPRS_QoS_Police_Profile	Yes	Yes	Yes
	IPV6_Local_Pool	Yes	Yes	Yes
	GPRS_PCSCF	Yes	Yes	Yes
	IPV6_AccessList	Yes	Yes	Yes
	Interface	No	Yes	No
	AAA_Group_Radius	Yes	Yes	Yes
	Route_Map	Yes	Yes	Yes
	GPRS_QoS_CAC_Policy	Yes	Yes	Yes
	APN	Yes	Yes	Yes
	VRF	Yes	Yes	Yes
	AAA_Authentication_PPP	Yes	Yes	Yes
	IP_AccessList	Yes	Yes	Yes
	PolicyMap	Yes	Yes	Yes
	ClassMap	Yes	Yes	Yes
	IP_Route_VRF	Yes	Yes	Yes
	GPRS_QoS_Bandwidth_Pool	Yes	Yes	Yes

Personality	Objects	Add	Modify	Delete
SGW	Node	No	Yes	No
	IP_Route	Yes	Yes	Yes
	IP_Local_Pool	Yes	Yes	Yes
	IPV6_Local_Pool	Yes	Yes	Yes
	GPRS_PCSF	Yes	Yes	Yes
	IPV6_AccessList	Yes	Yes	Yes
	GPRS_Charging_Profile	Yes	Yes	Yes
	Interface	Yes	Yes	Yes
	Route_Map	Yes	Yes	Yes
	GPRS_QoS_CAC_Policy	Yes	Yes	Yes
	APN	Yes	Yes	Yes
	VRF	Yes	Yes	Yes
	IP_AccessList	Yes	Yes	Yes
	ClassMap	Yes	Yes	Yes
	PolicyMap	Yes	Yes	Yes
	IP_Route_VRF	Yes	Yes	Yes
	GPRS_QoS_Bandwidth_Pool	Yes	Yes	Yes

1. Not all options and/or subcommands are supported.
2. Not all options and/or subcommands are supported.
3. See bug about VTP Mode Transparent

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

This section contains:

- Prerequisites for Using Provisioning, page 7-47
- Using the Provisioning Wizard, page 7-48

Prerequisites for Using Provisioning

Before you can provision an object:

- You must set up:
  - Basic IP connectivity
  - SNMP community strings
  - Credentials
  - Telnet or SSH access allowed
  - (*ITP only*) Basic signaling points configured

Note For provisioning to work correctly, the format of the point code in MWTM must match the point code format on the router.

  - (*GGSN only*) The GPRS service must be enabled in IOS
- MWTM must be able to successfully:
  - Discover the object
  - Retrieve running configuration from the object

Setting Up the MWTM to Retrieve Running Configuration from the Object

Before you can use the MWTM to provision objects, you must set up the MWTM to retrieve the running configuration from the object.

The MWTM inventory has two types of attributes:

- **Monitor attributes**—Attributes obtained from SNMP polling and/or status monitoring
- **Configuration attributes**—Attributes obtained from IOS running configuration.

Setting up the MWTM to retrieve running configuration is a two-step process. You must:

1. Supply credentials for the target node(s). For details, see Configuring Login Credentials, page 5-19.
2. Ensure that the MWTM is getting the IOS running configuration successfully from the object. There are two approaches you can use:
   - **Automatic configuration synchronization**—This is the default option. You can verify that the option in the *System.properties* file—look for the AUTO_SYNC_CONFIG field, which should be set to true. If you enable this option, the MWTM automatically retrieves the running configuration from the object after the MWTM processes a provisioning operation (from the GUI or NBAPI). During every status poll, the MWTM checks whether the running configuration has changed on the object. If the configuration has changed, the MWTM retrieves it.
   - **Manual configuration synchronization**—In certain situations, you may choose to turn off automatic configuration synchronization and manage configuration synchronization manually. You can request manual configuration synchronization using the NBAPI or the CLI. For details, see the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

Using the Provisioning Wizard

Note Throughout the wizard, you can click **Next** to continue, **Previous** to go back, **Cancel** to exit the wizard without saving changes, **Refresh** to reload the current window, or **Submit** to complete the provisioning

The provisioning wizards supports characters A-Z, a-z, 0-9, underscore (_), dash (-), and the “at” sign (@). The provisioning wizard might allow you to enter unsupported characters in text fields, but they might cause unexpected results in the provisioning wizard.

Note the following conditions when using special characters in the provisioning wizard:

- Do not enter # or % in any text fields in the provisioning wizard.

- If you use a special character (for example, +, a period (.), or a space) in any text field in the provisioning wizard, when you click **Next**, the MWTM GUI briefly flashes the encoded value of the special character. For example, + briefly displays as *%2B*. After refreshing, the MWTM GUI displays the correct value.

To start provisioning by using the MWTM provisioning wizard:

Step 1 Launch the Provisioning wizard using one of the following options:

- From the MWTM web interface, click a node in the navigation tree then, in the top of the Details tab, choose **Actions > Provision**.

Note The Provision menu item or button is not displayed if the node is not managed.

Step 2 Select a **Type** (and **SubType**, if applicable).

Step 3 Click **New** to create a new item of the chosen Type or select an item in the Provisioned Items list, then click **Edit** or **Delete**.

The provisioning wizard appears. The wizard stages are: Basic, Features, and Summary.

Note If you do not initiate activity on an active wizard window, your session will time out after 60 seconds, and the MWTM returns to the Provision Choices window.

Step 4 Enter the relevant information at the Basic stage and click **Next** to continue.

Step 5 (Optional) Make your selections at the Features stage. Notice that as you enable features, they appear in the Wizard Steps pane under Features. Click **Next** to continue.

Step 6 (Optional) If you have added features, you can choose to configure aspects of each feature. Click **Next** to continue, or click the wizard stage in the left pane to jump between stages.

Step 7 The Summary stage appears, showing which IOS commands the MWTM will send to the object.

You can optionally check the box **Write to IOS startup-config**, which saves your configuration changes permanently to the startup configuration on the object. This process can take time.

Note For ITP nodes only **Write to IOS startup-config** check box is displayed. For non ITP nodes, **Do not Deploy to Device** check box is displayed in addition to **Write to IOS startup-config**. This option saves the configuration changes to a batch file without applying to the object. When you check the box **Do not Deploy to Device**, the **Write to IOS startup-config** is disabled and **Add to Batch File** becomes a mandatory field.

Step 8 In the **Add to Batch File** pulldown menu, you can select configuration commands to add to a batch file. You can create a new batch file by entering a filename that does not already exist, but ensure that the file name does not start with ‘SampleConfig’.

Step 9 Click **Submit** to send the provisioning to the object.

The provisioning wizard provides colored status balls in the Wizard Steps pane, which indicate:

- **White**—The stage you are in currently
- **Red**—A problem in the stage

- **Yellow**—Stage is not yet configured
- **Green**—Stage is configured successfully

Polling Nodes

The MWTM automatically polls nodes at specified intervals. However, you can also request an immediate poll for a node. This section describes:

- Polling from the Discovery Dialog, page 7-50
- Performing a Normal Poll, page 7-51
- Performing a Clean Poll, page 7-51

Polling from the Discovery Dialog

To poll a node from the Discovery dialog box:

Step 1 Choose **Network > Network Discovery** from the MWTM main menu.

The MWTM displays the Discovery dialog box.

Step 2 Select the Discovery tab.

The MWTM displays the Discovery pane. The Discovered Nodes section of the Discovery pane lists all discovered nodes (all nodes, including new and excluded nodes, not just the nodes in the current view).

Step 3 Select one or more nodes.

Note You cannot poll a node with a Primary SNMP Address of N/A. If you select a node with a Primary SNMP Address of N/A, then the Poll Node button is dimmed and cannot be chosen. If you select more than one node, and even one of them has a Primary SNMP Address of N/A, then the Poll Node button is dimmed and cannot be clicked.

Step 4 Click **Poll Node**.

The MWTM begins a poll of the chosen nodes. During polling, the Poll Node button is dimmed, the `Selected nodes are being polled` message appears at the bottom of the Discovery dialog box, and individual nodes might display the polling status.

Note If the node has only one IP address for the MWTM to poll, and the poll fails or times out, the MWTM issues an error message. If the node has more than one IP address for the MWTM to poll, and the polls of one or more IP addresses fail or time out, the MWTM issues warning messages. If all polls fail or time out, the MWTM issues an error message.

When the `Selected nodes are being polled message` disappears and no nodes are in polling status, polling is complete. The MWTM database immediately reflects any new or changed data for the chosen nodes.

Performing a Normal Poll

A normal poll retains all objects associated with polled nodes, even objects that have been deleted and are therefore in Unknown status.

To poll one or more nodes, retaining all associated components in the MWTM database, use one of these procedures:

From a View in the Main Window

Step 1 Select a view in the navigation tree.

Step 2 Select one or more nodes in the navigation tree.

Step 3 Choose **Network > Poll Nodes > Normal Poll**.

The MWTM polls all chosen objects.

From Summary Lists

Step 1 Click **Nodes** under Summary Lists in the navigation tree.

Step 2 Select a node or adjacent node in the node table in the right pane.

Step 3 Choose **Network > Poll Nodes > Normal Poll**.

The MWTM polls that node.

From Right-click Menu in a View

Step 1 Select a view in the navigation tree.

Step 2 Right-click a node in the navigation tree.

Step 3 Choose **Poll Node > Normal Poll** from the right-click menu.

The MWTM polls the node.

From the MWTM web interface

Step 1 Select a node from the navigation tree of the MWTM web interface.

Step 2 Select **Normal Poll Node** from the Actions menu present under Details tab.

The MWTM polls that node.

Performing a Clean Poll

A clean poll removes all network objects in an unknown or unconfigured state from the node at the completion of the poll.

To poll one or more nodes, removing and then rediscovering all associated components, use one of these procedures:

From a View in the Main Window

Step 1 Select a view in the navigation tree.

Step 2 Select one or more nodes in the navigation tree.

Step 3 Choose **Network > Poll Nodes > Clean Poll**.

The MWTM polls all chosen nodes.

From Summary Lists

Step 1 Click **Nodes** under Summary Lists in the navigation tree.

Step 2 Select a node or adjacent node in the node table in the right pane.

Step 3 Choose **Network > Poll Nodes > Clean Poll**.

The MWTM polls that node.

From Right-click Menu in a View

Step 1 Select a view in the navigation tree.

Step 2 Right-click a node in the navigation tree.

Step 3 Choose **Poll Node > Clean Poll** from the right-click menu.

The MWTM polls the node.

From the MWTM web interface

Step 1 Select a node from the navigation tree of the MWTM web interface.

Step 2 Select **Clean Poll Node** from the Actions menu present under Details tab.

The MWTM polls that node.

Allowing and Disallowing Trap Processing for a Node

By default, the MWTM processes traps from all discovered nodes. However, you can prevent the MWTM from processing traps from one or more nodes. For example, if a node is experiencing many link changes and generating too many traps, you can disallow traps from that node until the situation stabilizes.

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 4) and higher.

Note If you prevent the MWTM from processing traps from a node, all MWTM clients and views connected to that MWTM server are prevented from processing traps from that node.

Also, if you prevent the MWTM from processing traps from a node, make a note of the change, and remember to reset the node when the problem is corrected or the maintenance is complete.

To prevent the MWTM from processing traps from a node, use one of these procedures:

- Uncheck the **Process Traps** check box for the node in the Node table.

Note By default, the Process Traps column is hidden. To display the Process Traps column, right-click in the table heading and select the **Process Traps** check box.

- Right-click the node in the navigation tree, then choose **Disallow Trap Processing**.

To allow the MWTM to process traps from a node, use one of these procedures:

- Check the **Process Traps** check box for the node in the Node table.
- Right-click the node in the navigation tree, then choose **Allow Trap Processing**.

Viewing Real-Time Data

You can use the MWTM to view real-time data for chosen objects in the navigation tree. The real-time statistics for some objects (CSG2, BWG, HA, GGSN, PDNGW, and SGWs on SAMI cards) appear only in the MWTM web interface (see Chapter 11, "Accessing Data from the Web Interface" to view these statistics).

Note In the MWTM client, the real-time icon  appears in some tabs in the right pane. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window when you no longer need to see it.

For more information on viewing real-time data, see:

- Viewing the Syslog, page 7-54
- Viewing CPU and Memory Performance, page 7-55
- Viewing Trap Settings, page 7-63
- Viewing Data for Interfaces, page 7-65
- Viewing Data for ITP Objects, page 7-73
- SCTP Association Configuration Details, page 7-84
- SCTP Association Statistics Details, page 7-86
- Viewing ITP MTP3 Errors, page 7-97

Viewing the Syslog

The Syslog section displays all messages in the system log for the chosen node.

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

To view the Syslog section, in the navigation tree, select a node, then click the Syslog tab in the content area.

The Syslog section displays these fields for the chosen node:

GUI Element	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Poll Interval ((*available only in Java client*)	Label that shows the current poll interval in seconds.

GUI Element	Description
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Timestamp	Date and time of the syslog message from the node.
Severity	Severity of the syslog message. Possible values are: • **Alert**—Conditions that require immediate action. • **Critical**—Critical conditions. • **Debug**—Debug conditions, log FTP commands, and WWW URLs. • **Emergency**—System unusable conditions. • **Error**—Error conditions. • **Info**—Information conditions. • **Notice**—Normal but significant conditions. • **Warning**—Warning conditions.
Facility	Name of the facility that generated the syslog message, such as SYS, SNMP, CS7MTP3, or CS7PING.
Name	Short text identifier for the message type. A facility name in conjunction with a message name uniquely identifies a syslog message type.
Message	Text of the syslog message.

Viewing CPU and Memory Performance

The CPU/Mem tab provides real-time chart and table statistics about:

- Viewing CPU Utilization, page 7-56
- Viewing Historical CPU Utilization, page 7-58
- Viewing CPU Processes, page 7-59
- Viewing Memory Utilization, page 7-60
- Viewing Historical Memory Utilization, page 7-62

Note In the MWTM client and web interface, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

To view real-time CPU performance statistics, in the navigation tree, select a node, then click the CPU/Mem tab in the content area.

Note In some cases, users can notice a difference in the number of CPUs reported by the CPU Utilization, CPU Processes, and Memory Utilization selections. The CPU MIBs do not report statistics for cards that are in standby mode (for example, supervisor cards). However, the memory MIB does report memory utilization for standby cards. Because of this difference, the Memory Utilization selection can display a greater number of CPUs than the CPU Utilization and CPU Processes selections.

Also, because the information for memory and CPU statistics comes from different MIBs, the CPU descriptions can vary. Users can correlate the information by comparing the descriptions available among the CPU Utilization, CPU Processes, and Memory Utilization selections. Devices that support the CISCO-MEMORY-POOL-MIB show only the description of the main processor.

Viewing CPU Utilization

To view real-time CPU utilization, select a node from the navigation tree, click the CPU/Mem tab, then from the View menu, select **CPU Utilization**.

The MWTM displays a CPU utilization chart with:

- A Summary tab that shows the combined utilization of all CPUs on the node
- Slot- and CPU-specific tabs that show utilization for a selected CPU

Note The MWTM web interface displays this data in tabular, instead of chart, format.

The CPU summary chart displays a vertical band whenever at least one its CPUs is above the normal threshold. Status balls on the CPU-specific tabs indicate the highest threshold status of all data series for the CPU for the last polling interval.

The CPU-specific charts display horizontal bands to show overloaded, warning, and acceptable thresholds; you must configure the CPU rising and falling thresholds on the device to display these bands in the MWTM. The falling threshold corresponds to the boundary between the acceptable and warning bands. The rising threshold corresponds to the boundary between the warning and overloaded bands. For multi-CPU devices, these thresholds apply only to the main CPU.

GUI Elements	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Fast Poller Interval (*available only in web client*)	Label that shows the current poll interval in seconds.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Change Poller, page 7-110.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.

GUI Elements	Description
Last Poll (*available only in web client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Slot/CPU (*available only in web client*)	Name of the CPU.
CPU Description (*available only in web client*)	Description of the CPU.
5 Sec % (*available only in web client*)	Average CPU utilization percentage for the node over the last 5 seconds.
1 Min % (*available only in web client*)	Average CPU utilization percentage for the node over the last minute.
5 Min % (*available only in web client*)	Average CPU utilization percentage for the node over the last 5 minutes.
Warning Threshold (*available only in web client*)	Specifies a level of traffic that should be avoided, but is below a level that impacts MSU routing. Once the traffic rate exceeds the Overloaded threshold, it is not considered non-impacting until the traffic falls below this threshold.
Overload Threshold (*available only in web client*)	Specifies a level of traffic indicating a rate that might impact MSU routing.
Percentage (*available only in Java client*)	Y-axis label that shows percentage of CPU utilization over time.

GUI Elements	Description
Time (*available only in Java client*)	X-axis label that displays a real-time scale and the server time zone.
Legend (*available only in Java client*)	Identifies the data series currently showing in the chart. • 5 sec—Average CPU utilization percentage for the node over the last 5 seconds. • 1 min—Average CPU utilization percentage for the node over the last minute. • 5 min—Average CPU utilization percentage for the node over the last 5 minutes. • No Data—Color-coded value that indicates no data is available to display. • CPU Threshold Crossed—In the Summary-tab chart, color-coded value that indicates when CPU utilization is above normal. • Overloaded—In a CPU-tab chart, color-coded value that indicates when CPU utilization is in the overloaded zone. • Warning—In a CPU-tab chart, color-coded value that indicates when CPU utilization is in the warning zone. • Acceptable—In a CPU-tab chart, color-coded value that indicates when CPU utilization is in the acceptable zone.

Viewing Historical CPU Utilization

Note This option is available in the MWTM web client only.

To view historical CPU utilization, select a node from the navigation tree, click the CPU/Mem tab, then from the View menu, select **Historical CPU Utilization**.

A summary table displays the following information:

Field	Description
Data Type	Data type, which can be either Average Utilization or Maximum Utilization.
Average Utilization	Average of the data across the chosen time range.
Maximum Utilization	Maximum utilization during the chosen time range.
Maximum Timestamp (*timezone*)	Timestamp for when the maximum utilization value occurred.
Warning Threshold	Threshold setting beyond which a warning is issued.
Overload Threshold	Threshold setting beyond which is considered overloaded.

When you run the report, the following information is displayed:

GUI Element	Description
Toolbar	Provides functions to select a report type, duration, output type. See Using the Toolbar, page 11-6.
Type	A comprehensive summary of average and maximum CPU utilization statistics.You can choose from 15-minute, hourly, or daily capacity summary reports, or choose a custom range.

GUI Element	Description
Graph	If you select **Graph** from the Output menu, the graph shows the average utilization and the maximum utilization.
Table	If you select **Table** from the Output menu, the table contains: • Timestamp (*timezone*)—Timestamp for when the maximum utilization value occurred. • Average Utilization—Average of the data across the specified time range. • Maximum Utilization—Maximum utilization during the specified time range. • Minimum Utilization—Minimum utilization during the specified time range. • Warning Threshold—Threshold setting beyond which a warning is issued. • Overload Threshold—Threshold setting beyond which is considered overloaded.
Expand to Full Screen	If Output Type is Graph, displays the graph in a new, full-screen window for easier viewing.
Percentage Utilization	If Output Type is Graph, the Y-axis label shows percentage of CPU utilization over time.
Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization: • Average Utilization—Average of the data across the chosen time range. • Maximum Utilization—Maximum value across the chosen time range. • No Data—Color-coded value that indicates no data is available to display. • Overloaded—Color-coded value that indicates when CPU utilization is in the overloaded zone. • Warning—Color-coded value that indicates when CPU utilization is in the warning zone. • Acceptable—Color-coded value that indicates when CPU utilization is in the acceptable zone.

Viewing CPU Processes

To view real-time CPU processes, select a node from the navigation tree, click the CPU/Mem tab, then from the View menu, select **CPU Processes**.

The MWTM displays information about CPU processes in a table with slot- and CPU-specific tabs. When you click the tabs for a specific slot and CPU, the MWTM shows CPU process information for the selected CPU. If only a single CPU exists, no tabs for slots or CPUs appear. The MWTM displays information for the CPU in the right pane.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

Each table contains:

Field or Column	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`**.** After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
PID	Process identifier.
Name	Name of the process.
Time Created	Total time since the process was created.
Total Runtime	CPU time the process has used.
Times Invoked	Number of times the process was invoked.
Average Runtime	Average CPU time for each process invocation.
5 Sec %	Average CPU utilization percentage for the node over the last 5 seconds.
1 Min %	Average CPU utilization percentage for the node over the last minute.
5 Min %	Average CPU utilization percentage for the node over the last 5 minutes.
Priority	Process queue priority. Possible values are: • Low • Normal • High • Critical

Viewing Memory Utilization

To view CPU memory utilization for the node, click the View drop-down menu in the MWTM client or MWTM web interface, and select **Memory Utilization**.

The MWTM displays memory utilization in a table with:

- A Summary tab that shows the combined memory utilization of all CPUs on the node
- Slot- and CPU-specific tabs that show memory utilization for a selected CPU

Note Depending on the device, memory utilization statistics may not be available from the management information base (MIB). Devices that support the CISCO-ENHANCED-MEMORY-POOL-MIB have detailed memory information for each CPU. Devices that support the CISCO-MEMORY-POOL-MIB have memory information only for the CPU of the main processor. For these devices, the memory utilization table shows only one entry even though these devices can have multiple CPUs. In these cases, the CPU Description column indicates *CPU of main processor.*

Summary Tab

The Summary tab displays a tabular overview of all CPUs in the chosen node to enable users to easily observe problem areas.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Summary table.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Summary table contains:

Field or Column	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
CPU	Slot number (if known) and CPU number.
CPU Description	Type of CPU.
Processor Memory	Percentage of available processor memory in use.
I/O Memory	Percentage of available I/O memory in use.

CPU-specific Tabs

The CPU-specific tabs display tabular information for the selected slot and CPU. If only a single CPU exists, no slot or CPU tabs appear and the MWTM displays the information for the CPU in the right pane.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

Each CPU-specific table contains:

Field or Column	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table. **Note** Polling for memory statistics takes longer than for CPU statistics. If excessive timeouts occur for memory polling, you can increase the number of milliseconds for the timeout by changing the MEMORY_POLLER_TIMEOUT_INCREMENT in the *Server.properties* file.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`**.** After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Memory Type	The type of memory, either processor memory or I/O memory.
Utilization	Percentage of utilization for each type of memory.
Total	Total amount of memory for each memory type.
Used	Amount of memory that is used for each memory type.
Free	Amount of free (unused) memory for each memory type.
Largest Free[1]	The largest available memory unit.
Valid[1]	Whether or not the memory is valid for use.

1. This column is hidden by default. Right-click in the column header and check the check box next to the heading label to display it.

Viewing Historical Memory Utilization

Note This option is available in the MWTM web client only.

To view historical memory utilization, select a node from the navigation tree, click the CPU/Mem tab, and then select **Historical Memory Utilization** from the View menu.

If you select **Graph** from the Output menu, the following information displayed:

GUI Element	Description
Toolbar	Provides functions to select a report type, duration, output type. See Using the Toolbar, page 11-6.
Type	A comprehensive summary of average and maximum memory utilization statistics. You can choose from the following types: • Memory Peak Utilization 15 Minutes • Memory Average Utilization 15 Minutes • Memory Peak Utilization Hourly • Memory Average Utilization Hourly • Memory Peak Utilization Daily • Memory Average Utilization Daily
Graph	If you select **Graph** from the Output menu, the graph shows the average utilization and the maximum utilization.
Table	If you select **Table** from the Output menu, the table contains: • Timestamp (*timezone*)—Timestamp for when the maximum utilization value occurred. • Memory Type—Type of memory. • Average Utilization—Average utilization for each type of memory. • Maximum Utilization—Maximum utilization during the specified time range. • Minimum Utilization—Minimum utilization during the specified time range. • Total—Total utilization for all types of memory. • Average Used—Average memory used. • Average Free—Average memory available.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Percentage Utilization	If Output Type is Graph, the Y-axis label shows percentage of memory utilization over time.
Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

Viewing Trap Settings

The Traps section displays all trap settings for the chosen node, as well as all hosts and port numbers to which the node sends traps.

If you have implemented MWTM User-Based Access, this option is available to users with authentication level 5 (System Administrator).

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

To view the Traps section, in the navigation tree, select a node, then click on the Traps tab in the content area.

The Traps section displays these fields for the chosen node:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Release 2 Trap Settings (ITP only)	Indicates whether these ITP release 12.2(4)MB4 trap settings are enabled: • SCTP Remote Address Change • Linkset State Change • Link State Change • Link Congestion State Change • Link Receive Utilization Change • Link Send Utilization Change • Route State Change • GTT MAP State Change
Release 3 Trap Settings (ITP only)	Indicates whether these ITP release 12.2(4)MB5 through 12.2(4)MB9a trap settings are enabled: • ASP State Change • AS State Change • SGMP State Change This column might not be visible if the ITP does not support ITP release 12.2(4)MB5 through 12.2(4)MB9a traps.

GUI Element	Description
Release 4 Trap Settings (ITP only)	Indicates whether these ITP release 12.2(4)MB10 through 12.2(20)SW trap settings are enabled: • Linkset State Change • Link State Change • Link Congestion State Change • Link Receive Utilization Change • Link Send Utilization Change • Route Destination State Change • Route Mgmt. State Change • Route Table Load • GTT MAP State Change • GTT Table Load • ASP Congestion Change • SNMP Congestion Change This column might not be visible if the ITP does not support ITP release 12.2(4)MB10 through 12.2(20)SW traps.
Release 6 Trap Settings (ITP only)	Indicates whether the following ITP release 12.2(25)SW3 trap setting is enabled: • MLR Load Table This column might not be visible if the ITP does not support ITP release 12.2(25)SW3 traps.
RAN Trap Settings (RAN-O only)	Trap settings for the node. These settings include: • GSM State Change • UMTS State Change
IP Address	IP address of a local host to which the node sends traps.
Port	Port to which the node sends traps.
Trap Version	Trap version sent to this IP address and port.
Community String	SNMP community name used by the node for read access to the information maintained by the SNMP agent on the node.

Viewing Data for Interfaces

Note The MWTM client provides charts and tables to display the performance and error information for the chosen interface. The MWTM web interface displays the same information in a tabular format.

For most interfaces, the MWTM displays interface performance and error information in separate tabs in the right pane. However, depending on variables such as node type, card type, interface type, IOS software image, and the running configuration on the node itself, performance and error statistics may not be available for the chosen interface.

Note

- Interface performance and error statistics are not available for T1, E1, Synchronous Digital Hierarchy (SDH), or RAN-O shorthaul interfaces.
- Statistics are also unavailable for these ATM interface types: ATM subinterface and ATM layer.

For the chosen interface, you can view:

- Real-Time Interface Performance, page 7-66
- Real-Time Interface Errors/Discards, page 7-68
- Real-Time Interface Advanced Details, page 7-71

Real-Time Interface Performance

To view real-time interface performance, select the interface in the navigation tree, then click the Performance tab.

Note In the MWTM client, the real-time icon  appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

You may be prompted to start an in-band poller if polling cannot be done out of band.

The Performance tab contains:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Fast Poller Interval (*available only in web client*)	Label that shows the current poll interval in seconds.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Change Poller, page 7-110.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Last Poll (*available only in Java client*)	Label that identifies when the last poll occurred.
Bits or Bytes/Sec (*available only in Java client*)	**MWTM client:** The MWTM displays separate charts for send (out) and receive (in) traffic on the chosen interface. The Y-axis label that displays the interface traffic rate in bits or bytes per second. The default is bits per second. To change the charts to show bytes per second, uncheck the Show Details in Bits instead of Bytes check box in the Preferences window (General Display Settings, page 4-4). The Y-axis automatically scales to the interface speed.
% Utilization (*available only in Java client*)	For interface speeds greater than zero, the right side of the Y axis displays the percent utilization of the interface, on a scale from 0 to 100%.
Time (*available only in Java client*)	X-axis label that displays a real-time scale and the server time zone.
Legend (*available only in Java client*)	Identifies the data series currently showing in the chart. • **Out**—Shows the outgoing (transmit) traffic rate of the chosen interface. • **In**—Shows the incoming (receive) traffic rate of the chosen interface. • **No Data**—Data is not available. A vertical bar appears in the chart.
Show/hide right-click menu (*available only in Java client*)	Provides options to show or hide one or more parts of a data series. See Right-click Menu, page 7-99, for descriptions of the options.

GUI Element	Description
Interface Utilization (*available only in web client*)	Table that shows this information for the chosen interface: • Data Type – Utilization %—Interface utilization in percentage. – Total Count (bits)—Total number of bits since reboot. – Speed (bits or bytes/sec)—Interface send and receive speed in bits per second. – Current Rate (bits or bytes/sec)—Interface utilization rate in bits per second. • Send—Send statistics of interface utilization. • Receive—Receive statistics of interface utilization.
Interface Packets (*available only in web client*)	Table that shows this information for the chosen interface: • Data Type – Receive Broadcast—Number of broadcast packets received by the interface. – Receive Multicast—Number of multicast packets received by the interface. – Receive Unicast—Number of unicast packets received by the interface. – Send Broadcast—Number of broadcast packets sent. – Send Multicast—Number of multicast packets sent. – Send Unicast—Number of unicast packets sent. – Total Receive Packets—Total number of packets received. – Total Send Packets—Total number of packets sent. • Count—Packet count since last reboot. • Rate (per sec)—Packet rate since last reboot. • Percent Of Packets—Percentage of packets since last reboot.

Real-Time Interface Errors/Discards

To view real-time interface errors/discards, select the interface in the navigation tree, then click the Errors/Discards tab.

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

You may be prompted to start an in-band poller if polling cannot be done out of band.

The Errors/Discards tab contains:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Change Poller, page 7-110.
Fast Poller Interval (*available only in web client*)	Label that shows the current poll interval in seconds.
Reset Counters	Opens the Reset Counters dialog box to configure the method of polling. See Changing Real-Time Poller and Counter Settings, page 4-20.
Poller Counter Mode (*available only in Java client*)	Label that displays the polling mode that you configure in the Reset Counters dialog box.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Last Poll (*available only in Java client*)	Label that identifies when the last poll occurred.
Congestion	Output Queue Size—The length of the output packet queue (in packets). When a router receives a packet, it typically forwards it to another interface. The packet enters a queue on the output interface before it is actually sent. The interface typically has a buffer that can hold a fixed number of packets in the queue. When the output queue overflows, the router begins to discard packets.

GUI Element	Description
Interface Errors/Discards	Table that shows this information for the chosen interface: • Data Type: – Receive Errors—Incoming errors. – Send Errors—Outgoing errors. – Receive Discards—Incoming discarded packets. – Send Discards—Outgoing discarded packets. – Total Receive Packets—Total incoming packets. – Total Send Packets—Total outgoing packets. – Unknown Protocol Packets Received—For packet-oriented interfaces, the number of received packets that were discarded because of an unknown or unsupported protocol. For character-oriented or fixed-length interfaces that support protocol multiplexing, the number of received transmission units that were discarded because of an unknown or unsupported protocol. For interfaces that do not support protocol multiplexing, the count will always be 0. • Counts—Error counts since the last reboot. • Rates (per sec)—Error rates since the last reboot. • Percent Of Packets—Percentage of packets since last reboot.

GUI Element	Description
Interface Detailed Errors (*available only in web client*)	Table that shows this information for the chosen interface: • Data Type: – Receive Runts—Number of packets input on a particular physical interface which were dropped as they were smaller than the minimum allowable physical media limit. – Receive Framing Errors—Number of input packets on a physical interface which were misaligned or had framing errors. – Receive Aborts—Number of input packets which were dropped because the receiver aborted. – Receive Queue Drops—Number of input packets which were dropped. – Receive Giants—Number of input packets on a particular physical interface which were dropped as they were larger than the largest permitted size of a packet which can be sent/received on an interface. – Receive Ignored—Number of input packets which were simply ignored by this physical interface due to insufficient resources to handle the incoming packets. – Receive Overruns—Number of input packets which arrived on a particular physical interface which were too quick for the hardware to receive and hence the receiver ran out of buffers. – Send Queue Drops—Number of output packets dropped by the interface even though no error had been detected to prevent them being transmitted. • Counts—Packet counts since the last reboot. • Rates (per sec)—Packet rates since the last reboot. • Percent Of Packets—Percentage of packets since last reboot.
Interface Errors/Sec (*available only in Java client*)	Chart that shows interface errors per second for the chosen interface. The Y axis shows errors per second. The X axis shows a real-time scale and the server time zone. A legend provides color-coded descriptions of the error types for the incoming and outgoing traffic. **Note** This chart is only available in the MWTM client interface. The MWTM web interface shows the same data in tabular format.

Real-Time Interface Advanced Details

To view real-time interface advanced details, select the interface in the navigation tree, then click the Advanced Details tab.

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

You might be prompted to start an in-band poller if polling cannot be done out of band.

The Advanced Details tab contains:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Change Poller	Button that opens the Poller Settings dialog box. See Change Poller, page 7-110.
Reset Counters	Opens the Reset Counters dialog box to configure the method of polling. See Changing Real-Time Poller and Counter Settings, page 4-20.
Poller Counter Mode	Label that displays the polling mode that you configure in the Reset Counters dialog box.
Poll Interval	Label that shows the current poll interval in seconds.
Last Poll	Label that identifies when the last poll occurred.
Configuration Information	The Configuration Information pane contains: • Description—Textual string containing information about the interface. • Alias—Alias name for the interface as specified by a network manager. • Connector Present—Indicates whether the interface sublayer has a physical connector. The valid values are: – Yes—Interface sublayer has a physical connector. – No—Interface sublayer does not have a physical connector. • DHCP Mode—Indicates the DHCP mode configured by the administrator. The valid values are: – Enabled—Indicates the DHCP is enabled. – Disabled—Indicates the DHCP is disabled. • Keep Alive—A keepalive is a small, layer-2 message that is transmitted by a network device to let directly-connected network devices know of its presence. The valid values are: – Enabled—Indicates keepalives are enabled on the interface. – Disabled—Indicates keepalives are disabled on the interface. • Promiscuous Mode—Indicates if the interface only accepts packets/frames that are addressed to this station. The valid values are: – Enabled— Indicates the station accepts all packets/frames transmitted on the media. – Disabled—Indicates the interface only accepts packets/frames that are addressed to this station.

GUI Element	Description
Status Information	The Status Information pane contains: • Interface Discontinuity Time—Indicates value of sysUpTime on the most recent occasion at which this interface's counters suffered a discontinuity. • State Change Reason—Describes the cause of the last state change of the interface. • Operational Status Cause—Indicates the detailed operational cause reason for the current operational state of the interface. • Operational Status Description—Indicates the description for the cause of current operational state of the interface.
Statistics Information	The Statistics Information pane contains: – Reset Count—Number of times the interface was internally reset and brought up. – Reset Rate—Rate at which the interface was internally reset and brought up. – Carrier Transition Count—Number of times interface saw the carrier signal transition. – Carrier Transition Rate—Rate at which the interface saw the carrier signal transition.

Viewing Data for ITP Objects

You use the MWTM to view detailed statistics for any of these ITP objects:

- Application Servers
- Application Server Process Associations
- Links
- Linksets
- Signaling Gateway Mated Pairs

To display detailed statistics for an object:

- In the MWTM client—In a view in the navigation tree, right-click an object, then choose **View > Real-Time Data and Charts**. The MWTM displays the Statistics Details window for the object.

Note The MWTM server automatically reflects updates for the objects received in this window.

Changes you make in this window might not be reflected throughout the MWTM until the next poll (by default, every 15 seconds). For information about changing the poll interval, see Poll Settings, page 7-81.

- In the web interface—Click on the relevant object (Application Server, Linkset, and so on) in the navigation tree and choose the relevant tab in the content pane.

The Statistics Details window in the MWTM client has a navigation tree, which contains:

Component	Applicable To	Content Links
Poll Settings	All objects	Poll Settings
Right-click menu	Links	Right-Click Menu

The Statistics Details window and the MWTM web interface may contain these tabs in the content pane:

Tab	Applicable To	Content Links
Alarms	All objects	Viewing Alarms and Recent Events
Charts (MWTM client only)	• Application servers • Application server process associations • Links • Linksets	Charts: Application Servers and Application Server Process Associations Charts: Links and Linksets
Details	All objects	Viewing Details
Interface Details	• Application Server Process Associations • Links • Signaling Gateway Mated Pairs	Interface Details
Linkset Access Lists	Linksets	Viewing ITP Linkset Access Lists
Notes	All objects	Viewing Notes
Q.752 Measurements	Links	Q.752 Measurements
Recent Events (MWTM client only)	All objects	Viewing Alarms and Recent Events
SCTP Association Configuration Details	• Application Server Process Associations • Links • Signaling Gateway Mated Pairs	SCTP Association Configuration Details
SCTP Association Statistics Details	• Application Server Process Associations • Links • Signaling Gateway Mated Pairs	SCTP Association Statistics Details
Statistics	• Application Servers • Application Server Process Associations • Links • Linksets	Statistics: Application Servers Statistics: Application Server Process Associations Statistics: Links and Linksets
Status Contributors	Application Servers	Viewing Status
Status Details	Links	Status Details
Troubleshooting	• Application Servers • Application Server Process Associations • Links • Linksets • Signaling Gateway Mated Pairs	Viewing Troubleshoot

Charts: Application Servers and Application Server Process Associations

You use the MWTM to view real-time MTP3 and ASP packet rate information for the chosen application server or application server process association. To do so, click the Charts tab in the Statistics Details window for an application server or application server process association, then click the relevant tab and the chosen chart appears.

The Statistics Details: Charts section for application servers and application server process associations contains:

Tab	Description	Applicable To
MTP3 Packet Rate	Displays MTP3 packet rate information for a chosen application server.	Application servers
ASP Packet Rate	Displays real-time application server process packet rate information for a chosen application server.	Application servers
Packets From ASP Rate	Displays real-time rate information for packets received by the application server process for the chosen application server or application server process association.	Application servers and application server process associations
Packets To ASP Rate	Displays real-time rate information for packets sent to the application server process by the chosen application server or application server process association.	Application servers and application server process associations
Packets From MTP3 Rate	Displays real-time rate information for packets received by the chosen application server or application server process association, from the MTP3 layer.	Application servers and application server process associations
Packets To MTP3 Rate	Displays real-time rate information for packets sent to the MTP3 layer from the chosen application server or application server process association.	Application servers and application server process associations

The tabs in the Statistics Details: Charts section for application servers and application server process associations contain:

Field or Button	Description
Time window (mins)	Drop-down list box used to specify the length of time appear in the chosen chart. Valid selections are 1, 2, 5, 10, 20, 40, or 60 minutes. The default selection is 5 minutes.
<*Type*> Rate Chart	Displays one of these rate charts for the chosen application server or application server process association as a function of time: • MTP3 Packet Rate Chart • ASP Packet Rate Chart • Packets From ASP Rate Chart • Packets To ASP Rate Chart • Packets From MTP3 Rate Chart • Packets To MTP3 Rate Chart To see the exact time and data coordinates for a data point, left-click the data point. The coordinates appear in the format (*hh*:*mm*:*ss*, *dd*.*dd*), where: • *hh*:*mm*:*ss* is the time for that data point in hours, minutes, and seconds. • *dd*.*dd* is the MTP3 packet rate for that data point. The Time window (mins) field specifies the total visible time in the chart. New data points are added to the right side of the chart. When the chart reaches the end of the time window (for example, after 5 minutes, if the Time window (mins) field is set to 5), new data points continue to be added to the right side of the chart, while old data points drop off the left side of the chart. If a poll is missed (for example, as a result of an SNMP timeout), the MWTM ignores the missing data point, stops drawing the line, and waits for the next valid data point to begin drawing the line again. To scroll left, right, up, or down in the chart, drag the cursor while holding down **Ctrl** and the left mouse button. To zoom in on a section of the chart, drag the cursor while pressing **Shift** and the left mouse button. To reset the chart to the default view and scaling, click **Reset**.
AS or ASPA	Displays color-coded icons for the application server process associations associated with the application server, or for the application server process association. To add the data for an application server process association to the chart, click the icon in this field. To remove the data from the chart, click the icon again. You use the MWTM to customize the symbols, line styles, and colors assigned to data points in real-time data charts. For more information, see Changing Charts Settings, page 4-11.
Reset	If you scrolled or zoomed the chart, resets the chart to the default view and scaling.
Grid On	Superimposes a graphic grid on the chart. The grid can make the data easier to read.
Grid Off	Removes the graphic grid from the chart.
Help	Displays online help for the current window.

Charts: Links and Linksets

You use the MWTM to view real-time received, sent, and dropped information for the chosen link or linkset. To do so, click the Charts tab in the Statistics Details window for a link or linkset, then click the relevant tab and the chosen chart appears.

The Statistics Details: Charts section for links and linksets contains:

Tab	Description
ReceivedUtilization	Displays real-time Received Utilization information for the chosen link or linkset.
SendUtilization	Displays real-time SendUtilization information for the chosen link or linkset.
PktsRcvdPerSec	Displays real-time packets-received-per-second information for the chosen link or linkset.
PktsSentPerSec	Displays real-time packets-sent-per-second information for the chosen link or linkset.
BitsRcvdPerSec or BytesRcvdPerSec	Displays real-time bits-received-per-second information for the chosen link or linkset (or bytes-received-per-second information, if you unchecked the Show Details in Bits Instead of Bytes check box in the Preferences window).
BitsSentPerSec or BytesSentPerSec	Displays real-time bits-sent-per-second information for the chosen link or linkset (or bytes-sent-per-second information, if you unchecked the Show Details in Bits Instead of Bytes check box in the Preferences window).
Drops	Displays drops information for the chosen link or linkset.

The tabs in the Statistics Details: Charts section for links and linksets contain:

Field or Button	Description
Linkset	Drop-down list box used to select the linkset from whose perspective data should be visible. By default, data appears from the perspective of the chosen linkset. To display data from the perspective of the adjacent linkset, select it in this list box.
Time window (mins)	Drop-down list box used to specify the length of time visible in the chosen chart. Valid selections are 1, 2, 5, 10, 20, 40, or 60 minutes. The default selection is 5 minutes.

Field or Button	Description
<*Type*> Chart	Displays one of these charts for the chosen link (and all links on the linkset) or linkset (up to 16 links) as a function of time: • Received Utilization Chart • Send Utilization Chart • Packets Received Chart • Packets Sent Chart • Bits or Bytes Received Chart • Bits or Bytes Sent Chart • Drops Chart To see the exact time and data coordinates for a data point, left-click the data point. The coordinates are visible in the format (*hh*:*mm*:*ss*, *dd*.*dd*), where: • *hh*:*mm*:*ss* is the time for that data point in hours, minutes, and seconds. • *dd*.*dd* is the receive utilization percentage for that data point. **Note** (For ReceivedUtilization and SendUtilization only) For serial and HSL links on Cisco 7507 and 7513 series routers, the visible utilization data can vary by up to 5% from the actual utilization—the MWTM might even display utilization data of more than 100%. This variance results from the synchronization of Layer 2 counters between the Versatile Interface Processor (VIP) CPU and the Route Switch Processor (RSP) CPU on 7500 series routers. This variance does not occur for links on Cisco 2600, 7200, or 7300 series routers. If more than one link appears in the SLC field, you can compare the visible data to that of one or more of the other links by clicking the color-coded icons. To remove the data for the additional links, click the icons again. The Time window (mins) field specifies the total visible time in the chart. New data points are added to the right side of the chart. When the chart reaches the end of the time window (for example, after 5 minutes, if the Time window (mins) field is set to 5), new data points continue to be added to the right side of the chart, while old data points “drop off” the left side of the chart. If a poll is missed (for example, as a result of an SNMP timeout), the MWTM ignores the missing data point, stops drawing the line, and waits for the next valid data point to begin drawing the line again. To scroll left, right, up, or down in the chart, drag the cursor while holding down **Ctrl** and the left mouse button. To zoom in on a section of the chart, drag the cursor while pressing **Shift** and the left mouse button. To reset the chart to the default view and scaling, click **Reset**.
SLC	Displays up to 17 color-coded icons. One for: • Each link (SLC) in the chosen chart, up to 16 total links. • The average of all SLCs. To add the data for a link or for the average to the chart, click the icon in this field. To remove the data from the chart, click the icon again. You use the MWTM to customize the symbols, line styles, and colors assigned to data points in real-time data charts. For more information, see Changing Charts Settings, page 4-11.

Field or Button	Description
Show threshold line for (Linksets only, ReceivedUtilization or SendUtilization)	Draws a horizontal line on the chosen utilization chart, indicating the receive and send threshold for the chosen link. If you do not want to draw a threshold line, select None. This is the default setting.
Scale to threshold (Linksets only, ReceivedUtilization or SendUtilization)	Scales the chosen utilization chart in order to draw the threshold chosen in the Show threshold line for field. To: • Scale the chart, check this check box. • Remove the scaling from the chart, uncheck this check box. This is the default setting. The Scale to threshold check box is not available if the **Show threshold line for** field is set to None.
Reset	If you scrolled or zoomed the chart, resets the chart to the default view and scaling.
Grid On	Superimposes a graphic grid on the chart. The grid can make the data easier to read.
Grid Off	Removes the graphic grid from the chart.
Help	Displays online help for the current window.

Interface Details

You use the MWTM to view real-time interface details for the chosen application server process association, link, or signaling gateway-mated pair.

The Interface Details section contains:

Section	Description
Configuration Information	Interface type, speed, and MTU. For SCTP links, this section also provides the IP address, mask, and physical address.
Status Information	Length of time the interface is up, administrative and operational status, and status of the line protocol.
Statistics Information	Number of bytes and packets that have been received and transmitted on the interface.
Errors Information	Number of packet errors and discarded packets.

Configuration Information

The Configuration Information subsection in the Statistics Details: Interface Details section for application server process associations, links, and signaling gateway mated pairs contains:

Field	Description
Type	Type of interface, such as Ethernet.
MTU	Size, in bytes, of the largest datagram that can send or receive on the interface.
Speed (Bits/Sec)	Estimate, in bits per second, of the interface's current bandwidth. If the interface does not vary in bandwidth; or, if no accurate estimate can be made, this field displays the nominal bandwidth.
IP Address	(SCTP links only) IP address corresponding to the media-dependent physical address. If the interface does not have such an address (for example, a serial line), this field displays `N/A`.

Field	Description
IP Mask	(SCTP links only) Subnet mask corresponding to the media-dependent physical address. If the interface does not have such an address (for example, a serial line), this field displays `N/A`.
Physical Address	(SCTP links only) Address of the interface at the protocol layer immediately below the network layer in the protocol stack. If the interface does not have such an address (for example, a serial line), this field displays `N/A`.

Note This section does not appear if the application server process association, link, or signaling gateway mated pair has been offloaded to a Service and Application Module for IP () card.

Status Information

The Status Information subsection in the Statistics Details: Interface Details section for application server process associations, links, and signaling gateway mated pairs contains:

Field	Description
Uptime	Time the interface is up, in days, hours, minutes, and seconds.
Admin Status	State of the interface. Possible values are: • Up • Down • Testing
Operational Status	Current operational state of the interface. Possible values are: • Up • Down • Testing • Unknown • Dormant
Line Protocol Status	Current state of the line protocol. Possible values are: • **Up**—Software processes that handle the line protocol consider the line to be usable (that is, keepalives are successful). • **Down—**Software processes that handle the line protocol consider the line to be unusable. You can use the Line Protocol together with Operational Status to troubleshoot interface connection problems. For example, if Operational Status is Up, but Line Protocol is Down, the interface has detected a carrier on the physical layer, but clocking or framing problems might occur.

Statistics Information

The Statistics Information subsection in the Statistics Details: Interface Details section for application server process associations, links, and signaling gateway mated pairs contains:

Field	Description
Bytes In per Sec	Number of bytes received on the interface per second, including framing characters.
Bytes Out per Sec	Number of bytes sent on the interface per second, including framing characters.
Packets In per Sec	Number of packets delivered per second to a higher-layer protocol.
Packets Out per Sec	Total number of packets that higher-level protocols requested to be sent to the network per second, including those that were discarded or not sent.

Errors Information

The Errors Information subsection in the Statistics Details: Interface Details section for application server process associations, links, and signaling gateway mated pairs contains:

Field	Description
In Discards	Number of inbound packets that were discarded, even though no errors were detected to prevent their delivery to a higher-layer protocol. For example, a packet might be discarded to free buffer space.
Out Discards	Number of outbound packets that were discarded, even though no errors were detected to prevent their delivery to a higher-layer protocol. For example, a packet might be discarded to free buffer space.
In Errors	Number of inbound packets that contained errors that prevented their delivery to a higher-layer protocol.
Out Errors	Number of outbound packets that were not sent because of errors.

Poll Settings

To view or change poll settings for the object's Statistics Details window in the MWTM client interface, click **Poll Settings** in the left pane. The MWTM displays the Poll Settings pane in the right pane.

The Poll Settings pane contains:

Field	Description
Poll Interval (secs)	New poll interval for the object's Statistics Details window, in seconds. Enter the new poll interval in this field. The valid range is 15 seconds to an unlimited number of seconds. The default value is 15 seconds.
Current Poll Interval	Current poll interval for the object's Statistics Details window, in seconds.
Number of Polls Received	Total number of polls received since polling began for the object's Statistics Details window.
Running Time	Total elapsed time since polling began for the object's Statistics Details window.
Last Message	Date and time of the last poll for the object's Statistics Details window.

Field	Description
Poll Counter Mode	Displays the current mode for poll counters, and the date and time that counters were last reset. Possible modes are: • **Since Reboot**—Counters display values aggregated since the last reboot of the node, or since the node last reset the counters. • **Since Last Poll**—Counters display values aggregated since the last poll. • **Since User Reset**—Counters display values aggregated since the last time they were reset by the user.
Reset Counters	Opens the MWTM Reset Counters dialog box, which you use to change MWTM poller and counter settings. For more information, see Changing Real-Time Poller and Counter Settings, page 4-20.

Q.752 Measurements

The Statistics Details: Q.752 Measurements section for links contains:

- Error Information, page 7-82
- Inhibited Information, page 7-82
- Retransmitted Information, page 7-83
- Congested Information, page 7-83

Statistics for links associated with the chosen linkset are visible in the left column, and for links associated with the adjacent linkset in the right column.

Error Information

The Error Information subsection contains:

Field	Description
Link Failure Count	Number of times the link was unavailable for signaling.
Alignment Error Count	Number of errors detected during link alignment. Link alignment occurs at start up, or when trying to bring up a failed link.
Negative ACKs Count	Number of errors detected during link acknowledgement.
Status Indicator Busy Count	Number of times the Status Indicator Busy was received.

Inhibited Information

The Inhibited Information subsection contains:

Field	Description
Local Inhibit Onset	Number of times a local ITP administrator has inhibited the link (that is, set the link to prevent traffic from flowing).
Local Inhibit Duration %	Percentage of time the link is locally inhibited since the last reboot of the ITP, or since ITP last reset the counters.

Field	Description
Remote Inhibit Onset	Number of times a remote ITP administrator has inhibited the link.
Remote Inhibit Duration %	Percentage of time the link is remotely inhibited since the last reboot of the ITP, or since ITP last reset the counters.

Retransmitted Information

The Retransmitted Information subsection contains:

Field	Description
Packets Retransmitted per Sec	Number of packets that the link transmits, per second.
Bytes Retransmitted per Sec	Number of bytes that the link transmits, per second.
Local Automatic Change Over Count	Number of *local automatic changeover* events detected.
Local Automatic Change Back Count	Number of *local automatic changeback* events detected.

Congested Information

The Congested Information subsection contains:

Field or Column	Description
Congestion Occurrences	Number of times congestion has occurred on the link.
Congestion Duration %	Percentage of time the link is congested since the last reboot of the ITP, or since ITP last reset the counters.
Congestion Level	Level of congestion: 1, 2, or 3.
Packets Lost	Number of packets lost by the link as a result of congestion at each level.
Packets Lost per Sec	Number of packets per second that the link loses, as a result of congestion at each level.
Times At Level With Packet Loss	Number of times the link is congested and has lost packets at each level.

Right-Click Menu

The Statistics Details window for a link in the MWTM client interface provides a right-click menu. To see this menu, right-click a link in the navigation tree of the Statistics Details window. The menu displays:

Menu Command	Description
Delete Item	Deletes the currently chosen link from the MWTM database. The MWTM displays the Confirm Deletion dialog box, To: • Delete the chosen link, click **Yes**. The MWTM deletes the link from the MWTM database and closes the Confirm Deletion dialog box. • Retain the chosen link, click **No**. The MWTM retains the link in the MWTM database and closes the Confirm Deletion dialog box. • Prevent the MWTM from displaying the Confirm Deletion dialog box, check the **Do not show this again** check box. **Note** If you check the **Do not show this again** check box, and you later decide you want the MWTM to begin displaying the Confirm Deletion dialog box again, you must check the Confirm Deletions check box in the General GUI settings in the Preferences window. For more information, see the description of the Confirm Deletions check box in Startup/Exit Settings, page 4-3. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Ignore Item	Ignores the link that you click at the next polling cycle. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.
Unignore Item	Stops ignoring the chosen link at the next polling cycle. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Power User (level 2) and higher.

SCTP Association Configuration Details

You use the MWTM to view Stream Control Transmission Protocol (SCTP) association configuration details for the chosen application server process association, link, or signaling gateway-mated pair.

The SCTP Assoc. Config Details section contains:

Section	Description
Configuration Information	Status information, length of time the link is up, remote and local numbers, and IP address information.
Local IP Address Information	Local IP addresses associated with the link and the length of time each address is up.
Remote IP Address Information	Remote IP addresses associated with the link, the length of time each address is up, and SCTP retry information.
Transmission Configuration Information	The MTU, number of inbound and outbound streams, retry timeouts, local and remote receive window sizes, and chunk bundling information.

Configuration Information

The Configuration Information subsection in the Statistics Details: SCTP Assoc. Config Details section for application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description
Status	Current status of the SCTP association. Possible values are: • Closed • CookieWait • CookieEchoed • DeleteTCB • Established • ShutdownAckSent • ShutdownPending • ShutdownReceived • ShutdownSent For detailed information about each status, see RFC 2960, Stream Control Transmission Protocol.
Uptime	Time the link is up, in days, hours, minutes, and seconds.
Remote Port	Remote port number for the SCTP association.
Local Port	Local port number for the SCTP association.
Primary IP Address	Designated primary IP address for the SCTP association.
Effective IP Address	IP address that the SCTP association uses.

Local IP Address Information

The Local IP Address Information subsection in the Statistics Details: SCTP Assoc. Config Details section for application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description
IP Address	Local IP addresses associated with the link.
Uptime	Time each local IP address associated with the link is up, in days, hours, minutes, and seconds.

Remote IP Address Information

The Remote IP Address Information subsection in the Statistics Details: SCTP Assoc. Config Details section for application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description
IP Address	Remote IP addresses associated with the link.
Uptime	Time each remote IP address associated with the link is up, in days, hours, minutes, and seconds.

Field	Description
Retry Timeout (msecs)	Current SCTP Retransmission Timeout (T3-rtx timer).
Maximum Retries	Maximum allowable number of retransmissions before this IP address is considered inactive.
Retries	Current retransmission count.

Transmission Configuration Information

The Transmission Configuration Information subsection contains:

Field	Description
MTU	Maximum transmission unit (MTU) size that this SCTP association uses. Out of the IP addresses that the SCTP association uses, the smallest size that is supported.
In Streams	Inbound streams as negotiated when the SCTP association was started.
Out Streams	Outbound streams as negotiated when the SCTP association was started.
Maximum Retries	Maximum number of data retransmissions in the SCTP association context.
Local Receive window Size	Current local receive window size for this SCTP association.
Remote Receive window Size	Current local send window size for this SCTP association.
Initial Retry Timeout (msecs)	Initial timeout value, in milliseconds, that the SCTP implementation permits for the retry timeout.
Minimum Retry Timeout (msecs)	Minimum timeout value, in milliseconds, that the SCTP implementation permits for the retry timeout.
Maximum Retry Timeout (msecs)	Maximum timeout value, in milliseconds, that the SCTP implementation permits for the retry timeout.
Bundle Chunks	Indicates whether the SCTP protocol allows chunks to be bundled into a single datagram as follows. Valid values are: • **true (1)**—Chunks are bundled. • **false (2)**—Chunks are not bundled.
Bundle Timeout (msecs)	Time, in milliseconds, to wait to allow data chunks to accumulate so that they can be transmitted in the same datagram.

SCTP Association Statistics Details

You use the MWTM to view Stream Control Transmission Protocol (SCTP) association statistics details for the chosen application server process association, link, or signaling gateway-mated pair.

The SCTP Assoc. Stats Details section contains:

Section	Description
Remote IP Address Information	IP addresses, round-trip times, failure counts, and IP address status and heartbeat.
Statistics Information (per sec) Rates	Sent and received counts for packets and chunks.

Remote IP Address Information

The Remote IP Address Information subsection in the Statistics Details: SCTP Assoc. Stats Details section for application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description
IP Address	Remote IP addresses associated with the link.
Smoothed Round Trip Time (msecs)	Average, in milliseconds, of all round-trip times between the local and remote systems on an IP network.
Failure Count	Number of times the remote IP address was marked as failed.
Heartbeat Status	Current status of the heartbeat associated with the remote IP address. Valid values are Active and Inactive.
IP Status	Current status of the remote IP address. Valid values are Active and Inactive.

Statistics Information (per sec) Rates

The Statistics Information (per sec) Rates subsection in the Statistics Details: SCTP Assoc. Stats Details section for application server process associations, SCTP links, and signaling gateway mated pairs contains:

Field	Description
Packets Sent	Number of IP datagrams that this SCTP association sends per second.
Packets Received	Number of IP datagrams that this SCTP association receives per second.
Control Chunks Sent	Number of control chunks that this SCTP association sends per second.
Control Chunks Rec	Number of control chunks that this SCTP association receives per second.
Ordered Chunks Sent	Number of ordered chunks that this SCTP association sends per second.
Ordered Chunks Rec	Number of ordered chunks that this SCTP association receives per second.
Unordered Chunks Sent	Number of unordered chunks that this SCTP association sends per second.
Unordered Chunks Rec	Number of unordered chunks that this SCTP association receives per second.
Retransmitted Chunks	Number of chunks that this SCTP association retransmits per second.
Retransmitted Fast Chunks	Number of fast chunks that this SCTP association retransmits per second.

Statistics: Application Servers

You use the MWTM to view statistics for a chosen application server.

The Statistics Details: Statistics tab contains:

Field	Description
Active Duration	Total time the application server is in service since the last reboot of the ITP, or since ITP last reset the counters.
MTP3 Packet Rate (per sec)	Number of MTP3 packets that the application server receives per second. This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates.
ASP Packet Rate (per sec)	Number of application server process packets that the application server sends per second. This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates.

Statistics: Application Server Process Associations

You use the MWTM to view statistics for a chosen application server process association.

The Statistics Details: Statistics tab contains:

- Packets Per Second Information, page 7-88
- Error Information, page 7-88
- ASP Initialization Counters, page 7-89
- Signaling Congestion Counters, page 7-89
- Destination Counters, page 7-90

Packets Per Second Information

The Packets Per Second Information section in the Statistics Details: Statistics tab for application server process associations contains:

Field	Description
Packets From ASP	Number of packets that the application server receives per second.
Packets To ASP	Number of packets that the application server sends per second.
Packets From MTP3	Number of packets that the MTP3 layer receives per second.
Packets To MTP3	Number of packets that the MTP3 layer sends per second.

Error Information

The Error Information section in the Statistics Details: Statistics tab for application server process associations contains:

Field	Description
Errors Received	Total number of error (ERR) messages that the application server process association receives.
Errors Sent	Total number of error (ERR) messages that the application server process association sends.

ASP Initialization Counters

The ASP Initialization Counters section in the Statistics Details: Statistics tab for application server process associations contains:

Field	Description
Up Messages Received	Total number of application server process up (ASPUP) messages that the application server process association receives.
Up ACK Messages Sent	Total number of application server process up acknowledgement (UPACK) messages that the application server process association sends.
Down Messages Received	Total number of application server process down (ASPDN) messages that the application server process receives.
Down ACK Messages Sent	Total number of application server process down acknowledgement (DOWNACK) messages that the application server process association sends.
Activation Messages Received	Total number of application server process active messages that the application server process association receives.
Activation ACK Messages Sent	Total number of application server process active acknowledgement messages that the application server process association sends.
Inactive Messages Received	Total number of application server process inactive messages that the application server process association receives.
Inactive ACK Messages Sent	Total number of application server process inactive acknowledgement messages that the application server process association sends.

Signaling Congestion Counters

The Signaling Congestion Counters section in the Statistics Details: Statistics tab for application server process associations contains:

Field	Description
Level 0 Messages Received	Total number of signaling congestion level 0 (SCON0) messages that the application server process receives.
Level 1 Messages Received	Total number of signaling congestion level 1 (SCON1) messages that the application server process receives.
Level 2 Messages Received	Total number of signaling congestion level 2 (SCON2) messages that the application server process receives.
Level 3 Messages Received	Total number of signaling congestion level 3 (SCON3) messages that the application server process receives.
Level 0 Messages Sent	Total number of signaling congestion level 0 (SCON0) messages that the application server process sends.
Level 1 Messages Sent	Total number of signaling congestion level 1 (SCON1) messages that the application server process sends.
Level 2 Messages Sent	Total number of signaling congestion level 2 (SCON2) messages that the application server process sends.
Level 3 Messages Sent	Total number of signaling congestion level 3 (SCON3) messages that the application server process sends.

Destination Counters

The Destination Counters section in the Statistics Details: Statistics tab for application server process associations contains:

Field	Description
Unavailable Messages Received	Total number of destination unavailable (DUNA) messages that the application server process association receives.
Unavailable Messages Sent	Total number of destination unavailable (DUNA) messages that the application server process association sends.
Available Messages Received	Total number of destination available (DAVA) messages that the application server process association receives.
Available Messages Sent	Total number of destination available (DAVA) messages that the application server process association sends.
User Part Unavailable Messages Received	Total number of destination user part unavailable (DUPU) messages that the application server process association receives.
User Part Unavailable Messages Sent	Total number of destination user part unavailable (DUPU) messages that the application server process association sends.
State Audit Messages Received	Total number of destination state audit (DAUD) messages that the application server process association receives.
State Audit Messages Sent	Total number of destination state audit (DAUD) messages that the application server process association sends.

Statistics: Links and Linksets

You use the MWTM to view statistics for a chosen link or linkset.

The Statistics Details: Statistics tab contains:

- Packet Information, page 7-91
- Bit Information or Byte Information, page 7-91
- LSSU Information (Links Only), page 7-92
- Utilization Information, page 7-92
- Service Information, page 7-93

Statistics for links associated with the chosen linkset are visible in the left column, and for links associated with the adjacent linkset in the right column.

Packet Information

The Packet Information section in the Statistics Details: Statistics tab for links and linksets contains:

Field	Description
Sent Per Sec	Number of packets that the link or linkset sends per second. This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates.
Received Per Sec	Number of packets that the link or linkset receives per second. This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates.
Drops	Total number of packets that have been dropped by the link or linkset.
Transmit Queue Depth (links only)	Number of packets waiting to be sent on by the link.
Transmit Queue High Depth (links only)	Highest level reached by the transmit queue since the last reboot of the ITP, or since ITP last reset the averages as a result of bad data.
Transmit Queue High Reset (links only)	Level at which the link is to reset the transmit queue. If the link is never to reset the transmit queue, this field displays `Never`.
Signal Link Test (links only)	Indicates whether test packets are being sent on the link. Valid values are: • **true (1)**—Test packets are being sent. • **false (2)**—Test packets are not being sent.

Bit Information or Byte Information

The Bit Information section (or Byte Information section, if you unchecked the Show Details in Bits Instead of Bytes check box in the Preferences window) in the Statistics Details: Statistics tab for links and linksets contains these fields:

Field	Description
Sent Per Sec	Number of bits or bytes (as set in the Preferences window) that the link or linkset sends per second. This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates.
Received Per Sec	Number of bits or bytes (as set in the Preferences window) that the link or linkset receives per second. This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates.

LSSU Information (Links Only)

The Links Status Signal Unit (LSSU) section in the Statistics Details: Statistics tab for links contains:

Field	Description
LSSU Packets Sent	Total number of LSSU packets that the link sends.
LSSU Packets Received	Total number of SS7 Message Transfer Part Layer 2 (MTP2) LSSU packets that the link receives.

Utilization Information

The Utilization Information section in the Statistics Details: Statistics tab for links and linksets contains:

Field	Description
Send Plan Capacity	Planned capacity of the link or linkset to send, in bits per second. For a link or linkset of type: • Serial or HSL, available bandwidth for the link/linkset. • SCTPIP (or Mixed for linksets), set on the ITP by using the plan-capacity CS7 link or linkset configuration command. If Send Plan Capacity is not set on the ITP for this link or linkset, this field displays the value **0**. • Other, this field always displays the value **0**.
%	Amount of the link or linkset's send capacity being used, as a percentage or in Erlangs (E) as set in the Preferences window, calculated by using this formula: Send Utilization = (Bits Sent Per Sec)/Planned Capacity This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates. For a link or linkset of type: • SCTPIP (or Mixed for linksets), if Send Plan Capacity is not set on the ITP for this link, or for one or more of the links associated with this linkset, this field displays the description `Set Plan Capacity on ITP`. • Other, this field always displays the description `Set Plan Capacity on ITP`.
Send Threshold % (links only)	Indicates when to generate the MWTM a cItpSpLinkSentUtilChange for the link, as a percent of its total send capacity. For example, if Send Plan Capacity is 64,000 bits per second, and Send Threshold % is **50**, then the MWTM generates a cItpSpLinkSentUtilChange notification when the link reaches 50% of 64,000, or 32,000 bits per second.
Receive Plan Capacity	Planned capacity of the link or linkset to receive, in bits per second. For a link or linkset of type: • Serial or HSL, available bandwidth for the link. • SCTPIP (or Mixed for linksets), set on the ITP using the plan-capacity CS7 link/linkset configuration command. If Receive Plan Capacity is not set on the ITP for this link or linkset, this field displays the value **0**. • Other, this field always displays the value **0**.

Field	Description
Receive Utilization %	Amount of the link or linksets receive capacity being used, as a percentage or in Erlangs (E) as set in the Preferences window, calculated by using this formula: Receive Utilization = (Bits Received Per Sec)/Receive Plan Capacity This field initially displays the description `Waiting for second poll`. After two polling cycles, the MWTM populates this field with actual calculated rates. For a link or linkset of type: • SCTPIP (or Mixed for linksets), if Receive Plan Capacity is not set on the ITP for this link, or for one or more of the links associated with this linkset, this field displays the description `Set Plan Capacity on ITP`. • Other, this field always displays the description `Set Plan Capacity on ITP`.
Receive Threshold % (links only)	Indicates when to generate the MWTM a cItpSpLinkRcvdUtilChange for the link, as a percent of its total receive capacity. For example, if Receive Plan Capacity is 64,000 bits per second, and Receive Threshold % is **50**, then the MWTM generates a cItpSpLinkRcvdUtilChange notification when the link reaches 50% of 64,000, or 32,000 bits per second.

Service Information

The Service Information section in the Statistics Details: Statistics tab for links and linksets contains:

Field	Description
Duration In Service %	Percentage of time the link or linkset is in service since the last reboot of the ITP, or since ITP last reset the counters.
Duration Out Of Service %	Percentage of time the link or linkset is out of service since the last reboot of the ITP, or since ITP last reset the counters.
MTP3 Accounting Enabled (linksets only)	Indicates whether the collection of MTP3 accounting statistics is enabled for the linkset. If the linkset is a Virtual linkset, this field displays N/A.
GTT Accounting Enabled (linksets only)	Indicates whether the collection of GTT accounting statistics is enabled for the linkset. For Cisco IOS software releases prior to 12.2(4)MB10, this field displays `Unknown`. If the linkset is a Virtual linkset, this field displays N/A.

Status Details

You use the MWTM to view status details for a chosen link.

The Statistics Details: Status Details tab contains:

Column	Description
Protocol State Details	Detailed information about the state of the protocol for this link. Possible values are: • **Changeback control (TCBC)**—Changeback control is buffering data on this link. • **Changeover control (TCOC)**—Changeover control is buffering data on this link. • **Link availability control (TLAC)**—Adjacent Signaling point is restarting. • **Link availability control (TLAC)**—Emergency changeover is in progress on this link. • **Link availability control (TLAC)**—Changeback is in progress on this link. • **Link availability control (TLAC)**—Changeover is in progress on this link. • **Link availability control (TLAC)**—The last changeover operation failed on this link. • **Link availability control (TLAC)**—Inhibit command will be retried. • **Link availability control (TLAC)**—Management request in progress for this link. • **Link availability control (TLAC)**—Signaling point is in the process of a restart. • **Signaling routing control (TSRC)**—Changeover request is complete. • **Signaling routing control (TSRC)**—Adjacent Signaling Point is restarting. • **Link availability control (TLAC)**—Link is inhibited by a local management operation. • **Link availability control (TLAC)**—Link is inhibited by a remote management operation. • **Link availability control (TLAC)**—Link is blocked because of a local processor outage. • **Link availability control (TLAC)**—Link is blocked because of a remote processor outage.
Link Test Results	Indicates the results of the link test. Possible results are: • **No Errors**—The link did not detect any errors. • **Undefined OPC (Origination Point Code)**—A signaling link test message arrived with an undefined OPC. This scenario can occur when a serial link connects incorrectly, or when you configure an SCTP link incorrectly. This scenario differs from Incorrect OPC because the signaling point is unaware of the point code in question. The point code is not defined for any linkset on this ITP. • **Incorrect OPC**—A signaling link test message arrived with an incorrect OPC. This scenario can occur when a serial link connects incorrectly, or when you configure an SCTP link incorrectly. This scenario differs from **Undefined OPC** because the signaling point is aware of the point code in question, and the point code is defined for a linkset on this ITP, but the point code is not correct for the current linkset. • **Undefined SLC (Signaling Link Code)**—A signaling link test message arrived with an undefined SLC. This scenario can occur when a serial link connects incorrectly, or when you configure an SCTP link incorrectly. The link connects to the correct linkset, but the linkset does not have a definition for the SLC in question. • **Incorrect SLC**—A signaling link test message arrived with an incorrect SLC. This scenario can occur when a serial link connects incorrectly, or when you configure an SCTP link incorrectly. The link connects to the correct linkset, but to the wrong link in that linkset. That is, the signaling test receives the test packet on the wrong link.

Column	Description
Link Test Results (continued)	• **Incorrect NI (Network Indicator)**—A signaling link test message arrived with an incorrect NI. This scenario can occur when links connect to the correct linkset and link, but the NIs of the two adjacent point codes are not the same. • **Bad Pattern**—A signaling link test message arrived with an incorrect test pattern. This error occurs because the test pattern is corrupt. This scenario usually indicates a hardware or configuration issue related to the physical format of the data on the links, caused by a variant mismatch or incorrect definitions on the physical link. • **Non Adjacent**—Received a signaling link test message from a nonadjacent node. • **Failed**—Unable to run the test, or no response arrived in the specified interval.
Link Fail Reason	If the link failed the link test, indicates the reason for the failure. Possible reasons are: • **None**—No additional reason available. • **Changeover in progress**—Changeover is in progress. This message diverts traffic away from a failed link. • **Management disconnect request**—An MTP3 sent a request to stop the link. • **Link alignment lost**—Link alignment is lost. A link is in alignment when signal units are received in sequence, and with the proper number of octets. The signal unit must be a total length of eight-bit multiples. If the signal unit is not of eight-bit multiples, or if the signaling information field (SIF) exceeds the 272-octet capacity, the signaling unit is considered to be in error. If excessive errors are encountered on a link, it is considered to be out of alignment. For M2PA links, this state reason is generated when the M2PA alignment timer T1 expires. This could indicate that the remote link is shutdown, or that intermittent IP connectivity problems exist. • **Link connection lost**—Link connection is lost. • **Local Disconnect**—A request to disconnect the link is received, but the link is already disconnected. • **Remote Disconnect**—A remote disconnect request is received. • **Signal unit error rate monitor failure**—The signal unit error rate monitor has failed. • **T1 timeout no FISU received**—A T1 timeout no FISU is received. This timer avoids message mis-sequencing during changeover. • **T2 timeout no SIO received**—A T2 timeout no SIO is received. This timer waits for a changeover acknowledgment.

Column	Description
Link Fail Reason (continued)	• **T3 timeout no SIN received**—A T3 timeout no SIN is received. This timer controls diversion-delay to avoid mis-sequencing on changeback. • **T6 timeout excessive congestion**—A T6 timeout excessive congestion is received. This timer avoids message mis-sequencing on controlled rerouting. • **T7 timeout excessive acknowledgement delay**—A T7 timeout excessive acknowledgment delay is received. The T7 timer prevents a signaling point from waiting too long for a positive or negative acknowledgment. Usually, an acknowledgment is sent when a signaling point becomes idle and does not have any more traffic to transmit. When congestion occurs at a signaling point, or an extreme amount of traffic is present, the T7 could possibly time out and force retransmission of messages. • **Link proving failure**—A link proving failure occurred. • **Abnormal BSN received**—An abnormal Backward Sequence Number (BSN) is received. • **Abnormal FIB received**—An abnormal Forward Indicator Bit (FIB) is received. • **Abnormal SIB received**—An abnormal Status Indicator Busy (SIB) is received. • **Abnormal LSSU received**—An abnormal Link Status Signal Unit (LSSU) is received. • **Peer not ready**—An MTP3 tried to bring up a link that is still cleaning up after being stopped. In some cases, the MTP3 does not change over after a link failure, so the M2PA or SCTP waits for an event that will not occur. When an MTP3 tries to bring up the link again, the previous control structures must first be cleaned up. If M2PA gets a start request from an MTP3, and the previous structures are still being held, M2PA cleans them up and sends a `PEER NOT READY` to the MTP3 layer. A subsequent request to start the link from the MTP3 layer will then cause the link to come up. • **Communication lost**—M2PA or SCTP has determined that the remote end signaling point is no longer reachable. Possible reasons include: – The maximum number of consecutive retries of a packet is reached. – In the absence of data, the MWTM failed to receive heartbeat ACKs in response to heartbeats, for the maximum number of retries. • **No Listen posted**—An MTP3 tried to start a link, but the local-peer port associated with the link is not available, probably because of a bad configuration. • **Unable to allocate buffer**—M2PAor SCTP cannot get buffers for sending or receiving packets. Buffer problems can be temporary or permanent. Temporary buffer problems will generally clear with little side effects. Permanent buffer problems can lead to failed linksets or links.

Column	Description
Link Fail Reason (continued)	• **Link card removed**—A link card is removed. • **Link card inserted**—A link card is inserted. • **False link congestion**—A false link congestion indication is received. • **Configuration downloading**—The configuration is downloading. • **Locally inhibited**—The link is locally inhibited by operator request. • **Locally uninhibited**—An operator request locally uninhibited the link. • **Remotely inhibited**—The link is remotely inhibited by operator request. • **Remotely uninhibited**—The link is remotely uninhibited by operator request. • **Locally blocked**—The link is blocked locally. • **Locally unblocked**—The link is unblocked locally. • **Remotely blocked**—The link is remotely blocked. • **Remotely unblocked**—The link is remotely unblocked.

Viewing ITP MTP3 Errors

The ITP MTP3 Errors table displays all MTP3 error information for the chosen ITP node.

If you have implemented MWTM User-Based Access, this option is available to users with authentication level System Administrator (level 5).

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

The MTP3 Errors section displays these columns for the chosen node:

Column	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Reset Counters	Opens the MWTM Reset Counters dialog box, which you use to change MWTM poller and counter settings. For more information, see Changing Real-Time Poller and Counter Settings, page 4-20.

Column	Description
Poll Counter Mode (*available only in Java client*)	Displays the current mode for poll counters, and the date and time that counters were last reset. Possible modes are: • **Since Reboot**—Counters display values aggregated since the last reboot of the ITP, or since ITP last reset the counters. • **Since Last Poll**—Counters display values aggregated since the last poll. • **Since User Reset**—Counters display values aggregated since the last time they were reset by the user.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Count	Number of times the indicated MTP3 error type was detected.
Error Description	Description of the MTP3 error type.

Viewing ITP MSU Rates

The ITP MSU Rates table displays all MSU rate information in charts for the chosen ITP node.

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

The MSU Rates tab contains a Summary sub-tab, showing totals for all MSU rates. Each additional sub-tab shows MSU rates for a specific CPU (for example, 0/0 shows CPU 0 located in slot 0). The status ball on the sub-tab indicates the current threshold level of the CPU.

GUI Elements	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Change Poller, page 7-110.

GUI Elements	Description
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
MSUs / sec	Y-axis label that displays traffic rate in MSUs per second.
Time	X-axis label that displays a real-time scale.
Legend	Identifies the data series currently showing in the chart. • **No Data**—Data is not available. A vertical bar appears in the chart. • **CPU Threshold Crossed**—One or more CPUs have crossed a processing threshold.

Right-click Menu

A right-click context menu provides options to modify how the chart appears:

Menu options	Description
Hide > *field*	Hides the currently shown data series.
Show > *field*	Shows the currently shown data series.
Reset Zoom	If you have zoomed into a specific area of the chart, resets the zoom. **Note** To zoom into a specific area of the chart, use the left mouse button to drag a box around the area.
Grid On	Displays a grid on the chart.
Grid Off	Removes the grid from the chart.
Shapes On	Displays individual data points as shapes on the rate lines and the chart legend.
Shapes Off	Removes shapes from the rate lines and the chart legend.

Viewing Non-Stop Operation

Non-Stop Operation (NSO) is an implementation of redundant data elements and software functionality that enables networks to approach 99.999% availability. The Non-Stop Operation table displays detailed information about all NSO settings associated with the chosen node.

To view the Non-Stop Operation section, in the navigation tree, select an ITP node or any of the mSEF node (HA, BWG, GGSN, CSG2, PDNGW, SGW, and PDSN), then click on the NSO tab in the content area.

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

The NSO table displays these fields for the chosen node:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Configuration: Split Mode	Indicates whether redundant units can communicate synchronization messages with each other: • **Enabled**—Communication is not permitted. The active unit does not communicate with the standby unit, and the standby unit progression does not occur. This mode can be useful during maintenance. • **Disabled**—Communication is permitted. The active unit communicates with the standby unit, and the standby unit is reset to recover.
Configuration: Keepalive Threshold	On platforms that support keepalives, this field indicates the number of lost keepalives allowed before a failure occurs. If a failure occurs, a Switch of Activity (SWACT) notification switches the active unit to standby status, and vice versa. On platforms that do not support keepalives, this field has no meaning.
Configuration: Keepalive Threshold Min	Minimum acceptable value for the Keepalive Threshold.
Configuration: Keepalive Threshold Max	Maximum acceptable value for the Keepalive Threshold.
Configuration: Keepalive Timer (msecs)	On platforms that support keepalives, this timer guards against lost keepalives. If the RF subsystem does not receive a keepalive before this timer expires, a SWACT notification switches the active unit to standby status, and vice versa. On platforms that do not support keepalives, this field has no meaning.
Configuration: Keepalive Time Min (msecs)	Minimum acceptable value for the Keepalive Timer.
Configuration: Keepalive Time Max (msecs)	Maximum acceptable value for the Keepalive Timer.

GUI Element	Description
Configuration: Notification Timer (msecs)	RF notification timer. As the standby unit progresses to the Hot Standby state, the active unit sends asynchronous messages to the standby unit, which then sends an acknowledgment back to the active unit. If the active unit: • Receives the acknowledgement before this timer expires, the standby unit progresses normally. • Does not receive a acknowledgement before this timer expires, a SWACT notification switches the active unit to standby status, and vice versa.
Configuration: Notification Timer Min (msecs)	Minimum acceptable value for the Notification Timer.
Configuration: Notification Timer Max (msecs)	Maximum acceptable value for the Notification Timer.
Configuration: RF Notification	Indicates whether RF system notification is enabled or disabled.
Configuration: Maintenance Mode	Indicates whether the redundant system is in maintenance mode: • **Enabled**—The redundant system is in maintenance mode. The active unit does not communicate with the standby unit, and the standby unit progression does not occur. • **Disabled**—The redundant system is in normal operation mode, not maintenance mode. The active unit communicates with the standby unit, and the standby unit is reset to recover.
Configuration: Redundancy Mode	Redundancy mode configured on this system. Possible values are: • **Cold Standby Redundant**—This system is configured for redundancy, but the redundant peer unit is not fully initialized and cannot retain established calls. • **Dynamic Load Share NonRedundant**—This system is not configured for redundancy, but it is load-sharing. The load-sharing is based on the operational load (that is, it is based on the number of calls, or some other factor). • **Static Load Share Redundant**—This system is configured for redundancy, and it is load-sharing. The load-sharing is based on the operational load. • **NonRedundant**—This system is not configured for redundancy, and it is not load-sharing. • **Static Load Share NonRedundant**—This system is not configured for redundancy, but it is load-sharing. The load-sharing is not based on the operational load. • **Static Load Share Redundant**—This system is configured for redundancy, and it is load-sharing. The load-sharing is not based on the operational load. • **Warm Standby Redundant**—This system is configured for redundancy, and the redundant peer unit can immediately handle new calls, but it cannot retain established calls. • **Hot Standby Redundant**—This system is configured for redundancy, the redundant peer unit can immediately handle new calls, and it can *instantaneously* retain established calls.
Configuration: Redundancy Mode Descr	Additional clarification or description of the Redundancy Mode.

GUI Element	Description
Configuration: Oper Redundancy Mode	Operational redundancy mode of this unit. Possible values are: • **Cold Standby Redundant**—This unit is configured for redundancy, but the redundant peer unit is not fully initialized and cannot retain established calls. • **Dynamic Load Share NonRedundant**—This unit is not configured for redundancy, but it is load-sharing. The load-sharing is based on the operational load (that is, it is based on the number of calls, or some other factor). • **Static Load Share Redundant**—This unit is configured for redundancy, and it is load-sharing. The load-sharing is based on the operational load. • **NonRedundant**—This unit is not configured for redundancy, and it is not load-sharing. • **Static Load Share NonRedundant**—This unit is not configured for redundancy, but it is load-sharing. The load-sharing is not based on the operational load. • **Static Load Share Redundant**—This unit is configured for redundancy, and it is load-sharing. The load-sharing is not based on the operational load. • **Warm Standby Redundant**—This unit is configured for redundancy, and the redundant peer unit can immediately handle new calls, but it cannot retain established calls. • **Hot Standby Redundant**—This unit is configured for redundancy, the redundant peer unit can immediately handle new calls, and it can *instantaneously* retain established calls.
History: Cold Starts	Number of system cold starts, including automatic and manual SWACTs, since the last system initialization.
History: Available Standby Time	Cumulative time that a standby redundant unit is available since the last system initialization.
Current Status: Unit ID	Unique identifier for this redundant unit.
Current Status: Unit State	Current RF status for this unit. Possible values are: • **Active**—Active and is processing calls. • **Active Drain**—Performing client cleanup. • **Active Extra Load**—Active and is processing calls for all feature boards in the system. • **Active Fast**—Performing call maintenance during a SWACT notification. • **Active Handback**—Active, is processing calls, and is handing off some resources to the other RF unit. • **Active Preconfiguration**—Active but has not yet read its configuration. • **Active Postconfiguration**—Active and is processing its configuration.

GUI Element	Description
Current Status: Unit State (continued)	• **Disabled**—RF is not currently operating on this unit. • **Hot Standby**—Ready to become the active unit. • **Initialization**—Establishing necessary system services. • **Negotiation**—Discovering and negotiating with its peer unit. • **Cold Standby**—Running the client RF notification. • **Cold Standby Bulk**—Synchronizing its client data with the peer (active) unit. • **Cold Standby Configuring**—Synchronizing its configuration with the peer (active) unit. • **Cold Standby File System**—Synchronizing its file system with the "V unit". • **Unknown**—The current RF state of this unit is not known.
Current Status: Peer Unit ID	Unique identifier for the peer redundant unit.
Current Status: Peer Unit State	Current RF status for this unit's peer unit. Possible values are: • **Active**—Active and is processing calls. • **Active Drain**—Performing client cleanup. • **Active Extra Load**—Active and is processing calls for all feature boards in the system. • **Active Fast**—Performing call maintenance during a SWACT notification. • **Active Handback**—Active, is processing calls, and is handing off some resources to the other RF unit. • **Active Preconfiguration**—Active but has not yet read its configuration. • **Active Postconfiguration**—Active and is processing its configuration. • **Disabled**—RF is not currently operating on the peer unit. • **Hot Standby**—Ready to become the active unit. • **Initialization**—Establishing necessary system services. • **Negotiation**—Discovering and negotiating with this unit. • **Cold Standby**—Running the client RF notification. • **Cold Standby Bulk**—Synchronizing its client data with this (active) unit. • **Cold Standby Configuring**—Synchronizing its configuration with this (active) unit. • **Cold Standby File System**—Synchronizing its file system with this (active) unit. • **Unknown**—The current RF state of the peer unit is not known.
Current Status: Primary Mode	Indicates whether this unit is the primary or secondary. The primary unit has a higher priority than the secondary unit. In a race situation (for example, during initialization), or in any situation in which the units cannot successfully negotiate activity between themselves, the primary unit becomes the active unit and the secondary unit becomes the standby unit. Only one redundant unit can be the primary unit at any given time.

GUI Element	Description
Current Status: Duplex Mode	Indicates whether the peer unit is detected: • **Duplex**—Detected. • **Simplex**—Not detected.
Current Status: Manual Switch Inhibit	Indicates whether a manual Switch of Activity (SWACT) is allowed: • **Enabled**—Not allowed. • **Disabled**—Allowed.
Current Status: Last Switchover Reason	Reason for the last Switch of Activity (SWACT). Possible values are: • **Active Unit Failed**—A failure of the active unit triggered an automatic SWACT. • **Active Unit Removed**—The removal of the active unit triggered an automatic SWACT. • **None**—No SWACT has occurred. • **Unknown**—The reason for the last SWACT is not known. • **Unsupported**—The reason code for the last SWACT is not supported. • **User Forced**—A user forced a manual SWACT, ignoring preconditions, warnings, and safety checks. • **User Initiated**—A user initiated a safe, manual SWACT.
Current Status: Last Failover Time	Date and time when the primary redundant unit became the active unit. If no failover has occurred, this field displays `No Failover Has Occurred`.
Current Status: Standby Available At Time	Date and time when the peer redundant unit entered the Hot Standby state. If a failover occurs, this fields displays `System Initialization` for a brief period until the system is back up.
Redundancy Mode Capability: Capability Mode	List of redundancy modes that the unit can support. Possible values are: • **Cold Standby Redundant**—This unit is configured for redundancy, but the redundant peer unit is not fully initialized and cannot retain established calls. • **Dynamic Load Share NonRedundant**—This unit is not configured for redundancy, but it is load-sharing. The load-sharing is based on the operational load (that is, it is based on the number of calls, or some other factor). • **Static Load Share Redundant**—This unit is configured for redundancy, and it is load-sharing. The load-sharing is based on the operational load. • **NonRedundant**—Redundancy is not configured on this unit, and it is not load-sharing. • **Static Load Share NonRedundant**—This unit is not configured for redundancy, but it is load-sharing. The load-sharing is not based on the operational load. • **Static Load Share Redundant**—This unit is configured for redundancy, and it is load-sharing. The load-sharing is not based on the operational load. • **Warm Standby Redundant**—This unit is configured for redundancy, and the redundant peer unit can immediately handle new calls, but it cannot retain established calls. • **Hot Standby Redundant**—This unit is configured for redundancy, the redundant peer unit can immediately handle new calls, and it can *instantaneously* retain established calls.

GUI Element	Description
Redundancy Mode Capability: Description	The Description column contains additional clarification or description of the Capability Mode.
Switchover History: Index	Number identifying the entry in the Switchover History table.
Switchover History: Prev. ID	Unit ID of the active unit that failed or was removed.
Switchover History: Curr. ID	Unit ID of the standby unit that became the new active unit.
Switchover History: Reason	• **Unknown**—The reason for the last SWACT is not known. • **Unsupported**—The reason code for the last SWACT is not supported. • **User Forced**—A user forced a manual SWACT, ignoring preconditions, warnings, and safety checks. • **User Initiated**—A user initiated a safe, manual SWACT.
Switchover History: Time	Date and time that the SWACT occurred.

Viewing TDM Statistics

You can view real-time TDM statistics for T1 and E1 interfaces. To view TDM statistics for one of these interfaces, launch the MWTM client or MWTM web interface (http://*server name*:1774), select the T1 or E1 interface in the navigation tree (in the Physical folder), then click the TDM Stats tab.

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

The TDM Stats tab contains:

GUI Element	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Change Poller, page 7-110. This button appears only in the MWTM client.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Last Poll (*available only in Java client*)	Label that identifies when the last poll occurred.

GUI Element	Description
Line Configuration	Pane that lists the line configuration parameters of the chosen T1 or E1 interface. See Line Configuration Pane, page 7-106.
Line Status Information [1]	Pane that provides line status information for the chosen T1 or E1 interface. See Line Status Information Pane, page 7-108.
Performance / Error Information [1]	Pane that provides performance and error information for the chosen T1 or E1 interface. See Performance and Error Information Pane, page 7-108.

1. To run basic troubleshooting commands on T1 and E1 interfaces, click the Troubleshooting tab, and select the Layer 2 Cross Connection category. See Viewing Troubleshoot, page 7-39.

Line Configuration Pane

The Line Configuration pane contains:

Parameter	Value
Interface Name	Name of the interface (for example, T1 0/0).
Line Type	Indicates the type of DS1 line that implements this circuit. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. Values include: • ESF—Extended Super Frame DS1. • D4—AT&T D4 format DS1. • E1—CCITT recommendation G.704 (Table 4a). • E1-CRC—CCITT recommendation G.704 (Table 4b). • E1-MF—G.704 (Table 4a) with TS16 multiframing enabled. • E1-CRC-MF—G.704 (Table 4b) with TS16 multiframing enabled. • Other—Line type that is other than those described by this parameter.
Line Code	Indicates the type of zero code suppression used on the line, which affects a number of its characteristics. Values include: • JBZS—Jammed Bit Zero Suppression. A technique in which the AT&T specification of at least one pulse every 8-bit period is literally implemented by forcing a pulse in bit 8 of each channel. Therefore, only seven bits per channel, or 1.344 Mbps, is available for data. • B8ZS—Bipolar with 8 Zeros Substitution. A specified pattern of normal bits and bipolar violations replace a sequence of eight zero bits. • ZBTSI—Zero Byte Time Slot Interchange. A technique applied to a DS1 frame to ensure pulse density requirements are met. ANSI clear channels use ZBTSI. • AMI—Alternate Mark Inversion. A technique in which no zero code suppression is present and the line encoding does not directly solve the problem. In this application, the higher layer must provide data which meets or exceeds the pulse density requirements. E1 links, with or without CRC, use this code or the HDB3 code. • HDB3—High Density Bipolar of order 3. A line code based on AMI. • Other—Line code that is other than those described by this parameter.

Parameter	Value
Send Code	Indicates what type of code is sent across the DS1 interface by the device. Values include: • Send No Code—Sending looped or normal data. • Send Line Code—Sending a request for a line loopback. • Send Payload Code—Sending a request for a payload loopback. • Send Reset Code—Sending a loopback termination request. • Send QRS—Sending a quasi-random signal (QRS) test pattern. • Send 511 Pattern—Sending a 511 bit fixed test pattern. • Send 3-in-24 Pattern—Sending a fixed test pattern of 3 bits set in 24. • Send Other Test Pattern—Sending a test pattern other than those described by this parameter.
Circuit Identifier	Contains the transmission vendor's circuit identifier, for the purpose of facilitating troubleshooting.
Loopback Config	Identifies the loopback configuration of the DS1 interface. Agents supporting read/write access should return badValue in response to a requested loopback state that the interface does not support. Values include: • No Loop—Not in the loopback state. A device that is not capable of performing a loopback on the interface always returns this value. • Payload Loop—The received signal at this interface is looped through the device. Typically the received signal is looped back for retransmission after it has passed through the device's framing function. • Line Loop—The received signal at this interface does not go through the device (minimum penetration) but is looped back out. • Other Loop—Loopbacks that are not defined by this parameter.
Signal Mode	Identifies the signal mode of the interface. Values include: • None—Indicates that no bits are reserved for signaling on this channel. • Robbed Bit—Indicates that T1 robbed bit signaling is in use. • Bit Oriented—Indicates that E1 channel associated signaling is in use. • Message Oriented—Indicates that common channel signaling is in use either on channel 16 of an E1 link or channel 24 of a T1.
Clock Source	Indicates the source of the transmit clock. Values include: • Loop Timing—Indicates that the recovered receive clock is used as the transmit clock. • Local Timing—Indicates that a local clock source is used. • Through Timing—Indicates that a recovered receive clock from another interface is used as the transmit clock.
Facilities Data Link	Describes the use of the facilities data link, and is the sum of the capabilities: • ANSI T1 403—Refers to the facilities data link (FDL) exchange recommended by ANSI. • AT&T 54016—Refers to ESF FDL exchanges. • FDL None—Indicates that the device does not use the FDL. • Other—Indicates use of a protocol other than those described by this parameter.

Line Status Information Pane

The Line Status Information pane contains:

Parameter	Value
Line Status	Indicates the line status of the interface. It contains loopback, failure, received alarm, and transmitted alarm information. Values include: • No Alarm—No alarm is present on the line. • Receive Far End LOF—Far end loss of frame (LOF). This notification is also known as a yellow alarm. • Transmit Far End LOF—Near end is sending LOF indication. • Receive AIS—Far end is sending alarm indication signal (AIS). • Transmit AIS—Near end is sending AIS. • Loss of Frame—Near end LOF (red alarm). • Loss of Signal—Near end loss of signal (LOS). • Loopback State—Near end is looped. • T16 AIS—E1 T16 alarm indication signal. • Receive Far End LOMF—Far end is sending T16 loss of multiframe (LOMF). • Transmit Far End LOMF—Near end is sending T16 LOMF alignment. • Receive Test Code—Near end is detecting a test code. • Other Failure—Any line status not defined by this parameter.
Loss of Frame Count [1]	Real-time count for loss of frame.
Loss of Signal Count [1]	Real-time count for loss of signal.
Remote Alarm Indication Count [1]	Real-time count for remote alarm indication.
Alarm Indication Signal Count [1]	Real-time count for alarm indication signal.

1. Not available for T1 or E1 controllers for ITP 12.2 releases.

Performance and Error Information Pane

The Performance and Error Information pane contains:

Parameter	Value
Time Elapsed within Interval	Number of minutes and seconds that have elapsed since the beginning of the current error-measurement period.
Line Code Violations	Number of line code violations (LCVs) encountered by the interface in the current 15-minute interval.
Path Coding Violations	Number of path coding violations encountered by the interface in one of the previous 96, individual 15-minute, intervals.

Parameter	Value
Slip Duration	Number of slip seconds encountered by the interface in the current 15-minute interval.
Severely Errored Framing Duration	Number of severely errored framing seconds encountered by the interface in the current 15-minute interval.
Line Error Duration	Number of line errored seconds encountered by the interface in the current 15-minute interval.
Degraded Duration	Number of degraded seconds encountered by the interface in the current 15-minute interval.
Errored Duration	Number of errored seconds encountered by the interface in the current 15-minute interval.
Bursty Error Duration	Number of bursty errored seconds encountered by the interface in the current 15-minute interval.
Severely Errored Duration	Number of severely errored seconds encountered by the interface in the current 15-minute interval.
Unavailable Duration	Number of unavailable seconds encountered by a DS1 interface in the current 15 minute interval.

Viewing RAN-O Performance Data

Note The web interface provides historical (not real-time) charts depicting performance information overuser-specified time ranges. You can use historical statistics for capacity planning and trend analysis. See Displaying RAN-O Historical Statistics, page 11-35.

The web interface provides historical (not real-time) charts depicting performance information over user-specified time ranges. You can use historical statistics for capacity planning and trend analysis. See Displaying RAN-O Historical Statistics, page 11-35.

The MWTM client interface provides access to RAN-O real-time performance statistics that you can use to troubleshoot problems that occur in real time. The zoom and navigation features quickly enable isolating and focusing on a problem area.

You use real-time charts in the MWTM client to view performance information on shorthaul and backhaul interfaces. To view performance data for a shorthaul or backhaul interface, select the interface in the navigation tree of the DEFAULT view (or any custom view), then click the Backhaul or Shorthaul Performance tab in the right pane.

The Backhaul or Shorthaul Performance tab displays one or more charts depending on whether you selected a shorthaul or a backhaul interface. These charts depict send and receive rates of optimized IP traffic over time. The charts display the traffic from 0 to the maximum speed on the interface. You can set the client preferences to display this data in bits or bytes per second. The default polling interval is 15 seconds, but you can change the frequency in the Poller Settings dialog box, which you launch by clicking the Change Poller button.

The Backhaul or Shorthaul Performance tab also shows total send and receive errors when you select a backhaul interface.

This section provides information about:

- Viewing Shorthaul Performance Data, page 7-110
- Viewing Backhaul Performance Data, page 7-111

Viewing Shorthaul Performance Data

The Shorthaul Performance tab displays a single chart that shows:

- The send rate plotted in one color and the receive rate plotted in a different color.
- A vertical band when the congestion mechanism is active (see the *Cisco MWR 1941-DC-A Mobile Wireless Edge Router Software Configuration Guide* for congestion management information).
- A different colored vertical band when no data exists.

Content Pane

The content (right) pane contains:

GUI Elements	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Right-click Menu, page 7-111.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Bits or Bytes/Sec	Y-axis label that displays traffic rate in bits or bytes per second. The default is bits per second. The Y axis automatically scales to the interface speed. To change the charts to show bytes per second, uncheck the Show Details in Bits instead of Bytes check box in the Preferences window (General Display Settings, page 4-4).
Time	X-axis label that displays a real-time scale and the server time zone.
Legend	Identifies the data series currently showing in the chart. • **No Data**—Data is not available. A vertical bar appears in the chart. • **Congestion Active**—Shows when the shorthaul is in a congested state. A vertical bar appears in the chart. **Note** You can configure the congestion mechanism for low-latency GSM and UMTS traffic. Other traffic (for example, SNMP or file transfer) can be discarded without entering the congestion mechanism. For detailed information about GSM and UMTS congestion management, see the *Cisco MWR 1941-DC-A Mobile Wireless Edge Router Software Configuration Guide*.

Change Poller

To change the poll interval, click the **Change Poller** button. The MWTM displays the Poller Settings dialog box. The Poller Settings window displays these labels and buttons for the chosen interface:

Label/Button	Description
Poll Interval (secs)	The poll interval, in seconds, for the chosen node. To set a new poll interval, click in the Poll Interval (secs) text box and enter a new value. The default value is 15 seconds. Valid values are between *5* and *60*.
Current Poll Interval	Value of the poll interval currently in use.
Number of Polls Received	Number of polls received by the chosen node.
Running Time	Time in hours, minutes, and seconds that the poller is running.
Change	Changes the poll interval from the current setting to the value you have entered in the Poll Interval (secs) text box.
Close	Closes the Poller Settings window.
Help	Displays online help for the current window.

Right-click Menu

A right-click context menu provides options to navigate to the backhauls that are associated with the chosen shorthaul interface. You can also modify how the chart appears. The right-click menu contains:

Menu options	Description
Go to > *backhaul*	Opens the Backhaul Performance tab for the backhaul interface associated with the chosen shorthaul interface.
Show/hide right-click menu	Provides options to show or hide one or more parts of a data series. See Right-click Menu, page 7-99, for descriptions of the options.

Viewing Backhaul Performance Data

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

The Backhaul Performance tab displays multiple charts in a split pane. The top pane displays send rate statistics, and the bottom pane displays receive rate statistics. You can maximize either pane to full screen size by using the split-pane control bar.

Each pane contains the following charts that share the same time domain:

- **Top chart**—Displays total GSM traffic, total UMTS traffic, and total traffic (a summation of total GSM and total UMTS) in bits or bytes per second (left Y axis). The right Y axis displays the backhaul utilization as a percentage of the user bandwidth. You can change the scale of the Y axis by changing the User Bandwidth (see Editing Properties for a RAN-O Backhaul, page 8-53). The Y axis automatically scales to the User Bandwidth.

  The top chart overlays the traffic display on top of threshold ranges (acceptable, warning, and overloaded) that are represented by color-coded, horizontal bands.

- **Middle chart**—Displays the traffic rates in bits or bytes per second for each shorthaul interface that is associated with the backhaul interface.
- **Bottom chart**—Displays total send-and-receive errors per second over time for all of the shorthaul interfaces included in the backhaul interface.

Content Pane

The content (right) pane contains:

GUI Elements	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Right-click Menu, page 7-111.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Last Poll (*available only in Java client*)	Label that identifies when the last poll occurred.
BH Bits or Bytes/Sec	Left Y-axis label that displays shorthaul (SH) or backhaul (BH) traffic rate in bits or bytes per second. The default is bits per second. This label appears for only the top and middle charts of both panes. The Y axis automatically scales to the User Bandwidth. To change the charts to show bytes per second, uncheck the Show Details in Bits instead of Bytes check box in the Preferences window (General Display Settings, page 4-4).
% Utilization	Y-axis label on the right side of the chart. The right-side axis displays the backhaul utilization as a percentage of the User Bandwidth. The chart background is color-coded to indicate these thresholds: • **Overloaded**—Top portion of chart background • **Warning**—Middle portion of chart background • **Acceptable**—Bottom portion of chart background For definitions of these thresholds, see Threshold Information (RAN-O Only), page 7-35. To change threshold settings, including the User Bandwidth, see Editing Properties for a RAN-O Backhaul, page 8-53. **Note** If the % Utilization exceeds 100%, see Why does my backhaul graph show greater than 100% for transmit traffic?, page C-24.

GUI Elements	Description
Errors/Sec	Y-axis label that displays the total number of errors per second for send and receive traffic. This label appears only for the bottom chart of both panes. **Note** The same Errors/Sec chart appears in each pane.
Time	X-axis label that displays real-time scales for all the charts in the pane. The chart also shows the server time zone.
 *Split-pane Control*	Pane sizing feature that separates the top and bottom panes. To fully expand the: • Bottom pane, click the noninverted triangle on the control bar. • Top pane, click the inverted triangle on the control bar. To partially expand a pane, left-click the control bar and drag it up or down.
Legend	Color-coded legend to the right of the charts that describes the information that appears in all charts of the pane.

Right-click Menu

A right-click context menu provides options to navigate to the shorthauls that are associated with the chosen backhaul interface. You can also modify how the chart appears.

The right-click menu contains:

Menu options	Description
Go to > *shorthaul*	Opens the Shorthaul Performance tab for the shorthaul interface associated with the chosen backhaul interface.
Display Series	Opens the Display Series dialog box, which allows you to select data series to show or hide. See Display Series Dialog Box, page 7-113.
Reset Zoom, Grid, Shapes	See Right-click Menu, page 7-99, for descriptions of these options.

Display Series Dialog Box

The Display Series dialog box allows you to select data series to show or hide. This dialog box is available when you select the report output as *Graph*. Most network-level reports contain more than 12 series.

The Display Series dialog box contains:

Column or Buttons	Description
Selected Series	Displays the FQDN IDs for the data that is used to create the report.
Available Series	Displays the list of available objects for this report. **Note** If there are many objects in the report, the objects in the Available Series column span multiple pages and not all objects are shown on one page. See Using the Toolbar, page 11-6 for more information on using the paging features. To view all selected objects, sort the table by the Display column.

Column or Buttons	Description
Display **Note** Depending on the report type you select, other columns displayed will differ.	Column of check boxes that allow you to display (by checking) or hide (by unchecking) the data series associated with the chosen backhaul. The MWTM displays no more than 12 series by default. You can change this setting for the MWTM Client Display or the MWTM Web Display: **MWTM Client Display** To change the maximum number of data series that the MWTM client interface displays by default, edit the MAX_CHART_SERIES parameter in the client-side *System.properties* file: • For the Windows client: *C:\Program Files\Cisco Systems\MWTM Client \properties\System.properties* • For Solaris or Linux client: */opt/CSCOsgmClient/System.properties* **Caution** Depending on the processing power and memory of your client system, setting the MAX_CHART_SERIES parameter too high can cause the client display to become unresponsive. If the client becomes unresponsive, set the MAX_CHART_SERIES to a lower value. Remember to restart the client to activate the new MAX_CHART_SERIES value. **MWTM Web Display** To change the maximum number of data series that the MWTM web interface displays by default, edit the MAX_CHART_SERIES parameter in the server-side *System.properties* file: */opt/CSCOsgm/properties/System.properties.* **Caution** Depending on the number of shorthauls that you display, setting the MAX_CHART_SERIES parameter too high can cause the web display to become unresponsive. If the web become unresponsive, set the MAX_CHART_SERIES to a lower value. Remember to restart the client to activate the new MAX_CHART_SERIES value.
Clear Selection	Deselects the selected list of series and then the **OK** button is grayed out. This is a simple way to deselect all the display check boxes.
OK	Applies the selections you made. If you deselect all items in the dialog box, the **OK** and **Clear Selection** buttons are grayed out.
Cancel	Cancels your selections and closes the Display Series dialog box.
Help	Opens the help system for the Display Series dialog box.

Viewing RAN-O Error Data

The MWTM client interface provides access to RAN-O real-time error statistics that you can use to troubleshoot problems that occur in real time. The zoom and navigation features quickly enable isolating and focusing on a problem area.

You use real-time charts in the MWTM client to troubleshoot errors that occur on shorthaul and backhaul interfaces. To view error data for a shorthaul or backhaul interface, select it in the navigation tree of the DEFAULT view (or any custom view), and click the Shorthaul or Backhaul Errors tab in the right pane.

The Shorthaul or Backhaul Errors tab shows errors for the chosen interface.

Note If the CISCO-IP-RAN-BACKHAUL-MIB on the node is not compliant with the MWTM, the MWTM issues the message:

```
MIB not compliant for reports
```

Install a version of IOS software on the node that is compatible with the MWTM. For a list of compatible IOS software, from the MWTM:

- Web interface, choose **Administrative > IPRAN OS README**.
- Client interface, choose **View > MWTM Web Links > Administrative**; then click **IPRAN OS README**.

Viewing Shorthaul Errors

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

When you select a GSM Abis shorthaul interface in the navigation tree in the DEFAULT view (or any custom view), the MWTM displays protocol, missed packet, and miscellaneous errors in the right pane. When you select a UMTS Iub shorthaul interface, the MWTM displays optimization and miscellaneous errors.

This window also includes a graph that displays the total number of errors per second. The graph has a right-click menu with options similar to those of the right-click menu of the Performance window.

You can use the split pane control bar to resize or maximize the error tables or the error graph.

Content Pane

The content (right) pane contains:

GUI Elements	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.

GUI Elements	Description
Change Poller (*available only in Java client*)	Button that opens the Poller Settings dialog box. See Right-click Menu, page 7-111.
Reset Counters	Opens the Reset Counters dialog box to configure the method of polling. See Changing Real-Time Poller and Counter Settings, page 4-20.
Poller Counter Mode (*available only in Java client*)	Label that displays the polling mode that you configure in the Reset Counters dialog box.
Poll Interval (*available only in Java client*)	Label that shows the current poll interval in seconds.
Last Poll (*available only in Java client*)	Label that identifies when the last poll occurred.
Optimization Failures	Pane that displays optimization failures for the chosen GSM Abis or UMTS Iub shorthaul interface. See Missed Packets, page 7-118.
Miscellaneous	Pane that displays miscellaneous errors on the chosen shorthaul interface. See Viewing PWE3 Statistics, page 7-119. **Note** This pane appears for both GSM Abis and UMTS Iub shorthaul interfaces but with some differences in the types of errors shown.
Missed Packets	Pane that displays missed packet errors on the chosen GSM Abis shorthaul interface. See Viewing PWE3 Statistics, page 7-119. **Note** This pane appears only for GSM Abis shorthaul interfaces.
 Split-pane Control Bar	Pane sizing feature that separates the top and bottom panes. To fully expand the: • Bottom pane, click the noninverted triangle on the control bar. • Top pane, click the inverted triangle on the control bar. To partially expand a pane, left-click the control bar and drag it up or down.
Total Errors / Second	Chart that displays the total number of errors per second on the shorthaul interface. See Total Errors per Second, page 7-119.

Protocol Failures

The Protocol Failures pane has a table that contains:

GUI Elements	Description
Columns	Table columns that list: • *Type of error*—Type of protocol failure on the GSM Abis or UMTS Iub • **Counts**—Number of errors of a particular type • **Rates (per sec)**—Error rate for a particular type of error
Total	Total number of protocol failures encountered during the compression and decompression of the GSM-Abis or UMTS-Iub traffic.

GUI Elements	Description
Packet Unavailable	Number of times compression failed because a packet was unavailable.
Reconstruction Failures	Number of times information in a packet could not be decompressed.
Encapsulation Errors	Number of times compression failed because of encapsulation errors.
QoS Drops	Number of times compression failed because of quality of service errors or traffic load.
Peer Route Unavailable	Number of times compression failed because a route to the peer was not available.
Interface Down	Number of times compression failed because an interface was down.
Congestion Drops (GSM Abis only)	Number of dropped GSM packets or UMTS cells because of traffic congestion. **Note** You can configure the congestion mechanism for low-latency GSM and UMTS traffic. Other traffic (for example, SNMP or file transfer) can be discarded without entering the congestion mechanism. For detailed information about GSM and UMTS congestion management, see the *Cisco MWR 1941-DC-A Mobile Wireless Edge Router Software Configuration Guide*.

Miscellaneous

The Miscellaneous pane has a table that contains:

Note The error types in the table apply to UMTS Iub and GSM Abis shorthaul interfaces unless otherwise noted.

GUI Elements	Description
Columns	Table columns that list: • *Type of error*—Type of miscellaneous error on the GSM Abis or UMTS Iub shorthaul. • **Counts**—Number of errors of a particular type. • **Rates (per sec)**—Error rate for a particular type of error.
Total	Total number of miscellaneous failures encountered during the compression and decompression of the GSM-Abis or UMTS-Iub traffic.
Peer Not Ready	The count of packets dropped on the backhaul because the peer was not ready.
Peer Not Active (GSM Abis only)	The count of packets dropped on the backhaul because the peer was reachable but not in an active state.
Invalid Packets	Number of backhaul packets that were received and dropped because they contained invalid information.
Packet Allocation (UMTS Iub only)	Number of times a packet could not be allocated to send data on the UMTS Iub shorthaul interface.
Protocol Encapsulation Errors (UMTS Iub only)	Number of times compression failed because of encapsulation errors.
Local PVC Unavailable (UMTS Iub only)	Number of packets dropped because a local PVC was unavailable.
Remote PVC Unavailable (UMTS Iub only)	Number of packets dropped because a remote PVC was unavailable.

GUI Elements	Description
Backhaul Drops (UMTS Iub only)	Number of packets dropped on the backhaul.
Lost Received Packets (GSM Abis only)	Number of backhaul packets expected to be received but that never arrived.
Lost Sent Packets (GSM Abis only)	Number of backhaul packets sent but the peer never received.
Fast Send Failures (GSM Abis only)	Number of fast send failures on the shorthaul interface.
Transmit Failures (GSM Abis only)	Number of packet transmit failures on the shorthaul interface.
Interrupt Failures (GSM Abis only)	Number of packets lost due to interrupt failures.
Late Arrivals (GSM Abis only)	Number of GSM packets that arrived later than the allowed time.
Early Arrivals (GSM Abis only)	Number of GSM packets that arrived earlier than the allowed time.

Missed Packets

The Missed Packets pane appears only for GSM Abis shorthaul interfaces and has a table that contains:

GUI Elements	Description
Columns	Table columns that list: • *Type of error*—Type of missed packet error on the GSM Abis shorthaul interface. • **Counts**—Number of errors of a particular type. • **Rates (per sec)**—Error rate for a particular type of error.
Total	Total number of missed packet errors encountered during the compression and decompression of the GSM-Abis shorthaul interface.
Late Packets	Number of packets missed on the backhaul because they arrived past the allowed time frame
Lost Packets	Number of packets missed because they were lost on the backhaul
Overruns (GSM Abis only)	Number of packets missed due to the jitter buffer running out of available space.
Transmit Interface Resets (GSM Abis only)	Number of transmission interface resets.
Transmit Buffer Unavailable (GSM Abis only)	Number of times that the system is unable to allocate buffer for transmission.
Reset Event	Number of packets missed on the backhaul because of a reset event
Insufficient Memory	Number of packets missed on the backhaul for lack of available memory to allocate the packet

Total Errors per Second

The Total Errors per Second pane displays a chart that contains:

GUI Elements	Description
Total Errors/Second (shorthaul)	Chart title that lists the chosen shorthaul.
Errors/Sec	Y-axis label that displays errors per second for the chosen shorthaul.
Time	X-axis label that displays a real-time scale for the chosen shorthaul. The chart also displays the server time zone.

Viewing Backhaul Errors

Note In the MWTM client, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

When you select a backhaul interface in the navigation tree, the MWTM displays a chart in the right pane. The charts shows GSM and UMTS errors per second for each shorthaul interface included in the backhaul.

The content (right) pane contains:

GUI Elements	Description
Change Poller	Button that opens the Poller Settings dialog box. See Right-click Menu, page 7-111.
Poll Interval	Label that shows the current poll interval in seconds.
Last Poll	Label that displays the date and time of the last poll.
GSM and UMTS Errors/Second	Chart title for GSM and UMTS errors.
Errors/Sec	Y-axis label that displays errors per second.
Time	X-axis label that displays a real-time scale and the server time zone.
Legend	Color-coded legend for the shorthaul interfaces included in the chosen backhaul.

A right-click menu provides navigational and chart control options. See Display Series Dialog Box, page 7-113.

Viewing PWE3 Statistics

You can view real-time Pseudowire Emulation Edge-to-Edge (PWE3) statistics for cell-site routers that have the PWE3 capability. To view real-time PWE3 statistics for one of these nodes, select the node in the navigation tree, then click the PWE3 Stats tab. You can view real-time PWE3 statistics in the MWTM client and web interfaces (there are minor differences in layout and appearance). This tab is available only in web client.

Note In the MWTM web interface, the real-time icon appears in the tab. This icon indicates that polling will periodically occur while this window is open. To prevent unnecessary traffic on your network, close this window (for example, by clicking a different tab) when you no longer need to view the real-time data.

The PWE3 Stats tab contains:

GUI Element	Description
Refresh	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Reset Counters	Button that opens the Reset Counters dialog box to configure the method of polling. See Changing Real-Time Poller and Counter Settings, page 4-20.
Fast Poller Interval	Label that shows the current poll interval in seconds.
ID	Table column label that lists the ID of the virtual circuit.
Type	Type of service that carries the virtual circuit.
PSN Type	Type of packet-switched network (PSN) that carries the virtual circuit. For example, MPLS.
Name	Name of the virtual circuit.
Description	Description of the virtual circuit.
Peer Address	IP address of the peer node.
Create Time[1]	Time when the virtual circuit was created.
Up Time[1]	Length of time the virtual circuit has been operational.
Admin Status[1]	The administrative status of the virtual circuit.
Oper Status[1]	The operational status of the virtual circuit.
Oper Status Inbound[1]	The operational status of the virtual circuit in the inbound direction.
Oper Status Outbound[1]	The operational status of the virtual circuit in the outbound direction.
Time Elapsed[1]	Time in seconds since the beginning of the measurement period.
Valid Intervals[1]	Number of valid intervals for which data was collected.
Received Packets Rate	Number of packets that the virtual circuit received each second from the packet-switched network.
Received Packets Count[1]	Total number of packets that the virtual circuit received from the packet-switched network.
Received Bits Rate	Number of bytes that the virtual circuit received each second from the packet-switched network.
Received Bits Count[1]	Total number of bytes that the virtual circuit received from the packet-switched network.
Sent Packets Rate	Number of packets that the virtual circuit forwarded each second to the packet-switched network.
Sent Packets Count[1]	Total number of packets that the virtual circuit forwarded to the packet-switched network.
Sent Bits Rate	Number of bytes that the virtual circuit forwarded each second to the packet-switched network.
Sent Bits Count[1]	Total number of bytes that the virtual circuit forwarded to the packet-switched network.

1. This column is hidden from view by default. To unhide the column, right-click in the column heading area and select the column label.

Viewing ITP Linkset Access Lists

The Linkset Access Lists section displays information about the access lists associated with the chosen linkset and its adjacent linkset.

To view the Linkset Access List section, in the navigation tree, select an ITP linkset, then click on the Linkset Access Lists tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need it.

This window is not available if the linkset is a Virtual linkset.

For each linkset, the Linkset Access Lists section displays these columns:

Column	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Poll Interval (*available only in Java client*)	Used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Linkset	Name of the linkset for which access lists appear.
In	Inbound access lists for the linkset. If the linkset has no inbound access lists, this field displays `None`.
Out	Outbound access lists for the linkset. If the linkset has no outbound access lists, this field displays `None`.
List #	Access list number configured on the node and applied to the linkset. ITP uses access list numbers 2700 through 2799.
Access List	List of commands in the access list.

Viewing ITP Linkset Statistics

The Linkset Statistics section displays information about the access lists associated with the chosen linkset and its adjacent linkset.

To view the Linkset Statistics section, in the navigation tree, select an ITP linkset, then click on the Statistics tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need it.

This window is not available if the linkset is a Virtual linkset.

The Linkset Statistics table displays these fields for the chosen signaling point:

GUI Element	Description
Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Reset Counters	Opens the MWTM Reset Counters dialog box, which you use to change MWTM poller and counter settings. For more information, see Changing Real-Time Poller and Counter Settings, page 4-20.
Poll Counter Mode (*available only in Java client*)	Displays the current mode for poll counters, and the date and time that counters were last reset. Possible modes are: • **Since Reboot**—Counters display values aggregated since the last reboot of the ITP, or since ITP last reset the counters. • **Since Last Poll**—Counters display values aggregated since the last poll. • **Since User Reset**—Counters display values aggregated since the last time they were reset by the user.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Packet Information	Packets sent and received and drops.
Bit Information	Bits sent and received.
Utilization Information	Send and receive plan capacity and utilization.
Service Information	MTP3 and GTT accounting settings and in service and out of service information.

Viewing Data Specific for ITP Signaling Points

These sections are specific only to ITP signaling points:

Viewing Route Detail

The Route Detail table displays detailed information about routes associated with the chosen signaling point, including dynamic and shadow routes. The Route Detail table automatically eliminates duplicate data in successive rows.

To view the Route Detail section, in the navigation tree, select an ITP signaling point, then click on the Route Detail tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

The Route Detail table displays these fields for the chosen signaling point:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description Polling node. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Destination Point Code	Destination point code for packets on the chosen signaling point. The destination point code is the point code to which a given packet is routed.

GUI Element	Description
Mask	Mask length for packets on the chosen signaling point. The mask length is the number of significant leading bits in the point code. The mask length is always 14 for ITU and 24 for ANSI.
Access	Status of the destination. Possible values are: • Accessible • Inaccessible • Restricted • Unknown
Congestion Level	Indicates the level of congestion on the route. A route is congested if it has too many packets waiting to be sent. This condition could be caused by the failure of an element in your network. Possible values for the Congestion Level field are *None*, indicating no congestion, and **1** to **7**, indicating levels of congestion from very light (**1**) to very heavy (**7**).
Number of Routes	Number of routes to the chosen destination route set (Destination Point Code plus Mask).
Cost	Cost of the route to the destination, relative to other routes. The valid costs range from **1** (lowest cost and highest priority) through **9** (highest cost and lowest priority).
Destination Linkset	Destination linkset associated with the destination point code. The destination linkset is also called the output linkset.
QoS	Quality of service (QoS) class of the route, as configured by the network administrator. Valid QoS classes range from **1** through **7**; `ALL` indicates that the route accepts all QoS classes.
Management Status	Accessibility of the destination from the adjacent point code at the remote end of the signaling point. Possible values are: • **Allowed**—Traffic is allowed on the route without restriction. • **Prohibited**—Traffic is prohibited on the route. • **Restricted**—Traffic is restricted on the route. • **Unknown**—Accessibility cannot be determined.
Route Status	Status of the route. Possible values are: • Available • Restricted • Unavailable

Viewing GTT MAP Status

The GTT MAP Status table displays detailed information about all GTT MAPs associated with the chosen signaling point. The GTT MAP Detail table automatically eliminates duplicate data in successive rows.

To view the GTT MAP Status section, in the navigation tree, select an ITP signaling point, then click on the GTT MAP Status tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

The GTT MAP Status table displays these columns for the chosen signaling point:

Column	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Reset Counters	Opens the MWTM Reset Counters dialog box, which you use to change MWTM poller and counter settings. For more information, see Changing Real-Time Poller and Counter Settings, page 4-20.
Poll Counter Mode (*available only in Java client*)	Displays the current mode for poll counters, and the date and time that counters were last reset. Possible modes are: • **Since Reboot**—Counters display values aggregated since the last reboot of the ITP, or since ITP last reset the counters. • **Since Last Poll**—Counters display values aggregated since the last poll. • **Since User Reset**—Counters display values aggregated since the last time they were reset by the user.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Point Code	Primary point code for the GTT MAP.
Point Code Status	Status of the primary point code. Possible values are: • **Allowed** • **Prohibited**—Either the point code cannot be reached, or the point code is labeled Prohibited by the SCCP protocol.
Congestion Level	MTP3 congestion level for the primary point code. Possible values are: • **No congestion**—Corresponds to None. The link is not congested. • **Congestion level 1**—Corresponds to Low. The link is slightly congested. • **Congestion level 2**—Corresponds to High. The link is congested. • **Congestion level 3**—Corresponds to Very High. The link is very congested. Low, High, and Very High correspond roughly to equivalent ANSI, China standard, ITU, NTT, and TTC congestion levels.
Point Code Congested	Number of times a point code was congested at the GTT MAP.

Column	Description
Point Code Unavailable	Number of times a point code was unavailable at the GTT MAP.
SCCP Unavailable	Number of times an SCCP was unavailable at the GTT MAP.
MTP3 Failures	Number of times the MTP3 layer failed at the GTT MAP.
Number of Subsystems	Number of subsystems for the GTT MAP.
Subsystem Number	Primary subsystem number (SSN) for the GTT MAP.
Subsystem Status	Status of the primary SSN. Possible values are: • Allowed • Prohibited—Either the remote subsystem cannot be reached, or the SCCP protocol labels the subsystem Prohibited.
Subsystem Unavailable	Number of times a subsystem was unavailable at the GTT MAP.
Subsystem Congested	Number of times a subsystem was congested at the GTT MAP.

Viewing GTT Statistics

The GTT Statistics table displays detailed statistical information about all GTTs that are associated with the chosen signaling point. The GTT Statistics table automatically eliminates duplicate data in successive rows.

To view the GTT Statistics section, in the navigation tree, select an ITP signaling point, then click on the GTT Statistics tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

The GTT Statistics table displays these columns for the chosen signaling point:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.

GUI Element	Description
Reset Counters	Opens the MWTM Reset Counters dialog box, which you use to change MWTM poller and counter settings. For more information, see Changing Real-Time Poller and Counter Settings, page 4-20.
Poll Counter Mode (*available only in Java client*)	Displays the current mode for poll counters, and the date and time that counters were last reset. Possible modes are: • **Since Reboot**—Counters display values aggregated since the last reboot of the ITP, or since ITP last reset the counters. • **Since Last Poll**—Counters display values aggregated since the last poll. • **Since User Reset**—Counters display values aggregated since the last time they were reset by the user.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
General Information: Uptime	Time the node is up, in days, hours, minutes, and seconds.
General Information: Selector Entries	Number of entries in the GTT Selector Table.
General Information: GTA Entries	Number of entries in the GTT GTA Table.
General Information: Application Group Entries	Number of entries in the GTT App Group Table.
General Information: Addr. Conversion Entries	Number of entries in the GTT Address Conversion Table.
General Information: Point Code List Entries	Number of entries in the GTT CPC List.
GTT Errors: Errors To MTP	Number of Error messages (ERRs) sent by GTT to the MTP.
GTT Errors: Errors From MTP	Number of Error messages (ERRs) received by GTT from the MTP.
GTT Errors: Translation Error	Number of times translation was requested for a combination of Translation Type, Numbering Plan, and Nature of Address for which no translation exists in the signaling point. Occurs when no selector is available for the combination of parameters provided in the MSU.
GTT Errors: Unequipped Subsystem Error	Number of times GTT could not perform a translation due to an unequipped subsystem.
GTT Errors: Q752 Unqualified Error	Number of times GTT could not perform a translation due to an error type not covered by the other, more specific error types.
GTT Errors: Invalid GTT Format	Number of times GTT detected an invalid global title format while performing translation.
GTT Errors: Hop Count Error	Number of times GTT detected a hop count violation in the MSU.
GTT Errors: MAP Not Found	Number of times a GTT to a point code or subsystem number was successful, but the point code or subsystem number was not found in the GTT MAP table.
GTT Errors: Counts	Number of GTT errors of the specified type since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data.

GUI Element	Description
GTT Errors: Rate (per sec)	Number of errors that GTT detected per second.
GTT Messages: Total Messages	Number of messages that GTT handled from local and remote subsystems.
GTT Messages: Local Messages	Number of messages that GTT handled from local subsystems only.
GTT Messages: Total GTT Messages	Number of messages that GTT handled that require translation.
GTT Messages: UDT Messages Sent	Number of unitdata messages (UDTs) that GTT sent.
GTT Messages: UDT Messages Received	Number of unitdata messages (UDTs) that GTT received.
GTT Messages: UDTS Messages Attempted	Number of unitdata service messages (UDTSs) GTT attempted to send.
GTT Messages: UDTS Messages Sent	Number of unitdata service messages (UDTSs) that GTT sent.
GTT Messages: UDTS Messages Received	Number of unitdata service messages (UDTSs) that GTT received.
GTT Messages: XUDT Messages Sent	Number of extended unitdata messages (XUDTs) GTT sent.
GTT Messages: XUDT Messages Received	Number of extended unitdata messages (XUDTs) that GTT received.
GTT Messages: XUDTS Messages Attempted	Number of extended unitdata service messages (XUDTSs) GTT attempted to send.
GTT Messages: XUDTS Messages Sent	Number of extended unitdata service messages (XUDTSs) that GTT sent.
GTT Messages: XUDTS Messages Received	Number of extended unitdata service messages (XUDTSs) that GTT received.
GTT Messages: LUDT Messages Sent	Number of long unitdata messages (LUDTs) that GTT sent.
GTT Messages: LUDT Messages Received	Number of long unitdata messages (LUDTs) that GTT received.
GTT Messages: LUDTS Messages Sent	Number of long unitdata service messages (LUDTSs) that GTT sent.
GTT Messages: LUDTS Messages Received	Number of long unitdata service messages (LUDTSs) that GTT received.
GTT Messages: CR Sent To MTP	Number of Connection Request (CR) message that GTT sent to the MTP. This count includes ISDN-UP messages with embedded CRs.
GTT Messages: CR Received From MTP	Number of Connection Request (CR) message that GTT received from the MTP.
GTT Messages: CREF Sent To MTP	Number of Connection Refusal (CREF) messages that GTT sent to the MTP. This count includes ISDN-UP messages with embedded CRs.
GTT Messages: CREF Received From MTP	Number of Connection Refusal (CREF) messages that GTT received from the MTP.
GTT Messages: RSR Sent To MTP	Number of Reset Request (RSR) messages that GTT sent to the MTP.

GUI Element	Description
GTT Messages: RSR Received From MTP	Number of Reset Request (RSR) messages that GTT received from the MTP.
GTT Messages: Counts	Number of GTT messages of the specified category since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data.
GTT Messages: Rate (per sec)	Number of errors messages handled by GTT, per second.

Viewing the MTP3 Event Log

The MTP3 Event Log table displays the most recent MTP3 events associated with the chosen signaling point.

To view the MTP3 Event Log section, in a view in the navigation tree, select an ITP signaling point, then click on the MTP3 Event Log tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

The MTP3 Event Log table displays these fields for the chosen signaling point:

GUI Element	Description
Poll Interval	Poll interval used to collect data for the table.
Last Poll	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Logged Events	Total number of MTP3 events that have been logged for this signaling point.
Dropped Events	Total number of MTP3 events that have been dropped for this signaling point.
Max Events	Maximum number of events that the event history can contain. When event history table is full, the oldest entries are deleted as new entries are added.
Allowed Events	ITP parameter that specifies the absolute maximum for the Max Events field. That is, for this node, the Max Events field can range from 0 to the value specified by the Allowed Events field.
Index	Event number that the ITP assigns.
Message	Message text for the event.

Viewing MLR Details

The MLR Details tab displays the MLR counters, trigger configuration, and trigger results associated with the chosen signaling point.

To view the MLR Details section, in the navigation tree, select an ITP signaling point, then click on the MLR Details tab in the content area.

Note This window polls your network periodically. To prevent unnecessary traffic on your network, close this window when you no longer need to refer to it.

The MLR Details tab displays these fields for the chosen signaling point:

GUI Element	Description
 Refresh (*available only in web client*)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause (*available only in web client*)	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Slow Poller Interval (*available only in web client*)	Poll interval used to collect data for the table.
Reset Counters	Opens the MWTM Reset Counters dialog box, which you use to change MWTM poller and counter settings. For more information, see Changing Real-Time Poller and Counter Settings, page 4-20.
Poll Counter Mode (*available only in Java client*)	Displays the current mode for poll counters, and the date and time that counters were last reset. Possible modes are: • **Since Reboot**—Counters display values aggregated since the last reboot of the ITP, or since ITP last reset the counters. • **Since Last Poll**—Counters display values aggregated since the last poll. • **Since User Reset**—Counters display values aggregated since the last time the user reset them.
Poll Interval (*available only in Java client*)	Poll interval used to collect data for the table.
Last Poll (*available only in Java client*)	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
MLR Counters	Displays the MLR Counters table. For more information, see Viewing MLR Counters, page 7-130.
MLR Trigger Config	Displays the MLR Trigger Configuration table. For more information, see Viewing MLR Trigger Config, page 7-132.
MLR Trigger Results	Displays the MLR Trigger Results table. For more information, see Viewing MLR Trigger Results, page 7-136.

Viewing MLR Counters

The MLR Counters table displays MLR counters associated with the chosen signaling point.

You can resize each column, or sort tables based on the information in one of the columns. By default, the MWTM displays all of the columns in the MLR Counters table.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The MLR Counters table displays these columns for the chosen signaling point:

Column	Description
Processed: Routed	Total number of packets routed by MLR, and the packet routing rate in packets per second.
Processed: MAP SMS-MO	Number of MSUs of type GSM-MAP SMS-MO processed by MLR, and the GSM-MAP SMS-MO MSU processing rate in packets per second.
Processed: MAP SMS-MT	Number of MSUs of type GSM-MAP SMS-MT processed by MLR, and the GSM-MAP SMS-MT MSU processing rate in packets per second.
Processed: MAP SRI-SM	Number of MSUs of type GSM-MAP SRI-SM processed by MLR, and the GSM-MAP SRI-SM MSU processing rate in packets per second.
Processed: MAP AlertSc	Number of MSUs of type GSM-MAP AlertSc processed by MLR, and the GSM-MAP AlertSc MSU processing rate in packets per second.
Processed: ANSI-41 SMD-PP	Number of MSUs of type ANSI-41 SMD-PP processed by MLR, and the ANSI-41 SMD-PP MSU processing rate in packets per second.
Processed: ANSI-41 SMS Requests	Number of MSUs of type ANSI-41 SMSRequest processed by MLR, and the ANSI-41 SMSRequest MSU processing rate in packets per second.
Processed: ANSI-41 SMS Notifys	Number of MSUs of type ANSI-41 SMSNotify processed by MLR, and the ANSI-41 SMSNotify MSU processing rate in packets per second.
Aborts: Total Aborted	Total number of MSUs aborted by MLR, and the MSU abort rate in packets per second.
Aborts: No Resources	Number of MSUs aborted by MLR because of a shortage of resources, and the No Resources MSU abort rate in packets per second.
Aborts: Results Blocked	Number of MSUs aborted by MLR with a result of block, and the Results Blocked MSU abort rate in packets per second.
Aborts: GTI Mismatches	Number of MSUs aborted by MLR because of mismatched GTIs, and the GTI Mismatches MSU abort rate in packets per second.
Aborts: Address Conversion Failures	Number of MSUs aborted by MLR because of a failed GTA address conversion, and the Address Conversion Failures MSU abort rate in packets per second.
Aborts: Destination Unavailables	Number of MSUs aborted by MLR because the destination was unavailable, and the Destination Unavailables MSU abort rate in packets per second.
Aborts: No Server Aborteds	Number of MSUs aborted by MLR because no server was available, and the No Server Aborteds MSU abort rate in packets per second.
Continues: Total Continued	Total number of MSUs returned to SCCP by MLR with a result of `continue`, and the MSU return rate in packets per second.
Continues: Failed Triggers	Number of MSUs returned to SCCP by MLR because of no trigger match, and the Failed Triggers MSU return rate in packets per second.
Continues: Result Continueds	Number of MSUs returned to SCCP by MLR with a result of `continue`, and the Result Continueds MSU return rate in packets per second.
Continues: Result GTTs	Number of MSUs returned to SCCP by MLR with a result of GTT, and the Result GTTs MSU return rate in packets per second.
Continues: Unsupported SCCP Msg Types	Number of MSUs returned to SCCP by MLR because of unsupported message types, and the Unsupported SCCP Msg Types MSU return rate in packets per second.
Continues: Unsupported Segmented SCCP Msgs	Number of MSUs returned to SCCP by MLR because of unsupported segments, and the Unsupported Segmented SCCP Msg MSU return rate in packets per second.

Column	Description
Continues: Unsupported Messages	Number of MSUs returned to SCCP by MLR because of parse failures, and the Unsupported Messages MSU return rate in packets per second.
Continues: Parse Errors	Number of MSUs returned to SCCP by MLR because of parse errors, and the Parse Errors MSU return rate in packets per second.
Continues: No Results	Number of MSUs returned to SCCP by MLR with no results, and the No Results MSU return rate in packets per second.
Continues: No Server Continueds	Number of MSUs returned to SCCP by MLR because no server was available, and the No Server Continueds MSU return rate in packets per second.

Viewing MLR Trigger Config

The MLR Trigger Config table displays the MLR trigger configuration associated with the chosen signaling point, divided into these subtables:

- Triggers, page 7-132
- SubTriggers, page 7-133
- Ruleset, page 7-133
- Rules, page 7-134
- Addresses, page 7-134
- Results, page 7-135

Triggers

The Triggers subtable displays MLR trigger information associated with the chosen signaling point.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Triggers subtable except Set Name, Start Date, End Date, and Status.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Triggers subtable displays these columns for the chosen signaling point:

Column	Description
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the trigger.
Index	Index number associated with the trigger.
SubTriggers	Number of subtriggers associated with the chosen trigger.
Start Date	Date and time on which this trigger should begin filtering traffic. If no Start Date is configured, this field displays N/A.
End Date	Date and time on which this trigger should stop filtering traffic. If no End Date is configured, this field displays N/A.

Column	Description
Status	Current status of the trigger. Possible values are: • **Active**—A corresponding GTT table entry for the trigger or, if this is an MTP3 trigger, an available route to the appropriate point code exists. • **Inactive**—No corresponding GTT table entry or available route to the appropriate point code for the trigger. The trigger will never match and a configuration error is likely.
Action	Action taken by the trigger.
Prematches	Preliminary count of trigger matches.
Prematch Rate	Number of Prematches per second for the trigger.
Matches	Number of trigger matches with result `Action Performed`.
Match Rate	Number of Matches per second for the trigger.
Parameters	Parameters that control the behavior of the trigger.

SubTriggers

The SubTriggers subtable displays MLR subtrigger information associated with the chosen signaling point and trigger.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the SubTriggers subtable.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The SubTriggers subtable displays these columns for the chosen signaling point:

Column	Description
Trigger (in subtable heading)	Set name of the parent trigger with which the chosen subtrigger is associated.
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the subtrigger.
Index	Index number associated with the subtrigger.
Action	Action taken by the subtrigger.
Matches	Number of subtrigger matches with result `Action Performed`.
Match Rate	Number of Matches per second for the subtrigger.
Parameters	Parameters that control the behavior of the subtrigger.

Ruleset

The Ruleset subtable displays MLR ruleset information associated with the chosen signaling point and trigger or subtrigger.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Ruleset subtable except Start Date and End Date.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Ruleset subtable displays these columns for the chosen signaling point:

Column	Description
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the ruleset.
Start Date	Starting date and time for this ruleset to become active.
End Date	Ending date and time for this ruleset to become active.
Segmented	Indicates whether this ruleset should process segmented messages.
Protocol	Default protocol for rules in this ruleset.
Search Type	Search type that this ruleset should perform.

Rules

The Rules subtable displays MLR rules information associated with the chosen signaling point and ruleset.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Rules subtable except Set Name.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Rules subtable displays these columns for the chosen signaling point:

Column	Description
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the rule.
Index	Index number associated with the rule.
Operation Type	Types of messages on which this rule matches.
Protocol	Protocol used for matching by this rule.
Matches	Number of rule matches with result `Action Performed`.
Match Rate	Number of Matches per second for the rule.
Rule Parameters	Parameters that control the behavior of the rule.
Result Parameters	Parameters that control the behavior of the result associated with this rule.

Addresses

The Addresses subtable displays MLR address information associated with the chosen signaling point and rule.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Addresses subtable except Set Name.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Addresses subtable displays these columns for the chosen signaling point:

Column	Description
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the address.
Address Type	Type of address. The MWTM 6.1 supports these types of addresses: • **bch**—Binary-coded hexadecimal • **gsmDa**—Groupe Special Mobile (GSM) 7-bit default alphabet
Address Digits	Address digits to be matched.
Exact Match	Indicates whether an exact match to the Address Digits is required.
Matches	Number of address matches with result `Action Performed`.
Match Rate	Number of Matches per second for the address.
Result Parameters	Parameters that control the behavior of the result associated with this address.

Results

The Results subtable displays MLR results information associated with the chosen signaling point and rule or address.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Results subtable except Index.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Results subtable displays these columns for the chosen signaling point:

Column	Description
Ruleset (in subtable heading)	Ruleset associated with the results.
No Server Available Action (in subtable heading)	Default behavior if no result is available. Possible actions are: • **Discard**—Discard the packet without forwarding it. • **Resume**—Return the unmodified packet to the higher level protocols for default routing.
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the results.
Index	Index number associated with the results.
Type	Type of result. Possible values are: • **PC**—Point code • **ASName**—Application server name
Result	Destination point code or name of the result.
Weight	Weight for this result in its set of results.

Column	Description
Count	Number of times this result is encountered.
Count Rate	Number of times per second this result is encountered.

Viewing MLR Trigger Results

The MLR Trigger Results table displays the MLR results associated with the chosen signaling point. You can use this subtable to determine which triggers, subtriggers, rules, and addresses are causing a particular result to execute.

The MLR Trigger Results table contains:

- Results, page 7-136
- Addresses, page 7-136
- Rules, page 7-137
- Ruleset, page 7-138
- SubTriggers, page 7-138
- Triggers, page 7-139

Results

The Results subtable displays all MLR results information associated with the chosen signaling point.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Results subtable except Index.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Results subtable displays these columns for the chosen signaling point:

Column	Description
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the results.
Index	Index number associated with the results.
Type	Type of result. Possible values are: • **PC**—Point code • **ASName**—Application server name
Result	Destination point code or name of the result.
Weight	Weight for this result in its set of results.
Count	Number of times this result is encountered.
Count Rate	Number of times per second this result is encountered.

Addresses

The Addresses subtable displays MLR address information associated with the chosen result.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Addresses subtable except Set Name.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Addresses subtable displays these columns for the chosen signaling point:

Column	Description
ResultSet (in subtable heading)	Set of results associated with the addresses.
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the address.
Address Type	Type of address. The MWTM 6.1 supports these types of addresses: • **bch**—Binary-coded hexadecimal • **gsmDa**—Groupe Special Mobile (GSM) 7-bit default alphabet
Address Digits	Address digits to be matched.
Exact Match	Indicates whether an exact match to the Address Digits is required.
Matches	Number of address matches with result `Action Performed`.
Match Rate	Number of Matches per second for the address.
Result Parameters	Parameters that control the behavior of the result associated with this address.

Rules

The Rules subtable displays MLR rules information associated with the chosen result.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Rules subtable except Set Name.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Rules subtable displays these columns for the chosen signaling point:

Column	Description
ResultSet (in subtable heading)	Set of results associated with the rules.
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the rule.
Index	Index number associated with the rule.
Operation Type	Types of messages on which this rule matches.
Protocol	Protocol used for matching by this rule.
Matches	Number of rule matches with result `Action Performed`.
Match Rate	Number of Matches per second for the rule.

Column	Description
Rule Parameters	Parameters that control the behavior of the rule.
Result Parameters	Parameters that control the behavior of the result associated with this rule.

Ruleset

The Ruleset subtable displays MLR ruleset information associated with the chosen result.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Ruleset subtable except Start Date and End Date.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Ruleset subtable displays these columns for the chosen signaling point:

Column	Description
Rule Number (in subtable heading)	Index number of the rule with which this ruleset is associated.
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the ruleset.
Start Date	Starting date and time for this ruleset to become active.
End Date	Ending date and time for this ruleset to become active.
Segmented	Indicates whether this ruleset should process segmented messages.
Protocol	Default protocol for rules in this ruleset.
Search Type	Search type that this ruleset should perform.

SubTriggers

The SubTriggers subtable displays MLR subtrigger information associated with the chosen result.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the SubTriggers subtable.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The SubTriggers subtable displays these columns for the chosen signaling point:

Column	Description
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the subtrigger.
Index	Index number associated with the subtrigger.
Action	Action taken by the subtrigger.
Matches	Number of subtrigger matches with result `Action Performed`.
Match Rate	Number of Matches per second for the subtrigger.
Parameters	Parameters that control the behavior of the subtrigger.

Triggers

The Triggers subtable displays MLR trigger information associated with the chosen result.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM displays all of the columns in the Triggers subtable except Set Name, Start Date, End Date, and Status.

For detailed information on working in tables, see Navigating Table Columns, page 4-23.

The Triggers subtable displays these columns for the chosen signaling point:

Column	Description
Ruleset (in subtable heading)	Ruleset with which this trigger is associated.
Entries (in subtable heading)	Total number of entries in the subtable.
Set Name	Set name associated with the trigger.
Index	Index number associated with the trigger.
SubTriggers	Number of subtriggers associated with the chosen trigger.
Start Date	Date and time on which this trigger should begin filtering traffic. If no Start Date is configured, this field displays N/A.
End Date	Date and time on which this trigger should stop filtering traffic. If no End Date is configured, this field displays N/A.
Status	Current status of the trigger. Possible values are: • **Active**—Either there is a corresponding GTT table entry for the trigger or, if this is an MTP3 trigger, there is an available route to the appropriate point code. • **Inactive**—There is no corresponding GTT table entry or available route to the appropriate point code for the trigger. The trigger will never match and a configuration error is likely.
Action	Action that the trigger takes.
Prematches	Preliminary count of trigger matches.
Prematch Rate	Number of Prematches per second for the trigger.
Matches	Number of trigger matches with result `Action Performed`.
Match Rate	Number of Matches per second for the trigger.
Parameters	Parameters that control the behavior of the trigger.

Viewing HSRP details

The HSRP tab is displayed for the mSEF devices including 7600 chassis and the SAMI cards running HA, BWG, GGSN, CSG2, PDNGW, SGW, and PDSN. Select the mSEF object in the navigation tree in the left pane and click the HSRP tab in the right pane. This tab is available only in web client.

Note On selection of the group in the Configured Interfaces table, the corresponding details are updated in the Detailed Information, Tracked Interfaces, and Secondary IP Addresses for Group panes.

The HSRP tab contains the following fields:

GUI Element	Description
 Refresh	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Poll Interval	Poll interval used to collect data for the table.
Last Poll	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Configured Interfaces: Interface	Name of the interface.
Configured Interfaces: Group Number	Group number is unique within the scope of an interface and can be reused across interfaces. The combination of Interface and group number is what identifies a discreet set of HSRP information.
Configured Interfaces: State	The status if the interface. The possible values are: • Initial • Learn • Listen • Speak • Standby • Active
Configured Interfaces: Virtual IP Address	Primary virtual address for this group.
Configured Interfaces: Priority	Priority of the interface.
Detailed Information: Interface	Name of the interface.
Detailed Information: Group Number	Group number is unique within the scope of an interface and can be reused across interfaces. The combination of Interface and group number is what identifies a discreet set of HSRP information.

GUI Element	Description
Detailed Information: State	The status if the interface. The possible values are: • Initial • Learn • Listen • Speak • Standby • Active
Detailed Information: Active IP Address	IP address of the current active router for this group.
Detailed Information: Standby IP Address	IP address of the current standby router for this group
Detailed Information: Virtual IP Address	Primary virtual IP address for this group.
Detailed Information: Virtual MAC Address	Virtual MAC Address used.
Detailed Information: Use Configured Timers	HSRP routers learn a group's Hello time or Hold time from hello messages. The possible values are: Yes or No
Detailed Information: Configured Hello Time (secs)	Interval between successive HSRP Hello messages from a given router (when the value of Use Configured Timers is Yes).
Detailed Information: Configured Hold Time (secs)	Interval between the receipt of a Hello message and the presumption that the sending router has failed (when the value of Use Configured Timers is Yes).
Detailed Information: Learned Hello Time (secs)	Interval between successive HSRP Hello messages from a given router when the value of Use Configured Timers is No
Detailed Information: Learned hold Time (secs)	Interval between the receipt of a Hello message and the presumption that the sending router has failed (when the value of Use Configured Timers is No).
Detailed Information: Preempt	The valid values are True or False.
Detailed Information: Preempt Delay	Time difference between a router power up and the time it can actually start preempting the currently active router.
Tracked Interfaces: Interface Name	Name of the tracked interface.
Tracked Interfaces: Priority	Priority of the tracked interface for the corresponding pair.
Secondary IP Addresses for Group: Secondary IP Addresses	Secondary virtual IP addresses defined for the group.

Viewing RAN Shorthauls

To view RAN shorthauls that are associated with a RAN-O backhaul, select the backhaul object in the navigation tree in the left pane, and click the RAN Shorthauls tab in the right pane. The right pane displays a tabular list of RAN shorthauls that are associated with the chosen backhaul.

To view descriptions of the columns of the RAN shorthauls table, see RAN Shorthauls Table, page 8-40.

Viewing Chassis

The Chassis tab is displayed for all the 7600 devices including ITP, mSEF, IPRAN, and Generic node types. To view the Chassis section, in the navigation tree, select any of the 7600 device, then click on the Chassis tab in the right pane.

The Chassis tab is displayed only in the MWTM web interface.

The Chassis tab contains:

GUI Element	Description
 Refresh	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
Status Refresh Interval	Allows you change the default refresh interval of 180 seconds. Enter a value between 180 and 900 seconds. **Note** Changes you make are temporary to the current page. Navigating away from the page sets the status refresh interval back to the default setting. To change the default setting, see Changing Web Preference Settings, page 4-18.
Last Poll	Time the last poll was run. This field initially displays the description `Polling node`. After the first polling cycle, the MWTM populates this field with the actual time of the last poll.
Chassis Node Name Information: Display Name	Name of the node.
Chassis Node Name Information: IP Address or DNS Hostname	IP Address or DNS host name of the CiscoWorks server.
Chassis Node Name Information: Node Type	Type of node. See Nodes Table, page 8-8, for a list of the available node types.
Chassis Node Name Information: Feature	Feature associated with the node.

GUI Element	Description
Chassis Node Name Information: Serial Number	Serial number of the node.
Chassis Node Description Information: Software Version	Version of node's software.
Chassis Node Description Information: Software Description	Full software version information.
Chassis: Slot	Slot number of the card in the node.
Chassis: Serial Number	Serial number of the node.
Chassis: Node	Type of node. **Note** This column displays N/A, when the SAMI card is not configured in the chassis.
Chassis: Software Version	Version of node's software. **Note** This column displays N/A, when the SAMI card is not configured with the IOS version.
Chassis: Description	Description of the node.

Creating Virtual RAN Backhauls

You use the MWTM to create a virtual RAN backhaul by grouping real backhauls. A virtual backhaul is useful if you have configured several RAN backhauls for the same interface. To view the utilization for that interface, create a virtual RAN backhaul that contains all the real backhauls that you have configured for the interface.

Note When creating virtual RAN backhauls, observe the following restrictions:

- You cannot add a real backhaul to more than one virtual backhaul.
- To add a real backhaul to a virtual backhaul, you must first enable report polling on the node that is associated with the real backhaul. If you add a real backhaul to a virtual backhaul, and then disable report polling on the associated node, historical reporting for the virtual backhaul will not work! To restore historical reporting for the virtual backhaul, you must enable report polling on the associated node or remove the real backhaul from the virtual backhaul. To enable report polling on a node, you must access the node by using its command line interface.

To create a virtual RAN backhaul, right-click a RAN backhaul, then choose **Create Virtual RAN Backhaul**. The MWTM displays the Virtual RAN Backhaul Editor.

The Virtual RAN Backhaul Editor contains:

Field or Button	Description
Name	Name of the virtual RAN backhaul.
Available Backhauls	Pane that contains the Available Backhauls table, which contains these columns: • **Name**—Name of the RAN backhaul • **Node**—Node to which the RAN backhaul belongs
Included Backhauls	Pane that contains the Included Backhauls table, which contains these columns: • **Name**—Name of the RAN backhaul • **Node**—Node to which the RAN backhaul belongs
Add	Adds the chosen backhaul to the Included Backhauls table.
Remove	Removes the chosen backhaul from the Included Backhauls table.
Save	Saves the virtual RAN backhaul and closes the Virtual RAN Backhaul Editor.
Cancel	Cancels the current operation and closes the Virtual RAN Backhaul Editor.
Help	Opens the Help window for this feature.

To create a virtual RAN backhaul:

Step 1 Enable report polling on the nodes associated with the backhauls that you plan to add to the virtual backhaul.

Step 2 Right-click a backhaul in the RAN Backhauls table or in a view in the navigation tree.

Step 3 Choose **Create Virtual RAN Backhaul** in the right-click menu.

The Virtual RAN Backhaul Editor appears.

Step 4 In the Available Backhauls pane, choose a backhaul from the table.

Step 5 Click **Add** to add the chosen backhaul to the Included Backhauls table.

Step 6 Repeat Step 5 for each additional backhaul you want to include in the virtual backhaul.

Step 7 To remove a backhaul from the Included Backhauls table, choose a backhaul from the table and click **Remove**.

Step 8 In the Name field at the top of the dialog box, enter a name for the virtual backhaul.

Step 9 Click **Save** to create the virtual RAN backhaul and close the dialog box.

Viewing APN-Specific Tables

This section describes the APN-specific tabs displayed on the APN node window.

- Viewing APNs, page 7-145
- Viewing APN Specific Nodes, page 7-146

Viewing APNs

The APNs window displays each APN instance for the selected APN and provides identity and status information about the APN instance.

The APNs table contains the following fields:

Field	Description
Internal ID	Not shown by default, the Internal ID of the APN is a unique ID for every object the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Node	Name of the APN node.
Name	Name of the APN Instance.
Index	Number assigned to the APN instance.
VRF Name	Name of the virtual routing and forwarding (VRF) over which communication with BMA occurs. If no VRF is specified, the global routing table is used.
IPv4 Pool Name	IP address pool providing IP addresses for this APN instance (in IPv4 format).
AAA Server Group Name	The AAA Radius server group providing authentication for this APN instance.
IPv4 Primary DNS	The address of the primary DNS (in IPv4 format) that is provided to the mobile station.
IPv4 Secondary DNS	The address of the secondary DNS (in IPv4 format) that is provided to the mobile station.
IPv6 Pool Name	IP address pool providing IP addresses for this APN instance (in IPv6 format).
IPv6 Primary DNS	The address of the primary DNS (in IPv6 format) that is provided to the mobile station.
IPv6 Secondary DNS	The address of the secondary DNS (in IPv6 format) that is provided to the mobile station.
Service Mode	The operational state of the APN. It is either in service or in maintenance.
Ignored	Indicates whether the object should be included when aggregating and displaying MWTM status information. This field can be edited by users with authentication level Power User (level 2) and higher.
Notes	Indicates whether a note is associated with the object.
Severity	Indicates the alarm severity for the chosen APN. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Chapter 9, "Managing Alarms and Events" for more information.
Last Status Change	Date and time the status of the APN last change.

Field	Description
Status	Current status of the APN.
Status Reason	For a full list of possible reasons, see the **stateReasons.html** file. If you installed the MWTM in the default directory, **/opt**, the file is located at the **/opt/CSCOsgm/apache/share/htdocs/eventHelp** directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons appear in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference."

Viewing APN Specific Nodes

This window lists the GGSN, PDNGW, or SGW nodes associated with the APN you selected. The fields of this window provide information about the GGSN, PDNGW, or SGW node. The table displays the same columns as that of Nodes table under Summary Lists. See Nodes Table, page 8-8.

CHAPTER 8

Understanding Basic Object Functions

You can use the Cisco Mobile Wireless Transport Manager (MWTM) to view basic information about any discovered MWTM object, including its associated objects, status, and other important information.

To view basic information for an object, click **Summary Lists** in the navigation tree of the MWTM main window, then select one of these objects:

Note Objects only appear if your network contains that particular object type.

Summary Lists	Applicable Network Type
Node Distributions (only in web interface)	All networks
Nodes The following options are available under Summary Lists > Nodes in the web interface: • Nodes > Alarms • Nodes > Uptime • Nodes > Config Download Alarms • Nodes > SNMP Timeout Alarms • Nodes > Software Versions • Nodes > Serial Numbers **Note** In the Java client, Alarms, Software Versions, and Serial Numbers appear under Summary Lists.	All networks

Summary Lists	Applicable Network Type
Signaling Points **Note** In a multi-instance network, the signaling point name has the format *pointcode*:*instanceName*. In a multi-instance network, the MWTM does not display signaling points that are only partly configured (that is, the variant and network name are configured, but not the primary point code).	ITP only
Linksets	
Links	
Application Servers	
Application Server Processes	
Application Server Process Associations	
Signaling Gateway Mated Pairs	
Interfaces	All networks
Cards	RAN-O only
RAN Backhauls	
RAN Shorthauls	
PWE3 Backhauls	
PWE3 Virtual Circuits	
Access Point Names	mSEF and GGSN only
IP Addresses (only in web interface)	All networks
Point Code (only in web interface)	ITP only

This chapter contains:

Displaying Object Windows

To display an object window, in the MWTM main window, under Summary Lists in the navigation tree, click the object type. The object window appears in the right pane.

Example:

To display the nodes table, choose **Summary Lists > Nodes**. The nodes table appears.

- The table lists all objects of the object type that you choose in the navigation tree. To see the fully qualified domain name (FQDN) of any object in the table, hover over the object with the mouse. A tooltip lists the FQDN for the object.
- Some table columns may be hidden by default. To see a list all columns, right-click on any column, and check the box for the columns that you want to expose.
- Tables are sorted based on the column that is highlighted. To sort by a different column, simply click the desired column.

Tip For detailed information on working in tables, see Navigating Table Columns, page 4-23.

Object windows provide information about all objects of a specific type that the MWTM has discovered and can contain:

Right-Click Menu for All Objects

To see the right-click menu for all objects, in the MWTM main window, under Summary Lists in the navigation tree, select the object type and right-click it. The right-click menu contains:

Menu Command	Description
Show in New Window	Opens the object window in a new window.
Back > List of Windows	Navigates back to a window viewed in this session. The MWTM maintains a list of up to 10 Back windows.
Forward > List of Windows	Navigates forward to a window viewed in this session. The MWTM maintains a list of up to 10 Forward windows.

Note The right-click menu, available by clicking on a specific object in the right pane, is described in Viewing the Right-Click Menu for an Object, page 7-2.

Node Distributions Table

The Node Distributions link displays the percentage distribution summary lists. To display the Node Distributions table, choose **Summary Lists > Node Distributions**. The available distribution display options are:

- Type
- Feature
- Software Version
- Severity

Node Distributions By Type

To display the Node Distributions by Type table, use the following procedure:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Summary Lists > Node Distributions**.

Step 2 In the tool bar of the right pane, choose Type from the Attribute drop-down menu.

Step 3 Click the Run icon (green arrow ).

The Node Distribution by Type table contains:

Column	Description
Type	Description of the hardware platform that supports a feature. See the description of Node Type in Nodes Table, page 8-8 for more information.
Total (*total number of nodes*)	Total number of nodes of a particular type.
Percentage	Percentage of nodes of this type out of all the discovered nodes.

Node Distributions By Feature

To display the Node Distributions by Feature table, use the following procedure:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Summary Lists > Node Distributions**.

Step 2 In the tool bar of the right pane, choose Feature from the Attribute drop-down menu.

Step 3 Click the Run icon (green arrow).

The Node Distribution by Feature table contains:

Column	Description
Feature	Primary function performed by a node type: • Unknown—Any device which is not pollable by MWTM. • ITP—IP Transfer Protocol • IP-RAN features: – ONS—Optical Networking Service – RAN_SVC—RAN Service – CSR—Cell Site Router – Cisco 7600 devices with Pseudowire Virtual Circuits configured – MetroE-Switch (fault support only) • mSEF features: – CSG1 or CSG2—Content Services Gateway – GGSN—Gateway GPRS Support Node – HA—Home Agent – BWG—Broadband Wireless Gateway – PDSN—Packet Data Serving Node – PDNGW—Packet Data Node Gateway – SGW—Serving Gateway – PCRF—Policy and Charging Rules Function • CDT—Cisco Data for Telecommunications (CDT) • Generic—Any pollable device not classified as one of the above types.
Total (*total number of nodes)*	Total number of nodes of a particular type.
Percentage	Percentage of nodes of this type out of all the discovered nodes.

Node Distributions By Software Version

To display the Node Distributions by Software Version table, use the following procedure:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Summary Lists > Nodes Distributions**.

Step 2 In the tool bar of the right pane, choose Software Version from the Attribute drop-down menu.

Step 3 Click the Run icon (green arrow).

The Node Distribution by Software Version table contains:

Column	Description
Software Version	Version of the software that is installed on the node.
Total (*total number of nodes*)	Total number of nodes of a particular software version.
Percentage	Percentage of nodes of this type out of all the discovered nodes.

Node Distributions By Severity

To display the Node Distributions by Severity table, use the following procedure:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Summary Lists > Nodes Distributions**.

Step 2 In the tool bar of the right pane, choose Severity from the Attribute drop-down menu.

Step 3 Click the Run icon (green arrow).

The Node Distribution by Severity table contains:

Column	Description
Severity	Indicates the alarm severity for the chosen node. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information.
Total (*total number of nodes*)	Total number of nodes of a particular severity.
Percentage	Percentage of nodes of this type out of all the discovered nodes.

Note For toolbar details, see Using the Toolbar, page 11-6.

Nodes Table

The nodes table displays information about nodes that the MWTM has discovered.

You can view the following links under **Summary Lists > Nodes** in web interface:

- Alarms, page 8-12
- Uptime, page 8-14
- Nodes by Alarm, page 8-15
- Software Versions, page 8-16
- Serial Numbers, page 8-16

Note In Java client, the Alarms, Software Versions, and Serial Numbers appear under Summary Lists.

To display the nodes table, choose **Summary Lists > Nodes**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The nodes table contains:

Column	Description
Internal ID	Internal ID of the node. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Display Name	Name of the node. This column is displayed by default.
Custom Name	Custom name of the node.
IP Address or DNS Hostname	IP address or DNS name of the node, as the MWTM discovered it.
SysName	System name of the node.
Primary SNMP Address	IP address of the node, which SNMP uses to poll the node. (There might be other IP addresses on the node that are not the primary SNMP address). This column is displayed by default.
CLLI Code (ITP only)	Common Language Location Identification code for the node. A CLLI code is a standardized 11-character identifier that uniquely identifies the geographic location of the node. If the node has no CLLI code configured, this field is blank.

Column	Description
Node Type	Description of the hardware platform that supports a feature. **ITP Node Types** • Cisco2650XM, Cisco2651XM, Cisco 2651 • Cisco2811 • Cisco7204VXR, Cisco7206VXR • Cisco7301 • Cisco7507, Cisco7507mx, Cisco7507z, Cisco7513, Cisco7513mx, Cisco7513z • Cisco 7603, Cisco 7603s, Cisco7604, Cisco7606, Cisco7606s, Cisco7609, Cisco7609s, Cisco7613 **IPRAN Node Types** • Cell Site Routers (CSR): – CiscoMWR-1941-DC—Cisco MWR-1941-DC-A series router – CiscoMWR-2941-DC—Cisco MWR-2941-DC series router – Cisco3825—Integrated Services Router • CiscoONS15454—Cisco ONS 15454 SONET multiplexer • RAN_SVC—RAN Service Module in the Cisco ONS 15454 • Cisco 7603, Cisco 7603s, Cisco7604, Cisco7606, Cisco7606s, Cisco7609, Cisco7609s, Cisco7613 • Cisco ME3400 Metro Ethernet switch • Cisco ME3750 Metro Ethernet switch • Skyla cards **mSEF Node Types** • CiscoSAMI—Service Application Module for IP (SAMI) • CiscoMWAM—Multiprocessor WAN Application Module (MWAM) • Cisco 7603, Cisco 7603s, Cisco7604, Cisco7606, Cisco7606s, Cisco7609, Cisco7609s, Cisco7613 **Other Node Types** • IPDevice—IP device, other than those listed previously. You can assign this icon to an unknown node if you know that it is an IP device. • Unknown—MWTM is unable to determine the node type. • Linux—Hardware platform for Cisco Database for Telecommunications (CDT) • Cisco ME 3400 Series Ethernet Access Switches This column is displayed by default.

Column	Description
Feature	Primary function performed by a node type: • Unknown—Any device which is not pollable by MWTM. • ITP—IP Transfer Protocol • IP-RAN features: – ONS—Optical Networking Service – RAN_SVC—RAN Service – CSR—Cell Site Router – Cisco 7600 devices with Pseudowire Virtual Circuits configured – MetroE-Switch (fault support only) • mSEF features: – CSG1 or CSG2—Content Services Gateway – GGSN—Gateway GPRS Support Node – HA—Home Agent – BWG—Broadband Wireless Gateway – PDSN—Packet Data Serving Node (PDSN) – PDNGW—Packet Data Node Gateway – SGW—Serving Gateway – PCRF—Policy and Charging Rules Function • CDT—Cisco Data for Telecommunications (CDT) • Generic—Any pollable device not classified as one of the above types. This column is displayed by default.
Software Version	Version of node's software. This column is displayed by default.
Avg. MWTM Poll Response (secs)	Average response time for the device to respond to poll from the MWTM server.
Serial Number	Serial number of the node.
Uptime	Time the node has been up, in days, hours, minutes, and seconds. This column is displayed by default.
Reboot Reason	Reason for the last reboot of the node.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Process Traps	Indicates whether the MWTM should process traps from this node. This field is read-only for the web client, but editable in the Java client.

Column	Description
Trap Polling	Indicates whether or not trap polling is enabled for this node. By default, trap polling is enabled for all nodes except for IP-RAN nodes. This field is read-only for the web client, but editable in the Java client. For IP-RAN nodes, you can modify this setting by using the following commands: • To enable trap polling for this node, set ipran-mib snmp-access to inBand on the node. • To disable trap polling for this node, set ipran-mib snmp-access to outOfBand on the node. **Note** For information about in-band and out-of-band management, see IP-RAN Specific FAQs, page C-19.
Report Polling	Indicates whether or not report polling is enabled for this node. This field is read-only for the web client, but editable in the Java client for ITP nodes. For IP-RAN nodes, you can modify this setting by using the following commands: • To enable report polling for this node, set ipran-mib location to aggSite on the node. • To disable report polling for this node, set ipran-mib location to cellSite on the node. For all other nodes, this field is not editable.
Notes	Indicates whether a note is associated with the node. This column is displayed by default.
Events (MWTM client only)	Indicates whether the node has received any events. If the node has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the node.
Severity	Indicates the alarm severity for the chosen node. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the node last changed.

Column	Description
Status	Current status of the node. Possible values are: • Active • Discovering • Polling • Unknown • Unmanaged • Waiting • Warning For detailed definitions of each status, see Appendix E, "Status Definitions." This column is displayed by default.
Status Reason	Reason for the current status of the node. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons appear in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Alarms

The alarms table displays a count of alarms by node and severity. To display the Alarms table, choose **Summary Lists > Nodes > Alarms**.

In Java client, to display the Alarms table, choose **Summary Lists > Alarms**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The alarms table contains:

Column	Description
Internal ID	Internal ID of the node. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Node	Name of the node. When you click any of the node names, the Alarms tab of that node is displayed. This column is displayed by default.
Feature	The feature name of the node. This column is displayed by default.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This column is available only in web client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is available only in web client and is displayed by default.
Last Status Change	Date and time that the status of the node alarms last changed.
Total	Total number of alarms for the node. This column is displayed by default.
Critical (*alarm count*) (*alarm percentage*)	Total number of critical alarms for the node. Click the severity name to sort the page by Critical severity. This column is displayed by default.
Major (*alarm count*) (*alarm percentage*)	Total number of major alarms for the node. Click the severity name to sort the page by Major severity. This column is displayed by default.
Minor (*alarm count*) (*alarm percentage*)	Total number of minor alarms for the node. Click the severity name to sort the page by Minor severity. This column is displayed by default.
Warning (*alarm count*) (*alarm percentage*)	Total number of warning alarms for the node. Click the severity name to sort the page by Warning severity. This column is displayed by default.
Informational (a*larm count*) (*alarm percentage*)	Total number of informational alarms for the node. Click the severity name to sort the page by Informational severity. This column is displayed by default.
Indeterminate (*alarm count*) (*alarm percentage*)	Total number of indeterminate alarms for the node. Click the severity name to sort the page by Indeterminate severity. This column is displayed by default.
Normal (*alarm count*) (*alarm percentage*)	Total number of normal alarms for the node. Click the severity name to sort the page by Normal severity. This column is displayed by default.

Uptime

The Uptime link displays the uptime for managed nodes. To display the Uptime for Managed Nodes table, choose **Summary Lists > Nodes > Uptime**.

The uptime for managed nodes table contains:

Column	Description
Internal ID	Internal ID of the node. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Name	Name of the node. This column is displayed by default.
Node Type	Description of the hardware platform that supports a feature. See the description of Node Type in Nodes Table, page 8-8 for more information. This column is displayed by default.
Feature	Primary function performed by a node type: • Unknown—Any device which is not pollable by MWTM. • ITP—IP Transfer Protocol • IP-RAN features: – ONS—Optical Networking Service – RAN_SVC—RAN Service – CSR—Cell Site Router – Cisco 7600 devices with Pseudowire Virtual Circuits configured – MetroE-Switch (fault support only) • mSEF features: – CSG1 or CSG2—Content Services Gateway – GGSN—Gateway GPRS Support Node – HA—Home Agent – BWG—Broadband Wireless Gateway – PDSN—Packet Data Serving Node (PDSN) – PDNGW—Packet Data Node Gateway – SGW—Serving Gateway – PCRF—Policy and Charging Rules Function • CDT—Cisco Data for Telecommunications (CDT) • Generic—Any pollable device not classified as one of the above types. This column is displayed by default.
Uptime	Time the node has been up, in days, hours, minutes, and seconds. This column is displayed by default.

Column	Description
Reboot Reason	Reason for the last reboot of the node. This column is displayed by default.
Severity	Indicates the alarm severity for the chosen node. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Nodes by Alarm

This section contains:

- Config Download Alarms, page 8-15
- SNMP Timeout Alarms, page 8-15

Config Download Alarms

The Config Download Alarms link displays the Nodes for Alarm ConfigurationDownload table. To display this table, choose **Summary Lists > Nodes > Configuration Download Alarms**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The table displays the same columns as that of Nodes Table, but the columns Status and Status Reason are hidden by default. See Nodes Table, page 8-8.

Note For toolbar details, see Using the Toolbar, page 11-6.

SNMP Timeout Alarms

The SNMP Timeout Alarms link displays the Nodes for Alarm NodeUnreachable table. To display this table, choose **Summary Lists > Nodes > SNMP Timeout Alarms**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The table displays the same columns as that of Nodes Table, but the columns Status and Status Reason are hidden by default. See Nodes Table, page 8-8.

Note For toolbar details, see Using the Toolbar, page 11-6.

Software Versions

The Software Versions table lists the software versions for each node the MWTM manages. To display the Software Versions table, choose **Summary Lists > Nodes > Software Versions**.

In Java client, to display the Software Versions table choose **Summary Lists > Software Versions**.

The Software Versions table contains:

Column	Description
Name	Name of the node. This column is displayed by default.
Node Type	Type of node. This column is displayed by default.
Feature	Name of the feature. This column is displayed by default.
Software Version	Software version used by the node. This column is displayed by default.
Software Description	Full software version information. This column is displayed by default.

For details on the Software Versions table, see Displaying Software Versions, page 11-20.

Serial Numbers

The serial numbers table displays information about serial numbers of the nodes that the MWTM has discovered. To display the serial numbers table, choose **Summary Lists > Nodes > Serial Numbers**.

In Java client, to display the Serial Numbers table choose **Summary Lists > Serial Numbers**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The serial numbers table contains:

Column	Description
Name	Name of the node. This column is displayed by default.
Node Type	Description of the hardware platform that supports a feature. **ITP Node Types** • Cisco2650XM, Cisco2651XM, Cisco 2651 • Cisco2811 • Cisco7204VXR, Cisco7206VXR • Cisco7301 • Cisco7507, Cisco7507mx, Cisco7507z, Cisco7513, Cisco7513mx, Cisco7513z • Cisco 7603, Cisco 7603s, Cisco7604, Cisco7606, Cisco7606s, Cisco7609, Cisco7609s, Cisco7613 **IPRAN Node Types** • Cell Site Routers (CSR): – CiscoMWR-1941-DC—Cisco MWR-1941-DC-A series router – CiscoMWR-2941-DC—Cisco MWR-2941-DC series router – Cisco3825—Integrated Services Router • CiscoONS15454—Cisco ONS 15454 SONET multiplexer • RAN_SVC—RAN Service Module in the Cisco ONS 15454 • Cisco 7603, Cisco 7603s, Cisco7604, Cisco7606, Cisco7606s, Cisco7609, Cisco7609s, Cisco7613 • Cisco ME3400 Metro Ethernet switch • Cisco ME3750 Metro Ethernet switch • Skyla cards **mSEF Node Types** • CiscoSAMI—Service Application Module for IP (SAMI) • CiscoMWAM—Multiprocessor WAN Application Module (MWAM) • Cisco 7603, Cisco 7603s, Cisco7604, Cisco7606, Cisco7606s, Cisco7609, Cisco7609s, Cisco7613 **Other Node Types** • IPDevice—IP device, other than those listed previously. You can assign this icon to an unknown node if you know that it is an IP device. • Unknown—MWTM is unable to determine the node type. • Linux—Hardware platform for Cisco Database for Telecommunications (CDT) • Cisco ME 3400 Series Ethernet Access Switches This column is displayed by default.

Column	Description
Serial Number	Serial number of the node. This column is displayed by default.
CLLI Code	Common Language Location Identification code for the node. A CLLI code is a standardized 11-character identifier that uniquely identifies the geographic location of the node. If the node has no CLLI code configured, this field is blank. This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Signaling Points Table

The signaling points table displays information about the signaling points that the MWTM has discovered. To display the signaling points table, choose **Summary Lists > Signaling Points**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The signaling points table contains:

Column	Description
Internal ID	Internal ID of the signaling point. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. It can also be useful when the TAC is debugging problems.
Name	Name of the signaling point. This column is displayed by default.
Node	Name of the node associated with this signaling point. This column is displayed by default.
Instance Number	Number of the instance associated with the signaling point.
Network Name	Name of the instance associated with the signaling point. This column is displayed by default.
Point Code	Primary point code of the signaling point. This column is displayed by default.
Variant	SS7 protocol variant. Valid variants are: • ANSI • China • ITU • NTT • TTC This column is displayed by default.

Column	Description
Network Indicator	Determines the type of call that is being placed. Valid values are: • **National**—National-bound call. The MWTM routes national calls through the national network. • **NationalSpare**—National-bound call, used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates the networks. • **International**—International-bound call. The MWTM forwards international-bound calls to an STP pair that acts as an international gateway. • **InternationalSpare**—International-bound call; used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates the networks. This column is displayed by default.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the signaling point. This column is displayed by default.
Events (MWTM client only)	Indicates whether the signaling point has received any events. If the signaling point has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the signaling point.
Severity	Indicates the alarm severity for the chosen signaling point. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the signaling point last changed.

Column	Description
Status	Current status of the signaling point. Possible values are: • Active • Unknown • Unmanaged • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the signaling point. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file resides at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file reside in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full status reason in a mouse over help popup. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Linksets Table

The linksets table displays information about the linksets that the MWTM has discovered. To display the linksets table, choose **Summary Lists > Linksets**.

Tip Linksets that are associated with nodes that are excluded from the current view are not visible in the linksets table. See Creating a New View, page 6-7, for more information about excluding nodes.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The linksets table contains:

Column	Description
Internal ID	Internal ID of the linkset. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. It can also be useful when the TAC is debugging problems.
Name	Name of the linkset. This column is displayed by default.
Node	Node associated with the linkset.
Signaling Point	Signaling point associated with the linkset.
Local Point Code	Point code of the primary signaling point for the linkset. This column is displayed by default.
Adjacent Pt Code	Point code of the adjacent signaling point for the linkset. This column is displayed by default.
Linkset Type	Type of linkset, which the MWTM determines by examining the links defined in the linkset. Possible linkset types are: • **HSL**—The links in this linkset use the SS7-over-ATM high-speed protocol. • **SCTPIP**—The links in this linkset use the Stream Control TCP/IP transport protocol. • **Serial**—The links in this linkset use the serial SS7 signaling protocol. • **Mixed**—The links in this linkset are of two or more types. (This configuration is not recommended.) • **Virtual**—The links in this linkset are virtual links, which connect signaling point instances running on the same node. The MWTM does not poll virtual linksets, nor does it display real-time data or accounting statistics for virtual linksets. **Note** Prior to IOS release 12.2(23)SW1, the user manually created virtual linksets on multi-instance nodes. In and after that release, users can now automatically create virtual linksets. • **Other**—No links have been defined for this linkset. This column is displayed by default.
Links	Total number of links in the linkset. This column is displayed by default.
Active Links	Number of links in the linkset that are `Active`. This column is displayed by default.
Congested Links	Number of links in the linkset that are `Congested`.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the linkset. This column is displayed by default.

Column	Description
Events (MWTM client only)	Indicates whether the linkset has received any events. If the linkset has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the linkset.
Severity	Indicates the alarm severity for the chosen linkset. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the linkset last changed.
Status	Current status of the linkset. Possible values are: • Active • Shutdown • Unavailable • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Links Table

The links table displays information about the links that the MWTM has discovered. To display the links table, choose **Summary Lists > Links**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The links table contains:

Column	Description
Internal ID	Internal ID of the link. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Node	Name of the node associated with the link. This column is displayed by default.
Signaling Point	Name of the signaling point associated with the link. This column is displayed by default.
Linkset	Name of the linkset associated with the link. This column is displayed by default.
SLC	Signaling link code (SLC) ID for the link. This column is displayed by default.
Type	Type of link. Possible link types are: • **HSL**—The link uses the SS7-over-ATM high-speed protocol. • **SCTPIP**—The link uses the Stream Control TCP/IP transport protocol. • **Serial**—The link uses the serial SS7 signaling protocol. • **Virtual**—The link is a virtual link, which connects signaling point instances running on the same node. The MWTM does not poll virtual links, nor does it display real-time data or accounting statistics for virtual links. This column is displayed by default.
Slot	Slot number. The column displays a proper value only when the link is offloaded to a PA line card or a SAMI line card. Otherwise it displays N/A.
Bay	Number of bays. The column displays a proper value only when the link is offloaded to a PA line card. Otherwise it displays N/A.
Processor	Number of processors. The column displays a proper value only when the link is offloaded to a SAMI line card. Otherwise it displays N/A.
Congestion Level	Indicates the level of congestion on the link. A link is congested if it has too many packets waiting to be sent. This condition could result from the failure of an element in your network. Possible values for the Congestion Level field are `None`, indicating no congestion, and `1` to `3`, indicating levels of congestion from very light (`1`) to very heavy (`3`).

Column	Description
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the link. This column is displayed by default.
Events (MWTM client only)	Indicates whether the link has received any events. If the link has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the link.
Severity	Indicates the alarm severity for the chosen link. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the link last changed.

Column	Description
Status	Current status of the link. Possible values are: • Active • Blocked • Failed • InhibitLoc • InhibitRem • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons appear in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Application Servers Table

The application servers table displays information about the application servers that the MWTM has discovered. To display the application servers table, choose **Summary Lists > App. Servers**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The application servers table contains:

Column	Description
Internal ID	Internal ID of the application server. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Name	Name of the application server. This column is displayed by default.
Node	Name of the node associated with the application server. This column is displayed by default.
Signaling Point	Name of the signaling point associated with the application server. This column is displayed by default.
Protocol	Protocol associated with the application server. Possible values are: • **M3UA**—MTP3-User Adaptation. • **SUA**—SCCP-User Adaptation.
Routing Key	Routing key associated with the application server. The application server bases its routing decisions on the routing key value.
Traffic Mode	Method by which the application server forwards requests to its active application server processes. Possible values are: • **overRide**—One application server process takes over all traffic for the application server, possibly overriding any currently active application server process in the application server. • **broadcast**—Every active application server process receives the same message. • **loadBind**—Each application server process shares in the traffic distribution with every other currently active application server process, based on application server process bindings. • **loadRndRobin**—Each application server process shares in the traffic distribution with every other currently active application server process, using a round-robin algorithm. • **undefined**—The traffic mode is not defined. The first application server process that becomes active defines the traffic mode.
Application Server Process Associations	Total number of application server processes associated with the application server. This column is displayed by default.
Active ASP Associations	Number of currently active application server processes associated with the application server. This column is displayed by default.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the application server. This column is displayed by default.

Column	Description
Events (MWTM client only)	Indicates whether the application server has received any events. If the application server has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the application server.
Severity	Indicates the alarm severity for the chosen application server. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the application server last changed.
Status	Current status of the application server. Possible values are: • Active • Down • Inactive • Pending • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Application Server Processes Table

The application server processes table displays information about the application server processes that the MWTM has discovered. To display the application server processes table, choose **Summary Lists > App. Server Processes**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The application server processes table contains:

Column	Description
Internal ID	Internal ID of the application server process. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Name	Name of the application server process. This column is displayed by default.
Node	Name of the node associated with the application server process. This column is displayed by default.
Local IP Address	Local IP address that the application server process is currently using. This column is displayed by default.
Local Port	Local port number that the application server process is currently using. This column is displayed by default.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the application server process. This column is displayed by default.
Events (MWTM client only)	Indicates whether the application server process has received any events. If the application server process has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the application server process.
Severity	Indicates the alarm severity for the chosen application server process. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the application server process last changed.

Column	Description
Status	Current status of the application server process. Possible values are: • Unknown • Unmanaged For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the application server process. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Application Server Process Associations Table

The application server process associations table displays information about the application server process associations that the MWTM has discovered. To display the application server process associations table, choose **Summary Lists > App. Server Proc. Assoc.**

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The application server process associations table contains:

Column	Description
Internal ID	Internal ID of the application server process association. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the application server process association. This column is displayed by default.
Node	Name of the node associated with the application server process association. This column is displayed by default.
Signaling Point	Name of the signaling point associated with the application server process association. This column is displayed by default.
Application Server	Name of the application server associated with the application server process association. This column is displayed by default.
Slot	Slot number. The column displays a proper value only when the ASPA is offloaded to a PA line card or a SAMI line card. Otherwise it displays N/A.
Bay	Bay number. The column displays a proper value only when the ASPA is offloaded to a PA line card. Otherwise it displays N/A.
Processor	Processor number. The column displays a proper value only when the ASPA is offloaded to a SAMI line card. Otherwise it displays N/A.
Protocol	Protocol associated with the application server process association. Possible values are: • **M3UA**—MTP3-User Adaptation. • **SUA**—SCCP-User Adaptation. This column is displayed by default.
Congestion Level	Indicates the level of congestion of an application server process association. An application server process association is congested if it has too many packets waiting to be sent. This condition could result from the failure of an element in your network. Possible values for the Congestion Level field are `None`, indicating no congestion, and `1` to `7`, indicating levels of congestion from very light (`1`) to very heavy (`7`).
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the application server process association. This column is displayed by default.
Events (MWTM client only)	Indicates whether the application server process association has received any events. If the application server process association has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the application server process association.
Severity	Indicates the alarm severity for the chosen application server process association. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.

Column	Description
Last Status Change	Date and time that the status of the application server process association last changed.
Status	Current status of the application server process association. Possible values are: • Active • Blocked • Down • Inactive • Pending • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the application server process association. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Signaling Gateway Mated Pairs Table

The signaling gateway-mated pairs table displays information about the signaling gateway-mated pairs that the MWTM has discovered. To display the signaling gateway-mated pairs table, choose **Summary Lists > Signaling Gateway Mated Pairs**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The signaling gateway-mated pairs table contains:

Column	Description
Internal ID	Internal ID of the signaling gateway-mated pair. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the signaling gateway-mated pair. This column is displayed by default.
Mate	Name of the node associated with the mate of the signaling gateway-mated pair. This column is displayed by default.
Node	Name of the node associated with the signaling gateway-mated pair. This column is displayed by default.
Congestion Level	Indicates the congestion level of a signaling gateway-mated pair. A signaling gateway-mated pair is congested if it has too many packets waiting to be sent. This condition could result from the failure of an element in your network. Possible values for the Congestion Level field are `None`, indicating no congestion, and `1` to `7`, indicating levels of congestion from very light (`1`) to very heavy (`7`).
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the signaling gateway-mated pair. This column is displayed by default.
Events (MWTM client only)	Indicates whether the signaling gateway-mated pair has received any events. If the signaling gateway-mated pair has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the signaling gateway-mated pair.
Severity	Indicates the alarm severity for the chosen signaling gateway-mated pair. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the signaling gateway-mated pair last changed.

Column	Description
Status	Current status of the signaling gateway-mated pair. Possible values are: • Active • Down • Inactive • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the signaling gateway-mated pair. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Interfaces Table

The interfaces table displays information about the ITP or RAN interfaces that the MWTM has discovered. To display the interfaces table, choose **Summary Lists > Interfaces**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The interfaces table contains:

Column	Description
Internal ID	Internal ID of the interface. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the interface. The node specifies the name of the interface. This column is displayed by default.
Node	Name of the node with the interface. This column is displayed by default.
Interface Type	Type of interface.
Send Speed	Interface send speed in bits per second. This column is displayed by default.
Receive Speed	Interface receive speed in bits per second. This column is displayed by default.
Interface Index	Unique numeric identifier of the interface. This identifier appears in the interface table (ifTable). This column is displayed by default.
Interface Description	Description of the interface. This field displays N/A if the Interface Description is blank for the particular node.
Maximum Packet Size	The maximum packet size that traverses the interface in bytes.
Physical Address	The physical address of the interface. If a physical address does not apply to the interface, `N/A` appears in the table cell.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the interface. This column is displayed by default.
Events (MWTM client only)	Indicates whether the interface has received any events. If the interface has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the interface.
Severity	Indicates the alarm severity for the chosen interface. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the interface last changed.

Column	Description
Status	Current status of the interface. Possible values are: • Active • Down • Inactive • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Admin Status	Desired state of the interface: • Up • Down • Testing • Shutdown For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.

Column	Description
Oper. Status	Current operational state of the interface: • Up • Down • Testing • Unknown • Dormant • Not present • Lower layer down For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.
Status Reason	Reason for the current status of the interface. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Cards Table

The cards table displays information about the cards in the ONS 15454 IPRAN node that the MWTM has discovered. To display the cards table, choose **Summary Lists > Cards**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The cards table contains:

Column	Description
Internal ID	Internal ID of the card. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the card. The node specifies the name of the card. This column is displayed by default.
Node	Name of the node in which the card resides. This column is displayed by default.
Card Type	Type of the card in the node. This column is displayed by default.
Model Name	Model name of the card (can include the part number).
Description	Description of the card.
Slot Number	The slot number of the card in the node.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the card. This column is displayed by default.
Events (MWTM client only)	Indicates whether the card has received any events. If the card has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the card.
Severity	Indicates the alarm severity for the chosen card. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the card last changed.
Status	Current status of the card. Possible values are: • Active • Down • Inactive • Shutdown • Unknown • Warning For detailed definitions of each status, see Appendix E, “Status Definitions”. This column is displayed by default.

Column	Description
Status Reason	Reason for the current status of the card. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference".
Hardware Version	Hardware version of the card.
Firmware Version	Firmware version of the card.
Software Version	Software version of the card.

Note For toolbar details, see Using the Toolbar, page 11-6.

RAN Backhauls Table

The RAN backhauls table displays information about the RAN backhauls that the MWTM has discovered. To display the RAN backhauls table, choose **Summary Lists > RAN Backhauls**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The RAN backhauls table contains:

Column	Description
Internal ID	Internal ID of the RAN backhaul. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the RAN backhaul. This column is displayed by default.
Node	Name of the node on which this RAN backhaul resides. This column is displayed by default.

Column	Description
Location	Location of the node (either at the cell site or the aggregation node site). This column is displayed by default.
Peer Name	Name of the object's peer. This column is displayed by default.
Peer Node	Name of the node to which the peer object belongs. This column is displayed by default.
Type	Indicates whether the RAN backhaul is a normal backhaul or a virtual backhaul (see Creating Virtual RAN Backhauls, page 7-143).
User Send Bandwidth User Receive Bandwidth	The bandwidth that the user specified for the backhaul. Values for send and receive bandwidths will be different if the interface is asymmetrical. To change this value, see Editing Properties for a RAN-O Backhaul, page 8-53.
System Send Bandwidth System Receive Bandwidth	The bandwidth that the system specifies for the backhaul. Values for send and receive bandwidths will be different if the interface is asymmetrical.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the RAN backhaul. This column is displayed by default.
Events (MWTM client only)	Indicates whether the RAN backhaul has received any events. If the RAN backhaul has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the RAN backhaul.
Severity	Indicates the alarm severity for the chosen RAN backhaul. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the RAN backhaul last changed.
Status	Current status of the RAN backhaul. Possible values are: • Active • Failed • Warning For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.

Column	Description
Status Reason	Reason for the current status of the RAN backhaul. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.
Accept Threshold[1]	The percentage threshold setting below which the backhaul is considered acceptable.
Warning Threshold[1]	The percentage threshold setting beyond which the backhaul issues a warning. Subsequent warnings are issued only if the value goes below the Acceptable Threshold.
Overload Threshold[1]	The percentage threshold setting beyond which the backhaul is considered overloaded. Subsequent overload messages are issued only if the value goes below the Warning Threshold.

1. To change the default setting, see Editing Properties for a RAN-O Backhaul, page 8-53.

Note For toolbar details, see Using the Toolbar, page 11-6.

RAN Shorthauls Table

The RAN shorthauls table displays information about the RAN shorthauls that the MWTM has discovered. To display the RAN shorthauls table, choose **Summary Lists > RAN Shorthauls**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The RAN shorthauls table contains:

Column	Description
Internal ID	Internal ID of the RAN shorthaul. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the RAN shorthaul. This column is displayed by default.

Column	Description
Node	Name of the node to which the RAN shorthaul is connected. This column is displayed by default.
Type	Type of shorthaul, either GSM or UMTS. This column is displayed by default.
Optimized	Whether or not the traffic is optimized. This column is displayed by default.
Location	Location of the node (either at the cell site or the aggregation node site). This column is displayed by default.
Peer Name	Name of the object's peer. This column is displayed by default.
Peer Node	Name of the node to which the peer object belongs. This column is displayed by default.
Interface Type	Type of interface (for example, a point-to-point interface or an ATM interface).
Send Speed	Send speed of the interface in bits per second (for example, 1.98M).
Receive Speed	Receive Speed of the interface in bits per second (for example, 1.98M).
Interface Index	Unique numeric identifier of the interface. This identifier appears in the interface table (ifTable).
Maximum Packet Size (bytes)	Maximum packet size on the interface in bytes.
Physical Address	Physical address, if applicable, of the interface.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the RAN shorthaul. This column is displayed by default.
Events (MWTM client only)	Indicates whether the RAN shorthaul has received any events. If the RAN shorthaul has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the RAN shorthaul.
Severity	Indicates the alarm severity for the chosen RAN shorthaul. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the shorthaul last changed.
Status	Current status of the RAN shorthaul. For detailed definitions of each status, see Appendix E, "Status Definitions". This column is displayed by default.

Column	Description
Admin Status	Desired state of the interface: • Up • Down • Testing • Shutdown For detailed definitions of each status, see Appendix E, "Status Definitions".
Operational Status	Current operational state of the interface: • Up • Down • Testing • Unknown • Dormant • Not present • Lower layer down For detailed definitions of each status, see Appendix E, "Status Definitions".
Status Reason	Reason for the current status of the RAN shorthaul. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

PWE3 Backhauls Table

The PWE3 Backhauls table displays information about the PWE3 backhauls that the MWTM has discovered. A PWE3 backhaul is an object created for the logical grouping of PWE3 virtual circuits on a given node that have the same remote peer.

To display the PWE3 backhauls table, choose **Summary Lists > PWE3 Backhauls**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The PWE3 Backhauls table contains:

Column	Description
Internal ID	Internal ID of the PWE3 backhaul. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the PWE3 backhaul. This column is displayed by default.
Node	Name of the node on which this PWE3 backhaul resides. This column is displayed by default.
Peer Name	Name of the object's peer. This column is displayed by default.
Peer Node	Name of the node to which the peer object belongs. This column is displayed by default.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the PWE3 backhaul. This column is displayed by default.
Events (MWTM client only)	Indicates whether the PWE3 backhaul has received any events. If the PWE3 backhaul has received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the PWE3 backhaul.
Severity	Indicates the alarm severity for the chosen PWE3 backhaul. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the PWE3 backhaul last changed.

Column	Description
Status	Current status of the PWE3 backhaul. Possible values are: • Active • Warning • Unknown This column is displayed by default.
Status Reason	Reason for the current status of the PWE3 backhaul. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

PWE3 Virtual Circuits Table

The PWE3 virtual circuits table displays information about the PWE3 virtual circuits that the MWTM has discovered. To display the PWE3 virtual circuits table, choose **Summary Lists > PWE3 Virtual Circuits**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The PWE3 virtual circuits table contains:

Column	Description
Internal ID	Internal ID of the PWE3 virtual circuit. The internal ID is a unique ID for every object, that the MWTM assigns for its own internal use.
Name	Name of the PWE3 virtual circuits. This column is displayed by default.

Column	Description
Node	Name of the node on which this PWE3 virtual circuits resides. This column is displayed by default.
Peer Name	Name of the object's peer. This column is displayed by default.
Peer Node	Name of the node to which the peer object belongs. This column is displayed by default.
Type	Indicates the service to be carried over this virtual circuit type.
PSN Type	Packet Switched Network (PSN) type on which this virtual circuit is carried. This column is displayed by default.
ID	Virtual circuit identifier.
Primary	Indicates whether the virtual circuit is primary. A virtual circuit that services traffic is considered primary. A virtual circuit that provides redundancy is not primary. This column is displayed by default.
Remote Interface String	If provided by the protocol, displays the interface description of the remote side of the virtual circuit.
Description	Each virtual circuit is associated to an interface in the ifTable of the node as part of the service configuration. If specified, this field displays the description of the interface.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the PWE3 virtual circuits. This column is displayed by default.
Events (MWTM client only)	Indicates whether the PWE3 virtual circuits have received any events. If the PWE3 virtual circuits have received an event, an icon appears in the table cell. Clicking the icon clears the event and takes you to the Recent Events tab for the PWE3 virtual circuits.
Severity	Indicates the alarm severity for the chosen PWE3 virtual circuits. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the virtual circuit last changed.
Status	Current status of the PWE3 virtual circuits. Possible values are: • Active • Shutdown • Unknown • Warning This column is displayed by default.

Column	Description
Admin Status	Desired state of the interface: • Up • Down • Testing • Shutdown For detailed definitions of each status, see Appendix E, "Status Definitions".
Oper Status	Indicates the actual combined operational status of this virtual circuit. Oper Status is *up* if both Inbound Oper Status and Outbound Oper Status are in the *up* state. • Up • Down For detailed definitions of each status, see Appendix E, "Status Definitions".
Inbound Oper Status	Indicates the actual operational status of this virtual circuit in the inbound direction.
Outbound Oper Status	Indicates the actual operational status of this virtual circuit in the outbound direction.
Status Reason	Reason for the current status of the virtual circuits. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Access Point Names Table

The Access Point Names (APN) table displays information about the APNs the MWTM has discovered. To display the Access Point Names table, choose **Summary Lists > Access Point Names**.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

The Access Point Names table contains:

Column	Description
Internal ID	Not shown by default, the Internal ID of the APN is a unique ID for every object the MWTM assigns for its own internal use. The ID can also be useful to TAC when troubleshooting problems.
Name	Name of the APN node. This column is displayed by default.
Ignored	Indicates whether to include the signaling point when aggregating and displaying MWTM status information. This field is read-only for the web client, but editable in the Java client. Users with authentication level Network Operator (level 3) and higher can edit this field. Users with authentication level Power User (level 2) and higher can edit the Unignore field. This column is displayed by default.
Notes	Indicates whether a note is associated with the APN. This column is displayed by default.
Severity	Indicates the alarm severity for the chosen APN. The severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, Unmanaged, or Normal. See Managing Alarms and Events, page 9-1 for more information. This column is displayed by default.
Last Status Change	Date and time that the status of the access point name last changed.
Status	Current status of the access point names. Possible values are: • Active • Shutdown • Unknown • Warning This column is displayed by default.
Status Reason	Reason for the current status of the access point names. For a full list of possible reasons, see the *stateReasons.html* file. If you installed the MWTM in: • The default directory, */opt*, then the file is located at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file are located in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full text in a tooltip. The status reasons are listed in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears first. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference". This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

IP Addresses Table

You can view current IP Addresses reports using the MWTM. You can also export the reports.

IP Addresses Statistics

To display the IP Address report table, choose **Summary Lists > IP Addresses**.

The IP Addresses table is sorted based on the information in the Node column. However, you can sort the table based on the information in any of the columns (see Navigating Table Columns, page 4-23).

The IP Addresses table contains:

Field or Column[1]	Description
Node	Name or IP address of the node. To see more information for the node, click the node name. **Note** Each node can be associated with one or more IP addresses. This column is displayed by default.
IP Address	IP address of the node. This column is displayed by default.
Last Regular Poll Interval	The last time this node was polled. This column is displayed by default.
SNMP Pollable	Whether the node can be polled by SNMP (yes or no). This column is displayed by default.
IP Address Type	Indicates whether the IP address displayed is the primary or secondary IP address for the device.

1. To sort the column in descending order, click the column heading. Click again to sort the list in ascending order.

Note For toolbar details, see Using the Toolbar, page 11-6.

Point Code Table

You can view current point code reports using the MWTM. You can also export the reports.

Point Code Statistics

The Point Codes page shows all point codes that are currently being used by all nodes that the MWTM detected. To display the Point Code table, choose **Summary Lists > Point Code**.

The Point Code table is sorted based on the information in the Node column. However, you can sort the table based on the information in any of the columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Signaling Point	Signaling point that is currently being used by a node. To sort the point codes by signaling point in descending order, click the **Signaling Points** heading. Click again to sort the point codes in ascending order. This column is displayed by default.
Point Code	Point code that is currently being used by a node. To sort the point codes by point code in ascending order, click the **Point Codes** heading. This is the default display. Click again to sort the point codes in descending order. This column is displayed by default.
Node	Name or IP address of the node. To see more information for the node, click the node name. To sort the point codes by node in descending order, click the **Node** heading. Click again to sort the point codes in ascending order. This column is displayed by default.
Point Code Type	Type of point code: • **Primary**—Main point code used by a node. • **Secondary**—Alternate or backup point code used by a node. • **Capability**—Shared by more than one node, each of which is also assigned a real point code. Also called an alias point code. To sort the point codes by type in ascending order, click the **Point Code Type** heading. Click again to sort the point codes in descending order. This column is displayed by default.

Note For toolbar details, see Using the Toolbar, page 11-6.

Editing Properties

In the Edit Properties dialog box you can change the basic properties associated with these objects:

- Views
- Nodes
- Signaling Points (ITP only)
- Application Server Processes (ITP only)
- Backhauls (RAN-O only), (see Editing Properties for a RAN-O Backhaul, page 8-53)

In the MWTM web interface, to edit node's properties, select Edit Properties option from the Actions menu in the Details tab of the node. See MWTM: Edit Properties Dialog, page 11-11.

To edit a node's properties, right-click the node in the Node table in the right pane or in a view in the navigation tree, and choose **Edit > Properties** in the right-click menu. The MWTM displays the Edit Properties dialog box, which contains:

Field or Button	Description
Name	Name of the object. • **For application server processes only**—This field cannot be edited. • **For nodes only**—By default, this field displays the node's DNS name, which the MWTM discovered. However, if you modified your preferences to identify nodes by their IP addresses, then that is how the node is identified in this field. For more information, see Node Name Settings, page 4-5. • **For signaling points only**—By default, this field displays the signaling point's point code and network name, which the MWTM discovered (for example, **1.22.0:net0**). You can also use this field to specify a new, more meaningful name for the node or ITP signaling point. Remember that: • You can change an object's name to a new name or IP address. • A new name can be from 1 to 30 characters, and can contain any letters (upper- or lowercase) and any numbers, as well as blank spaces ( ), hyphens (-), and underscores (_), but no periods (**.**). If you enter a name that is longer than 30 characters, or if you enter any other special characters or periods, the MWTM beeps and retains the current name. • If you enter a name that includes a period (.), the MWTM assumes that you are entering a new IP address. A new IP address must use the *x.x.x.x* format, where *x* is between 0 and 255, and must contain only numbers and periods (.), but no letters or special characters. If you enter an IP address that contains any letters or special characters, the MWTM beeps and retains the current IP address. • If you edit an object whose current name already contains invalid characters, the MWTM beeps and replaces the name with blanks. Enter a new name that uses only valid characters, or click **Cancel** to keep the existing name. If you click **Cancel**, the MWTM exits the Edit Properties dialog box without saving any changes to the Name, Connect Address, or Icon Name field. • If you leave the Name field blank, the MWTM reverts to the object's default name (dependent upon network type). • The new object's name *is* used when launching context-based applications, such as CiscoWorks. Therefore, if the new name that you enter is not the object's DNS name, and the application knows the object by its DNS name, context links into the application for that object might not work. When you click Save, all MWTM windows are updated automatically to reflect the new name.
Connect Address (Nodes only)	Connect IP address to pass to the Telnet or SSH command. A new Telnet or SSH IP address must use the *x.x.x.x* format, where *x* is between 0 and 255, and must contain only numbers and periods, but no letters or special characters. If you enter a Telnet or SSH IP address that contains any letters or special characters, the MWTM beeps and retains the current IP address.
Connection Protocol	Connection protocol to use. You cannot modify this field.
Connect Port (Nodes only)	Port to be used with the protocol specified in the Connector Protocol field. The default values are: • 23—Telnet • 22—SSH

Field or Button	Description
Icon Name	Drop-down menu of graphic icons to assign to this object in topology maps. The MWTM automatically assigns an appropriate icon to each discovered node and to `Unknown` nodes; but, you can use this field to assign a different icon (for example, if you know that a given `Unknown` node is a mobile switching center). **Note** Additional icon types appear in the list for user customization. When the MWTM discovers a single-instance node, it assigns the icon that corresponds to the node. When the MWTM discovers a multi-instance node, it assigns a separate icon for each unique instance. Icon names include the following: • ASP—Application server process • BSC—Base Station Controller [1] • BTS—Base Transceiver Station [1] • Building—Icon representing a collection of network objects in a building. • Cisco2600—Cisco 2650, Cisco 2650XM, Cisco 2651, Cisco 2651XM • Cisco2800 • Cisco3845 • Cisco7202, Cisco7204 (Cisco 7204, Cisco 7204VXR), Cisco7206 (Cisco 7206, Cisco 7206VXR) • Cisco7301, Cisco7304 • Cisco7505, Cisco7507 (Cisco 7507, Cisco 7507mx, Cisco 7507z), Cisco7513 (Cisco 7513, Cisco 7513mx, Cisco 7513z)

Field or Button	Description
Icon Name (continued)	• Cisco 7600—Cisco 7603, Cisco 7603s, Cisco 7604, Cisco 7606, Cisco 7606s, Cisco 7609, Cisco 7609s, Cisco 7613 • CiscoMWR1900—Cisco Mobile Wireless Router 1900 • City—Icon representing a collection of network objects in a city. • Cloud—Collection of network objects, called a submap. A submap can also contain other submaps. • Database—Icon representing a database object. • IPDevice—IP device, other than those listed previously. • MatedPair—Mated pair of signaling points • MSC—Mobile switching center. • Node B—The radio transmission/reception unit for communication between radio cells [1] • PGW—Cisco Public Switched Telephone Network (PSTN) Gateway (PGW) 2200 Softswitch • RAN_SVC—RAN Service Module in the Cisco ONS 15454 • RNC—Radio Network Controller [1] • SCP—Service control point • SignalingPoint—An SCP, SSP, or STP, or an ITP instance • SSP—Service switching point • STP—Signal transfer point • Tower—Icon representing a PC tower. • TrafficGenerator—Icon representing a device or emulator used to generate traffic, usually in a test environment. • Unknown—The MWTM is unable to determine the node or signaling point type. • Workstation—Icon representing a workstation. • Workstation2—Icon representing a different workstation. When you click **Save**, the topology window is updated automatically to reflect the new icon.

Field or Button	Description
Interface Structure	Drop-down menu to configure the way the MWTM displays the physical interfaces of a node (excluding the ONS node). Choices include: • Default—Restores the interface structure to the default setting for the node. For example, if the default structure is hierarchical, choosing this option restores the parent-child hierarchy in the Physical folder. **Note** In cases where the MWTM cannot determine the interface hierarchy of a node, the MWTM sets its default structure to be flat (that is, all interfaces appear at the same level). • Force Flat—Forces the interface structure of a node to be flat (that is, no hierarchy). All interfaces in the Physical folder appear at the same level. • Force Hierarchical—Forces the interface structure of a node to be hierarchical (that is, to display parent-child relationships among interfaces). When you choose a different setting, the MWTM opens a popup with this message: `A clean poll will be triggered if this value is changed.` Click **OK** to close the popup. Click **Save** to activate your changes. You can view your changes in the MWTM client and web interfaces.
Save	Button to save the changes that you make to the object information. Updates all MWTM windows to reflect your changes, and exits the dialog box.
Restore	Button to restore changes that you make to the Name and Icon Name fields of the Edit Properties dialog box and leave the dialog box open.
Cancel	Button to exit the dialog box without saving any changes.
Help	Button to display online help for the dialog box.

1. The MWTM does not manage BSC, BTS, RNC, or Node B objects but displays them in the topology window to help you visualize the network.

Editing Properties for a RAN-O Backhaul

To edit the properties of a backhaul or virtual backhaul interface, right-click the backhaul object in the navigation tree or right pane, and choose **Edit > Properties** in the right-click menu.

The MWTM displays the Edit RAN Backhaul Properties dialog box, which contains:

Field or Button	Description
Name	Name of the backhaul. You can use this field to specify a new, more meaningful name for the backhaul. Remember that: • You can change a backhaul's name to a new name. A new name can contain: – From 1 to 30 characters – Any letters (upper- or lowercase) – Any numbers, as well as blank spaces ( ), dashes (-), underscores (_), or periods (.) If you enter a name that is longer than 30 characters, or if you enter any other special characters, the MWTM beeps and retains the current name.

Field or Button	Description
	• If you edit an object whose current name already contains invalid characters, the MWTM beeps and replaces the name with blanks. Enter a new name that uses only valid characters, or click **Cancel** to keep the existing name. If you click **Cancel**, the MWTM exits the Edit RAN Backhaul Properties dialog box without saving any changes to the Name, Connect Address, or Icon Name field. When you click Save, all MWTM windows are updated automatically to reflect the new name.
Threshold Information	Displays slider bars for controlling the Acceptable, Warning, and Overloaded threshold settings. Left-click the slider and drag it to the desired setting for each threshold. See Threshold Information (RAN-O Only), page 7-35, for descriptions of these thresholds.
Bandwidth Information	Displays: • User Send Bandwidth (bits or bytes)/sec) • User Receive Bandwidth (bits or bytes)/sec) The user bandwidth is the value that you (the user) specify for the backhaul. Send and receive values will differ if the interface is asymmetrical. The backhaul appears in the backhaul real-time chart as a percentage of the User Bandwidth. The preset value for the User Bandwidth is the same as the System Bandwidth. When you change the User Bandwidth, you are changing the scale of the Y axis of the backhaul real-time chart in the Performance tab (see Displaying Backhaul Performance Statistics, page 11-36). The X and Y values of the data do not change. The threshold ranges resize because they are percentages of User Bandwidth. The User Bandwidth represents 100%. Data points that are higher than the User Bandwidth will exceed 100%. The Y axis dynamically increases to display all data points. (See Why does my backhaul graph show greater than 100% for transmit traffic?, page C-24). • System Send Bandwidth (bits/sec) • System Receive Bandwidth (bits/sec) The system bandwidth is the value that the system specifies for the backhaul. Send and receive values will differ if the interface is asymmetrical. You cannot edit this field.
Save	Saves changes that you make to the object information, updates all MWTM windows to reflect your changes, and exits the dialog box.
Restore	Restores changes that you make to the Name, and sets the Threshold Information, and Bandwidth Information fields to the system defaults. The dialog box is left open.
Cancel	Exits the dialog box without saving any changes.
Help	Displays online help for the dialog box.

Attaching Notes

Tip Users with East Asian Languages configured on Windows are supported.

You use the MWTM to annotate an object, attaching a descriptive string to it. To attach a note to an object, in the:

- MWTM client, right-click the object in the navigation tree, then choose **Edit > Notes**. The Edit Notes dialog box appears.

- Web interface, left-click the object in the navigation tree, click the Notes tab, then click **Edit**. The text area becomes active.

Note You can add a note to a node by using either the MWTM client or the web interface. You can also view the note from either interface.

The Edit Notes dialog contains:

Field or Button	Description
Name	Name of the object. You cannot edit this field.
Note Last Updated	Date and time the Notes field for this object was last updated. If no note is currently associated with this object, this field displays the value `Not Set`. You cannot edit this field.
Notes	Notes to associate with this object. In this field, you can enter any important information about the object, such as a detailed description, location, service history, and so on.
Edit	(Web interface only) Enables you to edit or add a note in the content area.
Save	Saves changes that you make to the object's notes, updates all MWTM windows to reflect your changes, and closes the dialog box. When you annotate an object, the MWTM displays a note icon in the Notes column of all object tables for the annotated object, and the topology map in the topology window displays a note icon in the upper-left corner of the object.
Cancel	Cancels the operation without saving any changes.
Help	Displays online help for the dialog box.

Related Topic

- Viewing Notes, page 8-55

Viewing Notes

You use the MWTM to view any notes that are associated with an object. To view a note:

- Select an object in the navigation tree, then click the Notes tab.
- Right-click an object in a window, then choose **View > Notes**. (The Notes option is dimmed if no note is associated with the chosen object.)

The MWTM displays the Notes tab for the chosen object, which shows:

- Notes associated with the object.
- The date and time the notes associated with the object were last updated, or the message `Not Set` if no notes are associated with the object.
- The message `No Notes` if no notes are associated with the object.

Note The Notes tab is not supported on the DEFAULT View in the web interface.

For example, to view a note for a node, right-click the node in the Node table in the right pane or in a view in the navigation tree, then choose **View > Notes** in the right-click menu.

Related Topic

- Attaching Notes, page 8-54

Deleting Objects

After discovery, the objects in your network are known to the MWTM and added to the MWTM database. Physically deleting objects from your network is not the same as deleting them from the MWTM database. These sections describe the differences between deleting objects from your network, the MWTM database, and the MWTM discovery database, and the procedures for doing so:

- Deleting an Object from Your Network, page 8-56
- Deleting an Object from the MWTM Database, page 8-56

Deleting an Object from Your Network

If you physically delete a known object from your network (for example, by powering down a node), it remains in the MWTM database, the MWTM labels it Unknown, and the system administrator is responsible for deleting it from the MWTM database, if you choose to do so.

Note For nodes, the MWTM also labels all associated network objects Unknown because the MWTM attempts to poll the node and gets no response. For details on polling nodes, see Polling Nodes, page 7-50.

Deleting an Object from the MWTM Database

Typically, you delete an object from the MWTM database for one of these reasons:

- You physically deleted the object from your network. This is the most common reason for deleting a object from the MWTM database.
- The object state is one of these:

Object	States	Applicable To
Node	Unknown, Unmanaged	ITP and IPRAN networks
Interface	Unknown	

Object	States	Applicable To
Signaling Point	Unknown, Unmanaged	ITP networks only
Linkset	Unknown	
Link	Unknown	
Application Server	Unknown	
Application Server Process	Unknown	
Application Server Process Association	Unknown	
Signaling Gateway Mated Pair	Unknown	

You are aware of the reason for the state, and you no longer want to see the object in the MWTM displays. For example, the object might be a test lab device, or it could be associated with an object that was removed from the network.

Note If an object has at least one adjacent object in Active, Discovering, Waiting, or Warning state, you cannot delete the object. If you try, the MWTM cancels the deletion.

- If you delete all associated connections to an Unmanaged object, the MWTM does not automatically delete the object. Instead, you must manually delete the object.

If you have physically deleted a known object from your network, and you then delete it from the MWTM, it is no longer in the MWTM database, it does not appear in MWTM windows, and it is not discovered when you run discovery.

If you have *not* physically deleted a known object from your network, and you delete it from the MWTM, any associated objects are also automatically deleted from the MWTM database (if applicable). However, at the next poll the MWTM finds the object (and any associated objects) and adds it back to the MWTM database, setting the status appropriately. If this happens, do not delete the object again. Instead, set it to Ignored. See Ignoring and Unignoring Objects, page 8-60, for more information.

To delete an object from the MWTM database, use one of these procedures:

Note If you delete an object from the MWTM database, the object is deleted for all MWTM clients and views that are connected to that MWTM server.

- Select one or more objects in a window, then choose **Edit > Delete** from the MWTM main menu.
- Right-click the object in a window, then select **Delete** from the right-click menu. (You cannot delete more than one object at a time from the right-click menu.)

The MWTM asks you to confirm the deletion. Click:

- **Yes** to delete the chosen objects. The MWTM deletes the objects from the MWTM database.
- **No** to return to the window without deleting any objects from the MWTM database.

You can also enter the **mwtm delete** commands from the command line interface to delete one or more objects from the MWTM database. See mwtm delete, page B-25, for more information on the use of this command.

Deleting a Node from the MWTM Discovery Dialog

If you want to completely eliminate a given node from the MWTM database, you can delete it from the MWTM Discovery dialog box, ensuring that the MWTM never even discovers it.

Note If you delete a node from the MWTM Discovery dialog box, the node is deleted for *all* MWTM clients and views connected to that MWTM server.

To delete a node from the MWTM Discovery dialog box:

Step 1 Choose **Network > Network Discovery** from the MWTM main menu. The Discovery dialog box appears.

Step 2 Click the **Discovery** tab.

Step 3 In the Discovered Nodes table, select the node that you want to delete.

Step 4 Click **Delete Node**.

The MWTM deletes the nodes from the MWTM database, without asking for confirmation. The MWTM will no longer discover the nodes.

Unmanaging and Managing Nodes or ITP Signaling Points

You use the MWTM to change a node or any associated signaling point to the Unmanaged state. You can also remove the Unmanaged state from these objects.

In some situations, you might not want to a node or signaling point to appear in MWTM windows. However, you might be unable to delete the object from the MWTM database. For example, if:

- You have not physically deleted a known node or signaling point from your network, and you delete it from the MWTM, the object is removed from the poll list. However, at the next poll, the MWTM returns the object to the DEFAULT view. If you are using a custom view, the MWTM labels the object as new.
- A node has at least one adjacent node in Active, Discovering, Waiting, or Warning state; or, if a signaling point has at least one adjacent signaling point in Active or Warning state, you cannot delete the node or signaling point. If you try, the MWTM cancels the deletion.

In these situations, you can label the object as Unmanaged. When you set a node or signaling point to the Unmanaged state, the MWTM removes the object from the poll list.

Note Users with authentication level Network Administrator (level 4) and higher can only Unmanage nodes or ITP signaling points.

Users with authentication level System Administrator (level 5) can Manage nodes or ITP signaling points.

Note If you change a node or signaling point to the Unmanaged state, the object is Unmanaged for all MWTM clients and views connected to that MWTM server.

To label a node or signaling point Unmanaged:

Step 1 Choose the node or signaling point in a window.

Note You cannot label a node Unmanaged if it has a Node Type of Unknown. If you select a node with a Node Type of Unknown, this menu option is dimmed and cannot be chosen. If you select more than one node, and at least one of them has a Node Type of Unknown, this menu option is grayed-out and cannot be chosen.

Step 2 Select **Unmanage** from the right-click menu. The MWTM labels the chosen node and any associated signaling point(s) Unmanaged and removes them from the poll list.

Note When you set a node or signaling point to the Unmanaged state, the events for the object will continue to appear in the Events window. If you want to suppress events for unmanaged objects, see Setting Alarm or Event Filters, page 9-12).

You can also remove the Unmanaged status from a node or signaling point, when you are ready to return them to the MWTM poll list. To remove the Unmanaged status from an object:

Step 1 Select the node or signaling point in a window.

Note You cannot remove the Unmanaged status from a node with a Node Type of Unknown. If you select a node with a Node Type of Unknown, then this menu option is dimmed and cannot be chosen. If you select more than one node, and at least one of them has a Node Type of Unknown, then this menu option is grayed-out and cannot be chosen.

Step 2 Select **Manage** from the right-click menu. The MWTM removes the Unmanaged status from the chosen node, returns it to the poll list, and polls it immediately.

Note (ITP only) You can also remove the Unmanaged status from a signaling point, when you are ready to return the signaling point to the MWTM poll list. To remove the Unmanaged status from a signaling point, right-click a signaling point in a window, then select **Manage Node** from the right-click menu. The MWTM removes the Unmanaged status from the chosen signaling point, the node associated with the signaling point, and all other signaling points associated with that node. The MWTM then returns these objects to the poll list, and polls them immediately.

Note In MWTM Web interface, to manage/unmanage the nodes, select Manage/Unmanage Node option from the Actions menu of the Details tab.

Excluding Nodes or ITP Signaling Points from a View

To exclude a node or signaling point from the current view, right-click the node or signaling point in a window, then select **Exclude from View** in the right-click menu. The MWTM excludes the node or signaling point from the current view. See Creating a New View, page 6-7, for more information about excluding objects from views.

Ignoring and Unignoring Objects

You can instruct the MWTM to ignore an object when it aggregates and displays network data. Setting objects to Ignored prevents known problems from affecting MWTM displays for associated network objects. In effect, you are preventing a known problem from distracting you from other, more urgent network problems.

Example:

You can set a node to Ignored before shutting down the node for maintenance.

Note If you set an object to Ignored, the object is ignored for all MWTM clients and views connected to that MWTM server.

Also, if you set an object to Ignored, make a note of the change, and remember to reset the object when the problem is corrected or the maintenance is complete.

- To set an object to Ignored:

  Right-click the object, then select **Ignore** from the menu

  or

  In the object window in the right pane, check the **Ignored** check box.
- To display all objects that are ignored in the object window, click the Ignored column heading. The MWTM displays all ignored objects at the top of the table.
- To set an object to ignore in the topology window, select an object in the topology map, then, in the left pane, select the **Ignored** check box for the object you want to ignore.
- To unignore an object, right-click the object, then select **Unignore** from the menu.

Note In MWTM Web interface, to ignore or unignore the objects, select Ignore/Unignore option from the Actions menu of the Details tab.

CHAPTER 9

Managing Alarms and Events

You can use the Cisco Mobile Wireless Transport Manager (MWTM) to view information about alarms and events, including their associated network objects and related information.

This chapter contains:

Basic Concepts and Terms

This section contains these topics:

Event Definition

Events are created when the status of a device changes and when a user performs certain actions. MWTM detects device status changes by receiving notifications from devices and by periodically polling the devices. Examples of events include:

- An interface status changes.
- A node is unreachable by MWTM.
- A user deletes a node from the MWTM inventory.

The MWTM writes events to the MWTM database once, and they never change. By definition, an event is a historical instance in time, and the MWTM does not modify any information about the event. It is important to understand that an event, once it occurs, does not change its status even when the conditions that triggered the event are no longer present.

To view a list of recent events, click **Event History** in the navigation tree of the client or web interface. To view archived events, click **Archived** in the web interface toolbar.

Alarm Definition

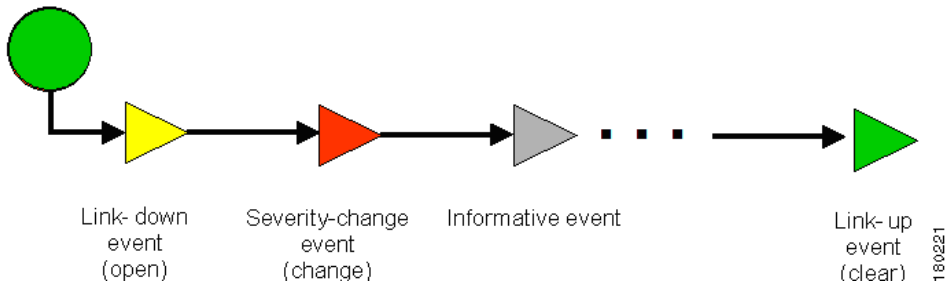
An alarm is a sequence of events, each representing a specific occurrence in the alarm lifecycle.

An alarm represents a series of correlated events that describe a fault occurring in the network or management system. An alarm describes the complete fault life cycle, from the time that the alarm is raised (when the fault is first detected) until the alarm is cleared. Examples of alarms include:

- An interface is operationally down.
- A node is unreachable by MWTM.
- There is a device fan failure.

Figure 9-1 shows an example of a sequence of correlated events that describe the lifecycle of one alarm.

Figure 9-1 Example of Alarm



The MWTM constructs alarms from a sequence of correlated events. A complete event sequence for an alarm includes a minimum of two events:

- Alarm open (for example, a link-down event raises an alarm).
- Alarm clear (for example, a link-up event clears the alarm).

The lifecycle of an alarm can include any number of correlated events that are triggered by changes in severity, updates to services, and so on. When a new related event occurs, the MWTM correlates it to the alarm and updates the alarm severity and message text based on the new event. If you manually clear the alarm, the alarm severity changes to normal. You can still view the events that formed this alarm in the Event History table.

Tip Remember that an alarm can change over time as new correlated events occur; but events, by definition, can never change. Events are historical instances in time.

To view all alarms, click **Active Alarms** in the navigation tree. By default, the navigation tree is sorted by alarm severity, with objects having the most severe alarms appearing at the top of the tree.

Note While some events correlate to a single alarm, there are events that do not raise alarms at all.

Displaying Active Alarms and Event History

You use the MWTM to view a network summary of active alarms and historical events. The contents of the Active Alarms window and the Event History window are very similar in appearance (the Active Alarms table shows fewer entries than the Event History table because multiple events are associated with a single alarm.)

Here are a few helpful facts about alarms and events:

- The MWTM displays the number of alarms or events in the message area (lower left area of the GUI).
- Not all events raise alarms.
- Alarms can be manually or automatically cleared and removed from the MWTM; events cannot be cleared, but they can be manually or automatically deleted.

To see a summary of all active alarms, in the MWTM client or web interface, click **Active Alarms** in the navigation tree. The MWTM shows the Active Alarms window in the right pane.

The Active Alarms window provides basic information about all active alarms in your network that are not excluded from your current view. The MWTM updates the information in the window at least once every minute. For more information about the Active Alarms window, see:

- Toolbar Buttons, page 9-8
- Right-click Menus, page 9-11

To see a summary of all the recent events, in the MWTM client or web interface, click **Event History** in the navigation tree. The MWTM shows the Event History window in the right pane.

For more information about the Event History window, see:

- Toolbar Buttons, page 9-8
- Right-click Menus, page 9-11

Note You can view multiple Event History windows at the same time, with different event filtering in each window or dialog box.

If you select a specific object in the navigation tree and click the Alarms tab or Recent Events tab, the MWTM shows information about the alarms or events for that object only.

You can resize each column (except when using the web interface), or sort the table based on the information in one of the columns.

Note For more information about resizing, sorting, displaying, or hiding columns, see Navigating Table Columns, page 4-23.

To see detailed information about an alarm or event, in the:

- MWTM client interface, right-click the event in a window, then select **Alarm and Event Properties** in the right-click menu.

- Web interface, select the alarm or event by checking its check box, then click the **Alarm and Event Properties** icon  in the toolbar.

Note When using the web interface to select an alarm or event in the table, you check the check box for the row. You can select multiple rows. To clear the selection, click Clear Selection in the toolbar. In the client interface, use the Shift key to select multiple rows. To clear the selection, left-click anywhere in the table.

The table columns of the Active Alarms, Alarms tab, Event History, and Recent Events tabs include:

Column	Description
Internal ID	Internal ID of the alarm or event. The internal ID is a unique ID that the MWTM assigns for its own internal use. This ID can also be useful when the Cisco Technical Assistance Center (TAC) is debugging problems.
Ack	Indicates whether the alarm or event has been acknowledged. To: • Acknowledge an unacknowledged alarm or event, use the Acknowledge toolbar button. • Make a previously acknowledged event unacknowledged, use the Unacknowledge toolbar button. This column is displayed by default.
Name	Name of the alarm or event. This column is displayed by default under Active Alarms and Alarms tab.
Alarm Nature	Nature of the alarm. The alarm nature is determined when the alarm is created. The valid values are: • ADAC - automatically detected and automatically cleared • ADMC - automatically detected and manually cleared • Undefined - undefined This column is present under Active Alarms and Alarms tab.
Alarm Type	The type of the alarm. The valid values (X.733 alarm types) are: • Communications • Processing Error • Environmental • QOS • Equipment • Undefined
Element Name	Network element name associated with the event.

Column	Description
Category	Type of the event. Default values include: • Create—Creation event, such as the creation of a seed file. • Delete—Deletion event, such as the deletion of an object or file. • Discover—Discovery event, such as Discovery beginning. • Edit—Edit event. A user has edited an object. • Ignore—Ignore event. A user has Ignored a link or linkset. • LaunchTerminal—An event related to the MWTM telnet or ssh terminal service. • Login—Login event. A user has logged in to the MWTM. • LoginDisable—LoginDisable event. The MWTM has disabled a user's User-Based Access authentication as a result of too many failed attempts to log in to the MWTM. • LoginFail—LoginFail event. An attempt by a user to log in to the MWTM has failed. • Logout—Logout event. A user has logged out of the MWTM. • OverWrite—OverWrite event. An existing file, such as a seed file or route file, has been overwritten. • Performance—Performance event. • Poll—Poll event, such as an SNMP poll. • Purge—Purge event. A user has requested Discovery with Delete Existing Data selected, and the MWTM has deleted the existing the MWTM database. • Provision—An event related to the MWTM device provisioning subsystem. • Status—Status change message generated. • Trap—SNMP trap message generated. You can customize this field (see Changing Event Categories, page 9-31). This column is displayed by default in the Event History window.
Feature	The feature name of the event. This column is displayed by default.

Column	Description
Severity	Severity of the alarm or event. Possible severities are:  Critical  Major  Minor  Warning  Normal  Indeterminate  Informational You can customize this field (see Right-Click Menu for a Specific Alarm or Event, page 9-11). To change the severity of an alarm, in the: • MWTM client interface, right-click the alarm and choose Change Severity > *new severity* from the menu. • Web interface, select the event by checking its check box, choose a new severity from the Severity drop-down menu, then click the **Change Severity** button. **Note** You cannot change the severity of an event. This column is displayed by default.
Original Severity	Original severity of the event.
Count	Number of events in the sequence of events for an alarm. This column is displayed by default in the Active Alarms window and the Alarms tab.
Note	Indicates whether a note is associated with the event.
Create Time *timezone*	Time at which this event was received. This column is displayed by default in the Event History window and the Events tab.
Create Time (Node Time Zone)	The node time zone at which the event was received.
Change Time *timezone*	Time at which this event was last updated. This column is displayed by default in the Active Alarms window and the Alarms tab.
Change Time (Node Time Zone)	The node time zone at which the event was updated.
Ack By	If you have not implemented the MWTM User-Based Access, name of the node that last acknowledged the event. If you have implemented the MWTM User-Based Access, name of the user who last acknowledged the event. If no one has acknowledged the event, this field is blank.
Ack Time *timezone*	The time at which the event was acknowledged.
Ack Time (Node Time Zone)	The node time zone at which the event was acknowledged.
Clear By	The user who cleared the event. This column is present in Active Alarms and Alarms tab and is hidden by default.

Column	Description
Clear Time	The time at which the event was cleared. This column is present in Active Alarms and Alarms tab.
Clear Time (Node Time Zone)	The node time zone at which the event was cleared. This column is present in Active Alarms and Alarms tab and is hidden by default.
Node	Name of the node associated with the alarm or event. If no node is associated with the alarm or event, None appears. This column is displayed by default.
Card (RAN-O only)	Card associated with this alarm or event.
SP (ITP only)	Name of the signaling point associated with the alarm or event. If no signaling point is associated with the alarm or event, None appears.
Linkset (ITP only)	Name of the linkset associated with the alarm or event. If no linkset is associated with the alarm or event, None appears.
Link (ITP only)	Name of the link associated with the alarm or event. If no link is associated with the alarm or event, None appears.
SGMP (ITP only)	Name of the signaling gateway-mated pair associated with the alarm or event. If no signaling gateway-mated pair is associated with the alarm or event, None appears.
ASP (ITP only)	Name of the application server process associated with the alarm or event. If no application server process is associated with the alarm or event, None appears.
AS (ITP only)	Name of the application server associated with the alarm or event. If no application server is associated with the alarm or event, None appears.
ASPA (ITP only)	Name of the application server process association associated with the alarm or event. If no application server process association is associated with the alarm or event, None appears.
Interface	Interface associated with this alarm or event.
RAN Backhaul (RAN-O only)	RAN backhaul associated with this alarm or event.
Message	The message associated with the alarm or event.

Toolbar Buttons

The Active Alarms and Event History windows in the client and the web interfaces provide these toolbar buttons:

Button	Description
 Set Filter or Modify Filter	Opens the Alarm and Event Filter dialog box.
 Apply Filter or Remove Filter	Activates and deactivates the event filter specified in the Event Filter dialog box. If: • The filter is activated, the MWTM shows only those alarms or events that pass the filter. • The filter is deactivated, the MWTM shows all alarms or events. • You activate a filter in an object's Recent Events table in the MWTM main window, the filter is activated in all Recent Events tables in the MWTM main window for all other objects. The filter is not activated in Recent Events tables in Show In New Window windows or Real-Time Data and Charts windows.
 Show only Archived Events or Show only Archived Alarms (Client interface only)	In the Active Alarms page, the Show only Archived Alarms button takes you to the Archived Alarms page in the web. In the Event History page, the Show only Archived Events button takes you to the Archived Events page in the web.
Archived (web interface only)	This option appears in the tool bar when you are viewing the Event History table or the Active Alarms table. Click the Archived button to display a table of archived events or alarms. Click the Archived button again to switch back and forth. **Caution** In the *Server.properties* file, you can limit the number of rows in the archived events table with the MAX_ ARCHIVED_EVENT_DB_ROWS property. The default value is 200,000. Increasing this value can have severe impact on server performance and can cause the server to run out of memory.
 Refresh (web interface only)	Forces a refresh of the current web page. Click this icon to refresh the current page.
 Pause Resume	Pauses or resumes the table. While the table is paused, the MWTM does not display new alarms or events in the table (unless you apply a filter or edit your preferences). When the table is resumed, all new alarms or events since the table was paused are added to the display. If alarms or events are deleted while the table is paused, they are not removed from the table. Instead, they are dimmed and cannot be acknowledged or edited. Deleted alarms or events are removed from the table when you resume the table.
All	Filters the page by all severities.

Button	Description
Critical (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Critical severity. This opens the Active Alarms filtered by Critical Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Major (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Major severity. This opens the Active Alarms filtered by Major Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Minor (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Minor severity. This opens the Active Alarms filtered by Minor Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Warning (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Warning severity. This opens the Active Alarms filtered by Critical Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Informational (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Informational severity. This opens the Active Alarms filtered by Critical Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Indeterminate (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Indeterminate severity. This opens the Active Alarms filtered by Indeterminate Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Normal (*alarm count*) (*alarm percentage*)	Filters the page to include only the alarms with Normal severity. This opens the Active Alarms filtered by Normal Severity page. **Note** The alarm count and the alarm percentage are not displayed in the Event History table.
Acknowledge	Makes the chosen alarms or events acknowledged.
Unacknowledge	Makes the chosen alarms or events unacknowledged.
Clear	Clears the chosen alarms in the Active Alarms table. When you clear an alarm, the alarm no longer affects the severity of the object (its severity changes to normal), but the alarm remains visible in the Active Alarms table. This option is not available for events.
Delete	Deletes the chosen alarms or events. When you delete an alarm or event, you remove it from the table, and the MWTM archives the alarm or event in its database. Also, the alarm or event no longer affects the severity of the object.

Button	Description
 Clear and Delete	Clears the chosen alarms and also deletes them from the Active Alarms table. Use the Clear and Delete button if you need to designate an alarm as manually cleared before deleting it. When you use the Clear and Delete button, the MWTM changes the alarm severity of the object to normal, sends an alarm log message to */opt/CSCOsgm/logs/messageLog.txt*, and sends a trap to a northbound host to indicate that the alarm cleared. This option is not available for events.
 Event Properties	Opens the Alarm and Event Properties window, Properties tab.
 Events for Alarm	Launches a dialog that shows a table of events that are associated with the selected alarm. (This button is only available in alarm tables.)
 Edit Notes	Opens the Alarm and Event Properties window, Notes tab.
 Time Difference	Shows the time difference in days, minutes, hours, and seconds between two alarms or events. In the client interface, use the Ctrl key to select two alarms or events. In the web interface, check the check boxes of two alarms or events. Then click the Time Difference button.
 Find (Client interface only)	Finds specified text in the Active Alarms or Event History table.
 Create Sound Filter (Client interface only)	Opens the Event Sound Filters dialog box, with fields populated based on the chosen event.
 Adjust Row Height (Client interface only)	Adjusts the table row height and wraps the message text. Click: • Once to double the row height and wrap the message text. • Again to triple the row height and wrap the message text. • Again for single row height and no message text wrapping. This is the default setting. This setting is saved automatically with your preferences.
 Export the report as a CSV file (Web interface only)	Exports the alarms and events related table data to a report with comma-separated values (CSV file). You can save this file to disk or open it with an application that you choose (for example, Microsoft Excel).
 Help for Event	Shows context-sensitive help for the chosen alarm or event in a separate browser window.

Right-click Menus

In the MWTM client interface navigation tree, to display the right-click menu for all:

- Alarms, right-click Active Alarms (see Right-Click Menu for All Alarms and Events, page 9-11).
- Events, right-click Event History (see Right-Click Menu for All Alarms and Events, page 9-11).

In the MWTM client interface, to display the right-click menu for a specific alarm or event, right-click the alarm or event in the right pane (see Right-Click Menu for a Specific Alarm or Event, page 9-11).

Note Right-click menus are available only in the MWTM client interface.

Right-Click Menu for All Alarms and Events

To see the right-click menu for all active alarms, in the MWTM client interface, select Active Alarms or Event History in the navigation tree and right-click the mouse button.

Menu Command	Description
Show In New Window	Opens the Active Alarms or Event History window in a new window.
Back > *List of Windows*	Navigates back to a window viewed in this session. The MWTM maintains a list of up to 10 Back windows.
Forward > *List of Windows*	Navigates forward to a window viewed in this session. The MWTM maintains a list of up to 10 Forward windows.

Right-Click Menu for a Specific Alarm or Event

To see this menu, in the MWTM client interface, select an alarm or event and right-click the mouse button.

The right-click menu provides these options:

Menu Command	Description
Edit Notes	Opens the Edit Alarm and Event Notes dialog for the chosen alarm or event.
Go To > *Object*	Shows the window for the object associated with the chosen alarm or event. If no object is associated with the alarm or event, this option is not visible.
Change Severity	Changes the alarm severity to critical, major, minor, warning, informational, indeterminate, or normal. **Note** This right-click menu option appears only in the Active Alarms window.
Acknowledge	Makes the chosen alarms or events acknowledged.
Unacknowledge	Makes the chosen alarms or events unacknowledged.
Clear	Clears the chosen alarm in the Active Alarms table. When you clear an alarm, the alarm no longer affects the severity of the object (its severity changes to normal). The alarm remains visible in the Active Alarms table for 24 hours. After 24 hours, the MWTM archives the alarm in its database. This option is not available for events. **Note** This right-click menu option appears only in the Active Alarms window.

Menu Command	Description
Delete	Deletes the chosen alarm or event. When you delete an alarm or event, you remove it from the table, and the MWTM archives the alarm or event in its database. Also, the alarm or event no longer affects the severity of the object.
Clear and Delete	Clears the chosen alarm and also deletes it from the Active Alarms table. Use the Clear and Delete button if you need to designate an alarm as manually cleared before deleting it. When you use the Clear and Delete button, the MWTM changes the alarm severity of the object to normal, sends an alarm log message to */opt/CSCOsgm/logs/messageLog.txt*, and sends a trap to a northbound host to indicate that the alarm cleared. This option is not available for events. **Note** This right-click menu option appears only in the Active Alarms window.
Properties	Opens the Alarm and Event Properties dialog.
Create Sound Filter	Opens the Event Sound Filters dialog box, with fields populated based on the chosen event.
Help for Event	Shows context-sensitive help for the chosen event in a separate browser window.

Managing Filters for Alarms and Events

You can use the MWTM to create filters to customize the information visible for events and alarms.

- Setting Alarm or Event Filters, page 9-12
- Loading Existing Filters, page 9-19
- Saving Filter Files, page 9-20

Setting Alarm or Event Filters

You can use the MWTM Alarm and Event Filter dialog box to change the way alarm or event information appears.

Note You can access the Alarm and Event Filter dialog box through the client interface or the web interface. Minor differences that exist are noted in this section.

To change the way the MWTM presents event information, click **Event History** in the navigation tree, then click the Modify event filter tool  at the top of the Event History window. The Alarm and Event Filter dialog box appears (in the client interface, the window appears with the Properties tab chosen).

Note The Selected Objects tab is available only in the client interface.

For more information about the Alarm and Event Filter dialog box, see these sections:

- Alarm and Event Filter Buttons, page 9-13
- Alarm and Event Filter Panes, page 9-13
- Selected Objects Settings, page 9-16
- Event Filter Example, page 9-19

Related Topics

- Loading Existing Filters, page 9-19
- Saving Filter Files, page 9-20
- Viewing Properties for Alarms and Events, page 9-21

Alarm and Event Filter Buttons

The Alarm and Event Filter dialog box contains:

Button	Description
Select All	Checks all check boxes in the section.
Deselect All	Unchecks all check boxes in the section.
OK	Applies any changes you made to the filter and closes the Alarm and Event Filter dialog box.
Load	Opens the Load File Dialog, which you use to load an already existing filter file. If you are viewing events for a specific object in the navigation tree of the MWTM main window, this button is not available.
Save	Opens the Save File Dialog, which you use to save the filter file with a new name, or overwrite an existing filter file. If you are viewing events for a specific object in the navigation tree of the MWTM main window, this button is not available.
Cancel	Closes the Alarm and Event Filter dialog box without applying any changes to the filter.
Help	Shows online help for the current dialog box.

Alarm and Event Filter Panes

You use the Alarm and Event Filter panes in the Alarm and Event Filter dialog box to specify the types of alarms or events the MWTM should display in the Active Alarms or Event History window, including the category, feature, and severity of the alarm or event.

The Alarm and Event Filter dialog box contains these panes:

- Categories, page 9-13
- Severities, page 9-14
- Features, page 9-14
- Other, page 9-15

Categories

Use the Categories pane of the Alarm and Event Filter dialog box to specify which event categories you want to display in the Active Alarms or Event History window.

The following categories are available:

- Status
- Trap
- Create

- Delete
- Discover
- Edit
- Ignore
- Login
- LoginDisable
- LoginFail
- Logout
- OverWrite
- Poll
- Purge
- Provision
- LaunchTerminal
- Performance

All categories are checked by default. You can click Deselect All, or Select All.

Note These are the default categories; there might be additional categories that the MWTM system administrator defines. For information about custom categories, see Changing Event Categories, page 9-31.

Severities

Use the Severities pane of the Alarm and Event Filter dialog box to specify which alarm/event severities you want to display in the Active Alarms or Event History window.

The Severities pane contains these default fields:

Check box	Description
Informational	Indicates whether events of the specified severity appear in the Active Alarms/Event History window. Check boxes are checked by default.
Normal	
Indeterminate	
Warning	
Critical	
Minor	
Major	

Features

Use the Features pane of the Alarm and Event Filter dialog box to specify which event features you want to display in the Active Alarms or Event History window.

The following features are available:

- Unknown

- ITP
- CSR
- ONS
- RAN_SVC
- GGSN
- CSG1
- CSG2
- CDT
- BWG
- HA
- mSEF
- IP-RAN
- MetroE-Switch
- Generic
- PDSN
- PDNGW
- SGW
- PCRF

All categories are checked by default. You can click Deselect All, or Select All.

Other

Use the Other pane of the Alarm and Event Filter dialog box to further define the filter for the Active Alarms or Event History window. These settings are applied to all alarm/event displays in the current view.

Field	Description
Acknowledged	Check box indicating whether only acknowledged alarms/events appear in the Active Alarms/Event History window. This check box is unchecked by default.
Unacknowledged	Check box indicating whether only unacknowledged alarms/events appear in the Active Alarms/Event History window. This check box is checked by default.
Time Before	Check box indicating whether only alarms/events that the MWTM logs prior to a specified date and time appear in the Active Alarms/Event History window. This check box is unchecked by default.
Time Before	Specifies the date and time prior to which alarms/events that the MWTM logs appear in the Active Alarms/Event History window. This field is dimmed unless the Time Before check box is checked.
Time After	Check box indicating whether only alarms/events that the MWTM logs after a specified date and time appear in the Active Alarms/Event History window. This check box is unchecked by default.
Time After	Specifies the date and time after which alarms/events that the MWTM logs appear in the Active Alarms/Event History window. This field is dimmed unless the Time After check box is checked.

Field	Description
Name or Message Matches	Check box indicating whether only alarms/events that contain the specified message text appear in the Active Alarms/Event History window. This check box is unchecked by default. The Name or Message Matches field value is retained after a message filter is set.
Match Case	Check box indicating whether only alarms/events that match the case of the text in the Name or Message Matches field should appear in the Active Alarms/Event History window. This field is dimmed unless the Name or Message Matches check box is checked. The default setting for Match Case check box is unchecked, if the Name or Message Matches check box is checked. Also, the check box is disabled, if the Match Regex check box is checked. The Active Alarms/Event History table is filtered properly based on the text entered in the Name or Message Matches text box (case sensitive), if Match case check box is selected. The check box Match Case is retained after a message filter is set.
Match Regex	Check box indicating whether only alarms/events that match the regular expression of the text in the Name or Message Matches field should appear in the Active Alarms/Event History window. This field is dimmed unless the Name or Message Matches check box is checked. The default setting for Match Regex check box is unchecked, if the Name or Message Matches check box is checked. Also, the check box is disabled, if the Match Case check box is checked. The Active Alarms/Event History table is filtered properly based on the regular expression entered in the Name or Message Matches text box (case sensitive), if Match Regex check box is selected. The check box Match Regex is retained after a message filter is set. **Note** If invalid regex is provided then Active Alarms/Event History table does not contain any row.
Suppress for unmanaged nodes	Check box for suppressing alarms/events for any objects that have been set to the unmanaged state (see Unmanaging and Managing Nodes or ITP Signaling Points, page 8-58, for steps to set an object to the unmanaged state). To suppress alarms/events for unmanaged objects, check the check box. To retain alarms/events for unmanaged objects, uncheck the check box. If you are viewing alarms/events for a specific object in the navigation tree of the MWTM main window, this button is not available.

Selected Objects Settings

Note The Selected Objects tab is not available in the Events dialog box if you are viewing events:

- For a specific object in the navigation tree of the MWTM main window.
- Using the web interface.

To specify an object for which the MWTM should display alarms or events in the Active Alarms/Event History window:

Step 1 Click **Active Alarms** or **Event History** or in the navigation tree.

The Active Alarms or Event History window appears in the right pane.

Step 2 Click the Set Filter tool  at the top of the window.

The Alarm and Event Filter dialog box appears with the Properties tab chosen.

Step 3 Click the **Selected Objects** tab.

The Selected Objects settings contains:

Field or Button	Description
Node	Drop-down list box of all nodes that the MWTM has discovered. If you: • Want to filter alarms/events based on a node, select a node from the drop-down list box. • Do not want to filter alarms/events based on a node, select None. The MWTM grays-out the other object fields. This is the default setting.
ApplicationServerProcess (ITP only)	Drop-down list box of all application server processes associated with the chosen node: • If you want to filter alarms/events based on an application server process, select an application server process from the drop-down list box. • If you do not want to filter alarms/events based on an application server process, select None. This is the default setting.
SignalingGatewayMatedPair (ITP only)	Drop-down list box of all signaling gateway-mated pairs associated with the chosen node: • If you want to filter alarms/events based on a signaling gateway-mated pair, select a signaling gateway-mated pair from the drop-down list box. • If you do not want to filter alarms/events based on a signaling gateway-mated pair, select None. This is the default setting.
SignalingPoint (ITP only)	Drop-down list box of all signaling points associated with the chosen node: • If you want to filter alarms/events based on a signaling point, select a signaling point from the drop-down list box. • If you do not want to filter alarms/events based on a signaling point, select None. This is the default setting.
Linkset (ITP only)	Drop-down list box of all linksets associated with the chosen signaling point: • If you want to filter alarms/events based on a linkset, select a linkset from the drop-down list box. • If you do not want to filter alarms/events based on a linkset, select None. This is the default setting.
Link (ITP only)	Drop-down list box of all links associated with the chosen linkset: • If you want to filter alarms/events based on a link, select a link from the drop-down list box. • If you do not want to filter alarms/events based on a link, select None. This is the default setting.
ApplicationServer (ITP only)	Drop-down list box of all application servers associated with the chosen signaling point: • If you want to filter alarms/events based on an application server, select an application server from the drop-down list box. • If you do not want to filter alarms/events based on an application server, select None. This is the default setting.

Field or Button	Description
ApplicationServerProcess Association (ITP only)	Drop-down list box of all application server process associations associated with the chosen application server: • If you want to filter alarms/events based on an application server process association, select an application server process association from the drop-down list box. • If you do not want to filter alarms/events based on an application server process association, select None. This is the default setting.
Card (RAN-O only)	Drop-down list box of all cards associated with the chosen node: • If you want to filter alarms/events based on a card, select a card from the drop-down list box. • If you do not want to filter alarms/events based on a card, select None. This is the default setting.
Interface	Drop-down list box of all interfaces (including subinterfaces) associated with the chosen node or card: • If you want to filter alarms/events based on an interface, select an interface from the drop-down list box. • If you do not want to filter alarms/events based on an interface, select None. This is the default setting.
Backhaul (RAN-O only)	Drop-down list box of all RAN backhauls associated with the chosen node or card: • If you want to filter alarms/events based on an interface, select an interface from the drop-down list box. • If you do not want to filter alarms/events based on an interface, select None. This is the default setting.
Selected Objects: Object Type	Indicates the type of object, if any, on which the filter is based.
Selected Objects: AS (ITP only)	Indicates the application server, if any, on which the filter is based.
Selected Objects: ASP (ITP only)	Indicates the application server process, if any, on which the filter is based.
Selected Objects: ASPA (ITP only)	Indicates the application server process application, if any, on which the filter is based.
Selected Objects: Link (ITP only)	Indicates the link, if any, on which the filter is based.
Selected Objects: Linkset (ITP only)	Indicates the linkset, if any, on which the filter is based.
Selected Objects: Node	Indicates the node, if any, on which the filter is based.
Selected Objects: SGMP (ITP only)	Indicates the signaling gateway-mated pair, if any, on which the filter is based.
Selected Objects: SP (ITP only)	Indicates the signaling point, if any, on which the filter is based.
Selected Objects: SP (GGSN, PDNGW, SGW only)	Indicates the access point name, if any, on which the filter is based.

Field or Button	Description
Selected Objects: Card (RAN-O only)	Indicates the card, if any, on which the filter is based.
Selected Objects: Interface	Indicates the interface or subinterface, if any, on which the filter is based.
Selected Objects: Backhaul (RAN-O only)	Indicates the RAN backhaul, if any, on which the filter is based.

Event Filter Example

This example shows how to set an event filter to display trap messages for warning events for a specific node. You perform this procedure by using the MWTM client interface.

Step 1 Choose **Event History** in the navigation tree of the MWTM main window of the client interface.

Step 2 Click the Event Filter tool  at the top of the Event History window.

The Event Filter dialog box appears with the Properties tab chosen.

Step 3 In the Categories pane, uncheck all check boxes except for the Trap check box.

Step 4 In the Severities pane, uncheck all check boxes except for the Warning check box.

Step 5 Click the Selected Objects tab.

Step 6 In the drop-down list box, choose a node from the list of discovered nodes.

Step 7 To activate the event filter and close the Event Filter dialog box, click **OK**.

Step 8 To save the event filter for future use:

a. In the Event Filter dialog box, click **Save**. This action opens the Save Filter dialog box.

b. In the Save Filter dialog box, enter a meaningful name in the Filename text box (for example, Node109-WarningTraps).

c. Click **OK** to close the Save Filter dialog box.

d. Click **OK** to close the Event Filter dialog box.

In the future, to view traps for warning events for Node109, click **Load** in the Event Filter dialog box, choose the Node109-WarningTraps filter, then click **OK**. The Events window will only display warning traps for Node109 until you load a different event filter or change the current one.

Loading Existing Filters

You use the MWTM client interface to load a specific filter file and change the list of filter files.

To load an existing filter, click **Load** in the Alarm and Event Filter dialog box. The Load File Dialog: Load Filter dialog box appears.

The Load File Dialog: Load Filter contains:

Field or Button or Icon	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the filter file or folder.
Last Modified	Date and time the filter file or folder was last modified.
Size (bytes)	Size of the filter file or folder, in bytes.
Number of Files (appears in lower left corner)	Total number of filter files and folders.
OK	Loads the chosen filter, saves any changes you made to the list of files, and closes the dialog box. To load an filter file, double-click it in the list, select it in the list and click **OK**, or enter the name of the file and click **OK**. The MWTM loads the filter file, saves any changes you made to the list of files, closes the Load File Dialog: Load Filter dialog box, and returns to the Alarm and Event Filter dialog box.
Delete	Deletes the chosen file from the filter file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without loading an filter file or saving any changes to the filter file list.
Help	Shows online help for the dialog box.

Saving Filter Files

You use the MWTM client interface to save a specific filter file and change the list of filter files.

When you are satisfied with the filter settings, click **Save** in the Alarm and Event Filter dialog box. The Save File Dialog:Save Filter dialog box appears.

The Save File Dialog: Save Filter contains:

Field or Button or Icon	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the filter file or folder.
Last Modified	Date and time the filter file or folder was last modified.
Size (bytes)	Size of the filter file or folder, in bytes.
Filename	Name by which you want to save the filter file. If you create a new filter filename, you can use any letters, numbers, or characters in the name that are allowed by your operating system. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*.
Number of Files (visible in bottom left corner)	Total number of filter files and folders.

Field or Button or Icon	Description
OK	Saves any changes you made to the current filter file and closes the dialog box. To save the filter file with a new name, use one of these procedures. To save the file with: • A completely new name, enter the new name and click **OK**. • An existing name, overwriting an old filter file, select the name in the list and click **OK**. The MWTM saves the filter file with the new name, saves any changes you made to the list of files, closes the Save File Dialog: Save Filter dialog box, and returns to the Alarm and Event Filter dialog box.
Delete	Deletes the chosen file from the filter file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without saving the filter file or saving any changes to the filter file list.
Help	Shows online help for the dialog box.

Viewing Properties for Alarms and Events

You use the MWTM to view detailed information about a chosen alarm or event, including its associated object, status, and other information.

To view detailed information about an alarm or event, in the:

- MWTM client interface, right-click the alarm or event in a window, then select **Event Properties** in the right-click menu.
- Web interface, select an alarm or event by checking its check box, then click the **Event Properties** icon  in the toolbar.

The Event Properties dialog box appears. The Event Properties dialog box contains:

Tab, Field, or Button	Description
Message	Message text for the alarm or event. You can customize this field (see Changing the Way the MWTM Processes Events, page 9-24).
Properties	Tab that shows detailed information about the chosen alarm or event.
Notes	Tab that shows notes associated with this alarm or event. If no note is currently associated with this alarm or event, this field shows the value *No Notes*. In the Notes tab, the date and time the Notes field for this alarm or event was last updated. If no note is currently associated with this alarm or event, this field shows the value *Not Set*.
Details	Tab that shows specific alarm or event attributes.
Events for Alarm	Tab that shows a table of events that are associated with the selected alarm. This tab does not appear in the Event Properties dialog box selected via Event History link.

Tab, Field, or Button	Description
Category	Type of the alarm or event. Default values are: • **Create**—Creation event, such as the creation of a seed file. • **Delete**—Deletion event, such as the deletion of an object or file. • **Discover**—Discovery event, such as Discovery beginning. • **Edit**—Edit event. A user has edited an object. • **Ignore**—Ignore event. A user has ignored a link or linkset. • **Login**—Login event. A user has logged in to the MWTM. • **LoginDisable**—LoginDisable event. The MWTM has disabled a user's User-Based Access authentication as a result of too many failed attempts to log in to the MWTM. • **LoginFail**—LoginFail event. A user's attempt to log in to the MWTM has failed. • **Logout**—Logout event. A user has logged out of the MWTM. • **OverWrite**—OverWrite event. An existing file, such as a seed file or route file, has been overwritten. • **Poll**—Poll event, such as an SNMP poll. • **Purge**—Purge event. A user has requested Discovery with Delete Existing Data selected, and the MWTM has deleted the existing MWTM database. • **Status**—Status change message generated. • **Trap**—SNMP trap message generated. You can customize this field (see Changing Event Categories, page 9-31).
Severity	Severity of the alarm or event. Possible severities are:  Critical  Major  Minor  Warning  Normal  Indeterminate  Informational You can customize this field (see Right-Click Menu for a Specific Alarm or Event, page 9-11).
Original Severity	Original severity of the alarm or event.
Create Time	Date and time the event was logged.
Change Time	Date and time the alarm last changed. **Note** This field is important only for alarms.
Acknowledged	Indicates whether the alarm or event has been acknowledged.
Acknowledged By	Name of the node that last acknowledged the alarm or event. If no one has acknowledged the alarm or event, this field is not shown.
Acknowledge Time	The time at which the event was acknowledged.
Cleared By User ID	The user who cleared the event.
Cleared Time	The time at which the event was cleared.

Tab, Field, or Button	Description
Internal ID	An internal identification that the MWTM uses for the alarm or event.
Name	The name for the alarm or event, for example, InterfaceState.
Alarm Nature	Nature of the alarm.
Alarm Type	Type of the alarm.
Count	Number of events in the sequence of events for an alarm. **Note** This field is important only for alarms because an event count will always be 1.
Element Name	Name of the managed element, for example, the node name.
object name	Name of the object associated with the alarm or event. The object can be: • Node or Interface • ITP objects: SP, Linkset, Link, AS, ASP, ASPA, SGMP • RAN-O objects: RAN Backhaul, Card • APN objects are applicable for GGSN
Node	Name of the node associated with the alarm or event.
Create Time (Node Time Zone)	The node time zone at which the event was received.
Change Time (Node Time Zone)	The node time zone at which the event was updated.
Acknowledge Time (Node Time Zone)	The node time zone at which the event was acknowledged.
Clear Time (Node Time Zone)	The node time zone at which the event was cleared.

Attaching Notes to Alarms or Events

You use the MWTM to annotate an alarm or event, attaching a descriptive string to it.

To annotate an alarm or event in the:

- MWTM client, right-click an alarm or event in the Event History window, then select **Edit Notes** in the right-click menu. The Edit Event dialog box appears.
- Web interface, select an alarm or event in the Event History window by checking its check box, then click the **Edit Notes** icon  . The Event Properties dialog box appears, with the Notes tab chosen.

Note You can add a note to an alarm or event by using either the MWTM client or the web interface. You can also view the note from either interface.

The Edit Event Dialog contains:

Field or Button	Description
Name	Message text of the alarm or event.
Last Update	Date and time the Notes field for this alarm or event was last updated. If no note is currently associated with this alarm or event, this field shows the value *Not Set*. You cannot edit this field.
Notes	Notes to associate with this alarm or event. In this field, you can enter any important information about the alarm or event, such as its associated object, what triggered the alarm or event, how often it has occurred, and so on.
Edit	Enables you to edit or add a note.
Save	Saves changes you have made to the alarm or event information.
Cancel	Cancels the operation without saving any changes.
Help	Shows online help for the current window.

Related Topic

Viewing Properties for Alarms and Events, page 9-21

Viewing Archived Event Files on the Web

The All Network Event Archived Files page provides access to archived alarm and event files for the server to which you are connected.

To access archived event files:

Step 1 In a web browser, navigate to the MWTM web interface (for details, see Accessing the MWTM Web Interface, page 11-2).

Step 2 Choose **File Archive > Events** from the web navigation tree.

In the Last Modified Date column, choose the day you want to view archived event files for.

Step 3 Adjacent to the date you have chosen, click the **Status Changes and SNMP Traps** link under **View**. The Network Status Archive page appears, showing a list of the status and trap messages in the archive.

Changing the Way the MWTM Processes Events

The types of MWTM events are:

- **Trap events**—Incoming events that the MWTM does not solicit
- **Status events**—Status changes that the MWTM detects
- **User Action events**—Events that user actions trigger

In those broad types, there occur subordinate types of events, each with a default category, severity, color, message text, and event help file. You use the MWTM to change the default characteristics of each type of event, tailoring them to meet your needs.

Note Changes you make to the MWTM event processing can adversely affect your operating environment. In most environments, the MWTM recommends that you use the default event-processing settings without modification.

To change the MWTM event processing, use one of these procedures:

- Choose **Tools > Event Editor** from the MWTM main menu of the client interface
- Choose **Start > Programs > Cisco MWTM Client > MWTM Event Editor** in Windows.
- Enter the **mwtm eventeditor** command (see mwtm eventeditor, page B-30).

The MWTM launches the MWTM Event Editor in the client interface. The Event Editor is not available in the web interface.

Note To use the Event Editor, you must be a power user (level 2) or higher.

You use the Event Editor to customize the visible category, severity, color, and message associated with events; and load, save, and deploy customized event configurations. You can also specify a list of SNMP servers to which the MWTM should forward events in the form of traps.

The high-level MWTM event processing settings appear in the navigation tree in the left pane in the MWTM Event Editor window. The detailed settings for each high-level setting appear in the content area in the right pane.

The MWTM Event Editor menu provides these options:

Menu Command	Description
File > Load Draft	Loads the local copy of the event configuration that you saved.
File > Save Draft (Ctrl-S)	Saves a local copy of the event configuration, including any changes you made by using the Event Editor. You can save only one local copy of the event configuration. You cannot specify a filename for the local copy.
File > Load Default	Loads the default event configuration on this MWTM client. The default event configuration is the standard event configuration that the MWTM uses when it is first installed. The default event configuration stored on the MWTM server and shared by all MWTM clients, but the clients cannot modify it.
File > Load Running	Loads the event configuration that is currently running on the MWTM server.
File > Load Backup	Loads the backup event configuration from the MWTM server. The MWTM creates a backup event configuration every time the event configuration on the MWTM server is overwritten.
File > Revert	Reverts to the last event configuration that was loaded on the MWTM client. This could be the draft, default, running, or backup event configuration.

Menu Command	Description
File > Deploy	Deploys the event configuration that is currently being edited on this MWTM client to the MWTM server. The deployed event configuration does not take effect until you restart the MWTM server. When you restart the MWTM server, the MWTM automatically reflects your changes to the event configuration on the MWTM server and on all MWTM clients that connect to that server, and reflects any new or changed categories, severities, and other event characteristics in its web navigation bars.
File > Exit	Closes the Event Editor window. If you have made any changes to the event configuration, the MWTM asks if you want to save the changes before leaving the window. Click: • **Save Draft** to save the changes in a local copy of the event configuration. You can save only one local copy of the event configuration. You cannot specify a filename for the local copy. • **Deploy** to deploy the event configuration, including any changes you made, to the MWTM server. The deployed event configuration does not take effect until you restart the MWTM server. When you restart the MWTM server, the MWTM automatically reflects your changes to the event configuration on the MWTM server and on all MWTM clients that connect to that server, and reflects any new or changed categories, severities, and other event characteristics in its web display navigation bars. • **No** or **Cancel** to close the prompt window and return to the Event Editor window.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

This section provides this information:

Changing Event Limits

To change limits for the MWTM event database, click the turner beside Event Configuration, then click **Limits**. The Limits Configuration window appears in the right pane.

Field	Description
MaxEventDbRecords	Sets the maximum number of events allowed in the in-memory or active database. You can observe these events in the client NBAPI. The MWTM archives deleted events. By default, the active database can hold a maximum of 10,000 events. If the database exceeds 10,000 events, the MWTM archives the oldest events until the database is reduced to 10,000 events. To change the size of the active database, enter the new size, in number of events, in this field. The valid range is 0 events (that is, no limit) to an unlimited number of events. The default setting is 10,000 events. **Note** As you increase the size of the event database, you negatively impact the performance of the MWTM server and clients.
MaxAlarmDbRecords	Sets the maximum number of alarms allowed in the in-memory or active database. You can observe these alarms in the client NBAPI. The MWTM archives deleted alarms. By default, the active database can hold a maximum of 10,000 alarms. If the database exceeds 10,000 alarms, the MWTM archives the oldest alarms until the database is reduced to 10,000 alarms. To change the size of the active database, enter the new size, in number of alarms, in this field. The valid range is 0 alarms (that is, no limit) to an unlimited number of alarms. The default setting is 10,000 alarms. **Note** As you increase the size of the alarm database, you negatively impact the performance of the MWTM server and clients.
MaxEventTimeToLive	Sets the maximum length of time, in days, the MWTM should retain events in the in-memory or active database.You can observe these events in the client NBAPI. The MWTM archives deleted events. By default, the active database retains events a maximum of 7 days. The MWTM archives events that are older than 7 days. To change the maximum age for events, enter the new age, in days, in this field. The valid range is 0 days (events are purged at each maintenance interval) to an unlimited number of days. The default setting is 7 days.
CompressEventDbInterval	Sets the length of time, in minutes, between maintenance checks of the in-memory or active database. The MWTM archives these events and alarms when this task runs. Also, the oldest archived events and alarms may be deleted from the database. By default, the MWTM performs maintenance on the active database every 15 minutes, archiving all events and alarms in excess of 10,000, all events older than 7 days, and all alarms older than 14 days. To change the maintenance interval, enter the new interval, in minutes, in this field. The valid range is 0 minutes (perform continual maintenance; not advised) to an unlimited number of minutes. The default setting is 60 minutes. **Note** The smaller the maintenance interval, the greater the negative impact on the performance of the MWTM server and clients.

Field	Description
AutomationTimeout	Sets the maximum length of time, in seconds, the MWTM should allow an event automation script to run. By default, the MWTM event database allows an event automation script to run for 300 seconds (5 minutes) before canceling the script and moving on. To change the event automation timeout interval, enter the new interval, in seconds, in this field. The valid range is 0 seconds (no automation) to an unlimited number of seconds. The default setting is 300 seconds. **Note** The MWTM runs each automation script sequentially, not in parallel. Therefore, the longer the automation timeout interval, the greater the chance that a failed script can delay subsequent scripts.
ProcessUndiscovered	Determines whether the MWTM should process events from undiscovered nodes: • **False**—Do not process events from undiscovered nodes. This setting is the default. • **True**—Begin processing events from undiscovered nodes.
Send Updates	Determines whether the MWTM should send traps northbound: • **False**—Do not send traps northbound when an event is updated or deleted. Only send traps when an event is new. This setting is the default. • **True**—(Default setting) Send traps northbound when an event is updated, deleted, or new.
ProcessUnrecognizedTraps	Determines whether the MWTM should create events for unrecognized traps: • **False**—Do not create events for unrecognized traps. • **True**—(Default setting) Create events for unrecognized traps.
TrapGenThrottle	A delay (in milliseconds) between each trap sent to a northbound host. This value is helpful if the MWTM is sending traps faster than the northbound host can receive them. The default is 10 milliseconds.
HeartbeatTrapInterval	A delay (in seconds) between each heartbeat trap sent to a northbound host. If this value is zero or less than one, no heartbeat trap is sent. The default is 0.
MaxArchivedRecords	The maximum number of alarms and events allowed in the archive database. The default is 200,000.
MaxAlarmAge	The maximum age, in days, of all active alarms in the database. The default is 14 days.
CloneAlarms	⚠ **Caution** This feature is for advanced users (Cisco developers and third-party integrators). Determines whether the MWTM should create separate alarm instances from underlying events: • **False**—No alarms are created. • **True**—Alarms are created from underlying events. This setting is the default.

Field	Description
AllowEventDeduplication	⚠ **Caution** This feature is for advanced users (Cisco developers and third-party integrators). Determines whether the MWTM should eliminate redundant (duplicate) events if a correlation key has been specified and enabled: • **False**—The MWTM does not eliminate duplicate alarms. This setting is the default. • **True**—The MWTM eliminates duplicate alarms.
AllowStateAggregation	⚠ **Caution** This feature is for advanced users (Cisco developers and third-party integrators). Determines whether the MWTM should allow alarms to change the state of the node: • **False**—Alarms will not affect the node state. • **True**—Alarms will affect the node state. This setting is the default.
ClearedAlarmsTimetoLive	The time, in minutes, before the MWTM archives cleared alarms. The default setting is 1440 minutes (24 hours).
SendEvents	Determines whether the MWTM should send events to a northbound system: • **False**—(Default setting) Does not send events to the northbound system. • **True**—Sends events to the northbound system.
SendAlarms	Determines whether the MWTM should send alarms to a northbound system: • **False**—Does not send alarms to the northbound system. • **True**—(Default setting) Sends alarms to the northbound system.
UseAlternateTrapOids	When set to true, allows user-specified trap OIDs (SNMPv1 trap enterprise/specific type or SNMPv2 snmpTrapOID)
ClearAlarmsOnUpdate	When set to true, automatically clears outstanding alarms when a new event in the alarm sequence occurs.
DeleteAlarmsOnUpdate	When set to true, automatically deletes outstanding alarms when a new event in the alarm sequence occurs.
SendAlarmSetsAndClears	When set to true, sends a northbound notification only when an alarm is raised and when it is cleared.
ArchiveActiveAlarms	Determines whether the MWTM should archive alarms. • **True**—(Default setting) Allows alarm achiving in accordance with both MaxAlarmAge and MaxAlarmDbRecords. • **False. Ignore MaxAlarmAge**—Does not archive alarms until they are manually or automatically cleared through alarm correlation. • **False. Ignore MaxAlarmAge and MaxAlarmDbRecords**— Never automatically archive an active alarm.

Field	Description
FilterIgnoredNEs	Determines whether the MWTM should propagate alarms to a northbound system: • **False**—(Default setting) Propagates alarms to the northbound system. • **True**—Does not propagate alarms to the northbound system.
ThrottleAlarmCountThreshold	Threshold count for Alarms. If the trap count exceeds the threshold, the traps need to be forwarded to NorthBound.
ThrottleAlarmTimeThreshold	Threshold time for Alarms. If *X* traps are received within configured time, traps need to be forwarded to NorthBound, where *X* is ThrottleAlarmCountThreshold.
NodeDisplayName	The name from the Node object to be assigned to the NodeDisplayName variable for inclusion in event messages. The values are: • CustomName—Custom name of the device. • NodeName—Node name of the device. • SysName—SysName of the device.

Specifying SNMP Servers for Trap Forwarding

You use the MWTM to specify a list of SNMP servers, or hosts, to which the MWTM should forward events in the form of traps.

For more information about enabling MWTM trap forwarding, see Forwarding Events as Traps to Other Hosts, page 9-37.

To specify the list of hosts, click the turner beside Event Configuration, then click **SNMP Servers**. The SNMP Servers Configuration window appears in the content area in the right pane.

Field or Button	Description
Host	Name of the host NMS that should receive traps from the MWTM. The host must be IP-routable, and the name must be a valid IP address or DNS name.
Port	Host port number to which the MWTM should forward traps.
Community	SNMP community string that the MWTM should include in forwarded traps.
Version	Trap version to forward. Valid values are 1 and 2c.
Trap Type	Type of trap that the MWTM should forward to this host. Valid trap types are: • CISCO-SYSLOG: The CISCO-SYSLOG-MIB clogMessageGenerated trap. • CISCO-EPM: CISCO-EPM-NOTIFICATION-MIB ciscoEpmNotificationRev1 trap.
Add	Adds a new hostname to the bottom of the list. Type over the default values with the new values.
Delete	Deletes the chosen hostname from the list.

Field or Button	Description
Send a trap for all events	Checks the **Send Traps** check box for all MWTM events. Click this button if you want the MWTM to forward all events to the list of hosts. If you click this radio button, and then you uncheck even a single **Send Traps** check box for any event, the MWTM unchecks this button. This radio button is mutually exclusive with the **Send a trap for no events** button.
Send a trap for no events	Unchecks the **Send Traps** check box for all MWTM events. Click this button if you do not want the MWTM to forward any events to the list of hosts. This is the default setting. If you click this radio button, and then you check even a single **Send Traps** check box for any event, the MWTM unchecks this button. This radio button is mutually exclusive with the **Send a trap for all events** button.

Changing Event Categories

To change categories for the MWTM event database, click the turner beside Event Configuration, then click **Categories**. The Categories Configuration window appears in the content area in the right pane.

Field or Button	Description
Category Name	Lists the names of the currently defined MWTM event categories. By default, the MWTM provides these event categories: • **Status**—Status change message generated. • **Trap**—SNMP trap message generated. • **Create**—Creation event, such as the creation of a seed file. • **Delete**—Deletion event, such as the deletion of an object or file. • **Discover**—Discovery event, such as Discovery beginning. • **Edit**—Edit event. A user has edited an event, linkset, or node. • **Ignore**—Ignore event. A user has Ignored a link or linkset. • **Login**—Login event. A user has logged in to the MWTM. • **LoginDisable**—LoginDisable event. The MWTM has disabled a user's User-Based Access authentication as a result of too many failed attempts to log in to the MWTM. • **LoginFail**—LoginFail event. An attempt by a user to log in to the MWTM has failed. • **Logout**—Logout event. A user has logged out of the MWTM. • **OverWrite**—OverWrite event. An existing file, such as a seed file or route file, has been overwritten. • **Poll**—Poll event, such as an SNMP poll. • **Purge**—Purge event. A user has requested Discovery with Delete Existing Data selected, and the MWTM has deleted the existing the MWTM database. To change the name of an existing event category, highlight the category name and type over it with the new name. For example, you could replace every occurrence of LoginFail with BadLogin.

Field or Button	Description
Add	Adds a new category name to the bottom of the list. Type over the default category name with the new name.
Delete	Deletes the chosen category name from the list. If events in the MWTM database use the deleted category name, the Entry Substitution dialog box appears. Use this dialog box to select a new category name in place of the deleted category name. Select an existing category name from the drop-down list box, or enter a new category name. If you enter a new category name, the MWTM adds it to the Category Name field.

Configuring Trap, Status Alarm, or User Action Events

The MWTM can detect these event types:

- **Traps**—Events that are triggered by SNMP traps or notifications
- **Status Alarms**—Events that are triggered by status changes
- **User Actions**—Events that are triggered by user actions

You can choose to view all traps, all status alarms, and all user actions, or you can view these based on network type (RAN-O, ITP, and so on.)

To configure the event parameters for any of these event types:

Step 1 Choose **Tools > Event Editor** from the MWTM main menu in the client interface.

Step 2 Click the turner beside Event Configuration.

Step 3 Click the turner beside the event type that you want to configure:

- All Traps
- All Status Alarms
- All User Actions
- Common (lists all traps, status alarms, and user actions common to all networks)
- IPRAN
- ITP
- CSG1
- CSG2
- GGSN
- BWG
- HA
- PDSN
- PDNGW
- SGW
- PCRF

The MWTM lists the currently defined traps, status alarms, or user actions in the navigation tree under the event type.

Step 4 Click the turner beside the specific trap, status alarm, or user action for which you want to configure an event.

The MWTM lists the currently defined events in the navigation tree under the chosen event type.

Step 5 To add an event to an event type, right-click the event name and select **Add** from the right-click menu.

The MWTM adds the chosen event to the list of configured events and creates a default entry for the event in the left pane.

Step 6 Click the default entry in the left pane.

The Event Configuration pane appears in the right pane.

Step 7 Configure the event by adjusting the parameters.

Step 8 To delete an event, right-click the event in the left pane and click **Delete**.

The Event Configuration pane contains:

Field or Button	Description
Name	Fixed, internal name of the event, such as cItpRouteStateChange. You cannot change this field.
Event Keys and Setting	**Caution** This feature is for advanced users (Cisco developers and third-party integrators). Names of the event keys, such as RouteDestinationState, and their settings, such as False. You cannot change the names of the event keys, but you can change their settings. To change an event key setting, select a new setting from the drop-down list box. For example, you can change the setting for RouteDestinationState from Accessible to Unknown.
Alarm Nature	Nature of the alarm. The alarm nature is determined when the alarm is created. The valid values are: • ADAC - automatically detected and automatically cleared • ADMC - automatically detected and manually cleared • Undefined - undefined
Alarm Type	The type of the alarm. The valid values (X.733 alarm types) are: • Communications • Processing Error • Environmental • QOS • Equipment • Undefined
Category	Category of the event (for example, from Trap to Status). To change the category, select a new category from the drop-down list box.
Severity	Severity of the event (for example, from Warning to Minor). To change the severity, select a new severity from the drop-down list box.

Field or Button	Description
Event Name	User-specified name for the event, that the MWTM uses for trap forwarding, also used in the MWTM client. If you want the MWTM to forward this event in the form of a trap to another host, you can specify a new, more meaningful name for the event. The new name can be from 1 to 30 characters, and can contain any letters (upper- or lowercase), any numbers, and any special characters. If you do not specify a new name, the MWTM uses the default name, `MWTM`. For more information about trap forwarding, see Forwarding Events as Traps to Other Hosts, page 9-37.
Message	Message text associated with the event. To change the message text, type over the message text. You can also right-click in the field and choose **Launch Text Editor**, where you can update, clear, or discard your text changes. You can also insert variable text in the message. To do so, right-click in the message text area. A popup menu of the valid substitutions for this event appears. To insert a variable in the text area, select from the popup menu.
Help File	Help file associated with the event. By default, the MWTM provides extensive type-specific help for events. However, you can use the MWTM to provide your own enterprise-specific instructions to operators in the help file. To change the help file, create a new HTML help file or change the default MWTM help file. If you installed the MWTM in: • The default directory, */opt*, then the default help files are in the */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the default help directory and files are located in that directory. If you use an MWTM help file as a basis for your help file, rename it when you save it; do not use the existing MWTM name. If you do, the next time you install the MWTM, the MWTM overwrites the file and you lose your changes. When you have created your new help files, store them in the */opt/CSCOsgm/apache/share/htdocs/customHelp* directory. This directory and its contents are preserved when you upgrade to a new MWTM release. If you do not store your new help files in the */customHelp* directory, the files are lost the next time you upgrade to a new MWTM release. When you have created your new help files and stored them in the */customHelp* directory, enter the new help file path and filename in the Help File field. After you deploy the new event settings and restart the MWTM server, whenever you display help for the trap, the MWTM shows your new, custom help file.
Open	Opens the help file associated with the event. To see the help file, click **Open**. The MWTM shows context-sensitive help for the chosen event in a separate web browser.

Field or Button	Description
Action: Run	Automation command or script for the event that a UNIX process runs. You use the MWTM to automate events. That is, you can configure the MWTM to call a UNIX script to drive automatic paging or e-mail, for example, whenever the MWTM logs an event for which you have defined an automation script. To configure automation for an event, enter a Run line with this format: *UNIXCommand EventParameters* where: • *UnixCommand* specifies either a binary command name or a shell script. • *EventParameters* are information from the event that the MWTM sends to *UnixCommand* as parameters. The set of *EventParameters* is the same as the set of Message element parameters, and they are specified the same way.
Action: Run (continued)	For example, this Run line: `/users/johndoe/auto-inhibit.exp $NodeDisplayName $User` causes these automatic actions whenever the MWTM logs the associated event: • The MWTM spawns a UNIX process to execute the */users/johndoe/auto-inhibit.exp* script. • The MWTM passes the $NodeDisplayName and $User parameters to the script. After you deploy the new event settings and restart the MWTM server, the specified event causes the automation script to run. When configuring automation for events, remember: • Detailed information about event automation scripts, including the times they start and stop and any output produced by the scripts, is recorded in the MWTM system event automation log file (see Viewing the Event Automation Log, page 12-11). • The MWTM event automation scripts run separately from all other MWTM processes. • If the MWTM logs more than one automated event in rapid succession, the MWTM runs each automation script sequentially, not in parallel. The MWTM spawns a new UNIX process for each script, and waits for it to complete before running the next script. • By default, the MWTM allows an event automation script to run for 300 seconds (5 minutes) before canceling the script and moving on to the next script. To change the maximum run-time for event automation scripts, see Changing Event Limits, page 9-26. You can right-click in the field and choose **Launch Text Editor**, where you can update, clear, or discard your text changes.
Action: Poll (available only for Trap events)	Check box indicating whether MWTM should poll the associated nodes. If you: • Want MWTM to poll the nodes when this event occurs, check the check box. • Do not want MWTM to poll the nodes when this event occurs, uncheck the check box.
Action: Send Trap	Check box indicating whether the MWTM should forward the event as a trap to other systems. If you: • Want MWTM to forward the event, check the check box. • Do not want MWTM to forward the event, uncheck the check box. This is the default setting.

Field or Button	Description
Raise Alarm	**Caution** This feature is for advanced users (Cisco developers and third-party integrators). If the Raise Alarm check box is checked, then, when this event happens, the MWTM raises an alarm that appears in the Active Alarms table.
Correlate	**Caution** This feature is for advanced users (Cisco developers and third-party integrators). When you check this check box, you can then define a key in the Key field.
Key	**Caution** This feature is for advanced users (Cisco developers and third-party integrators). You can define a key to correlate appropriate events. The EPM notification includes this key for use by the north-bound system. Right-click in the text field to select a key. You can also right-click in the field and choose **Launch Text Editor**, where you can update, clear, or discard your text changes.
Disable	Check box to disable this event without removing the event configuration from the */opt/CSCOsgm/etc* file.
Personalities	Clicking Edit opens the Personalities Editor, where you can select from the following networks by checking the box: • IPRAN • ITP • CSG1 • CSG2 • GGSN • BWG • HA • PDNGW • SGW • PCRF Check the networks you want to include, then click **Update**, or click **Discard** to exit the window without saving your changes.

Field or Button	Description
Detect Flapping	**Note** This field is only active if you have defined a key. If you check the Detect Flapping check box, the following fields appear: • Flapping Threshold—Number of correlated events raised if the value matches or exceeds what is set for the Flapping Time Span in seconds value. • Flapping Time Span in seconds—At most, you can get one flapping event per flapping time span period. • Flapping Event Name—Name of flapping event. • Flapping Severity—Severity of flapping event. • Flapping Message—Detailed message for the flapping event.
Errors	Error messages associated with the event. Correct all errors before deploying the new event configuration.

Forwarding Events as Traps to Other Hosts

You use the MWTM to forward MWTM events to other hosts, in the form of SNMP traps. This operation enables the MWTM to integrate with high-level event- and alarm-monitoring systems such as the Cisco Info Center (CIC). These systems can provide a single high-level view of all alarm monitoring in your network, making it easier to detect and resolve problems.

To forward MWTM events to other hosts:

Step 1 Specify the list of SNMP servers, or hosts, to which you want the MWTM to forward traps (see Specifying SNMP Servers for Trap Forwarding, page 9-30).

Step 2 Specify the events you want to forward, using one of these procedures. To forward:

a. All MWTM events, click the **Send a trap for all events** radio button in the SNMP Servers Configuration window of the MWTM Event Editor. For more information, see Specifying SNMP Servers for Trap Forwarding, page 9-30.

b. Only chosen events, edit the events in the MWTM Event Editor and check the **Send Trap** check box. For more information, see the description of the Send Trap field in Configuring Trap, Status Alarm, or User Action Events, page 9-32.

Step 3 (Optional) Specify new, more meaningful names for the events that you want to forward. If you do not specify a new message name for an event, the MWTM uses the default message name, MWTM. For more information, see the description of the Message Name field in Configuring Trap, Status Alarm, or User Action Events, page 9-32.

Step 4 Save your new event settings, deploy them to the MWTM server, and restart the MWTM server.

Step 5 MWTM allows you to specify source address for trap forwarding. You can specify the source address in SOURCE_SERVER field present in the Server Properties (*/opt/CSCOsgm/properties/Server.properties*) file.

Note For more details, see the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

Setting Sounds for Events at an MWTM Client

You use the MWTM client interface to create and change event sound filters for the MWTM client. Event sound filters determine the sounds that the MWTM client plays when specific events are logged. The MWTM client plays the sounds even if the Event History window is not currently visible.

On Solaris and Linux systems, the root user can access the sound feature from a local or remote device. However, users other than the root user must use a local device and client, not a remote MWTM client accessed by using the xhost + UNIX command.

This section includes:

From the MWTM web interface, you can modify the sound to be played when the client loses its connection to the MWTM server as explained in Events and Alarms, page 11-25.

Listing Event Sound Filters

You use the MWTM client interface to change the list of event sound filters that the MWTM client applies to events, or prevent the MWTM client from playing sounds for events.

To work with the list of event sound filters, choose **Tools > Event Sounds** from the MWTM main menu. The Event Sound Filters List dialog box appears.

The Event Sound Filters List dialog box lists all event sound filters that have been defined.

Field or Button	Description
Sound filters applied in order	Indicates the order in which sound filters are to be applied, from top to bottom. If an event matches two or more filters in the list, the top-most filter determines the sound that the MWTM client plays. This field is blank until you have created at least one new sound filter for events.
Move Up	Moves the chosen event sound filter up in the Sound filters applied in order list.
Move Down	Moves the chosen event sound filter down in the Sound filters applied in order list.
New	Opens the Event Sound Filters dialog box, which you use to create a new event sound filter.
Edit	Opens the Event Sound Filters dialog box, which you use to change an existing event sound filter in the Sound filters applied in order list.
Delete	Deletes the chosen event sound filter from the Sound filters applied in order list.
Mute Sounds	Check box indicating whether the MWTM client should play event sounds. To: • Play event sounds, check the check box. This is the default setting. • Not play event sounds, uncheck the check box.

Field or Button	Description
Client Disconnect Sound	Drop-down menu of sound files to choose from. When the connection to the MWTM server is lost, an error popup appears and the selected sound plays in a loop for as long as the MWTM client window remains open. **Note** After a server connection loss, you must set this sound again; otherwise, no sound will play the next time the server connection is lost.
Set Sound	Button to set the sound you chose for loss of server connection.
OK	Applies any changes you made to the event sound filters list and closes the Event Sound Filters List dialog box. When you are satisfied with the changes you made to the event sound filters list, click **OK**.
Apply	Applies any changes you made to the event sound filters list without closing the Event Sound Filters List dialog box.
Cancel	Closes the Event Sound Filters List dialog box without applying any changes to the event sound filters list.
Help	Shows online help for the current window.

Related Topics

- Setting Sounds for Events at an MWTM Client, page 9-38
- Managing Alarms and Events, page 9-1

Creating New Event Sound Filters

You use the MWTM client interface to create a new event sound filter. Open the Event Sound Filters List dialog box, as described in Listing Event Sound Filters, page 9-38, then click **New**. The Event Sound Filters dialog box appears.

The Event Sound Filters dialog box contains:

Button or Field	Description
Filter Name	Name of the event sound filter file. Enter a name for the filter, then specify filter criteria for this event sound filter in the Event Sound Filter Criteria field.
Event Sound Filter Criteria	Table listing the filter criteria for this event sound filter. To add a criteria, select options from the drop-down list boxes: • To filter based on message text: a. Choose **Message Text** from the first drop-down list box. b. Choose **Contains**, **Equals**, **Does Not Contain**, or **Does Not Equal** from the second drop-down list box. c. Enter the message text in the character string field. • To filter based on event severity: a. Choose **Severity** from the first drop-down list box. b. Choose **Equals** or **Does Not Equal** from the second drop-down list box. c. Choose a severity, such as **Normal**, from the third drop-down list box, the message text. • To filter based on event category: a. Choose **Category** from the first drop-down list box. b. Choose **Equals** or **Does Not Equal** from the second drop-down list box. c. Choose a category, such as **Status** or **Purge**, from the third drop-down list box, the message text. • To filter based on the name of the node associated with the event: a. Choose **Node** from the first drop-down list box. b. Choose **Equals** or **Does Not Equal** from the second drop-down list box. c. Choose a node from the third drop-down list box. The MWTM lists all nodes that have been discovered in the drop-down list box.
More	Adds one or more additional filter criteria to the event sound filter. To add a filter criteria to the event sound filter, click **More**. The MWTM adds a new criteria to the bottom of the list.
Fewer	Removes one or more filter criteria from the event sound filter. To remove a filter criteria from the event sound filter, click **Fewer**. The MWTM deletes the last criteria in the list.

Button or Field	Description
Play this sound:	Drop-down list box indicating the sound to play if an event matches this event sound filter. The MWTM client sound files are stored in the MWTM client's */sounds* directory. If you installed the MWTM client: • For Solaris/Linux in the default directory, */opt*, then the sound file directory is */opt/CSCOsgmClient/sounds*. • For Windows in the default directory, */Program Files*, then the sound file directory is *C:\Program Files\MWTMClient\sounds*. To add a sound file to the MWTM, add it to the */sounds* directory (see Adding Sound Files to the MWTM, page 9-41).
Play	Plays a sample of the sound chosen in the Play this sound drop-down list box.
OK	Applies any changes you made to the event sound filter criteria and closes the Event Sound Filters dialog box. When you are satisfied with the changes you made to the event sound filters, click **OK**.
Cancel	Closes the Event Sound Filters dialog box without applying any changes to the event sound filter criteria.
Help	Shows online help for the current window.

Related Topics

- Listing Event Sound Filters, page 9-38
- Managing Alarms and Events, page 9-1

Adding Sound Files to the MWTM

You can add sound files to an MWTM client. The MWTM clients can play these sound file formats:

- AIFC
- AIFF
- AU
- SND
- WAV

Note WAV files encoded using MPEG Layer-3 are not supported.

The MWTM client sound files are stored in the MWTM client's */sounds* directory. If you installed the MWTM client:

- For Solaris/Linux in the default directory, */opt*, then the sound file directory is */opt/CSCOsgmClient/sounds*.
- For Windows in the default directory, */Program Files*, then the sound file directory is *C:\Program Files\MWTMClient\sounds*.
- In a different directory, then the sound file directory is located in that directory.

Note Sound files used by the MWTM web client must also be copied to the MWTM server sound directory at */opt/CSCOsgm/sounds*.

If for some reason the MWTM cannot play a specified sound file, the MWTM plays a default beep. For example, the MWTM cannot play a sound file if one of these conditions exists:

- The file has been moved or deleted from the */sounds* directory.
- The */sounds* directory has been deleted or cannot be found.
- Some other application is using all of the sound resources.
- No sound card is present.

Related Topics

- Creating New Event Sound Filters, page 9-39
- Managing Alarms and Events, page 9-1

Changing an Existing Event Sound Filter

You use the MWTM client interface to change an existing event sound filter. Open the Event Sound Filters List dialog box, as described in Listing Event Sound Filters, page 9-38, select the filter in the **Sound filters applied in order** list, then click **Edit**. The MWTM shows the Event Sound Filters dialog box, populated with the chosen filter's settings.

Change the settings as needed, then click **OK**. The MWTM applies your changes and closes the Event Sound Filters dialog box.

Deleting Event Sound Filters

You use the MWTM client interface to delete an existing event sound filter. Open the Event Sound Filters List dialog box, as described in Listing Event Sound Filters, page 9-38, select the filter in the **Sound filters applied in order** list, then click **Delete**. The MWTM deletes the chosen filter.

Playing and Muting Event Sounds

You use the MWTM client interface to specify whether you want the MWTM client to play event sounds. To do so, open the Event Sound Filters List dialog box, as described in Listing Event Sound Filters, page 9-38. To:

- Play event sounds, uncheck the **Mute Sounds** check box. This is the default setting.
- Not play event sounds, check the **Mute Sounds** check box.

Event Processing

This section contains these topics:

Event Queue Congestion

Event processing in the MWTM may occasionally experience congestion (for example, during discovery of very large networks). If the number of events exceeds the threshold of the event queue, the event congestion icon  appears in the lower left of the MWTM client and web windows. If the icon appears, the presentation of event information in the MWTM GUI will lag behind the actual state of network objects until the congestion clears. The event congestion icon will disappear from MWTM client and web windows when the congestion clears. No user action is necessary.

The event queue threshold is stored in the EVENT_QUEUE_THRESHOLD_LIMIT property in the */opt/CSCOsgm/properties/Server.properties* file. The default setting is 1000 events.

Trap Rate Limits

If one or more nodes in the managed network begin to malfunction, these nodes can generate numerous trap notifications that trigger:

- An excessive number of events
- Excessive SNMP polling
- Increased database access

This condition is called a trap storm. In a large network, a trap storm can adversely affect the performance of the MWTM server. To minimize the effect of trap storms, the MWTM provides a server property to limit the trap rate of network nodes.

If a node in the network exceeds the trap rate threshold, the MWTM stops processing traps from that node. The MWTM raises an alarm (TrapStatusAlarm) to indicate that the node is generating excessive traps and that the MWTM has disabled trap processing for the node.

When you have corrected the problem with the faulty node and the trap rate is measured at a rate less than the TRAP_RATE_LIMIT_COUNT minus the TRAP_RATE_ABATE_OFFSET, the trap rate limit alarm will automatically clear and trap processing will automatically resume.

Though optional, you can clear the trap status alarm and re-enable trap processing for the node as described below:

Step 1 In the navigation tree of the MWTM client, select the node.

Step 2 Click the **Alarms** tab.

Step 3 In the content pane, right-click the trap status alarm and choose **Clear** from the menu.

Step 4 In the navigation tree, right-click the node and choose **Allow Trap Processing** from the menu.

The */opt/CSCOsgm/properties/Server.properties* file provides these properties to limit the trap rate of managed nodes:

Server Property	Description
TRAP_RATE_ABATE_OFFSET	This is an offset value from the trap rate limit count. The abate threshold limit is calculated by subtracting this value from the TRAP_RATE_LIMIT_COUNT. The default value is 200 indicating if a node generates 2000-200 = 1800 or more traps it is still considered to be faulty and MWTM stops further trap processing for these nodes.
TRAP_RATE_LIMIT_COUNT	The threshold limit for a node. The default setting is 2,000. If a node generates 2,000 traps (or more) in the trap rate limit interval, the MWTM: • Raises a trap status alarm for the node • Disables trap processing for the node
TRAP_RATE_LIMIT_INTERVAL	The time interval for trap limitation. The default setting is 30 minutes. The MWTM scans its managed nodes every 30 minutes to determine if any nodes are exceeding the trap rate limit count.
TRAP_RATE_MINOR_LIMIT_COUNT	The threshold limit for the trap rate minor alarm. By default, if a node generates 1,000 or more traps, MWTM raises a minor alarm.

Database Archiving

Database archiving describes the process by which the MWTM archives alarms and events in its database. The archival process for alarms and events follows this basic sequence:

1. An alarm or event occurs.
2. The alarm or event remains active for a configurable time period.
3. The MWTM archives the alarm or event in its database.
4. The alarm or event remains in archive for a configurable time period.
5. The MWTM deletes the alarm or event from the MWTM database.

The following sections go into greater detail about the archival process, including the differences between event and alarm archiving:

- Event Archival Process, page 9-44
- Alarm Archival Process, page 9-45

Event Archival Process

When you click Event History in the navigation tree of the MWTM client or MWTM web interface, the right pane displays a tabular list of recent events. The events that appear in this table remain active for seven days (this is the default setting). After seven days, the MWTM removes active events from the Event History table and archives them in the MWTM database. To view the archived events, go to the MWTM web interface, click Event History in the navigation tree, then click the Archived link in the tool bar.

If a user manually deletes an event from the Event History table, the MWTM removes the event from the table and archives it in the MWTM database.

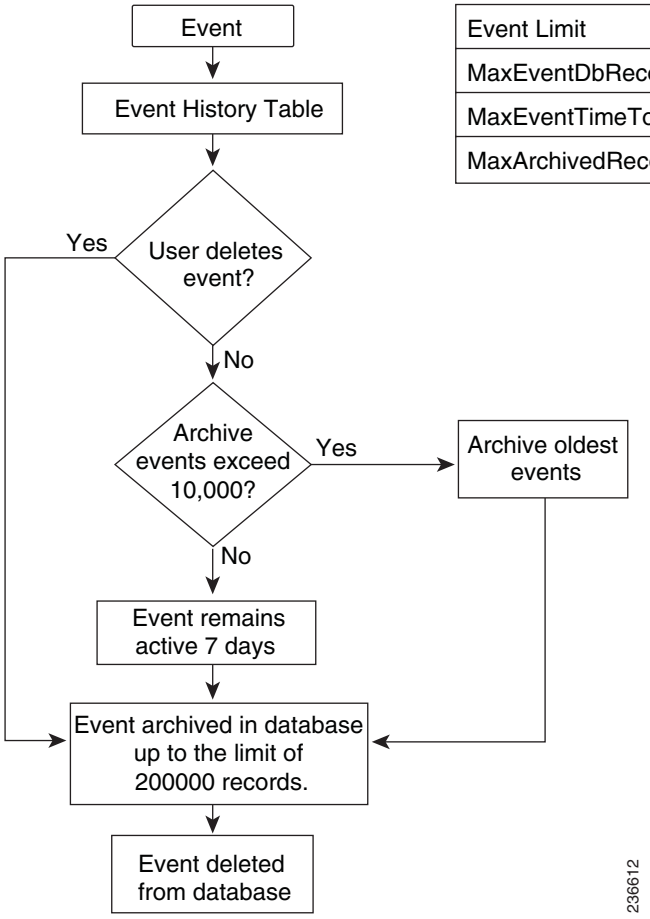
Also, if the number of active events exceeds 10,000 (this is the default setting), the MWTM archives the oldest events regardless of how long they have been active. This mechanism ensures optimal performance of the MWTM server and its clients.

The MWTM archives events in the MWTM database upto the limit of 200,000 records. After 200,000 records, the MWTM deletes the archived events from the MWTM database.

To change the default settings for archiving events, change the appropriate event limit. See Changing Event Limits, page 9-26.

Figure 9-2 illustrates the archival process for events and lists the event limits associated with the event archival process.

Figure 9-2 Event Archival Process



Event Limit	Default
MaxEventDbRecords	10,000
MaxEventTimeToLive	7 days
MaxArchivedRecords	200000

Alarm Archival Process

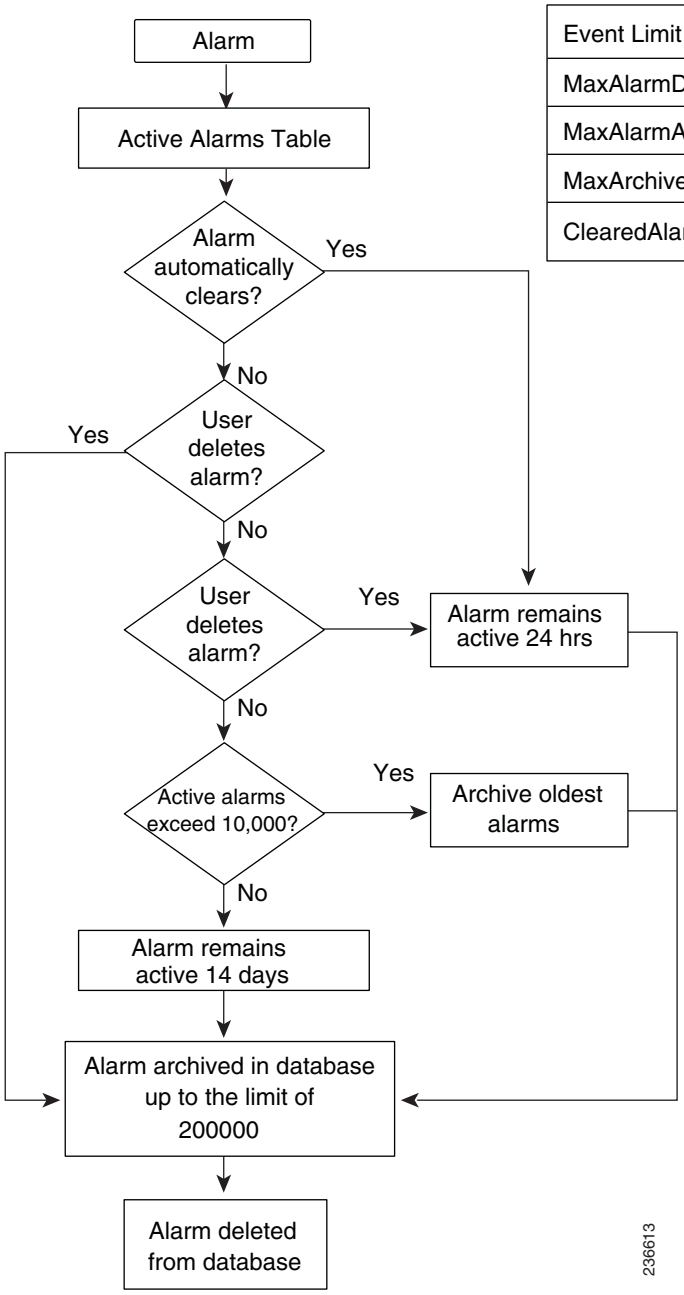
The archival process for alarms is very similar to the process for events. When you click Active Alarms in the navigation tree of the MWTM client or MWTM web interface, the right pane displays a tabular list of active alarms. The alarms that appear in this table remain active for 14 days (the default setting). After 14 days, the MWTM removes alarms from the Active Alarms table and archives them in the MWTM database. To view the archived alarms, go to the MWTM web interface, click Active Alarms in the navigation tree, then click the Archived link in the tool bar.

If the alarm automatically clears or if you manually delete the alarm from the Active Alarms table, the MWTM removes the alarm from the table and archives it in the MWTM database.

Likewise, if the alarm automatically clears or you manually clear an alarm from the Active Alarms table, the MWTM retains the alarm in the table for 1440 minutes, which is 24 hours (the default setting). After 24 hours, the MWTM removes the cleared alarm from the table and archives it in the MWTM database.

Figure 9-3 illustrates the archival process for alarms and lists the event limits associated with the alarm archival process.

Figure 9-3 Alarm Archival Process



Event Limit	Default
MaxAlarmDbRecords	10,000
MaxAlarmAge	14 days
MaxArchivedRecords	200000
ClearedAlarmsTimeToLive	1440 mins.

Also, if the number of active alarms exceeds 10,000 (this is the default setting), the MWTM archives the oldest alarms regardless of how long they have been active. This mechanism ensures optimal performance of the MWTM server and its clients.

The MWTM archives alarms in the MWTM database upto the limit of 200,000 records. After 200,000 records, the MWTM deletes the archived alarms from the MWTM database.

To change the default settings for archiving alarms, change the appropriate event limit. See Changing Event Limits, page 9-26.

File-based Archiving

The MWTM exports events and alarms from its database archives once a day and consolidates them into a CSV-based file. File-based archiving allows administrators to access archived events and alarms in a file format. For example, an administrator may want to process the contents of a file archive by using third-party scripting tools.

To view file-based archives, choose **File Archive > Events** from the MWTM web interface. The MWTM displays file archives in the right pane. These examples illustrate the file-naming convention:

```
Status+Trap.WedJun04.log.csv.zip
Status+Trap.TueJun03.log.csv.zip
Status+Trap.MonJun02.log.csv.zip
```

The MWTM stores file archives in this directory:

/opt/CSCOsgm/logs/netstatus

If you want to change the default directory, use the mwtm msglogdir command.

The MWTM retains file archives for 31 days. (This default setting is the same value that is used for database archiving.) After 31 days, the MWTM deletes the files. If you want to change the default setting, use the mwtm msglogage command.

Another approach would be to configure the aging parameters of the file and database archives with different values. For example, you could use the default setting of 31 days to retain database archives but configure the file archive retention to 90 days (assuming your server has sufficient disk space). This file-based approach for long-term archiving is more efficient than retaining archives in the database beyond the 31-day default setting.

If required, you could retrieve file archives before the MWTM deletes them by using a backup system or a network file system that performs automatic file backups.

CHAPTER 10

Viewing Network Topology

Note The web interface does not support viewing the network topology. You can view the network topology in the MWTM client interface only.

In addition to tabular (text) views of your network, the Cisco Mobile Wireless Transport Manager (MWTM) client provides a topological (graphical) view of the objects in your ITP or RAN-O network, including:

- Nodes
- RAN-O service modules
- Interfaces
- ITP signaling points
- ITP application servers
- ITP application server process associations
- ITP linksets
- Adjacent legacy nodes

Note The MWTM does not manage legacy nodes (such as BSC, BTS, RNC, or Node B objects), but displays them in the topology map to help you visualize the interconnections between network objects.

Any associated alarms also appear in the topology window. You can use the MWTM to customize the topological view (for details, see Chapter 6, "Managing Views").

To view the topology of your network, use one of these procedures:

- Choose **View > Topology** from the MWTM main menu.
- Right-click an object, then choose **View > Center in Topo** in the right-click menu.

The topology window appears.

The topology window shows tabular information about MWTM objects in the left pane and the graphical topology map in the right pane. Alarms associated with the chosen object appear in the bottom pane.

The topology window contains:

- Topology Panes, page 10-5
- Topology Map, page 10-8
- Topology Alarm Pane, page 10-14

The MWTM provides these functions related to the topology map:

- Creating a Custom Layout, page 10-14
- Finding an Object, page 10-14
- Centering the Topology Map on an Object, page 10-15
- Displaying Detailed Information About a Topology Map Element, page 10-16
- Printing the Topology Map, page 10-16
- Saving the Topology Map as a JPEG File, page 10-16
- Selecting a Directory for the JPEG File, page 10-17
- Activating a Magnetic Grid on the Topology Map, page 10-18
- Specifying a Color for the Magnetic Grid, page 10-19
- Specifying a Background Color for the Topology Map, page 10-20
- Aligning Objects on the Topology Map, page 10-22
- Hiding and Displaying Non-ITP Nodes and Linksets, page 10-23
- Locking and Unlocking the Position of an Icon, page 10-23
- Improving Topology Performance, page 10-23
- Saving the Topology Map, page 10-24
- Restoring the Topology Map, page 10-25

Related Topics

- Diagnosing a Typical Network Problem, page D-5
- Changing MWTM Server Poller Settings, page 5-2
- Chapter 6, “Managing Views”

Topology Menu

The topology window is identical to the MWTM main menu. For detailed descriptions of the options it provides, see Using the MWTM Main Menu, page 3-18.

Note The menu option Go does not display in the Topology window, instead you can view Topology Tools menu command. The Topology Tools menu contains the options as in the table under Topology Right-Click Menu: Map, page 10-13.

Topology Toolbar Buttons

The topology window contains these toolbar buttons:

Button	Description
 Close view tab	Closes the currently visible view in the topology window. This option is dimmed if the currently visible view is the highest-level parent view.
 Open parent view	Opens the parent view of the currently visible view in the topology window. This option is dimmed if the currently visible view is the highest-level parent view.
 Lay out nodes in a circle	Shows the map in a circular layout.
 Lay out nodes in a spring	Shows the map in a spring layout. That is, the MWTM draws nodes with the most lines closer to the center of the map, and draws nodes with fewer lines farther away. This is the default setting the first time the map appears. **Note** You can change how far apart to space the nodes when the MWTM draws the spring layout (see Changing Topology Settings, page 4-13).
 Zoom in by a factor of 200%	Makes the map twice as large.
 Zoom out by a factor of 50%	Makes the map half as large.
 Zoom by percentage	Zooms the map by a chosen percentage. You can choose a percentage from the drop-down list box; or, enter a percentage and click **Enter**. Valid values are integers in the range 5 through 400.
 Zoom in on an area	Zooms in on the selected area of the map. Click the button, then click in the topology map and drag a rectangle around the area on which you want to zoom. The MWTM expands the selected area to fill the topology map.
 Zoom to fit window	Adjusts the size of the map to fit in the window. This is the default setting the first time the map appears.
 Find objects	Opens the Find Objects dialog box, which you use to find and highlight an object in the topology window.

Button	Description
 Set magnetic grid properties	Opens the Magnetic Grid Settings dialog box, which you use to activate and deactivate the magnetic topology grid, and modifies how it appears. With the grid activated, when you move objects on the topology map they automatically align with the grid.
 Align objects on map	Opens the Align Objects dialog box, which you use to align two or more objects on the topology map.
 Hiding/Showing non-ITP nodes (ITP only)	Hides or shows all non-ITP signaling points and linksets on the topology map. (Hidden signaling points and linksets still appear in the left pane.) The process determines whether the node's parent (visible on the topology maps) has an ITP MIB or not. If not, it is classified as a non-ITP node and it will be hidden or visible when the button is toggled. The MWTM automatically saves this setting (with non-ITP nodes and linksets either hidden or visible) with your preferences.
Node Dragging Optimizer 	Turns the Node Dragging Optimizer on or off: • When the Node Dragging Optimizer is **On**, the MWTM hides linkset lines as you drag an object around the topology map. The MWTM draws the linkset lines when you drop the object in its final position. This is the default setting. • When the Node Dragging Optimizer is **Off**, the MWTM continually redraws linkset lines as you drag an object around the topology map. The MWTM automatically saves this setting (with the Node Dragging Optimizer on or off) with your preferences.
Hiding/Showing Dangling Connections 	Hides or shows connections to objects that are not visible in the current view, which are called dangling connections. When the Hiding Dangling Connections is set to: • **Hide**, the MWTM hides dangling connections. This is the default setting. • **Show**, the MWTM shows dangling connections, drawing the objects in shades of gray to distinguish them from actual objects in the current view. The MWTM does not save this setting (with the Hiding Dangling Connections set to **Show** or **Hide**) when you save the view. To include a dangling connections in the current view, select the connection, then select **Include In View**.

Button	Description
 Show/Hide alarm pane	Shows or hides the alarm pane at bottom.
 Lock position or  Unlock position	Locks or unlocks the position of an icon on the topology map. Locking the position of an icon can be useful if you want to keep the icon in its position, and you want to ensure you do not move it inadvertently. Locked icons do not appear in the circular or spring layouts. To lock the position of an icon, select: • An unlocked icon, then select **Lock position**. • A locked icon, then select **Unlock position**. This is the default setting. The MWTM automatically saves this setting (with icon positions locked or unlocked) with your view.

Topology Panes

In the topology window, you can access:

- View Objects and Connections Panes, page 10-5
- Topology Map, page 10-8

View Objects and Connections Panes

The View Objects pane in the left pane of the topology window shows information about the MWTM objects that are currently visible in the topology map. The Connections pane shows information about the connections associated with the object that you chose in the View Objects table, or the object currently chosen in the topology map.

Tip If you cannot see the View Objects or Connections tables, click on the arrow bar  to expand.

- To redraw the topology map centered on a specific object, double-click the object in this table.
- You cannot select more than one object at a time in this table.
- To see the tooltip for each column in the table, place the cursor over a column heading.
- If a cell is too small to show all of its data, place the cursor over the cell to see the full data in a tooltip.

You can resize each column, or sort the table based on the information in one of the columns. By default, the MWTM sorts this table by Severity.

To:

- Display hidden columns, right-click in the table heading and check the check boxes for the columns you want to display.
- Hide columns, right-click in the table heading and uncheck the check boxes for the columns you want to hide.

For more information about resizing, sorting, displaying, or hiding columns, see Navigating Table Columns, page 4-23.

The View Objects or Connections table contains:

Column	Description
Internal ID	Internal ID of the object. The internal ID is a unique ID for every object, that MWTM assigns for its own internal use. It can also be useful when the TAC is debugging problems.
Type (View Objects)	Object types can be ITP only, RAN-O only, or General to all types of networks. General object types include: • **Node**—Any interconnecting node that is not an ITP node. • **View**—Custom view (if one exists). ITP only object types include: • **ASP**—An application server process. • **SP**—A signaling point. RAN-O only object types include: • **CSR**—Cell Site Router (CSR) node. • **RAN SVC Node**—A RAN service card in an Optical Networking System (ONS) node.
Type (Connections)	Connection types can be ITP only, RAN-O only, or General to all types of networks. ITP only object types include: • **Linkset**—A linkset associated with a signaling point. • **ASPA**—An application server process association associated with a signaling point. RAN-O only object types include: • **RAN Backhaul**—Virtual RAN backhaul associated with a RAN node or RAN SVC node. • **PWE3 Backhaul** • **GSM Interface**—GSM interface associated with a RAN node or RAN SVC node. • **Universal Mobile Telecommunications System (UMTS) Interface**—UMTS interface associated with a RAN node or RAN SVC node.
Name	Name of the object.
Node	Name of the node associated with the object.
Notes	Indicates whether a note is associate with the object.

Column	Description
Events	Indicates whether the object has a recent event. (Even if the server purges all of the events associated with the object, the MWTM continues to display the event icon  in this field.) During discovery, the MWTM might flag most objects with an event icon  . If the event icons are too distracting, choose **Edit > Clear All Events** from the MWTM main menu to remove them.
Last Status Change	Date and time that the status of the object last changed.
Severity	Severity of the alarm. Possible severities are:  Critical  Major  Minor  Warning  Informational  Indeterminate  Unmanaged  Normal You can customize this field (see Right-Click Menu for a Specific Alarm or Event, page 9-11).
Status	Current status of the object. Possible values are: •  Active •  Unknown •  Unmanaged •  Warning For detailed definitions of each status, see the "Status Definitions" section on page E-1.

Column	Description
Status Reason	Reason for the current status of the object. For a full list of possible reasons, see the *stateReasons.html* file. If you installed MWTM in: • The default directory, */opt*, then the file resides at */opt/CSCOsgm/apache/share/htdocs/eventHelp* directory. • A different directory, then the help directory and file reside in that directory. If the cell is too small to show all of the status reason, place the cursor over the cell to see the full status reason in a tooltip. The MWTM lists status reasons in order of decreasing magnitude. If two or more reasons apply, the reason of greatest magnitude appears. If the status reason is Unsupported Configuration, correct the configuration and enter the **mwtm cleandiscover** command to delete all current network data and begin a discovery of the network. If the status reason remains Unsupported Configuration, enter the **mwtm clean** command to restore the MWTM server to a state that would exist after a new installation of the MWTM, excluding the log files, which the MWTM retains. To also remove the log files, enter the **mwtm cleanall** command. For more information on the use of these commands, see Appendix B, "Command Reference."
Ignored	Indicates whether the object should be included when aggregating and displaying MWTM status information: • Uncheck the check box to include the object. This is the default setting. • Check the check box to exclude the object. Users with authentication level Power User (level 2) and higher can edit this field.

Topology Map

The topology map in the right pane of the topology window shows the objects and views in your network in an easy-to-read graphical format.

Views

If you have defined custom views, you can view them in the topology map. The MWTM shows a tab for each visible view. Each tab shows a colored ball that indicates the current status of that view:

- Active
- Warning

Note For detailed definitions of each status, see Appendix E, "Status Definitions."

Excluded and Unmanaged Objects

The MWTM removes from the topology map any objects and their associated objects (including adjacent legacy nodes) that you exclude from the current view and Creating a New View, page 6-7).

If you unmanage an object from the topology map right-click menu (see Topology Right-Click Menu: Object, page 10-13) the MWTM marks the object status as Unmanaged and removes any adjacent legacy nodes from the topology map.

Tooltips

To see a tooltip, place the cursor over an object. For details on turning off tooltips, see Changing Topology Settings, page 4-13.

Viewing Associated Objects

To view objects associated with a chosen object, in the:

- Tabs in the View Objects pane, click an object. Any associated objects (such as signaling points with associated linksets) appear in the Connections pane.
- Content area, click a single line, a heavy line  , a diamond  , circle  , arrowhead  , or double-triangle  to:
  - Highlight the closest associated node in the View Objects pane in a tab. For example, if a line connects node **sgm-2600a** and node **sgm-2600b**, and you click the line closer to node **sgm-2600a**, then the MWTM highlights that node in the View Objects pane.
  - Display all objects (if any) associated with that node in the Connections pane in a tab.
  - Highlight the clicked object (if it is configured) in the Connections pane in a tab.

Viewing Details for an Object

To display the Details tab for any object in the map, double-click it. If multiple options are possible, the Selection dialog box appears. Highlight the object, then click **Select**.

Navigating and Scrolling

To:

- Scroll around in the topology map using keyboard options, click anywhere in the map, then click the arrow, **Page Up**, and **Page Down** keys.
- Redraw the topology map centered on a specific object, double-click the object in the View Objects pane in a tab.
- Activate or change the magnetic topology grid, which can help you align objects when you move them, use the Magnetic Grid Settings dialog box (see Activating a Magnetic Grid on the Topology Map, page 10-18).
- Align two or more objects on the topology map, use the Align Objects dialog box (see Aligning Objects on the Topology Map, page 10-22).

Saving the Topology Map

To save the topology map as a JPEG file, use the Save as JPEG dialog box (see Saving the Topology Map as a JPEG File, page 10-16).

Hiding or Showing Dangling Connections

To hide objects that connect to objects that are not in the current view (called dangling connections), click the **Hiding/Showing Dangling Connections** button to set it to **Hide**. To show dangling connections, click the **Hiding/Showing Dangling Connections** button to set it to **Show**. The MWTM draws the objects in shades of gray to distinguish them from actual objects in the current view. The MWTM does not save this setting (with the Hiding Dangling Connections set to **Show** or **Hide**). To include a dangling object in the current view, right-click the object and select **Include In View**.

Locking and Unlocking Icon Positions

To lock the position of an icon on the topology map, select an unlocked icon, then select **Lock position**.

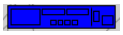
Locking the position of an icon can be useful if you want to keep the icon in its position, and you want to ensure that you do not move it inadvertently. The MWTM does not include locked icons in the circular or spring layouts.

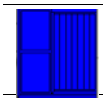
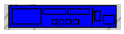
To unlock the position of an icon on the topology map, click a locked icon, then select **Unlock position**.

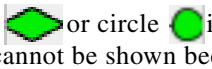
Object Types in the Topology Map

The topology map might contain graphical elements for any of these objects, which the MWTM automatically assigns:

Note Icon colors vary. The color of a graphical element indicates its current severity. If more than one object is configured on the connection, the color associated with the object that is in the most compromised state represents the severity color of the connection.

Object Type	Notes
 ASP	N/A
 BSC	Base Station Controller
 BTS	Base Transceiver Station
 Cisco 2600 series router	Cisco 2650, Cisco 2650XM, Cisco 2651, Cisco 2651XM
 Cisco 2811 series router	N/A
 Cisco 7202 series router	N/A
 Cisco 7204 series router	Cisco 7204, Cisco 7204VXR
 Cisco 7206 series router	Cisco 7206, Cisco 7206VXR
 Cisco 7301 series router	N/A
 Cisco 7304 series router	N/A
 Cisco 7505 series router	N/A

Object Type	Notes
 Cisco 7507 series router	Cisco 7507, Cisco 7507mx, Cisco 7507z
 Cisco 7513 series router	Cisco 7513, Cisco 7513mx, Cisco 7513z
 Cisco 7600 series router	Cisco 7603, Cisco 7603s, Cisco 7604, Cisco 7606, Cisco 7606s, Cisco 7609, Cisco 7609s, Cisco 7613
 Cisco MWR 1900 series router	N/A
 Cloud	A collection of objects, called a submap. A submap can also contain other submaps.
 IP device	Other than those listed previously (if assigned by a user; see Editing Properties, page 8-49)
 PGW	Cisco Public Switched Telephone Network (PSTN) Gateway (PGW) 2200 Softswitch
 Signaling point	An SCP, SSP, or STP, or an ITP instance (if the ITP is configured for multi-instance)

- A line indicates a single logical connection configured between two nodes. A line that:
  - Ends in a diamond  indicates that the connection has at least one configured interface or linkset associated with the node.
  - Ends in a circle  indicates that the connection is a virtual linkset, associated with a signaling point.
  - Does not end in a diamond or circle  indicates that the interface or linkset is not configured on the node or cannot be shown because the MWTM is not managing the node.
  - Ends in an arrowhead  indicates that the connection is an application server process association.
  - Ends in a double-triangle  indicates a connection to a view that has multiple interfaces.
- A heavy line  indicates that two or more interfaces or linksets exist between two nodes, or between views and other objects.

In addition, users can assign graphical elements for these objects (see Editing Properties, page 8-49):

Object Type	Description
 Building	Icon representing a collection of objects in a building.
 City	Icon representing a collection of objects in a city.
 Database	Icon representing a database object.

Object Type	Description
 MatedPair	Mated pair of signaling points.
 MSC	Mobile switching center.
 Node-B	Radio transmission (or reception) unit for communication between radio cells in a UMTS network (Node-B resides at the cell site). **Note** The MWTM does not manage the Node B but displays the object in the topology window to help you visualize the network.
 RAN SVC Node	RAN service module card.
 RNC	Radio Network Controller used in a UMTS network to aggregate multiple Node-B units. **Note** The MWTM does not manage the RNC but displays the object in the topology window to help you visualize the network.
 SCP	Service control point.
 SSP	Service switching point.
 STP	Signal transfer point.
 Tower	Icon representing a PC tower.
 TrafficGenerator	Icon representing a device or emulator used to generate traffic, usually in a test environment.
 Unknown	Node that does not respond to SNMP requests for supported MIBs.
 Workstation	Icon representing a workstation.
 Workstation2	Icon representing a different workstation.

The topology map also provides right-click menus for elements. For more information, see these sections:

- Topology Right-Click Menu: Map, page 10-13
- Topology Right-Click Menu: Object, page 10-13

Topology Right-Click Menu: Map

The topology window provides a subset of the MWTM main menu as a right-click menu. To see this menu for a map, right-click in a blank area of the topology map. The topology map right-click menu displays:

Command	Description
Zoom > Zoom In (Ctrl-=)	Makes the map twice as large.
Zoom > Zoom Out (Ctrl-- or Ctrl-Minus)	Makes the map half as large.
Zoom > Zoom Area	Zooms in on the selected area of the map.
Zoom > Zoom Fit	Adjusts the size of the map to fit in the window. This is the default setting the first time the map appears.
Layout > Circular	Shows the map in a circular layout.
Layout > Spring	Shows the map in a spring layout. That is, the MWTM draws nodes with the most links closer to the center of the map, and draws nodes with fewer links farther away. This is the default setting the first time the map appears.
Find (Ctrl-F)	Opens the Find Objects dialog box, which you use to find and highlight an object in the topology window.
Restore Positions	Restores the view to the last saved view.
Save As JPEG (Ctrl-J)	Opens the Save as JPEG dialog box, enabling you to save the topology map to a JPEG file.
Magnetic Grid	Opens the Magnetic Grid Settings dialog box.
Change Background Color	Opens the Select Background Color dialog box, which you use to select a color for the background of the topology map.
Align	Opens the Align Objects dialog box, which you use to align two or more objects on the topology map.
Open Parent View	Opens the parent view of the currently visible view in the topology window. This option is dimmed if the currently visible view is the highest level parent view.
Close View	Closes the currently visible view in the topology window. This option is dimmed if the currently visible view is the highest level parent view.

Topology Right-Click Menu: Object

The topology window displays a subset of the MWTM main menu as a right-click menu. To see this menu for any object in the topology window, right-click on an object in the topology map in the right pane. Options may vary depending on the chosen object type.

For a list of right-click menu options, see Viewing the Right-Click Menu for an Object, page 7-2.

Topology Alarm Pane

The Alarm pane at the bottom of the topology window shows any current alarms on the chosen object. For details about the buttons and fields in the Alarm pane, see Chapter 9, "Managing Alarms and Events."

Creating a Custom Layout

You can use the MWTM to create a custom layout for the topology map by manually moving objects on the map and by grouping them or isolating them to meet your needs. To move:

- A single object, click and drag the object to its new position.
- More than one object at the same time, press the Shift key and at the same time, select the objects and drag them. Objects keep their positions relative to one another.

When you are satisfied with the new topology map layout, choose **File > Save View** from the MWTM main menu. The MWTM saves the changes you have made to the network view, including any changes you have made to the topology map layout.

Finding an Object

Some topology maps are so large and complex that it can be difficult to find a specific object.

If the object appears in the tabs in the left pane, select the object, and the MWTM highlights it in the topology map.

If the object does *not* appear in the tabs in the left pane, click the **Find objects** button  in the topology window; or, choose **Edit > Find** from the MWTM main menu. The Find Object dialog box appears.

You can search by using the:

- Name
- Point code (for ITP signaling points)
- IP address (for RAN-O nodes)

The Find Object dialog box contains:

Field or Button	Description
Search string	Character string for which the MWTM should search.
OK	Launches the search. If: • No matching object is found, the MWTM shows an appropriate message. • Exactly one object is found that matches the **Search string**, the MWTM highlights the object in the Tables pane of the topology window, and zooms in on the chosen object in the topology map. • More than one object is found that matches the **Search string**, the Choose dialog box appears, in which you can select from a list of the found objects (see Using the Selection Dialog, page 10-15).
Cancel	Closes the Find Objects dialog box without launching the search.

Using the Selection Dialog

If more than one object matches the Search string in the Find Objects dialog box, the Selection dialog box appears.

The Selection dialog box contains:

Field or Button	Description
Select one in list	Type, Name, or Status of the found objects. Select the object you want to find.
Select	Highlights the chosen object in the left pane of the topology window, and zooms in on the chosen object in the topology map.
Cancel	Closes the Selection dialog box without selecting an object.

Centering the Topology Map on an Object

To redraw the topology map centered on a specific object, double-click the object in one of the tabs.

Displaying Detailed Information About a Topology Map Element

To display detailed information about an element in the map, double-click it in the map, then respond to the prompts. Double click:

- An object to view the Details tab in the MWTM main menu for that object.
- A single line, or a diamond  , circle  , or arrowhead  at the end of a single line, to display the MWTM main window details for that linkset or application server process association.
- A double-triangle  at the end of a heavy line  to display the Selection dialog box. (A heavy line indicates that two or more interfaces or linksets exist between two objects, or between views and other objects.) Then, select one of the interfaces or linksets to display the Selection dialog box for that interface or linkset.

Printing the Topology Map

To print the topology map, see Printing Windows, page 4-24.

Saving the Topology Map as a JPEG File

You can use the MWTM to save the topology map to a JPEG file. You can save the entire topology map, or just the current window.

To save the topology map to a JPEG file, choose **Topology Tools > Save as JPEG** from the topology window.

The Save as JPEG dialog box appears. The Save as JPEG dialog box contains:

Field or Button	Description
All	Saves the entire topology map as a JPEG file. This check box is checked by default.
Current Window	Saves just the portion of the topology map visible in the current window as a JPEG file. This check box is unchecked by default, which saves the entire map; not just the current window.
Quality	Specifies the quality of the JPEG file, from 0 (lowest quality) to 1.0 (highest quality). The default setting is 0.7, which is sufficient for most JPEG files.
Max. Size	Specifies the size of the JPEG file, in pixels. Choose a value from the drop-down list box. The valid range is 400-2400 pixels. The default value is 400 pixels, which is sufficient for most JPEG files.

Field or Button	Description
Name	Enter a name for the JPEG file, or accept the default filename, *out.jpg*. The default directory for the JPEG file is the directory in which you installed the MWTM client: • In Solaris/Linux, the default installation directory for the MWTM client is */opt/CSCOsgmClient*. • In Windows, the default installation directory for the MWTM client is *C:\Program Files\SGMClient*. • If you installed the MWTM client in a different directory, then the installation directory resides in that directory. If you do not want to save the JPEG file to the default directory, click **Browse** to select a different directory.
Browse	Opens the Save dialog box for a topology map, which you use to specify or select a name when you save the JPEG file. If you do not want to save the JPEG file to the default directory, click **Browse** to select a different directory.
Save	Saves the JPEG file and closes the Save as JPEG dialog box.
Cancel	Closes the Save as JPEG dialog box without saving the JPEG file.

Selecting a Directory for the JPEG File

You can use the MWTM to specify or select a name or directory when you save a topology map to a JPEG file. You can save the entire topology map, or just the current window.

To specify a name or directory for the JPEG file, click **Browse** in the Save as JPEG dialog box.

The Save dialog box appears for a topology map. The Save dialog box for a topology map contains:

Field or Button	Description
Save In	Selects the directory in which you want to save the topology map JPEG file. You can accept the default directory, or select a new directory from the drop-down list box.
File Name	Enter a name for the JPEG file, or select a file from those listed in the **Save In** field.
Files of Type	Specifies the type of file to save, and shows all files of that type in the chosen directory. Choose a file type from the drop-down list box: • **All files**—Shows all files in the chosen directory, and saves the topology map file as a JPEG file. • **jpg files**—Shows only JPEG files in the chosen directory, and saves the topology map file as a JPEG file. This is the default value.
 Up One Level	Shows the subfolders and files that are in the folder that is up one level from the currently visible folder.
 Desktop	Shows the subfolders and files that are on your workstation desktop.

Field or Button	Description
 Create New Folder	Creates a new subfolder in the currently visible folder.
 List	Shows only icons for subfolders and files.
 Details	Shows detailed information for subfolders and files, including their size, type, date they were last modified, and so on.
Save	Saves the file and closes the Save dialog box for a topology map. When you are satisfied with the settings, click **Save**. The MWTM closes the Save dialog box for a topology map and populates the Name field in the Save as JPEG dialog box with the new name and directory.
Cancel	Closes the Save dialog box for a topology map without saving the file.

Activating a Magnetic Grid on the Topology Map

You can use the MWTM to activate the magnetic topology grid and change how it appears. With the grid activated, when you move objects on the topology map they align with the grid.

Note Magnetic grid settings are *not* saved when you save the view.

To activate or change the magnetic topology grid, choose **Topology Tools > Magnetic Grid** from the topology window. The Magnetic Grid Settings dialog box appears. The Magnetic Grid Settings dialog box contains:

Field or Button	Description
Grid Activated	Specifies whether the magnetic topology grid is activated. To: • Activate the grid, check this check box. • Deactivate the grid, uncheck this check box. This is the default setting.
Display Grid	Specifies whether the grid should be visible on the topology map. To: • Display the grid, check this check box. This is the default setting. • Hide the grid, uncheck this check box. If **Grid Activated** is not checked, this check box is dimmed.
Grid Spacing	Specifies the spacing between lines on the grid, in pixels. To specify the spacing between lines on the grid, in pixels, check the **Grid Activated** check box, then select a **Grid Spacing** level. The valid range is 0-150 pixels. The default setting is 50 pixels, which is sufficient for most topology maps.

Field or Button	Description
Grid Color	Opens the Select Grid Color dialog box. To specify a color for the grid, check the **Grid Activated** check box, then click **Change Color** in the Grid Color field. The MWTM opens the Select Grid Color dialog box.
OK	Sets the new grid settings and closes the Magnetic Grid Settings dialog box. When you are satisfied with the magnetic grid settings, click **OK**.
Cancel	Closes the Magnetic Grid Settings dialog box without changing any settings.

Specifying a Color for the Magnetic Grid

You can use the MWTM to customize the color of the magnetic topology grid.

Note The grid color is *not* saved when you save the view.

To specify a color for the grid, check the Grid Activated check box in the Magnetic Grid Settings dialog box, then click **Select** in the Grid Color field.

The Select Grid Color dialog box opens. The Select Grid Color dialog box contains:

- Swatches Pane (Recommended), page 10-19
- HSB Pane, page 10-19
- RGB Pane, page 10-20
- Select Grid Color Field and Buttons, page 10-20

Related Topic:

Activating a Magnetic Grid on the Topology Map, page 10-18.

Swatches Pane (Recommended)

You can use the Swatches pane of the Select Grid Color dialog box to select a grid color from a set of color swatches. This is the recommended method for selecting a grid color.

To display the Swatches pane, click the Swatches tab in the Select Grid Color dialog box.

To select a grid color, select a swatch. The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

HSB Pane

You can use the HSB pane of the Select Grid Color dialog box to select a grid color based on color hue, saturation, and brightness (HSB).

To display the HSB pane, click the HSB tab in the Select Grid Color dialog box.

To select a grid color, use one of these procedures:

- Select a color range on the vertical color bar, then select a specific color by moving the cursor around on the color square.
- Enter specific values in the hue (H), saturation (S), and brightness (B) fields.

The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

RGB Pane

You can use the RGB pane of the Select Grid Color dialog box to select a grid color based on the red, green, and blue (RGB) content of the color.

To display the RGB pane, click the RGB tab in the Select Grid Color dialog box.

To select a grid color, select values for the Red, Green, and Blue fields. The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

Select Grid Color Field and Buttons

The Select Grid Color dialog box contains:

Field	Description
Preview	Shows a preview of the currently chosen grid color. Whichever method you choose to select a grid color, the chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.
OK	Sets the grid color as shown in the Preview field, and closes the Select Grid Color dialog box.
Cancel	Closes the Select Grid Color dialog box without selecting a grid color.
Reset	Resets the grid color to its initial setting.

Specifying a Background Color for the Topology Map

You can use the MWTM to customize the background color of the topology map.

Note The background color is *not* saved when you save the view.

To specify a background color for the topology map, right-click in a blank area of the topology map, then select **Change Background Color** from the right-click menu.

The Select Background Color dialog box contains:

- Swatches Pane (Recommended), page 10-21
- HSB Pane, page 10-21
- RGB Pane, page 10-21
- Select Background Color Field and Buttons, page 10-21

Swatches Pane (Recommended)

You can use the Swatches pane of the Select Background Color dialog box to select a background color from a set of color swatches. This is the recommended method for selecting a background color.

To display the Swatches pane, click the Swatches tab in the Select Background Color dialog box.

To select a background color, select a swatch. The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

HSB Pane

You can use the HSB pane of the Select Background Color dialog box to select a background color based on color hue, saturation, and brightness (HSB).

To display the HSB pane, click the HSB tab in the Select Background Color dialog box.

To select a grid color, use one of these procedures:

- Select a color range on the vertical color bar, then select a specific color by moving the cursor around on the color square.
- Enter specific values in the hue (H), saturation (S), and brightness (B) fields.

The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

RGB Pane

You can use the RGB pane of the Select Background Color dialog box to select a background color based on the red, green, and blue (RGB) content of the color.

To display the RGB pane, click the RGB tab in the Select Background Color dialog box.

To select a background color, select values for the Red, Green, and Blue fields. The chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.

Select Background Color Field and Buttons

The Select Background Color dialog box contains:

Field	Description
Preview	Shows a preview of the currently chosen background color. Whichever method you choose to select a background color, the chosen color appears in the Preview field. When you are satisfied with the color, click **OK**.
OK	Sets the background color as shown in the Preview field, and closes the Select Background Color dialog box.
Cancel	Closes the Select Background Color dialog box without selecting a background color.
Reset	Resets the background color to its initial setting.

Aligning Objects on the Topology Map

Note To unalign objects, drag and drop the object to move it on the topology map.

You can use the MWTM to align two or more objects on the topology map. You can align the objects based on their left, right, top, or bottom edges, or you can center them in the map. The MWTM saves the alignment when you save the view.

To align objects, choose the objects that you want to align, then choose **Topology Tools > Align** from the topology window. The Align dialog box appears. The Align dialog box contains:

Field	Description
Vertically: None	Does not align the chosen objects vertically.
Vertically: Left	Aligns the chosen objects vertically, aligned with the left edge of the left chosen object.
Vertically: Center	Aligns the chosen objects vertically, with centers aligned.
Vertically: Right	Aligns the chosen objects vertically, aligned with the right edge of the right chosen object.
Vertically: Side by side	Aligns the chosen objects vertically, aligned side-by-side, with no horizontal space between the objects. (There might still be vertical space between the objects.)
Horizontally: None	Does not align the chosen objects horizontally.
Horizontally: Top	Aligns the chosen objects horizontally, aligned with the top edge of the top chosen object.
Horizontally: Center	Aligns the chosen objects horizontally, with centers aligned.
Horizontally: Bottom	Aligns the chosen objects horizontally, aligned with the bottom edge of the bottom chosen object.
Horizontally: Side by side	Aligns the chosen objects horizontally, aligned side-by-side, with no vertical space between the objects. (There might still be horizontal space between the objects.)
Apply	Aligns the chosen objects and keeps the Align dialog box open, enabling you to continue aligning objects.
OK	Aligns the chosen objects and closes the Align dialog box.
Cancel	Closes the Align dialog box. Changes you applied are saved; other changes are not saved.
Help	Opens the Help window for this object.

Hiding and Displaying Non-ITP Nodes and Linksets

Note This function applies only to ITP objects. If you have not discovered ITP objects in your network, the Hiding/Showing Non-ITP Nodes button does not appear.

To hide all non-ITP nodes and linksets on the topology map (the default setting), click the **Hiding/Showing Non-ITP Devices** button. (The hidden signaling points and linksets are still visible in the left pane.)

To display all hidden nodes and linksets on the topology map, click the **Hiding/Showing Non-ITP Devices** button again.

The MWTM automatically saves this setting (with non-ITP nodes and linksets either hidden or visible) with your preferences.

Locking and Unlocking the Position of an Icon

You can use the MWTM to lock the position of an icon on the topology map. Locking the position of an icon can be useful if you want to keep the icon in its position, and you want to ensure that you do not move it inadvertently. The MWTM does not include locked icons in the circular or spring layouts.

- To lock the position of an icon on the topology map, right-click an unlocked icon, then select **Lock Position**.
- To unlock the position of an icon on the topology map, right-click a locked icon, then select **Unlock Position**. This is the default setting.

The MWTM saves this setting (with icon positions locked or unlocked) when you save the view.

Improving Topology Performance

In certain cases, you can enhance topology performance by:

- Turning Off Antialiasing, page 10-23
- Connecting Locally for Large Networks—Solaris Clients Only, page 10-24
- Hiding and Redrawing Connections When Redrawing, page 10-24
- Hiding and Showing Connections When Redrawing, page 10-24

Turning Off Antialiasing

Antialiasing, which is on by default, improves the appearance of the icons and connections in the topology map. However, antialiasing can cause an unexpected delay in the MWTM client on a remote workstation (that is, a Solaris/Linux workstation using xhost, or a Windows workstation by using an X-Window system emulator such as eXceed or Reflection X).

You can use the MWTM to turn off antialiasing to improve the performance of the MWTM client on a remote workstation. To do so, check the **X Performance Enhancer (AntiAliasing Off)** check box in the Topology settings in the Preferences window (see Changing Topology Settings, page 4-13).

To turn antialiasing back on, uncheck the check box.

Tip Keep in mind that for small networks, performance is always better if you access the MWTM by installing the MWTM client on the remote workstation.

Connecting Locally for Large Networks—Solaris Clients Only

If you are using a remote Solaris client and you have a large network, use a local Solaris client with a graphics card and an attached monitor, rather than remote access, to improve topology performance.

Note This issue might also cause an unexpected delay in the unsupported Linux client.

Hiding and Redrawing Connections When Redrawing

To aid performance, you can use the MWTM to hide connection lines as you drag an object around the topology map, then re-draw the connection lines when you drop the object in its final position. To do so, click the **Node Dragging Optimizer** button to turn it on. This is the default setting.

To have the MWTM continually redraw connection lines as you drag an object around the topology map, click the **Node Dragging Optimizer** button to turn it off.

The MWTM automatically saves this setting (with the Node Dragging Optimizer on or off) with your preferences.

Hiding and Showing Connections When Redrawing

To aid performance, you can use the MWTM to hide connections linked to objects that are not in the current view, called dangling connections. To do so, click the **Hiding/Showing Dangling Connections** button to set it to Hide. This is the default setting.

To show dangling connections, click the **Hiding/Showing Dangling Connections** button to set it to Show. The MWTM draws the connections in shades of gray to distinguish them from actual objects in the current view.

The MWTM does *not* save this setting (with the Hiding Dangling Connections set to Show or Hide) when you save the view.

To include a dangling connection in the current view, right-click the connection and select **Include In View**.

Saving the Topology Map

When you are ready to close the topology window, choose **File > Save View** from the MWTM main menu. The MWTM prompts you to save any changes you made to the network view, including any changes you have made to the topology map layout, and closes the window (see Closing the View Editor Window, page 6-13).

Restoring the Topology Map

You can use the MWTM to restore the topology map to the way it looked in the last saved view. To do so, choose **Topology Tools > Restore Positions** from the topology window. The MWTM restores the view.

CHAPTER 11

Accessing Data from the Web Interface

This chapter provides information about accessing Cisco Mobile Wireless Transport Manager (MWTM) data from the MWTM web interface by using a web browser.

This chapter contains:

Supported Browsers

The MWTM web interface is supported on the following browsers:

- Microsoft Internet Explorer version 6.0 and 7.0 on Microsoft Windows operating system
- Mozilla Firefox 2.0 on Solaris 9 and Red Hat Linux Enterprise AS 4.0 operating system
- Mozilla Firefox 3.5+ on Solaris 10 and Red Hat Linux Enterprise 5.3 and Microsoft Windows operating systems.

Note The first time you attempt to connect to the MWTM server using Firefox 3.0, you must add an exception to allow the connection. See Importing an SSL Certificate to an MWTM Client, page 2-25 for more information.

Checking Your Browser

To check your browser and screen settings, from the MWTM web interface Home page, select **Browser Checker**.

Note Opening the MWTM in an unsupported browser generates a warning. Also, if JavaScript is not enabled, the MWTM web interface cannot function.

The Browser Checker window contains:

Pane or Field	Description
Browser Information	
Browser	The name and version of the browser you are using.
Browser User Agent	Text string sent to identify the user agent to the server. Typically includes information such as the application name, version, host operating system, and language.
Platform	The platform type. For example, Win32.
Cookies Enabled	Whether you have cookies enabled on the browser (Yes or No).
Javascript Enabled	Whether Javascript is enabled (Yes or No).
AJAX Component	The Asynchronous JavaScript and XML (AJAX) component sends asynchronous HTTP update requests. The MWTM web application is only accessible to web browsers that have an AJAX component enabled. Typical values include XMLHttpRequest (for Mozilla-based browsers) and MSXML2.XmlHttp (for IE 6).
Screen Information	
Size	Resolution of the display; for example, 1600 x 1200.
Color Depth	Depth of the color display; for example, 16.

Accessing the MWTM Web Interface

The home page of the MWTM web interface is the first window to appear when you launch the MWTM web interface.

To access the MWTM web interface, use one of these methods:

- Open a browser and enter **http://*mwtm_server*:1774** in the Address field. (1774 is the default port).

Note Accessing the MWTM web interface through a URL other than ***http://mwtm-server:*1774** is not supported.

- From the MWTM client interface, choose **View > MWTM Web Links > Home**.

The MWTM Home page window opens in the browser window. For details about the Home page, see Displaying the Home Page, page 11-12.

Overview of the MWTM Web Interface

The MWTM web interface shows basic information about the events and objects that the MWTM manages. The MWTM web interface shows:

Pane	Description
Title Bar	Shows: • Mobile Wireless Transport Manager, version, and server name • Managed networks (can be any combination of IP-RAN, ITP, CSG1, CSG2, GGSN, BWG, HA, PDNGW, SGW, PCRF, and PDSN) • Logout (appears only if you enable user access; see Configuring User Access, page 2-1) • Help—Click this link to access context-sensitive online help • Preferences—Click this link to access preferences that you can change from the web interface (see Changing Web Preference Settings, page 4-18)
Location bar	Shows where you currently are in the MWTM navigation tree.
Navigation Tree	In the left pane, shows a tree of information organized by categories (see MWTM Web Interface Navigation Tree, page 11-3).
Content Area	In the right pane, shows detailed information about the object chosen in the navigation tree (see MWTM Web Interface Content Area, page 11-5).

MWTM Web Interface Navigation Tree

You can easily navigate the features of the MWTM web interface by using the navigation tree in the left pane. By default, the navigation tree is sorted by alarm severity, with objects having the most severe alarms appearing at the top of the tree.

Note To learn more about alarm severity, see Chapter 9, "Managing Alarms and Events."

To view detailed information about a selection in the navigation tree, click the item in the tree. The content area in the right pane shows details about the chosen item. A plus (+) or minus (-) just to the left of the item indicates whether the item has subtending items under its domain.

The MWTM automatically updates the navigation tree when changes occur to discovered nodes or to the network. When any changes occur in the MWTM client navigation tree, the MWTM web interface reflects these changes in its navigation tree. For example, if you delete a node in the MWTM client, the MWTM web interface removes that node from its navigation tree.

Note For information about the navigation tree in the MWTM client interface, see MWTM Client Navigation Tree, page 3-16.

The MWTM web interface navigation tree contains:

GUI Element	Description
 Sort tree by name	Sorts all content in the navigation tree alphabetically by name.
 Sort tree by status	Sorts all content in the navigation tree by status, from the highest alarms to the lowest.
Home	Shows links to MWTM client software, Cisco documentation, and information about the MWTM on the Cisco web (see Displaying the Home Page, page 11-12).
Administrative	The Administrative page of the MWTM web interface provides the following tabs: General—Shows MWTM system information including messages, logs, status, and properties. See Viewing General Tab Details, page 12-2. SNMP—Provides access to SNMP (Simple Network Management Protocol) Editor to edit the SNMP settings. See Viewing SNMP Tab Details, page 12-19. Credentials—Provides access to Device Credentials Editor to edit the credential details for the nodes. Viewing Credentials Tab Details, page 12-21. Discovery—Allows you to discover the network. Viewing Discovery Tab Details, page 12-24. User Management—Displays all users in the system along with the time of their most recent login, their access level, and their account status. Viewing User Management Tab Details, page 12-29. If MWTM User-Based Access is enabled, only users with authentication level 3 (Network Operator) and higher can see all options. Users of all other levels see only the System Information and System Status panes.
Active Alarms	Shows alarms (see Displaying Alarms and Events, page 11-19).
Event History	Shows information about the events delivered by the MWTM event logger and event processor for events that the MWTM event logger and event processor deliver for all objects in the current network view (see Displaying Alarms and Events, page 11-19).
Summary Lists	Shows summaries of all objects that the MWTM manages (see Displaying Summary Lists, page 11-20).
Reports	Common Statistics—Shows common statistic reports for AAA, CPU, IP Local Pool, Interface, and Memory. For more information, see Viewing Common Statistics Reports, page 13-10. ITP Statistics—Shows ITP statistic reports for AS, ASP, GTT Rates, Link, Link-Multi-Day, Linkset, MLR, MSU Rates, and SCTP. For more information, see Viewing ITP Statistics Reports, page 13-45. Mobile Statistics—Shows mobile statistic reports for CSG, GGSN, PDNGW, PDSN, and SGW. For more information, see Viewing Mobile Statistics Reports, page 13-100. RAN Statistics—shows RAN statistic reports for PWE3, QOS, and RAN-Optimized. For more information, see RAN-Optimized Reports, page 13-198. ITP Accounting—Shows ITP accounting reports for AS, GTT, and MTP3. For more information, see Viewing ITP Accounting Reports, page 13-212. Mobile Subscribers—Shows subscriber account reports for BWG, CSG, GGSN, HA, PDNGW, PDSN, and SGW. For more information, see Viewing Mobile Subscribers Reports, page 13-215.

GUI Element	Description
File Archive	Events—Shows archived events. For more information, see Viewing Archived Event Files on the Web, page 9-24. Inventory—Shows archived inventory reports. For more information, see Viewing File Archive Inventory Reports, page 13-232 Common Statistics—Shows archived common statistic reports. For more information, see Viewing File Archive Common Statistics Reports, page 13-234. ITP Statistics—Shows archived ITP statistic reports. For more information, see Viewing File Archive ITP Statistics Reports, page 13-240. Mobile Statistics—Shows archived Mobile statistic reports. For more information, see Viewing File Archive Mobile Statistics Reports, page 13-254. RAN Statistics—Shows archived RAN statistic reports. For more information, see Viewing File Archive RAN Statistics Reports, page 13-266. ITP Accounting—Shows archived ITP accounting reports. For more information, see Viewing File Archive ITP Accounting Reports, page 13-271. Mobile Subscribers—Shows archived mobile subscribers reports. For more information, see Viewing File Archive Mobile Subscribers Reports, page 13-272.
Tools	Provides tools for launching CiscoView, CiscoWorks LMS Portal, and Device Center. Provides a search tool for Home Agent and APN subscribers and Events and Alarms tool (see Tools, page 11-25).
Groups	Displays user-defined groups (see Understanding Groups, page 11-29).
DEFAULT View	Shows a current list of nodes in the DEFAULT view.

MWTM Web Interface Content Area

The content area of the MWTM client interface is fully described in MWTM Client Content Area, page 3-17. That description also applies to the web interface. Additional navigational features that appear only in the web interface include:

- Customizing Date and Time Ranges, page 11-5
- Using the Toolbar, page 11-6

Customizing Date and Time Ranges

Some windows require that you select date ranges for generating historical graphs and for synchronizing alarms. The **Customize the date and time range** tool allows you to choose the dates with server timezone.

To customize the date range:

Step 1 Click the **Customize the date and time range** tool in the toolbar of the content area. The Choose a Date Range *server timezone* dialog box appears.

Step 2 Enter:

a. Begin Date and End Date; or, select those dates by clicking the Calendar tool. These dates are the dates with server timezone.

b. Begin Hour and End Hour from the drop-down menus, if they are available.

Note The dialog box shows an error if the End Date is equal to or less than the Begin Date. Correct the error before proceeding.

Step 3 Click **OK** to accept the date and time changes; or, **Cancel** to cancel this operation.

The MWTM web interface accepts and applies the changes either by generating a report for the chosen server time (in case of reports) or by synchronizing the alarms (in case of alarm synchronization).

Using the Toolbar

Depending upon the object you select in the navigation tree, the web interface toolbar provides these tools and options:

Tool or Function	Description
Last Updated	Date and time the MWTM last updated the information on the page.
Page	Shows where you are (page X of X total pages) and lists the total number of entries.
 Refresh	Forces a refresh of the current web page. Click this icon to refresh the current page.
Status Refresh Interval	Allows you change the default refresh interval of 180 seconds. Enter a value between 180 and 900 seconds. **Note** Changes you make are temporary to the current page. Navigating away from the page sets the status refresh interval back to the default setting. To change the default setting, see Changing Web Preference Settings, page 4-18.
Page Size	Drop-down list of different page sizes (the number of table rows in the display). Click the drop-down arrow to select a different value. The value that you select becomes the default page size for all pages in the web interface. The title bar displays the current page and total number of table entries.

Tool or Function	Description
Quick Search	Text box to filter the objects listed under the Summary List tables (Except for IP Addresses and Point Code tables). Enter the string in the text box to filter the table by and then press Enter. The rows under the table are filtered based on the string entered. Below are the details for each Summary table about which columns are used for looking for the filtered string: • Alarms: Internal ID, Node, Feature • Nodes: Internal ID, Display Name, Primary SNMP Address, Node Type, Feature, Software Version, Serial Number, Reboot Reason, Status Reason • Signaling Points: Internal ID, Name, Node, Network Name, Point Code, Variant, Network Indicator, Status Reason • Linksets: Internal ID, Name, Node, Signaling Point, Local Point Code, Adjacent Point Code, Linkset Type, Status Reason • Links: Internal ID, Node, Signaling Point, Linkset, Type, Status Reason • Application Servers: Internal ID, Name, Node, Signaling Point, Protocol, Routing Key, Traffic Mode, Status Reason • Application Server Processes: Internal ID, Name, Node, Local IP Address, Status Reason • Application Server Process Associations: Internal ID, Name, Node, Signaling Point, Application Server, Protocol, Congestion Level, Status Reason • Signaling Gateway Mated Pairs: Internal ID, Name, Mate, Node, Congestion Level, Status Reason • Interfaces: Internal ID, Name, Node, Interface Type, Status Reason • Cards: Internal ID, Name, Node, Card Type, Model Name, Description, Status Reason, Hardware Version, Firmware Version, Software Version • RAN Backhauls: Internal ID, Name, Node, Location, Peer Name, Peer Node, Type, Status Reason • RAN Shorthauls: Internal ID, Name, Node, Type, Location, Peer Name, Peer Node, Interface Type, Status Reason • PWE3 Backhauls: Internal ID, Name, Node, Peer Name, Peer Node, Status Reason • PWE3 Virtual Circuits: Internal ID, Name, Node, Peer Name, Peer Node, Type, PSN Type, Remote Interface String, Description, Status Reason • Access Point Names: Internal ID, Name, Status Reason • Software Versions: Name, Node Type, Software Version, Software Description
>	Advances the display to the next page of information.
>>	Advances the display to the last page of information.
<	Advances the display to the previous page of information.
<<	Advances the display to the first page of information.
 Modify event filter	Opens the Event Filter dialog box. You can create a filter to display only the events in which you are interested (see Setting Alarm or Event Filters, page 9-12).
 Remove	Applies or removes a filter that you created.

Tool or Function	Description
Archived	Link that shows only archived alarms or events. This link appears when you select Event History or Active Alarms in the navigation tree. It also appears when you click the Alarms tab or Recent Events tab for a specific object. **Caution** In the *Server.properties* file, you can limit the number of rows in the archived events table with the MAX_ARCHIVED_EVENT _DB_ROWS property. The default value is 200,000. Increasing this value can have severe impact on server performance and can cause the server to run out of memory.
 Customize the date and time range	Opens the Choose a Date Range *Server timezone* dialog box (see Customizing Date and Time Ranges, page 11-5).
 Graph Series Editor	Opens the Graph Series Editor dialog box, which provides a check box for each available data series. Check the check box to display a series, and uncheck the check box to hide a series. If you click **OK** without selecting a series, it is the same as clicking Cancel. By default, the MWTM displays no more than 12 series by default. To change this default setting, see Display Series Dialog Box, page 7-113.
 Run	Runs the report type for the chosen duration.
 Export the report as a CSV file	Exports the data in the table to comma-separated value file (CSV file). You can save this file to disk or open it with an application that you choose (for example, Microsoft Excel).
Data Range (*timezone*)	Label that shows the chosen time range for the historical statistics. The label displays the data range with server time.
Type	Drop-down list of report types.
Duration	Drop-down list of default time ranges. Select one of these options, then click the **Run** tool. To specify a nondefault time range, click the **Customize Date and Time Range** too.
Output	Drop-down menu that provides these options: • Graph—Displays statistical data in graphs and tables • Table—Presents statistical data in tabular format only • CSV—Exports statistical data using comma-separated values
Sort Parameter	Used in the graph output of certain reports to select the criteria for including a top set of series and for ordering the corresponding graphs displayed.
 Pause	Pauses the page refresh feature. Click Pause to disable the page refresh that would normally occur after the Status Refresh Interval. Click Pause again to re-enable the Status Refresh Interval.
 Edit Notes	Enables you to edit or add notes for events.

Tool or Function	Description
Slow Poller Interval	Allows you to change the default slow poller interval of 60 seconds. Enter a value between 60 and 300 seconds. **Note** Changes you make are temporary to the current page. Navigating away from the page sets the status refresh interval back to the default setting. To change the default setting, see Changing Web Preference Settings, page 4-18.
Fast Poller Interval	Allows you to change the default fast poller interval of 15 seconds. Enter a value between 5 and 60 seconds. **Note** Changes you make are temporary to the current page. Navigating away from the page sets the status refresh interval back to the default setting. To change the default setting, see Changing Web Preference Settings, page 4-18.
Reset Counters	Enables you to modify the counter reset settings to one of the following: • Show counters since reboot • Show counters since last poll • Show counters since user reset
Launch	Drop-down list of applications you can launch: • CiscoView (This option is available only for non SAMI nodes and is not displayed for PCRF nodes) • CiscoWorks LMS Portal • Device Center (This option is not displayed for PCRF nodes) • Node Home Page (This option is displayed based on the CiscoWorks user configuration) After you choose the application, click the  Run icon to launch it.
Severity	Drop-down list of the severities of alarms or events. Severity can be Critical, Major, Minor, Warning, Informational, Indeterminate, or Normal. This drop-down list appears when you select Event History or Active Alarms in the navigation tree. It also appears when you click the Alarms tab or Recent Events tab for a specific object.
Change Severity	Button to change the severity level of an alarm or event. To change the severity level, select one or more alarms or events by clicking the corresponding check boxes, choose a severity from the Severity drop-down list, then click Change Severity. This button appears when you select Event History or Active Alarms in the navigation tree. It also appears when you click the Alarms tab or Recent Events tab for a specific object.
Clear Selection	Link to clear the selection of one or more events or alarms. To select one or more alarms or events, check the corresponding check boxes. To clear the selection, click the Clear Selection link. This button appears when you select Event History or Active Alarms in the navigation tree. It also appears when you click the Alarms tab or Recent Events tab for a specific object.
Toolbar for alarms and events	The web interface provides the same toolbar for alarms and events as the client interface. For full descriptions of these tools, see Toolbar Buttons, page 9-8.

Tool or Function	Description
Actions	Drop-down menu appears when you hover over the Actions button. The Actions button is displayed for all the object based Summary Lists (i.e. except Node Distributions, Alarms, Software Versions, IP Addresses, and Point Code), Management interfaces and Physical folders of the nodes under the navigation tree, and under the Details tab of all the objects. **Note** Users with authentication level 1 cannot see the Actions button. Also, the Manage and Ignore options have separate permissions for Manage/Unmanage and Ignore/Unignore. The menu item is not shown if both the permissions are invalid. **Note** The Action Menu appears in the Shorthauls tab for Backhauls and in the Nodes tab for APNs. For all the objects/summary lists except APN the drop-down menu contains: • Normal Poll Node—Polls the chosen nodes. • Clean Poll Node—Polls all chosen nodes and removes any Unknown objects after the completion of the poll. • Provision—Allows you to provision the objects. • Edit Properties—Opens the MWTM: Edit Properties Dialog window. • Edit SNMP IP Addresses—Opens the MWTM: Edit SNMP IP Addresses Dialog window. • Ignore/Unignore—Ignores or stops ignoring the chosen object at the next polling cycle. • Manage/Unmanage—Labels the chosen node Managed or Unmanaged. The option Manage or Unmanage is displayed based on the selected item. • Allow Trap Processing/Disallow Trap Processing—Enables or disables the MWTM to process traps from the chosen node. The option Allow Trap Processing or Disallow Trap Processing is displayed based on the selected item. • Allow Report Polling/Disallow Report Polling—Enables or disables the report polling. The option Allow Report Polling or Disallow Report Polling is displayed based on the selected item. This option is not displayed for RAN-O and ONS nodes. • Delete—Deletes the chosen object. For Management interfaces and Physical folders of the nodes, the drop-down menu contains: • Ignore/Unignore—Ignores or stops ignoring the chosen object at the next polling cycle. For APNs the drop-down menu contains the following options: • Search for APN Subscriber—Used to search for a specific subscriber across one or more designated GGSN, PDNGW, and SGW subscribers. See Searching for APN Subscribers, page 11-28 for more information. • Ignore/Unignore—Ignores or stops ignoring the chosen object at the next polling cycle. • Delete—Deletes the chosen object. **Note** For the nodes that are not manageable, the Actions menu contains only Ignore and Delete options. The Details tab of the groups created contains the Actions drop-down menu which contains the following options: • Batch Provision—Used to perform Batch Provisioning. See Batch Provisioning, page 11-32. **Note** The Actions button does not appear for the groups if they do not have a batch file of the corresponding node type.

MWTM: Edit Properties Dialog

The Edit Properties option is available under the Actions menu on the Details tab of all the nodes and on the Details tab of ITP node signaling points. This options opens MWTM: Edit Properties Dialog window that has editable properties.

Node properties include Name and Interface Structure. For the editable signaling point properties, only the Name is editable.

The MWTM: Edit Properties Dialog window contains:

Field or Button	Description
Name	Name of the node. The name field is green for valid input and is red for invalid input. The name may include up to 100 alphanumeric and the special characters hyphen (-), underscore (_), period (.), and colon (:). The Save option is disabled for the invalid name. After saving, this new name gets displayed in the navigation tree and in the Details panel. **Note** The character '.' is allowed only when the resulting name is a valid hostname.
Interface Structure	Drop-down menu to configure the way the MWTM displays the physical interfaces of a node (excluding the ONS node). Choices include: • Default—Restores the interface structure to the default setting for the node. For example, if the default structure is hierarchical, choosing this option restores the parent-child hierarchy in the Physical folder. **Note** In cases where the MWTM cannot determine the interface hierarchy of a node, the MWTM sets its default structure to be flat (that is, all interfaces appear at the same level). • Force Flat—Forces the interface structure of a node to be flat (that is, no hierarchy). All interfaces in the Physical folder appear at the same level. Force Hierarchical—Forces the interface structure of a node to be hierarchical (that is, to display parent-child relationships among interfaces).
Save	Saves the changes you have made.
Restore	Restores the changes that you make to the fields of the Edit Properties dialog box and leaves the dialog box open.
Cancel	Closes the window without saving the changes you have made.
Help	Displays online help for this window.

MWTM: Edit SNMP IP Addresses Dialog

The Edit SNMP IP Addresses option is available under the Actions menu on the Details tab of all the nodes. This options opens MWTM: Edit SNMP IP Addresses Dialog window that has editable properties.

The Edit SNMP IP Addresses option is available only for the users with authentication level 4 and level 5.

The MWTM: Edit SNMP IP Addresses Dialog window contains:

Field or Button	Description
Available IP Addresses	List of all IP addresses associated with this node that users could not or do not want the MWTM to use for SNMP polling.
IP Addresses for SNMP	Lists the IP addresses associated with the node, including the primary SNMP address and all backup IP addresses, that are intended for SNMP.
Add	Adds the IP Addresses from the Available IP Address box to the IP Addresses for SNMP box. This option is disabled if there is no IP address in the Available IP Address box.
Remove	Removes the IP Addresses from the IP Addresses for SNMP box and adds to the Available IP Addresses box. This option is disabled if there is no IP address in the IP Addresses for SNMP box.
Raise	Moves the selected IP address one level up in the IP Addresses for SNMP box. This option is disabled if there is only one IP address in the IP Addresses for SNMP box.
Lower	Lowers the selected IP address one level below in the IP Addresses for SNMP box. This option is disabled if there is only one IP address in the IP Addresses for SNMP box.
Save	Saves the changes you have made.
Cancel	Closes the window without applying any changes you have made.
Help	Displays online help for this window.

Displaying the Home Page

The MWTM web interface Home page provides access to MWTM client software, Cisco documentation, and information about the MWTM.

To access the Home page of the MWTM web interface, click **Home** under the navigation tree in the left pane.

The content area in the right pane shows these GUI elements:

Pane	GUI Element	Description
Client Software	Download Windows Client Download Solaris Client Download Linux Client Browser Checker	Shows the download instructions for the: • Windows client • Solaris client • Linux client • Information about the browser and screen display For details, see Downloading the MWTM Client from the Web, page 11-15.
MWTM on Cisco.com	MWTM Home Page MWTM Software Download Page Latest MWTM Documentation Engineering Software Updates (FTP) MWTM Supported IOS Releases	Shows hyperlinks to: • MWTM information on the Cisco website • MWTM software download from Cisco.com • Most recent versions of MWTM documentation • Software updates provided by Cisco Engineering • Supported IOS Releases document for the current release For details, see Accessing Software Updates and Additional Information, page 11-17.
User Documentation	README CHANGES Help Home Page Frequently Asked Questions Release Notes Install Guide User Guide OSS Integration Guide Alarm Guide Third Party and Open Source Copyrights	Shows: • *README.txt* file • Major new changes for the release • Online Help system for the MWTM • HTML version of the FAQs • PDF versions[1] of the: – *Release Notes for the Cisco Mobile Wireless Transport Manager* – *Installation Guide for the Cisco Mobile Wireless Transport Manager* – *User Guide for the Cisco Mobile Wireless Transport Manager* – *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager* – *Alarm Guide for the Cisco Mobile Wireless Transport Manager* – *Third Party and Open Source Copyrights* For details, see Viewing the MWTM Technical Documentation, page 11-17.

Pane	GUI Element	Description
System Documentation	MWTM Server Help Command Large Deployment Tuning README (pdf) Bandwidth Usage README Export Reports README MWTM Supported SNMP MIBs	Shows: • CLI output of the **mwtm help** command • Document on **MWTM Tuning for Large IP-RAN deployment** • *README-Bandwidth-Usage.txt* file • *README-ExportReports.txt* file • Lists of MIBs, which may include: – (*IPRAN only*) RAN MIBs – (*ITP only*) ITP MIBs – (*mSEF only*) CSG1 MIBs – (*mSEF only*) CSG2 MIBs – (*mSEF only*) GGSN MIBs – (*mSEF only*) BWG MIBs – (*mSEF only*) HA MIBs – (*PDNGW only*) – PDNGW MIBs – (*SGW only*) – SGW MIBs – (*PDSN only*) – PDSN MIBs – (*PCRF only*) – PCRF MIBs – Common MIBs For details, see MIB Reference, page F-1.

Pane	GUI Element	Description
Managed Platform Documentation	• (*ITP only*) ITP OS README • (*IPRAN only*) IP-RAN OS README • (*mSEF, CSG1 only*) Content Service Gateway 1 (CSG1) OS README • (*mSEF, CSG2 only*) Content Service Gateway 2 (CSG2) OS README • (*mSEF, GGSN only*) Gateway GPRS Service Node (GGSN) OS README • (*mSEF, HA only*) Home Agent (HA) OS README • (*mSEF, BWG only*) Broadband Wireless Gateway (BWG) OS README • (*mSEF, PDSN only*) Packet data Serving Node (PDSN) OS README • (*mSEF, PDNGW only*) Packet Data Network Gateway (PDNGW) OS README • (*mSEF, SGW only*) Serving Gateway (SGW) OS README • (*mSEF, PCRF only*) Policy and Charging Rules Function (PCRF) OS README	• *MWTM-OS-Info-ITP* file • *MWTM-OS-Info-IPRAN* file • *MWTM-OS-Info-CSG1* file • *MWTM-OS-Info-CSG2* file • *MWTM-OS-Info-GGSN* file • *MWTM-OS-Info-HA* file • *MWTM-OS-Info-BWG* file • *MWTM-OS-Info-PDSN* file • *MWTM-OS-Info-PDNGW* file • *MWTM-OS-Info-SGW* file • *MWTM-OS-Info-PCRF* file For details, see Viewing Managed Platform Documentation, page 11-17.

1. To access the latest versions, go to the parent index for Cisco MWTM user documents: http://www.cisco.com/en/US/products/ps6472/tsd_products_support_series_home.html

Downloading the MWTM Client from the Web

You can access the MWTM client installation software for Linux (unsupported), Solaris, and Windows from the MWTM web interface Home page. This access is useful if you do not have the CD-ROM, or if you prefer to download the software by using your web browser. Once you have downloaded the MWTM client installation software to your workstation, you must install the software on your local system.

For more information about installing the MWTM client software by using a web server, see the following chapters in the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5:*

- "Installing the MWTM on Solaris"
- "Installing the MWTM on Windows"
- "Installing the MWTM on Linux"

Related Topics

- Downloading the Solaris Client, page 11-16
- Downloading the Windows Client, page 11-16
- Downloading the Linux Client (Unsupported), page 11-16

Downloading the Solaris Client

To access the MWTM Client for Solaris page, select **Download Solaris Client**.

The web interface shows the supported Solaris versions and instructions for downloading the Solaris client. See the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for a detailed procedure.

To start the client after installation, add the */opt/CSCOsgmClient/bin* subdirectory to your path, then enter the **mwtm client** command from the command line.

Downloading the Windows Client

To access the MWTM Client for Windows page, select **Download Windows Client**.

The web interface shows supported Windows versions and instructions for downloading the Windows setup program. After downloading the setup program onto your desktop or other Windows directory, double-click the **setup.exe** icon to start the setup program and launch the installation wizard. See the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for detailed procedures.

To start the client after installation, launch it from the Windows Start menu or double-click the **MWTM Client** icon on your desktop.

Downloading the Linux Client (Unsupported)

To access the MWTM Client for Linux page, select **Download Linux Client**.

Note The MWTM does not support the MWTM client for Linux. Use the MWTM Linux client under advisement.

The web interface shows the supported Linux versions and instructions for downloading the Linux client. See the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for a detailed procedure.

To start the client after installation, add the */opt/CSCOsgmClient/bin* subdirectory to your path, then enter the **mwtm client** command from the command line.

Accessing Software Updates and Additional Information

You can access this information about the MWTM from the MWTM web interface Home page. To:

- View information about the MWTM or any other Cisco product available on Cisco.com, select **Cisco Home Page**.
- Read Cisco literature associated with the MWTM, including product data sheets, Q and As, and helpful presentations, select **MWTM Home Page**.
- Access software updates for the MWTM from Cisco.com for FTP, select **Engineering Software Updates (FTP)**. The Cisco Systems Engineering FTP server page appears.
- Access software updates for the MWTM from Cisco.com, select **MWTM Software Download Page**. The Software Download page for the MWTM appears.
- Access the most recent versions of customer documentation for the MWTM, select **Latest MWTM Documentation**. The Cisco Mobile Wireless Transport Manager documentation page on Cisco.com appears. From this page, you can view the latest versions of MWTM release notes, installation guides, and end-user guides.

Note If you cannot access Cisco.com from your location, you can always view the customer documentation that was delivered with the MWTM software. See the Viewing the MWTM Technical Documentation, page 11-17.

Viewing the MWTM Technical Documentation

From the MWTM web interface Home page, you can view this MWTM technical documentation. To view the:

- Entire Cisco Mobile Wireless Transport Manager Help System, select **Help Home Page**.
- Entire *User Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* as a PDF file on the web, using the Adobe Acrobat Reader, select **User Guide (PDF)**.
- Entire *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* as a PDF file on the web, using the Adobe Acrobat Reader, select **Install Guide (PDF)**.
- Entire *Release Notes for the Cisco Mobile Wireless Transport Manager 6.1.5* as a PDF file on the web, using the Adobe Acrobat Reader, select **Release Notes (PDF)**.
- Frequently Asked Questions (FAQs) about the MWTM, select **Frequently Asked Questions**.
- Syntax for every MWTM command, select **MWTM Server Help Command**.

Caution These PDF versions of technical documents might not be the latest versions. For the latest versions, go to: http://www.cisco.com/en/US/products/ps6472/tsd_products_support_series_home.html.

Viewing Managed Platform Documentation

Depending upon which type(s) of network you are managing, you can view the following MWTM managed platform documentation from the MWTM web interface:

- (*ITP only*) **ITP OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-ITP* file. This file contains a list of the supported OS software images for:
  - ITP nodes
  - GTT encoding scheme
  - MLR address table configuration
  - GTT accounting statistics reports
  - Route table and GTT table deployment
  - MSU rates
  - ITP provisioning

  To access the MWTM ITP OS README page, choose **ITP OS README** from the MWTM Home page.
- (*IPRAN only*) **IPRAN OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-IPRAN* file. This file contains a list of the supported OS software images for:
  - MWR nodes
  - ONS nodes
  - RAN SVC cards

  To access the MWTM IPRAN OS README page, choose **IPRAN OS README** from the MWTM Home page.
- (*mSEF, CSG1 only*) **CSG1 OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-CSG* file. This file contains a list of the supported OS software images for CSG1.

  To access the MWTM CSG1 OS README page, choose **CSG1 OS README** from the MWTM Home page.
- (*mSEF, CSG2 only*) **CSG2 OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-CSG2* file. This file contains a list of the supported OS software images for CSG2.

  To access the MWTM CSG2 OS README page, choose **CSG2 OS README** from the MWTM Home page.
- (*mSEF, GGSN only*) **GGSN OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-GGSN* file. This file contains a list of the supported OS software images for GGSN.

  To access the MWTM GGSN OS README page, choose **GGSN OS README** from the MWTM Home page.
- (*mSEF, HA only*) **HA OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-HA* file. This file contains a list of the supported OS software images for HA.

  To access the MWTM HA OS README page, choose **HA OS README** from the MWTM Home page.
- (*mSEF, BWG only*) **BWG OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-BWG* file. This file contains a list of the supported OS software images for BWG.

To access the MWTM BWG OS README page, choose **BWG OS README** from the MWTM Home page.

- (*mSEF*, *PDSN only*) **PDSN OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-PDSN* file. This file contains a list of the supported OS software images for PDSN.

  To access the MWTM PDSN OS README page, choose **PDSN OS README** from the MWTM Home page.

- (*mSEF, PDSN only*) **PDNGW OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-PDNGW* file. This file contains a list of the supported OS software images for PDNGW.

  To access the MWTM PDNGW OS README page, choose **PDNGW OS README** from the MWTM Home page.

- (*mSEF, SGW only*) **SGW OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-SGW* file. This file contains a list of the supported OS software images for SGW.

  To access the MWTM SGW OS README page, choose **SGW OS README** from the MWTM Home page.

- (*mSEF, PCRF only*) **PCRF OS README**—Shows the contents of the */opt/CSCOsgm/install/MWTM-OS-Info-PCRF* file. This file contains a list of the supported OS software images for PCRF.

  To access the MWTM PCRF OS README page, choose **PCRF OS README** from the MWTM Home page.

Displaying Alarms and Events

To display alarms in the web interface, click **Active Alarms** in the navigation tree, or select an object in the navigation tree and click the Alarms tab.

To display events in the web interface, click Event History in the navigation tree, or select an object in the navigation tree and click the Recent Events tab.

Viewing alarms and events in the web interface is essentially the same as viewing them in the MWTM client. Only minor differences exist:

- A paging feature for paging through large tables.
- A refresh interval that you can change.
- An Archived link for viewing archived alarms.
- Alarm selection by check box and a Clear Selection link.
- Severity drop-down list and a Change Severity button.

For detailed descriptions of these tools, see the "Using the Toolbar" section on page 11-6.

For descriptions of the columns, see the "Right-click Menus" section on page 9-11.

Displaying Summary Lists

Displaying Summary Lists in the web interface is essentially the same as displaying them in the MWTM client. Only minor differences exist. Clicking on an object under the Summary Lists in the web interface causes the content area to show information about the object.

For details on:

- Navigating table columns, see Navigating Table Columns, page 4-23.
- The toolbar, see Using the Toolbar, page 11-6.

For complete information about Summary Lists, see the Displaying Object Windows, page 8-3.

Displaying Software Versions

The Software Versions table lists the software versions for each node the MWTM manages.

To access the Software Versions page:

- From the Web interface navigation tree, choose **Summary Lists > Nodes > Software Versions**.
- From the MWTM main window, choose **View > MWTM Web Links > Software Versions**.

For details on:

- Navigating the columns of the Software Versions table, see Navigating Table Columns, page 4-23.
- The toolbar, see Using the Toolbar, page 11-6.

The Software Versions table contains:

Column	Description
Name	Name of the node. This column is displayed by default.
Node Type	Type of node. This column is displayed by default.
Feature	Name of the feature. This column is displayed by default.
Software Version	Software version used by the node. This column is displayed by default.
Software Description	Full software version information. This column is displayed by default.

Displaying Status and Summary Reports

You can view a table, graph, or CSV file that shows the overall state of the available MWTM reports, the time the server took to gather data from the network and store it in the database, and enable or disable reports from the report page. You can also run hourly and daily performance summary reports.

Step 1 In the MWTM Web interface, in the navigation tree, click **Reports**. The Report Status window appears as described in Viewing Report Status, page 11-21.

Step 2 From the Type pulldown menu, select one of the following types of reports:

- Report Status—See Viewing Report Status, page 11-21.
- Performance Summary Hourly—See Performance Summary Hourly Report, page 11-22.
- Performance Summary Daily—See Performance Summary Daily Report, page 11-22.

Step 3 Select a duration and output type. See the "Using the Toolbar" section on page 11-6 for more information about these fields.

Viewing Report Status

The Reports page in the MWTM web interface allows you to view a table, graph, or CSV file that shows the overall state of the available MWTM reports. You can also enable or disable reports from the report page.

Note Only reports that run on a regularly scheduled interval are displayed in the Hourly and Daily data. Reports that run continuously are not displayed.

Note Only reports that run on a regular scheduled interval display information in the following columns:Last Start Time, Last End Time, and Duration. Reports that run continuously display *N/A* for these columns. A report that has not yet run has *Unknown* in the above columns.

To access the main Reports page:

Step 1 Do one of the following:

- In a web browser, launch the MWTM web interface (see Accessing the MWTM Web Interface, page 11-2). In the navigation tree, click **Reports**.
- From the MWTM client, in the MWTM main window, choose **View > MWTM Web Links > Reports**.

The Reports page in the content area shows the Report Type and the status (enabled or disabled). If you have generated a report, a green status ball and the word "Enabled" appear in the Status column. If you have not generated a report, a red status ball and the word "Disabled" appears.

Note Clicking a Report Type takes you directly to the report data page.

The Status column indicates whether you have enabled or disabled data gathering for the specified report type.

Step 2 To enable a report in the MWTM Web interface, click "Disabled" in the Status column. The Status changes "Enabled" and a green status ball appears.

Performance Summary Hourly Report

The Performance Summary Hourly Report shows the time it takes to gather the data from the network and store it in the database. This report shows data for reports that are invoked via an hourly cronjob only and not reports that run continuously.

Step 1 In the MWTM Web interface, in the navigation tree, click **Reports**. The Report Status window appears as described in Viewing Report Status, page 11-21.

Step 2 From the Type pulldown menu, select **Performance Summary Hourly**.

GUI Element	Description
Toolbar	Provides functions to select a report type, duration, output type. See Using the Toolbar, page 11-6.
Table	If you select the Output Type **Table**, the table contains: • Report Type—Type of report. • Start Time (*timezone*)—Time the report started. • End Time (*timezone*)—Time the report ended. • Duration (secs)—Time it took to run the report. • Object Count—Number of objects on which the report was run. **Note** If the Output Type is Table or CSV, the same data is presented but the column headings are labeled by data type.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Duration (Secs)	If Output Type is Graph, Y-axis label that shows duration in second. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.
Time	If Output Type is Graph, X-axis label that shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, color-coded legend that shows labels for output.

Performance Summary Daily Report

The Performance Summary Daily Report shows the time it takes to gather the data from the network and store it in the database. This report shows data for reports that are invoked via a daily cronjob only and not reports that run continuously.

Step 1 In the MWTM Web interface, in the navigation tree, click **Reports**. The Report Status window appears as described in Viewing Report Status, page 11-21.

Step 2 From the Type pulldown menu, select **Performance Summary Daily**.

GUI Element	Description
Toolbar	Provides functions to select a report type, duration, output type. See Using the Toolbar, page 11-6.
Table	If you select the Output Type **Table**, the table contains: • Report Type—Type of report. • Start Time (*timezone*)—Time the report started. • End Time (*timezone*)—Time the report ended. • Duration (secs)—Time it took to run the report • Object Count—Number of objects on which the report was run. • If the Output Type is Table or CSV, the same data is presented but the column headings are labeled by data type.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Duration (Secs)	If Output Type is Graph, Y-axis label that shows duration in second. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.
Time	If Output Type is Graph, X-axis label that shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, color-coded legend that shows labels for output.
Bits/Sec or Bytes/Sec	If Output Type is Graph, Y-axis label that shows traffic rate in bits per second. The Y axis automatically scales to the interface speed. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.

Viewing Historical Statistics Report Settings

Step 1 In the MWTM Web interface, in the navigation tree, click **Reports**. The Report Status window appears as described in Viewing Report Status, page 11-21.

Step 2 Click the **Settings** tab. The Historical Stats Report Settings information is displayed.

You can click on Disabled or Enabled to change the state of any of the reports.

You can click on any field, except for the Reports Directory field, to modify its value.

Field		Description
General Settings	Reports Directory	Specifies the directory in which the MWTM reports are stored. You must use the CLI to change the directory in which the reports are stored; you cannot click on this field to modify it.
	Time Mode	Specifies the time mode, either 12-hour or 24-hour, for the reports.
	Master Report Flag	If this option is enabled, the individual report settings are used. If this is option is disabled, all reports are turned off.
	Perform Disk Space Checking	Specifies whether disk space checking is enabled or disabled.
	Export Reports	Specifies whether to automatically generate reports in CSV format.
	15 Min Stats Aging (Days)	Specifies the database aging value for 15-minute statistics. When records exceed the specified value, they are aged out of the database.
	Hourly Stats Aging (Days)	Specifies the database aging value for hourly statistics. When records exceed the specified value, they are aged out of the database.
	Daily Stats Aging (Days)	Specifies the database aging value for daily statistics. When records exceed the specified value, they are aged out of the database.
	Monthly Stats Aging (Days)	Specifies the database aging value for monthly statistics. When records exceed the specified value, they are aged out of the database.
	Custom Stats Aging (Days)	Specifies the database aging value for custom statistics. When records exceed the specified value, they are aged out of the database.
	15 Min CSV Aging (Days)	Specifies the database aging value for 15-minute CSV statistics. When records exceed the specified value, they are aged out of the database.
	Hourly CSV Aging (Days)	Specifies the database aging value for hourly CSV statistics. When records exceed the specified value, they are aged out of the database.
	Daily CSV Aging (Days)	Specifies the database aging value for daily CSV statistics. When records exceed the specified value, they are aged out of the database.
	Monthly CSV Aging (Days)	Specifies the database aging value for monthly CSV statistics. When records exceed the specified value, they are aged out of the database.
	Inventory Aging (Days)	Specifies the database aging value for inventory statistics. When records exceed the specified value, they are aged out of the database.
	Node Name Type	Name type for the Node column of the CSV reports. The valid values are: • DNS Name • Custom Name • Sys Name

Field		Description
ITP Report Settings	Show links with no capacity set (nullcaps)	Specifies whether to show links/linksets that do not have planned send and receive capacities.
	Show SCTP IP Links	Specifies whether to show SCTP IP links.
	High In-Service Ratio Threshold	Displays the high value for the In-Service ratio threshold.
	High Utilization Ratio Threshold	Displays the high value for the utilization ratio threshold.

Tools

To access launch and search tools, click **Tools** in the navigation tree of the MWTM web interface. The following options are available:

- Launch Tools, page 11-25
- Events and Alarms, page 11-25
- Search Tools, page 11-27

Launch Tools

If you have integrated with a CiscoWorks server, one or more of the following applications appears in the Launch pane as active links:

- CiscoView
- CiscoWorks LMS Portal
- Device Center

The name of the server appears in parentheses following the application names. To launch an application, click the application name. See Integrating the MWTM with Other Products, page 4-36.

Events and Alarms

The Events and Alarms pane contains the following links:

- Client disconnect sound
- Alarm Synchronization

The Events and Alarms tool allows you to select a sound to be played when the client loses its connection to the MWTM server. By default, no sound is played when the client loses its connection to the server. You must select a sound to be played.

Step 1 Click **Tools** in the navigation tree of the MWTM web interface. From the **Client disconnect sound** pulldown menu, select a sound. The sound you selected is saved.

Step 2 After selecting a client disconnect sound, click **Play** to sample the sound.

Note Make sure you are not logged into the MWTM client at the same time that you are changing the client disconnect sound in the MWTM web interface. Any sound changes you make using the MWTM client override changes you make using the web interface.

You can use the MWTM client interface to create and change event sound filters for the MWTM client as explained in Setting Sounds for Events at an MWTM Client, page 9-38.

Alarm Synchronization

Click the Alarm Synchronization link to open the Alarm Synchronization page. This page contains the following toolbar buttons and the panes:

Toolbar Buttons

The page contains the following toolbar buttons:

Field or Button	Description
Back	Use this button to return to the previous page.
 Forward Alarms	Click this icon to forward the alarms within the specified range.

Trap Target Information

The Trap Target Information pane contains the following fields:

Field or Button	Description
Target Host Name or IP Address	Enter the destination host name or IP address in this text field.
Target Port	Host port number to which the MWTM should forward traps.
SNMP Community String	SNMP community string that the MWTM should include in forwarded traps.

Field or Button	Description
SNMP Version	Trap version to forward. Valid values are 1 and 2c.
Trap Type	Type of trap that the MWTM should forward to this host. Valid trap types are: CISCO-SYSLOG: The CISCO-SYSLOG-MIB clogMessageGenerated trap. CISCO-EPM: CISCO-EPM-NOTIFICATION-MIB ciscoEpmNotificationRev1 trap. CISCO-EPM-2: CISCO-EPM-NOTIFICATION-MIB ciscoEpmNotificationRev2 trap.

Match Alarms by Date Range

The Match Alarms by Date Range pane contains the following fields:

Field or Button	Description
 Customize Date and Time Range	Opens the Customize Date and Time Range dialog box (see Customizing Date and Time Ranges, page 11-5).
Clear	Click this icon to clear the alarm dates and enable match by ID section.
Start Alarm Change Time	The start alarm change time to forward the traps.
End Alarm Change Time	The end alarm change time to forward the traps.

Match Alarms by Alarm Id Range

The Match Alarms by Date Range pane contains the following fields:

Field or Button	Description
Clear	Click this icon to clear the alarm IDs and enable match by date section.
Start Alarm Id	The start alarm ID to forward the traps.
End Alarm Id	The end alarm ID to forward the traps.

Search Tools

Note You must have HA (for Home Agent subscriber tool) or GGSN, PDNGW, or SGW (for APN Subscriber tool) networks enabled to use this tool (for details on enabling HA, see mwtm manage, page B-46).

The Search pane provides a tool that you use to search for a specific subscriber across one or more designated Cisco Home Agent (HA) routers or to search for GGSN, PDNGW, and SGW subscribers. These tools are useful for troubleshooting problems that subscribers might report.

In the Search pane, click one of the following options:

- **Search for Home Agent Subscriber** (See Searching for Home Agent Subscribers, page 11-28)
- **Search for APN Subscriber** (See Searching for APN Subscribers, page 11-28)

Searching for Home Agent Subscribers

Step 1 Click **Tools** in the navigation tree of the MWTM web interface, then select **Search for Home Agent Subscriber**.

Step 2 Click the Identifier Type radio button:

- **Network Access Identifier**—Use this option if you know the subscriber's network access identifier (NAI); for example, jdoe@xyz.com.
- **IP Address**—Use this option if you know the subscriber's IP address

Step 3 Depending on your selection in Step 2, enter the subscriber's NAI or IP address in the Mobile Node Identifier field.

Step 4 In the Select Groups to Search pane, click on the group(s) for which you want to search for Home Agents. This field is only available if you have previously created an HA config, HA report, or General group. (See Creating Groups, page 11-29).

Step 5 In the Select Home Agents to Search pane, check the check boxes of the Home Agents that you want to search. (The default setting is all Home Agents.) Click **Select All** to check all boxes and search all Home Agents. Click **Deselect All** to clear all check boxes.

Step 6 To conduct the search, click the **Search** button.

The Search Results popup window appears.

Step 7 If the search successfully locates the subscriber, and you want to troubleshoot the problem, click the **Troubleshoot Subscriber** button in the Search Results popup.

The MWTM automatically navigates to the Troubleshooting tab of the HA device.

Step 8 For more information about troubleshooting devices by using the Troubleshooting tab, see Viewing Troubleshoot, page 7-39.

Searching for APN Subscribers

Step 1 Click **Tools** in the navigation tree of the MWTM web interface, then click **Search for APN Subscriber**.

Step 2 In the MSISDN field, enter the MSISDN for which you want to search.

Step 3 In the Select Groups to Search pane, click on the group(s) for which you want to search for GGSN, PDNGW, or SGW subscribers. This field is only available if you have previously created a GGSN config, GGSN report, PDNGW config, PDNGW report, SGW config, SGW report, or General group. (See Creating Groups, page 11-29).

Step 4 In the Select Nodes to Search field, select all the Nodes on which you want to search for the MSISDN you entered. Click **Select All** to check all boxes and search all the nodes. Click **Deselect All** to clear all check boxes.

Step 5 To conduct the search, click the **Search** button.

The Search Results popup window appears.

Step 6 If the search is successful, you can select from the matching nodes to troubleshoot the subscriber by clicking the **Troubleshoot Subscriber** button in the Search Results popup.

Understanding Groups

MWTM allows you to create *groups* of nodes that can simplify operations. You can create groups using the MWTM web interface and then perform operations against all nodes of a group instead of performing the operation against each node individually. You can also perform searches on groups. For example, you can search for a home agent subscriber on nodes within a specific group.

For provisioning groups, the *master node* is the first node in the group. The master node is used to determine provisioning commands.

Related Topics

- Creating Groups, page 11-29
- Editing Groups, page 11-30
- Viewing Group Summary Information, page 11-31

Creating Groups

Note This option is available to users with authentication level Power User (level 2) and higher.

You can create the following types of groups:

Step 1 From the web interface, click **Groups**.

Step 2 Click the Create icon. The New Group form appears.

Step 3 Complete the New Group fields:

Field	Description
Name	Enter a name for the group
Type	From the pulldown menu, select the group type: CSG configuration CSG report GGSN configuration GGSN report General—Any node can be in the general group. HA configuration HA report IPRAN configuration RAN-O configuration PDNGW configuration PDNGW report SGW configuration SGW report mSEF configuration

Note If a group contains non-existent nodes or if you add a node of the wrong type to a group, the group will be invalid.

Step 4 Click **OK**.

The Edit window appears displaying information about the group you just created. See Viewing Group Summary Information, page 11-31 for more information.

Related Topics

- Understanding Groups, page 11-29
- Editing Groups, page 11-30
- Viewing Group Summary Information, page 11-31

Editing Groups

After you have created a group, you can add nodes to and remove nodes from the group. You can also order the nodes within the group.

Note This option is available to users with authentication level Power User (level 2) and higher. If you do not have the required privileges you will not see the Edit tab.

Step 1 From the web interface, click **Groups** > ***group name***.

Step 2 Click the **Edit** tab. The Group Settings pane displays the group name and group type.

Step 3 In the Group Members pane, specify to display available members by **Nodes** or by **Groups**. You might want to view members by Group if you want to copy all members of one group to another group. The available members or groups are displayed.

Note Only valid nodes for a group are displayed in the Available members/groups list. A group is invalid if it contains non-existent nodes or if the group contains nodes of the wrong type.

Step 4 Click on a member or group to add to the specified group, then click **Add**. The member or group is added to the Selected Members list.

Step 5 To remove a member, click on the member in the Selected Members list, then click **Remove**.

Step 6 To order the nodes in a group, use the **Raise** and **Lower** buttons.

For provisioning groups, the *master node* is the first node in the group. The master node is used to determine provisioning commands.

Viewing Group Summary Information

From the web interface navigation tree, click **Groups** to display the Group Summary List.

Note Some table columns are hidden by default. Right-click on the web table header to see all columns.

Field	Description
Internal ID	Internal ID of the object. The internal ID is a unique ID for every object, which the MWTM assigns for its own internal use. This ID can also be useful when the TAC is debugging problems.
Name	Name of the group.
Group Type	Type of group.
Size	Number of nodes in the group.
Notes	Displays any notes attached to the group.
Valid	**Yes** indicates the group is valid. **No** indicates the group is not valid. A group is invalid if it contains non-existent nodes or if the group contains nodes of the wrong type.
Create Time	The time at which the group was created.
Last Updated	Date and time the MWTM last updated the information on the page.

Field	Description
Create User	The IP address from which the group was created.
Last Changed User	Displays the local IP Address.
Last Verified	Time and date group was last verified.

Displaying Group Details

Step 1 From the web interface, click **Groups > *group name***. You can click on any of the following tabs for more information about the specified group:

Details—See Viewing Group Details, page 11-32.

Notes—See Viewing Notes, page 8-55.

Events—Displays events associated with the nodes in the group only. See Displaying Alarms and Events, page 11-19.

Alarms—Displays alarms associated with the nodes in the group only. See Displaying Alarms and Events, page 11-19.

Edit—See Editing Groups, page 11-30.

Viewing Group Details

Step 1 From the web interface, click **Groups > *group name***.

Step 2 Click **Details**. Detailed information about the specified group is displayed. See Nodes Table, page 8-8 for descriptions of the fields.

The Group Member Verification Status field specifies that status of each group member as it exists in the group. If the group is not valid, this field indicates which node is causing the group to not be valid.

Batch Provisioning

The MWTM provides a popup text field where you can type any CLI commands and then have those stored in a file on the server. These commands can then be used in batch operations to push out config changes to the nodes where there is no direct support in the wizard GUI interface. Also, MWTM stores some sample batch config files in the path */opt/CSCOsgm/etc/batch* that gives you an example how these work.

Note You can not delete the sample batch config files and also you can not create a batch file with the name starting with “SampleConfig” through batch file editor.

The MWTM uses the existing "Groups" feature to create group objects. Once you have a group to provision (see Using the Provisioning Wizard, page 7-48), select the group from left panel and then choose **Actions > Batch Provision** from the toolbar. The page gets loaded with the Batch Provision page.

Note The Batch Provision option is available only for the users with authentication level 3 and above. Also, the Batch Provision is not available for a group of the type "Report".

The Batch Provision page contains:

Field or Button	Description
Back	Use this button to go back to the previous page.
 Load File	Opens the MWTM: File Dialog window, which allows you to load the batch files.
 Save File	Saves the changes you have made to the chosen batch file. The saved batch files are added in the path */opt/CSCOsgm/etc/batch* with the naming convention "$*Name*.99.9(99).Generic.batch". **Note** When you load the sample batch config files, the Save File button gets disabled.
 Save As	Click this to save the updated batch file with a new name, or to overwrite an existing batch file. Opens the MWTM: File Dialog window with the addition of a text field "Filename" where you can specify the new name for the batch file. If an existing file name is given in the "File Name" text field, a confirmation dialog box is displayed asking whether to overwrite the existing file. The saved batch files are added in the path */opt/CSCOsgm/etc/batch* with the naming convention "$*Name*.99.9(99).Generic.batch".
Write Mem	Click this check box to save the script to the running configuration.
Provision	Allows you to perform batch provisioning for the nodes in the selected group. Opens Add credential for all nodes in the group window.
Batch File	Text area to display or edit the contents of the batch file. This text area is empty and the title displays "Batch File: No File" when there is no batch file loaded. Once the batch files are loaded (using the Load File option), the text area displays the contents of the loaded batch file and the title of the text area changes to Batch File: *filename,* where *filename* is the name of the batch file. You can also enter the device level commands in this text area to provision the nodes in the selected group.

MWTM: File Dialog

The MWTM: File Dialog window contains:

Field or Button	Description
Batch File List	The Batch File List pane contains the following columns: • Type—Icon indicating the item in the table is a file. • Name—Name of the batch file. • Node Type—Type of node. See Nodes Table, page 8-8, for a list of the available node types. • Last Modified—Date and time the batch file or folder was last modified. • Size (bytes)—Size of the batch file or folder, in bytes.
OK	Loads the chosen batch file and closes the dialog box. To load a batch file, select the file in the list and click **OK**. The batch file is loaded properly in the "Batch File:" text area panel of the "Batch Provision" page.
Delete	Deletes the chosen file from the batch file list. The MWTM displays a confirmation message before deleting the file.
Cancel	Closes the dialog box without loading a batch file or saving any changes to the batch file list.
Help	Displays online help for the dialog box.

Add credential for all nodes in the group

The Add credential for all nodes in the group window contains:

Field or Button	Description
User Name	Enter the login username.
Password	Enter the login password.
Enable User Name	Enter the login enable username.
Enable Password	Enter the login enable password.
OK	Adds the new credential information to the MWTM database.
Cancel	Closes the current window without saving the changes.
Help	Displays the online help for the window.

Viewing Statistics

You can use statistics for capacity planning and trend analysis. For example, you can generate graphs, tables, or CSV files:

- For a specified time range to display historical statistics for customer busy-hours.
- To show the maximum send and receive traffic over a specified time period.
- To show data on a 15-minute, daily, or hourly basis.

MWTM provides two types of statistics:

- **Real-time statistics**—The MWTM provides real-time (not historical) performance statistics and error information occurring in real time. The MWTM client also displays graphs for real-time statistics. You use real-time statistics for troubleshooting active problem areas in your network.
- **Historical reports (statistics)**. These reports are available on the MWTM web interface only.

  These statistics vary by the time frame over which they are collected and stored and for some domains, the statistics gathered vary. For example, real-time SCTP Association Statistic Details describes link-level SCTP statistics collected every 15 seconds. The SCTP historical reports describe device-level SCTP statistics for all of the SCTP links on a specific device over 15 minute, hourly, and daily intervals.

Displaying RAN-O Statistics

You can view real-time performance data for a shorthaul or backhaul interface in the MWTM:

- Web interface by selecting a shorthaul or backhaul interface in the navigation tree and clicking the Shorthaul Performance or Performance tab in the right pane.
- Client interface by right-clicking a shorthaul or backhaul interface in the navigation tree and clicking Performance History. The MWTM client interface provides access to RAN-O real-time performance statistics that you can use to troubleshoot problems that occur in real time. The zoom and navigation features quickly enable isolating and focusing on a problem area.

Note If the CISCO-IP-RAN-BACKHAUL-MIB on the node is not compliant with the MWTM, the MWTM issues the message:

```
MIB not compliant for reports
```

Install a version of IOS software on the node that is compatible with the MWTM. For a list of compatible IOS software, from the MWTM:

- Web interface, choose **Administrative > IPRAN OS README**.
- Client interface, choose **View > MWTM Web Links > Administrative**; then click **IPRAN OS README**.

The Performance tab shows one or more graphs depending on the type of report chosen. These graphs depict send and receive rates of optimized IP traffic over a specified time range. The graphs display the traffic in bits per second. Each data series shows maximum, minimum, and average rates of optimized traffic.

The Performance tab for a backhaul interface shows total rates for GSM and UMTS traffic, including total error rates.

This section provides information about:

- Displaying Shorthaul Performance Statistics, page 11-35
- Displaying Backhaul Performance Statistics, page 11-36

Displaying Shorthaul Performance Statistics

The Shorthaul Performance tab for a shorthaul interface shows the maximum, minimum, and average rates for send and receive traffic.

The Shorthaul Performance tab for a shorthaul interface contains:

GUI Element	Description
Toolbar	Provides functions to select a report type, duration, output type. See Using the Toolbar, page 11-6.
Type	A comprehensive summary of minimum, average, and maximum capacity statistics for send and receive traffic on a RAN shorthaul. You can choose from 15-minute, hourly, or daily capacity summary reports, or choose a custom range.
Table	If you select the Output Type Table, the table contains: • Data Type—Type of data, send or receive • Average—Average of the data across the chosen time range • Minimum—Minimum value across the chosen time range • Minimum Timestamp EDT—Time the minimum value occurred • Maximum—Maximum value across the chosen time range • Maximum Timestamp EDT—Time the maximum value occurred **Note** If the Output Type is Table or CSV, the same data is presented but the column headings are labeled by data type (for example, Send Average and Receive Average).
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Bits/Sec or Bytes/Sec	If Output Type is Graph, Y-axis label that shows traffic rate in bits per second. The Y axis automatically scales to the interface speed. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.
Time	If Output Type is Graph, X-axis label that shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, color-coded legend that shows labels for traffic rates.

Displaying Backhaul Performance Statistics

The Performance tab for a backhaul interface shows minimum, average, and maximum traffic rates for send and receive traffic. You can also determine the percentage of backhaul utilization that various traffic types occupy. Error rates appear, too.

The Performance tab for a backhaul interface contains:

GUI Elements	Description
Toolbar	Provides functions to select a report type, duration, output type, and the Graph Series Editor. See the "Using the Toolbar" section on page 11-6.
Type	Report Type. If you choose a Capacity Summary report, the report shows a comprehensive summary of minimum, average, and maximum capacity statistics for total traffic (GSM-Abis and UMTS-Iub), total GSM-Abis traffic, and total UMTS-Iub traffic. You can choose from 15-minute, hourly, or daily capacity summary reports. Error rates appear, too. If Output Type is Graph, statistics appear in these graphs: • Top—Capacity statistics for send traffic rates, including percentage of backhaul utilization (right side of graph). • Middle—Capacity statistics for receive traffic rates, including percentage of backhaul utilization (right side of graph). • Bottom—Error counts for send and receive traffic.
Type (continued)	If you choose a Minimum, Average, or Maximum Capacity report, the tables and graphs show capacity statistics for the backhaul interface. You can choose from 15-minute, hourly, or daily capacity reports. If Output Type is Graph, send and receive rate statistics appear in separate panes. Each pane shows two fully expandable graphs: • Top—Shows total (GSM-Abis and UMTS-Iub), total GSM-Abis, and total UMTS-Iub traffic rates, including percentage of backhaul utilization (right side of graph). • Bottom—Shows traffic rates for each shorthaul interface that belongs to the backhaul.
Table	**Note** Different tables appear depending on the report Type and Output Type selections. If the Output Type is Graph, a table appears with these columns: • Data Type—Type of data, send or received • Average—Average of the data across the chosen time range • Minimum—Minimum value across the chosen time range • Minimum Timestamp EDT—Time the minimum value occurred • Maximum—Maximum value across the chosen time range • Maximum Timestamp EDT—Time the maximum value occurred **Note** If the Output Type is Table or CSV, similar data is presented but the column headings may vary. Also, if the value is N/A, that means no data is available. Another table has these columns: • Data Type—Category of error for which statistics are gathered. Types include optimization, missed packets, and miscellaneous errors. • Total Counts—Total error count for each type of error. • Avg. Error Rate (Per Sec)—The calculated average error rate per second for each error type over the duration of the data range that you chose. **Note** You can sort the contents of the columns in ascending or descending order by clicking the column heading.

GUI Elements	Description
Expand to Full Screen	If Output Type is Graph, text link that shows a graph in a new, full-screen window for easier viewing.
Bits/Sec or Bytes/Sec	If Output Type is Graph, primary Y-axis label (left side of graph) that shows traffic rate in bits per second. The Y axis automatically scales to the User Bandwidth. If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.
% Utilization	If Output Type is Graph, secondary Y-axis label (right side of graph) that shows the backhaul utilization as a percentage of the User Bandwidth. The graph background has horizontal bars that are color-coded to indicate these thresholds: • Overloaded—Top portion of graph. • Warning—Middle portion of graph. • Acceptable—Bottom portion of graph. For definitions of these thresholds, see the "Threshold Information (RAN-O Only)" section on page 7-35. **Note** If the% Utilization exceeds 100%, see Why does my backhaul graph show greater than 100% for transmit traffic?, page C-24.
Time	X-axis label that shows a user-specified, historical time scale and the server time zone.
Legend	Color-coded legend that shows labels for traffic and error rates.

Displaying Error Statistics

You can view error data for a shorthaul or backhaul interface in the MWTM:

- Web interface by selecting an interface in the navigation tree and clicking the Shorthaul Errors or Errors tab in the content area.
- Client by right-clicking an interface in the navigation tree and clicking **Error History**.

Note If the CISCO-IP-RAN-BACKHAUL-MIB on the node is not compliant with the MWTM, the MWTM issues the message:

```
MIB not compliant for reports
```

Install a version of IOS software on the node that is compatible with the MWTM. For a list of compatible IOS software, from the MWTM:

- Web interface, choose **Administrative > IPRAN OS README**.
- Client interface, choose **View > MWTM Web Links > Administrative**; then click **IPRAN OS README**.

You view error data for a shorthaul or backhaul interface by selecting the interface in the navigation tree and clicking the Errors tab in the content area. The Errors tab shows total error counts and average error rates in table and graph format.

This section provides information about:

- Displaying Shorthaul Error Statistics, page 11-39
- Displaying Backhaul Error Statistics, page 11-40

Displaying Shorthaul Error Statistics

The Shorthaul Errors tab for a shorthaul interface shows a single table and a graph that shows the error rates and counts for different types of GSM-Abis and UMTS-Iub errors.

The Shorthaul Errors tab for a shorthaul interface contains:

GUI Elements	Description
Toolbar	Provides functions to select report type, duration, and output type. See the "Using the Toolbar" section on page 11-6.
Type	Report Type. If you choose an Error Summary report, the table and graph display a comprehensive summary of total error counts and average error rates for protocol, missed-packet, and miscellaneous errors for the chosen shorthaul. You can choose from 15-minute, hourly, or daily error summary reports. Statistics appear in table and graph format. If you choose an error report that is not a summary report, the table and graph displays protocol, missed packet, or miscellaneous errors for the shorthaul interface. You can choose from 15-minute, hourly, or daily error reports. Statistics appear in table and graph format. For definitions of these error types, see: • Protocol Failures, page 7-116 • Miscellaneous, page 7-117 • Missed Packets, page 7-118
Table	**Note** Different tables and column headings appear depending on the report Type and Output Type selections. If Output Type is Graph, a table appears with these columns: • Data Type—Category of error for which statistics are gathered. Types include protocol, missed packets, and miscellaneous errors. • Total Counts—Total error count for each type of error. • Avg. Error Rate (Per Sec)—The calculated average error rate per second for each error type over the duration of the data range that you chose. **Note** If the value is N/A, that means no data is available. Depending on the report Type selection, if the Output Type is Table or CSV, a table appears with multiple columns showing various error types and their counts. For definitions of these error types, see the: • Protocol Failures, page 7-116 • Miscellaneous, page 7-117 • Missed Packets, page 7-118 **Note** You can sort the contents of the columns in ascending or descending order by clicking the column heading.
Expand to Full Screen	If Output Type is Graph, this text link displays a graph in a new, full-screen window for easier viewing.
Error Counts	If Output Type is Graph, Y-axis label on left side of graph that shows traffic rate in bits per second. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.

GUI Elements	Description
Time	If Output Type is Graph, X-axis label that shows a user-specified, historical time scale and the server time zone.
Legend	If Output Type is Graph, color-coded legend that shows labels for traffic and error rates.

Displaying Backhaul Error Statistics

The Errors tab for a RAN backhaul interface shows a single table and a graph that shows the error rates and counts for different interfaces belonging to the backhaul.

The Errors tab for a backhaul interface contains:

GUI Elements	Description
Toolbar	Provides functions to select a report type, duration, output type, and the Graph Series Editor. See the "Using the Toolbar" section on page 11-6.
Table	**Note** Different tables and column headings appear depending on the report Type and Output Type selections. If Output Type is Graph, a table appears with these columns: • Data Type—Category of error for which statistics are gathered. Types include optimization, missed packets, and miscellaneous errors. • Total Counts—Total error count for each type of error. • Avg. Error Rate (Per Sec)—The calculated average error rate per second for each error type over the duration of the data range that you chose. **Note** If the value is N/A, that means no data is available. If Output Type is Table, a table appears with columns for total error counts for various error types (for example, total GSM-Abis errors). **Note** You can sort the contents of the columns in ascending or descending order by clicking the column heading.
Expand to Full Screen	If Output Type is Graph, text link that shows a graph in a new, full-screen window for easier viewing.
Error Counts	If Output Type is Graph, Y-axis label on left side of graph that shows traffic rate in bits per second.
Time	If Output Type is Graph, X-axis label that shows a user-specified, historical time scale and the server time zone.
Legend	If Output Type is Graph, color-coded legend that shows labels for traffic and error rates (for example, Total Errors UMTS-Iub).

Generating RAN Data Export Files

You can easily generate historical reports for RAN backhauls and shorthauls in the web interface. You can then export this data to a report with comma-separated values (CSV file). You can save this file to disk or open it with an application that you choose (for example, Microsoft Excel).

To export RAN data:

Step 1 Select a RAN backhaul or shorthaul in the navigation tree of the web interface.

Step 2 Click the Performance or Errors tab in the right pane.

Step 3 Generate a report.

Step 4 Choose CSV from the Type drop-down menu.

Displaying CSG2 Real-Time Statistics

The MWTM enables you to display real-time statistics for CSG2 nodes in the MWTM web interface. To display real-time statistics, select the node in the navigation tree and click the Statistics tab. The following options appear under the Type drop-down menu:

- Global Statistics, page 11-41
- CSG2 Protocol, page 11-46
- Gx Global Statistics, page 11-47
- Gx Policy Preload, page 11-49
- Gx Policy Preload Ext, page 11-50
- Gx PCRF Method List Message, page 11-52
- Gx PCRF Method List Message Error, page 11-53
- Billing Plan Statistics, page 11-54

Global Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Global Statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

- Global Statistics, page 11-42
- Load Statistics, page 11-42
- BMA Statistics, page 11-44
- Quota Server Statistics, page 11-45
- User Database Statistics, page 11-46

Global Statistics

The Global Statistics pane contains:

Field	Description
User Current	The total number of users with one or more active sessions on the system.
Session Current	The total number of sessions on the system. A session corresponds to a transmission control protocol (TCP) or user datagram protocol (UDP) flow.
User High Water	The highest number of active users reported by the User Current field since its last reset.
Session High Water	The highest number of active sessions reported by the Session Current field since its last reset.
User License	Number of users allowed by the license.
The following statistics are available only on CSG2, Release 2, for devices running IOS 12.4(15) or later.	
GTP BMA Rejected	Number of messages received from all the Billing Mediation Agents (BMAs) with reject cause code.
GTP BMA Dropped	Total Number of messages dropped destined for any of the BMAs
GTP BMA Retransmit	Number of messages retransmitted to all BMAs.
GTP QuotaMgr Rejected	Number of messages received from all the Quota Managers with reject cause code.
GTP QuotaMgr Dropped	Total Number of messages dropped destined for any of the Quota Managers.
GTP QuotaMgr Retransmit	Number of messages retransmitted to all the Quota Managers.

Load Statistics

Load statistics are available only on CSG2, Release 2, for devices running IOS 12.4(15) or later.

The Load Statistics pane contains:

		Description
Statistics Type	**Column**	Defines the type of statistics for each row: • Radius Start Requests • Session Create Requests • BMA Messages • Messages to Quota Server • User Database Requests • Gx Events *(available only on CSG2, Release 3.5, for devices running 12.4(22)MDA1 or later)*

		Description
Radius Start Requests	Allowed	Number of outgoing Radius Start requests allowed.
	Allowed Rate	Number of outgoing Radius Start requests allowed per second.
	Allowed Peak	The highest number of outgoing Radius Start requests allowed per second.
	IPC Queue Depth Tolerance	Maximum queue depth for Radius Start requests in the (Inter Processor Communication) IPC queue.
	Denied	Number of outgoing Radius Start requests denied.
	Denied Rate	Number of outgoing Radius Start requests denied per second.
	Denied Peak	The highest number of outgoing Radius Start requests denied per second.
Session Create Requests	Allowed	Number of outgoing Session Create Requests allowed.
	Allowed Rate	Number of outgoing Session Create Requests allowed per second.
	Allowed Peak	The highest number of outgoing Session Create Requests allowed per second.
	IPC Queue Depth Tolerance	Maximum queue depth for Session Create Requests in the IPC queue.
	Denied	Number of outgoing Session Create Requests denied.
	Denied Rate	Number of outgoing Session Create Requests denied per second.
	Denied Peak	The highest number of outgoing Session Create Requests denied per second.
BMA Messages	Allowed	Number of outgoing BMA messages allowed.
	Allowed Rate	Number of outgoing BMA messages allowed per second.
	Allowed Peak	The highest number of outgoing BMA messages allowed per second.
	IPC Queue Depth Tolerance	Maximum queue depth for BMA messages in the IPC queue.
	Denied	Number of outgoing BMA messages denied.
	Denied Rate	Number of outgoing BMA messages denied per second.
	Denied Peak	The highest number of outgoing BMA messages denied per second.
Messages to Quota Server	Allowed	Number of outgoing messages to Quota Manager allowed.
	Allowed Rate	Number of outgoing messages to Quota Manager allowed per second.
	Allowed Peak	The highest number of outgoing messages to Quota Manager allowed per second.
	IPC Queue Depth Tolerance	Maximum queue depth for messages to Quota Manager in the IPC queue.
	Denied	Number of outgoing messages to Quota Manager denied.
	Denied Rate	Number of outgoing messages to Quota Manager denied per second.
	Denied Peak	The highest number of outgoing messages to Quota Manager denied per second.

		Description
User Database Requests	Allowed	Number of outgoing User Database requests allowed.
	Allowed Rate	Number of outgoing User Database requests allowed per second.
	Allowed Peak	The highest number of outgoing User Database requests allowed per second.
	IPC Queue Depth Tolerance	Maximum queue depth for User Database requests in the IPC queue.
	Denied	Number of outgoing User Database requests denied.
	Denied Rate	Number of outgoing User Database requests denied per second.
	Denied Peak	The highest number of outgoing User Database requests denied per second.
Gx Events *(available only on CSG2, Release 3.5, for devices running 12.4(22)MDA1 or later)*	Allowed	Number of outgoing Gx Events allowed.
	Allowed Rate	Number of outgoing Gx Events allowed per second.
	Allowed Peak	The highest number of outgoing Gx Events allowed per second.
	IPC Queue Depth Tolerance	Maximum queue depth for Gx Events in the IPC queue.
	Denied	Number of outgoing Gx Events denied.
	Denied Rate	Number of outgoing Gx Events denied per second.
	Denied Peak	The highest number of outgoing Gx Events denied per second.

BMA Statistics

The Billing Mediation Agent (BMA) Statistics pane contains:

Column	Description
Server	Name of the BMA server.
Port	The UDP port of the BMA.
VRF Name	Name of the virtual routing and forwarding (VRF) over which communication with BMA occurs. If no VRF is specified, the global routing table is used.
State	The state of the BMA. Possible states include: Standby—The server is prepared to become active. Failed—The server has failed to respond to requests. Active—The server has been activated to receive requests. Echowait—An echo request to this billing mediation agent is waiting for a response. Nawait—A node-alive request to this billing mediation agent is waiting for a response. Suspended—The server has received a stop request from the operator.
Lost Records	Total number of lost records since system initialization or the last time the counter wrapped.
Total Sent	Total number of records sent to the billing mediation agent.
Failed Acks	Number of acknowledgments received from the billing mediation agent for which there are no outstanding requests.
Outstanding	Current number of messages waiting to be acknowledged. An arrow icon indicates the trend (up or down) since the last poll.

Column	Description
Outstanding High Water	The highest number of messages waiting for acknowledgements as reported by the Outstanding field since its last reset.
Bad Records	Number of bad records received. These are records in which an error was detected while attempting to decode the contents.
Retransmits	Number of messages retransmitted to the billing mediation agent.
Sent Rate	Rate at which records are sent to the billing mediation agent.
The following statistics are available only on CSG2, Release 2, for devices running IOS 12.4(15) or later.	
Rate Interval	The duration of time interval in Packet Rate and Ack Rate.
Packet Rate	Number of packets sent to the BMA per second calculated over the interval indicated by Rate Interval.
Ack Rate	Number of acknowledgments received from the BMA per second calculated over the interval indicated by Rate Interval.

Quota Server Statistics

The Quota Server Statistics pane contains:

Column	Description
Server	Name of the quota server.
Port	The UDP port of the quota server.
VRF Name	Name of the Virtual Routing and Forwarding (VRF) over which communication with the quota server occurs. If no VRF is specified, the global routing table is used.
State	The state of the quota manager. Possible states include: • Standby—The quota manager is prepared to become active. • Failed—The quota manager has failed to respond to requests. • Active—The quota manager has been activated to receive requests. • Echowait—An echo request to this quota manager is waiting for a response. • Nawait—A node-alive request to this quota manager is waiting for a response. • Suspended—The quota manager has received a stop request from the operator.
Lost Records	Total number of lost records since system initialization or the last time the counter wrapped.
Total Sent	Total number of records sent to the quota server.
Failed Acks	Number of acknowledgments received from the quota server for which there are no outstanding requests.
Outstanding	Current number of messages waiting to be acknowledged. An arrow icon indicates the trend (up or down) since the last poll.
Outstanding High Water	The highest number of messages waiting for acknowledgements as reported by the Outstanding field since its last reset.
Bad Records	Number of bad records received. These are records in which an error was detected while attempting to decode the contents.
Retransmits	Number of messages retransmitted to the quota manager.
Sent Rate	Rate at which records are sent to the quota server.

Column	Description
The following statistics are available only on CSG2, Release 2, for devices running IOS 12.4(15) or later.	
Rate Interval	The duration of time interval in Packet Rate and Ack Rate.
Packet Rate	Number of packets sent to the Quota Manager per second calculated over the interval indicated by Rate Interval.
Ack Rate	Number of acknowledgments received from the Quota Manager per second calculated over the interval indicated by Rate Interval.

User Database Statistics

The user database is a service that translates a client IP address into a user identifier. The User Database Statistics pane contains:

Column	Description
Server	Name of the user database server.
Port	The listening UDP port of the server.
VRF Name	Name of the VRF over which communication with user data server occurs. If no VRF is specified, the global routing table is used.
State	State of the user database. Possible values include: Reset—State before the database is determined to be active. Active—The database is available and processing requests. Failed—The database has failed and is not processing requests.
Requests	Number of user database requests.
User Identifiers Returned	Number of user identifiers returned.
Requests Resent	Number of user database requests resent.
Request Timeouts	Number of user database requests that have timed out.
Request Errors	Number of errors returned on user database requests.
Requests Rate	Rate of user database requests.
User Identifiers Returned Rate	Rate at which user identifiers are returned.

CSG2 Protocol

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the CSG2 Protocol statistics, choose this option from the Type drop-down menu. The GUI displays:

Column	Description
Inspection Method	Type of inspection method used to identify the protocol.
Protocol	Protocol name used in the configuration of the entity which provides the content services.
Transactions	• Count—Total number of transactions occurred in the network. • Rate—Number of transactions occurred in the network per second. • Peak—The highest number of transactions occurred in the network per second.
Subscriber Send Packets	• Count—Total number of outgoing subscriber packets. • Rate—Number of outgoing subscriber packets per second. • Peak—The highest number of outgoing subscriber packets per second.
Subscriber Send Bits	• Count—Total number of outgoing subscriber bits. • Rate—Number of outgoing subscriber bits per second. • Peak—The highest number of outgoing subscriber bits per second.
Network Send Packets	• Count—Total number of outgoing network packets. • Rate—Number of outgoing network packets per second. • Peak—The highest number of outgoing network packets per second.
Network Send Bits	• Count—Total number of outgoing network bits. • Rate—Number of outgoing network bits per second. • Peak—The highest number of outgoing network bits per second.

Gx Global Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Gx Global statistics, choose this option from the Type drop-down menu. The GUI displays the following categories:

- Global Message Statistics, page 11-47
- Global Message Error Statistics, page 11-48

Global Message Statistics

The Global Message Statistics pane contains:

Column	Description
Active Sessions	Total number of active sessions.
Credit Control Request Initial Messages Sent	Total number of CCR-Initial messages sent.

Column	Description
Credit Control Request Initial Messages Sent Rate	Rate at which CCR-Initial messages are sent.
Credit Control Request Update Messages Sent	Total number of CCR-Update messages sent.
Credit Control Request Update Messages Sent Rate	Rate at which the CCR-Update messages are sent.
Credit Control Request Final Messages Sent	Total number of CCR-Final messages sent.
Credit Control Request Final Messages Sent Rate	Rate at which the CCR-Final messages are sent.
Credit Control Answer Messages Received	Total number of CCA messages received.
Credit Control Answer Messages Received Rate	Rate at which the CCA messages are received.
Reauthorization Request Messages Received	Total number of RAR messages received.
Reauthorization Request Messages Received Rate	Rate at which the RAR messages are sent.
Reauthorization Answer Messages Sent	Total number of RAA messages sent.
Reauthorization Answer Messages Sent Rate	Rate at which the RAA messages are sent.

Global Message Error Statistics

The Global Message Error Statistics pane contains:

Column	Description
Credit Control Response Failures	Number of failures to send CCR.
Invalid Message Type Errors	Total number of invalid message type errors.
Duplicate Request Errors	Total number of duplicate request type errors.

Column	Description
Credit Control Answer Errors	Total number of errors occurred in CCA.
Reauthorization Answer Failures	Number of failures to send RAA.
Reauthorization Response Errors	Total number of errors occurred in RAR.
Invalid Request Type Errors	Number of errors due to invalid request type.
Invalid Request Number Errors	Number of errors due to invalid request number.
Invalid Request Status Errors	Number of errors due to invalid request status.
Invalid Session ID Errors	Number of times the session id received does not exist or when the session id associated with request is not the same as the one received.

Gx Policy Preload

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Gx Policy Preload statistics, choose this option from the Type drop-down menu. The GUI displays the following categories:

- Policy Preload Statistics, page 11-49
- Policy Preload Error Statistics, page 11-50

Policy Preload Statistics

The Policy Preload Statistics pane contains:

Column	Description
PCEF Initiated Preloading	Number of PCEF initiated preloading.
PCRF Initiated Preloading	Number of PCRF initiated preloading.
Policy Preload Requests	Number of Policy Preload requests.
Policy Preload Responses	Number of Policy Preload responses.
Global Policy Push Count	Number of Global Policy Push.
Global Policy Push Acknowledgement	Number of Global Policy Push Acknowledgement.

Policy Preload Error Statistics

The Policy Preload Error Statistics pane contains:

Column	Description
Preload Data Inconsistent	Number of times the preload data is inconsistent.
Attribute Value Pairs Missing	Number of times the mandatory AVPs (Attribute Value Pairs) are missing.
Wrong Order Failures	Number of failures due to wrong order.
Enforcement Failures	Number of failures to enforce.
Static configuration Conflicts	Number of conflicts with static config.
Credit Control Request Failures	Number of times failed to CCR (Credit Control Request).
Invalid Message Type Errors	Number of invalid message type errors.
Credit Control Answer Errors	Total number of errors occurred in CCA (Credit Control Answer).
Reauthorization Answer Failures	Number of times failed to send RAA (Re-Authorization Answer).
Reauthorization Response Errors	Total number of errors occurred in RAR (Re-Authorization Request).
Invalid Request Type Errors	Number of invalid req-type errors.
Invalid Request Number Errors	Number of invalid req-num errors.
Invalid Request Status Errors	Number of invalid req-status errors.
Invalid Session ID Errors	Number of times the session id received does not exist or when the session id associated with request is not the same as the one received.
Preload Timeout Errors	Number of times the preload timeout occurs.

Gx Policy Preload Ext

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Gx Policy Preload Ext statistics, choose this option from the Type drop-down menu. The GUI displays:

Field or Column	Description
Delete Failed	• Service Contents—Number of times deletion of service contents has failed during preload. • Accounting Policy Maps—Number of times deletion of accounting policy-maps has failed during preload. • Billing Services—Number of times deletion of billing services has failed during preload. • Content Policies—Number of times deletion of content policies has failed during preload. • Billing Plans—Number of times deletion of billing plans has failed during preload.
Deleted	• Service Contents—Number of service contents deleted during preload. • Accounting Policy Maps—Number of accounting policy-maps deleted during preload. • Billing Services—Number of billing services deleted during preload. • Content Policies—Number of content policies deleted during preload. • Billing Plans—Number of billing plans deleted during preload.
Insert Failed	• Service Contents—Number of times insertion of service contents has failed during preload. • Accounting Policy Maps—Number of times insertion of accounting policy-maps has failed during preload. • Billing Services—Number of times insertion of billing services has failed during preload. • Content Policies—Number of times insertion of content policies has failed during preload. • Billing Plans—Number of times insertion of billing plans has failed during preload.
Inserted	• Service Contents—Number of service contents inserted during preload. • Accounting Policy Maps—Number of accounting policy-maps inserted during preload. • Billing Services—Number of billing services inserted during preload. • Content Policies—Number of content policies inserted during preload. • Billing Plans—Number of billing plans inserted during preload.

Field or Column	Description
Roll Back Failed	• Service Contents—Number of times rollback has failed on insertion or deletion of service contents during preload. • Accounting Policy Maps—Number of times rollback has failed on insertion or deletion of accounting policy-maps during preload. • Billing Services—Number of times rollback has failed on insertion or deletion of billing services during preload. • Content Policies—Number of times rollback has failed on insertion or deletion of content policies during preload. • Billing Plans—Number of times rollback has failed on insertion or deletion of billing plans during preload.
Rolled Back	• Service Contents—Number of times the rollback is successful on insertion or deletion of service contents during preload. • Accounting Policy Maps—Number of times the rollback is successful on insertion or deletion of accounting policy-maps during preload. • Billing Services—Number of times the rollback is successful on insertion or deletion of billing services during preload. • Content Policies—Number of times the rollback is successful on insertion or deletion of content policies during preload. • Billing Plans—Number of times the rollback is successful on insertion or deletion of billing plans during preload.

Gx PCRF Method List Message

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Gx PCRF Method List Message statistics, choose this option from the Type drop-down menu. The GUI displays:

Column	Description
Method List Name	Method list name.
Credit Control Request Initial Messages Sent	• Count—Total number of CCR-Initial messages sent. • Rate—Rate at which CCR-Initial messages are sent.
Credit Control Request Update Messages Sent	• Count—Total number of CCR-Update messages sent. • Rate—Rate at which the CCR-Update messages are sent.
Credit Control Request Final Messages Sent	• Count—Total number of CCR-Final messages sent. • Rate—Rate at which the CCR-Final messages are sent.
Credit Control Answer Messages Received	• Count—Total number of CCA messages received. • Rate—Rate at which the CCA messages are received.

Column	Description
Reauthorization Request Messages Received	• Count—Total number of RAR messages received. • Rate—Rate at which the RAR messages are sent.
Reauthorization Answer Messages Sent	• Count—Total number of RAA messages sent. • Rate—Rate at which the RAA messages are sent.

Gx PCRF Method List Message Error

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Gx PCRF Method List Message Error statistics, choose this option from the Type drop-down menu.

The GUI displays:

Column	Description
Method List Name	Method list name.
PCRF Reboots	Number of times PCRF reboots.
Invalid Message Type Errors	Total number of invalid message type errors.
Duplicate Request Errors	Total number of duplicate request type errors.
Credit Control Response Failures	Number of failures to send CCR.
Credit Control Answer Errors	Total number of errors occurred in CCA.
Reauthorization Answer Failures	Number of failures to send RAA.
Reauthorization Response Errors	Total number of errors occurred in RAR.
Invalid Request Type Errors	Number of errors due to invalid request type.
Invalid Request Number Errors	Number of errors due to invalid request number.
Invalid Request Status Errors	Number of errors due to invalid request status.
Invalid Session ID Errors	Number of times the session id received does not exist or when the session id associated with request is not the same as the one received.

Billing Plan Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Billing Plan statistics, choose this option from the Type drop-down menu.

The GUI displays:

Column	Description
Billing Plan Name	Name of the billing plan.
Subscriber Count	Number of subscribers associated with a given Billing Plan.
Peak Subscriber Count	The highest number of subscribers associated with a given Billing Plan.

If the device is not defined with Billing Plan Statistics, then the GUI displays the following error message:

```
Billing Plan Statistics are not defined on the device
```

Displaying BWG Real-Time Statistics

The MWTM enables you to display real-time statistics for Broadband Wireless Gateway (BWG) nodes in the MWTM web interface. To display BWG real-time statistics, select a BWG node in the navigation tree and click the Statistics tab. The following subtabs appear:

- Global, page 11-54
- Paths, page 11-62
- User Groups, page 11-63

Global

The Global subtab shows global statistics for BWG nodes and contains:

- Status, page 11-55
- Creation and Deletion Statistics, page 11-55
- Miscellaneous Statistics, page 11-56
- Signaling Packet Statistics, page 11-57
- DHCP Packet Statistics, page 11-58
- Handoff Statistics, page 11-58
- Data Packet Statistics, page 11-59
- Dropped Packet Statistics, page 11-60
- Profile Statistics, page 11-61
- Rejected Statistics, page 11-62

Note For toolbar details, see Using the Toolbar, page 11-6.

Status

The Status pane shows:

Field	Description
Version	Software version of the BWG.
Description	Description of the physical instance of the BWG.
Operational Status	Current operational state of the BWG.
Session Redundancy Status	Indicates whether session redundancy is enabled or disabled.

Creation and Deletion Statistics

The Creation and Deletion Statistics pane shows:

Field	Description
Base Stations	• Maximum—Maximum number of base stations that can be concurrently supported by this BWG. • Current—Current number of signaling paths to all base stations. One signaling path is created between the BWG and each base station, so the current number of signaling paths is equal to the number of base stations currently connected to the BWG. • Created Count—Total number of signaling paths created on this BWG which include active and past signaling paths. • Created Rate—Rate at which signaling paths are created. • Deleted Count—Total number of signaling paths deleted on this BWG. • Deleted Rate—Rate at which signaling paths are deleted.
Data Paths	• Maximum—N/A • Current—Current number of data paths to all base stations. • Created Count—Total number of data paths created on this BWG which include active and past data paths. • Created Rate—Rate at which data paths are created. • Deleted Count—Total number of data paths deleted on this BWG. • Deleted Rate—Rate at which data paths are deleted.

Field	Description
Subscribers	• Maximum—Maximum number of subscribers that can be concurrently supported by this BWG. • Current—Number of subscribers currently connected to this BWG. • Created Count—Total number of subscribers created on this BWG which includes active and past subscribers • Created Rate—Rate at which subscribers are created. • Deleted Count—Total number of subscribers deleted on this BWG. • Deleted Rate—Rate at which subscribers are deleted.
Sessions	• Maximum—N/A • Current—Number of sessions currently active on this BWG. • Created Count—Total number of sessions created on this BWG which include active and past sessions. • Created Rate—Rate at which sessions are created. • Deleted Count—Total number of sessions deleted on this BWG. • Deleted Rate—Rate at which sessions are deleted.
Flows	• Maximum—N/A • Current—Current number of flows for all sessions active on this BWG. • Created Count—Total number of flows created on this BWG which include active and past flows. • Created Rate—Rate at which flows are created. • Deleted Count—Total number of flows deleted on this BWG. • Deleted Rate—Rate at which flows are deleted.
Hosts	• Maximum—N/A • Current—Current number of hosts connected to this BWG. • Created Count—Total number of hosts created on this BWG which include active and past hosts. • Created Rate—Rate at which hosts are created. • Deleted Count—Total number of hosts deleted on this BWG. • Deleted Rate—Rate at which hosts are deleted.

Miscellaneous Statistics

The Miscellaneous Statistics pane shows:

Field	Description
Framed Routes	Indicates the current number of unique framed routes downloaded from AAA and inserted into the IP routing table on a gateway.
Framed Router Subscribers	Indicates the number of subscribers using framed routes.

Field	Description
Auto-Provisioned Sessions	Indicates the number of auto-provisioned sessions on gateway.
Redirected Sessions	Indicates the number of sessions with all uplink IP packets redirected by the gateway.
Networks Behind Mobile Stations	Indicates the number of networks behind mobile stations.
Aged Out Hosts	• Count—Indicates the number of idle static hosts aged out. • Rate—Rate at which idle static hosts are aged out.

Signaling Packet Statistics

The Signaling Packet Statistics pane shows:

Field	Description
Pending	• Count—Total number of signaling packets currently pending on this BWG
Processed	• Count—Total number of signaling packets processed by this BWG. • Rate—Rate at which signaling packets are processed.
Requeued	• Count—Total number of signaling packets that were requeued on this BWG. • Rate—Rate at which signaling packets are requeued.
Congestion Drops	• Count—Number of signaling packets dropped when too many signaling packets are queued. The current queue limit is 1000 packets. • Rate—Rate at which signaling packets are dropped.
Service Disabled Drops	• Count—Number of signaling packets dropped due to disabled service. • Rate—Rate at which signaling packets are dropped.
Service Not Ready Drops	• Count—Number of signaling packets dropped while in non-active state for redundant configuration. • Rate—Rate at which signaling packets are dropped.
Encapsulation Errors Drops	• Count—Number of signaling packets dropped due to encapsulation errors. • Rate—Rate at which signaling packets are dropped.
Disposed Drops	• Count—Number of signaling packets disposed by the BWG. • Rate—Rate at which signaling packets are disposed.

DHCP Packet Statistics

The DHCP Packet Statistics pane shows:

Field	Description
Discover	• Count—Number of DHCP discover packets. • Rate—Rate at which DHCP packets are discovered.
Offer	• Count—Number of DHCP offer packets. • Rate—Rate at which DHCP packets are offered.
Request	• Count—Number of DHCP request packets. • Rate—Rate at which DHCP packets are requested.
Decline	• Count—Number of DHCP decline packets. • Rate—Rate at which DHCP packets are declined.
Ack	• Count—Number of DHCP acknowledged packets. • Rate—Rate at which DHCP packets are acknowledged.
Nak	• Count—Number of DHCP negatively acknowledged packets. • Rate—Rate at which DHCP packets are negatively acknowledged.
Release	• Count—Number of DHCP release packets. • Rate—Rate at which DHCP packets are released.
Inform	• Count—Number of DHCP inform packets. • Rate—Rate at which DHCP packets are informed.
Lease Query	• Count—Number of DHCP lease query packets. • Rate—Rate at which DHCP packets are lease queried.
Unknown	• Count—Number of DHCP unknown packets. • Rate—Rate at which DHCP packets are unknown.

Handoff Statistics

The Handoff Statistics pane shows:

Field	Description
Successful Handoffs	• Count—Number of successful session handoffs between Base Stations. • Rate—Rate at which successful session handoffs occur.
Failed Handoffs	• Count—Number of failed session handoffs between Base Stations. • Rate—Rate at which failed session handoffs occur.
Successful CMAC Key Updates	• Count—Number of successful CMAC Key count updates related to handoff between base stations. • Rate—Rate at which successful CMAC Key count updates are received.

Field	Description
Failed CMAC Key Updates	• Count—Number of failed CMAC Key count updates related to handoff between base stations. • Rate—Rate at which failed CMAC Key count updates are received.
Successful Security Key Updates	• Count—Number of successful security key updates during handoff between base stations. • Rate—Rate at which successful security key updates occur.
Failed Security Key Updates	• Count—Number of failed security key updates during handoff between base stations. • Rate—Rate at which failed security key updates occur.

Data Packet Statistics

The Data Packet Statistics pane shows:

Field	Description
Received IP Packets	• Count—Number of data packets received by the BWG. • Rate—Rate at which data packets are received by the BWG.
Received IP Bits	• Count—Number of data bits received by the BWG. • Rate—Rate at which data bits are received by the BWG.
Sent IP Packets	• Count—Number of data packets sent by the BWG. • Rate—Rate at which data packets are sent by the BWG.
Sent IP Bits	• Count—Number of data bits sent by the BWG. • Rate—Rate at which data bits are sent by the BWG.
Redirected IP Packets	• Count—Number of IP packets redirected by the BWG. • Rate—Rate at which IP packets are redirected by the BWG.
Redirected IP Bits	• Count—Number of IP bits redirected by the BWG. • Rate—Rate at which IP bits are redirected by the BWG.
Received Ethernet Packets	• Count—Number of ethernet packets received by the BWG. • Rate—Rate at which IP packets are redirected by the BWG.
Received Ethernet Bits	• Count—Number of ethernet bits received by the BWG. • Rate—Rate at which ethernet bits are received by the BWG.
Sent Ethernet Packets	• Count—Number of ethernet packets sent by the BWG. • Rate—Rate at which ethernet packets are sent by the BWG.
Sent Ethernet Bits	• Count—Number of ethernet bits sent by the BWG. • Rate—Rate at which ethernet bits are sent by the BWG.
Redirected Ethernet Packets	• Count—Number of ethernet packets redirected by the BWG. • Rate—Rate at which ethernet packets are redirected by the BWG.

Field	Description
Redirected Ethernet Bits	• Count—Number of ethernet bits redirected by the BWG. • Rate—Rate at which ethernet bits are redirected by the BWG.
Punted Data Packets	• Count—Number data packets punted from the cef path to the process path. • Rate—Rate at which packets are punted from the cef path to the process path.

Dropped Packet Statistics

The Dropped Packet Statistics pane shows:

Field	Description
Encapsulation Errors Drops	• Count—Number of data packets dropped due to encapsulation errors. • Rate—Rate at which data packets are dropped.
Invalid Address Drops	• Count—Number of data packets dropped due to invalid IP address. • Rate—Rate at which data packets are dropped.
Service Disabled Drops	• Count—Number of data packets dropped due to disabled service. • Rate—Rate at which data packets are dropped.
Invalid Protocol Type Drops	• Count—Number of data packets dropped due to invalid protocol types. • Rate—Rate at which data packets are dropped.
Length Error Drops	• Count—Number of data packets dropped due to IP packet length errors. • Rate—Rate at which data packets are dropped.
Absent Key Drops	• Count—Number of data packets dropped due to GRE key errors. • Rate—Rate at which data packets are dropped.
Flow Not Found Drops	• Count—Number of data packets dropped due to flow not found errors. • Rate—Rate at which data packets are dropped.
Flow Path Not Found Drops	• Count—Number of data packets dropped due to flow path not found errors. • Rate—Rate at which data packets are dropped due to flow path not found errors.
Flow Path Invalid Source Drops	• Count—Number of data packets dropped due to invalid source path address errors in the GRE header. • Rate—Rate at which data packets are dropped due to invalid source path address errors in the GRE header.
Session Not Found Drops	• Count—Number of data packets dropped due to session not found errors for the GRE key. • Rate—Rate at which data packets are dropped due to session not found errors.
Subscriber Not Found Drops	• Count—Number of data packets dropped due to subscriber not found errors for the GRE key. • Rate—Rate at which data packets are dropped due to subscriber not found errors.

Field	Description
Checksum Error Drops	• Count—Number of data packets dropped due to checksum errors. • Rate—Rate at which data packets are dropped due to checksum errors.
Ingress Filtering Drops	• Count—Number of data packets dropped due to subscriber invalid source IP address errors. • Rate—Rate at which data packets are dropped due to invalid source IP address errors.
Sequence Number Error Drops	• Count—Number of data packets dropped due to sequence number errors. • Rate—Rate at which data packets are dropped due to sequence number errors.
Fragmented Drops	• Count—Number of data packets dropped due to fragmented packet errors. • Rate—Rate at which data packets dropped due to fragmented packet errors.
Static IP Host Creation Failure Drops	• Count—Number of packets, such as upstream ARP and upstream data packets, dropped due to failure in creation of Static IP Host. • Rate—Rate at which data packets are dropped due to failure in creation of Static IP Host.
L2 Multicast and Broadcast Drops	• Number of L2 multicast and broadcast data packets other than ARP and DHCP dropped by BWG. • Rate—Rate at which L2 multicast and broadcast data packets are dropped.
Throttled Path Punt Drops	• Count—Number of data packets dropped due to throttling of punts. • Rate—Rate at which L2 multicast and broadcast data packets are dropped.
Learned Static Hosts Drops	• Count—Number of data packets dropped due to BWG learning about static hosts from upstream data packets. • Rate—Rate at which data packets are dropped due to BWG learning about static hosts from upstream data packets.

Profile Statistics

The Profile Statistics pane shows:

Field	Description
Service Flow Profile Not Found	• Count—Number of service flow creation errors due to an unconfigured service flow profile. • Rate—Rate at which creation errors are received.
QOS Profile Not Found	• Count—Number of service flow creation errors due to an unconfigured service flow QoS profile. • Rate—Rate at which creation errors are received.

Field	Description
Classifier Profile Not Found	• Count—Number of service flow creation errors due to an unconfigured service flow packet classifier profile. • Rate—Rate at which service flow creation errors occur due to an unconfigured service flow packet classifier profile.
SLA Profile Not Found	• Count—Number number of session creation failures due to configuration error in Service Level Agreement (SLA) profile on BWG. • Rate—Rate at which session creation failures occur due to configuration error in Service Level Agreement (SLA) profile on BWG.

Rejected Statistics

The Rejected Statistics pane shows:

Field	Description
Rejected Base Station Paths	• Count—Number of paths rejected because they exceeded the maximum number of base stations allowed to connect to this BWG. • Rate—Rate at which paths are rejected because they exceeded the maximum number of base stations allowed to connect to this BWG.
Unapproved Base Station Sessions	• Count—Number of session creation and/or session handoffs rejected because the requesting base station is not approved for it. • Rate—Rate at which created sessions and/or session handoffs are rejected because the base station is not approved for it.
Rejected Subscriber Sessions	• Count—Number of sessions rejected due to exceeding the maximum number of allowed subscribers. • Rate—Rate at which sessions that were rejected due to exceeding the maximum number of allowed subscribers.
Rejected Session Flows	• Count—Number of flows that were rejected due to exceeding the maximum number of flows allowed per session. • Rate—Rate at which flows were rejected due to exceeding the maximum number of flows allowed per session.
Session Deleted by the Gateway	• Count—Number of sessions deleted by the BWG. • Rate—Rate at which sessions were deleted by the BWG.
Rejected Hosts Open Requests	• Count—Number of *hosts open* requests rejected. • Rate—Rate at which *hosts open* requests are rejected.

Paths

Note For toolbar details, see Using the Toolbar, page 11-6.

The Paths subtab shows information and statistics about each base station and contains:

Column	Description
Remote IP Address	Path IP address at the base station side.
Local IP Address	Path IP address at the BWG side.
Type	Path type, can be signaling or data.
Sessions	Number of sessions over the path.
Flows	Number of flows over the path.
Sent IP Packets	• Count—Total number of IP packets sent over the path. • Rate—Rate at which IP packets are sent.
Sent IP Bits	• Count—Total number of IP bits sent over the path. • Rate—Rate at which IP bits are sent.
Received IP Packets	• Count—Total number of IP packets received over the path. • Rate—Rate at which IP packets are received.
Received IP Bits	• Count—Total number of IP bits received over the path. • Rate—Rate at which IP bits are received.
Sent Ethernet Packets	• Count—Total number of Ethernet packets sent over the path. • Rate—Rate at which Ethernet packets are sent.
Sent Ethernet Bits	• Count—Total number of Ethernet bits sent over the path. • Rate—Rate at which Ethernet bits are sent.
Received Ethernet Packets	• Count—Total number of Ethernet packets received over the path. • Rate—Rate at which Ethernet packets are received.
Received Ethernet Bits	• Count—Total number of Ethernet bits received over the path. • Rate—Rate at which Ethernet bits are received.

User Groups

The User Groups subtab shows information and statistics for user groups and contains:

- Sessions and Flow Statistics, page 11-64
- Traffic Statistics, page 11-64

Note For toolbar details, see Using the Toolbar, page 11-6.

Sessions and Flow Statistics

The Sessions and Flow Statistics pane shows:

Column	Description
Name	Domain name identifying a user group.
Service Mode	User group service mode.
Current Session Count	Total number of active sessions per user group.
Current Flows Count	Total number of active flows per user group.
Sessions Created	• Count—Total number of sessions created per user group. • Rate—Rate at which sessions are created.
Sessions Deleted	• Count—Total number of sessions deleted per user group. • Rate—Rate at which sessions are deleted.
Flows Created	• Count—Total number of flows created per user group. • Rate—Rate at which flows are created.
Flows Deleted	• Count—Total number of flows deleted per user group. • Rate—Rate at which flows are deleted.
Group Overwrites	• Count—Number of times this user group has been overwritten by the user group received from the AAA server. Users can belong to a particular user group at the time of initial entry and the AAA server can recategorize the user under a different user group after successful authentication. • Rate—Rate at which this user group has been overwritten by the user group received from the AAA server.

Traffic Statistics

The Traffic Statistics pane shows:

Column	Description
Name	Domain name identifying a user group.
Service Mode	User group service mode.
Sent IP Packets	• Count—Total number of IP packets sent over the path. • Rate—Rate at which IP packets are sent.
Sent IP Bits	• Count—Total number of IP bits sent over the path. • Rate—Rate at which IP bits are sent.
Received IP Packets	• Count—Total number of IP packets received over the path. • Rate—Rate at which IP packets are received.
Received IP Bits	• Count—Total number of IP bits received over the path. • Rate—Rate at which IP bits are received.

Column	Description
Sent Ethernet Packets	• Count—Total number of Ethernet packets sent over the path. • Rate—Rate at which Ethernet packets are sent.
Sent Ethernet Bits	• Count—Total number of Ethernet bits sent over the path. • Rate—Rate at which Ethernet bits are sent.
Received Ethernet Packets	• Count—Total number of Ethernet packets received over the path. • Rate—Rate at which Ethernet packets are received.
Received Ethernet Bits	• Count—Total number of Ethernet bits received over the path. • Rate—Rate at which Ethernet bits are received.
Invalid Source Packets	• Count—Number of packets dropped due to invalid source address errors. • Rate—Rate at which packets are dropped.
Invalid Source Bits	• Count—Number of bits dropped due to invalid source address errors. • Rate—Rate at which bits are dropped.

Displaying HA Real-Time Statistics

The MWTM enables you to display real-time statistics for Home Agent (HA) nodes in the MWTM web interface. To display HA real-time statistics, select a HA node in the navigation tree and click the Statistics tab. These subtabs appear:

- Global, page 11-65
- IP Local Pool Config, page 11-67
- IP Local Pool Stats, page 11-67

Global

The Global subtab shows global statistics for HA nodes and contains:

- Registrations Processed by AAA, page 11-66
- Registration Requests, page 11-66
- Standby Synchronization, page 11-67

Note For toolbar details, see Using the Toolbar, page 11-6.

Registrations Processed by AAA

The Registrations Processed by AAA pane shows:

Field	Description
Maximum Processed in one minute	The maximum number of registration requests processed in a minute by the HA. It includes only those registration requests which were authenticated by the AAA server.
Average time to process (msecs)	The average time taken by the home agent to process a registration request. Calculations are based on only those registration requests that were authenticated by the AAA server.
Authenticated via AAA Server	• Count—The total number of registration requests processed by the home agent, including only those registration requests that were authenticated by the AAA server. • Rate—The total rate of registration requests processed by the home agent, including only those registration requests that were authenticated by the AAA server.

Registration Requests

The Registration Requests pane shows:

Field	Description
Current Bindings	• Count—The current number of entries in the home agent's mobility binding list. The home agent updates this number in response to registration events from mobile nodes. • Rate—The count can increment or decrease, resulting in a positive or negative rate.
Initial Received	• Count—Total number of initial registration requests received by the HA. • Rate—Rate at which initial registration requests are received by the HA.
Initial Denied	• Count—Total number of initial registration requests denied by the HA. • Rate—Rate at which initial registration requests are denied by the HA.
All Received	• Count—Total number of all registration requests received by the HA. • Rate—Rate at which all registration requests are received by the HA.
All Denied	• Count—Total number of all registration requests denied by the HA. • Rate—Rate at which all registration requests are denied by the HA.

Standby Synchronization

The Standby Synchronization pane shows:

Field	Description
Binding Updates Sent	• Count—Total number of binding updates sent by the home agent to a standby home agent. • Rate—Total rate of binding updates sent by the home agent to a standby home agent.
Binding Updates Unacknowledged	• Count—Total number of binding updates sent by the home agent for which no acknowledgement is received from the standby home agent. • Rate—Total rate of binding updates sent by the home agent for which no acknowledgement is received from the standby home agent.

IP Local Pool Config

Note For toolbar details, see Using the Toolbar, page 11-6.

The IP Local Pool Config subtab shows IP addresses for HA nodes and contains:

Column	Description
Name	Name that uniquely identifies an IP local pool. This name must be unique among all the local IP pools even when they belong to different pool groups.
Addresses: Low	This object specifies the first IP address of the range of IP addresses contained by this pool entry. This address must be less than or equal to the High address.
Addresses: High	This object specifies the last IP address of the range of IP addresses mapped by this pool entry. If only a single address is being mapped, the value of this object is equal to the Low value.
Addresses: Free	Number of IP addresses available for use in the range of IP addresses.
Addresses: In Use	Number of IP addresses being used in the range of IP addresses.
Priority	This object specifies the priority of the IP local pool. IP local pools will be used in assigning IP addresses in the order of priority.

IP Local Pool Stats

Note For toolbar details, see Using the Toolbar, page 11-6.

The IP Local Pool Stats subtab shows IP addresses and IP addresses in use for HA nodes and contains:

Column	Description
Name	Name that uniquely identifies an IP local pool. This name must be unique among all the local IP pools even when they belong to different pool groups.
Addresses: Free	Number of IP addresses available for use in this IP local pool.
Addresses: In Use	Number of IP addresses being used in this IP local pool.
Addresses: Maximum In Use	Contains the high water mark of used addresses in an IP local pool since pool creation, since the system was restarted, or since this object was reset, whichever occurred last.
Addresses In Use: Low Threshold	When the number of used addresses in an IP local pool falls below this threshold value, a notification is generated.
Addresses In Use: High Threshold	When the number of used addresses in an IP local pool is equal or exceeds this threshold value, a notification is generated.
Addresses In Use: Low Threshold Percentage	When the percentage of used addresses in an IP local pool falls below this threshold value, a notification is generated.
Addresses In Use: High Threshold Percentage	When the percentage of used addresses in an IP local pool is equal or exceeds this threshold value, a notification is generated.

Displaying GGSN Real-Time Statistics

The MWTM enables you to display real-time statistics only in the MWTM web interface for Gateway GPRS Support Nodes (GGSNs) that reside on the Service and Application Module for IP (SAMI). To display GGSN real-time statistics, select a SAMI-based GGSN node in the navigation tree and click the Statistics tab. These subtabs appear:

- Global, page 11-68
- SGSN Throughput, page 11-74
- APN, page 11-75
- IP Local Pool Config, page 11-79
- IP Local Pool Stats, page 11-80

Global

Note For toolbar details, see Using the Toolbar, page 11-6.

The Global subtab shows global statistics for GGSN nodes and contains:

- GTP Statistics, page 11-69
- Charging Statistics, page 11-69
- GTP Throughput Statistics Ext, page 11-70

GTP Statistics

The GTP Statistics pane displays statistics about the GPRS Tunneling Protocol (GTP) and contains:

Field	Description
GTP Signaling Messages	GTP signaling messages sent between the Serving GPRS Support Node (SGSN) and GGSN.
G-PDU Messages	GTP Packet Data Unit (G-PDU) messages sent or received on an SGSN path.
G-PDU Octets	G-PDU bits sent or received in a GTP PDU message on an SGSN path.
Unexpected GTP Signaling Messages	Number of unexpected GTP signaling messages sent or received.
GTP Messages with Parser Errors	Number of GTP messages received with wrong value.
Sent	• Count—Number of messages or bits in the transmit direction. • Rate—The transmit rate of the messages or bits.
Received	• Count—Number of messages or bits in the receive direction. • Rate—The receive rate of the messages or bits.

Charging Statistics

The Charging Statistics pane displays count and rate statistics for GGSN charging messages and contains:

Field	Description
Current Open CDRs	• Count—The number of currently opened G-CDRs on the GGSN. • Rate—Rate of currently opened G-CDRs on the GGSN.
Current Closed CDRs	• Count—The number of currently closed G-CDRs on the GGSN which have not been sent to the CG. • Rate—Rate of currently closed G-CDRs on the GGSN which have not been sent to the CG.
Current Containers	• Count—The number of currently open or closed charging containers. • Rate—Rate of currently open or closed charging containers.
CDR Messages Pending	• Count—The number of currently pending G-CDR output messages. • Rate—Rate of currently pending G-CDR output messages.

Field	Description
CDR Messages Sent	• Count—The number of transmitted G-CDR output messages since the charging service is enabled. • Rate—Rate of transmitted G-CDR output messages since the charging service is enabled.
CDRs Opened	• Count—Total number of CDRs opened on the GGSN either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of CDRs opened on the GGSN either since system startup or since the last time the charging statistics was cleared.
Containers Created	• Count—Total number of containers created on the GGSN either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of containers created on the GGSN either since system startup or since the last time the charging statistics was cleared.
Service Records Created	• Count—Total number of service records created on the GGSN either since the system startup or since the time the service aware feature is enabled. • Rate—Rate of service records created on the GGSN either since the system startup or since the time the service aware feature is enabled.
Total Unique APNs	• Count—The number of access points for which charging data is being collected. • Rate—Rate of access points for which charging data is being collected.
Charging Gateway Down Times	• Count—The number of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup. • Rate—Rate of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup.

GTP Throughput Statistics Ext

The GTP Throughput Statistics Ext pane displays count and rate statistics about GTP throughput and contains:

Field	Description
GTP Packets	GTP packets between the GGSN and SGSN.
GTP Bytes	GTP bytes between the GGSN and SGSN.
Sampling Interval in Minutes: 3	Global GTP throughput statistics on the GGSN for a duration of 3 minutes.
Sampling Interval in Minutes: 5	Global GTP throughput statistics on the GGSN for a duration of 5 minutes.
Data age (minutes)	The difference in minutes between the time when the data was collected and retrieved. This is the time that has elapsed after the previous collection or update of the data.
Upstream	Rate (per second) of upstream GTP traffic during the last sampling period.
Downstream	Rate (per second) of downstream GTP traffic during the last sampling period.

PDP Context Statistics

The PDP Context Statistics pane shows count and rate values for these statistics:

Field	Description
Active GTP v0 PDP Contexts	• Count—PDP contexts (GTP version 0) that are active. • Rate—The rate of active PDP contexts (GTP version 0).
Active GTP v1 PDP Contexts	• Count—PDP contexts (GTP version 1) that are active. • Rate—The rate of active PDP contexts (GTP version 1).
PDP Contexts Created	• Count—PDP contexts that were created. • Rate—Rate of PDP contexts that were created.
PDP Contexts Deleted	• Count—PDP contexts that were deleted. • Rate—Rate of PDP contexts that were deleted.
PDP Context Activations Rejected	• Count—PDP contexts for which the activation request was rejected. • Rate—Rate of PDP contexts for which the activation request was rejected.
PDP PPP-Regen Interfaces Created	• Count—Device-specific interfaces created for association with PDP contexts regenerated to a PPP session. • Rate—Rate of device-specific interfaces created for association with PDP contexts regenerated to a PPP session.
Active PDP Contexts with Direct Tunnel	• Count—Active PDP contexts with direct tunnel enabled. • Rate—Rate of active PDP contexts with direct tunnel enabled.
PDP Contexts Deleted Without Waiting for the SGSN	• Count—PDPs deleted in the GGSN without waiting for a delete context response from the SGSN. • Rate—Rate of PDPs deleted in the GGSN without waiting for a delete context response from the SGSN.
PDP Contexts Deleted Without Sending to the SGSN	• Count—PDPs deleted in the GGSN without sending a delete request to the SGSN. • Rate—Rate of PDPs deleted in the GGSN without sending a delete request to the SGSN.
Update PDP Context Requests Sent	• Count—Update PDP context requests that the GGSN initiated and that were sent to the SGSN. • Rate—Rate of update PDP context requests that the GGSN initiated and that were sent to the SGSN.
Update PDP Context Responses Received	• Count—Update PDP context responses received from the SGSN for the GGSN-initiated update requests. • Rate—Rate of update PDP context responses received from the SGSN for the GGSN-initiated update requests.
COA Messages Received	• Count—Change of Authorization (COA) messages received at the GGSN. • Rate—Rate of COA messages received at the GGSN.
COA Messages Dropped	• Count—COA messages dropped at the GGSN. • Rate—Rate of COA messages dropped at the GGSN.

Field	Description
COA QOS Updates Sent	• Count—Update PDP requests for QOS changes that COA initiated and that are sent from the GGSN. • Rate—Rate of update PDP requests for QOS changes that COA initiated and that are sent from the GGSN.
Error Indication Messages Received	• Count—Number of error indication messages received on the GGSN. • Rate—Rate of error indication messages received on the GGSN.
Direct Tunnels Enabled	• Count—Direct tunnels enabled for the PDP contexts in the GGSN. • Rate—Rate of direct tunnels enabled for the PDP contexts in the GGSN.
Error Indications for DT PDP Contexts	• Count—Error indications received for Direct Tunnel (DT) PDP contexts from the Radio Network Controller (RNC). • Rate—Rate of error indications received for Direct Tunnel (DT) PDP contexts from the Radio Network Controller (RNC).
DT PDP Contexts Deleted Due to Update Response	• Count—Direct tunnel PDP contexts deleted because of update response failure. • Rate—Rate of direct tunnel PDP contexts deleted because of update response failure.
PDP Context Activations Failure Ratio	• Count—Number of PDP context activation failures. • Rate—Rate of PDP context activation failures.
PDP Context Requests Rejected due to Insufficient Resources	• Count—Number of PDP context requests rejected due to insufficient resources. • Rate—Rate of PDP context requests rejected due to insufficient resources.
PDP Context Requests Rejected due to Insufficient Resources for PPP Regeneration	• Count—Number of PDP context Requests rejected due to insufficient resources for PPP regeneration. • Rate—Rate of PDP context requests rejected due to insufficient resources for PPP regeneration.
PDP Context Requests Dropped due to the PPP Regeneration Threshold Limit	• Count—Number of PDP context requests dropped due to the PPP regeneration threshold limit. • Rate—Rate of PDP context requests dropped due to the PPP regeneration threshold limit.
PDP Context Messages with TFT Semantic Errors	• Count—Number of PDP context messages with TFT semantic errors. • Rate—Rate of PDP context messages with TFT semantic errors.
PDP Context Messages with TFT Syntax Errors	• Count—Number of PDP context messages with TFT syntax errors. • Rate—Rate of PDP context messages with TFT syntax errors.
PDP Context Messages with Packet Filter Syntax Errors	• Count—Number of PDP context messages with packet filter syntax errors. • Rate—Rate of PDP context messages with packet filter syntax errors.
PDP Context Messages with Packet Filter Semantic Errors	• Count—Number of PDP context messages with packet filter semantic errors. • Rate—Rate of PDP context messages with packet filter semantic errors.
Error indication Messages Sent	• Count—Number of error indication messages sent. • Rate—Rate at which the error indication messages are sent.

AAA Authentication Statistics

AAA Authentication Statistics pane shows:

Field	Description
Server Name	Name of the server.
Server State	Whether the server is up (operational) or down (not operational).
Transactions Completed	• Count—Number of authentication transactions with the server which succeeded since it is made active. • Rate—Rate at which the authentication transactions with the server are succeeded since it is made active.
Transaction Failures	• Count—Number of authentication transactions with this server which failed since it is made active. • Rate—Rate at which the authentication transactions with the server are failed since it is made active.
Requests	• Count—Number of authentication requests sent to this server since it is made active. • Rate—Rate at which the authentication requests are sent to the server since it is made active.
Request Timeouts	• Count—Number of authentication requests which are timed out since it is made active. • Rate—Rate at which the authentication requests are timed out since it is made active.
Error Responses	• Count—Number of server ERROR authentication responses received from this server since it is made active. • Rate—Rate at which the server ERROR authentication responses are received from the server since it is made active.
Incorrect Responses	• Count—Number of authentication responses which could not be processed since it is made active. • Rate—Rate (per second) of authentication responses which could not be processed since it is made active.

AAA Accounting Statistics

AAA Accounting Statistics pane shows:

Field	Description
Server Name	Name of the server.
Server State	Whether the server is up (operational) or down (not operational).
Transactions Completed	• Count—Number of accounting transactions with the server which succeeded since system reinitialization. • Rate—Rate at which the accounting transactions with the server are succeeded since it is made active.
Transaction Failures	• Count—Number of accounting transactions with this server which failed since system reinitialization. • Rate—Rate at which the accounting transactions with the server are failed since it is made active.
Requests	• Count—Number of accounting requests sent to this server since system reinitialization. • Rate—Rate at which the accounting requests are sent to the server since it is made active.

Field	Description
Request Timeouts	• Count—Number of accounting requests which have timed out since system reinitialization. • Rate—Rate at which the accounting requests are timed out since it is made active.
Error Responses	• Count—Number of server ERROR accounting responses received from this server since system reinitialization. • Rate—Rate at which the server ERROR accounting responses are received from the server since it is made active.
Incorrect Responses	• Count—Number of accounting responses which could not be processed since system reinitialization. • Rate—Rate of accounting responses which could not be processed since system reinitialization.

IP and UDP Statistics

The IP and UDP Statistics pane shows:

Field	Description
IP In Header Errors	Input datagrams discarded because of errors in their IP headers, including bad checksums, version number mismatches, other format errors, time-to-live exceeded, and errors discovered in processing their IP options.
IP Out Discards	Outbound packets that were discarded although no errors were detected. One reason for discarding a packet would be to free buffer space.
IP Out No Routes	IP datagrams discarded because no route could be found to transmit them. This statistic includes any datagrams that a host cannot route because all its default gateways are down.
IP Reassembly Fails	Failures detected by the IP reassembly algorithm.
IP Routing Discards	Routing entries that were discarded even though they are valid. One reason for discarding a routing entry would be to free buffer space for other routing entries.
UDP In Datagrams	UDP datagrams delivered to UDP users.

SGSN Throughput

Note For toolbar details, see Using the Toolbar, page 11-6.

The SGSN Throughput subtab shows:

Field	Description
SGSN Name	Name of the SGSN.
Sampling Interval in Minutes: 3	Throughput statistics on the SGSN for a duration of 3 minutes.
Sampling Interval in Minutes: 5	Throughput statistics on the SGSN for a duration of 5 minutes.

Field	Description
Upstream Packets	Rate (per second) of upstream packets sent on this SGSN during the last sampling period.
Upstream Bytes	Rate (per second) of upstream bytes sent on this SGSN during the last sampling period.
Downstream Packets	Rate (per second) of downstream packets sent on this SGSN during the last sampling period.
Downstream Bytes	Rate (per second) of downstream bytes sent on this SGSN during the last sampling period.
Data age (minutes)	The difference in minutes between the time when the data was collected and retrieved. This is the time that has elapsed after the previous collection or update of the data.

APN

Note For toolbar details, see Using the Toolbar, page 11-6.

The APN subtab contains:

APN Instance Throughput

To view the APN Instance Throughput Statistics table, choose this option from the Type drop-down menu. The GUI displays the count and rate values for these statistics:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Upstream Bits	• Count—Number of upstream bits sent on this APN during the last sampling period. • Rate—Rate (per second) of upstream bits sent on this APN during the last sampling period.
Downstream Bits	• Count—Number of downstream bits sent on this APN during the last sampling period. • Rate—Rate (per second) of downstream bits sent on this APN during the last sampling period.

Field	Description
Upstream Packets	• Count—Number of upstream packets sent on this APN during the last sampling period. • Rate—Rate (per second) of upstream packets sent on this APN during the last sampling period.
Downstream Packets	• Count—Number of downstream packets sent on this APN during the last sampling period. • Rate—Rate (per second) of downstream packets sent on this APN during the last sampling period.

APN Instance Throughput Ext

To view the APN Instance Throughput Ext Statistics table, choose this option from the Type drop-down menu. The GUI displays the count and rate values for these statistics:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Sampling Interval in Minutes: 3	Throughput statistics on the APN for a duration of 3 minutes.
Sampling Interval in Minutes: 5	Throughput statistics on the APN for a duration of 5minutes.
Upstream Packets	Rate (per second) of upstream packets sent on this APN during the last sampling period.
Upstream Bits	Rate (per second) of upstream bytes sent on this APN during the last sampling period.
Downstream Packets	Rate (per second) of downstream packets sent on this APN during the last sampling period.
Downstream Bytes	Rate (per second) of downstream bytes sent on this APN during the last sampling period.
Data Age (minutes)	The difference in minutes between the time when the data was collected and retrieved. This is the time that has elapsed after the previous collection or update of the data.

APN Instance PDP

To view the APN Instance PDP Statistics table, choose this option from the Type drop-down menu. The GUI displays the count and rate values for these statistics:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Active PDP/Bearers	• Count—Current number of active PDP/Bearer contexts on this APN.
PDP/Bearer Activations by MS Success	• Count—Total number of successfully completed PDP/Bearer context activation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed PDP/Bearer context activation procedures by the MS on this APN. • Ratio—Number of successful activations for every 100 activation attempts.

Field	Description
PDP/Bearer Activations by MS Failure	• Count—Total number of failed PDP/Bearer context activation procedures by the MS on this APN. • Rate—Rate (per second) of failed PDP/Bearer context activation procedures by the MS on this APN.
PDP/Bearer Deactivations by Network Success	• Count—Total number of successfully completed PDP/Bearer context deactivation procedures by the GGSN on this APN. • Rate—Rate (per second) of successfully completed PDP/Bearer context deactivation procedures by the GGSN on this APN.
PDP/Bearer Deactivations by Network Failure	• Count—Total number of failed PDP/Bearer context deactivation procedures by the GGSN on this APN. • Rate—Rate (per second) of failed PDP/Bearer context deactivation procedures by the GGSN on this APN.
PDP/Bearer Deactivations by Network PDP/Bearer Retainability	• Ratio—For every 100 PDP/Bearer contexts, the number of activations whose deactivation was not completed by the GGSN.
PDP/Bearer Deactivations By MS Success	• Count—Total number of successfully completed PDP/Bearer context deactivation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed PDP/Bearer context deactivation procedures by the MS on this APN. • Ratio—Number of successful deactivations for every 100 deactivation attempts.
PDP/Bearer Deactivations By MS Failure	• Count—Total number of failed PDP/Bearer context deactivation procedures by the MS on this APN. • Rate—Rate (per second) of failed PDP/Bearer context deactivation procedures by the MS on this APN.

APN Instance PDP Ext

To view the APN Instance PDP Ext Statistics table, choose this option from the Type drop-down menu. The GUI displays the count and rate values for these statistics:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Dynamic PDP/Bearer Activations By MS Success	• Count—Total number of successfully completed dynamic PDP/Bearer context activation procedures initiated by MS on this APN. • Rate—Rate (per second) of successfully completed dynamic PDP/Bearer context activation procedures initiated by MS on this APN. • Ratio—Number of successful dynamic activations for every 100 dynamic activation attempts.
Dynamic PDP/Bearer Activations By MS Failure	• Count—Total number of failed dynamic PDP/Bearer context activation procedures initiated by MS on this APN. • Rate—Rate (per second) of failed dynamic PDP/Bearer context activation procedures initiated by MS on this APN.

Field	Description
PDP/Bearer Activations By Network Success	• Count—Total number of successfully completed network initiated PDP/Bearer context activation procedures. • Rate—Rate (per second) of successfully completed network initiated PDP/Bearer context activation procedures. • Ratio—Number of successful network initiated activations for every 100 activation attempts.
PDP/Bearer Activations By Network Failure	• Count—Total number of failed network initiated PDP/Bearer context activation procedures. • Rate—Rate (per second) of failed network initiated PDP/Bearer context activation procedures.
PDP/Bearer Updates By Network Success	• Count—Total number of successful update responses received from the SGSN for GGSN initiated update requests on this APN. • Rate—Rate (per second) of successful update responses received from the SGSN for GGSN initiated update requests on this APN. • Ratio—Number of successful update responses received for every 100 update attempts.
PDP/Bearer Updates By Network Failure	• Count—Total number of failed update responses received from the SGSN for GGSN initiated update requests on this APN. • Rate—Rate (per second) of failed update responses received from the SGSN for GGSN initiated update requests on this APN.

APN Instance Miscellaneous

To view the APN Instance Miscellaneous Statistics table, choose this option from the Type drop-down menu. The GUI displays count and rate values for these statistics:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
DHCP Requests Success	• Count—Total number of successful DHCP address request sent by the GGSN or PDNGW on this APN. • Rate—Rate at which the successful DHCP address requests are sent by the GGSN or PDNGW on this APN. • Ratio—Number of successful DHCP requests for every 100 DHCP requests.
DHCP Requests Failure	• Count—Total number of unsuccessful DHCP address request sent by the GGSN or PDNGW on this APN. • Rate—Rate at which the unsuccessful DHCP address requests are sent by the GGSN or PDNGW on this APN.
DHCP Releases	• Count—Total number of DHCP address release request sent by the GGSN or PDNGW on this APN. • Rate—Rate at which the DHCP address release request is sent by the GGSN or PDNGW on this APN.

Field	Description
COA Message Success	• Count—Number of successfully acknowledged COA messages by the GGSN or PDNGW with a COA ACK. • Rate—Rate of successfully acknowledged COA messages by the GGSN or PDNGW with a COA ACK. • Ratio—Number of successfully acknowledged COA messages for every 100 COA messages received on this APN.
COA Message Failure	• Count—Number of unsuccessfully acknowledged COA messages by the GGSN or PDNGW with a COA ACK. • Rate—Rate of unsuccessfully acknowledged COA messages by the GGSN or PDNGW with a COA ACK.
Direct Tunnels Enabled	• Count—Direct tunnels enabled for the PDP contexts on this APN. • Rate—Rate at which the direct tunnels are enabled for the PDP contexts on this APN.

IP Local Pool Config

Note For toolbar details, see Using the Toolbar, page 11-6.

The IP Local Pool Config subtab shows IP addresses for GGSN, PDNGW, or SGW nodes and contains:

Field	Description
Name	Name of the IP local pool.
Addresses	• Low—The first IP address of the range of IP addresses contained by this pool entry. • High—The last IP address of the range of IP addresses mapped by this pool entry. • Free—Number of IP addresses available for use within the range of IP addresses. • In Use—Number of IP addresses being used within the range of IP addresses.

IP Local Pool Stats

Note For toolbar details, see Using the Toolbar, page 11-6.

The IP Local Pool Stats subtab shows IP addresses and IP addresses in use for GGSN, PDNGW, or SGW nodes and contains:

Field	Description
Name	Name of the IP local pool.
Addresses	• Free—Number of IP addresses available for use in this IP local pool. • In Use—Number of IP addresses being used in this IP local pool. • Maximum in Use—The maximum number of used addresses in an IP local pool since pool creation, since the system was restarted, or since this object was reset, whichever occurred last.

Displaying PDSN Real-Time Statistics

The MWTM enables you to display real-time statistics for Packet Data Serving Node (PDSN) nodes in the MWTM web interface. To display PDSN real-time statistics, select a PDSN node in the navigation tree and click the Statistics tab. The following option appears under Type drop-down menu:

- System Statistics, page 11-80

System Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the System Statistics, choose this option from Type drop-down menu. The GUI displays the following categories:

Session Statistics

The Session Statistics pane contains:

Field	Description
Maximum Allowed Sessions	Count—Maximum number of sessions allowed by the system.
Session Failure Ratio	Count—Ratio of session failures.
Session Utilization	Count—Total session utilization.
Total Active Sessions	Count—Total number of sessions in active state.
Total Dormant Sessions	Count—Total number of sessions in dormant state.
Total HDLC over GRE Sessions	Count—Total number of HDLCoGRE sessions currently established with the system.
Total PPP over GRE Sessions	Count—Total number of PPPoGRE sessions currently established with the system.
Total Session Failures	Count—Number of A10/A11 session failures occurring since PDSN agent restarted.
Total Sessions	Count—Total number of sessions currently established with the system.
Total Sessions Established	Count—Total number of sessions established since system was last restarted.
Total Sessions Established Rate	Count—Rate at which the sessions were established since system was last restarted.
Total Sessions Release	Count—Total number of sessions released since system was last restarted.
Total Sessions Released Rate	Count—Rate at which the sessions were released since system was last restarted.

Flow Statistics

The Flow Statistics pane contains:

Field	Description
Flow Failure Ratio	• Count—Ratio of flow failures.
Total Mobile IP Flow Failures	• Count—Total number of mobile IP flow setup request failed since system reboot. • Rate—Rate of mobile IP flow setup request failed since system reboot.
Total Mobile IP Flows	• Count—Total number of flows currently using MoIP services.
Total Mobile IP Flows Established	• Count—Total number of mobile IP flow that has been established successfully since system reboot. • Rate—Rate of mobile IP flow that has been established successfully since system reboot.
Total MSID Flows	• Count—Total number of flows currently using MSID service.
Total Proxy Mobile IP Flow Failures	• Count—Total number of proxy mobile IP flow setup request failed since system reboot. • Rate—Rate of proxy mobile IP flow setup request failed since system reboot.
Total Proxy Mobile IP Flows	• Count—Total number of flows currently using proxy MoIP service.
Total Proxy Mobile IP Flows Established	• Count—Total number of proxy mobile IP flow that has been established successfully since system reboot. • Rate—Rate of proxy mobile IP flow that has been established successfully since system reboot.
Total Simple IP Flow Failures	• Count—Total number of simple IP flow setup request failed since last system reboot. • Rate—Rate of simple IP flow setup request failed since last system reboot.
Total Simple IP Flows	• Count—Total number of flows currently using simple IP service.
Total Simple IP Flows Established	• Count—Total number of Simple IP flow that has been established successfully since system reboot. • Rate—Rate of Simple IP flow that has been established successfully since system reboot.
Total Unknown Type Flow Failures	• Count—Total number of unknown type flow setup request failed since last system reboot. • Rate—Rate of unknown type flow setup request failed since last system reboot.
Total VPDN Flow Failures	• Count—Total number of VPDN flow setup request failed since last system reboot. • Rate—Rate of VPDN flow setup request failed since last system reboot.

Field	Description
Total VPDN Flows	• Count—The total number of flows currently using VPDN service.
Total VPDN Flows Established	• Count—Total number of VPDN flow that has been established successfully since system reboot. • Rate—Rate of VPDN flow that has been established successfully since system reboot.

Session Bandwidth Statistics

The Session Bandwidth Statistics pane contains:

Field	Description
Bandwidth Utilization	Count—Total bandwidth that has been utilized.
Total Allocated Bandwidth	Count—Total bandwidth allocated for sessions currently established on the PDSN.
Total Available Bandwidth	Count—Bandwidth available on the PDSN system for creation of new sessions.
Total Configured Bandwidth	Count—total bandwidth value configured via the CLI that would be supported by PDSN system.

PCF Statistics

The PCF Statistics pane contains:

Field	Description
Maximum Allowed PCFs	Count—Maximum number of PCF allowed by the system.
PCF Utilization	Count—Total PCF utilization.
Total PCFs	Count—Total number of PCF currently interacting with the system.

Traffic Statistics

The Traffic Statistics pane contains:

Field	Description
Proxy Mobile IP Packets Received	• Count—Total number of proxy mobile IP data packets received from mobile stations by PDSN since system was last restarted. • Rate—Rate at which the proxy mobile IP data packets are received from mobile stations by PDSN since system was last restarted.
Short Data Burst Packets Sent	• Count—Total number of SDB marked data packets sent to PCF from PDSN since system was last restarted. • Rate—Rate at which the SDB marked data packets are sent to PCF from PDSN since system was last restarted.
Simple IP Packets Sent	• Count—Total number of simple IP data packets sent to mobile stations since system was last restarted. • Rate—Rate at which the simple IP data packets are sent to mobile stations since system was last restarted.
Mobile IP Packets Sent	• Count—Total number of mobile IP data packets sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the mobile IP data packets are sent to mobile stations from PDSN since system was last restarted.
No Session Packet Discards	• Count—Total number of packets discarded from PCF because of missing session since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of missing session since system was last restarted.
Proxy Mobile IP Packets Sent	• Count—Total number of proxy mobile IP data packets sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the proxy mobile IP data packets are sent to mobile stations from PDSN since system was last restarted.
Invalid GRE Protocol Packet Discards	• Count—Total number of packets discarded from PCF because of invalid GRE protocol since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of invalid GRE protocol since system was last restarted.
Mobile IP Packets Received	• Count—Total number of mobile IP data packets received from mobile stations since system was last restarted. • Rate—Rate at which the mobile IP data packets are received from mobile stations since system was last restarted.
Simple IP Bits Sent	• Count—Total number of simple IP data octets (in unit of 1024 octets) sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the simple IP data octets (in unit of 1024 octets) are sent to mobile stations from PDSN since system was last restarted.

Field	Description
Mobile IP Bits Received	• Count—Total number of mobile IP data octets (in unit of 1024 octets) received from mobile stations by PDSN since system was last restarted. • Rate—Rate at which the mobile IP data octets (in unit of 1024 octets) are received from mobile stations by PDSN since system was last restarted.
Short Data Burst Bits Sent	• Count—Total number of SDB marked data octets sent to PCF from PDSN since system was last restarted. • Rate—Rate at which the SDB marked data octets are sent to PCF from PDSN since system was last restarted.
Proxy Mobile IP Bits Sent	• Count—Total number of proxy mobile IP data octets (in unit of 1024 octets) sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the proxy mobile IP data octets (in unit of 1024 octets) are sent to mobile stations from PDSN since system was last restarted.
Mobile IP Bits Sent	• Count—Total number of mobile IP data octets (in unit of 1024 octets) sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the mobile IP data octets (in unit of 1024 octets) are sent to mobile stations from PDSN since system was last restarted.
Proxy Mobile IP Bits Received	• Count—Total number of proxy mobile IP data octets (in unit of 1024 octets) received from mobile stations since system was last restarted. • Rate—Rate at which the proxy mobile IP data octets (in unit of 1024 octets) are received from mobile stations since system was last restarted.
Simple IP Bits Received	• Count—Total number of simple IP data octets (in unit of 1024 octets) received from mobile stations by PDSN since system was last restarted. • Rate—Rate at which the simple IP data octets (in unit of 1024 octets) are received from mobile stations by PDSN since system was last restarted.
No GRE Key Packet Discards	• Count—Total number of packets discarded from PCF because of the missing GRE Keying since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of the missing GRE Key since system was last restarted.
Invalid Checksum Packet Discards	• Count—Total number of packets discarded from PCF because of invalid checksum since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of invalid checksum since system was last restarted.
Simple IP Packets Received	• Count—Total number of simple IP data packets received from mobile stations since system was last restarted. • Rate—Rate at which the simple IP data packets are received from mobile stations since system was last restarted.

Displaying SGW Real-Time Statistics

The MWTM enables you to display real-time statistics for SGW nodes in the MWTM web interface. To display real-time statistics, select the node in the navigation tree and click the Statistics tab. These options appear under the Type drop down list:

AAA

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the AAA statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

AAA Authentication Statistics

AAA Authentication Statistics pane shows:

Column	Description
Server Name	Name of the server.
Server State	Whether the server is up (operational) or down (not operational).
Transactions Completed	• Count—Number of authentication transactions with the server which succeeded since it is made active. • Rate—Rate at which the authentication transactions with the server are succeeded since it is made active.

Column	Description
Transaction Failures	• Count—Number of authentication transactions with this server which failed since it is made active. • Rate—Rate at which the authentication transactions with the server are failed since it is made active.
Requests	• Count—Number of authentication requests sent to this server since it is made active. • Rate—Rate at which the authentication requests are sent to the server since it is made active.
Request Timeouts	• Count—Number of authentication requests which are timed out since it is made active. • Rate—Rate at which the authentication requests are timed out since it is made active.
Error Responses	• Count—Number of server ERROR authentication responses received from this server since it is made active. • Rate—Rate at which the server ERROR authentication responses are received from the server since it is made active.
Incorrect Responses	• Count—Number of authentication responses which could not be processed since it is made active. • Rate—Rate of authentication responses which could not be processed since it is made active.

AAA Accounting Statistics

AAA Accounting Statistics pane shows:

Column	Description
Server Name	Name of the server.
Server State	Whether the server is up (operational) or down (not operational).
Transactions Completed	• Count—Number of accounting transactions with the server which succeeded since system reinitialization. • Rate—Rate at which the accounting transactions with the server are succeeded since it is made active.
Transaction Failures	• Count—Number of accounting transactions with this server which failed since system reinitialization. • Rate—Rate at which the accounting transactions with the server are failed since it is made active.
Requests	• Count—Number of accounting requests sent to this server since system reinitialization. • Rate—Rate at which the accounting requests are sent to the server since it is made active.
Request Timeouts	• Count—Number of accounting requests which have timed out since system reinitialization. • Rate—Rate at which the accounting requests are timed out since it is made active.
Error Responses	• Count—Number of server ERROR accounting responses received from this server since system reinitialization. • Rate—Rate at which the server ERROR accounting responses are received from the server since it is made active.
Incorrect Responses	• Count—Number of accounting responses which could not be processed since system reinitialization. • Rate—Rate of accounting responses which could not be processed since system reinitialization.

APN Instance Throughput

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the APN Instance Throughput Statistics table, choose this option from the Type drop-down menu. The GUI displays the count and rate values for these statistics:

Column	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Upstream Bits	• Count—Number of upstream bits sent on this APN during the last sampling period. • Rate—Rate (per second) of upstream bits sent on this APN during the last sampling period.
Downstream Bits	• Count—Number of downstream bits sent on this APN during the last sampling period. • Rate—Rate (per second) of downstream bits sent on this APN during the last sampling period.
Upstream Packets	• Count—Number of upstream packets sent on this APN during the last sampling period. • Rate—Rate (per second) of upstream packets sent on this APN during the last sampling period.
Downstream Packets	• Count—Number of downstream packets sent on this APN during the last sampling period. • Rate—Rate (per second) of downstream packets sent on this APN during the last sampling period.

APN Instance Throughput Ext

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the APN Instance Throughput Ext Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Sampling Interval in Minutes: 3	Throughput statistics on the APN for a duration of 3 minutes.
Sampling Interval in Minutes: 5	Throughput statistics on the APN for a duration of 5minutes.
Upstream Packets	Rate (per second) of upstream packets sent on this APN during the last sampling period.
Upstream Bits	Rate (per second) of upstream bits sent on this APN during the last sampling period.
Downstream Packets	Rate (per second) of downstream packets sent on this APN during the last sampling period.

Field	Description
Downstream Bits	Rate (per second) of downstream bits sent on this APN during the last sampling period.
Data Age (minutes)	The difference in minutes between the time when the data was collected and retrieved. This is the time that has elapsed after the previous collection or update of the data.

APN Instance Bearer

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the APN Instance Bearer statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Active Bearers	• Count—Total number of bearers on this APN.
Bearer Activations Success	• Count—Total number of successfully completed Bearer activation procedures by MS on this APN. • Rate—Rate (per second) of successfully completed Bearer activation procedures by the MS on this APN. • Ratio—Number of successful activations for every 100 activation attempts.
Bearer Activations Failure	• Count—Total number of failed Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of failed Bearer activation procedures by the MS on this APN.
Bearer Deactivations Success	• Count—Total number of successfully completed Bearer deactivation procedures by the SGW on this APN. • Rate—Rate (per second) of successfully completed Bearer deactivation procedures by the SGW on this APN.
Bearer Updates Success	• Count—Total number of successful bearer update initiated by network. • Rate—Rate (per second) of successful bearer update initiated by network. • Ratio—Number of successful bearer update initiated by network for every 100 attempts.
Bearer Updates Failure	• Count—Total number of unsuccessful bearer modify initiated by MME or SGSN. • Rate—Rate at which the unsuccessful bearer modify initiated by MME or SGSN.
Bearer Modifications Success	• Count—Total number of successful bearer modify initiated by MME or SGSN. • Rate—Rate (per second) of successful bearer modify initiated by MME or SGSN. • Ratio—Number of successful bearer modify initiated by MME or SGSN for every 100 initiation attempts.
Bearer Modifications Failure	• Count—Total number of unsuccessful bearer modify initiated by MME or SGSN. • Rate—Rate at which the unsuccessful bearer modify initiated by MME or SGSN.

Field	Description
Dedicated Bearer Activations Success	• Count—Total number of successful dedicated bearer creation initiated by network. • Rate—Rate (per second) of successful dedicated bearer creation initiated by network. • Ratio—Number of successful dedicated bearer creation for every 100 bearer creation attempts.
Dedicated Bearer Activations Failure	• Count—Total number of unsuccessful dedicated bearer activation procedures received on this APN. • Rate—Rate (per second) of unsuccessful dedicated bearer activation procedures received on this APN.

EPC Buffering

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the EPC Buffering Statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

- Buffering Configuration, page 11-90
- Buffering Status, page 11-90
- Buffering Statistics, page 11-91

Buffering Configuration

The Buffering Configuration pane shows:

Field	Description
Buffering Agent Status	The state of buffering agent.
Maximum Buffer Size	The maximum buffer size allocated for the buffering agent per bearer.
Buffer Duration	The duration for which the buffering agent stores data before discarding it.
Maximum Packets Per Buffer	The maximum number of packets allowed per buffer.

Buffering Status

The Buffering Status pane shows:

Field	Description
Total In Use Buffers	Count— Total number of buffers currently in use.
Total Buffered Packets	Count—Total number of packets buffered at present in the buffer.
Total Buffered Bits	Count—Total number of bits buffered at present in the buffer.
Total Buffers Available	Count—Current available buffer size.

Buffering Statistics

The Buffering Statistics pane shows:

Field	Description
Buffers Created	• Count—Total number of buffers created. • Rate—Rate at which the buffers are created.
Buffers Deleted	• Count—Total number of buffers deleted. • Rate—Rate at which the buffers are deleted.
Buffer Rejected Low Memory	• Count—Total number of times the buffer allocation is rejected due to low memory availability in the gateway. • Rate—Rate at which the buffer allocation is rejected due to low memory availability in the gateway.
Buffers Timed Out	• Count—Total number of buffers that got timed out. • Rate—Rate at which the buffers got timed out.
Buffer Packets Enqueued	• Count—Total number of packets enqueued to the buffering agent. • Rate—Rate at which the packets are enqueued to the buffering agent.
Buffer Rejected Memory Unavailable	• Count—Total number of times the buffer allocation is rejected by gateway due to requested memory is greater than the total available buffers. • Rate—Rate at which the buffer allocation is rejected by gateway due to requested memory is greater than the total available buffers.
Buffer Packets Dequeued	• Count—Total number of packets dequeued from the buffering agent. • Rate—Rate at which the packets are dequeued from the buffering agent.
Buffer Bits Enqueued	• Count—Total bits of data enqueued to the buffering agent. • Rate—Rate at which the bits of data are enqueued to the buffering agent.
Buffer Bits Dequeued	• Count—Total bits of data dequeued from the buffering agent. • Rate—Rate at which the bits of data are dequeued from the buffering agent.

EPC Overload Protection

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the EPC Overload Protection Statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

- Status Information, page 11-92
- Congestion Threshold Information, page 11-92
- Statistics Information, page 11-92
- Congestion Times, page 11-92

Status Information

The Status Information pane shows:

Field	Description
Congestion Status	The congestion gateway status.
Congestion DFP Weight	The dfp value, which is used to measure the congestion level in the gateway.

Congestion Threshold Information

The Congestion Threshold Information pane shows:

Field	Description
Congestion Low Threshold %	The low threshold for congestion.
Congestion High Threshold %	The high threshold for congestion.

Statistics Information

The Statistics Information pane shows:

Field	Description
Call Requests Dropped	• Count—Total number of incoming calls dropped at the gateway. • Rate—Rate at which the incoming calls are dropped at the gateway.
Times High Congestion Reached	• Count—The number of times high congestion occurred on the gateway. • Rate—Rate at which the high congestion occurred on the gateway.
Times Low Congestion Reached	• Count—The number of times low congestion occurred on the gateway. • Rate—Rate at which the low congestion are occurred on the gateway.

Congestion Times

The Congestion Times pane shows:

Field	Description
Congestion Low	• Last Occurrence—Timestamp at which the low congestion last occurred on the gateway. • Last Duration—Duration of last low congestion.
Congestion High	• Last Occurrence—Timestamp at which the high congestion last occurred on the gateway. • Last Duration—Duration of last high congestion.

GTP Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTP Statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

GTP Active Statistics

The GTP Statistics pane shows:

Column	Description
Bearers	• Count—Total number of bearers.
Users	• Count—Total number of users.

Charging Statistics

The Charging Statistics pane shows:

Field	Description
Current Open CDRs	• Count—The number of currently opened G-CDRs on the SGW. • Rate—Rate of currently opened G-CDRs on the SGW.
Current Closed CDRs	• Count—The number of currently closed G-CDRs on the SGW which have not been sent to the CG. • Rate—Rate of currently closed G-CDRs on the SGW which have not been sent to the CG.
Current Containers	• Count—The number of currently open or closed charging containers. • Rate—Rate of currently open or closed charging containers.
CDR Messages Pending	• Count—The number of currently pending G-CDR output messages. • Rate—Rate of currently pending G-CDR output messages.
CDR Messages Sent	• Count—The number of transmitted G-CDR output messages since the charging service is enabled. • Rate—Rate of transmitted G-CDR output messages since the charging service is enabled.

Field	Description
CDRs Opened	• Count—Total number of CDRs opened on the SGW either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of CDRs opened on the SGW either since system startup or since the last time the charging statistics was cleared.
Containers Created	• Count—Total number of containers created on the SGW either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of containers created on the SGW either since system startup or since the last time the charging statistics was cleared.
Service Records Created	• Count—Total number of service records created on the SGW either since the system startup or since the time the service aware feature is enabled. • Rate—Rate of service records created on the SGW either since the system startup or since the time the service aware feature is enabled.
Total Unique APNs	• Count—The number of access points for which charging data is being collected. • Rate—Rate of access points for which charging data is being collected.
Charging Gateway Down Times	• Count—The number of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup. • Rate—Rate of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup.

GTP Bearer Statistics

The GTP PDP/Bearer Statistics pane shows:

Column	Description
Bearer Activation Failure Ratio	• Count—Ratio of bearer activation request to bearer activation failures. • Rate—Rate (per second) of ratio of bearer activation request to bearer activation failures.
Bearers Created	• Count—Number of bearers created since the system is up. • Rate—Rate at which the bearers are created since the system is up.
Bearers Rejected	• Count—Number of bearers rejected since the system is up. • Rate—Rate at which the bearers are rejected since the system is up.
Bearers Deleted	• Count—Number of bearers deleted since the system is up • Rate—Rate at which the bearers are deleted since the system is up.

GTP Throughput Statistics

The GTP Throughput Statistics pane displays count and rate statistics about GTP throughput and shows:

Column	Description
GTP signaling Messages Sent	• Count—Number of signaling messages sent on a SGSN path. • Rate—Rate at which the signaling messages are sent on a SGSN path.
GTP Signaling Messages Received	• Count—Number of signaling messages received on a SGSN path. • Rate—Rate at which the signaling messages are received on a SGSN path.
G-PDU Messages Sent	• Count—Number of PDU messages sent on a SGSN path. • Rate—Rate at which the PDU messages are sent on a SGSN path.
G-PDU Messages Received	• Count—Number of PDU messages received on a SGSN path. • Rate—Rate at which the PDU messages are received on a SGSN path.
G-PDU Bits Sent	• Count—Number of PDU bits sent in PDU message on a SGSN path. • Rate—Rate at which the PDU bits are sent in PDU message on a SGSN path.
G-PDU Bits Received	• Count—Number of PDU bits received in PDU message on a SGSN path. • Rate—Rate at which the PDU bits are received in PDU message on a SGSN path.

GTP Throughput Statistics Ext

The GTP Throughput Statistics Ext pane shows:

Field	Description
GTP Packets	GTP packets between the SGW and SGSN.
GTP Bytes	GTP bytes between the SGW and SGSN.
Sampling Interval in Minutes: 3	Global GTP throughput statistics on the SGW for a duration of 3 minutes.
Sampling Interval in Minutes: 5	Global GTP throughput statistics on the SGW for a duration of 5 minutes.
Upstream	Rate (per second) of upstream GTP traffic during the last sampling period.
Downstream	Rate (per second) of downstream GTP traffic during the last sampling period.
Data age (minutes)	The difference in minutes between the time when the data was collected and retrieved. This is the time that has elapsed after the previous collection or update of the data.

GTP Error Statistics

The GTP Error Statistics pane shows:

Column	Description
GTP Messages with Parser Errors	• Count—Number of GTP messages received with wrong value. • Rate—Rate (per second) of GTP messages received with wrong value.
Dropped Signaling Messages	• Count—Number of signaling packets dropped by SGW. • Rate—Rate at which the signaling packets are dropped by SGW.
Unexpected GTP Signaling Messages	• Count—Number of unexpected GTP signaling messages received. • Rate—Rate at which the unexpected GTP signaling messages are received.

GTPv2 Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTPv2 Statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

- GTPv2 Bearer Statistics, page 11-96
- GTPv2 Session Statistics, page 11-97

GTPv2 Bearer Statistics

The GTPv2 Bearer Statistics pane shows:

Field	Description
Delete Bearer Responses	Total number of delete bearer response messages.
Update Bearer Requests	Total number of update bearer request messages.
Modify Bearer Requests	Total number of modify bearer request messages.
Create Bearer Requests	Total number of create bearer request messages.
Sent	• Count—Total number of bearer response or bearer request messages sent. • Rate—Rate at which the bearer response or bearer request messages are sent.
Received	• Count—Total number of bearer response or bearer request messages received. • Rate—Rate at which the bearer response or bearer request messages are received.
Rejected	• Count—Total number of bearer response or bearer request messages rejected. • Rate—Rate at which the bearer response or bearer request messages are rejected.

GTPv2 Session Statistics

The GTPv2 Session Statistics pane shows:

Field	Description
Delete Session Responses	Total number of delete session response messages.
Create Session Responses	Total number of create session response messages.
Delete Session Requests	Total number of delete session request messages.
Create Session Requests	Total number of create session request messages.
Sent	• Count—Total number of session response or session request messages sent. • Rate—Rate at which the session response or session request messages are sent.
Received	• Count—Total number of session response or session request messages received. • Rate—Rate at which the session response or session request messages are received.
Rejected	• Count—Total number of session response or session request messages rejected. • Rate—Rate at which the session response or session request messages are rejected.

GTPv2 Path Bearer Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTPv2 Path Bearer Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
GTP Path	GTP path.
Create Requests Sent	• Count—Total number of create bearer request messages sent. • Rate—Rate at which the create bearer request messages are sent.
Create Requests Received	• Count—Total number of create bearer request messages received. • Rate—Rate at which the create bearer request messages are received.
Create Requests Rejected	• Count—Total number of create bearer request messages rejected. • Rate—Rate at which the create bearer request messages are rejected.
Modify Requests Sent	• Count—Total number of modify bearer request messages sent. • Rate—Rate at which the modify bearer request messages are sent.
Modify Requests Received	• Count—Total number of modify bearer request messages received. • Rate—Rate at which the modify bearer request messages are received.
Modify Requests Rejected	• Count—Total number of modify bearer request messages rejected. • Rate—Rate at which the modify bearer request messages are rejected.

Field	Description
Update Requests Sent	• Count—Total number of update bearer request messages sent. • Rate—Rate at which the update bearer request messages are sent.
Update Requests Received	• Count—Total number of update bearer request messages received. • Rate—Rate at which the update bearer request messages are received.
Update Requests Rejected	• Count—Total number of update bearer request messages rejected • Rate—Rate at which the update bearer request messages are rejected.
Delete Responses Sent	• Count—Total number of delete bearer response messages sent. • Rate—Rate at which the delete bearer response messages are sent.
Delete Responses Received	• Count—Total number of delete bearer response messages received • Rate—Rate at which the delete bearer response messages are received.
Delete Responses Rejected	• Count—Total number of delete bearer response messages rejected. • Rate—Rate at which the delete bearer response messages are rejected.

GTPv2 Path Session Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTPv2 Path Session Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
GTP Path	GTP path.
Create Requests Sent	• Count—Total number of create session request messages sent. • Rate—Rate at which the create session request messages are sent.
Create Requests Received	• Count—Total number of create session request messages received. • Rate—Rate at which the create session request messages are received.
Create Requests Rejected	• Count—Total number of create session request messages rejected. • Rate—Rate at which the create session request messages are rejected.
Delete Requests Sent	• Count—Total number of delete session request messages sent. • Rate—Rate at which the delete session request messages are sent.
Delete Requests Received	• Count—Total number of delete session request messages received. • Rate—Rate at which the delete session request messages are received.
Delete Requests Rejected	• Count—Total number of delete session request messages rejected. • Rate—Rate at which the delete session request messages are rejected.
Create Responses Sent	• Count—Total number of create session response messages sent. • Rate—Rate at which the create session response messages are sent.

Field	Description
Create Responses Received	• Count—Total number of update session response messages received. • Rate—Rate at which the update session response messages are received.
Create Responses Rejected	• Count—Total number of update session response messages rejected • Rate—Rate at which the update session response messages are rejected.
Delete Responses Sent	• Count—Total number of delete session response messages sent. • Rate—Rate at which the delete session response messages are sent.
Delete Responses Received	• Count—Total number of delete session response messages received • Rate—Rate at which the delete session response messages are received.
Delete Responses Rejected	• Count—Total number of delete session response messages rejected. • Rate—Rate at which the delete session response messages are rejected.

GTP Path Error Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTP Path Error Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
GTP Path	GTP path.
Signaling Messages	**Unexpected** • Count—Number of unexpected GTP signaling messages sent or received. • Rate—Rate at which the unexpected GTP signaling messages are sent or received. **Dropped** • Count—Number of signaling messages that are dropped. • Rate—Rate at which the signaling messages are dropped.

IP Local Pool Configuration

The GUI displays the same fields as that of IP Local Pool Configuration statistics for GGSN node. See IP Local Pool Config, page 11-79.

IP Local Pool Statistics

The GUI displays the same fields as that of IP Local Pool statistics for GGSN node. See IP Local Pool Stats, page 11-80.

Displaying PDNGW Real time statistics

The MWTM enables you to display real-time statistics for PDNGW nodes in the MWTM web interface. To display real-time statistics, select the node in the navigation tree and click the Statistics tab. These options appear under the Type drop down list:

AAA

The GUI displays the same fields as that of AAA Statistics for SGW node. See AAA, page 11-86.

APN Instance Throughput

The GUI displays the same fields as that of APN Instance Throughput Statistics for SGW node. See APN Instance Throughput, page 11-88.

APN Instance Throughput Ext

The GUI displays the same fields as that of APN Instance Throughput Ext Statistics for SGW node. See APN Instance Throughput Ext, page 11-88.

APN Instance PDP/Bearer

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the APN Instance PDP/Bearer Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Active PDP/Bearers	• Count—Number of active PDP contexts or Bearers on this APN.
PDP/Bearer Activations by MS Success	• Count—Total number of successfully completed PDP context/Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed PDP context/Bearer activation procedures by the MS on this APN. • Ratio—Number of successful activations for every 100 activation attempts.
PDP/Bearer Activations by MS Failure	• Count—Total number of failed PDP context/Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of failed PDP context/Bearer activation procedures by the MS on this APN.
PDP/Bearer Deactivations by Network Success	• Count—Total number of successfully completed PDP context/Bearer deactivation procedures by the PDNGW on this APN. • Rate—Rate (per second) of successfully completed PDP context/Bearer deactivation procedures by the PDNGW on this APN.
PDP/Bearer Deactivations by Network Failure	• Count—Total number of failed PDP context/Bearer deactivation procedures by the PDNGW on this APN. • Rate—Rate (per second) of failed PDP context/Bearer deactivation procedures by the PDNGW on this APN.
PDP/Bearer Retainability	• Ratio—For every 100 PDP contexts/Bearers, the number of activations whose deactivation was not completed by the network.
PDP/Bearer Deactivations by MS Success	• Count—Total number of successfully completed PDP context/Bearer deactivation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed PDP context/Bearer deactivation procedures by the MS on this APN. • Ratio—Number of successful deactivations for every 100 deactivation attempts.
PDP/Bearer Deactivations by MS Failure	• Count—Total number of failed PDP context/Bearer deactivation procedures by the MS on this APN. • Rate—Rate (per second) of failed PDP context/Bearer deactivation procedures by the MS on this APN.

APN Instance PDP/Bearer Ext

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the APN Instance PDP/Bearer Ext Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Dynamic PDP/Bearer Activations By MS Success	• Count—Total number of successfully completed dynamic PDP context/Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed dynamic PDP context/Bearer activation procedures by the MS on this APN. • Ratio—Number of successful dynamic activations for every 100 dynamic activation attempts.
Dynamic PDP/Bearer Activations By MS Failure	• Count—Total number of failed dynamic PDP context/Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of failed dynamic PDP context/Bearer activation procedures by the MS on this APN.
PDP/Bearer Activations By Network Success	• Count—Total number of successfully completed network initiated PDP context/Bearer activation procedures. • Rate—Rate (per second) successfully completed network initiated PDP context/Bearer activation procedures. • Ratio—number of successful network initiated activations for every 100 activation attempts.
PDP/Bearer Activations By Network Failure	• Count—Total number of failed network initiated PDP context/Bearer activation procedures. • Rate—Rate (per second) failed network initiated PDP context/Bearer activation procedures.
PDP/Bearer Updates By Network Success	• Count—Total number of successful update responses received on this APN. • Rate—Rate (per second) of successful update responses received on this APN. • Ratio—Number of successful update responses received for every 100 activation attempts.
PDP/Bearer Updates By Network Failure	• Count—Total number of unsuccessful update responses received on this APN. • Rate—Rate (per second) of unsuccessful update responses received on this APN.
Dedicated Bearer Activations Success	• Count—Total number of successful dedicated bearer activation procedures received on this APN. • Rate—Rate (per second) of successful dedicated bearer activation procedures received on this APN. • Ratio—Number of successful dedicated bearer activation procedures for every 100 activation attempts.
Dedicated Bearer Activations Failure	• Count—Total number of unsuccessful dedicated bearer activation procedures received on this APN. • Rate—Rate (per second) of unsuccessful dedicated bearer activation procedures received on this APN.

APN Instance Miscellaneous

The GUI displays the same fields as that of APN instance Miscellaneous Statistics for GGSN node. See APN Instance Miscellaneous, page 11-78.

EPC Buffering

The GUI displays the same fields as that of EPC Buffering Statistics for SGW node. See EPC Buffering, page 11-90.

EPC Overload Protection

The GUI displays the same fields as that of EPC Overload protection Statistics for SGW node. See EPC Overload Protection, page 11-91.

GTP Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTP Statistics table, choose this option from the Type drop-down menu. The GUI displays the following categories:

- GTP Active Statistics, page 11-103
- Charging Statistics, page 11-104
- GTP PDP/Bearer Statistics, page 11-104
- GTP Throughput Statistics, page 11-105
- GTP Throughput Statistics Ext, page 11-95
- GTP Error Statistics, page 11-106

GTP Active Statistics

The GTP Active Statistics pane shows:

Column	Description
GTP v0 PDP Contexts	PDP contexts (GTP version 0) that are active.
GTP v1 PDP Contexts	PDP contexts (GTP version 1) that are active.
GTP v2 EPS Bearers	EPS bearers (GTP version 2) that are active.
PPP Regen PDPs	Device-specific interfaces created for association with PDP contexts regenerated to a Point-to-Point (PPP) session.
PPP PDPs	Total number of point to point PDP contexts.
PDP Contexts with Direct Tunnel	Direct tunnels enabled for the PDP contexts in the PDNGW.

Charging Statistics

The Charging Statistics pane shows:

Field	Description
Current Open CDRs	• Count—The number of currently opened G-CDRs on the PDNGW. • Rate—Rate of currently opened G-CDRs on the PDNGW.
Current Closed CDRs	• Count—The number of currently closed G-CDRs on the PDNGW which have not been sent to the CG. • Rate—Rate of currently closed G-CDRs on the PDNGW which have not been sent to the CG.
Current Containers	• Count—The number of currently open or closed charging containers. • Rate—Rate of currently open or closed charging containers.
CDR Messages Pending	• Count—The number of currently pending G-CDR output messages. • Rate—Rate of currently pending G-CDR output messages.
CDR Messages Sent	• Count—The number of transmitted G-CDR output messages since the charging service is enabled. • Rate—Rate of transmitted G-CDR output messages since the charging service is enabled.
CDRs Opened	• Count—Total number of CDRs opened on the PDNGW either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of CDRs opened on the PDNGW either since system startup or since the last time the charging statistics was cleared.
Containers Created	• Count—Total number of containers created on the PDNGW either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of containers created on the PDNGW either since system startup or since the last time the charging statistics was cleared.
Service Records Created	• Count—Total number of service records created on the PDNGW either since the system startup or since the time the service aware feature is enabled. • Rate—Rate of service records created on the PDNGW either since the system startup or since the time the service aware feature is enabled.
Total Unique APNs	• Count—The number of access points for which charging data is being collected. • Rate—Rate of access points for which charging data is being collected.
Charging Gateway Down Times	• Count—The number of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup. • Rate—Rate of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup.

GTP PDP/Bearer Statistics

The GTP Bearer Statistics pane shows:

Column	Description
PDP/Bearer Context Activation Failure Ratio	• Count—Ratio of PDP/bearer activation request to bearer activation failures. • Rate—Rate (per second) of ratio of PDP/bearer activation request to bearer activation failures.
PDP/Bearer Contexts Created	• Count—Number of PDP/bearers created since the system is up. • Rate—Rate at which the PDP/bearers are created since the system is up.
PDP/Bearer Context Activations Rejected	• Count—Number of PDP/bearer activation requests rejected since the system is up. • Rate—Rate at which the PDP/bearer activation requests are rejected since the system is up.
PDP/Bearer Contexts Deleted	• Count—Number of PDP/bearers deleted since the system is up • Rate—Rate at which the PDP/bearers are deleted since the system is up.

GTP Throughput Statistics

The GTP Throughput Statistics pane displays count and rate statistics about GTP throughput and shows:

Column	Description
GTP Signaling Messages Sent	• Count—Number of signaling messages sent on a SGSN path. • Rate—Rate at which the signaling messages are sent on a SGSN path.
GTP Signaling Messages Received	• Count—Number of signaling messages received on a SGSN path. • Rate—Rate at which the signaling messages are received on a SGSN path.
G-PDU Messages Sent	• Count—Number of PDU messages sent on a SGSN path. • Rate—Rate at which the PDU messages are sent on a SGSN path.
G-PDU Messages Received	• Count—Number of PDU messages received on a SGSN path. • Rate—Rate at which the PDU messages are received on a SGSN path.
G-PDU Bits Sent	• Count—Number of PDU bits sent in PDU message on a SGSN path. • Rate—Rate at which the PDU bits are sent in PDU message on a SGSN path.
G-PDU Bits Received	• Count—Number of PDU bits received in PDU message on a SGSN path. • Rate—Rate at which the PDU bits are received in PDU message on a SGSN path.

GTP Throughput Statistics Ext

The GTP Throughput Statistics Ext pane shows:

Field	Description
GTP Packets	GTP packets between the PDNGW and SGSN.
GTP Bytes	GTP bytes between the PDNGW and SGSN.

Field	Description
Sampling Interval in Minutes: 3	Global GTP throughput statistics on the PDNGW for a duration of 3 minutes.
Sampling Interval in Minutes: 5	Global GTP throughput statistics on the PDNGW for a duration of 5 minutes.
Upstream	Rate (per second) of upstream GTP traffic during the last sampling period.
Downstream	Rate (per second) of downstream GTP traffic during the last sampling period.
Data age (minutes)	The difference in minutes between the time when the data was collected and retrieved. This is the time that has elapsed after the previous collection or update of the data.

GTP Error Statistics

The GTP Error Statistics pane shows:

Column	Description
PDP Context Activations Rejected due to Insufficient Resources	• Count—Number of PDP context requests rejected due to insufficient resources. • Rate—Rate at which the PDP context requests are rejected due to insufficient resources.
PDP Context Requests Rejected due to Insufficient Resources Rejection for PPP Regeneration	• Count—Number of PDP context requests rejected due to insufficient resources for PPP regeneration. • Rate—Rate at which the PDP context requests are rejected due to insufficient resources for PPP regeneration.
PDP Context Requests Dropped due to the PPP Regeneration Threshold Limit	• Count—Number of PDP context requests dropped due to the PPP regeneration threshold limit. • Rate—Rate at which the PDP context requests are dropped due to the PPP regeneration threshold limit.
PDP Context Messages with Packet Filter Semantic Errors	• Count—Total number of received PDP context messages that had packet filters with semantic errors. • Rate—Rate at which the PDP context messages that had packet filters with semantic errors are received.
PDP Context Messages with Packet Filter Syntax Errors	• Count—Total number of received PDP context messages that had packet filters with syntax errors. • Rate—Rate at which the PDP context messages that had packet filters with syntax errors are received.
PDP Context Messages with TFT Syntax Errors	• Count—Total number of received PDP context messages that had Traffic Flow Templates (TFT) with syntax errors. • Rate—Rate at which the PDP context messages that had Traffic Flow Templates (TFT) with syntax errors are received.

Column	Description
PDP Context Messages with TFT Semantic Errors	• Count—Total number of received PDP context messages that had Traffic Flow Templates (TFT) with semantic errors. • Rate—Rate at which the PDP context messages that had Traffic Flow Templates (TFT) with semantic errors are received.
Unexpected GTP Signaling Messages	• Count—Number of unexpected GTP signaling messages sent or received. • Rate—Rate at which the unexpected GTP signaling messages are sent or received.
Dropped GTP Signaling Messages	• Count—Number of dropped GTP signaling messages. • Rate—Rate at which the GTP signaling messages are dropped.
GTP Message Parsers Errors	• Count—Number of GTP messages received with wrong value. • Rate—Rate at which the GTP messages with wrong value are received.

GTPv2 Statistics

The GUI displays the same fields as that of GTPv2 Statistics for SGW node. See GTPv2 Statistics, page 11-96.

GTPv2 Path Bearer Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTPv2 Path Bearer Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
GTP Path	GTP path.
Create Requests Received	• Count—Total number of create bearer request messages received. • Rate—Rate at which the create bearer request messages are received.
Create Requests Rejected	• Count—Total number of create bearer request messages rejected. • Rate—Rate at which the create bearer request messages are rejected.
Modify Requests Received	• Count—Total number of modify bearer request messages received. • Rate—Rate at which the modify bearer request messages are received.
Modify Requests Rejected	• Count—Total number of modify bearer request messages rejected. • Rate—Rate at which the modify bearer request messages are rejected.
Update Requests Received	• Count—Total number of update bearer request messages received. • Rate—Rate at which the update bearer request messages are received.

Field	Description
Update Requests Rejected	• Count—Total number of update bearer request messages rejected. • Rate—Rate at which the update bearer request messages are rejected.
Delete Responses Sent	• Count—Total number of delete bearer response messages sent. • Rate—Rate at which the delete bearer response messages are sent.

GTPv2 Path Session Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the GTPv2 Path Session Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
GTP Path	GTP path.
Create Requests Received	• Count—Total number of create session request messages received. • Rate—Rate at which the create session request messages are received.
Create Requests Rejected	• Count—Total number of create session request messages rejected. • Rate—Rate at which the create session request messages are rejected.
Delete Requests Received	• Count—Total number of delete session request messages received. • Rate—Rate at which the delete session request messages are received.
Delete Requests Rejected	• Count—Total number of delete session request messages rejected. • Rate—Rate at which the delete session request messages are rejected.
Create Responses Sent	• Count—Total number of create session response messages sent. • Rate—Rate at which the create session response messages are sent.
Delete Responses Sent	• Count—Total number of delete session response messages sent. • Rate—Rate at which the delete session response messages are sent.

GTP Path Error Statistics

The GUI displays the same fields as that of GTP Path Error Statistics for SGW node. See GTP Path Error Statistics, page 11-99.

IP Local Pool Configuration

The GUI displays the same fields as that of IP Local Pool Configuration statistics for GGSN node. See IP Local Pool Config, page 11-79.

IP Local Pool Statistics

The GUI displays the same fields as that of IP Local Pool statistics for GGSN node. See IP Local Pool Stats, page 11-80.

Displaying QoS Statistics

You can view QOS real-time statistics for IP-RAN aggregation and cell-site routers that have both pseudo wires and RAN Optimized backhauls. To view QOS real-time statistics for one of these nodes, select the node in the navigation tree, then click the QoS tab.

The following options appear under View drop-down menu:

- Config, page 11-109
- Class Map, page 11-109
- Queuing, page 11-110
- Match Statement, page 11-110
- Packet Marking, page 11-111
- Traffic Shaping, page 11-112
- Policing, page 11-112

Config

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Config details, choose Config option from the View drop-down menu. The GUI displays a bullet list/tree of the QOS configuration.

Class Map

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Class Map Statistics table, choose Class Map option from the View drop-down menu. The GUI displays:

Column	Description
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Pre-Policy Packets	The number of inbound packets prior to executing any QoS policies.

Column	Description
Pre-Policy Bits	The number of inbound octets prior to executing any QoS policies.
Pre-Policy Bits Rate	The rate of the traffic prior to executing any QoS policies.
Post-Policy Bits	The number of outbound octets after executing QoS policies.
Post-Policy Bits Rate	The rate of the traffic after executing QoS policies
Dropped Packets	The number of dropped packets per class as the result of all features that can produce drops.
Dropped Bits	The number of dropped bits per class as the result of all features that can produce drops.
Drop Bits Rate	The rate of the drops per class as the result of all features that can produce drops.
SRAM Buffer Dropped Packets	The number of drop packet count which occurred due to a lack of SRAM buffers during output processing on an interface.

Queuing

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Queuing Statistics table, choose Queuing option from the View drop-down menu. The GUI displays:

Column	Description
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Queue Depth	The current depth of the queue.
Max Queue Depth	The maximum depth of the queue.
Queue Discarded Bits	The count of octets, associated with this class, that were dropped by queueing.
Queue Discarded Packets	The number of packets, associated with this class, that were dropped by queueing.

Match Statement

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Match Statement Statistics table, choose Match Statement option from the View drop-down menu. The GUI displays:

Column	Description
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Match Statement	The specific match criteria to identify packets for classification purposes.
Pre-Policy Packets	The number of inbound packets prior to executing any QoS policies.
Pre-Policy Bits	The number of inbound octets prior to executing any QoS policies.
Pre-Policy Bits Rate	The rate of the traffic prior to executing any QoS policies.

Packet Marking

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Packet Marking Statistics table, choose Packet Marking option from the View drop-down menu. The GUI displays:

Column	Description
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
DSCP Packets	The number of packets whose DSCP field is marked by Set feature.
Precedence Packets	The number of packets whose Precedence field is marked by Set feature.
QOS Group Packets	The number of packets whose Qos Group field is marked by Set feature.
Frame Relay DE Packets	The number of packets whose Frame Relay DE Bit is marked by Set feature.
ATM CLP Packets	The number of packets whose ATM CLP Bit is marked by Set feature.
Layer 2 COS Packets	The number of packets whose Layer 2 Cos field is marked by Set feature.
MPLS Experimental Imposition Packets	The number of packets whose MPLS Experimental Imposition field is marked by Set feature.
Discard Class Packets	The number of packets whose Discard Class field is marked by Set feature.
MPLS Experimental Top Most Packets	The number of packets whose MPLS Experimental Top Most field is marked by Set feature.

Column	Description
SRP Priority Packets	The number of packets whose SRP Priority field is marked by Set feature.
DSCP Tunnel Packets	The number of packets whose DSCP Tunnel field is marked by Set feature.
Precedence Tunnel Packets	The number of packets whose Precedence Tunnel field is marked by Set feature.
Frame Relay FECN	The number of packets whose Frame Relay FECN BECN field is marked by Set feature.

Traffic Shaping

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Traffic Shaping Statistics table, choose this option from the View drop-down menu. The GUI displays:

Column	Description
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Active	The current traffic-shaping state. When traffic-shaping is enabled and the traffic rate exceeds the shape rate, traffic-shaping is considered to be active. Otherwise, it is considered inactive.
Queue Size	The current traffic-shaping queue depth in packets.
Delayed Bits	The number of octets that have been delayed.
Delayed Packets	The number of packets that have been delayed.
Dropped Bits	The number of octets that have been dropped during shaping.
Dropped Packets	The number of packets that have been dropped during shaping.

Policing

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Policing Statistics table, choose Policing option from the View drop-down menu. The GUI displays:

Column	Description
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Conformed Packets	The number of packets treated as conforming by the policing feature
Conformed Bits	The number of octets treated as conforming by the policing feature
Conformed Bits Rate	The rate of conforming traffic.
Exceeded Packets	The number of packets treated as non-conforming by the policing feature.
Exceeded Bits	The number of octets treated as non-conforming by the policing feature.
Exceeded Bits Rate	The rate of non-conforming traffic.
Violated Packets	The number of packets treated as violated by the policing feature.
Violated Bits	The number of octets treated as violated by the policing feature.
Violated Bits Rate	The rate of the violating traffic.

Displaying PWE3 Real-Time Statistics

The MWTM enables you to display PWE3 real-time statistics in the MWTM web interface. Because the MWTM client also displays these statistics and the GUIs for the web and client interfaces are so similar, the PWE3 real-time statistics are described in Viewing PWE3 Statistics, page 7-119.

Displaying TDM Real-Time Statistics

The MWTM enables you to display TDM real-time statistics in the MWTM web interface. Because the MWTM client also displays these statistics and the GUIs for the web and client interfaces are so similar, the TDM real-time statistics are described in Viewing TDM Statistics, page 7-105.

Displaying SLB Real time statistics

The MWTM enables you to display SLB real-time statistics in the MWTM web interface, for the mSEF devices that support 7600 supervisor card. To display SLB real-time statistics, select the mSEF node that supports 7600 supervisor card in the navigation tree and click the Statistics tab. These options appear under the Type drop-down menu:

- Virtual Servers, page 11-114
- Real Servers, page 11-114
- Server Farms, page 11-115
- Global Statistics, page 11-116

- DFP Agents, page 11-117
- DFP Real Servers, page 11-117

Virtual Servers

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Virtual Server statistics table, choose Virtual Servers option from the Type drop-down menu. The GUI displays:

Column	Description
Virtual Server Name	Name of the virtual server.
Protocol	Protocol for the virtual server.
IP Address	IP address of the virtual server.
Port	Port of the virtual server.
State	State of the virtual server.
Current Connections	Number of currently assigned connections being handled by this virtual server.
Total Connections	• Count—Number of assigned connections handled by the virtual server since the server was configured. • Rate—Rate at which the assigned connections are handled by the virtual server since the server was configured.
Server Farm	Name of the virtual server farm bound to the virtual server.

Real Servers

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Real server configuration and statistics table, choose Real Servers option from the Type drop-down menu. The GUI displays:

Column	Description
IP Address	IP Address of the real server.
Farm Name	Name of the server farm of the real server.
State	Current state of real server.
Current Connections	Number of assigned connections being handled by this real server.

Column	Description
Total Connections	• Count—Number of assigned connections handled by this real server since this server was configured. • Rate—Rate at which the assigned connections are handled by the real server since the server was configured.
Consecutive Connection Failures	Number of connection failures to this real server without a successful connection.
Total Connection Failures	• Count—Total number of times this real server has failed since the creation of this row. • Rate—Rate at which the real server has failed since the creation of this row.
Administrative Weight	User-configured weight of the real server for the load balancing algorithms.
Operational Weight	Actual operating weight of the real server used by the load-balancing algorithms.

Server Farms

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Server farm configuration and statistics table, choose Server Farm option from the Type drop-down menu. The GUI displays:

Column	Description
Farm Name	Name of the server farm.
Predictor	Load balancing algorithm in use by the server farm for its real servers for the local SLB entity.
NAT Setting	Type of NAT employed by the local SLB entity for servers in this server farm.
Number of Real Servers	Number of real servers in the server farm.
Bind ID	Identifies one or more server farms to which the real server belongs.

Global Statistics

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the Global Statistics table, choose this option from the Type drop-down menu. The GUI displays:

Field	Description
Assisted Switching Packets	• Count—Number of packets handled by SLB which are switched via the highest-performance switching path. • Rate—Rate at which the packets are handled by SLB which are switched via the highest-performance switching path.
Zombies	• Count—Number of TCP and UDP connections currently in the zombie state waiting for timers to expire. • Rate—Rate at which the TCP and UDP connections currently in the zombie state waiting for timers are expired.
Connections Reassigned	• Count—Number of TCP and UDP connections reassigned from one real server to another. • Rate—Rate at which the TCP and UDP connections are reassigned from one real server to another.
Connections Destroyed	• Count—Number of TCP and UDP connections destroyed by SLB, either by TCPIP teardown or timeout. • Rate—Rate at which the TCP and UDP connections are destroyed by SLB.
Connections Created	• Count—Number of TCP and UDP connections created since SLB was configured. • Rate—Rate at which the TCP and UDP connections are created since SLB is configured.
Unassisted Switching Packets	• Count—Number of packets forwarded by the Software Load Balancing manager's software. • Rate—Rate at which the packets are forwarded by the Software Load Balancing manager's software.
Connections Established	• Count—Number of connections established through SLB. • Rate—Rate at which the connections are established through SLB.

DFP Agents

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the DFP Agents statistics table, choose this option from the Type drop-down menu. The GUI displays:

Column	Description
IP Address	IP address of the DFP agent.
Port	Port number of DFP agent.
State	State of DFP agent.
Time Out	Time interval during which the agent must send at least one message to the manager.
Retry Count	Number of times the manager will attempt to re-establish a connection with the agent.
Agent Interval	Time interval before SLB retries connecting to a DFP agent.

DFP Real Servers

Note For toolbar details, see Using the Toolbar, page 11-6.

To view the DFP Real Servers statistics table, choose this option from the Type drop-down menu. The GUI displays:

Column	Description
IP Address	IP address of the DFP agent.
Protocol	Protocol of the real server.
Port	Port number of real server.
Bind ID	Identifies one or more server farms to which the real server belongs.
Real Weight	Weight of the real server reported from a DFP agent.

CHAPTER 12

Viewing Administrative Information from the Web Interface

To access the Administrative page of the MWTM web interface, click **Administrative** in the navigation tree in the left pane. The right pane displays the following tabs:

- General
- SNMP
- Credentials
- Discovery
- Inventory Import
- User Management

This chapter contains:

Note If MWTM User-Based Access is enabled, only users with authentication level 3 (Network Operator) and higher can see all options. Users of all other levels see only the System Information and System Status panes (except License Information and Chassis Inventory (7600/SAMI) Report).

Viewing General Tab Details

The MWTM web interface **General** tab provides access to MWTM system information, including messages, logs, status, and properties. To view the General tab information, click **Administrative** in the navigation tree and then click **General** tab in the right pane. This tab displays the information indicated in the following table.

Pane	GUI Elements	Description	Reference
System Status	• System Status • System Versions • System Check • Connected Clients • License Information • Chassis Inventory (7600/SAMI) Report	Shows the output of these system commands: • **mwtm status** • **mwtm version** • **sgmCheckSystemLog.txt** • **mwtm who** • **mwtm licenseinfo** • **mwtm chassisinventory**	For details, see Viewing System Status Information, page 12-8.
System Messages	• Info Messages • Error Messages • User Actions • Message Archives • Console Log Archives	Shows tabular information about different types of system messages.	For details, see Viewing System Messages, page 12-3.
Properties	• System • Server • WebConfig • Reports • Trap Forwarding	Shows the contents of these system property files: • *System.properties* • *Server.properties* • *WebConfig.properties* • *Reports.properties* • *TrapForwarder.properties*	For details, see Viewing System Properties, page 12-13.
System Logs	• Install Log • Console Log • Backup Log • Command Log • Troubleshooting Log • Event Automation Log • Security Log • Web Access Log • Web Error Log • Report Log • ITP Report Timers	Shows the contents of these system logs: • *sgmConsoleLog.txt* • *mwtmBackupLog.txt* • *sgmCommandLog.txt* • *sgmTroubleshootLog.txt* • *eventAutomationLog.txt* • *sgmSecurityLog.txt* • *cisco_sgmsvr_install.log* • *access_log* • *error_log* • *sgmReportLog.txt*	For details, see Viewing System Logs, page 12-9.

The General tab displays the following:

Viewing System Messages

You can view the following MWTM system messages from the MWTM web interface by clicking **Administrative** in the navigation tree in the left pane and then clicking **General** tab in the right pane:

Note These messages are related to the MWTM system itself, not to your network.

Viewing Info Messages

You can view info messages by clicking **Administrative > General > Info Messages**, or **Info** from the web page menu bar, if visible.

The System Messages: Last *number* Info Messages page shows informational messages in the MWTM system log. These messages can be useful when diagnosing and correcting MWTM operational problems.

The Last Info Messages table contains:

Column	Description
Period (in heading)	Collection period of the table, such as *Since Server Restart*.
Timestamp (in heading)	Date and time the MWTM last updated the information on the page.
Row	Unique number identifying each entry in the table. You cannot edit this field.
Time	Date and time the message was logged. To sort the messages by time, click the Time heading.
Source	Source for the message, with the format *process.host.id*, where: • *process* is the process that logged the message. • *host* is the hostname of the process that logged the message. • *id* is an MWTM ID that uniquely identifies the process that logged the message; or in the event that two or more clients are running on the same node, connected to the same MWTM server.

Column	Description
Task	Task, or thread, that logged the message.
Message	Text of the message. To sort the messages alphabetically by message text, click the Message heading.

Viewing Error Messages

The System Messages: Last *number* Error Messages page shows error messages stored in the MWTM system log. These messages can be useful when diagnosing and correcting MWTM operational problems.

To access this page, click:

- **Administrative > General > Error Messages**.
- **Error** from the web page menu bar, if visible.

The Last Error Messages table contains:

Column	Description
Period (in heading)	Collection period of the table, such as *Since Server Restart.*
Timestamp (in heading)	Date and time the MWTM last updated the information on the page.
Row	Unique number identifying each entry in the table. You cannot edit this field.
Time	Date and time the message was logged. To sort the messages by time, click the Time heading.
Source	Source for the message, with the format *process.host.id*, where: • *process* is the process that logged the message. • *host* is the hostname of the process that logged the message. • *id* is an MWTM ID that uniquely identifies the process that logged the message; or in the event that two or more clients are running on the same node, connected to the same MWTM server.
Task	Task, or thread, that logged the message.
Message	Text of the message. To sort the messages alphabetically by message text, click the Message heading.

Viewing MWTM User Action Messages

The System Messages: Last *number* Action Messages page shows user action messages stored in the MWTM system log. These messages can be useful when diagnosing and correcting MWTM operational problems, and when monitoring audit trails of user actions.

To access this page, use one of these procedures. Click:

- **Administrative > General > User Actions**.
- **Action** from the web page menu bar, if visible.

The MWTM shows the System Messages: Last *number* Action Messages page. The System Messages: Last *number* Action Messages page has these sections:

- Last Action Messages Menu, page 12-5
- Last Action Messages Table, page 12-5

Last Action Messages Menu

By default, the MWTM shows action messages of all classes on the System Messages: Last *number* Action Messages page. However, the MWTM provides menu options that enable you to display only messages of a specific class on the page.

The Last Action Messages menu contains:

Column	Description
Create	Opens the System Messages: Last *number* Action: specified web page: • **Create**—Opens the Create Messages web page, showing only Create action messages. • **Delete**—Opens the Delete Messages web page, showing only Delete action messages. • **Discover**—Opens the Discover Messages web page, showing only Discover action messages. • **Edit**—Opens the Edit Messages web page, showing only Edit action messages. • **Ignore**—Opens the Ignore Messages web page, showing only Ignore action messages. • **OverWrite**—Opens the OverWrite Messages web page, showing only OverWrite action messages. • **Poll**—Opens the Poll Messages web page, showing only Poll action messages. • **Purge**—Opens the Purge Messages web page, showing only Purge action messages. • **LogInOut**—Opens the LogInOut Messages web page, showing only Log in and Log out action messages. • **All**—Opens a web page that shows all action messages. • **LaunchTerminal**—Opens a web page showing all Launch Terminal messages. • **Provision**—Opens a web page that shows all provisioning messages.
Delete	
Discover	
Edit	
Ignore	
OverWrite	
Poll	
Purge	
LogInOut	
All	
LaunchTerminal	
Provision	

Last Action Messages Table

The Last Action Messages table contains:

Column	Description
Period (in heading)	Collection period of the table, such as *Since Server Restart*.
Timestamp (in heading)	Date and time the information on the page was last updated by the MWTM.
Row	Unique number identifying each entry in the table. You cannot edit this field.
Time	Date and time the message was logged. To sort the messages by time, click the Time heading.

Column	Description
Class	Class of the message. Possible classes are: • **Create**—Creation event, such as the creation of a seed file. • **Delete**—Deletion event, such as the deletion of an object or file. • **Discover**—Discovery event, such as Discovery beginning. • **Edit**—Edit event. A user has edited an object. • **Ignore**—Ignore event. A user has flagged a link or linkset as Ignored. • **Login**—Login event. A user has logged in to the MWTM. • **LoginDisable**—LoginDisable event. The MWTM has disabled a user's User-Based Access authentication as a result of too many failed attempts to log in to the MWTM. • **LoginFail**—LoginFail event. An attempt by a user to log in to the MWTM has failed. • **Logout**—Logout event. A user has logged out of the MWTM. • **OverWrite**—OverWrite event. An existing file, such as a seed file or route file, has been overwritten. • **Poll**—Poll event, such as an SNMP poll. • **Purge**—Purge event. A user has requested Discovery with Delete Existing Data chosen, and the MWTM has deleted the existing MWTM database. To sort the messages by class, click the Class heading.
Message	Text of the message. To sort the messages alphabetically by message text, click the Message heading.

Viewing All Archived MWTM Messages

The System Message Archives: All Messages page shows all archived messages in the MWTM system logs, including:

- error
- informational
- trace
- debug
- dump
- messages
- SNMP

To access the System Message Archives: All Messages page, use one of these options. Click:

- **Administrative > General > Message Archives**.
- **Archives** from the web page menu bar, if visible.

On the System Message Archives: All Messages page, messages are archived by timestamp. Each archived file contains all MWTM system messages for a single session for the server to which you are connected, and which is currently running the MWTM server. (If you restart the server, the MWTM creates a new file.)

To view archived messages, click a timestamp. The System Messages Archive: Last *number* All Messages page appears, which shows all messages that were in the system log at the specified timestamp.

Note You might observe an entry labeled *messageLog-old* among a list of files that have timestamps in the filenames. A daily cron job creates the files with the timestamps. The cron job, which runs at midnight, searches through the *messageLog.txt* and *messageLog-old.txt* files for all entries from the past day. The *messageLog-old.txt* file exists only if the size of *messageLog.txt* exceeds the limit set by the mwtm logsize command. The MWTM lists the contents of *messageLog-old.txt* because it could contain important data from the day the message log file rolled over.

The Last All Messages table contains this information (without column headers):

Description	Information
Index	Message number that the MWTM assigns to the message.
Time	Date and time the message was logged.
Type	Type of message. Possible types are: • Action • Debug • Dump • Error • Info • SNMP • Trace
Source	Source for the message, with the format *process.host.id*, where: • *process* is the process that logged the message. • *host* is the hostname of the process that logged the message. • *id* is an MWTM ID that uniquely identifies the process that logged the message; or, in the event that two or more clients are running on the same node, connected to the same MWTM server.
Task	Task, or thread, that logged the message.
Message	Text of the message.

Viewing Console Log Archived Messages

The System Console Archives: All Messages page shows all archived system console messages.

To access the System Console Archives: All Messages page, choose **Administrative > General > Console Log Archives**.

On the System Console Archives: All Messages page, messages are archived by timestamp. Each archived file contains all MWTM system console messages for a single session for the server to which you are connected, and which is currently running the MWTM server. (If you restart the server, the MWTM creates a new file).

To view these archived messages, click a timestamp. The Console Archive: Last *number* All Messages page appears, which shows all the console messages that were in the system log at the specified timestamp.

Viewing System Status Information

You can view the MWTM system status information from the MWTM web interface by clicking **Administrative** in the navigation tree in the left pane and then clicking **General** tab in the right pane:

Viewing System Status

To access system status information, choose **Administrative > General > System Status** (the MWTM might take a few seconds to display this page). This page shows the status of all MWTM servers, local clients, and processes.

Viewing System Versions

To access version information, choose **Administrative > General > System Versions** (the MWTM might take a few seconds to display this page). This page shows version information for all MWTM servers, clients, and processes.

Viewing System Check

To access system information, choose **Administrative > General > System Check**. MWTM displays the output from the following command:

/opt/CSCOsgm/logs/sgmCheckSystemLog.txt

Viewing Connected Clients

To access connected client information, choose **Administrative > General > Connected Clients**. This page lists all MWTM clients that are currently connected to the MWTM server. It also lists all Solaris and Linux users that are logged in to the MWTM server.

Viewing License Information

To access license information and to verify license compliance, choose **Administrative > General > License Information**.

MWTM displays the output from the following command:

/opt/CSCOsgm/bin/mwtm licenseinfo

When you select **Administrative > License Information**, MWTM displays the number of devices and cards that are managed by the MWTM software. For example, for an mSEF network, MWTM displays the number of 7600, 7300, and 7200 devices in addition to the number of SAMI cards. For ITP networks, MWTM displays the number of 7600, including the number of different types of cards on the 7600 device, 7300, 7200, and 2800 devices.

Viewing Chassis Inventory (7600/SAMI) Report

To access chassis inventory (7600/SAMI) report information, choose **Administrative > General > Chassis Inventory (7600/SAMI) Report.**

MWTM displays the output from the following command:

/opt/CSCOsgm/bin/ mwtm chassisinventory

Viewing System Logs

You can view the MWTM system logs information from the MWTM web interface by clicking **Administrative** in the navigation tree in the left pane and then clicking **General** tab in the right pane:

Viewing the Install Log

The Install Log shows the contents of the MWTM installation log file for the server to which you are connected, and which is currently running the MWTM.

To access the Install Log, choose **Administrative > General > Install Log**. You can also view the Console Log with the **mwtm installlog** command.

Viewing the Console Log

The Console Log shows the contents of the MWTM system console log file for the server to which you are connected, and which is currently running the MWTM. The console log file contains unexpected error and warning messages from the MWTM server, such as those that might occur if the MWTM server cannot start. It also provides a history of start-up messages for server processes and the time each message appeared.

To access the Console Log, choose **Administrative > General > Console Log**. You can also view the Console Log with the **mwtm console** command.

Viewing the Backup Log

The Backup Log shows the contents of the MWTM backup log file for the server to which you are connected, and which is currently running the MWTM.

The default path and filename for the backup log file is */opt/CSCOsgm/logs/mwtmBackupLog.txt*. If you installed the MWTM in a directory other than */opt*, then the backup log file is in that directory.

To access the Backup Log, choose **Administrative > General > Backup Log**. You can also view the Backup Log with the **mwtm backuplog** command.

Viewing the Command Log

The Command Log shows the contents of the MWTM system command log file for the server to which you are connected, and which is currently running the MWTM server. The system command log lists all **mwtm** commands that have been entered for the MWTM server, the time each command was entered, and the user who entered the command.

To access the Command Log, choose **Administrative > General > Command Log**. You can also view the Command Log with the **mwtm cmdlog** command.

The MWTM Command Log page appears. The Command Log table contains:

Column	Description
Timestamp	Date and time the command was logged. To sort the messages by time, click the Timestamp heading.
User Name	User who entered the command. To sort the commands by user, click the User heading.
Command	Text of the command. To sort the messages alphabetically by command text, click the Command heading.

Viewing the Troubleshooting Log

The Troubleshooting Log shows the contents of the MWTM troubleshoot log file for the server to which you are connected, and which is currently running the MWTM server.

Note By default, the Troubleshoot logging is disabled. To enable this log, execute **mwtm tshootlog action** command.

The default path and filename for the troubleshoot log file is */opt/CSCOsgm/logs/sgmTroubleshootLog.txt*. If you installed the MWTM in a directory other than */opt*, then the troubleshoot log file is in that directory.

To access the Troubleshoot Log page, choose **Administrative > General > Troubleshooting Log**. You can also view the Troubleshoot Log page using the **mwtm tshootlog** command.

The Troubleshooting Log table contains these columns:

Column	Description
Timestamp	Time of command execution.
Client IP Address or User Name	User who executed the command.
Node	Node on which the command is executed.
Feature	Personality of the device.
Category	Category of the command.
Command Name	Name of the command.
Command	The actual command from execution.

Viewing the Event Automation Log

The Event Automation Log shows the contents of the system event automation log file for the server to which you are connected, and which is currently running the MWTM server. The system event automation log lists all messages that event automation scripts generate.

The default path and filename for the system event automation log file is */opt/CSCOsgm/logs/eventAutomationLog.txt*. If you installed the MWTM in a directory other than */opt*, then the system event automation log file is in that directory.

To access the Event Automation Log, choose **Administrative > General > Event Automation Log**. You can also view the Event Automation Log with the **mwtm eventautolog** command.

Related Topic

Changing the Way the MWTM Processes Events, page 9-24.

Viewing the Security Log

The Security Log shows the contents of the MWTM system security log file for the server to which you are connected, and which is currently running the MWTM server. The system security log lists:

- All security events that have occurred for the MWTM server
- The time each event occurred
- The user and command that triggered the event
- The text of any associated message

The default path and filename for the system security log file is */opt/CSCOsgm/logs/sgmSecurityLog.txt*. If you installed the MWTM in a directory other than */opt*, then the system security log file is in that directory.

To access the Security Log, choose **Administrative > General > Security Log**. You can also view the Security Log with the **mwtm seclog** command.

The Last Security Entries table contains these columns:

Column	Description
Timestamp	Date and time the security event occurred. To sort the entries by time, click the Time heading.
User	User who triggered the security event. To sort the entries by user, click the **User** heading.
Message	Text of the security event message. To sort the entries alphabetically by message text, click the Message heading.
Command	Text of the command that triggered the security event. To sort the entries alphabetically by command text, click the Command heading.

Viewing the Install Log

The Install Log shows the contents of the MWTM system installation log. The installation log contains messages and other information recorded during installation, which can be useful when troubleshooting problems. The Install Log also records the installer's selections (for example, whether the installer chose to configure the MWTM to receive SNMP traps).

The default path and filename for the install log file is */opt/CSCOsgm/install/cisco_sgmsvr_install.log*. If you installed the MWTM in a directory other than */opt*, then the install log file is in that directory.

To access the Install Log, choose **Administrative > General > Install Log**. You can also view the Install Log with the **mwtm installlog** command.

Viewing the Web Access Logs

The Web Access Logs page shows a list of web access log files for the server to which you are connected, and which is currently running the MWTM server. The web access log lists all system web access messages that have been logged for the MWTM server, providing an audit trail of all access to the MWTM server through the MWTM web interface.

The default path and filename for the web access log file is */opt/CSCOsgm/apache/logs/access_log*. If you installed the MWTM in a directory other than */opt*, then the web access log file is in that directory.

To access the Web Access Logs page, choose **Administrative > General > Web Access Logs**. You can also view the Web Access Logs page using the **mwtm webaccesslog** command.

Viewing the Web Error Logs

The Web Error Logs page shows a list of web error log files for the server to which you are connected, and which is currently running the MWTM server. The web server error log lists all system web error messages that have been logged for the MWTM web server. You can use the web error log to troubleshoot the source of problems that users may have encountered while navigating the MWTM web interface.

The default path and filename for the web error log file is */opt/CSCOsgm/apache/logs/error_log*. If you installed the MWTM in a directory other than */opt*, then the web error log file is in that directory.

To access the Web Error Logs page, choose **Administrative > General > Web Error Logs**. You can also view the Web Error Logs page using the **mwtm weberrorlog** command.

Viewing the Report Log

The Report Log shows the message log for ITP reports for the server to which you are connected, and which is currently running the MWTM server. You can view this log to determine the beginning and finish times for report generation. The log also records errors that occurred during report generation (for example, server connection errors).

The default path and filename for the report log file is */opt/CSCOsgm/logs/sgmReportLog.txt*. If you installed the MWTM in a directory other than */opt*, then the report log file is in that directory.

To access the Report Log, choose **Administrative > General > Report Log**. You can also view the Report Log with the **mwtm replog** command.

Viewing the ITP Report Timers

To access the ITP Report Timers, choose **Administrative > General > ITP Report Timers**. This link is displayed only if the ITP personality is enabled.

The ITP Report Timers displays the output of the following command:

```
/opt/CSCOsgm/bin/mwtm statrep timer
```

The output displays the timer file for MWTM ITP network statistics reports. The timer file is useful for identifying how much time the MWTM spends gathering report data and generating reports.

Viewing Properties

Property files for the MWTM are in the */opt/CSCOsgm/properties* directory. You can view the MWTM properties from the MWTM web interface by clicking **Administrative** in the navigation tree in the left pane and then clicking **General** tab in the right pane:

- Viewing System Properties, page 12-13
- Viewing Server Properties, page 12-15
- Viewing Web Configuration Properties, page 12-15
- Viewing Reports Properties, page 12-17
- Viewing Trap Forwarding Properties, page 12-18

Viewing System Properties

To access the System Properties file, choose **Administrative > General > System** in the Properties pane. The MWTM shows the contents of the */opt/CSCOsgm/properties/System.properties* file.

The System Properties file contains MWTM server and client properties that control various MWTM configuration parameters.

You can change some of the system properties using MWTM commands:

To change this system property	Use this MWTM command
ATBLDIR	mwtm atbldir, page B-101
AUTO_SYNC_CONFIG	mwtm autosyncconfig, page B-102

To change this system property	Use this MWTM command
BACKUP_RMIPORT	mwtm secondaryserver, page B-61
BACKUP_SERVER	
BACKUP_WEBPORT	
BACKUPDAYS	mwtm backupdays, page B-10
BADLOGIN_TRIES_ALARM	mwtm badloginalarm, page B-12
BADLOGIN_TRIES_DISABLE	mwtm badlogindisable, page B-12
CHART_MAX_WINDOW	mwtm chartwindow, page B-15
CONSOLE_ARCHIVE_DIR_MAX_SIZE	mwtm archivedirsize, page B-8
CONSOLE_LOG_MAX_SIZE	mwtm consolelogsize, page B-22
CSV_FIELD_DELIMITER	mwtm collectstats, page B-21
CSV_STRING_DELIMITER	
CW2K_SERVER	mwtm cwsetup, page B-23
CW2K_WEB_PORT	
CW2K_SECURE_WEB_PORT	
GTTDIR	mwtm gttdir, page B-111
JSP_PORT	mwtm jspport, page B-41
LOGAGE	mwtm msglogage, page B-50
LOGDIR	mwtm msglogdir, page B-50
LOGSIZE	mwtm logsize, page B-44
LOGTIMEMODE	mwtm logtimemode, page B-45
LOG_TROUBLESHOOTING	mwtm tshootlog, page B-90
MANAGE_BWG	mwtm manage, page B-46
MANAGE_CSG1	
MANAGE_CSG2	
MANAGE_GGSN	
MANAGE_HA	
MANAGE_ITP	
MANAGE_RAN-O	
PERSISTENCEDIR	mwtm datadir, page B-24
PROMPT_CREDS	mwtm logincreds, page B-44
REQUIRE_ARCHIVE_COMMENTS	mwtm deploycomments, page B-106
ROUTEDIR	mwtm routedir, page B-124
SBACKUPDIR	mwtm backupdir, page B-11
SERVER_NAME	mwtm servername, page B-62
SNMPCONFFILE	mwtm snmpconf, page B-66
SSL_ENABLE	mwtm ssl, page B-75
TFTP_ATBLPATH	mwtm atbldir, page B-101

To change this system property	Use this MWTM command
TFTP_GTTPATH	mwtm gttdir, page B-111
TFTP_ROUTEPATH	mwtm routedir, page B-124
TRAP_LIST_ENABLE	mwtm trapsetup, page B-89
TRAP_PORT	
USE_TERMINAL_PROXY	mwtm termproxy, page B-86
VCS_REPOSITORY_DIR	mwtm archivedir, page B-100
WEB_PORT	mwtm webport, page B-95
WEB_BROWSER	mwtm browserpath, page B-13

For these system properties, you can view related documentation:

System Property	Related Documentation
CLIENT_PORT	Configuring Port Numbers and Parameters, page H-5
DATASERVER_PORT	
LOGINSERVER_PORT	
RMIREGISTRY_PORT	
MAX_CHART_SERIES	Displaying Backhaul Performance Statistics, page 11-36

Viewing Server Properties

To access the Server Properties file, choose **Administrative > General > Server** in the Properties pane. The MWTM shows the contents of the */opt/CSCOsgm/properties/Server.properties* file.

The Server Properties file contains various properties that control the MWTM server.

You can use MWTM commands to change these server properties:

To change this server property	Use this MWTM command
DEMAND_POLLER_TIMELIMIT	mwtm pollertimeout, page B-53
SNMP_MAX_ROWS	mwtm snmpwalk, page B-72
UNKNOWN_AGING_TIMEOUT	mwtm unknownage, page B-91

To change poller parameters in the Server Properties file, see the "Changing MWTM Server Poller Settings" section on page 5-2.

Viewing Web Configuration Properties

To access the Web Configuration Properties file, choose **Administrative > General > WebConfig** in the Properties pane. The MWTM shows the contents of the */opt/CSCOsgm/properties/WebConfig.properties* file.

The Web Configuration Properties file contains properties that control the configuration of the MWTM web interface. For example:

```
MAX_ASCII_ROWS      = 6000
```

```
MAX_HTML_ROWS       = 100

# The selectable page sizes start at MIN_SELECTABLE_PAGE_SIZE and doubles until
# the MAX_SELECTABLE_PAGE_SIZE value is reached
# (e.g. 25, 50, 100, 200, 400, 800)
MIN_SELECTABLE_PAGE_SIZE = 25
MAX_SELECTABLE_PAGE_SIZE = 800
LOG_UPDATE_INTERVAL = 300
WEB_UTIL            = percent
WEB_NAMES           = display
MAX_EV_HIST         = 15000
```

You can use the MWTM to change the web configuration properties:

Web Configuration Property	Changing Default Setting
LOG_UPDATE_INTERVAL	To control how often, in seconds, the MWTM updates certain web output, use the **mwtm weblogupdate** command. The valid range is 1 second to an unlimited number of seconds. The default value is 300 seconds (5 minutes).
MAX_ASCII_ROWS	To set the maximum number of rows for MWTM ASCII web output, such as displays of detailed debugging information, use the *mwtm maxasciirows* command. The valid range is 1 row to an unlimited number of rows. The default value is 6,000 rows.
MAX_EV_HIST	To set the maximum number of rows for MWTM to search in the event history logs, use the **mwtm maxevhist** command. The event history logs are the current and archived MWTM network status logs for status change and SNMP trap messages. The MWTM sends the results of the search to the web browser, where the results are further limited by the setting of the mwtm maxhtmlrows command. The valid range is 1 row to an unlimited number of rows. The default value is 15,000 rows.
MAX_HTML_ROWS	To set the maximum number of rows for MWTM HTML web output, such as displays of statistics reports, status change messages, or SNMP trap messages, use the **mwtm maxhtmlrows** command. This lets you select a page size (if you have not explicitly chosen a page size). Once you select a page size from any page, the MWTM remembers your preference until you delete your browser cookies. The default value is 100 rows.
MIN_SELECTABLE_PAGE_SIZE	This setting determines the minimum page size for the user to select from the Page Size drop-down menu. The page size values start with the MIN_SELECTABLE_PAGE_SIZE and double until they reach the MAX_SELECTABLE_PAGE_SIZE.
MAX_SELECTABLE_PAGE_SIZE	This setting determines the maximum page size for the user to select from the Page Size drop-down menu. The page size values start with the MIN_SELECTABLE_PAGE_SIZE and double until they reach the MAX_SELECTABLE_PAGE_SIZE.

Web Configuration Property	Changing Default Setting
WEB_NAMES	To specify whether the MWTM should show real DNS names or display names in web pages, enter the **mwtm webnames** command. To show: • The real DNS names of nodes, as discovered by the MWTM, enter **mwtm webnames real**. • Display names, enter **mwtm webnames display**. Display names are new names that you specify for nodes. This is the default setting. For more information about display names, see the "Editing Properties" section on page 8-49.
WEB_UTIL	To specify whether the MWTM should display send and receive as percentages or in Erlangs in web pages, enter the **mwtm who** command. To show: • as a percentage, enter **mwtm webutil percent**. This is the default setting. • Display in Erlangs (E), enter **mwtm webutil erlangs**. See Displaying RAN-O Statistics, page 11-35 and Displaying Error Statistics, page 11-38 for more information. See Chapter 13, "Managing Reports" for more information on send and receive for linksets and links.

Each of the web configuration commands requires you to be logged in as the root user, as described in the "Becoming the Root User (Server Only)" section on page 3-2, or as a superuser, as described in the "Specifying a Super User (Server Only)" section on page 2-19.

Related Topic

PDSN Reports, page 13-159.

Viewing Reports Properties

To access the Reports Properties file, choose **Administrative > General > Reports** in the Properties pane. The MWTM shows the contents of the */opt/CSCOsgm/properties/Reports.properties* file.

The Reports Properties file contains properties that control various aspects of the reports that are available in the MWTM web interface.

You can use MWTM commands to change these reports properties:

To change this server property	Use this MWTM command
AAA_REPORTS	mwtm statreps, page B-77
ACC_REPORTS	mwtm accstats, page B-98
APN_REPORTS	mwtm statreps, page B-77
CHASSISINVENTORY_REPORTS	mwtm statreps, page B-77
CSG_REPORTS	mwtm statreps, page B-77
CPU_REPORTS	mwtm statreps, page B-77
EPC_REPORTS	mwtm statreps, page B-77
GGSN_REPORTS	mwtm ggsnstats, page B-128

To change this server property	Use this MWTM command
GTTRATES_REPORTS	mwtm gttstats, page B-112
GTP_REPORTS	mwtm statreps, page B-77
HA_REPORTS	mwtm statreps, page B-77
INTERFACE_REPORTS	mwtm statreps, page B-77
IPLOCALPOOL_REPORTS	mwtm statreps, page B-77
LINK_REPORTS	mwtm linkstats, page B-113
MEM_REPORTS	mwtm statreps, page B-77
MLR_REPORTS	mwtm mlrstats, page B-116
MSU_REPORTS	mwtm statreps, page B-77
MTP3EV_REPORTS	mwtm evreps, page B-106
PDSN_REPORTS	mwtm statreps, page B-77
PWE3_REPORTS	mwtm statreps, page B-77
Q752_REPORTS	mwtm q752stats, page B-122
QOS_REPORTS	mwtm statreps, page B-77
RAN_REPORTS	mwtm statreps, page B-77
RANO_REPORTS	mwtm statreps, page B-77
RPT_15MIN_AGE	mwtm statreps 15minage, page B-83
RPT_CUSTOM_AGE	mwtm repcustage, page B-123
RPT_DAILY_AGE	mwtm statreps, page B-77
RPT_HOURLY_AGE	mwtm statreps, page B-77
RPT_INV_AGE	mwtm statreps, page B-77
RPT_RAN_AGE	mwtm statreps, page B-77
RPT_IPLINKS	mwtm statreps, page B-77
RPT_MONTHLY_AGE	mwtm statreps monthlyage, page B-84
RPT_NULLCAPS	mwtm statreps, page B-77
RPT_UTILRATIO	mwtm statreps, page B-77
RPT_SERVRATIO	mwtm statreps, page B-77
RPT_TIMEMODE	mwtm statreps, page B-77
SCTP_REPORTS	mwtm statreps, page B-77
SLB_REPORTS	mwtm statreps, page B-77
STATS_REPORTS	mwtm statreps, page B-77
XUA_REPORTS	mwtm xuastats, page B-126

Viewing Trap Forwarding Properties

To access the Trap Forwarding Properties file, choose **Administrative > General > TrapForwarding** in the Properties. The MWTM shows the contents of the */opt/CSCOsgm/properties/TrapForwarder.properties* file.

The Trap Forwarder Properties file contains a list of the destination addresses for the trap forwarder. Enter each destination address on its own line and use this format:

SERVER*xx*=*destination_IP_address*[**:***port_number*]

The *port_number* parameter is optional.

Viewing SNMP Tab Details

The MWTM web interface **SNMP** tab provides access to SNMP (Simple Network Management Protocol) Editor to edit the SNMP settings. To view the **SNMP** tab information, click **Administrative** in the navigation tree and then click **SNMP** tab in the right pane. The **SNMP** tab contains:

- SNMP Editor Buttons, page 12-20
- SNMP Editor Table, page 12-21

SNMP Editor Buttons

The SNMP tab contains the following buttons:

Button	Description
 Add a new SNMP entry	Adds the new SNMP settings to the MWTM database. It opens Add SNMP Entry window. To add a new node or range of nodes, enter the SNMP information in the appropriate fields of the Add SNMP Entry window and click **OK**. The new SNMP settings are added to the MWTM database and are displayed in the SNMP Editor table in the right pane. Click **Cancel** to close the Add SNMP Entry window. Click **Help** to display the online help for the window.
 Save All SNMP entries	Saves all the SNMP entries added.
 Reload SNMP entries the server	Reloads all the SNMP entries from the server.

Add SNMP Entry

The Add SNMP Entry window contains the following fields:

Field or Button	Description
IP Address Range or Hostname	IP address or DNS name of a node or range of nodes. An asterisk (*) indicates a wildcard value.
Read Community	SNMP community name used by the node for read access to the information maintained by the SNMP agent on the node.
Timeout (secs)	Time, in seconds, the MWTM waits for a response from the node.
Retries	Number of times the MWTM attempts to connect to the node.
Poll Interval (mins)	Time, in minutes, between polls for the node.
OK	Applies the new SNMP settings to the MWTM database.
Cancel	Closes the Add SNMP Entry window without applying any changes.
Help	Shows online help for the current window.

SNMP Editor Table

The SNMP Editor table contains:

Column	Description
IP Address Range or Hostname	IP address or DNS name of a node or range of nodes. An asterisk (*) indicates a wildcard value.
Read Community	SNMP community name used by the node for read access to the information maintained by the SNMP agent on the node.
Timeout (secs)	Time, in seconds, the MWTM waits for a response from the node.
Retries	Number of times the MWTM attempts to connect to the node.
Poll Interval (mins)	Time, in minutes, between polls for the node.
Action	Delete—Deletes the entries in the corresponding row.

Viewing Credentials Tab Details

The MWTM web interface **Credentials** tab provides access to Device Credentials Editor to edit the credential details for the nodes. To view the **Credentials** tab information, click **Administrative** in the navigation tree and then click **Credentials** tab in the right pane. The **Credentials** tab contains:

- Device Credentials Editor Buttons, page 12-21
- Global Settings Table, page 12-22
- Node Settings Table, page 12-22

Device Credentials Editor Buttons

The Credentials tab contains the following buttons:

Button	Description
 Add a new credential for a node	Adds new credentials to a specified node. It opens Add a Credential window. To add a new credential, enter the credential information in the appropriate fields of the Add a Credential window and click **OK**. The new credentials are added to the MWTM database and are displayed in the Global Settings table in the right pane. Click **Cancel** to close the Add a Credential window. Click **Help** to display the online help for the window.
 Save All Credentials	Saves all the new credentials added.
 Reload credentials from the server	Reloads all the credentials from the server.

Add a Credential

The Add a Credential window contains the following fields:

Field or Button	Description
Node	Name of the node.
User Name	Login username.
Password	Login password.
Enable User Name	Login enable username.
Enable Password	Login enable password.
Protocol	Choose the protocol to use when connecting to the node, either SSH or Telnet. **Note** The key size on the node must be configured to a minimum of 768 bits and a maximum of 2048 bits.
OK	Adds the new credential information to the MWTM database.
Cancel	Closes the current window without saving the changes.
Help	Displays the online help for the window.

Global Settings Table

The Global Settings table contains:

Column	Description
Node Type	Type of node.
User Name	Login username.
Password	Login password.
Enable User Name	Login enable username.
Enable Password	Login enable password.
Connection Protocol	Choose the protocol to use when connecting to the node, either SSH or Telnet. **Note** The key size on the node must be configured to a minimum of 768 bits and a maximum of 2048 bits.
Action	This column contains the following buttons: • Test the Credentials—You can test the credentials you have configured on the corresponding node or the default credentials against a selected node type. This opens Test Credentials for Node Type window. An error message is displayed, if there are no nodes in data model to test. • Clear the Row—Clears the entries in the corresponding row. The entries are cleared from the user interface.

Node Settings Table

The Node Settings table contains:

Column	Description
Node	Type of node.
User Name	Login username.
Password	Login password.
Enable User Name	Login enable username.
Enable Password	Login enable password.
Connection Protocol	Choose the protocol to use when connecting to the node, either SSH or Telnet. **Note** The key size on the node must be configured to a minimum of 768 bits and a maximum of 2048 bits.
Action	• Test the Credentials—You can test the credentials you have configured on the corresponding node. This opens Test Credentials for Node window. • Clear the Row—Clears the entries in the corresponding row. The entries are cleared in the user interface alone.

Test Credentials for *Node Type*

The Test Credentials for *Node Type* window contains:

- Select a Node Pane

  The Select a Node pane contains a drop-down menu which lists all the nodes of the corresponding *Node Type.*

- Logging Information Pane

  The Logging Information pane displays the logging information about the node that you selected from the Select a Node drop-down menu. The information for the selected node is displayed after clicking **OK** button in the window.

- Test Credentials for *Node Type* Buttons

  The Test Credentials for *Node Type* contains the following buttons:

Button	Description
OK	Tests the credentials you have configured on the corresponding node or the default credentials against a selected node type.
Close	Closes the current window.
Help	Displays the online help for the window.

Test Credentials for *Node*

The Test Credentials for *Node* window contains:

- Logging Information Pane

  The Logging Information pane displays the logging information about the node. a timeout error is displayed if the credential information is not present for the corresponding node.

- Test Credentials for *Node* Buttons

  The Test Credentials for *Node* contains the following buttons:

Button	Description
Close	Closes the current window.
Help	Displays the online help for the window.

Viewing Discovery Tab Details

The MWTM web interface **Discovery** tab allows you to discover the network. To view the **Discovery** tab information, click **Administrative** in the navigation tree and then click **Discovery** tab in the right pane. The **Discovery** tab contains:

- Discover Network Buttons, page 12-24
- Discovery Seeds Pane, page 12-27
- Discovery Settings Pane, page 12-28

See Discovering Your Network, page 3-4 for more information on Discovery feature.

Discover Network Buttons

The Discover Network pane contains the following buttons:

Button	Description
 Load Seeds	Opens Load File Dialog window, enabling you to load a seed file into the MWTM.
 Save Seeds	Saves the changes you have made to the chosen seed file.

Button	Description
Save As	Opens the Save File Dialog, using which you can save the updated seed file with a new name, or overwrite an existing seed file.
Discover Network	Begins discovering the network. Click **Discover Network** to begin Discovery. If you have not defined at least one seed node in the Seed Settings tab, the MWTM prompts you to do so. When Discovery begins: • The **Discover Network** button changes to **Stop Discovery**. • The `Discovery In Progress` message appears in the title bar of all MWTM client windows. Discovery progresses in bursts. You might see a number of updates, followed by a pause, followed by more updates. The information that MWTM windows displays is not fully updated until Discovery is complete. By default, Discovery times out after 600 seconds (10 minutes). To change the Discovery timeout, change the value of the DISCOVERY_TIMELIMIT entry in the *Server.properties* file: • If you installed the MWTM in the default directory, */opt*, then the location of the *Server.properties* file is */opt/CSCOsgm/properties/Server.properties*. • If you installed the MWTM in a different directory, then the *Server.properties* file resides in that directory. Because the MWTM is an asynchronous system, with the MWTM server contacting clients one at a time, and because clients might run at different speeds, the information that MWTM clients display during Discovery might not always be synchronized. All other MWTM windows (Node, topology, and so on) are also populated with the newly discovered network data.

Load File Dialog

The Load File Dialog window contains:

Field or Button	Description
Seed File List	The Seed File List pane contains: • Go up one Folder—Click this icon to go up one folder in the directory structure. • Type—Icon indicating whether the item in the table is a file or a folder. • Name—Name of the seed file or folder. • Last Modified—Date and time the seed file or folder was last modified. • Size (bytes)—Size of the seed file or folder, in bytes.
Make this my preferred start option	Specifies whether the chosen seed file should be loaded automatically whenever this MWTM client is started or the Discovery dialog box is opened. By default, this check box is unchecked for all seed files. That is, no seed file is loaded automatically when the MWTM client is started or the Discovery dialog box is opened.

Field or Button	Description
OK	Loads the chosen seed file, saves any changes you made to the list of files, and closes the dialog box. To load a seed file, double-click it in the list, select it in the list and click **OK**, or enter the name of the file and click **OK**. The MWTM saves any changes you made to the list of files, closes the Load File Dialog: Seed File List dialog box, loads the seed file, and returns to the Discovery dialog box. The MWTM lists all of the seed nodes in the seed file in the Seed Nodes pane, and displays details of the SNMP settings for the seed nodes in the Seed Details pane.
Delete	Deletes the chosen file from the seed file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without loading a seed file or saving any changes to the seed file list.
Help	Displays online help for the dialog box.

See Loading a Seed File, page 3-8 for more information about loading the seed files.

Save File Dialog

The Save File Dialog window contains:

Field or Button	Description
Seed File List	The Seed File List pane contains: • Go up one Folder—Click this icon to go up one folder in the directory structure. • New Folder—Click this icon to create a new folder in the current directory. This action opens the Input dialog box. Enter a folder name and click **OK**. The new folder appears in the Save File dialog box. Double-click the folder to open it. You can save files in this folder or create another folder at this level. • Type—Icon indicating whether the item in the table is a file or a folder. • Name—Name of the seed file or folder. • Last Modified—Date and time the seed file or folder was last modified. • Size (bytes)—Size of the seed file or folder, in bytes.
Filename	Name by which you want to save the seed file. If you create a new seed filename, you can use any letters, numbers, or characters in the name that are allowed by your operating system. However, if you include any spaces in the new name, the MWTM converts those spaces to hyphens. For example, the MWTM saves file *a b c* as *a-b-c*.
Make this my preferred start option	Specifies whether the chosen seed file should be loaded automatically whenever this MWTM client is started or the Discovery dialog box is opened. By default, this check box is unchecked for all seed files. That is, no seed file is loaded automatically when the MWTM client is started or the Discovery dialog box is opened.

Field or Button	Description
OK	Saves the seed file and any changes you made to the seed file list and closes the dialog box. To save the seed file with a new name, you can either save the file with: • A completely new name. Enter the new name and click **OK**. • An existing name, overwriting an old seed file. Select the name in the list and click **OK**. The MWTM: • Saves the seed file with the new name • Saves any changes you made to the list of files • Closes the Save File Dialog: Seed File List dialog • Returns to the Discovery dialog box
Delete	Deletes the chosen file from the seed file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without saving the seed file or saving any changes to the seed file list.
Help	Displays online help for the dialog box.

See Saving a Seed File, page 3-8 for more information on saving the seed files.

Discovery Seeds Pane

The Discovery Seeds pane contains:

- Seed Nodes File: No File panel, page 12-27
- Seed Details panel, page 12-28

Seed Nodes File: No File panel

The Seed Nodes File: No File panel contains:

Field or Button	Description
IP Address, Address Range, Subnet, CIDR, or DNS Hostname	Address or name of the chosen seed node. To create a new seed file, enter the name or address of a seed node in this field. Examples of acceptable input include: • IP Address: 1.2.3.4 (see the guidelines for IP addresses in SNMP Configuration Table, page 5-15). • Address Range: 1.2.3.2-15 • Subnet, CIDR: 1.2.3.0/24, 1.2.3.0/255.255.255.0 • DNS Hostname: mwtm.cisco.com

Field or Button	Description
Add	Adds a new seed node to the MWTM.
Delete	Deletes the chosen seed node. A confirmation dialog is displayed before deleting the seed node.

Seed Details panel

The Seed Details panel contains:

Field	Description
IP Address Range or Hostname	IP address or DNS name of a node or range of nodes. An asterisk (*) indicates a wildcard value.
Read Community	SNMP community name used by the node for read access to the information maintained by the SNMP agent on the node.
Timeout (secs)	Time, in seconds, the MWTM waits for a response from the node.
Retries	Number of times the MWTM attempts to connect to the node.
Poll Interval (mins)	Time, in minutes, between polls for the node.

Discovery Settings Pane

The Discovery Settings pane contains:

Field	Description
Entire Network	Check box used to specify the extent of the network discovery: • To discover the entire network, check this check box. This is called *recursive discovery*, and it is the default setting. With this check box checked, the MWTM discovers all seed nodes and attempts to manage them; then attempts to discover and manage all nodes that are adjacent to those seed nodes (unless the nodes are connected by serial links only); then attempts to discover and manage all nodes that are adjacent to *those* nodes; and so on, until the Max Hops limit is reached. • To rediscover only seed nodes, uncheck this check box. This is called *nonrecursive discovery*. With this check box unchecked, the MWTM discovers all seed nodes and attempts to manage them, then labels all nodes that are adjacent to those seed nodes as Unmanaged. **Note** When the user unchecks this option, the Max Hops field gets grayed-out.

Field	Description
Max Hops	The maximum number of hops from the seed node to search for other nodes to discover. Default is 3.
Delete Existing Data	Check box used to keep or delete the existing MWTM database when discovering the network: • To keep all existing network data in the MWTM database before rediscovering the network, uncheck this check box. This is the default setting. • To delete all existing network data from the MWTM database before rediscovering the network, check this check box. Choose this option if you know that network elements have been deleted from your network since the last Discovery. If you discover the network with Delete Existing Data chosen, the MWTM stops any real-time polls that are running and issues appropriate messages.

Viewing Inventory Import Tab Details

The MWTM web interface **Inventory Import** tab allows you to log in to Active Network Abstraction (ANA) to retrieve ANA inventory (IP Address, Node Name and SNMP strings) and discover the nodes .

To access the **Inventory Import**, click **Administrative** in the navigation tree and then click **Inventory Import** tab in the right pane. This tab displays the IP Address and credentials to be entered.

The Inventory Import tab contains:

- **Host Name** or **IP Address**: This field allows the user to enter the ANA IP Address.
- **User Name**: This field allows the user to enter the User Name.
- **Password**: This field allows the user to enter the Password.
- **Synchronize**: This button allows the user to discover the added node. After entering the IP Address, User Name and Password, click the **Synchronize** button and wait for a few minutes for the nodes to get discovered and added to the Navigation Tree.
  - After the nodes get discovered and added to the Navigation Tree, select a node and delete. Click the **Synchronize** button to get the node re-discovered and added into the Navigation Tree.

Note The MWTM cronjob is scheduled periodically every 1 hour to sycronize the ANA inventory details with MWTM.

Viewing User Management Tab Details

The MWTM allows user management through the web interface. User access must be enabled for this feature. A level 5 user must be created during installation or post-installation using the MWTM CLI as root. A web user with user management permissions with MWTM access level five, can add or delete users and modify user passwords and roles/access levels.

To access the **User Management**, click **Administrative** in the navigation tree and then click **User Management** tab in the right pane. This tab displays all users in the system along with the time of their most recent login, their access level, and their account status.

The User Management tab contains:

User Management Buttons

The User Management tab contains the following buttons:

Button	Description
 Create a new user account	When the local authentication is enabled, it opens the Add New User window. Password is the input when local authentication is enabled. When the solaris or linux authentication is enabled, it opens the Add New User window. But it does not prompt for passwords since it reuses the OS-based passwords. To add a new user, enter the user information in the appropriate fields of the Add New User window and click **OK**. The new user is added to the MWTM database and the new information is displayed in the User Management table. Click **Cancel** to close the window. Click **Help** to display the online help for the window.
 Delete an existing user account	Deletes an existing user. The user interface asks for confirmation and deletes the user. To delete multiple users, click the check box in the user row and then click the 'Delete an existing user account' button in the toolbar.
Users users selected	Number of currently selected users.
Clear Selection	Deselects the selected list of users.

Add New User

The Add New User window contains the following options when the local authentication is enabled:

Field or Button	Description
Name	The username.
Level	Authentication level for the user. The valid values are: • Basic User • Power User • Network Operator • Network Administrator • System Administrator • Custom Level 1 • Custom Level 2
Password	User's password.
Confirm Password	Retype the password to confirm the new password.
Force user to reset password at login?	Whether to force the user to change the password at the next log in. The default is not to force the user to change the password.
OK	Saves the new user information.

Field or Button	Description
Cancel	Closes the window without saving the changes.
Help	Shows online help for the window.

Add New User

The Add New User window contains the following options when solaris or linux authentication is enabled:

Field or Button	Description
Name	The username.
Level	Authentication level for the user. The valid values are: • Basic User • Power User • Network Operator • Network Administrator • System Administrator • Custom Level 1 • Custom Level 2
Add users not known to system?	Whether to add the users who are not known to the system. The default is not to add the unknown users to the system.
OK	Saves the new user information.
Cancel	Closes the window without saving the changes.
Help	Shows online help for the window.

User Management Table

The User Management table contains:

Field or Button	Description
Action	Allows you to change the user's password. Click the Change a user's password icon under the 'Action' column, To open Update user window. Enter the new passwords in the appropriate fields of the window and click **OK**. Click **Cancel** to close the window without saving the changes. Click **Help** to display the online help for the window.
User	The MWTM user for whom a User-Based Access account has been set up.
Last Login	Date and time the user last logged in to the MWTM.

Field or Button	Description
Access Level	Authentication level and number for the user. Valid levels and numbers are: • Basic User, 1 • Power User, 2 • Network Operator, 3 • Network Administrator, 4 • System Administrator, 5 • Custom Level 1, 11 • Custom Level 2, 12
Account Status	Current status of the user's account. Valid status settings are: • **Enabled**—The account has been enabled and is functioning normally. • **Disabled**—The account has been disabled for one of these reasons: – A System Administrator disabled the account. See the "mwtm disablepass" section on page B-27 and the "mwtm disableuser" section on page B-28 for more information. – The MWTM disabled the account as a result of too many failed attempts to log in using the account. See the "mwtm badlogindisable" section on page B-12 for more information. – The MWTM disabled the account because it was inactive for too many days. See the "mwtm inactiveuserdays" section on page B-37 for more information. • Expired Password • Temporary Password

Update *user* window

The Update *user* window contains:

Field or Button	Description
Password	User's password.
Confirm Password	Retype the password to confirm the new password.
Force user to reset password at login?	Whether to force the user to change the password at the next log in. The default is not to force the user to change the password.
OK	Saves the new user information.
Cancel	Closes the window without saving the changes.
Help	Displays online help for the window.

CHAPTER 13

Managing Reports

At scheduled intervals, you can configure the Cisco Mobile Wireless Transport Manager (MWTM) to gather critical information from network objects that it detects. The MWTM uses that information to calculate statistics (accounting statistics, performance statistics, and so on) and generates reports based on those statistics.

You can view reports in several ways:

- From the MWTM web navigation tree, in **Reports** or **File Archive**, click the type of report you want to view in the web navigation tree; for example, if you want to view current link reports, select **Reports > ITP Statistics > Link**. All link reports appear. See Displaying Status and Summary Reports, page 11-20 for more information about accessing reports from the web interface.
- For a single object of a specified type do one of the following. From the MWTM:
  - Web navigation tree, in **DEFAULT View**, click a node select an object in a node. In the content area in the right pane, click the **Reports** tab. Reports appear for the active object only.
  - Client, right-click an object and click **Latest Reports**. The Reports tab in the MWTM web interface opens for the active object only.

This chapter contains:

Using the Reports Page

To access the main Reports page:

Step 1 Do one of the following:

- In a web browser, launch the MWTM web interface (see Accessing the MWTM Web Interface, page 11-2). In the navigation tree, click **Reports**.

- From the MWTM client, in the MWTM main window, choose **View** > **MWTM Web Links** > **Reports**.

The Reports page in the content area shows the Report Type and the status (enabled or disabled). If you have generated a report, a green status ball and the word "Enabled" appear in the Status column. If you have not generated a report, a red status ball and the word "Disabled" appears.

Note Clicking a Report Type takes you directly to the report data page.

The Status column indicates whether you have enabled or disabled data gathering for the specified report type.

Step 2 To enable a report in the MWTM Web interface, click "Disabled" in the Status column. The Status changes "Enabled" and a green status ball appears.

Enabling Automatic Reports Using the CLI

Using CLI commands, there are two types of reports that you can generate:

- Continuous reports that run at specified intervals. You enable automatic generation of these reports with the **mwtm statreps** commands (see Generating Custom ITP Statistics Reports Using the CLI, page 13-285). After you enable generation of a continuous report, it will run at the specified intervals until you disable it with the appropriate CLI command.
- Custom ITP reports that you create one-time on demand. You generate these reports with the **mwtm *abc*stats** commands where *abc* is the type of command (see Generating Custom ITP Statistics Reports Using the CLI, page 13-285). They run at custom intervals or on demand at the specified times. Custom reports are *custom* because you can specify that they run at custom time intervals. The content of custom ITP reports is the same as the regularly scheduled reports. This option is only available for ITP reports listed in Table 13-1.

Enabling continuos reports using the CLI is the same as enabling and disabling reports from the Reports page.

To enable continuous reports using the CLI:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

cd /opt/CSCOsgm/bin

Step 3 Enter the following CLI command to enable all report types:

./mwtm statreps all

You can enable and disable specific reports using specific CLI commands. For example, to generate continuous GTT statistics, enter:

./mwtm statreps gtt

To see a list of all report-related CLI commands, enter the following command:

./mwtm rephelp

To determine which CLI command generates which report, see Generating Custom ITP Statistics Reports Using the CLI, page 13-285.

Step 4 (Optional) View the generated report in the MWTM web interface by clicking **Reports** in the navigation pane as described in Viewing Reports, page 13-4.

Note After you issue the CLI to generate a continuous report, the report is not immediately available for viewing. It takes approximately two times the report interval before the report is available.

Customized Report Disabling

Using the below steps you can individually disable the reports:

Step 1 Copy ReportsDisableMaster.conf file into ReportDisable.conf file. The ReportsDisableMaster.conf file exists in the report directory. By default, this file will be available in */CSCOsgm/reports/etc* directory. The ReportsDisable.conf file is used to disable individual reports.

Step 2 Remove the # sign from the line in the report to be disabled. The syntax is report name followed by the colon(:) symbol followed by 0 or 1. 0 represents report to be disabled and 1 represents report to be enabled.

Note The report name will have a value that map to the individual report names as listed in the README-ExportFiles.txt file.

Step 3 Now, restart the server It may take an hour for the reports to get disabled.

Customized Report Aging

Using the below steps you can mention the number of days a specific report has to be retained in the report folders:

Step 1 Copy ReportsAgingMaster.conf file into ReportsAging.conf file. The ReportsAgingMaster.conf file exists in the report directory. By default, this file will be available in /CSCOsgm/reports/etc directory. The ReportsAging.conf file is used to age the individual reports.

Step 2 Remove the # sign from the line to enable a report.

The syntax is *<report name>:<DBTableName>:<export report folder>:<Aging Value>*. For example, AaaAccounting:DBTableName:export15min:3. The Aging value can be changed to customize the value.

Note The <*DBTableName*> is not currently used but may be used in the future.The <*Aging Value*> mentions the number of days for which a specific report has to be restored in <*export report folder* > (export15min, exporthourly, exportdaily or exportmonthly).

Viewing Reports

After you generate reports, you can view them using the MWTM web interface. You can view historical reports for all objects of a specific type (for example, all link reports for all links) or, you can view reports for a specific object (for example, all link reports for a specific link).

Note For the reports having output type as Graph, the Graph Series Editor window is displayed when you click the Custom series icon. See Viewing Graph Series Editor Details, page 13-282.

Note For the reports having output type as Graph, the Sort Parameter option is available to select the criteria for including a top set of series and for ordering of the corresponding graphs displayed.

You can access reports in the MWTM web interface through these categories:

Category	Report Type	Related Content
Reports> Dashboards	CPU/Memory	CPU / Memory Reports, page 13-8
	Interface	Interface Reports, page 13-8
Reports > Common Statistics	AAA	AAA Reports, page 13-10
	CPU	CPU Reports, page 13-13
	IP Local Pool	IP Local Pool Reports, page 13-18
	Interface	Interface Reports, page 13-21
	Memory	Memory Reports, page 13-40
Reports > ITP Statistics	AS	AS Reports, page 13-45
	ASP	ASP Reports, page 13-52
	GTT Rates	GTT Rates Reports, page 13-65
	Link	Link Reports, page 13-69
	Link Multi-Day	Link Multi-Day Report, page 13-79
	Linkset	Linkset Reports, page 13-80
	MLR	MLR Reports, page 13-90
	MSU Rates	MSU Rates Reports, page 13-95
	SCTP	SCTP Reports, page 13-97

Category	Report Type	Related Content
Reports > Mobile Statistics	CSG	CSG Reports, page 13-101
	GGSN	GGSN Reports, page 13-123
	PDNGW	PDNGW Reports, page 13-146
	PDSN	PDSN Reports, page 13-159
	SGW	SGW Reports, page 13-172
Reports > RAN Statistics	PWE3	PWE3 Reports, page 13-187
	QOS	QOS Reports, page 13-192
	RAN-Optimized	RAN-Optimized Reports, page 13-198
Reports > ITP Accounting	AS	AS Accounting Reports, page 13-212
	GTT	GTT Accounting Reports, page 13-213
	MTP3	MTP3 Accounting Reports, page 13-214
Reports > Mobile Subscribers	BWG	BWG Subscribers Reports, page 13-216
	CSG	CSG Subscribers Reports, page 13-217
	GGSN	GGSN Subscribers Reports, page 13-221
	HA	HA Subscribers Reports, page 13-222
	PDNGW	PDNGW Subscribers Reports, page 13-223
	PDSN	PDSN Subscribers Reports, page 13-227
	SGW	SGW Subscribers Reports, page 13-228
File Archive > Events	Events	You can find information on archived event reports in the “Managing Events” chapter (see Viewing Archived Event Files on the Web, page 9-24).
File Archive > Inventory	Chassis	Chassis Inventory Archived Reports, page 13-233
	Element	Element Inventory Archived Reports, page 13-233
File Archive > Common Statistics	AAA	AAA Archived Reports, page 13-234
	CPU	CPU Archived Reports, page 13-236
	IP Local Pool	IP Local Pool Archived Reports, page 13-237
	Interface	Interface Archived Reports, page 13-238
	Memory	Memory Archived Reports, page 13-239

Category	Report Type	Related Content
File Archive > ITP Statistics	Custom	Custom Archived Reports, page 13-241
	Rolling	Rolling Archived Reports, page 13-244
	AS	Application Server Archived Reports, page 13-244
	ASP	Application Server Process Archived Reports, page 13-245
	GTT Rates	GTT Rates Archived Reports, page 13-246
	Link	Link Archived Reports, page 13-246
	Linkset	Linkset Archived Reports, page 13-247
	MLR	MLR Archived Reports, page 13-248
	MSU	MSU Archived Reports, page 13-249
	MTP3/AS Events	MTP3/AS Events Archived Reports, page 13-250
	Point Code	Point Code Archived Reports, page 13-251
	Q752	Q752 Archived Reports, page 13-252
	SCTP	SCTP Archived Reports, page 13-253
File Archive > Mobile Statistics	CSG	CSG Archived Reports, page 13-254
	GGSN	GGSN Archived Reports, page 13-256
	HA	HA Archived Reports, page 13-258
	PDNGW	PDNGW Archived Reports, page 13-259
	PDSN	PDSN Archived Reports, page 13-262
	SGW	SGW Archived Reports, page 13-263
	SLB	SLB Archived Reports, page 13-265
File Archive > RAN Statistics	Ethernet	Ethernet Archived Reports, page 13-267
	PWE3	PWE3 Archived Reports, page 13-267
	QOS	QOS Archived Reports, page 13-268
	RAN-Optimized	RAN-Optimized Archived Reports, page 13-269
File Archive > ITP Accounting	GTT Accounting	GTT Accounting Archived Reports, page 13-271
	MTP3/AS Acct	MTP3/AS Accounting Archived Reports, page 13-272
File Archive > Mobile Subscribers	BWG	BWG Subscriber Statistics Archived Reports, page 13-272
	CSG	CSG Subscriber Statistics Archived Reports, page 13-273
	GGSN	GGSN Subscriber Statistics Archived Reports, page 13-274
	HA	HA Subscriber Statistics Archived Reports, page 13-275
	PDNGW	PDNGW Subscriber Statistics Archived Reports, page 13-276
	PDSN	PDSN Subscriber Statistics Archived Reports, page 13-276
	SGW	SGW Subscriber Statistics Archived Reports, page 13-277

To view a Web report:

Step 1 For all objects of a specified type:

- From the MWTM web navigation tree, in **Reports** or **File Archive**, click the type of report you want to view in the web navigation tree; for example, if you want to view current link reports, select **Reports > ITP Statistics > Link**. All link reports appear.

For a single object of a specified type do one of the following. From the MWTM:

- Web navigation tree, in **DEFAULT View**, click a node to select an object in a node. In the content area in the right pane, click the **Reports** tab. Reports appear for the active object only.
- Client, right-click an object and click **Latest Reports**. The Reports tab in the MWTM web interface opens for the active object only.

Step 2 Choose the **Type** and **Duration** from the drop-down lists; for example, if you wanted to view hourly link reports for the last 12 hours, choose **Link Hourly** from the Type list and **Last 12 Hours** from the Duration list.

Step 3 (Optional) For most Statistics and Accounting reports, to customize the date or time range (or both) click the Customize the date and time range icon.  . Note that these dates are the dates with server time zone.

Step 4 Click the green arrow to run the report. If you change the Type or Duration, an information message appears:

```
Click the green arrow to show the selected report.
```

Step 5 To disable this error message, click **Hide Message**. To display the message again, click the **Information** icon. 

Step 6 (Optional) For Statistics and Accounting reports, to export the report as a *.csv* file, click the **Export** icon. 

Note For information about all File Archive export reports in *csv.zip* format, refer to the MWTM readme file by clicking **Administrative** on the navigation pane, then under System Information, click **Export Reports README**. The readme contains documentation on every field in each export report, description of the report fields, and in most cases, the SNMP MIB variables used to generate the field values.

Note To navigate to the Details tab for an object, click the underlined object in the report; for example, to go to the Details tab for a node, click the underlined node in the reports table.

Tip For details on web toolbars and icons, see Using the Toolbar, page 11-6.

Viewing Dashboard Reports

Dashboard Reports are located within **Reports> Dashboards** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view any of the following Dashboard reports:

- CPU / Memory Reports, page 13-8
- Interface Reports, page 13-8

CPU / Memory Reports

The MWTM interface provides **CPU Average/Peak Utilization Summary and Memory Average/Peak Utilization summary** report of nodes over a duration.To generate a CPU Average/CPU Peak/Memory Average/Memory Peak Utilization Daily reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Dashboards > CPU/Memory**.

Step 2 In the tool bar of the right pane, choose a report type from the **Type** drop-down menu.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

The CPU/Memory reports display the following summary table with the hide and show link options to view the specific report type you have selected:

- **CPU Average Utilization Summary**: Displays the average ten CPU values gathered during the specified period.This report is similar to the CPU Average Utilization Daily Reports, page 13-16, except that it displays the output data in a table format without the graph output.
- **CPU Peak Utilization Summary**: Displays the ten CPU values with the maximum CPU utilization over the specified time period.This report is similar to the CPU Peak Utilization Daily Reports, page 13-14, except that it displays the output data in a table format without the graph output.
- **Memory Average Utilization Summary**: Displays the ten average memory values gathered during the specified period. This report is similar to the Memory Average Utilization Daily Reports, page 13-43, except that it displays the output data in a table format without the graph output.
- **Memory Peak Utilization Summary**: Displays the ten CPU values with the highest memory utilization over the specified time period.This report is similar to the Memory Peak Utilization Daily Reports, page 13-41 , except that it displays the output data in a table format without the graph output.

Interface Reports

The MWTM web interface provides a dashboard of interface reports. To generate Interface Dashboard reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Dashboards > Interface**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.).

The Type drop-down menu contains the following reports:

- Interface Utilization/Errors Percentage Daily, page 13-9
- Interface Utilization/Discards Percentage Daily, page 13-9
- Interface Errors/Discards Percentage Daily, page 13-9
- Interface Broadcast/Multicast Packets Percentage Daily, page 13-9
- Interface Total Packets / Errors-Discards Daily, page 13-10

Interface Utilization/Errors Percentage Daily

MWTM displays the summary tables of Interface Utilization / Errors Percentage Daily reports during a specified period in a single page with the hide and show options to display a specific report. This report is similar to the Interface Utilization Daily Reports, page 13-21 and Interface Errors Percentage Daily Reports, page 13-38, except that it displays the output data in a table format without the graph output.

The Interface Utilization/Errors Percentage Daily report type display a set of Send/Receive Interface Utilization Percentage Summary and Send/Receive Interface Errors Percentage Summary values.

Interface Utilization/Discards Percentage Daily

MWTM display the summary tables of Interface Utilization / Discards Percentage Daily reports during a specified period in a single page with the hide and show options to display a specific report.This report is similar to the Interface Utilization Daily Reports, page 13-21 and Interface Discards Percentage Daily Reports, page 13-35, except that it displays the output data in a table format without the graph output.

The Interface Utilization/Discards Percentage Daily report type display a set of Send/Receive Interface Utilization Percentage Summary and Send/Receive Interface Discards Percentage Summary values.

Interface Errors/Discards Percentage Daily

MWTM display the summary tables of Interface Errors / Discards Percentage Daily reports during a specified period in a single page with the hide and show options to display a specific report.This report is similar to the Interface Errors/Discards Daily Report, page 13-26 except that it displays the output data in a table format without the graph output.

The Interface Errors/Discards Percentage Daily report type display a set of Send/Receive Interface Errors Percentage Summary and Send/Receive Interface Discards Percentage Summary values.

Interface Broadcast/Multicast Packets Percentage Daily

MWTM display the summary tables of Interface Broadcast / Multicast Packets Percentage Daily reports during a specified period in a single page with the hide and show options to display a specific report.This report is similar to the Interface Broadcast Packets Percentage Daily Reports, page 13-29 and Interface Multicast Packets Percentage Daily Reports, page 13-30 except that it displays the output data in a table format without the graph output.

The Interface Broadcast/Multicast Packets Percentage Daily report type display a set of Send/Receive Interface Broadcast Packets Percentage Summary and Send/Receive Interface Multicast Packets Percentage Summary values.

Interface Total Packets / Errors-Discards Daily

MWTM displays the Interface Total Packets / Errors-Discards Daily during a specified period at node level in a single summary table.This report is similar to the Interface Total Packets Daily Reports, page 13-23 and Interface Errors/Discards Daily Report, page 13-26 except that it displays the output data in a table format without the graph output.

The Interface Total Packets / Errors-Discards Daily report type display a set of Send/Receive Interface Total Packets Summary and Send/Receive Interface Errors Discards Summary values.

Viewing Common Statistics Reports

Common Statistics Reports are located within **Reports> Common Statistics** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view any of the following Common statistics reports:

- AAA Reports, page 13-10
- CPU Reports, page 13-13
- Interface Reports, page 13-21
- Memory Reports, page 13-40

AAA Reports

The MWTM web interface provides node-level and network wide AAA reports for monitoring communications and status of AAA Server operation. To generate a network wide AAA reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > AAA**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Table or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- AAA Accounting Statistics Daily Report, page 13-11
- AAA Authentication Statistics Daily Report, page 13-11

AAA Accounting Statistics Daily Report

MWTM displays the AAA accounting statistics daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > AAA**.

Note The 15-minute and hourly AAA accounting statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the AAA reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose AAA Accounting Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node for the object
Server Name	Name of the Server.
Timestamp (*time zone*)	Timestamp of the report.
Requests	The number of accounting requests sent to the server during the system reinitialization.
Request Timeouts	The number of accounting requests timed out during the system reinitialization.
Transaction Completed	• Count—Total number of accounting transactions with the server which seceded during the system reinitialization. • Rate—Rate at which the accounting transactions succeeded during the system reinitialization.
Transaction Failures	The number of accounting transactions with this server which failed during the system reinitialization.
Error Responses	The number of server ERROR accounting responses received from the server during the system reinitialization.
Incorrect Responses	The number of accounting responses which could not be processed during the system reinitialization.

AAA Authentication Statistics Daily Report

MWTM displays the AAA authentication statistics daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > AAA**.

Note The 15-minute and hourly AAA authentication statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the AAA reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose AAA Authentication Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node for the object
Server Name	Name of the Server.
Timestamp (*time zone*)	Timestamp of the report.
Requests	The number of authentication requests sent to the server during the system reinitialization.
Request Timeouts	The number of authentication requests which have timed out since the server is in active state.
Transaction Completed	• Count—Total number of authentication transactions with the server which succeeded during the system reinitialization. • Rate—Rate at which the authentication transactions succeeded during the system reinitialization.
Transaction Failures	The number of authentication transactions occurred when the server which failed since the server is in active state.
Error Responses	The number of server ERROR authentication responses received from the server since the server is in active state.
Incorrect Responses	The number of authentication responses which could not be processed since the server is in active state.

CPU Reports

The MWTM web interface provides node-level CPU reports. The information is available in graphical, tabular, and CSV formats. There are two types of utilization reports:

- Peak utilization—Displays the maximum (or peak) values obtained during the specified period (for example, 15 minutes, hourly, daily).
- Average utilization—Displays the average values obtained during the specified period (for example, 15 minutes, hourly, daily).

Note The 15-minute and hourly CPU reports are available from the node level only; they are not available from the top level or the network level.

In addition to generating network-wide CPU reports as explained in the following steps, you can also generate node-level CPU reports as explained in Generating Node-Level CPU/Memory Reports, page 13-211.

To generate a network-wide CPU reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > CPU**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- CPU Peak Utilization Daily Reports, page 13-14
- CPU Average Utilization Daily Reports, page 13-16

CPU Peak Utilization Daily Reports

The CPU Peak Utilization Daily reports display the CPUs with the highest maximum CPU utilization over the specified time period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > CPU**. You can access node-level CPU/Memory reports by clicking on a node name, then clicking the **Performance** tab.

Step 2 From the Type menu, select one of the following CPU utilization reports:

- CPU Peak Utilization Daily
- CPU Average Utilization Daily

Note The 15-minute and hourly CPU reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CPU reports to navigate to a specific node to view hourly and 15 minute reports for that node.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Slot/CPU	Slot number (if known) and CPU number.
CPU Description	Type of CPU.
Average Utilization	Average utilization across the chosen time range.
Maximum Utilization	Maximum utilization during the specified time range.
Maximum Date (*time zone*)	Timestamp when the maximum utilization occurred.
Warning Threshold	Threshold setting beyond which a warning is issued.
Overload Threshold	Threshold setting beyond which is considered overloaded.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

GUI Element	Description
Graph	If you select **Graph** from the Output menu, the graph displays the 12 CPUs with the highest maximum CPU utilization over the specified time period.
Table or CSV	If you select **Table** from the Output menu, the table contains all CPUs monitored by MWTM. By default, the CPUs are sorted by maximum CPU utilization. The table includes: • Node—Name of the node. • Slot/CPU—Slot number (if known) and CPU number. • CPU Description—Type of CPU. • Timestamp (*time zone*)—Timestamp at which the maximum utilization rate occurred. • Average Utilization—Average of the data across the chosen time range. • Maximum Utilization—Maximum utilization during the specified time range. • Minimum Utilization—Minimum utilization during the specified time range. • Warning Threshold—Threshold setting beyond which a warning is issued. • Overload Threshold—Threshold setting beyond which is considered overloaded. **Note** If you select **CSV** from the Output menu, the same data is presented in the excel format.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Percentage Utilization	If Output Type is Graph, the Y-axis label shows percentage of CPU utilization over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

CPU Average Utilization Daily Reports

The CPU Average Utilization Daily reports display the average CPU values gathered during the specified period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > CPU**. You can access node-level CPU/Memory reports by clicking on a node name, then clicking the **Performance** tab.

Step 2 In the tool bar of the right pane, from the Type menu, select **CPU Average Utilization Daily**.

A summary table displays the following information:

Field	Description
Node	Name of the node.
Slot/CPU	Name of the CPU.
CPU Description	Description of the CPU.
Average Utilization	Average utilization across the chosen time range.
Maximum Utilization	Highest utilization of the average values during the specified time range.
Maximum Date (*time zone*)	Timestamp for when the maximum utilization value occurred.
Warning Threshold	Threshold setting beyond which a warning is issued.
Overload Threshold	Threshold setting beyond which is considered overloaded.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

GUI Element	Description
Graph	If you select **Graph** from the Output menu, the graph displays the average daily CPU utilization over the specified time period.
Table or CSV	If you select **Table** from the Output menu, the table contains all CPUs monitored by MWTM. By default, the CPUs are sorted by maximum CPU utilization. The table includes: • Node—Name of the node. • Slot/CPU—Slot number (if known) and CPU number. • CPU Description—Type of CPU. • Timestamp (*time zone*)—Timestamp at which the maximum utilization rate occurred. • Average Utilization—Average of the data across the chosen time range. • Maximum Utilization—Maximum utilization during the specified time range. • Minimum Utilization—Minimum utilization during the specified time range. • Warning Threshold—Threshold setting beyond which a warning is issued. • Overload Threshold—Threshold setting beyond which is considered overloaded. **Note** If you select **CSV** from the Output menu, the same data is presented in the excel format.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Percentage Utilization	If Output Type is Graph, the Y-axis label shows percentage of CPU utilization over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

IP Local Pool Reports

The MWTM web interface provides node-level and network wide IP local pool reports. To generate a network wide IP local pool reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > IP Local Pool**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- IP Local Pool Statistics Daily Reports, page 13-18

Note If MWTM detects an utilization percentage that it considers to be impossible, the GUI displays 'Out of Range' in the corresponding table cells.

IP Local Pool Statistics Daily Reports

MWTM displays the IP Local Pool Statistics Daily report during the specified period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > IP Local Pool**.

Note The 15-minute and hourly IP Local Pool reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the IP Local Pool reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose IP Local Pool Statistics Daily from Type drop-down menu.

The Free Addresses and the In Use Addresses tables contain summary information as described below:

Field	Description
Node	Name of the node.
Pool Name	Name of an IP local pool.
Total Addresses	Total number of IP Addresses in the IP Local Pool.

Field	Description
Free Addresses	• Average—Average number of IP addresses available for use in the IP local pool. • Minimum—Minimum number of IP addresses available for use in the IP local pool. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum number of IP addresses available for use in the IP local pool. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
In Use Addresses	• Average—Average number of IP addresses being used in the IP local pool. • Minimum—Minimum number of IP addresses being used in the IP local pool. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum number of IP addresses being used in the IP local pool. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
IP Local Pool Statistics Daily	Table, CSV	Node	Name of the node.
		Pool Name	Name of an IP local pool.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Total Addresses	Total number of IP Addresses in the IP Local Pool.
		Free Addresses	• Average—Average number of IP addresses available for use in the IP local pool. • Maximum—Maximum number of IP addresses available for use in the IP local pool. • Minimum—Minimum number of IP addresses available for use in the IP local pool.
		In Use Addresses	• Average—Average number of IP addresses being used in the IP local pool. • Maximum—Maximum number of IP addresses being used in the IP local pool. • Minimum—Minimum number of IP addresses being used in the IP local pool.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Min Addresses/ Avg Addresses/ Max Addresses	If Output Type is Graph, the Y-axis label shows Minimum/Average/Maximum addresses available IP addresses that are Free/In use.
		Server Time	Name of the node for the link.
		Legend	If Output Type is Graph, a color-coded legend shows labels for Minimum/Average/Maximum addresses available IP addresses that are Free/In use.

Interface Reports

The MWTM web interface provides node-level and network wide interface reports. To generate a network wide interface reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- Interface Utilization Daily Reports, page 13-21
- Interface Total Packets Daily Reports, page 13-23
- Interface Errors/Discards Daily Report, page 13-26
- Interface Broadcast Packets Percentage Daily Reports, page 13-29
- Interface Multicast Packets Percentage Daily Reports, page 13-30
- Interface Unicast Packets Percentage Daily Reports, page 13-32
- Interface Discards Percentage Daily Reports, page 13-35
- Interface Errors Percentage Daily Reports, page 13-38

Note If MWTM detects an utilization percentage that it considers to be impossible, the GUI displays 'Out of Range' in the corresponding table cells.

Interface Utilization Daily Reports

MWTM displays the Interface Utilization Daily report during the specified period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Utilization reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the Interface Utilization reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Utilization Daily from Type drop-down menu.

The Interface Utilization table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Utilization Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Name of the interface.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Average Utilization%	• Send—Average of the data sent across the chosen time range. • Receive—Average of the data received across the chosen time range.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Utilization %	If Output Type is Graph, the Y-axis label shows Utilization in percentage.
		Server Time	Name of the node for the link.
		Legend	Device allows the user to interact with the operating system.

Interface Total Packets Daily Reports

MWTM displays the Interface Total Packets Daily report during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Total Packets reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the Interface Total Packets reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Total Packets Daily from Type drop-down menu.

The Interface Total Packets table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	GUI Element	Field	Description
Interface Total Packets Daily	Table, CSV		Node	Name of the node for the link.
			Interface	Device allows the user to interact with the operating system.
			Time stamp (*time zone*)	Timestamp of the report.
		Send	Total Packets	The total number of packets sent by the Interface.
			Unicast Packets %	The number packets sent from a single source to a specified destination by the interface.
			Multicast Packets %	The number of packets sent from the single source to multiple destinations by the interface.
			Broadcast Packets %	The number of packets sent from multiple source to multiple destinations.
		Receive	Total Packets	The total number of packets received by the Interface.
			Unicast Packets %	The number of unicast packets received by the interface.
			Multicast Packets %	The number of multicast packets received by the interface.
			Broadcast Packets %	The number of broadcast packets received by the interface.
	Graph		Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
			Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
			Total Packets	If Output Type is Graph, the Y-axis label shows total packets.
			Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
			Legend	If Output Type is Graph, a color-coded legend shows labels for total packets.

Interface Performance Reports

The 15-minute, hourly, and daily Interface Performance reports are available from the interface level only; they are not available from the node level or the network level. Click on a interface name in the navigation tree and then click the Reports tab to view 15 minute, hourly, and daily Interface Performance reports for that interface.

The Graph and Table/CSV output of these reports display the combined output of the fields of Interface Utilization reports and Interface Total Packets reports. At the interface level, the summary table contains the additional column Data Type.

See Interface Utilization Daily Reports and Interface Total Packets Daily Reports for information on column names.

Interface Errors/Discards Daily Report

MWTM displays the Interface failed during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Errors/Discards reports are available from the node and interface level only; they are not available from the top level or the network level. Click on a node or interface name in the Interface Errors/Discards reports to navigate to a specific node or interface to view hourly and 15 minute reports for that nodeor interface.

Step 2 Choose Interface Errors/Discards from Type drop-down menu.

The Interface Errors+Discards table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.

Field	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Errors/ Discards Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Device allows the user to interact with the operating system.
		Time stamp (*time zone*)	Timestamp of the report.
		Send	• Packets—Total number of outbound packets. • Errors—Number of outbound packets that contained errors. • Error %—Percentage of outbound packets that contained errors. • Discards—Number of outbound packets that were discarded. • Discard %—Percentage of outbound packets that were discarded.
		Receive	• Packets—Total number of inbound packets. • Errors—Number of inbound packets that contained errors. • Error %—Percentage of inbound packets that contained errors. • Discards—Number of inbound packets that were discarded. • Discard %—Percentage of inbound packets that were discarded.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Errors+ Discards	If Output Type is Graph, the Y-axis label shows Errors+Discards.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for Errors+Discards.

Interface Broadcast Packets Percentage Daily Reports

MWTM displays the Interface Broadcast Packets Percentage Daily report during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Broadcast Packets Percentage reports are available from the node and interface level only; they are not available from the top level or the network level. Click on a node or the interface name in the Interface Broadcast Packets Percentage reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Broadcast Packets Percentage Daily from Type drop-down menu.

The Interface Broadcast Packets Percentage table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Broadcast Packets Percentage Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Name of the interface.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Send	• Total Packets—The total number of packets sent by the Interface. • Unicast Packets %—The number of packets sent from a single source to a specified destination by the interface. • Multicast Packets %—The number of packets sent from the single source to multiple destinations by the interface. • Broadcast Packets %—The number of packets sent from multiple source to multiple destinations. This is the default sortable column.
		Receive	• Total Packets—The total number of packets received by the Interface. • Unicast Packets %—The number of unicast packets received by the interface. • Multicast Packets %—The number of multicast packets received by the interface. • Broadcast Packets %—The number of broadcast packets received by the interface.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets %	If Output Type is Graph, the Y-axis label shows packets in percentage.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for packets.

Interface Multicast Packets Percentage Daily Reports

MWTM displays the Interface Multicast Packets Percentage Daily report during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Multicast Packets Percentage reports are available from the node and interface level only; they are not available from the top level or the network level. Click on a node or the interface name in the Interface Multicast Packets Percentage reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Multicast Packets Percentage Daily from Type drop-down menu.

The Interface Multicast Packets Percentage table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Multicast Packets Percentage Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Name of the interface.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Send	• Total Packets—The total number of packets sent by the Interface. • Unicast Packets %—The number of packets sent from a single source to a specified destination by the interface. • Multicast Packets %—The number of packets sent from the single source to multiple destinations by the interface. This is the default sortable column. • Broadcast Packets %—The number of packets sent from multiple source to multiple destinations.
		Receive	• Total Packets—The total number of packets received by the Interface. • Unicast Packets %—The number of unicast packets received by the interface. • Multicast Packets %—The number of multicast packets received by the interface. • Broadcast Packets %—The number of broadcast packets received by the interface.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets %	If Output Type is Graph, the Y-axis label shows packets in percentage.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for packets.

Interface Unicast Packets Percentage Daily Reports

MWTM displays the Interface Unicast Packets Percentage Daily report during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Unicast Packets Percentage reports are available from the node and interface level only; they are not available from the top level or the network level. Click on a node or the interface name in the Interface Unicast Packets Percentage reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Unicast Packets Percentage Daily from Type drop-down menu.

The Interface Unicast Packets Percentage table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Unicast Packets Percentage Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Name of the interface.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Send	• Total Packets—The total number of packets sent by the Interface. • Unicast Packets %—The number of packets sent from a single source to a specified destination by the interface. This is the default sortable column. • Multicast Packets %—The number of packets sent from the single source to multiple destinations by the interface. • Broadcast Packets %—The number of packets sent from multiple source to multiple destinations.
		Receive	• Total Packets—The total number of packets received by the Interface. • Unicast Packets %—The number of unicast packets received by the interface. • Multicast Packets %—The number of multicast packets received by the interface. • Broadcast Packets %—The number of broadcast packets received by the interface.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets %	If Output Type is Graph, the Y-axis label shows packets in percentage.
		Server Time	Name of the node for the link.
		Legend	If Output Type is Graph, a color-coded legend shows labels for packets.

Interface Packets Percentage Reports

The 15-minute, hourly, and daily Interface Packets Percentage reports are available from the interface level only; they are not available from the node level or the network level. Click on a interface name in the navigation tree and then click the Reports tab to view 15 minute, hourly, and daily Interface Packets Percentage reports for that interface.

The Graph and Table/CSV output of these reports display the combined output of the fields of Interface Broadcast Packets Percentage reports, Interface Multicast Packets Percentage, and Interface Unicast Packets Percentage. At the interface level, the summary table contains the additional column Data Type.

See Interface Broadcast Packets Percentage Daily Reports, Interface Multicast Packets Percentage Daily Reports, and Interface Unicast Packets Percentage Daily Reports for information on column names.

Interface Discards Percentage Daily Reports

MWTM displays the Interface Discards Percentage Daily report during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Discards Percentage reports are available from the node and interface level only; they are not available from the top level or the network level. Click on a node or the interface name in the Interface Discards Percentage reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Discards Percentage Daily from Type drop-down menu.

The Interface Discards Percentage table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.

Field	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Discards Percentage Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Name of the interface.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Send	• Packets—Total number of outbound packets. • Errors—Number of outbound packets that contained errors. • Error %—Percentage of outbound packets that contained errors. • Discards—Number of outbound packets that were discarded. • Discard %—Percentage of outbound packets that were discarded.
		Receive	• Packets—Total number of inbound packets. • Errors—Number of inbound packets that contained errors. • Error %—Percentage of inbound packets that contained errors. • Discards—Number of inbound packets that were discarded. • Discard %—Percentage of inbound packets that were discarded.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Discards %	If Output Type is Graph, the Y-axis label shows discards in percentage.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for discards.

Interface Errors Percentage Daily Reports

MWTM displays the Interface Errors Percentage Daily report during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Interface**.

Note The 15-minute and hourly Interface Errors Percentage reports are available from the node and interface level only; they are not available from the top level or the network level. Click on a node or the interface name in the Interface Errors Percentage reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose Interface Errors Percentage Daily from Type drop-down menu.

The Interface Errors Percentage table contains summary information as described below:

Field	Description
Node	Name of the node.
Interface	Name of the interface.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp that shows time when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
Interface Errors Percentage Daily	Table, CSV	Node	Name of the node for the link.
		Interface	Name of the interface.
		Timestamp (*time zone*)	Timestamp that shows time bits-per second value occurred.
		Send	• Packets—Total number of outbound packets. • Errors—Number of outbound packets that contained errors. • Error %—Percentage of outbound packets that contained errors. • Discards—Number of outbound packets that were discarded. • Discard %—Percentage of outbound packets that were discarded.
		Receive	• Packets—Total number of inbound packets. • Errors—Number of inbound packets that contained errors. • Error %—Percentage of inbound packets that contained errors. • Discards—Number of inbound packets that were discarded. • Discard %—Percentage of inbound packets that were discarded.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Errors %	If Output Type is Graph, the Y-axis label shows errors in percentage.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for errors.

Interface Errors/Discards Percentage Reports

The 15-minute, hourly, and daily Interface Errors/Discards Percentage reports are available from the interface level only; they are not available from the node level or the network level. Click on a interface name in the navigation tree and then click the Reports tab to view 15 minute, hourly, and daily Interface Errors/Discards Percentage reports for that interface.

The Graph and Table/CSV output of these reports display the combined output of the fields of Interface Discards Percentage reports and Interface Errors Packets Percentage. At the interface level, the summary table contains the additional column Data Type.

See Interface Discards Percentage Daily Reports and Interface Errors Percentage Daily Reports for information on column names.

Memory Reports

The MWTM web interface provides node-level Memory reports. The information is available in graphical, tabular, and CSV formats. There are two types of utilization reports:

- Peak utilization—Displays the maximum (or peak) values obtained during the specified period (for example, 15 minutes, hourly, daily).
- Average utilization—Displays the average values obtained during the specified period (for example, 15 minutes, hourly, daily).

Note The 15-minute and hourly Memory reports are available from the node level only; they are not available from the top level or the network level.

In addition to generating network-wide Memory reports as explained in the following steps, you can also generate node-level CPU reports as explained in Generating Node-Level CPU/Memory Reports, page 13-211.

To generate a network-wide Memory reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Memory**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- Memory Peak Utilization Daily Reports, page 13-41
- Memory Average Utilization Daily Reports, page 13-43

Memory Peak Utilization Daily Reports

The Memory Peak Utilization Daily reports display the CPUs with the highest memory utilization over the specified time period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Memory**. You can access node-level CPU/Memory reports by clicking on a node name, then clicking the **Performance** tab.

Step 2 From the Type menu, select one of the following Memory utilization reports:

- Memory Peak Utilization 15 minutes
- Memory Peak Utilization Hourly
- Memory Peak Utilization Daily

Note The 15-minute and hourly Memory reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the Memory reports to navigate to a specific node to view hourly and 15 minute reports for that node.

A summary table displays the following information:

Field	Description
Node	Name of the node.
Slot/CPU	Name of the CPU.
CPU Description	Description of the CPU.
Memory Description	Type of memory.
Average Utilization	Average memory utilization during the specified time range.
Maximum Utilization	Maximum memory utilization during the specified time range
Maximum Date (*time zone*)	Timestamp for when the maximum utilization value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

GUI Element	Description
Graph	If you select **Graph** from the Output menu, the graph displays the CPUs with the highest memory utilization over the specified time period.
Table or CSV	If you select **Table** from the Output menu, the table contains all CPUs monitored by MWTM. By default, the CPUs are sorted by maximum CPU utilization. The table includes: • Node—Name of the node. • Slot/CPU—Slot number (if known) and CPU number. • CPU Description—Type of CPU. • Timestamp (*time zone*)—Timestamp at which the maximum utilization rate occurred. • Memory Description—Type of memory, which can be processor, I/O, Fast, etc. • Average Utilization—Average of the data across the chosen time range. • Maximum Utilization—Maximum utilization during the specified time range. • Minimum Utilization—Minimum utilization during the specified time range. • Total—Average Used plus Average Free memory during the specified time frame. • Average Used—Average memory used during the specified time range. • Average Free—Average memory available during the specified time range. **Note** If you select **CSV** from the Output menu, the same data is presented in the excel format.
Percentage Utilization	If Output Type is Graph, the Y-axis label shows percentage of memory utilization over time.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

Memory Average Utilization Daily Reports

The Memory Average Utilization Daily reports display the average memory values gathered during the specified period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Common Statistics > Memory**. You can access node-level CPU/Memory reports by clicking on a node name, then clicking the **Performance** tab.

Step 2 From the Type menu, select one of the following Memory utilization reports:

- Memory Average Utilization 15 minutes
- Memory Average Utilization Hourly
- Memory Average Utilization Daily

Note The 15-minute and hourly Memory reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the Memory reports to navigate to a specific node to view hourly and 15 minute reports for that node.

A summary table displays the following information:

Field	Description
Node	Name of the node.
Slot/CPU	Name of the CPU.
CPU Description	Description of the CPU.
Memory Description	Type of memory.
Average Utilization	Average memory utilization during the specified time range.
Maximum Utilization	Highest memory utilization of the average values during the specified time range.
Maximum Date (*time zone*)	Timestamp for when the maximum utilization value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

GUI Element	Description
Graph	If you select **Graph** from the Output menu, the graph displays the average memory utilization over the specified time period.
Table or CSV	If you select **Table** from the Output menu, the table contains all CPUs monitored by MWTM. By default, the CPUs are sorted by maximum CPU utilization. The table includes: • Node—Name of the node. • Slot/CPU—Slot number (if known) and CPU number. • CPU Description—Type of CPU. • Timestamp (*time zone*)—Timestamp at which the maximum utilization rate occurred. • Memory Description—Type of memory, which can be processor, I/O, Fast, etc. • Average Utilization—Average of the data across the chosen time range. • Maximum Utilization—Maximum utilization during the specified time range. • Minimum Utilization—Minimum utilization during the specified time range. • Total—Average Used plus Average Free memory during the specified time frame. • Average Used—Average memory used during the specified time range. • Average Free—Average memory available during the specified time range. **Note** If you select **CSV** from the Output menu, the same data is presented in the excel format.
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Percentage Utilization	If Output Type is Graph, the Y-axis label shows percentage of memory utilization over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

Viewing ITP Statistics Reports

ITP Statistics Reports are located within **Reports > ITP Statistics** in the MWTM web interface. You can also find ITP statistics reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All reports are saved as export files in .csv format.

You can view any of the following ITP statistics reports:

- AS Reports, page 13-45
- ASP Reports, page 13-52
- GTT Rates Reports, page 13-65
- Link Reports, page 13-69
- Link Multi-Day Report, page 13-79
- Linkset Reports, page 13-80
- MLR Reports, page 13-90
- MSU Rates Reports, page 13-95
- SCTP Reports, page 13-97

AS Reports

The MWTM web interface provides node-level Application Server (AS) reports. The information is available in graphical, tabular, and CSV formats. To generate a network-wide AS report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > AS**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table or CSV) from the Output drop-down menu for contents of each output type.

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- AS Statistics Hourly Reports, page 13-45
- AS Statistics Daily Reports, page 13-47
- AS Peaks Statistics Daily Reports, page 13-50

AS Statistics Hourly Reports

MWTM displays the AS Statistics Hourly report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > AS**.

Step 2 Choose AS Statistics Hourly from the Type drop-down menu.

The Send Packets and Receive Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
AS Statistics Hourly Report	Table, CSV	Node	Name of the node.
		Signaling Point	Name of the signaling point for the application server.
		AS	Name of the application server.
		Timestamp (*time zone*)	Timestamp of the report.
		Packets From MTP3	Total number of packets that the application server received, sent from the MTP3 layer.
		Packets To ASPs	Total number of packets that the application server sent to the application server processes.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets	If Output Type is Graph, the Y-axis label shows hourly statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.

AS Statistics Daily Reports

MWTM displays the AS Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > AS**.

Step 2 Choose AS Statistics Daily from the Type drop-down menu.

The Send Packets and Receive Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
AS Statistics Daily Report	Table, CSV	Node	Name of the node.
		Signaling Point	Name of the signaling point for the application server.
		AS	Name of the application server.
		Timestamp (*time zone*)	Timestamp of the report.
		Send	• Packets To ASPs—Total number of packets that the application server sent to the application server processes for the specified date. • Peak To ASPs—Highest hourly Packets To ASPs for the application server for the specified date. • Peak To Hour—Hour in which the Peak To ASPs for the application server occurred for the specified date.
		Receive	• Packets From MTP3—Total number of packets that the application server receives from the MTP3 layer for the specified date. • Peak From MTP3—Highest hourly Packets From MTP3 for the application server for the specified date. • Peak From Hour—Hour in which the Peak From MTP3 for the application server occurred for the specified date.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets	If Output Type is Graph, the Y-axis label shows daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.

AS Peaks Statistics Daily Reports

MWTM displays the AS Peaks Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > AS**.

Step 2 Choose AS Peaks Statistics Daily from the Type drop-down menu.

The Send Peak Packets and Receive Peak Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
AS Peaks Statistics Daily Report	Table, CSV	Node	Name of the node for the application server.
		SP Name	Name of the signaling point for the application server.
		AS	Name of the application server that recorded the peak value.
		Timestamp (*time zone*)	Timestamp of the report.
		Send	• Peak To ASPs—Highest hourly Packets To ASPs for the application server for the specified date. • Peak To Hour—Hour in which the Peak To ASPs for the application server occurred for the specified date.
		Receive	• Peak From MTP3—Highest hourly Packets From MTP3 for the application server for the specified date. • Peak From Hour—Hour in which the Peak From MTP3 for the application server occurred for the specified date.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Peaks	If Output Type is Graph, the Y-axis label shows peaks daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

ASP Reports

The MWTM web interface provides node-level Application Server Process (ASP) reports. The information is available in graphical, tabular, and CSV formats. To generate a network-wide ASP report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > ASP**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table or CSV) from the Output drop-down menu for contents of each output type.

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- ASP Statistics Hourly Reports, page 13-52
- ASP Statistics Daily Reports, page 13-55
- ASP Peaks Statistics Daily Reports, page 13-57
- ASP MTP3 Statistics Daily Reports, page 13-60
- ASP MTP3 Peaks Statistics Daily Reports, page 13-62

ASP Statistics Hourly Reports

MWTM displays the ASP Statistics Hourly report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > ASP**.

Step 2 Choose ASP Statistics Hourly from the Type drop-down menu.

The Send Packets and Receive Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server process.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
ASP	Name of the application server process.

Field	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
ASP Statistics Hourly	Table, CSV	Node	Name of the node.
		Signaling Point	Name of the signaling point for the application server.
		AS	Name of the application server.
		ASP	Name of the application server process.
		Timestamp (*time zone*)	Timestamp of the report.
		Packets From ASP	Total number of packets that the application server process send for the specified date and hour.
		Packets To ASP	Total number of packets sent to the application server process for the specified date and hour.
		Packets From MTP3	Total number of packets that the application server process received from the MTP3 layer for the specified date and hour.
		Packets To MTP3	Total number of packets the application server process sent to the MTP3 layer for the specified date and hour.
		Send Errors	Total number of errors that occurred when sending packets to the application server process for the specified date and hour.
		Receive Errors	Total number of errors that occurred when receiving packets from the application server process for the specified date and hour.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets	If Output Type is Graph, the Y-axis label shows hourly statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

ASP Statistics Daily Reports

MWTM displays the ASP Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > ASP**.

Step 2 Choose ASP Statistics Daily from the Type drop-down menu.

The Send Packets and Receive Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server process.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
ASP	Name of the application server process.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
ASP Statistics Daily	Table, CSV	Node	Name of the node.
		Signaling Point	Name of the signaling point for the application server.
		AS	Name of the application server.
		ASP	Name of the application server process.
		Timestamp (*time zone*)	Timestamp of the report.
		Packets From ASP	Total number of packets that the application server process sent for the specified date.
		Peak From ASP	Highest hourly Packets From ASP for the application server process for the specified date.
		Peak From Hour	Hour in which the Peak From ASP for the application server process occurred for the specified date. Click the hour to see the ASP Hourly Report for the chosen application server process and hour.
		Packets To ASP	Total number of packets that the application server sent to the application server processes for the specified date.
		Peak To ASP	Highest hourly Packets To ASP for the application server process for the specified date.
		Peak To Hour	Hour in which the Peak To ASP for the application server process occurred for the specified date.
		Send Errors	Total number of errors that occurred when sending packets to the application server processes for the specified date.
		Peak Send Errors	Highest hourly Send Errors for the application server process for the specified date.
		Peak Send Hour	Hour in which the Peak Send Errors for the application server process occurred for the specified date.
		Receive Errors	Total number of errors that occurred when receiving packets from the application server processes for the specified date.
		Peak Receive Errors	Highest hourly receive errors for the application server process for the specified date.
		Peak Receive Hour	Hour in which the peak receive errors for the application server process occurred for the specified date.

Report Type	Output	Field	Description
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets	If Output Type is Graph, the Y-axis label shows hourly statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

ASP Peaks Statistics Daily Reports

MWTM displays the ASP Peaks Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > ASP**.

Step 2 Choose ASP Peaks Statistics Daily from the Type drop-down menu.

The Send Peak Packets and Receive Peak Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server process.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
ASP	Name of the application server process.

Field	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
ASP Peaks Statistics Daily	Table, CSV	Node	Name of the node.
		SP Name	Name of the signaling point for the application server.
		AS	Name of the application server.
		ASP	Name of the application server process.
		Timestamp (*timestamp*)	Timestamp of the report.
		Peak From ASP	Highest hourly Packets From ASP for the application server process for the chosen day.
		Peak From Hour	Hour in which the Peak From ASP for the application server process occurred for the chosen day.
		Peak To ASP	Highest hourly Packets To ASP for the application server process for the chosen day.
		Peak To Hour	Hour in which the Peak To ASP for the application server process occurred for the chosen day.
		Peak Send Errors	Highest hourly Send Errors for the application server process for the last 30 days.
		Peak Send Hour	Hour in which the Peak Send Errors for the application server process occurred for the chosen day.
		Peak Receive Errors	Highest hourly Receive Errors for the application server process or the last 30 days.
		Peak Receive Hour	Hour in which the Peak Receive Errors for the application server process occurred for the chosen day.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Peaks	If Output Type is Graph, the Y-axis label shows daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

ASP MTP3 Statistics Daily Reports

MWTM displays the ASP MTP3 Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > ASP**.

Step 2 Choose ASP MTP3 Statistics Daily from the Type drop-down menu.

The Send Packets and Receive Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server process.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
ASP	Name of the application server process.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
ASP MTP3 Statistics Daily	Table, CSV	Node	Name of the node.
		Signaling Point	Name of the signaling point for the application server.
		AS	Name of the application server.
		ASP	Name of the application server process.
		Timestamp (*time zone*)	Timestamp of the report.
		Packets From MTP3	Total number of packets that the application server process receives from the MTP3 layer for the specified date.
		Peak From MTP3	Highest hourly Packets From MTP3 for the application server process for the specified date.
		Peak From Hour	Hour in which the Peak From MTP3 for the application server process occurred for the specified date. Click the hour to see the ASP Hourly Report for the chosen application server process and hour.
		Packets To MTP3	Total number of packets sent to the MTP3 layer by the application server process for the specified date.
		Peak To MTP3	Highest hourly Packets To MTP3 for the application server process for the specified date.
		Peak To Hour	Hour in which the Peak To MTP3 for the application server process occurred for the specified date.
		Send Errors	Total number of errors that occurred when sending packets to the MTP3 layer for the specified date.
		Peak Send Errors	Highest hourly Send Errors for the application server process for the specified date.
		Peak Send Hour	Hour in which the Peak Send Errors for the application server process occurred for the specified date.
		Receive Errors	Total number of errors that occurred when receiving packets from the MTP3 layer for the specified date.
		Peak Receive Errors	Highest hourly Receive Errors for the application server process for the specified date.
		Peak Receive Hour	Hour in which the Peak Receive Errors for the application server process occurred for the specified date. Click the hour to see the ASP Hourly Report for the chosen application server process and hour.

Report Type	Output	Field	Description
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Packets	If Output Type is Graph, the Y-axis label shows hourly statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

ASP MTP3 Peaks Statistics Daily Reports

MWTM displays the ASP MTP3 Peaks Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > ASP**.

Step 2 Choose ASP MTP3 Peaks Statistics Daily from the Type drop-down menu.

The Send Peak Packets and Receive Peak Packets tables contain summary information as described below:

Field	Description
Node	Name of the node for the application server process.
Signaling Point	Name of the signaling point for the application server.
Application Server	Name of the application server.
ASP	Name of the application server process.

Field	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
ASP MTP3 Peaks Statistics Daily	Table, CSV	Node	Name of the node.
		Signaling Point	Name of the signaling point for the application server.
		AS	Name of the application server.
		ASP	Name of the application server process.
		Timestamp (*time zone*)	Timestamp of the report.
		Peak From MTP3	Highest hourly Packets From MTP3 for the application server process for the specified date.
		Peak From Hour	Hour in which the Peak From MTP3 for the application server process occurred for the specified date.
		Peak To MTP3	Highest hourly Packets To MTP3 for the application server process for the specified date.
		Peak To Hour	Hour in which the Peak To MTP3 for the application server process occurred for the specified date.
		Peak Send Errors	Highest hourly Send Errors for the application server process for the specified date.
		Peak Send Hour	Hour in which the Peak Send Errors for the application server process occurred for the specified date.
		Peak Receive Errors	Highest hourly Receive Errors for the application server process for the specified date.
		Peak Receive Hour	Hour in which the Peak Receive Errors for the application server process occurred for the specified date.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Peaks	If Output Type is Graph, the Y-axis label shows peaks daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

GTT Rates Reports

You can view peak GTT rates or average GTT rates. The information is available in graphical, tabular, and CSV formats. There are two types of GTT rates reports:

- Peak utilization—Displays the maximum (or peak) GTT rates obtained during the specified period (for example, 15 minutes, hourly, daily).
- Average utilization—Displays the average values obtained during the specified period (for example, 15 minutes, hourly, daily).

Note The 15-minute and hourly reports for GTT Rates are available from the node level only; they are not available from the top level or the network level.

To generate a network-wide GTT reports:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > GTT Rates**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Note The Graph output displays up to twelve GTT Rates data streams based on traffic and/or number of errors. To view all GTT Rates data streams, choose Graph, Table, or CSV.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- GTT Rate Peak Daily Reports, page 13-66
- GTT Rate Average Daily Reports, page 13-67

GTT Rate Peak Daily Reports

GTT Rate Peak Daily Report displays the maximum (or peak) GTT rates obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > GTT Rates**.

Step 2 Choose GTT Rate Peak Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Slot/CPU	Slot number (if known) and CPU number.
CPU Description	Type of CPU.
Timestamp (*time zone*)	Timestamp of the report.
Average GTT Rate	Average GTT rate for the specified duration.
Maximum GTT Rate	Maximum GTT rate during the specified duration.
Minimum GTT Rate	Minimum GTT rate during the specified duration.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
GTT Rate Peak Daily Report	*Table*	Node	Name of the node for the object. You can click on a node name to see node-specific reports.
		Slot/CPU	Slot number (if known) and CPU number.
		CPU Description	Type of CPU.
		Average GTT Rate	Average GTT rate for the specified duration.
		Maximum GTT Rate	Maximum GTT rate during the specified duration.
		Maximum Date (*time zone*)	Timestamp when the maximum GTT rate occurred.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Global Title Translations /Sec	If Output Type is Graph, Y-axis label that shows the Global Title Translations per second. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.
		Server Time	If Output Type is Graph, X-axis label that shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, color-coded legend that shows labels for output.

GTT Rate Average Daily Reports

GTT Rate Average Daily Report displays the average values obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > GTT Rates**.

Step 2 Choose GTT Rate Average Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Slot/CPU	Slot number (if known) and CPU number.
CPU Description	Type of CPU.
Average GTT Rate	Average GTT rate for the specified duration.
Maximum GTT Rate	Maximum GTT rate during the specified duration.
Maximum Date (*time zone*)	Timestamp when the maximum utilization occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
GTT Rate Average Daily Report	*Table*	Node	Name of the node for the object. You can click on a node name to see node-specific reports.
		Slot/CPU	Slot number (if known) and CPU number.
		CPU Description	Type of CPU.
		Average GTT Rate	Average GTT rate for the specified duration.
		Maximum GTT Rate	Maximum GTT rate during the specified duration.
		Maximum Date (*time zone*)	Timestamp when the maximum GTT rate occurred.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Global Title Translations /Sec	If Output Type is Graph, Y-axis label that shows the Global Title Translations per second. **Note** If no data exists between any two data points, the graph displays a color-coded vertical bar to show the period for which no data is available.
		Server Time	If Output Type is Graph, X-axis label that shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, color-coded legend that shows labels for output.

Link Reports

You can view summary reports of hourly and daily statistics for links, and export the reports.

This section covers:

- Link Statistics Hourly Reports, page 13-69
- Link Statistics Daily Reports, page 13-72
- Link Peaks Statistics Daily Reports, page 13-76

Link Statistics Hourly Reports

You can view hourly summaries of statistics for all links or a specific link that the MWTM detected on the specified date and hour. The Link Hourly Report page shows summary reports of hourly link statistics by date and hour. You can also graph the results.

The Link Hourly Report table is sorted based on the information in the Send Average Utilization column; however, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Link**.

Step 2 In the tool bar of the right pane, from the Type drop-down menu, select Link Hourly Statistics. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

The Send Utilization and Receive Utilization tables contain summary information as described below:

Field or Column	Description
Node	Name of the node for the link.
Signaling Point	Name of the signaling point for the link.
Linkset	Linkset for the object.
SLC	ID of the link.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 6 Depending on what you select from the Output pulldown menu, the following information is displayed:

Field or Column	Description
Graph	
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Utilization %	If Output Type is Graph, the Y-axis label shows hourly statistics over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.
Table, CSV	
Node	Name of the node for the link.
SP Name	Name of the signaling point for the link.
Linkset Name	Linkset for the object.
SLC	ID of the link.
Timestamp (*time zone*)	Timestamp of the report.
Type	Type of link. Possible link types are: • **HSL**—Uses the SS7-over-ATM (Asynchronous Transfer Mode) high-speed protocol. • **SCTP**—Uses the Stream Control Transmission Protocol (SCTP) IP transport protocol. • **Serial**—Uses the serial SS7 signaling protocol. • **Virtual**—A virtual link that connects signaling point instances that run on the same node. The MWTM does not poll virtual links; nor does it display real-time data or accounting statistics for virtual links.
Hourly In-Service (%)	Percentage of time the link was in service on the specified date and hour.
Long Term In-Service (%)	Average percentage of time the link was in service since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data.
Congestion %	Percentage of time the link was congested on the specified date and hour.

Field or Column	Description
Send	• Average Utilization %—Average Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Long Term Average Utilization %—Long-term average Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • MSUs—Total number of MTP3 message signal units (MSUs) sent on the specified date and hour.
Receive	• Average Utilization %—Average Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Long Term Average Utilization %—Long-term average Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • MSUs—Total number of MTP3 message signal units (MSUs) received on the specified date and hour.

Link Statistics Daily Reports

You can view daily summaries of statistics for all links or for a specific link that the MWTM detected on the specified date and hour. The Link Daily Report page shows summary reports of daily link statistics by date and hour.

The Link Daily Report table is sorted based on the information in the Avg Send or Avg Send Erlangs column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Link**.

Step 2 In the tool bar of the right pane, from the Type drop-down menu, select Link Daily Statistics. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

The Send Utilization and Receive Utilization tables contain summary information as described below:

Field or Column	Description
Node	Name of the node for the link.
Signaling Point	Name of the signaling point for the link.
Linkset	Linkset for the object.
SLC	ID of the link.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 6 Depending on what you select from the Output pulldown menu, the following information is displayed:

Field or Column	Description
Graph	
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Utilization Percentage	If Output Type is Graph, the Y-axis label shows daily link statistics over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.
Table, CSV	
Node	Name of the node for the link.
SP Name	Name of the signaling point for the link.
Linkset Name	Linkset for the object.
SLC	ID of the link.
Timestamp (*time zone*)	Timestamp of the report
Type	Type of link. Possible link types are: • **HSL**—Uses the SS7-over-ATM (Asynchronous Transfer Mode) high-speed protocol. • **SCTP**—Uses the Stream Control Transmission Protocol (SCTP) IP transport protocol. • **Serial**—Uses the serial SS7 signaling protocol. • **Virtual**—A virtual link that connects signaling point instances that run on the same node. The MWTM does not poll virtual links; nor does it display real-time data or accounting statistics for virtual links.
Daily In-Service %	Percentage of time the link was in service on the specified date.
Long Term In-Service %	Average percentage of time the link was in service since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data.
Daily Low In-Service %	Lowest hourly in-service percentage for the link for the specified date.
Low Service Hour	Hour in which the lowest in-service percentage occurred for the specified date.
Avg Congestion %	Average percentage of time the link was congested on the specified date.

Field or Column	Description
Send	• Average Utilization %—Average Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Peak Utilization %—Highest Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Peak Hour—Hour in which the Peak Send for the link occurred for the specified date. Click the hour to see the Link Hourly Report for the chosen link and hour. • Long Term Average Utilization %—Long-term average Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • MSUs—Total number of MTP3 message signal units (MSUs) sent on the specified date and hour.
Receive	• Average Utilization %—Average Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Peak Utilization %—Highest Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Peak Hour—Hour in which the Peak Receive for the link occurred for the specified date. Click the hour to see the Link Hourly Report for the chosen link and hour. • Long Term Average Utilization %—Long-term average Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • MSUs—Total number of MTP3 message signal units (MSUs) received on the specified date and hour.

Link Peaks Statistics Daily Reports

You can view a daily link statistics peaks report using the Link Peaks Daily Report page. The peaks report shows peak values for each day and the hour in which each peak value occurred.

The Link Peaks Daily table is sorted based on the information in the Peak Send or Peak Send Erlangs column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Link**.

Step 2 In the tool bar of the right pane, from the Type drop-down menu, select Link Peaks Daily Statistics. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

The Send Utilization and Receive Utilization tables contain summary information as described below:

Field or Column	Description
Node	Name of the node for the link.
Signaling Point	Name of the signaling point for the link.
Linkset	Linkset for the object.
SLC	ID of the link.

Field or Column	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 6 Depending on what you select from the Output pulldown menu, the following information is displayed:

Field or Column	Description
Graph	
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Utilization %	If Output Type is Graph, the Y-axis label shows daily link statistics over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.
Table, CSV	
Node	Name of the node for the link.
SP Name	Name of the signaling point for the link.
Linkset Name	Linkset for the object.
SLC	ID of the link.
Timestamp (*time zone*)	Timestamp of the report
Type	Type of link. Possible link types are: • **HSL**—Uses the SS7-over-ATM (Asynchronous Transfer Mode) high-speed protocol. • **SCTP**—Uses the Stream Control Transmission Protocol (SCTP) IP transport protocol. • **Serial**—Uses the serial SS7 signaling protocol. • **Virtual**—A virtual link that connects signaling point instances that run on the same node. The MWTM does not poll virtual links; nor does it display real-time data or accounting statistics for virtual links.

Field or Column	Description
Send	• Peak Utilization—Highest Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Peak Hour—Hour in which the Peak Send for the link occurred for the specified date. Click the hour to see the Link Hourly Report for the chosen link and hour. • Long Term Average Utilization—Long-term average Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • MSUs—Total number of MTP3 message signal units (MSUs) sent on the specified date and hour.
Receive	• Peak Utilization—Highest Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • Peak Hour—Hour in which the Peak Receive for the link occurred for the specified date. Click the hour to see the Link Hourly Report for the chosen link and hour. • Long Term Average Utilization—Long-term average Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field. • MSUs—Total number of MTP3 message signal units (MSUs) received on the specified date and hour.

Link Multi-Day Report

The Link Multi-Day Report page shows send and receive percentages for all links for the last three or five days.

The Link Multi-Day table is sorted based on the information in the Avg Send column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Link Multi-Day**.

Step 2 In the tool bar of the right pane, from the Type pulldown menu, select Link Statistics Multi-Day. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

The information described in the following table is displayed for the duration you selected.

Note If there are less than five days of data available, the Link Multi-Day Report displays N/A for the days for which there is no data.

Field or Column	Description
Node	Name of the node for the link.
Network Name	Name of the network for the link.
Signaling Point	Name of the signaling point for the link.
Link	Name of the link.
Avg. Send Utilization (%)	Send for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for each of the last five days. If you do not set the planned send capacity for the SCTP link, then `NoCap` appears in the field.
Avg. Receive Utilization (%)	Receive for the link, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for each of the last five days. If you do not set the planned receive capacity for the SCTP link, then `NoCap` appears in the field.

Linkset Reports

You can view summary reports of hourly and daily statistics for linksets, and export the reports.

This section covers:

- Linkset Statistics Hourly Reports, page 13-81
- Linkset Statistics Daily Reports, page 13-84
- Linkset Peaks Statistics Daily Reports, page 13-87

Linkset Statistics Hourly Reports

You can view hourly summaries of statistics for all linksets or for a specific linkset that the MWTM detected on the specified date and hour. The Linkset Hourly Report page shows summary reports for all archived MWTM hourly linkset statistics by date and hour.

The Linkset Hourly Report table is sorted based on the information in the Send Utilization column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Linkset**.

Step 2 In the tool bar of the right pane, from the Type drop-down menu, select Linkset Hourly Statistics. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

The Send Utilization and Receive Utilization tables contain summary information as described below:

Field or Column	Description
Node	Name of the node for the linkset.
Signaling Point	Name of the signaling point for the linkset.
Linkset	Linkset for the object.

Field or Column	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 6 Depending on what you select from the Output pulldown menu, the following information is displayed:

Field or Column	Description
Graph	
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Utilization Percentage	If Output Type is Graph, the Y-axis label shows hourly linkset utilization over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.
Table, CSV	
Node	Name of the node for the linkset.
SP Name	Name of the signaling point for the linkset.
Linkset Name	Linkset for the object.
Timestamp (*time zone*)	Timestamp of the report.
Hourly In-Service (%)	Percentage of time the linkset was in service on the specified date.
Long Term In-Service (%)	Average percentage of time the linkset was in service since MWTM polling began for the link, or since the MWTM last reset the averages as a result of bad data.
Send Utilization (%)	Average Send for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned send capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.
Long Term Send Utilization (%)	Long-term average Send for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.
Receive Utilization (%)	Average Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned receive capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.
Long Term Receive Utilization (%)	Long-term average Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned receive capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.

Linkset Statistics Daily Reports

You can view daily summaries of statistics for all linksets or for a specific linkset that the MWTM detected on the specified date and hour. The Linkset Daily Report page shows summary reports of all archived MWTM daily linkset statistics by date and hour.

The Linkset Daily Report table is sorted based on the information in the Send Average column. You can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Linkset**.

Step 2 In the tool bar of the right pane, from the Type drop-down menu, select Linkset Daily Statistics. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

The Send Utilization and Receive Utilization tables contain summary information as described below:

Field or Column	Description
Node	Name of the node for the linkset.
Signaling Point	Name of the signaling point for the linkset.
Linkset	Linkset for the object.

Field or Column	Description
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 6 Depending on what you select from the Output pulldown menu, the following information is displayed:

Field or Column	Description
Graph	
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Utilization Percentage	If Output Type is Graph, the Y-axis label shows daily linkset statistics over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.
Table, CSV	
Date	Date of the report.
Node	Name of the node for the linkset.
SP Name	Name of the signaling point for the linkset.
Linkset Name	Linkset for the object.
Timestamp (*time zone*)	Timestamp of the report.
Daily In-Service (%)	Percentage of time the linkset was in service on the specified date.
Long Term In-Service (%)	Average percentage of time the linkset was in service since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data.
Daily Low In-Service (%)	Lowest hourly in-service percentage for the linkset for the specified date.
Low Service Hour	Hour in which the lowest in-service percentage occurred for the specified date.

Field or Column	Description
Send	• Average Utilization (%)—Average Send for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned receive capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field. • Peak Utilization (%)—Highest Send for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. • Peak Hour—Hour in which the Peak Send for the linkset occurred for the specified date. Click the hour to see the Link Hourly Report for all links associated with the chosen linkset for the chosen hour. • Long Term Average Utilization (%)—Long-term average Send for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.
Receive	• Average Utilization (%)—Average Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. If you do not set the planned receive capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field. • Peak Utilization (%)—Highest Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. • Peak Hour—Hour in which the Peak Receive for the linkset occurred for the specified date. Click the hour to see the Link Hourly Report for all links associated with the chosen linkset for the chosen hour. • Long Term Average Utilization (%)—Long-term average Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.

Linkset Peaks Statistics Daily Reports

You can view a linkset daily statistics peaks report using the Linkset Peaks Daily Report page. The peaks report shows peak values for each day and the hour in which each peak value occurred.

The Linkset Peaks Daily Report table is sorted based on the information in the Peak Send or Peak Send Erlangs column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > Linkset**.

Step 2 In the tool bar of the right pane, from the Type drop-down menu, select Linkset Peaks Daily Statistics. (See Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

The Send Utilization and Receive Utilization tables contain summary information as described below:

Field or Column	Description
Node	Name of the node for the linkset.
Signaling Point	Name of the signaling point for the linkset.
Linkset	Linkset for the object.
Send	• Average—Average Send for the statistic for the specified time. • Minimum—Minimum Send for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Minimum—Minimum Receive for the statistic for the specified time. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 6 Depending on what you select from the Output pulldown menu, the following information is displayed:

Field or Column	Description
Graph	
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Utilization Percentage	If Output Type is Graph, the Y-axis label shows daily linkset statistics over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.
Table, CSV	
Node	Name of the node for the linkset.
SP Name	Name of the signaling point for the linkset.
Linkset Name	Linkset for the object.
Timestamp (*time zone*)	Timestamp of the report.

Field or Column	Description
Send	• Peak Utilization %—Highest Send or Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. • Peak Hour—Hour in which the Peak Send or Peak Receive for the linkset occurred for the specified date. Click the hour to see the Link Hourly Report for all links associated with the chosen linkset for the chosen hour. • Long Term Average Utilization %—Long-term average Send or Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.
Receive	• Peak Utilization %—Highest Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command) for the specified date and hour. • Peak Hour—Hour in which the Peak Receive for the linkset occurred for the specified date. Click the hour to see the Link Hourly Report for all links associated with the chosen linkset for the chosen hour. • Long Term Average Utilization %—Long-term average Receive for the linkset, expressed as a percentage or number of Erlangs (E) (as set with the **mwtm webutil** command), since MWTM polling began for the linkset, or since the MWTM last reset the averages as a result of bad data. If you do not set the planned send capacity for one or more of the SCTP links associated with the linkset, then `NoCap` appears in the field.

MLR Reports

Multi-Layer SMS Routing, or MLR, is a routing scheme that enables intelligent routing of Short Message Service (SMS) mobile originated (MO) messages based on the application or service from which they originated or to which they are destined. The MLR feature can make SMS message routing decisions based on information found in the TCAP, MAP, and MAP-user layers; MAP operation codes MAP-MT-FORWARD-SM and SEND-ROUTING-INFO-FOR-SM; and ANSI TCAP and IS-41 MAP operations.

You can view a summary report of daily statistics for MLR. You can also export the reports.

Daily MLR Reports

You can view a summary report of MLR processed, aborts, continues, result invokes, rule matches, subtriggers, and triggers statistics for the MWTM on a specified date. The MLR *type* Daily Report page shows reports of all archived MWTM daily MLR processed, aborts, continues, result invokes, rule matches, subtriggers, and triggers by date.

These archived daily MLR reports are available:

- MLR Aborts Statistics Daily Reports, page 13-91
- MLR Continues Statistics Daily Reports, page 13-92
- MLR Processed Statistics Daily Reports, page 13-92
- MLR ResultInvokes Statistics Daily Reports, page 13-93
- MLR RuleMatches Statistics Daily Reports, page 13-94
- MLR SubTriggers Statistics Daily Reports, page 13-94
- MLR Triggers Statistics Daily Reports, page 13-95

MLR Aborts Statistics Daily Reports

The MLR Aborts Statistics Custom Report table is sorted based on the information in the Total Aborted column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.
Signaling Point	Name of the signaling point.
Total Aborted	Total number of MSUs aborted by MLR on the specified date.
No Resources	Number of MSUs aborted by MLR because of a shortage of resources on the specified date.
Results Blocked	Number of MSUs aborted by MLR with a result of **block** on the specified date.
GTI Mismatches	Number of MSUs aborted by MLR because of mis-matched GTIs on the specified date.
Address Conversion Failures	Number of MSUs aborted by MLR because of a failed GTA address conversion on the specified date.
Destination Unavailables	Number of MSUs aborted by MLR because the destination was unavailable on the specified date.
No Server Aborteds	Number of MSUs aborted by MLR because no server was available on the specified date.

MLR Continues Statistics Daily Reports

The MLR Continues Statistics Custom Report table is sorted based on the information in the Total Continued column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.
Signaling Point	Name of the signaling point.
Total Continued	Total number of MSUs returned to SCCP by MLR with a result of **continue** on the specified date.
Unsupported Message Type	Number of MSUs returned to SCCP by MLR because of unsupported message types on the specified date.
Unsupported Seg SCCP	Number of MSUs returned to SCCP by MLR because of unsupported SCCP segments on the specified date.
Unsupported Messages	Number of MSUs returned to SCCP by MLR because of parse failures resulting from unsupported messages on the specified date.
Parse Errors	Number of MSUs returned to SCCP by MLR because of parse errors on the specified date.
No Results	Number of MSUs returned to SCCP by MLR with no results on the specified date.
Result Continueds	Number of MSUs returned to SCCP by MLR with a result of **continue** on the specified date.
No Server Continueds	Number of MSUs returned to SCCP by MLR because no server was available on the specified date.
Result GTTs	Number of MSUs returned to SCCP by MLR with a result of **GTT** on the specified date.
Failed Triggers	Number of MSUs returned to SCCP by MLR because of no trigger match on the specified date.

MLR Processed Statistics Daily Reports

The MLR Processed Statistics Custom Report table is sorted based on the information in the Routed column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.
Signaling Point	Name of the signaling point.
Routed	Total number of packets routed by MLR on the specified date.
Total Continued	Total number of MSUs passed back to SCCP processing by MLR on the specified date.
Total Aborted	Total number of MSUs not processed by MLR because of invalid data or a blocked MSU.
MAP SMS-MOs	Number of MSUs of type GSM-MAP SMS-MO processed by MLR on the specified date.
MAP SMS-MTs	Number of MSUs of type GSM-MAP SMS-MT processed by MLR on the specified date.
MAP SRI-SMs	Number of MSUs of type GSM-MAP SRI-SM processed by MLR on the specified date.
MAP AlertScs	Number of MSUs of type GSM-MAP AlertSc processed by MLR on the specified date.
ANSI-41 SMD-PPs	Number of MSUs of type ANSI-41 SMD-PP processed by MLR on the specified date.
ANSI-41 SMS-Requests	Number of MSUs of type ANSI-41 SMSRequest processed by MLR on the specified date.
ANSI-41 SMS-Notifys	Number of MSUs of type ANSI-41 SMSNotify processed by MLR on the specified date.
Links	Contains links to related MLR reports (Aborts, Continues, Triggers, SubTriggers, RuleMatches, and ResultInvokes). The target report is filtered by the signaling point.

MLR ResultInvokes Statistics Daily Reports

The MLR ResultInvokes Statistics Custom Report table is sorted based on the information in the Invokes column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.

Field or Column	Description
Signaling Point	Name of the signaling point.
ResultSet	Name of the result set of which this result is a member.
Result Number	Number of this result in the result set.
Invokes	Total number of times this result was invoked.

MLR RuleMatches Statistics Daily Reports

The MLR RuleMatches Statistics Custom Report table is sorted based on the information in the Matches column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.
Signaling Point	Name of the signaling point.
RuleSet	Name of the rule set of which this rule is a member.
Rule Number	Number of this rule in the rule set.
Matches	Total number of times this rule was matched.

MLR SubTriggers Statistics Daily Reports

The MLR SubTriggers Statistics Custom Report table is sorted based on the information in the Matches column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.
Signaling Point	Name of the signaling point.
Trigger Index	Index number associated with the trigger.
Sub Trigger Index	Index number associated with the subtrigger.

Field or Column	Description
Action	Action taken by the subtrigger. Clicking on the ruleset name highlights the signaling point in the navigation tree and opens the MLR Trigger Config tab for the chosen ruleset.
Parameters	Parameters that control the behavior of the subtrigger.
Matches	Number of subtrigger matches with result **Action Performed**.

MLR Triggers Statistics Daily Reports

The MLR Triggers Statistics Custom Report table is sorted based on the information in the Matches column. However, you can sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the signaling point.
Network Name	Name of the network for the signaling point.
Signaling Point	Name of the signaling point.
Trigger Index	Index number associated with the trigger.
Action	Action taken by the trigger. Clicking on the ruleset name highlights the signaling point in the navigation tree and opens the MLR Trigger Config tab for the chosen ruleset.
Parameters	Parameters that control the behavior of the trigger.
Preliminary Matches	Preliminary count of trigger matches.
Matches	Number of trigger matches with result **Action Performed**.
Links	Contains links to related MLR SubTrigger reports. The target report is filtered by the signaling point.

MSU Rates Reports

You can view 15 minute, hourly, and daily MSU rates reports. You can also export the reports in CSV format.

This section covers:

- MSU Load Statistics Reports, page 13-96
- MSU Peaks Statistics Reports, page 13-96

MSU Load Statistics Reports

You can view a 15 minute, hourly, or daily report of MSU load rates for all nodes that the MWTM detected in that time. The MSU Load Report provides the distribution of send and receive MSU packets, pertaining to overload thresholds for every CPU.

The MSU Load Report tables are sorted based on the information in the Date column. However, you can sort the tables based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Date	Date of the report.
Node	Name of the node.
Processor Slot/Bay	Number of the processor and the number of the bay containing the processor. This number is set to zero when the platform does not support processors in multiple slots or bays.
Overloaded Threshold	Over this rate of traffic, MSU traffic handling may be impacted.
Duration % Send	Duration of time the send MSU rate is in the specified percentage.
Duration % Receive	Duration in time the receive MSU rate is in the specified percentage.

MSU Peaks Statistics Reports

You can view a 15 minute, hourly, or daily report of MSU peak rates for all nodes that the MWTM detected in that time. The MSU Peaks Report page provides information that helps you analyze the maximum send and receive rates for each processor in MSU units per second.

The MSU Peaks Report tables are sorted based on the information in the Send column. However, you can sort the tables based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Date	Date of the report.
Node	Name of the node.
Processor Slot/Bay	Number of the processor and the number of the bay containing the processor. This number is set to zero when the platform does not support processors in multiple slots or bays.
Max Rate (MSU/sec) Send	This value records the highest rate of MSUs per second sent by the processor since the measurement was cleared.
Max Rate (MSU/sec) Receive	This value records the highest rate of MSU per second received by the processor since the measurement was cleared.
Threshold (MSU/sec) Acceptable	Specifies a level of traffic below which traffic is considered to be acceptable. Once the traffic rate exceeds the Warning threshold, it is not Acceptable until traffic falls below this threshold.
Threshold (MSU/sec) Warning	Specifies a level of traffic that should be avoided, but is below a level that impacts MSU routing. Once the traffic rate exceeds the Overloaded threshold, it is not considered non-impacting until the traffic falls below this threshold.

Field or Column	Description
Threshold (MSU/sec) Overloaded	Specifies a level of traffic indicating a rate that might impact MSU routing.
Duration in Acceptable Threshold (Seconds) Send	Rate of traffic (in seconds) sent by this processor considered as acceptable.
Duration in Acceptable Threshold (Seconds) Receive	Rate of traffic (in seconds) received by this processor considered as acceptable.
Duration in Overloaded Threshold (Seconds) Send	Rate of traffic (in seconds) sent by this processor at a level that might impact MSU routing.
Duration in Overloaded Threshold (Seconds) Receive	Rate of traffic (in seconds) received by this processor at a level that might impact MSU routing.

SCTP Reports

The MWTM web interface provides node-level SCTP reports for performance and error statistics. The information is available in graphical, tabular, and CSV formats.

Note SCTP Reports are supported on ITP platforms only.

To generate a network-wide SCTP report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > SCTP**. You can also click on a node name, then select the Reports tab.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu:

- SCTP Performance Daily Reports, page 13-97
- SCTP Errors Daily Reports, page 13-99

Note The 15-minute and hourly reports for SCTP are available from the node level only; they are not available from the top level or the network level.

SCTP Performance Daily Reports

MWTM displays the SCTP performance rates obtained during the specified period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > ITP Statistics > SCTP**.

Note The 15-minute and hourly reports for SCTP are available from the node level only; they are not available from the top level or the network level. Click on a node name in the SCTP reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose SCTP Performance Daily from Type drop-down menu.

The Sent Packets and Receive Packets tables contain summary information as described below:

Field or Column		Description
Node		You can click on a node name to go to node-specific reports.
Send	Average Packets	Average SCTP packets sent.
	Maximum Packets	Maximum SCTP packets sent.
	Maximum Date (*time zone*)	Time when the maximum SCTP packets sent value occurred.
Receive	Average Packets	Average SCTP packets received.
	Maximum Packets	Maximum SCTP packets received.
	Maximum Date (*time zone*)	Time when the maximum SCTP packets received value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

GUI Element	Description
Graph	If you select **Graph** from the Output menu, the graph displays the SCTP send and receive packets rates over the specified time period.
Table	If you select **Table** from the Output menu, the table contains: • Node—Name of the node. • Timestamp (*time zone*)—Timestamp of the report. • Send – SCTP Packets—Number of SCTP packets sent to peers. – Control Chunks—Number of SCTP control chunks sent to peers (no transmissions included). – Ordered Chunks—Number of SCTP ordered data chunks sent to peers (no transmissions included). – Unordered Chunks—Number of SCTP unordered chunks (which are data chunks in which the U bit is set to one) sent to peers (no transmissions included). • Receive – SCTP Packets—Number of SCTP packets received from peers. – Control Chunks—Number of SCTP control chunks received from peers (no transmissions included). – Ordered Chunks—Number of SCTP ordered data chunks received from peers (no transmissions included). – Unordered Chunks—Number of SCTP unordered chunks (which are data chunks in which the U bit is set to one) received from peers (no transmissions included).
Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
Packets	If Output Type is Graph, the Y-axis label shows percentage of utilization over time.
Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

SCTP Errors Daily Reports

MWTM displays the SCTP error rates obtained during the specified period.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Statistics > SCTP**.

Note The 15-minute and hourly reports for SCTP are available from the node level only; they are not available from the top level or the network level. Click on a node name in the SCTP reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose SCTP Errors Daily from Type drop-down menu.

The summary table displays the following information:

Field or Column	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Unassociated Packets	Number of SCTP packets received by the host which are correctly formed but for which the receiver is not able to identify the association to which the packet belongs.
Checksum Errors	Number of SCTP packets received from peers with an invalid checksum.
Fragmented User Messages	Number of user messages that have to be fragmented because of the MTU.
Reassembled User Messages	Number of user messages reassembled.
Retransmitted Chunks	Number of SCTP chunks retransmitted due to the T3 timers expiring before the packet is acknowledged.
Retransmitted Chunks (Fast Recovery)	Number of SCTP chunks retransmitted using the fast-recovery retransmission mechanism specified in SCTP.
Destination Address Failures	Number of times a destination IP address was marked unavailable since the start of the association. The IP destination address will be marked unavailable when the specified number of retransmissions have failed.

Viewing Mobile Statistics Reports

Mobile Statistics Reports are located within **Reports > Mobile Statistics** in the MWTM web interface. You can also find Mobile statistics reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All reports are saved as export files in .csv format.

You can view any of the following Mobile statistics reports:

- CSG Reports, page 13-101
- GGSN Reports, page 13-123
- PDNGW Reports, page 13-146
- PDSN Reports, page 13-159
- SGW Reports, page 13-172

CSG Reports

The MWTM web interface provides node-level Content services reports. Content Service is a capability to examine IP/TCP/UDP headers, payload and enable billing based on the content being provided.

To generate a network-wide Content services report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Table or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- CSG BMA Statistics Daily Reports, page 13-102
- CSG Global Peaks Rates Daily Reports, page 13-103
- CSG Protocol Rates Daily Reports, page 13-104
- CSG Load Session Rates Daily Reports, page 13-105
- CSG Load Radius Rates Daily Reports, page 13-106
- CSG Load BMA Rates Daily Reports, page 13-107
- CSG Load User DB Rates Daily Reports, page 13-108
- CSG Load Gx Event Rates Daily Reports, page 13-109
- CSG Quota Manager Statistics Daily Reports, page 13-110
- CSG Billing Plan Statistics Daily Reports, page 13-111
- CSG Gx Global Message Statistics Daily Reports, page 13-112
- CSG Gx Global Message Errors Daily Reports, page 13-113
- CSG Gx PCRF Method List Message Statistics Daily Reports, page 13-114
- CSG Gx PCRF Method List Message Errors Daily Reports, page 13-115
- CSG Gx Policy Preload Statistics Daily Reports, page 13-116
- CSG Gx Policy Preload Errors Daily Reports, page 13-117
- CSG Gx Policy Preload Accounting Policy Statistics Daily Reports, page 13-118

- CSG Gx Policy Preload Billing Plan Statistics Daily Reports, page 13-119
- CSG Gx Policy Preload Billing Services Statistics Daily Reports, page 13-120
- CSG Gx Policy Preload Content Policy Statistics Daily Reports, page 13-121
- CSG Gx Policy Preload Service Content Statistics Daily Reports, page 13-122

CSG BMA Statistics Daily Reports

MWTM displays the CSG BMA Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG BMA Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG BMA Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG BMA Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Server	Name of the Server.
Port	Name of the Port.
VRF Name	Name of the VRF.
Timestamp (*time zone*)	Timestamp of the report.
Sent	Number of records sent to the billing mediation agent.
Sent Per Second	Number of records sent per second to the billing mediation agent.
Retransmits	Number of messages retransmitted to the billing mediation agent.
Failed Acks	Number of acknowledgments received from the billing mediation agent for which there are no outstanding requests.
Lost Records	Number of lost records since system initialization or the last time the counter wrapped.
Bad Records	Number of bad records received. These are records in which an error was detected while attempting to decode the contents.

CSG Global Peaks Rates Daily Reports

MWTM displays the CSG Global Peaks Rates Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Global Peaks Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Global Peaks Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Global Peaks Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Users	• Average—Average CSG rate for the specified duration. • Minimum—Minimum CSG rate during the specified duration. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum CSG rate during the specified duration. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Sessions	• Average—Average CSG rate for the specified duration. • Minimum—Minimum CSG rate during the specified duration. • Minimum Date (*time zone*)—Timestamp when the minimum value occurred. • Maximum—Maximum CSG rate during the specified duration. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
CSG Global Peak Rates Daily	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Time value occurred.
		Average Users	The average number of users using the network.
		Peak Users	The maximum number of users using the network.
		Average Sessions	The average number of sessions in the network.
		Peak Sessions	The maximum number of sessions in the network.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Peak Users/ Peak Sessions	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Utilization	If Output Type is Graph, a color-coded legend shows labels for utilization.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

CSG Protocol Rates Daily Reports

MWTM displays the CSG Protocol Rates Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Protocol Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Protocol Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Protocol Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Protocol	Name of the protocol.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Inspection Method	The type of inspection method applied in the network.
Transactions	• Count—Total number of transactions occurred in the network. • Rate—Number of transactions occurred in the network per second. • Peak—The highest number of transactions occurred in the network per second.
Subscriber Send Packets	• Count—Total number of outgoing subscriber packets. • Rate—Number of outgoing subscriber packets per second. • Peak—The highest number of outgoing subscriber packets per second.
Subscriber Send Bits	• Count—Total number of outgoing subscriber bits. • Rate—Number of outgoing subscriber bits per second. • Peak—The highest number of outgoing subscriber bits per second.
Network Send Packets	• Count—Total number of outgoing network packets. • Rate—Number of outgoing network packets per second. • Peak—The highest number of outgoing network packets per second.
Network Send Bits	• Count—Total number of outgoing network bits. • Rate—Number of outgoing network bits per second. • Peak—The highest number of outgoing network bits per second.

CSG Load Session Rates Daily Reports

MWTM displays the CSG Load Session Rates Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Load Session Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Load Session Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Load Session Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
IPC Queue Depth Tolerance	Maximum queue depth for Radius Start requests in the IPC queue.
Allowed	Number of outgoing Radius Start requests allowed.
Allowed Rate	Number of outgoing Radius Start requests allowed per second.
Allowed Peak	Number of outgoing Radius Start maximum requests allowed.
Denied	Number of outgoing Radius Start requests denied.
Denied Rate	Number of outgoing Radius Start requests denied per second.
Denied Peak	Number of outgoing Radius Start maximum requests denied.

CSG Load Radius Rates Daily Reports

MWTM displays the CSG Load Radius Rates Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Load Radius Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Load Radius Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Load Radius Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
IPC Queue Depth Tolerance	Maximum queue depth for Radius Start requests in the IPC queue.
Allowed	Number of outgoing Radius Start requests allowed.
Allowed Rate	Number of outgoing Radius Start requests allowed per second.
Allowed Peak	Number of outgoing Radius Start maximum requests allowed.
Denied	Number of outgoing Radius Start requests denied.
Denied Rate	Number of outgoing Radius Start requests denied per second.
Denied Peak	Number of outgoing Radius Start maximum requests denied.

CSG Load BMA Rates Daily Reports

MWTM displays the CSG Load BMA Rates Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Load BMA Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Load BMA Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Load BMA Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
IPC Queue Depth Tolerance	Maximum queue depth for Radius Start requests in the IPC queue.
Allowed	Number of outgoing Radius Start requests allowed.
Allowed Rate	Number of outgoing Radius Start requests allowed per second.
Allowed Peak	Number of outgoing Radius Start maximum requests allowed.
Denied	Number of outgoing Radius Start requests denied.
Denied Rate	Number of outgoing Radius Start requests denied per second.
Denied Peak	Number of outgoing Radius Start maximum requests denied.

CSG Load User DB Rates Daily Reports

MWTM displays the CSG Load User DB Rates Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Load User DB Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Load User DB Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Load User DB Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
IPC Queue Depth Tolerance	Maximum queue depth for Radius Start requests in the IPC queue.
Allowed	Number of outgoing Radius Start requests allowed.
Allowed Rate	Number of outgoing Radius Start requests allowed per second.
Allowed Peak	Number of outgoing Radius Start maximum requests allowed.
Denied	Number of outgoing Radius Start requests denied.
Denied Rate	Number of outgoing Radius Start requests denied per second.
Denied Peak	Number of outgoing Radius Start maximum requests denied.

CSG Load Gx Event Rates Daily Reports

MWTM displays the CSG Load Gx Event Rates Daily report, obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Load Gx Event Rates reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Load Gx Event Rates reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Load Gx Event Rates Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
IPC Queue Depth Tolerance	Maximum queue depth for Radius Start requests in the IPC queue.
Allowed	• Count—Number of outgoing Radius Start requests allowed. • Rate—Number of outgoing Radius Start requests allowed per second. • Peak—Number of outgoing Radius Start maximum requests allowed.
Denied	• Count—Number of outgoing Radius Start requests denied. • Rate—Number of outgoing Radius Start requests denied per second. • Peak—Number of outgoing Radius Start maximum requests denied.

CSG Quota Manager Statistics Daily Reports

MWTM displays the CSG Quota Manager Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Quota Manager Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Quota Manager Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Quota Manager Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Server	Name of the Server.
Port	Name of the Port.
VRF Name	Name of the VRF.
Timestamp (*time zone*)	Timestamp of the report.
Sent	Number of records sent to the billing mediation agent.
Sent Per Second	Number of records sent per second to the billing mediation agent.
Retransmits	Number of messages retransmitted to the billing mediation agent.
Failed Acks	Number of acknowledgments received from the billing mediation agent for which there are no outstanding requests.
Lost Records	Number of lost records since system initialization or the last time the counter wrapped.
Bad Records	Number of bad records received. These are records in which an error was detected while attempting to decode the contents.

CSG Billing Plan Statistics Daily Reports

MWTM displays the CSG Billing Plan Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Billing Plan Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Billing Plan Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Billing Plan Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Billing Plan Name	Name of the billing plan.
Subscriber Count	Number of subscribers associated with a given Billing Plan.
Peak Subscriber Count	The highest number of subscribers associated with a given Billing Plan.

CSG Gx Global Message Statistics Daily Reports

MWTM displays the CSG Gx Global Message Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Global Message Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Global Message Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Global Message Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Active Sessions	Number of sessions which are in active state.
Credit Control Request	**Initial Messages Sent** • Count—Number of CCR-Initial messages sent. • Rate—Rate at which the CCR-Initial messages are sent. **Update Messages Sent** • Count—Number of CCR-Update messages sent. • Rate—Rate at which the CCR-Update messages are sent. **Final Messages Sent** • Count—Number of CCR-Final messages sent. • Rate—Rate at which the CCR-Final messages are sent.
Credit Control Answer Messages Received	• Count—Number of CCA received. • Rate—Rate at which the CCA are received.
Reauthorization	**Request Messages Received** • Count—Number of RRR received. • Rate—Rate at which the RRR are received. **Answer Messages Sent** • Count—Number of RAR sent. • Rate—Rate at which the RAR sent.

CSG Gx Global Message Errors Daily Reports

MWTM displays the CSG Gx Global Message Errors Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Global Message Errors reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Global Message Errors reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Global Message Errors Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Invalid Message Type Errors	Number of invalid message type errors.
Duplicate Request Errors	Number of duplicate request type errors.
Credit Control	• Response Failures—Number of Failures to send CCR. • Answer Errors—Number of errors occurred in CCA.
Reauthorization Answer Failures	• Answer Failures—Number of failures to send CCA. • Response Errors—Number of failures occurred in RAR
Invalid Request	• Type Errors—Number of errors due to invalid request type. • Number Errors—Number of errors due to invalid request number. • Status Errors—Number of errors due to invalid request status.
Invalid Session ID Errors	Number of times the session id received does not exist.

CSG Gx PCRF Method List Message Statistics Daily Reports

MWTM displays the CSG Gx PCRF Method List Message Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx PCRF Method List Message Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx PCRF Method List Message Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx PCRF Method List Message Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Method List Name	Method list name.
Timestamp (*time zone*)	Timestamp of the report.
Active Sessions	Number of sessions which are in active state.
Credit Control Request	**Initial Messages Sent** • Count—Number of CCR-Initial messages sent. • Rate—Rate at which the CCR-Initial messages are sent. **Update Messages Sent** • Count—Number of CCR-Update messages sent. • Rate—Rate at which the CCR-Update messages are sent. **Final Messages Sent** • Count—Number of CCR-Final messages sent. • Rate—Rate at which the CCR-Final messages are sent.
Credit Control Answer Messages Received	• Count—Number of CCA received. • Rate—Rate at which the CCA are received.
Reauthorization	**Request Messages Received** • Count—Number of RRR received. • Rate—Rate at which the RRR are received. **Answer Messages Sent** • Count—Number of RAR sent. • Rate—Rate at which the RAR sent.

CSG Gx PCRF Method List Message Errors Daily Reports

MWTM displays the CSG Gx PCRF Method List Message Errors Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx PCRF Method List Message Errors reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx PCRF Method List Message Errors reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx PCRF Method List Message Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Method List Name	Method list name.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
PCRF Reboots	Number of times PCRF reboots.
Invalid Message Type Errors	Number of invalid message type errors.
Duplicate Request Errors	Number of duplicate request type errors.
Credit Control Response	• Response Failures—Number of Failures to send CCR. • Answer Errors—Number of errors occurred in CCA.
Reauthorization	• Answer Failures—Number of failures to send CCA. • Response Errors—Number of failures occurred in RAR
Invalid Request	• Type Errors—Number of errors due to invalid request type. • Number Errors—Number of errors due to invalid request number. • Status Errors—Number of errors due to invalid request status.
Invalid Session ID Errors	Number of times the session id received does not exist.

CSG Gx Policy Preload Statistics Daily Reports

MWTM displays the CSG Gx Policy Preload Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the Gx Policy Preload Daily Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
PCEF Initiated Preloading	Number of PCEF initiated preloading
PCRF Initiated Preloading	Number of PCRF initiated preloading
Policy Preload Requests	Number of Policy Preload requests.
Policy Preload Responses	Number of Policy Preload responses.
Global Policy Push Count	Number of Global Policy Push.
Global Policy Push Acknowledgement	Number of Global Policy Push Acknowledgements.

CSG Gx Policy Preload Errors Daily Reports

MWTM displays the CSG Gx Policy Preload Errors Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Errors Daily Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Policy Preload Errors Daily reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Errors Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Preload Data Inconsistent	Number of times the preload data is inconsistent.
Attribute Value Pairs Missing	Number of times the mandatory AVPs are missing
Wrong Order Failures	Number of failures due to wrong order.
Enforcement Failures	Number of failures to enforce.
Static Configuration Conflicts	Number of conflicts with static config.
Invalid Message Type Errors	Number of invalid message type errors.
Credit Control	• Request Failures—Number of times failed to send CCR. • Answer Errors—Number of errors occurred in CCA.
Reauthorization	• Answer Failures—Number of times failed to send RAA. • Response Errors—Number of errors occurred in RAR.
Invalid Request	• Type Errors—Number of errors due to invalid request type. • Number Errors—Number of errors due to invalid request number. • Status Errors—Number of errors due to invalid request status.
Invalid Session ID Errors	Number of times the session id received does not exist.
Preload Timeout Errors	Number of times the preload timeout occurs.

CSG Gx Policy Preload Accounting Policy Statistics Daily Reports

MWTM displays the CSG Gx Policy Preload Accounting Policy Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Accounting Policy Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Policy Preload Accounting Policy Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Errors Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Accounting Policy	• Inserted—Number of accounting policy-maps inserted during preload. • Deleted—Number of accounting policy-maps deleted during preload. • Rolled Back—Number of times rollback is successful on insertion/deletion of accounting policy-maps during preload. • Insert Failed —Number of times insertion of accounting policy-maps has failed. • Delete Failed—Number of times deletion of accounting policy-maps has failed. • Roll Back Failed—Number of times rollback has failed on insertion/deletion of accounting policy-maps during preload.

CSG Gx Policy Preload Billing Plan Statistics Daily Reports

MWTM displays the CSG Gx Policy Preload Billing Plan Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Billing Plan Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Policy Preload Billing Plan Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Billing Plan Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Billing Plans	• Inserted—Number of billing-plans inserted during preload. • Deleted—Number of billing-plans deleted during preload. • Rolled Back—Number of times rollback is successful on insertion/deletion of billing-plans during preload. • Insert Failed —Number of times insertion of billing-plans has failed. • Delete Failed—Number of times deletion of billing-plans has failed. • Roll Back Failed—Number of times rollback has failed on insertion/deletion of billing-plans during preload.

CSG Gx Policy Preload Billing Services Statistics Daily Reports

MWTM displays the CSG Gx Policy Preload Billing Services Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Billing Services Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Policy Preload Billing Services Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Billing Services Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Billing Services	• Inserted—Number of billing-services inserted during preload. • Deleted—Number of billing-services deleted during preload. • Rolled Back—Number of times rollback is successful on insertion/deletion of billing-services during preload. • Insert Failed —Number of times insertion of billing-services has failed. • Delete Failed—Number of times deletion of billing-services has failed. • Roll Back Failed—Number of times rollback has failed on insertion/deletion of billing-services during preload.

CSG Gx Policy Preload Content Policy Statistics Daily Reports

MWTM displays the CSG Gx Policy Preload Content Policy Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Content Policy Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Policy Preload Content Policy Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Content Policy Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Content Policies	• Inserted—Number of content-policies inserted during preload. • Deleted—Number of content-policies deleted during preload. • Rolled Back—Number of times rollback is successful on insertion/deletion of content-policies during preload. • Insert Failed —Number of times insertion of content-policies has failed. • Delete Failed—Number of times deletion of content-policies has failed. • Roll Back Failed—Number of times rollback has failed on insertion/deletion of billing-services during preload.

CSG Gx Policy Preload Service Content Statistics Daily Reports

MWTM displays the CSG Gx Policy Preload Service Content Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > CSG**.

Note The 15-minute and hourly CSG Gx Policy Preload Service Content Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the CSG Gx Policy Preload Service Content Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose CSG Gx Policy Preload Service Content Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Service Contents	• Inserted—Number of service-contents inserted during preload. • Deleted—Number of service-contents deleted during preload. • Rolled Back—Number of times rollback is successful on insertion/deletion of service-contents during preload. • Insert Failed —Number of times insertion of service-contents has failed. • Delete Failed—Number of times deletion of service-contents has failed. • Roll Back Failed—Number of times rollback has failed on insertion/deletion of service-contents during preload.

GGSN Reports

The MWTM web interface provides node-level GGSN reports. To generate a network-wide GGSN report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > GGSN**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 If available, choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- APN Aggregate Miscellaneous Statistics Daily Reports, page 13-124
- APN Aggregate PDP/Bearer Statistics Daily Reports, page 13-127
- APN Aggregate PDP/Bearer Extended Statistics Daily Reports, page 13-130
- APN Aggregate Throughput Statistics Daily Reports, page 13-132
- APN Instance Miscellaneous Statistics Daily Reports, page 13-136
- APN Instance PDP/Bearer Statistics Daily Reports, page 13-136
- APN Instance PDP/Bearer Extended Statistics Daily Reports, page 13-136
- APN Instance Throughput Statistics Daily Reports, page 13-136

- GTP Active Statistics Daily Reports, page 13-136
- GTP Charging Statistics Daily Reports, page 13-138
- GTP Error Statistics Daily Reports, page 13-141
- GTP PDP Statistics Daily Reports, page 13-142
- GTP Throughput Statistics Daily Reports, page 13-143

Note The 15-minute and hourly reports for GGSN are available from the node level only; they are not available from the top level or the network level.

APN Aggregate Miscellaneous Statistics Daily Reports

MWTM displays the APN Aggregate Miscellaneous Statistics Daily report obtained during the specified period.

Note The same column names are displayed for **APN Instance Miscellaneous Statistics Daily Reports** with the addition of the column Node. Also, the same column names are displayed for APN Aggregate Miscellaneous Statistics Daily Reports of GGSN and PDNGW reports.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN or PDNGW***

Note The 15-minute and hourly reports for APN Aggregate Miscellaneous Statistics and APN Instance Miscellaneous Statistics are available from the node level only; they are not available from the top level or the network level. Click on a node name in the APN Aggregate Miscellaneous Statistics or in the APN Instance Miscellaneous Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose APN Aggregate Miscellaneous Statistics Daily (or APN Instance Miscellaneous Statistics Daily) from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
APN	The name of the Access Point Name (APN).
Average Redirected Inter Mobile Traffic	Average of packets, pertaining to inter mobile communication, that have been redirected to device specified by cgprsAccPtRedirInterMobilAddr.
Maximum Redirected Inter Mobile Traffic	Maximum number of packets, pertaining to inter mobile communication, that have been redirected to device specified by cgprsAccPtRedirInterMobilAddr.
Maximum Date (*time zone*)	Time the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
APN Aggregate Miscellaneous Statistics Daily (or APN Instance Miscellaneous Statistics Daily)	Table, CSV	APN Name	The name of the Access Point Name (APN).
		Timestamp (*time zone*)	Timestamp of the report.
		DHCP Requests Success	• Count—Number of DHCP request packets. • Rate—Rate at which DHCP packets are requested. • Ratio—Ratio of DHCP successful request packets.
		DHCP Requests Failure	• Count—Number of DHCP failure packets. • Rate—Rate at which DHCP packets are declined.
		DHCP Releases	• Count—Number of DHCP released packets. • Rate—Rate at which DHCP packets released.
		COA Message Success	• Count—Number of COA messages received at GGSN or PDNGW. • Rate—Rate at which COA messages received at GGSN or PDNGW. • Ratio—Ratio of COA messages received at GGSN or PDNGW.
		COA Message Failure	• Count—Number of Error indication messages received on the GGSN or PDNGW. • Rate—Rate at which Error indication messages received on the GGSN or PDNGW.
		Direct Tunnels Enabled	• Count—Direct tunnels enabled for the PDP contexts in the GGSN or PDNGW. • Rate—Rate at which the direct tunnels are enabled for the PDP contexts in the GGSN or PDNGW.
		Redirected Inter Mobile Traffic	• Count—Total number of packets, pertaining to inter mobile communication, that have been redirected to device specified by cgprsAccPtRedirInterMobilAddr. • Rate—Rate of packets, pertaining to inter mobile communication, that have been redirected to device specified by cgprsAccPtRedirInterMobilAddr.

Report Type	Output	Field	Description
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Redirected Inter Mobile Traffic	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

APN Aggregate PDP/Bearer Statistics Daily Reports

MWTM displays the APN Aggregate PDP/Bearer Statistics Daily report obtained during the specified period.

Note The same column names are displayed for **APN Instance PDP/Bearer Statistics Daily Reports** with the addition of the column Node. Also, the same column names are displayed for APN Aggregate PDP/Bearer Statistics Daily Reports of GGSN and PDNGW reports.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN or PDNGW***.

Note The 15-minute and hourly reports for APN Aggregate PDP/Bearer Statistics and APN Instance PDP/Bearer Statistics are available from the node level only; they are not available from the top level or the network level. Click on a node name in the APN Aggregate PDP/Bearer Statistics reports or in the APN Instance PDP/Bearer Statistics to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose APN Aggregate PDP/Bearer Statistics Daily (or APN Instance PDP/Bearer Statistics Daily) from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
APN	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Average Active PDP/Bearer Contexts	Average Number of PDP/Bearer contexts that are currently established on the GGSN or PDNGW devices.
Maximum Active PDP/Bearer Contexts	Maximum Number of PDP/Bearer contexts that are currently established on the GGSN or PDNGW devices.
Maximum Date (*time zone*)	Time the maximum value occurred.
Average PDP/Bearer Activation Success Ratio	Average ratio of PDP/Bearer context request messages received by the GGSN or PDNGW devices.
Maximum PDP/Bearer Activation Success Ratio	Maximum ratio of PDP/Bearer context request messages received by the GGSN or PDNGW devices.
Maximum Date (*time zone*)	Time the maximum value occurred.
Average PDP/Bearer Retainability Ratio	Average ratio of PDP/Bearer context messages retained by the GGSN or PDNGW devices.
Maximum PDP/Bearer Retainability Ratio	Maximum ratio of PDP/Bearer context messages retained by the GGSN or PDNGW devices.
Maximum Date (*time zone*)	Time the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
APN Aggregate PDP/Bearer Statistics Daily (or APN Instance PDP/Bearer Statistics Daily)	Table, CSV	APN Name	The name of the Access Point Name (APN).
		APN Index	A unique numerical identifier for the APN.
		Timestamp (*time zone*)	Timestamp of the report.
		Active PDP/Bearers	• Count—Number of active PDP contexts or Bearers on this APN.
		PDP/Bearer Activation by MS Success	• Count—Total number of successfully completed PDP context/Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed PDP context/Bearer activation procedures by the MS on this APN. • Ratio—Number of successful activations for every 100 activation attempts.
		PDP/Bearer Activation by MS Failure	• Count—Total number of failed PDP context/Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of failed PDP context/Bearer activation procedures by the MS on this APN.
		PDP/Bearer Deactivations by Network Success	• Count—Total number of successfully completed PDP context/Bearer deactivation procedures by the GGSN or PDNGW on this APN. • Rate—Rate (per second) of successfully completed PDP context/Bearer deactivation procedures by the GGSN or PDNGW on this APN.
		PDP/Bearer Deactivations by Network Failure	• Count—Total number of failed PDP context/Bearer deactivation procedures by the GGSN or PDNGW on this APN. • Rate—Rate (per second) of failed PDP context/Bearer deactivation procedures by the GGSN or PDNGW on this APN.
		PDP/Bearer Retainability	• Ratio—For every 100 PDP contexts/Bearers, the number of activations whose deactivation was not completed by the network.

Report Type	Output	Field	Description
		PDP/Bearer Deactivations by MS Success	• Count—Total number of successfully completed PDP context/Bearer deactivation procedures by the MS on this APN. • Rate—Rate (per second) of successfully completed PDP context/Bearer deactivation procedures by the MS on this APN. • Ratio—Number of successful deactivations for every 100 deactivation attempts.
		PDP/Bearer Deactivations by MS Failure	• Count—Total number of failed PDP context/Bearer deactivation procedures by the MS on this APN. • Rate—Rate (per second) of failed PDP context/Bearer deactivation procedures by the MS on this APN.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Active PDP/Bearer Contexts/ PDP/Bearer Activation Success Ratio PDP/Bearer Retainability Ratio	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

APN Aggregate PDP/Bearer Extended Statistics Daily Reports

MWTM displays the APN Aggregate PDP/Bearer Extended Statistics Daily report obtained during the specified period.

Note The same column names are displayed for **APN Instance PDP/Bearer Extended Statistics Daily Reports** with the addition of the column Node. Also, the same column names are displayed for APN Aggregate PDP/Bearer Extended Statistics Daily Reports of GGSN and PDNGW reports.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN or PDNGW***.

Note The 15-minute and hourly reports for APN Aggregate PDP/Bearer Extended Statistics and APN Instance PDP/Bearer Extended Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the APN Aggregate PDP/Bearer Extended Statistics reports or in the APN Instance PDP/Bearer Extended Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose APN Aggregate PDP/Bearer Extended Statistics Daily (or APN Instance PDP/Bearer Extended Statistics Daily) from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
APN Name	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Timestamp (*time zone*)	Timestamp of the report.
Dynamic PDP/Bearer Activations By MS Success	• Count—Total number of successfully completed dynamic PDP/Bearer context activation procedures initiated by MS on this APN. • Rate—Rate (per second) of successfully completed dynamic PDP/Bearer context activation procedures initiated by MS on this APN. • Ratio—Number of successful dynamic activations for every 100 dynamic activation attempts.
Dynamic PDP/Bearer Activations By MS Failure	• Count—Total number of failed dynamic PDP/Bearer context activation procedures initiated by MS on this APN. • Rate—Rate (per second) of failed dynamic PDP/Bearer context activation procedures initiated by MS on this APN.
PDP/Bearer Activations By Network Success	• Count—Total number of successfully completed network initiated PDP/Bearer context activation procedures. • Rate—Rate (per second) of successfully completed network initiated PDP/Bearer context activation procedures. • Ratio—Number of successful network initiated activations for every 100 activation attempts.

Field	Description
PDP/Bearer Activations By Network Failure	• Count—Total number of failed network initiated PDP/Bearer context activation procedures. • Rate—Rate (per second) of failed network initiated PDP/Bearer context activation procedures.
PDP/Bearer Updates By Network Success	• Count—Total number of successful update responses received from the SGSN for GGSN or PDNGW initiated update requests on this APN. • Rate—Rate (per second) of successful update responses received from the SGSN for GGSN or PDNGW initiated update requests on this APN. • Ratio—Number of successful update responses received for every 100 update attempts.
PDP/Bearer Updates By Network Failure	• Count—Total number of failed update responses received from the SGSN for GGSN or PDNGW initiated update requests on this APN. • Rate—Rate (per second) of failed update responses received from the SGSN for GGSN or PDNGW initiated update requests on this APN.
Dedicated Bearer Activations Success	• Count—Total number of successful dedicated bearer activation procedures received on this APN. • Rate—Rate (per second) of successful dedicated bearer activation procedures received on this APN. • Ratio—Number of successful dedicated bearer activation procedures for every 100 activation attempts.
Dedicated Bearer Activations Failure	• Count—Total number of unsuccessful dedicated bearer activation procedures received on this APN. • Rate—Rate (per second) of unsuccessful dedicated bearer activation procedures received on this APN.

APN Aggregate Throughput Statistics Daily Reports

MWTM displays the APN Aggregate Throughput Statistics Daily report obtained during the specified period.

Note The same column names are displayed for **APN Instance Throughput Statistics Daily Reports** with the addition of the column Node. Also, the same column names are displayed for APN Aggregate Throughput Statistics Daily Reports of GGSN, PDNGW, and SGW reports.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN, PDNGW, or SGW***.

Note The 15-minute and hourly reports for APN Aggregate Throughput Statistics and APN Instance Throughput Statistics are available from the node level only; they are not available from the top level or the network level. Click on a node name in the APN Aggregate Throughput Statistics reports or in the APN Instance Throughput Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose APN Aggregate Throughput Statistics Daily (APN Instance Throughput Statistics Daily) from the Type drop-down menu.

A summary table displays the information described in the following table:

GUI Element	Field	Description
	APN	The name of the Access Point Name (APN).
	APN Index	A unique numerical identifier for the APN.
Upstream Bits	Average Rate	Average Rate during the specified duration.
	Maximum Rate	Maximum Rate during the specified duration.
	Maximum Date (*time zone*)	Timestamp that shows time when the maximum bits-per-second value occurred.
Downstream Bits	Average Rate	Average Rate during the specified duration.
	Maximum Rate	Maximum Rate during the specified duration.
	Maximum Date (*time zone*)	Timestamp that shows time when the maximum bits-per-second value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
APN Aggregate Throughput Statistics Daily (or APN Instance Throughput Statistics Daily)	Table, CSV	APN Name	The name of the Access Point Name (APN).
		APN Index	The Unique identifier for the Access Point Name.
		Timestamp (*time zone*)	Timestamp of the report.
		Upstream Bits	• Count—Number of upstream bytes sent on this APN during the last sampling period. • Rate—Rate (per second) of upstream bytes sent on this APN during the last sampling period.
		Downstream Bits	• Count—Number of downstream bytes sent on this APN during the last sampling period. • Rate—Rate (per second) of downstream bytes sent on this APN during the last sampling period.
		Upstream Packets	• Count—Number of upstream packets sent on this APN during the last sampling period. • Rate—Rate (per second) of upstream packets sent on this APN during the last sampling period.
		Downstream Packets	• Count—Number of downstream packets sent on this APN during the last sampling period. • Rate—Rate (per second) of downstream packets sent on this APN during the last sampling period.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Upstream Throughput Rate/Downstream Throughput Rate	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

APN Instance Miscellaneous Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate Miscellaneous Statistics Daily report with the addition of the column Node. See APN Aggregate Miscellaneous Statistics Daily Reports, page 13-124.

APN Instance PDP/Bearer Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate PDP/Bearer Statistics Daily report with the addition of the column Node. See APN Aggregate PDP/Bearer Statistics Daily Reports, page 13-127.

APN Instance PDP/Bearer Extended Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate PDP/Bearer Extended Statistics Daily report with the addition of the column Node. See APN Aggregate PDP/Bearer Extended Statistics Daily Reports, page 13-130.

APN Instance Throughput Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate Throughput Statistics Daily report with the addition of the column Node. See APN Aggregate Throughput Statistics Daily Reports, page 13-132.

GTP Active Statistics Daily Reports

MWTM displays the GTP Active Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > GGSN**.

Note The 15-minute and hourly GTP Active Statistics (GGSN) reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Active Statistics (GGSN) reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Active Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Average Active Sessions	Average sessions which are in active state.
Maximum Active Sessions	Maximum sessions which are in active state.

Field	Description
Maximum Date (*time zone*)	Timestamp when the maximum value occurred.
Average GTP v0 PDP Contexts	Average PDP contexts (GTP version 0) that are active.
Maximum GTP v0 PDP Contexts	Maximum PDP contexts (GTP version 0) that are active.
Maximum Date (*time zone*)	Timestamp when the maximum value occurred.
Average GTP v1 PDP Contexts	Average PDP contexts (GTP version 1) that are active.
Maximum GTP v1 PDP Contexts	Maximum PDP contexts (GTP version 1) that are active.
Maximum Date (*time zone*)	Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
GTP Active Statistics Daily	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		Active Sessions	Total number of sessions currently established with the system.
		Direct Tunnel PDP Contexts	Direct tunnels enabled for the PDP contexts in the GGSN.
		GTP v0 PDP Contexts	PDP contexts (GTP version 0) that are active.
		GTP v1 PDP Contexts	PDP contexts (GTP version 1) that are active.
		PPP Regen PDPs	Device-specific interfaces created for association with PDP contexts regenerated to a Point-to-Point (PPP) session.
		PPP PDPs	Total number of point to point PDP contexts.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Active Sessions/ GTP v0 PDP Contexts/ GTP v1 PDP Contexts	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.

GTP Charging Statistics Daily Reports

MWTM displays the GTP Charging Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Note The same column names are displayed for GTP Throughput Statistics Daily Reports of GGSN, PDNGW, and SGW reports.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN, PDNGW, or SGW***.

Note The 15-minute and hourly GTP Charging Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Charging Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node. At the Node level, the summary table contains the additional columns - Data Type, Minimum, and Minimum Date (*time zone*).

Step 2 Choose GTP Charging Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
CDR Messages Pending	• Average—Average Send for the statistic for the specified time. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
CDR Messages Sent	• Average—Average Receive for the statistic for the specified time. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
GTP Charging Statistics Daily	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		Current Containers	The number of currently open or closed charging containers.
		Current CDRs	• Open—The number of currently opened G-CDRs on the GGSN, PDNGW, or SGW. • Closed—The number of currently closed G-CDRs on the GGSN, PDNGW, or SGW which have not been sent to the CG.
		CDR Messages Pending	• Count—The number of currently pending G-CDR output messages.
		CDR Messages Sent	• Count—The number of transmitted G-CDR output messages since the charging service is enabled. • Rate—Rate of transmitted G-CDR output messages since the charging service is enabled.
		CDRs Opened	• Count—Total number of CDRs opened on the GGSN, PDNGW, or SGW either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of CDRs opened on the GGSN, PDNGW, or SGW either since system startup or since the last time the charging statistics was cleared.
		Containers Created	• Count—Total number of containers created on the GGSN, PDNGW, or SGW either since system startup or since the last time the charging statistics was cleared. • Rate—Rate of containers created on the GGSN, PDNGW, or SGW either since system startup or since the last time the charging statistics was cleared.
		Service Records Created	• Count—Total number of service records created on the GGSN, PDNGW, or SGW either since the system startup or since the time the service aware feature is enabled. • Rate—Rate of service records created on the GGSN, PDNGW, or SGW either since the system startup or since the time the service aware feature is enabled.

Report Type	Output	Field	Description
		Total Unique APNs	• Count—The number of access points for which charging data is being collected. • Rate—Rate of access points for which charging data is being collected.
		Charging Gateway Down Times	• Count—The number of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup. • Rate—Rate of occurrences of cgprsCgAlarmEchoFailure traps state transitions since system startup.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		CDR Messages Pending/CDR Messages Sent	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.

GTP Error Statistics Daily Reports

MWTM displays the GTP Error Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > GGSN**.

Note The 15-minute and hourly GTP Error Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Error Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Error Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
PDP Context Activations	• Insufficient Resources Rejection—Number of PDP context requests rejected due to insufficient resources.
PDP Context Requests	• PPP Regeneration Insufficient Resources Rejection—PDP context requests rejected due to insufficient resources for PPP regeneration. • PPP Regeneration Threshold Limit Drops—Number of PDP context requests dropped due to the PPP regeneration threshold limit.
PDP Context Messages	• TFT Semantic Errors—Total number of received PDP context messages that had Traffic Flow Templates (TFT) with semantic errors. • TFT Syntax Errors—Total number of received PDP context messages that had TFTs with syntax errors. • Packet Filter Semantic Errors—Total number of received PDP context messages that had packet filters with semantic errors. • Packet Filter Syntax Errors—Total number of received PDP context messages that had packet filters with syntax errors.
Signaling Messages	• Unexpected—Number of unexpected GTP signaling messages sent or received. • GTP Message Parsers Errors—Number of GTP messages received with wrong value.

GTP PDP Statistics Daily Reports

Note The same column names are displayed for **GTP PDP/Bearer Statistics Daily Reports** of PDNGW Reports and **GTP Bearer Statistics Daily Reports** of SGW Reports.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN, PDNGW, or SGW.***

Note The 15-minute and hourly GTP PDP Statistics (GGSN), GTP PDP/Bearer Statistics (PDNGW), and GTP Bearer Statistics (SGW) reports are available from the node level only; they are not available from the top level or the network level.Choose GTP PDP Statistics Daily from the Type drop-down menu.

Step 2 Choose GTP PDP Statistics Daily (GTP PDP/Bearer Statistics Daily or GTP Bearer Statistics Daily) from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Activation Failure Ratio	Failure ratio.
Created	• Count—Number of PDP/Bearer contexts created. • Rate—Rate at which the PDP/Bearer contexts are created.
Rejected	• Count—Number of PDP/Bearer contexts rejected. • Rate—Rate at which the PDP/Bearer contexts are rejected.
Deleted	• Count—Number of PDP/Bearer contexts deleted. • Rate—Rate at which the PDP/Bearer contexts are deleted.

GTP Throughput Statistics Daily Reports

MWTM displays the GTP Throughput Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Note The same column names are displayed for GTP Throughput Statistics Daily Reports of GGSN, PDNGW, and SGW reports.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *GGSN, PDNGW, or SGW***.

Note The 15-minute and hourly GTP Throughput Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Throughput Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node. At the Node level, the summary table contains the additional columns - Data Type, Minimum, and Minimum Date (*time zone*).

Step 2 Choose GTP Throughput Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Send	• Average—Average Send for the statistic for the specified time. • Maximum—Maximum Send for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.
Receive	• Average—Average Receive for the statistic for the specified time. • Maximum—Maximum Receive for the statistic for the specified time. • Maximum Date (*time zone*)—Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
GTP Throughput Statistics Daily	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		GTP Signaling Messages	**Sent** • Count—GTP signaling messages sent between the Serving GPRS Support Node (SGSN) and GGSN, PDNGW, or SGW. • Rate—Rate at which the GTP signaling messages are sent between SGSN and GGSN. **Received** • Count—GTP signaling messages received between the Serving GPRS Support Node (SGSN) and GGSN, PDNGW, or SGW • Rate—Rate at which the GTP signaling messages are received between SGSN and GGSN.
		G-PDU Messages	**Sent** • Count—Number of GTP Packet Data Unit (G-PDU) messages sent on a SGSN path. • Rate—Rate at which the G-PDU messages are sent on a SGSN path. **Received** • Count—Number of G-PDU messages received on a SGSN path. • Rate—Rate at which the G-PDU messages are received on a SGSN path.
		G-PDU Bits	**Sent** • Count—Number of G-PDU bits sent on a SGSN path. • Rate—Rate at which the G-PDU bits are sent on a SGSN path. **Received** • Count—Number of G-PDU bits received on a SGSN path. • Rate—Rate at which the G-PDU bits are received on a SGSN path.

Report Type	Output	Field	Description
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		GTP Signaling Messages Sent/ GTP Signaling Messages Received	If Output Type is Graph, the Y-axis label shows daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.

PDNGW Reports

The MWTM web interface provides node-level PDNGW reports for bearer performance statistics. To generate a network wide PDNGW report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 If available, choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- APN Aggregate Miscellaneous Statistics Daily Reports, page 13-147
- APN Aggregate PDP/Bearer Statistics Daily Reports, page 13-147
- APN Aggregate PDP/Bearer Extended Statistics Daily Reports, page 13-147
- APN Aggregate Throughput Statistics Daily Reports, page 13-147
- APN Instance Miscellaneous Statistics Daily Reports, page 13-147
- APN Instance PDP/Bearer Statistics Daily Reports, page 13-148

- APN Instance PDP/Bearer Extended Statistics Daily Reports, page 13-148
- APN Instance Throughput Statistics Daily Reports, page 13-148
- EPC Gateway Protection Statistics Daily Reports, page 13-148
- EPC Gateway Buffering Statistics Daily Reports, page 13-149
- GTP Active Statistics Daily Reports, page 13-151
- GTP Charging Statistics Daily Reports, page 13-151
- GTP Error Statistics Daily Reports, page 13-151
- GTP Path Errors Daily Reports, page 13-152
- GTP PDP/Bearer Statistics Daily Reports, page 13-153
- GTP Throughput Statistics Daily Reports, page 13-153
- GTPv2 Bearer Statistics Daily Reports, page 13-153
- GTPv2 Session Statistics Daily Reports, page 13-156
- GTPv2 Path Bearer Statistics Daily Reports, page 13-157
- GTPv2 Path Session Statistics Daily Reports, page 13-158

Note The 15-minute and hourly reports for PDNGW are available from the node level only; they are not available from the top level or the network level.

APN Aggregate Miscellaneous Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate Miscellaneous Statistics Daily report of GGSN Reports. See APN Aggregate Miscellaneous Statistics Daily Reports, page 13-124.

APN Aggregate PDP/Bearer Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate PDP/Bearer Statistics Daily report of GGSN Reports. See APN Aggregate PDP/Bearer Statistics Daily Reports, page 13-127.

APN Aggregate PDP/Bearer Extended Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate PDP/Bearer Extended Statistics Daily report of GGSN Reports. See APN Aggregate PDP/Bearer Extended Statistics Daily Reports, page 13-130.

APN Aggregate Throughput Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate Throughput Statistics Daily report of GGSN Reports. See APN Aggregate Throughput Statistics Daily Reports, page 13-132.

APN Instance Miscellaneous Statistics Daily Reports

The GUI displays the same fields as that of APN Instance Miscellaneous Statistics Daily report of GGSN Reports. See APN Instance Miscellaneous Statistics Daily Reports, page 13-136.

APN Instance PDP/Bearer Statistics Daily Reports

The GUI displays the same fields as that of APN Instance PDP/Bearer Statistics Daily report of GGSN Reports. See APN Instance PDP/Bearer Statistics Daily Reports, page 13-136.

APN Instance PDP/Bearer Extended Statistics Daily Reports

The GUI displays the same fields as that of APN Instance PDP/Bearer Extended Statistics Daily report of GGSN Reports. See APN Instance PDP/Bearer Extended Statistics Daily Reports, page 13-136.

APN Instance Throughput Statistics Daily Reports

The GUI displays the same fields as that of APN Instance Throughput Statistics Daily report of GGSN Reports. See APN Instance Throughput Statistics Daily Reports, page 13-136.

EPC Gateway Protection Statistics Daily Reports

MWTM displays the EPC Gateway Protection Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Note The same column names are displayed for EPC Gateway Protection Statistics Daily Reports of PDNGW and SGW reports.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *PDNGW or SGW***.

Note The 15-minute and hourly EPC Gateway Protection Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the EPC Gateway Protection Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose EPC Gateway Protection Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Call Requests Dropped	• Count—Total number of incoming calls dropped at the gateway. • Rate—Rate at which the incoming calls are dropped at the gateway.
Times Low Congestion Reached	• Count—The number of times low congestion occurred on the gateway. • Rate—Rate at which the low congestion are occurred on the gateway.
Times High Congestion Reached	• Count—The number of times high congestion occurred on the gateway. • Rate—Rate at which the high congestion occurred on the gateway.

EPC Gateway Buffering Statistics Daily Reports

MWTM displays the EPC Gateway Buffering Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Note The same column names are displayed for EPC Gateway Buffering Statistics Daily Reports of PDNGW and SGW reports.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > *PDNGW or SGW***.

Note The 15-minute and hourly EPC Gateway Buffering Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the EPC Gateway Buffering Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose EPC Gateway Buffering Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Total In Use Buffers	Total number of buffers currently in use.
Total Buffered Packets	Total number of packets buffered at present in the buffer.
Total Buffered Bits	Total number of bytes buffered at present in the buffer.
Total Buffers Available	Current available buffer size.
Buffers Created	• Count—Total number of buffers created. • Rate—Rate at which the buffers are created.
Buffers Deleted	• Count—Total number of buffers deleted. • Rate—Rate at which the buffers are deleted.
Buffers Timed Out	• Count—Total number of buffers that got timed out. • Rate—Rate at which the buffers got timed out.
Buffer Packets Enqueued	• Count—Total number of packets enqueued to the buffering agent. • Rate—Rate at which the packets are enqueued to the buffering agent.
Buffer Packets Dequeued	• Count—Total number of packets dequeued from the buffering agent. • Rate—Rate at which the packets are dequeued from the buffering agent.
Buffer Bits Enqueued	• Count—Total bytes of data enqueued to the buffering agent. • Rate—Rate at which the bits of data are enqueued to the buffering agent.
Buffer Bits Dequeued	• Count—Total bytes of data dequeued from the buffering agent. • Rate—Rate at which the bits of data are dequeued from the buffering agent.
Buffer Rejected Memory Unavailable	• Count—Total number of times the buffer allocation is rejected by gateway due to requested memory is greater than the total available buffers. • Rate—Rate at which the buffer allocation is rejected by gateway due to requested memory is greater than the total available buffers.
Buffer Rejected Low Memory	• Count—Total number of times the buffer allocation is rejected due to low memory availability in the gateway. • Rate—Rate at which the buffer allocation is rejected due to low memory availability in the gateway.

GTP Active Statistics Daily Reports

MWTM displays the GTP Active Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Note The 15-minute and hourly GTP Active Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Active Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Active Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Active Sessions	Total number of sessions currently established with the system.
Direct Tunnel PDP Contexts	Direct tunnels enabled for the PDP contexts in the GGSN.
GTP v0 PDP Contexts	PDP contexts (GTP version 0) that are active.
GTP v1 PDP Contexts	PDP contexts (GTP version 1) that are active.
GTP v2 EPS Bearers	EPS bearers (GTP version 2) that are active.
PPP Regen PDPs	Device-specific interfaces created for association with PDP contexts regenerated to a Point-to-Point (PPP) session.
PPP PDPs	Total number of point to point PDP contexts.

GTP Charging Statistics Daily Reports

The GUI displays the same fields as that of GTP Charging Statistics Daily report of GGSN Reports. See GTP Charging Statistics Daily Reports, page 13-138.

GTP Error Statistics Daily Reports

MWTM displays the GTP Error Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Note The 15-minute and hourly GTP Error Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Error Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Error Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
PDP Context Activations	• Insufficient Resources Rejection—Number of PDP context requests rejected due to insufficient resources.
PDP Context Requests	• PPP Regeneration Insufficient Resources Rejection—PDP context requests rejected due to insufficient resources for PPP regeneration. • PPP Regeneration Threshold Limit Drops—Number of PDP context requests dropped due to the PPP regeneration threshold limit.
PDP Context Messages	• TFT Semantic Errors—Total number of received PDP context messages that had Traffic Flow Templates (TFT) with semantic errors. • TFT Syntax Errors—Total number of received PDP context messages that had TFTs with syntax errors. • Packet Filter Semantic Errors—Total number of received PDP context messages that had packet filters with semantic errors. • Packet Filter Syntax Errors—Total number of received PDP context messages that had packet filters with syntax errors.
Signaling Messages	• Unexpected—Number of unexpected GTP signaling messages sent or received. • Dropped—Number of dropped GTP signaling messages.
GTP Message Parsers Errors	Number of GTP messages received with wrong value.

GTP Path Errors Daily Reports

MWTM displays the GTP Path Errors Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Note The 15-minute and hourly GTP Path Error (PDNGW) reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Path Error (PDNGW) reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Path Errors Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
GTP Path	Path of the GTP.
Timestamp (*time zone*)	Timestamp of the report.
Signaling Messages	**Unexpected** • Count—Number of unexpected GTP signaling messages sent or received. • Rate—Rate at which the unexpected GTP signaling messages are sent or received. **Dropped** • Count—Number of signaling messages that are dropped. • Rate—Rate at which the signaling messages are dropped.

GTP PDP/Bearer Statistics Daily Reports

The GUI displays the same fields as that of GTP PDP Statistics Daily report of GGSN Reports. See GTP PDP Statistics Daily Reports, page 13-142.

GTP Throughput Statistics Daily Reports

The GUI displays the same fields as that of GTP Throughput Statistics Daily report of GGSN Reports. See GTP Throughput Statistics Daily Reports, page 13-143.

GTPv2 Bearer Statistics Daily Reports

MWTM displays the GTPv2 Bearer Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Note The 15-minute and hourly GTPv2 Bearer Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the SGW GTPv2 Bearer Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Bearer Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Bearer Requests Received	• Count—Number of create bearer request messages received. • Rate—Rate at which the create bearer request messages are received.
Create Bearer Requests Rejected	• Count—Number of create bearer request messages rejected. • Rate—Rate at which the create bearer request messages are rejected.
Modify Bearer Requests Received	• Count—Number of modify bearer request messages received. • Rate—Rate at which the modify bearer request messages are received.
Modify Bearer Requests Rejected	• Count—Number of modify bearer request messages rejected. • Rate—Rate at which the modify bearer request messages are rejected.
Update Bearer Requests Received	• Count—Number of update bearer request messages received. • Rate—Rate at which the update bearer request messages are received.
Update Bearer Requests Rejected	• Count—Number of update bearer request messages rejected. • Rate—Rate at which the update bearer request messages are rejected.
Delete Bearer Responses Sent	• Count—Number of delete bearer response messages sent. • Rate—Rate at which the delete bearer response messages are sent.

GTPv2 Session Statistics Daily Reports

MWTM displays the GTPv2 Session Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**

Note The 15-minute and hourly GTPv2 Session Daily (PDNGW) reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTPv2 Session Daily (PDNGW) reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Session Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Create Session Requests Received	• Count—Number of create session request messages received. • Rate—Rate at which the create session request messages are received.
Create Session Requests Rejected	• Count—Number of create session request messages rejected. • Rate—Rate at which the create session request messages are rejected.
Delete Session Requests Received	• Count—Number of delete session request messages received. • Rate—Rate at which the delete session request messages are received.
Delete Session Requests Rejected	• Count—Number of delete session request messages rejected. • Rate—Rate at which the delete session request messages are rejected.
Create Session Responses Sent	• Count—Number of create session response messages sent. • Rate—Rate at which the create session response messages are sent.
Delete Session Responses Sent	• Count—Number of delete session response messages sent. • Rate—Rate at which the delete session response messages are sent.

GTPv2 Path Bearer Statistics Daily Reports

MWTM displays the GTPv2 Path Bearer Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Note The 15-minute and hourly GTPv2 Path Bearer Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTPv2 Path Bearer Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Path Bearer Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
GTP Path	Path of GTP.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Bearer Requests Received	• Count—Number of create bearer request messages received. • Rate—Rate at which the create bearer request messages are received.
Create Bearer Requests Rejected	• Count—Number of create bearer request messages rejected. • Rate—Rate at which the create bearer request messages are rejected.
Modify Bearer Requests Received	• Count—Number of modify bearer request messages received. • Rate—Rate at which the modify bearer request messages are received.
Modify Bearer Requests Rejected	• Count—Number of modify bearer request messages rejected. • Rate—Rate at which the modify bearer request messages are rejected.
Update Bearer Requests Received	• Count—Number of update bearer request messages received. • Rate—Rate at which the update bearer request messages are received.
Update Bearer Requests Rejected	• Count—Number of update bearer request messages rejected. • Rate—Rate at which the update bearer request messages are rejected.
Delete Bearer Responses Sent	• Count—Number of delete bearer response messages sent. • Rate—Rate at which the delete bearer response messages are sent.

GTPv2 Path Session Statistics Daily Reports

MWTM displays the GTPv2 Path Session Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDNGW**.

Note The 15-minute and hourly GTPv2 Path Session Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTPv2 Path Session Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Path Session Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
GTP Path	Path of GTP.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Session Requests Received	• Count—Number of create session request messages received. • Rate—Rate at which the create session request messages are received.
Create Session Requests Rejected	• Count—Number of create session request messages rejected. • Rate—Rate at which the create session request messages are rejected.
Delete Session Requests Received	• Count—Number of delete session request messages received. • Rate—Rate at which the delete session request messages are received.
Delete Session Requests Rejected	• Count—Number of delete session request messages rejected. • Rate—Rate at which the delete session request messages are rejected.
Create Session Responses Sent	• Count—Number of create session response messages sent. • Rate—Rate at which the create session response messages are sent.
Delete Session Responses Sent	• Count—Number of delete session response messages sent. • Rate—Rate at which the delete session response messages are sent.

PDSN Reports

The MWTM web interface provides node-level PDSN reports. To generate a network-wide PDSN report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table or CSV) from the Output drop-down menu for contents of each output type.

Step 5 If available, choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- PDSN Session Statistics Daily Reports, page 13-159
- PDSN Session Bandwidth Statistics Daily Reports, page 13-162
- PDSN Flow Statistics Daily Reports, page 13-164
- PDSN Flow Extended Statistics Daily Reports, page 13-166
- PDSN Packet Control Function Statistics Daily Reports, page 13-168
- PDSN Traffic Statistics Daily Reports, page 13-169
- PDSN Traffic Extended Statistics Daily Reports, page 13-171

PDSN Session Statistics Daily Reports

MWTM displays the PDSN Session Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN Session reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN Session reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Session Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Total Sessions	Total number of sessions currently established with the system.
Maximum Allowed Session	Maximum number of sessions allowed by the system.
Average Session Utilization	Average session utilization during the specified duration.
Maximum Session Utilization	Maximum session utilization during the specified duration.
Maximum Date (*time zone)*	Timestamp when the maximum value occurred

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDSN Session Statistics Daily	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		Total Sessions	Total number of sessions currently established with the system.
		Maximum Allowed Sessions	Maximum number of sessions allowed by the system.
		Session Utilization	Total session utilization.
		Total Active Sessions	Total number of sessions in active state.
		Total Dormant Sessions	Total number of sessions in dormant state.
		Total PPP over GRE Sessions	Total number of PPPoGRE sessions currently established with the system.
		Total HDLC over GRE Sessions	Total number of HDLCoGRE sessions currently established with the system.
		Total Sessions Established	Total number of sessions established since system was last restarted.
		Total Sessions Established Rate	Rate at which the sessions were established since system was last restarted.
		Total Sessions Released	Total number of sessions released since system was last restarted.
		Total Sessions Released Rate	Rate at which the sessions were released since system was last restarted.
		Total Session Failures	Number of A10/A11 session failures occurring since PDSN agent restarted.
		Session Failure Ratio	Ratio of session failures.

Report Type	Output	Field	Description
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Maximum Allowed Sessions/ Total Sessions/ Session Utilization	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Utilization	If Output Type is Graph, a color-coded legend shows labels for utilization.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDSN Session Bandwidth Statistics Daily Reports

MWTM displays the PDSN Session Bandwidth Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN Session Bandwidth reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN Session Bandwidth reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Session Bandwidth Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Total Allocated Bandwidth	Total bandwidth allocated for sessions currently established on the PDSN.
Total Configured Bandwidth	Total bandwidth value configured via the CLI that would be supported by PDSN system.
Average Bandwidth Utilization	Average bandwidth utilization during the specified duration.
Maximum Bandwidth Utilization	Maximum bandwidth utilization during the specified duration.
Maximum Date (*time zone*)	Timestamp when the maximum value occurred

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDSN Session Bandwidth Statistics Daily	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		Total Available Bandwidth	Bandwidth available on the PDSN system for creation of new sessions.
		Total Allocated Bandwidth	Total bandwidth allocated for sessions currently established on the PDSN.
		Total Configured Bandwidth	Total bandwidth value configured via the CLI that would be supported by PDSN system.
		Bandwidth Utilization	Total bandwidth that has been utilized.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Total Allocated Bandwidth/ Total Configured Bandwidth/ Bandwidth Utilization	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Utilization	If Output Type is Graph, a color-coded legend shows labels for utilization.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDSN Flow Statistics Daily Reports

MWTM displays the PDSN Flow Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN Flow reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN Flow reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Flow Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Total Simple IP Flows	Total number of flows currently using simple IP service.
Total Mobile IP Flows	Total number of flows currently using MoIP services.
Maximum Date (*time zone*)	Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDSN Flow Statistics Daily Reports	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		Total Simple IP Flows	Total number of flows currently using simple IP service.
		Total Mobile IP Flows	Total number of flows currently using MoIP services.
		Total Proxy Mobile IP Flows	Total number of flows currently using proxy MoIP service.
		Total MSID Flows	Total number of flows currently using MSID service.
		Total VPDN Flows	The total number of flows currently using VPDN service.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Total Simple IP Flows/ Total Mobile IP Flows	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDSN Flow Extended Statistics Daily Reports

MWTM displays the PDSN Flow Extended Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN Flow Extended Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN Flow Extended Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Flow Extended Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Total Simple IP Flows Established	• Count—Total number of Simple IP flow that has been established successfully since system reboot. • Rate—Rate at which the Simple IP flow is established successfully since system reboot.
Total Mobile IP Flows Established	• Count—Total number of mobile IP flow that has been established successfully since system reboot. • Rate—Rate at which the mobile IP flow is established successfully since system reboot.
Total Proxy Mobile IP Flows Established	• Count—Total number of proxy mobile IP flow that has been established successfully since system reboot. • Rate—Rate at which the proxy mobile IP flow is established successfully since system reboot.
Total VPDN Flows Established	• Count—Total number of VPDN flow that has been established successfully since system reboot. • Rate—Rate at which the VPDN flow is established successfully since system reboot.
Total Simple IP Flow Failures	• Count—Total number of simple IP flow setup request failed since last system reboot. • Rate—Rate at which the simple IP flow setup request is failed since last system reboot.
Total Mobile IP Flow Failures	• Count—Total number of mobile IP flow setup request failed since system reboot. • Rate—Rate at which the mobile IP flow setup request is failed since system reboot.
Total Proxy Mobile IP Flow Failures	• Count—Total number of proxy mobile IP flow setup request failed since system reboot. • Rate—Rate at which the proxy mobile IP flow setup request is failed since system reboot.

Field	Description
Total VPDN Flow Failures	• Count—Total number of VPDN flow setup request failed since last system reboot. • Rate—Rate at which the VPDN flow setup request is failed since last system reboot.
Total Unknown Type Flow Failures	• Count—Total number of unknown type flow setup request failed since last system reboot. • Rate—Rate at which the unknown type flow setup request is failed since last system reboot.
Flow Failure Ratio	Ratio of flow failures.

PDSN Packet Control Function Statistics Daily Reports

MWTM displays the PDSN Packet Control Function Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN PCF Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN PCF reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Packet Control Function Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Total PCFs	Total number of PCF currently interacting with the system.
Maximum Allowed PCFs	Maximum number of PCF allowed by the system.
Average PCF Utilization	Average PCF utilization during the specified duration.
Maximum PCF Utilization	Maximum PCF utilization during the specified duration.
Maximum Date (*time zone*)	Timestamp for when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDSN Packet Control Function Statistics Daily Reports	Table, CSV	Node	Name of the node.
		Timestamp (*time zone*)	Timestamp of the report.
		Total PCFs	Total number of PCF currently interacting with the system.
		Maximum Allowed PCFs	Maximum number of PCF allowed by the system.
		PCF Utilization	PCF utilization.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Total PCFs/ PCF Utilization/ Maximum Allowed PCFs	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDSN Traffic Statistics Daily Reports

MWTM displays the PDSN Traffic Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN Traffic Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN Traffic Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Traffic Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Simple IP Bits Sent	• Count—Total number of simple IP data octets (in unit of 1024 octets) sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the simple IP data octets (in unit of 1024 octets) are sent to mobile stations from PDSN since system was last restarted.
Simple IP Bits Received	• Count—Total number of simple IP data octets (in unit of 1024 octets) received from mobile stations by PDSN since system was last restarted. • Rate—Rate at which the simple IP data octets (in unit of 1024 octets) are received from mobile stations by PDSN since system was last restarted.
Simple IP Packets Sent	• Count—Total number of simple IP data packets sent to mobile stations since system was last restarted. • Rate—Rate at which the simple IP data packets are sent to mobile stations since system was last restarted.
Simple IP Packets Received	• Count—Total number of simple IP data packets received from mobile stations since system was last restarted. • Rate—Rate at which the simple IP data packets are received from mobile stations since system was last restarted.
Mobile IP Bits Sent	• Count—Total number of mobile IP data octets (in unit of 1024 octets) sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the mobile IP data octets (in unit of 1024 octets) are sent to mobile stations from PDSN since system was last restarted.
Mobile IP Bits Received	• Count—Total number of mobile IP data octets (in unit of 1024 octets) received from mobile stations by PDSN since system was last restarted. • Rate—Rate at which the mobile IP data octets (in unit of 1024 octets) are received from mobile stations by PDSN since system was last restarted.
Mobile IP Packets Sent	• Count—Total number of mobile IP data packets sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the mobile IP data packets are sent to mobile stations from PDSN since system was last restarted.
Mobile IP Packets Received	• Count—Total number of mobile IP data packets received from mobile stations since system was last restarted. • Rate—Rate at which the mobile IP data packets are received from mobile stations since system was last restarted.

Field	Description
Proxy Mobile IP Bits Sent	• Count—Total number of proxy mobile IP data octets (in unit of 1024 octets) sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the proxy mobile IP data octets (in unit of 1024 octets) are sent to mobile stations from PDSN since system was last restarted.
Proxy Mobile IP Bits Received	• Count—Total number of proxy mobile IP data octets (in unit of 1024 octets) received from mobile stations since system was last restarted. • Rate—Rate at which the proxy mobile IP data octets (in unit of 1024 octets) are received from mobile stations since system was last restarted.
Proxy Mobile IP Packets Sent	• Count—Total number of proxy mobile IP data packets sent to mobile stations from PDSN since system was last restarted. • Rate—Rate at which the proxy mobile IP data packets are sent to mobile stations from PDSN since system was last restarted.
Proxy Mobile IP Packets Received	• Count—Total number of mobile IP data packets received from mobile stations since system was last restarted. • Rate—Rate at which the mobile IP data packets are received from mobile stations since system was last restarted.

PDSN Traffic Extended Statistics Daily Reports

MWTM displays the PDSN Traffic Extended Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > PDSN**.

Note The 15-minute and hourly PDSN Traffic Extended Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PDSN Traffic Extended Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PDSN Traffic Extended Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Short Data Burst Packets Sent	• Count—Total number of SDB marked data packets sent to PCF from PDSN since system was last restarted. • Rate—Rate at which the SDB marked data packets are sent to PCF from PDSN since system was last restarted.
Short Data Burst Bits Sent	• Count—Total number of SDB marked data octets sent to PCF from PDSN since system was last restarted. • Rate—Rate at which the SDB marked data octets are sent to PCF from PDSN since system was last restarted.
No GRE Key Packet Discards	• Count—Total number of packets discarded from PCF because of the missing GRE Keying since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of the missing GRE Key since system was last restarted.
No Session Packet Discards	• Count—Total number of packets discarded from PCF because of missing session since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of missing session since system was last restarted.
Invalid GRE Protocol Packet Discards	• Count—Total number of packets discarded from PCF because of invalid GRE protocol since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of invalid GRE protocol since system was last restarted.
Invalid Checksum Packet Discards	• Count—Total number of packets discarded from PCF because of invalid checksum since system was last restarted. • Rate—Rate at which the packets are discarded from PCF because of invalid checksum since system was last restarted.

SGW Reports

The MWTM web interface provides node-level SGW reports for bearer performance statistics. To generate a network wide PDNGW report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 If available, choose a sort parameter from the Sort Parameter drop-down menu.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- APN Aggregate Bearer Statistics Daily Reports, page 13-173
- APN Aggregate Throughput Statistics Daily Reports, page 13-176
- APN Instance Bearer Statistics Daily Reports, page 13-177
- APN Instance Throughput Statistics Daily Reports, page 13-177
- EPC Gateway Protection Statistics Daily Reports, page 13-177
- EPC Gateway Buffering Statistics Daily Reports, page 13-177
- GTP Active Statistics Daily Reports, page 13-177
- GTP Charging Statistics Daily Reports, page 13-178
- GTP Error Statistics Daily Reports, page 13-178
- GTP Path Errors Daily Reports, page 13-179
- GTP Bearer Statistics Daily Reports, page 13-180
- GTP Throughput Statistics Daily Reports, page 13-180
- GTPv2 Bearer Statistics Daily Reports, page 13-180
- GTPv2 Session Statistics Daily Reports, page 13-181
- GTPv2 Path Bearer Statistics Daily Reports, page 13-183
- GTPv2 Path Session Statistics Daily Reports, page 13-185

Note The 15-minute and hourly reports for SGW are available from the node level only; they are not available from the top level or the network level.

APN Aggregate Bearer Statistics Daily Reports

MWTM displays the APN Aggregate Bearer Statistics Daily report obtained during the specified period.

Note The same column names are displayed for **APN Instance Bearer Statistics Daily Reports** with the addition of the column Node.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly reports for APN Aggregate Bearer Statistics are available from the node level only; they are not available from the top level or the network level. Click on a node name in the APN Aggregate Bearer Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose APN Aggregate Bearer Statistics Daily (or APN Instance Bearer Statistics Daily) from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
APN	The name of the Access Point Name (APN).
APN Index	A unique numerical identifier for the APN.
Average Active Bearers	Average Number of bearer contexts that are currently established on the SGW devices.
Maximum Active Bearers	Maximum Number of bearer contexts that are currently established on the SGW devices.
Maximum Date (*time zone*)	Time the maximum value occurred.
Average Bearer Activation Success Ratio	Average ratio of bearer context request messages received by the SGW devices.
Maximum Bearer Activation Success Ratio	Maximum ratio of bearer context request messages received by the SGW devices.
Maximum Date (*time zone*)	Time the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
APN Aggregate Bearer Statistics Daily (or APN Instance Bearer Statistics Daily)	Table, CSV	APN Name	The name of the Access Point Name (APN).
		APN Index	A unique numerical identifier for the APN.
		Timestamp (*time zone*)	Timestamp of the report.
		Active Bearers	• Count—Number of active Bearer contexts on this APN.
		Bearer Activations Success	• Count—Total number of successfully completed Bearer activation procedures by MS. • Rate—Rate (per second) of successfully completed Bearer activation procedures by the MS Total number of unsuccessful bearer modify initiated by MME or SGSN. • Ratio—Number of successful activations for every 100 activation attempts.
		Bearer Activations Failure	• Count—Total number of failed Bearer activation procedures by the MS on this APN. • Rate—Rate (per second) of failed Bearer activation procedures by the MS on this APN.
		Bearer Deactivations Success	• Count—Total number of successfully completed Bearer deactivation procedures by the SGW on this APN. • Rate—Rate (per second) of successfully completed Bearer deactivation procedures by the SGW on this APN.
		Bearer Updates Success	• Count—Total number of successful bearer update initiated by network. • Rate—Rate (per second) of successful bearer update initiated by network. • Ratio—Number of successful bearer update initiated by network for every 100 attempts.
		Bearer Updates Failure	• Count—Total number of unsuccessful bearer update initiated by MME or SGSN. • Rate—Rate at which the unsuccessful bearer update initiated by MME or SGSN.

Report Type	Output	Field	Description
		Bearer Modifications Success	• Count—Total number of successful bearer modify initiated by MME or SGSN. • Rate—Rate (per second) of successful bearer modify initiated by MME or SGSN. • Ratio—Number of successful bearer modify initiated by MME or SGSN for every 100 initiation attempts.
		Bearer Modifications Failure	• Count—Total number of unsuccessful bearer modify initiated by MME or SGSN. • Rate—Rate at which the unsuccessful bearer modify initiated by MME or SGSN.
		Dedicated Bearer Activations Success	• Count—Total number of successful dedicated bearer creation initiated by network. • Rate—Rate (per second) of successful dedicated bearer creation initiated by network. • Ratio—Number of successful dedicated bearer creation for every 100 bearer creation attempts.
		Dedicated Bearer Activations Failure	• Count—Total number of unsuccessful dedicated bearer activation procedures received on this APN. • Rate—Rate (per second) of unsuccessful dedicated bearer activation procedures received on this APN.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing.
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Active Bearers/ Bearer Activation Success Ratio	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, a color-coded legend shows labels for utilization.

APN Aggregate Throughput Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate Throughput Statistics Daily report of GGSN Reports. See APN Aggregate Throughput Statistics Daily Reports, page 13-132.

APN Instance Bearer Statistics Daily Reports

The GUI displays the same fields as that of APN Aggregate Bearer Statistics Daily report of SGW reports. See APN Aggregate Bearer Statistics Daily Reports, page 13-173.

APN Instance Throughput Statistics Daily Reports

The GUI displays the same fields as that of APN Instance Throughput Statistics Daily report of GGSN Reports. See APN Instance Throughput Statistics Daily Reports, page 13-136.

EPC Gateway Protection Statistics Daily Reports

The GUI displays the same fields as that of EPC Gateway Protection Statistics Daily report of PDNGW Reports. See EPC Gateway Protection Statistics Daily Reports, page 13-148.

EPC Gateway Buffering Statistics Daily Reports

The GUI displays the same fields as that of EPC Gateway Buffering Statistics Daily report of PDNGW Reports. See EPC Gateway Buffering Statistics Daily Reports, page 13-149.

GTP Active Statistics Daily Reports

MWTM displays the GTP Active Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTP Active Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Active Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Active Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Active Bearers	Number of active Bearer contexts on this APN.
Active Sessions	Total number of sessions currently established with the system.
Active Users	Number of active users.
Idle Users	Total number of users currently in Idle state in the gateway.
Suspended Users	Total number of users suspended by the gateway.

GTP Charging Statistics Daily Reports

The GUI displays the same fields as that of GTP Charging Statistics Daily report of GGSN Reports. See GTP Charging Statistics Daily Reports, page 13-138.

GTP Error Statistics Daily Reports

MWTM displays the GTP Error Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTP Error Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Error Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Error Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp of the report.
Signaling Messages	• Unexpected—Number of unexpected GTP signaling messages sent or received. • Dropped—Number of dropped GTP signaling messages.
GTP Message Parsers Errors	Number of GTP messages received with wrong value.

GTP Path Errors Daily Reports

MWTM displays the GTP Path Errors Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTP Path Errors reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTP Path Errors reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTP Path Errors Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
GTP Path	Path of the GTP.
Timestamp (*time zone*)	Timestamp of the report.
Signaling Messages	**Unexpected** • Count—Number of unexpected GTP signaling messages sent or received. • Rate—Rate at which the unexpected GTP signaling messages are sent or received. **Dropped** • Count—Number of signaling messages dropped. • Rate—Rate at which the signaling messages are dropped.

GTP Bearer Statistics Daily Reports

The GUI displays the same fields as that of GTP PDP Statistics Daily reports of GGSN Reports. See GTP PDP Statistics Daily Reports, page 13-142.

GTP Throughput Statistics Daily Reports

The GUI displays the same fields as that of GTP Throughput Statistics Daily reports of GGSN Reports. See GTP Throughput Statistics Daily Reports, page 13-143.

GTPv2 Bearer Statistics Daily Reports

MWTM displays the GTPv2 Bearer Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTPv2 Bearer Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the SGW GTPv2 Bearer Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Bearer Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Bearer Requests Sent	• Count—Number of create bearer request messages sent. • Rate—Rate at which the create bearer request messages are sent.
Create Bearer Requests Received	• Count—Number of create bearer request messages received. • Rate—Rate at which the create bearer request messages are received.
Create Bearer Requests Rejected	• Count—Number of create bearer request messages rejected. • Rate—Rate at which the create bearer request messages are rejected.
Modify Bearer Requests Sent	• Count—Number of modify bearer request messages sent. • Rate—Rate at which the modify bearer request messages are sent.
Modify Bearer Requests Received	• Count—Number of modify bearer request messages received. • Rate—Rate at which the modify bearer request messages are received.
Modify Bearer Requests Rejected	• Count—Number of modify bearer request messages rejected. • Rate—Rate at which the modify bearer request messages are rejected.
Update Bearer Requests Sent	• Count—Number of update bearer request messages sent • Rate—Rate at which the update bearer request messages are sent.
Update Bearer Requests Received	• Count—Number of update bearer request messages received. • Rate—Rate at which the update bearer request messages are received.
Update Bearer Requests Rejected	• Count—Number of update bearer request messages rejected. • Rate—Rate at which the update bearer request messages are rejected.
Delete Bearer Responses Sent	• Count—Number of delete bearer response messages sent • Rate—Rate at which the delete bearer response messages are sent.
Delete Bearer Responses Received	• Count—Number of delete bearer response messages received. • Rate—Rate at which the delete bearer response messages are received.
Delete Bearer Responses Rejected	• Count—Number of delete bearer response messages rejected. • Rate—Rate at which the delete bearer response messages are rejected.

GTPv2 Session Statistics Daily Reports

MWTM displays the GTPv2 Session Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTPv2 Session Statistics Daily reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTPv2 Session Statistics Daily reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Session Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Session Requests Sent	• Count—Number of create session request messages sent. • Rate—Rate at which the create session request messages are sent.
Create Session Requests Received	• Count—Number of create session request messages received. • Rate—Rate at which the create session request messages are received.
Create Session Requests Rejected	• Count—Number of create session request messages rejected. • Rate—Rate at which the create session request messages are rejected.
Delete Session Requests Sent	• Count—Number of delete session request messages sent. • Rate—Rate at which the delete session request messages are sent.
Delete Session Requests Received	• Count—Number of delete session request messages received. • Rate—Rate at which the delete session request messages are received.
Delete Session Requests Rejected	• Count—Number of delete session request messages rejected. • Rate—Rate at which the delete session request messages are rejected.
Create Session Responses Sent	• Count—Number of create session response messages sent. • Rate—Rate at which the create session response messages are sent.
Create Session Responses Received	• Count—Number of create session response messages received. • Rate—Rate at which the create session response messages are received.
Create Session Responses Rejected	• Count—Number of create session response messages rejected. • Rate—Rate at which the create session response messages are rejected.
Delete Session Responses Sent	• Count—Number of delete session response messages sent. • Rate—Rate at which the delete session response messages are sent.
Delete Session Responses Received	• Count—Number of delete session response messages received. • Rate—Rate at which the delete session response messages are received.
Delete Session Responses Rejected	• Count—Number of delete session response messages rejected. • Rate—Rate at which the delete session response messages are rejected.

GTPv2 Path Bearer Statistics Daily Reports

MWTM displays the GTPv2 Path Bearer Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTPv2 Path Bearer Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTPv2 Path Bearer Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Path Bearer Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
GTP Path	Path of GTP.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Bearer Requests Sent	• Count—Number of create bearer request messages sent. • Rate—Rate at which the create bearer request messages are sent.
Create Bearer Requests Received	• Count—Number of create bearer request messages received. • Rate—Rate at which the create bearer request messages are received.
Create Bearer Requests Rejected	• Count—Number of create bearer request messages rejected. • Rate—Rate at which the create bearer request messages are rejected.
Modify Bearer Requests Sent	• Count—Number of modify bearer request messages sent. • Rate—Rate at which the modify bearer request messages are sent.
Modify Bearer Requests Received	• Count—Number of modify bearer request messages received. • Rate—Rate at which the modify bearer request messages are received.
Modify Bearer Requests Rejected	• Count—Number of modify bearer request messages rejected. • Rate—Rate at which the modify bearer request messages are rejected.
Update Bearer Requests Sent	• Count—Number of update bearer request messages sent. • Rate—Rate at which the update bearer request messages are sent.
Update Bearer Requests Received	• Count—Number of update bearer request messages received. • Rate—Rate at which the update bearer request messages are received.
Update Bearer Requests Rejected	• Count—Number of update bearer request messages rejected. • Rate—Rate at which the update bearer request messages are rejected.
Delete Bearer Responses Sent	• Count—Number of delete bearer responses messages sent. • Rate—Rate at which the update bearer responses messages are sent.
Delete Bearer Responses Received	• Count—Number of delete bearer response messages received. • Rate—Rate at which the delete bearer response messages are received.
Delete Bearer Responses Rejected	• Count—Number of delete bearer response messages rejected. • Rate—Rate at which the delete bearer response messages are rejected.

GTPv2 Path Session Statistics Daily Reports

MWTM displays the GTPv2 Path Session Statistics Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Statistics > SGW**.

Note The 15-minute and hourly GTPv2 Path Session Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the GTPv2 Path Session Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose GTPv2 Path Session Statistics Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
GTP Path	Path of GTP.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Create Session Requests Sent	• Count—Number of create session request messages sent. • Rate—Rate at which the create session request messages are sent.
Create Session Requests Received	• Count—Number of create session request messages received. • Rate—Rate at which the create session request messages are received.
Create Session Requests Rejected	• Count—Number of create session request messages rejected. • Rate—Rate at which the create session request messages are rejected.
Delete Session Requests Sent	• Count—Number of delete session request messages sent. • Rate—Rate at which the delete session request messages are sent.
Delete Session Requests Received	• Count—Number of delete session request messages received. • Rate—Rate at which the delete session request messages are received.
Delete Session Requests Rejected	• Count—Number of delete session request messages rejected. • Rate—Rate at which the delete session request messages are rejected.
Create Session Responses Sent	• Count—Number of create session response messages sent. • Rate—Rate at which the create session response messages are sent.
Create Session Responses Received	• Count—Number of create session response messages received. • Rate—Rate at which the create session response messages are received.
Create Session Responses Rejected	• Count—Number of create session response messages rejected. • Rate—Rate at which the create session response messages are rejected.
Delete Session Responses Sent	• Count—Number of delete session response messages sent. • Rate—Rate at which the delete session response messages are sent.
Delete Session Responses Received	• Count—Number of delete session response messages received. • Rate—Rate at which the delete session response messages are received.
Delete Session Responses Rejected	• Count—Number of delete session response messages rejected. • Rate—Rate at which the delete session response messages are rejected.

Viewing RAN Statistics Reports

RAN Statistics Reports are located within **Reports > RAN Reports** in the MWTM web interface. You can also find the RAN statistics reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All reports are saved as export files in .csv format.

You can view any of the following RAN statistics reports:

- PWE3 Reports, page 13-187
- QOS Reports, page 13-192
- RAN-Optimized Reports, page 13-198

PWE3 Reports

The MWTM web interface provides network-wide and node level reports that summarize PWE3 over a specified time period. The information is available in graphical, tabular, and CSV formats. Administrators use these reports for analysis of network-wide performance and errors for RAN backhauls and shorthauls. For example, you can generate a report to show which backhaul links were the most heavily utilized in the last 24 hours.

To generate a network-wide PWE3 report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > PWE3**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu (see Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

Note The Graph output displays up to twelve RAN data streams based on traffic and/or number of errors. To view all RAN data streams, choose Table or CSV.

Step 6 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- PWE3 Peak Performance Daily Reports, page 13-187
- PWE3 Average Performance Daily Reports, page 13-190

PWE3 Peak Performance Daily Reports

MWTM displays the PWE3 Peak Performance Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > PWE3**.

Note The 15-minute and hourly PWE3 Peak Performance reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PWE3 Peak Performance reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PWE3 Peak Performance Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Virtual Circuit	Name of the Virtual Circuit
Send Bits/Sec	• Average—Average bits/second sent. • Maximum—Maximum bits/second sent. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Recv Bits/Sec	• Average—Average bits/second received. • Maximum—Maximum bits/second received. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PWE3 Peak Performance Daily	Table, CSV	Node	Name of the node for the virtual circuit.
		ID	Virtual circuit ID.
		Timestamp (*time zone*)	Timestamp of the report.
		Peer Address	IP address of the peer node.
		Received	• Packet Count—Number of packets received. • Packet Max Rate—Maximum packet rate for traffic received. • Packet Avg Rate—Average packet rate for traffic received. • Packet Min Rate—Minimum packet rate for traffic received. • Total—Total bits received. • Max Rate—Maximum bits received. • Avg Rate—Average bits received. • Min Rate—Minimum bits received.
		Sent	• Packet Count—Number of packets sent. • Packet Max Rate—Maximum packet rate for traffic sent. • Packet Avg Rate—Average packet rate for traffic sent. • Packet Min Rate—Minimum packet rate for traffic sent. • Total—Total bits sent. • Max Rate—Maximum bits sent. • Avg Rate—Average bits sent. • Min Rate—Minimum bits sent.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Maximum Bits/Sec	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PWE3 Average Performance Daily Reports

MWTM displays the PWE3 Average Performance Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > PWE3**.

Note The 15-minute and hourly PWE3 Average Performance reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the PWE3 Average Performance reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose PWE3 Average Performance Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Virtual Circuit	Name of the Virtual Circuit
Send Bits/Sec	• Average—Average bits/second sent. • Maximum—Maximum bits/second sent. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.
Recv Bits/Sec	• Average—Average bits/second received. • Maximum—Maximum bits/second received. • Maximum Date (*time zone*)—Timestamp when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PWE3 Average Performance Daily	Table, CSV	Node	Name of the node for the virtual circuit.
		ID	Virtual circuit ID.
		Timestamp (*time zone*)	Timestamp of the report.
		Peer Address	IP address of the peer node.
		Received	• Packet Count—Number of packets received. • Packet Max Rate—Maximum packet rate for traffic received. • Packet Avg Rate—Average packet rate for traffic received. • Packet Min Rate—Minimum packet rate for traffic received. • Total—Total bits received. • Max Rate—Maximum bits received. • Avg Rate—Average bits received. • Min Rate—Minimum bits received.
		Sent	• Packet Count—Number of packets sent. • Packet Max Rate—Maximum packet rate for traffic sent. • Packet Avg Rate—Average packet rate for traffic sent. • Packet Min Rate—Minimum packet rate for traffic sent. • Total—Total bits sent. • Max Rate—Maximum bits sent. • Avg Rate—Average bits sent. • Min Rate—Minimum bits sent.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Average Bits/Sec	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

QOS Reports

The MWTM web interface provides node-level QOS reports. To generate a network-wide QOS report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Table or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- QOS Class Map Daily Reports, page 13-192
- QOS Match Statement Daily Reports, page 13-193
- QOS Packet Marking Daily Reports, page 13-194
- QOS Policing Daily Reports, page 13-195
- QOS Queuing Daily Reports, page 13-196
- QOS Traffic Shaping Daily Reports, page 13-197

QOS Class Map Daily Reports

MWTM displays the QOS Class Map Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**.

Note The 15-minute and hourly QOS Class Map reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the QOS Class Map Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose QOS Class Map Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Pre-Policy	• Packets—The number of inbound packets prior to executing any QoS policies. • Bits—The number of inbound octets prior to executing any QoS policies. • Bits Rate—The rate of the traffic prior to executing any QoS policies.
Post-Policy	• Bits—The number of outbound octets after executing QoS policies. • Bits Rate—The rate of the traffic after executing QoS policies
Dropped	• Packets—The number of outbound packets after executing QoS policies. • SRAM Buffer Packets—The number of drop packet count which occurred due to a lack of SRAM buffers during output processing on an interface. • Bits—The number of drop octet count which occurred due to a lack of SRAM buffers during output processing on an interface. • Bits Rate—The rate of the traffic due to a lack of SRAM buffers during output processing on an interface.

QOS Match Statement Daily Reports

MWTM displays the QOS Match Statement Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**.

Note The 15-minute and hourly QOS Match Statement Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the QOS Match Statement Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose QOS Match Statement Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Match Statement	The specific match criteria to identify packets for classification purposes.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Pre-Policy	• Packets—The number of inbound packets prior to executing any QoS policies. • Bits—The number of inbound octets prior to executing any QoS policies. • Bits Rate—The rate of the traffic prior to executing any QoS policies.

QOS Packet Marking Daily Reports

MWTM displays the QOS Packet Marking Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**.

Note The 15-minute and hourly QOS Packet Marking Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the QOS Packet Marking Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose QOS Packet Marking Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
QOS Group Packets	The number of packets whose QoS Group field is marked by Set feature.
ATM CLP Packets	The number of packets whose ATM CLP Bit is marked by Set feature.
Layer 2 COS Packets	The Layer 2 CoS value to use when mapping this DSCP to layer 2 CoS.
Discard Class Packets	The number of packets whose Discard Class field is marked by Set feature.
SRP Priority Packets	The number of packets whose SRP Priority field is marked by Set feature.
Precedence	• Packets—The number of packets whose Precedence field is marked by Set feature. • Tunnel Packets—The number of packets whose Precedence Tunnel field is marked by Set feature.
Frame Relay	• DE Packets—The number of packets whose Frame Relay DE Bit is marked by Set feature. • FECN—The number of packets whose Frame Relay FECN BECN field is marked by Set feature.
MPLS Experimental	• Imposition Packets—The number of packets whose MPLS Experimental Imposition field is marked by Set feature. • Topmost Packets—The number of packets whose MPLS Experimental Top Most field is marked by Set feature.
DSCP	• Packets—The number of packets whose DSCP field is marked by Set feature. • Tunnel Packets—The number of packets whose Precedence Tunnel field is marked by Set feature.

QOS Policing Daily Reports

MWTM displays the QOS Policing Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**.

Note The 15-minute and hourly QOS Policing Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the QOS Policing Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose QOS Policing Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Conformed	• Packets—The number of packets treated as conforming by the policing feature. • Bits—The number of octets treated as conforming by the policing feature. • Bits Rate—The rate of conforming traffic.
Exceeded	• Packets—The number of packets treated as non-conforming by the policing feature. • Bits—The number of octets treated as non-conforming by the policing feature. • Bits Rate—The rate of non-conforming traffic.
Violated	• Packets—The number of packets treated as violated by the policing feature. • Bits—The number of octets treated as violated by the policing feature. • Bits Rate—The rate of the violating traffic.

QOS Queuing Daily Reports

MWTM displays the QOS Queuing Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**.

Note The 15-minute and hourly QOS Queuing Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the QOS Queuing Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose QOS Queuing Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Queue Depth	The current depth of the queue.
Max Queue Depth	The maximum depth of the queue.
Queue Discarded	• Bits—The number of octets, associated with this class, that were dropped by queueing. • Packets—The number of packets, associated with this class, that were dropped by queueing.

QOS Traffic Shaping Daily Reports

MWTM displays the QOS Traffic Shaping Daily report obtained during the specified period.

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > QOS**.

Note The 15-minute and hourly QOS Traffic Shaping Statistics reports are available from the node level only; they are not available from the top level or the network level. Click on a node name in the QOS Traffic Shaping Statistics reports to navigate to a specific node to view hourly and 15 minute reports for that node.

Step 2 Choose QOS Traffic Shaping Daily from Type drop-down menu.

A summary table displays the information described in the following table:

Field	Description
Node	Name of the node.
Class Map	User-defined traffic class that contains one or many match statements used to classify packets into different categories.
Service Policy Direction	The direction of traffic for which the service policy is applied.
Timestamp (*time zone*)	Timestamp shows the time bits-per second value occurred.
Active	The current traffic-shaping state. When traffic-shaping is enabled and the traffic rate exceeds the shape rate, traffic-shaping is considered to be active. Otherwise, it is considered inactive.
Queue Size	The current traffic-shaping queue depth in packets.
Delayed	• Bits—The number of octets that have been delayed. • Packets—The number of packets that have been delayed.
Dropped	• Bits—The number of octets that have been dropped during shaping. • Packets—The number of packets that have been dropped during shaping.

RAN-Optimized Reports

The MWTM web interface provides network-wide reports that summarize IP-RAN over a specified time period. The information is available in graphical, tabular, and CSV formats. Administrators use these reports for analysis of network-wide performance and errors for RAN backhauls and shorthauls. For example, you can generate a report to show which backhaul links were the most heavily utilized in the last 24 hours.

To generate a network-wide RAN report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > RAN Statistics > RAN-Optimized**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu (see Table 13-1 for a list of report types and their contents).

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu (see Table 13-1 for contents of each output type).

Step 5 Choose a sort parameter from the Sort Parameter drop-down menu.

Note The Graph output displays up to twelve RAN data streams based on traffic and/or number of errors. To view all RAN data streams, choose Table or CSV.

Step 6 To generate the report, click the Run icon (green arrow).

Step 7 To understand the report, click the report type listed in Table 13-1 for a detailed description of the report fields.

Report Type	Output	Contents
Backhaul Performance Daily Report	Graph	Minimum, maximum, and average performance data for all the RAN backhauls in the network: • Send Summary—Table summary of backhaul send data. • Receive Summary—Table summary of backhaul receive data. • Send Backhaul Performance Daily—Graph of backhaul send data. • Receive Backhaul Performance Daily—Graph of backhaul receive data.
	Table or CSV	Send and receive data, node, and backhaul in tabular format.
Backhaul Errors Daily Report	Graph	For all the RAN backhauls in the network: • Table—Average error rate, total errors, and total GSM-Abis and UMTS-Iub errors in tabular format. • Backhaul Errors Daily—Graph that shows total errors, GSM errors, and UMTS errors.
	Table or CSV	Tabular information that shows total errors, total GSM-Abis errors, total UMTS-Iub errors, node, and backhaul.
Shorthaul Performance Daily Report	Graph	Minimum, maximum, and average performance data for all the RAN shorthauls in the network: Send Summary—Table summary of shorthaul send data. Receive Summary —Table summary of shorthaul receive data. Send Shorthaul Performance Daily—Graph of shorthaul send data. Receive Shorthaul Performance Daily—Graph of shorthaul receive data.
	Table or CSV	Tabular information that shows send and receive data, protocol type, node, and shorthaul.
GSM Errors Daily Reports	Graph	Table—Tabular data that shows total GSM error counts and average error rate over the chosen time period. GSM Errors Daily—Graph of GSM errors over the chosen time period.
	Table or CSV	Tabular information that shows total errors, total missed packets, total protocol errors, total miscellaneous errors, node, backhaul, and shorthaul.

Report Type	Output	Contents
UMTS Errors Daily Reports	Graph	Table—Tabular data that shows total UMTS error counts and average error rate over the chosen time period. UMTS Errors Daily—Graph of UMTS errors over the chosen time period.
	Table or CSV	Tabular information that shows total errors, total protocol errors, total miscellaneous errors, node, backhaul, and shorthaul.

Backhaul Performance Daily Report

Output	GUI Element	Description
Graph	Node	Table column that lists nodes that contain RAN backhauls. To access details for a specific node, click a node in this column.
	Backhaul	Table column that lists the visible backhauls. To access details for a specific backhaul, click a backhaul in this column. **Note** The column shows a maximum of 12 backhauls by default. To change the number of visible backhauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Average Utilization %	Table column that shows the average of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed.
	Average	Table column that shows average bits per second for the backhaul.
	Minimum Utilization %	Table column that shows the minimum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed.
	Minimum	Table column that shows minimum number of bits per second for the backhaul.
	Minimum Date (*time zone*)	Table column that shows time when the minimum bits-per-second value occurred.
	Maximum Utilization %	Table column that shows the maximum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed.
	Maximum	Table column that shows maximum number of bits per second for the backhaul.
	Maximum Date (*time zone*)	Table column that shows time when the maximum bits-per-second value occurred.
	Expand to Full Screen	Click this link to open the graph in a full-screen window for better viewing.
	Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
	Minimum Bits/Sec	Y-axis labels for graphs that show minimum, average, and maximum bits per second for the visible backhauls. **Note** The graph shows a maximum of 12 backhauls by default. To change the number of visible backhauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Average Bits/Sec	
	Maximum Bits/Sec	
	Legend	Appearing below each graph, a legend of color-coded labels for each backhaul that appears in the graph.

Output	GUI Element	Description
Table, CSV	Node	Table column that lists all network nodes that contain backhauls. If Output is Table, to access performance details for a specific node, click a node in this column.
	Backhaul	Table column that lists all the backhauls in the network. If Output is Table, to access performance details for a specific backhaul, click a backhaul in this column.
	Errors	Table column that shows total error counts for each backhaul.
	Send Bits/Sec	• Minimum Date (*time zone*)—Table column that shows time when the minimum bits-per-second value occurred. • Minimum Utilization %—Table column that shows the minimum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Minimum—Table column that shows minimum number of bits per second for the backhaul. • Average Date (*time zone*)—Table column that shows time when the Average bits-per-second value occurred. • Average Utilization %—Table column that shows the average of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Average—Table column that shows average of bits per second for the backhaul. • Maximum Date (*time zone*)—Table column that shows time when the maximum bits-per-second value occurred. • Maximum Utilization %—Table column that shows the maximum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Maximum—Table column that shows maximum number of bits per second for the backhaul.

Output	GUI Element	Description
	Receive Bits/Sec	• Minimum Date (*time zone*)—Table column that shows time when the minimum bits-per-second value occurred. • Minimum Utilization %—Table column that shows the minimum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Minimum—Table column that shows minimum number of bits per second for the backhaul. • Average Date (*time zone*)—Table column that shows time when the Average bits-per-second value occurred. • Average Utilization %—Table column that shows the average of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Average—Table column that shows average of bits per second for the backhaul. • Maximum Date (*time zone*)—Table column that shows time when the maximum bits-per-second value occurred. • Maximum Utilization %—Table column that shows the maximum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Maximum—Table column that shows maximum number of bits per second for the backhaul.

Backhaul Errors Daily Report

Output	GUI Element	Description
Graph	Node	Table column that lists nodes that contain RAN backhauls. To access details for a specific node, click a node in this column.
	Backhaul	Table column that lists the visible backhauls. To access details for a specific backhaul, click a backhaul in this column. **Note** The graph shows a maximum of 12 backhauls by default. To change the number of visible backhauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Avg. Error Rate (Per Sec)	Table column that lists the average error rate each second for the visible backhauls.
	Total Errors	Table column that lists the total number of errors (GSM and UMTS) for each visible backhaul.
	Total Errors GSM-Abis	Table column that lists the total number of GSM-Abis errors for each visible backhaul.
	Total Errors UMTS-Iub	Table column that lists the total number of UMST-Iub errors for each visible backhaul.
	Expand to Full Screen	Click this link to open the graph in a full-screen window for better viewing.
	Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
	UMTS Errors	Y-axis labels for graphs that show total UMTS errors, total GSM errors, and a combined total of UMTS and GSM errors for the visible backhauls. **Note** The graph shows a maximum of 12 backhauls by default. To change the number of visible backhauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	GSM Errors	
	Total Errors	
	Legend	Positioned below the graph, a legend of color-coded labels for each backhaul that appears in the graph.
Table, CSV	Lists the same information as the graph output type, but in tabular format; also includes one unique field: Timestamp—identifies the time that each error value occurred for each visible backhaul.	

Shorthaul Performance Daily Report

Output	GUI Element	Description
Graph	Node	Table column that lists nodes that contain RAN shorthauls. To access details for a specific node, click a node in this column.
	Backhaul	Table column that lists the visible backhauls. To access details for a specific backhaul, click a backhaul in this column.
	Shorthaul	Table column that lists the visible shorthauls. To access details for a specific shorthaul, click a shorthaul in this column. **Note** The graph shows a maximum of 12 shorthauls by default. To change the number of visible shorthauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Average	Table column that shows the average bits per second for the shorthaul.
	Minimum	Table column that shows the minimum number of bits per second for the shorthaul.
	Minimum Date (*time zone*)	Table column that shows time when the minimum bits-per-second value occurred.
	Maximum	Table column that shows maximum number of bits per second for the shorthaul.
	Maximum Date (*time zone*)	Table column that shows time when the maximum bits-per-second value occurred.
	Expand to Full Screen	Click this link to open the graph in a full-screen window for better viewing.
	Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
	Minimum Bits/Sec	Y-axis labels for graphs that show minimum, average, and maximum bits per second for the visible shorthauls. **Note** The graph shows a maximum of 12 shorthauls by default. To change the number of visible shorthauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Average Bits/Sec	
	Maximum Bits/Sec	
	Legend	Positioned below each graph, a legend of color-coded labels for each shorthaul that appears in the graph.

Output	GUI Element	Description
Table, CSV	Node	Table column that lists all the nodes that contain RAN backhauls. If Output is Table, to access details for a specific node, click a node in this column.
	Backhaul	Table column that lists all the RAN backhauls in the network. If Output is Table, to access details for a specific backhaul, click a backhaul in this column.
	Shorthaul	Table column that lists all the RAN shorthauls in the network. If Output is Table, to access details for a specific shorthaul, click a shorthaul in this column.
	Protocol	Table column that shows whether the shorthaul protocol is GSM or UMTS.
	Send Bits/Sec	• Minimum Date (*time zone*)—Table column that shows time when the minimum bits-per-second value occurred. • Minimum Utilization %—Table column that shows the minimum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Minimum—Table column that shows minimum number of bits per second for the backhaul. • Average Date (*time zone*)—Table column that shows time when the Average bits-per-second value occurred. • Average Utilization %—Table column that shows the average of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Average—Table column that shows average of bits per second for the backhaul. • Maximum Date (*time zone*)—Table column that shows time when the maximum bits-per-second value occurred. • Maximum Utilization %—Table column that shows the maximum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Maximum—Table column that shows maximum number of bits per second for the backhaul.

Output	GUI Element	Description
	Receive Bits	• Minimum Date (*time zone*)—Table column that shows time when the minimum bits-per-second value occurred. • Minimum Utilization %—Table column that shows the minimum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Minimum—Table column that shows minimum number of bits per second for the backhaul. • Average Date (*time zone*)—Table column that shows time when the Average bits-per-second value occurred. • Average Utilization %—Table column that shows the average of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Average—Table column that shows average of bits per second for the backhaul. • Maximum Date (*time zone*)—Table column that shows time when the maximum bits-per-second value occurred. • Maximum Utilization %—Table column that shows the maximum of the backhaul. A value greater than 100% indicates that the backhaul is oversubscribed. • Maximum—Table column that shows maximum number of bits per second for the backhaul.

GSM Errors Daily Reports

Output	GUI Element	Description
Graph	Node	Table column that lists nodes that contain GSM shorthauls. To access details for a specific node, click a node in this column.
	Backhaul	Table column that lists backhauls that contain GSM shorthauls. To access details for a specific backhaul, click a backhaul in this column.
	Shorthaul	Table column that lists the visible GSM shorthauls. To access details for a specific shorthaul, click a shorthaul in this column. **Note** The table shows a maximum of 12 shorthauls by default. To change the number of visible shorthauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Total Counts	Table column that lists the total number of GSM errors for the visible shorthauls during the chosen duration.
	Avg. Error Rate (Per Sec)	Table column that lists the average error rate each second for the visible shorthauls.
	Expand to Full Screen	Click this link to open the graph in a full-screen window for better viewing.
	Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
	Error Counts	Y-axis label for graph that shows total GSM errors for the visible GSM shorthauls. **Note** The graph shows a maximum of 12 shorthauls by default. To change the number of visible shorthauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Legend	Positioned below the graph, a legend of color-coded labels for each shorthaul that appears in the graph.

Output	GUI Element	Description
Table, CSV	Node	Table column that lists all the nodes that contain GSM shorthauls. If Output is Table, to access details for a specific node, click a node in this column.
	Backhaul	Table column that lists all the backhauls that contain GSM shorthauls. If Output is Table, to access details for a specific backhaul, click a backhaul in this column.
	Shorthaul	Table column that lists all the GSM shorthauls in the network. If Output is Table, to access details for a specific shorthaul, click a shorthaul in this column.
	Timestamp (*time zone*)	Timestamp of the report.
	Total Errors	Table column that lists the total number of GSM errors for the visible shorthauls during the chosen duration.
	Total Missed Packets	Total number of missed packets on the GSM shorthaul.
	Total Protocol Errors	Total number of protocol errors on the GSM shorthaul.
	Total Miscellaneous Errors	Total number of miscellaneous errors on the GSM shorthaul.

UMTS Errors Daily Reports

Output	GUI Element	Description
Graph	Node	Table column that lists nodes that contain UMTS shorthauls. To access details for a specific node, click a node in this column.
	Backhaul	Table column that lists backhauls that contain UMTS shorthauls. To access details for a specific backhaul, click a backhaul in this column.
	Shorthaul	Table column that lists the visible UMTS shorthauls. To access details for a specific shorthaul, click a shorthaul in this column. **Note** The table shows only 12 shorthauls by default. To change the number of visible shorthauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Total Counts	Table column that lists the total number of UMTS errors that occurred for the visible shorthauls during the chosen duration.
	Avg. Error Rate (Per Sec)	Table column that lists the average error rate each second for the visible shorthauls during the chosen duration.
	Expand to Full Screen	Click this link to open the graph in a full-screen window for better viewing.
	Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
	Error Counts	Y-axis label for the graph that shows the total number of UMTS errors for the visible UMTS shorthauls. **Note** The graph shows only 12 shorthauls by default. To change the number of visible shorthauls, use the Graph Series Editor. See Using the Toolbar, page 11-6, for more information.
	Legend	Positioned below the graph, a legend of color-coded labels for each UMTS shorthaul that appears in the graph.

Output	GUI Element	Description
Table, CSV	Node	Table column that lists nodes that contain UMTS shorthauls. If Output is Table, to access details for a specific node, click a node in this column.
	Backhaul	Table column that lists all the backhauls that contain UMTS shorthauls. If Output is Table, to access details for a specific backhaul, click a backhaul in this column.
	Shorthaul	Table column that lists all the UMTS shorthauls in the network. If Output is Table, to access details for a specific shorthaul, click a shorthaul in this column.
	Timestamp (*time zone*)	Time that the error values occurred for the visible shorthauls.
	Total Errors	Table column that lists the total number of UMTS errors for the visible shorthauls during the chosen duration.
	Total Protocol Errors	Table column that lists the total number of protocol errors on the UMTS shorthaul.
	Total Miscellaneous Errors	Table column that lists the total number of miscellaneous errors on the UMTS shorthaul.

Generating Node-Level CPU/Memory Reports

In addition to generating network-wide CPU/Memory reports as explained in CPU Reports, page 13-13, you can also generate node-level CPU/Memory reports as explained in the following steps.

Step 1 From the MWTM web interface, click on a node name.

Step 2 Click the Performance tab.

Step 3 From the View pulldown menu, select **Historical CPU Utilization** or **Historical Memory Utilization**.

If the device you selected has multiple CPUs, in addition to the Summary tab, there are also separate Slot tabs. Each Slot tab contains CPU statistics for the CPUs in that slot.

Step 4 From the Type menu, select which CPU or Memory report to view:

- CPU Peak Utilization 15 Minutes
- CPU Average Utilization 15 Minutes
- CPU Peak Utilization Hourly
- CPU Average Utilization Hourly
- CPU Peak Utilization Daily
- CPU Average Utilization Daily
- Memory Peak Utilization 15 Minutes
- Memory Average Utilization 15 Minutes
- Memory Peak Utilization Hourly

- Memory Average Utilization Hourly
- Memory Peak Utilization Daily
- Memory Average Utilization Daily

Viewing ITP Accounting Reports

You can view any of the following statistics reports:

- AS Accounting Reports, page 13-212
- GTT Accounting Reports, page 13-213
- MTP3 Accounting Reports, page 13-214

Note All accounting reports are supported on ITP platforms only.

AS Accounting Reports

You can view daily reports for application server (AS) accounting statistics by using the MWTM. You can also export the report. AS accounting describes MTP3 layer traffic in support of application servers.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the linkset.
Network Name	Name of the network for the linkset.
Signaling Point	Name of the signaling point for the linkset.
AS	Name of the application server.
OPC	Originating point code of the traffic, which is a unique identifier for each set of statistics. To see only statistics that match a specific OPC for a given linkset, find the linkset and click the point code.
DPC	Destination point code of the traffic. To see only statistics that match a specific DPC for a given linkset, find the linkset and click the point code.

Field or Column	Description
SI	Service indicator, which indicates the type of Signaling System 7 (SS7) traffic. Valid values include: • **0**—Signaling Network Management Message (SNM) • **1**—Maintenance Regular Message (MTN) • **2**—Maintenance Special Message (MTNS) • **3**—Signaling Connection Control Part (SCCP) • **4**—Telephone User Part (TUP) • **5**—ISDN User Part (ISUP) • **6**—Data User Part (call and circuit-related messages) • **7**—Data User Part (facility registration/cancellation messages) To see only more information for a specific type of SI, click the SI type.
Send MSUs	Total number of MTP3 MSUs sent on the specified date.
Receive MSUs	Total number of MTP3 MSUs received on the specified date.
Send Bytes	Total number of bytes sent on the specified date.
Receive Bytes	Total number of bytes received on the specified date.

GTT Accounting Reports

You can view summary reports of daily GTT accounting statistics. You can also export the reports.

GTT Accounting Daily Reports

You can view a daily summary of GTT accounting reports for all nodes that the MWTM detected on a specified date. The GTT Accounting Daily Report page shows all MWTM daily GTT accounting reports by date. Each file contains a daily summary of GTT accounting statistics for all nodes that the MWTM detected on a specified date.

The GTT Accounting Daily Report table is sorted based on the information in the Packets column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node associated with the **From Network Name** for which data is visible.
From Network Name	Name of the network from which GTT traffic originated, and for which data is visible.
Signaling Point	Name of the signaling point associated with the **From Network Name** instance for which data is visible.

Field or Column	Description
Linkset	Name of the linkset associated with the **From Network Name** instance for which data is visible.
Selector	Name of the selector.
GTA	Global Title Address (GTA) associated with the selector.
To Network Name	Name of the network in which the translated point code resides.
Point Code	Destination point code for the GTA.
Packets	Total number of packets requiring translation by GTT on the specified date.
Octets	Total number of octets requiring translation by GTT on the specified date.

MTP3 Accounting Reports

MTP3 accounting describes MTP3 layer traffic in support of linksets. You can also export the MTP3 accounting reports.

Note Every five minutes (by default), the ITP moves data records from a quick-access table to a database that stores long term accounting records. This database contains accumulated accounting data since the last clearing or from the time accounting was originally enabled. The MWTM shows only the data from this database, not from the quick-access table.

MTP3 Accounting Daily Reports

You can view a daily summary of MTP3 accounting statistics for the MWTM on a specified date. The MTP3 Accounting Daily Report page shows detail reports of all MWTM daily MTP3 accounting statistics by date. Each file contains a daily summary of MTP3 accounting statistics for the MWTM on a specified date.

The MTP3 Accounting Daily Report table is sorted based on the information in the Send MSUs column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Note If a statistics calculation results in an undefined value, such as a number divided by zero (0), or an undefined number, based on the configuration, then `MathError` appears in the field.

Field or Column	Description
Date	Date of the report.
Node	Name of the node for the linkset.
Network Name	Name of the network for the linkset.
Signaling Point	Name of the signaling point for the linkset.
Linkset	Name of the linkset.

Field or Column	Description
Gateway Screening	Indicates whether the traffic passed or failed the Gateway Screening test at the ITP. To see only statistics that passed or failed for a specific linkset, select a linkset and click **Pass**, **Fail**, or **Unroutable**.
OPC	Originating point code of the traffic, which is a unique identifier for each set of statistics. To see only statistics that match a specific OPC for a given linkset, find the linkset and click the point code.
DPC	Destination point code of the traffic. To see only statistics that match a specific DPC for a given linkset, find the linkset and click the point code.
SI	Service indicator, which indicates the type of SS7 traffic. Valid values include: • **0**—Signaling Network Management Message (SNM) • **1**—Maintenance Regular Message (MTN) • **2**—Maintenance Special Message (MTNS) • **3**—Signaling Connection Control Part (SCCP) • **4**—Telephone User Part (TUP) • **5**—ISDN User Part (ISUP) • **6**—Data User Part (call and circuit-related messages) • **7**—Data User Part (facility registration/cancellation messages) To see only more information for a specific type of SI, click the SI type.
Send MSUs	Total number of MTP3 MSUs sent on the specified date.
Receive MSUs	Total number of MTP3 MSUs received on the specified date.
Send Bytes	Total number of bytes sent on the specified date.
Receive Bytes	Total number of bytes received on the specified date.

Viewing Mobile Subscribers Reports

You can view any of the following subscriber count reports:

- BWG Subscribers Reports, page 13-216
- CSG Subscribers Reports, page 13-217
- GGSN Subscribers Reports, page 13-221
- HA Subscribers Reports, page 13-222
- PDNGW Subscribers Reports, page 13-223
- PDSN Subscribers Reports, page 13-227
- SGW Subscribers Reports, page 13-228

Node Instance Counts in BWG and GGSN Subscriber Reports

When viewing BWG and GGSN subscriber reports, you might notice a discrepancy in the Node Instance column between the most recent record and older records. This occurs when the most recent record is not complete due to the differences in polling intervals of BWG and GGSN devices. Up to 6 BWG and GGSN IOS instances can run on a single SAMI card. MWTM sees each instance as a separate device and is not aware at the management level that different devices might run on the same physical card. As a result, the devices are polled and data is collected at different times during the regular polling interval.

For example, *GGSN A* on *SAMI 1* is polled at 12:01 p.m. and *GGSN B* on *SAMI 1* is polled at 12:14 p.m. during a regular 15-minute polling interval. When you view the latest report data for reports that aggregate data at the SAMI card level, such as subscriber reports, there are discrepancies. The subscriber report is a card- level report that aggregates the results of each device instance that runs on a SAMI card by adding the subscriber count of all devices with the same serial number. Using the times given in the above example, if you view the GGSN subscriber report for the last 6 hours at 12:10 p.m., you see the results from *GGSN A* only, and only *GGSN A* contributes to those results. If you view the same report at 12:15 p.m., you will see the sum of *GGSN A* and *GGSN B* subscriber counts, and both devices contribute to the results.

BWG Subscribers Reports

You can view any of the following BWG Subscriber Count Reports

- BWG Subscribers Hourly Reports, page 13-216
- BWG Subscribers Daily Reports, page 13-216
- BWG Subscribers Monthly Reports, page 13-217

Related Topic

- Node Instance Counts in BWG and GGSN Subscriber Reports, page 13-216

BWG Subscribers Hourly Reports

The BWG Subscribers Hourly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers per node.
Node Instances	Number of node instances per SAMI.

BWG Subscribers Daily Reports

The BWG Subscribers Daily Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers per node.
Node Instances	Number of node instances per SAMI.

BWG Subscribers Monthly Reports

The BWG Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers per node.
Node Instances	Number of node instances per SAMI.

CSG Subscribers Reports

The MWTM web interface provides network level CSG Subscribers reports. To generate a network-wide CSG Subscribers report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > CSG**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- CSG Subscribers Hourly Reports, page 13-217
- CSG Subscribers Daily Reports, page 13-219
- CSG Subscribers Monthly Reports, page 13-220

CSG Subscribers Hourly Reports

MWTM displays the CSG Subscribers Hourly report obtained during the specified period.

The CSG Subscribers Hourly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > CSG**.

Step 2 Choose CSG Subscribers Hourly from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
CSG Subscribers Hourly	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

CSG Subscribers Daily Reports

MWTM displays the CSG Subscribers Daily report obtained during the specified period.

The CSG Subscribers Daily Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > CSG**.

Step 2 Choose CSG Subscribers Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
CSG Subscribers Daily	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

CSG Subscribers Monthly Reports

MWTM displays the CSG Subscribers Monthly report obtained during the specified period.

The CSG Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > CSG**.

Step 2 Choose CSG Subscribers Monthly from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
CSG Subscribers Monthly	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

GGSN Subscribers Reports

You can view any of the following GGSN Subscribers Reports:

- GGSN Subscribers Hourly Reports, page 13-221
- GGSN Subscribers Daily Reports, page 13-222
- GGSN Subscribers Monthly Reports, page 13-222

Related Topic

- Node Instance Counts in BWG and GGSN Subscriber Reports, page 13-216

GGSN Subscribers Hourly Reports

The GGSN Subscribers Hourly Report tables are sorted based on the information in the **Subscriber Count** column. However, you can sort each table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.
Node Instances	Number of node instances per SAMI.

GGSN Subscribers Daily Reports

The GGSN Subscribers Daily Report tables are sorted based on the information in the **Subscriber Count** column. However, you can sort the tables based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.
Node Instances	Number of node instances per SAMI.

GGSN Subscribers Monthly Reports

The GGSN Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.
Node Instances	Number of node instances per SAMI.

HA Subscribers Reports

You can view any of the following HA Subscribers Reports:

- HA Subscribers Hourly Reports, page 13-222
- HA Subscribers Daily Reports, page 13-223
- HA Subscribers Monthly Reports, page 13-223

HA Subscribers Hourly Reports

The HA Subscribers Hourly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Node	Name of the node.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.

HA Subscribers Daily Reports

The HA Subscribers Daily Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Node	Name of the node.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.

HA Subscribers Monthly Reports

The HA Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Node	Name of the node.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.

PDNGW Subscribers Reports

The MWTM web interface provides network level PDNGW Subscribers reports. To generate a network-wide PDNGW Subscribers report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > PDNGW**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon  . Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- PDNGW Subscribers Hourly Reports, page 13-224
- PDNGW Subscribers Daily Reports, page 13-225
- PDNGW Subscribers Monthly Reports, page 13-226

PDNGW Subscribers Hourly Reports

MWTM displays the PDNGW Subscribers Hourly report obtained during the specified period.

The PDNGW Subscribers Hourly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > PDNGW**.

Step 2 Choose PDNGW Subscribers Hourly from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDNGW Subscribers Hourly	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDNGW Subscribers Daily Reports

MWTM displays the PDNGW Subscribers Daily report obtained during the specified period.

The PDNGW Subscribers Daily Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > PDNGW**.

Step 2 Choose PDNGW Subscribers Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.

Field or Column	Description
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDNGW Subscribers Daily	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDNGW Subscribers Monthly Reports

MWTM displays the PDNGW Subscribers Monthly report obtained during the specified period.

The PDNGW Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > PDNGW**.

Step 2 Choose PDNGW Subscribers Monthly from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
PDNGW Subscribers Monthly	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

PDSN Subscribers Reports

You can view any of the following PDSN Subscribers Reports:

- PDSN Subscribers Hourly Reports, page 13-228
- PDSN Subscribers Daily Reports, page 13-228
- PDSN Subscribers Monthly Reports, page 13-228

PDSN Subscribers Hourly Reports

The PDSN Subscribers Hourly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Node	Name of the node.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.

PDSN Subscribers Daily Reports

The PDSN Subscribers Daily Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Node	Name of the node.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.

PDSN Subscribers Monthly Reports

The PDSN Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Field or Column	Description
Timestamp (*time zone*)	Timestamp of the report.
Node	Name of the node.
Serial Number	Serial number of the chassis.
Subscriber Count	Number of subscribers.

SGW Subscribers Reports

The MWTM web interface provides network level SGW Subscribers reports. To generate a network-wide SGW Subscribers report:

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > SGW**.

Step 2 In the tool bar of the right pane, choose a report type from the Type drop-down menu for a list of report types and their contents.

Step 3 Choose a time range from the Duration drop-down menu or customize your own time range by clicking the Customize the date and time range icon. Note that these dates are the dates with server time zone.

Step 4 Choose an output format (Graph, Table, or CSV) from the Output drop-down menu for contents of each output type.

Step 5 To generate the report, click the Run icon (green arrow).

The Type drop-down menu contains the following reports:

- SGW Subscribers Hourly Reports, page 13-229
- SGW Subscribers Daily Reports, page 13-230
- SGW Subscribers Monthly Reports, page 13-231

SGW Subscribers Hourly Reports

MWTM displays the SGW Subscribers Hourly report obtained during the specified period.

The SGW Subscribers Hourly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > SGW**.

Step 2 Choose SGW Subscribers Hourly from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
SGW Subscribers Hourly	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

SGW Subscribers Daily Reports

MWTM displays the SGW Subscribers Daily report obtained during the specified period.

The SGW Subscribers Daily Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > SGW**.

Step 2 Choose SGW Subscribers Daily from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.

Field or Column	Description
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
SGW Subscribers Daily	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

SGW Subscribers Monthly Reports

MWTM displays the SGW Subscribers Monthly report obtained during the specified period.

The SGW Subscribers Monthly Report table is sorted based on the information in the **Subscriber Count** column. However, you can sort the table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

Step 1 In the left pane (navigation tree) of the MWTM web interface, choose **Reports > Mobile Subscribers > SGW**.

Step 2 Choose SGW Subscribers Monthly from the Type drop-down menu.

A summary table displays the information described in the following table:

Field or Column	Description
Node	Name of the node.
Average	Average statistics for the specified duration.
Maximum	Maximum statistics for the specified duration.
Maximum Date (*time zone*)	Timestamp that shows time when the maximum value occurred.

Step 3 Select the duration and output (see Using the Toolbar, page 11-6), and the following information is displayed:

Report Type	Output	Field	Description
SGW Subscribers Monthly	Table, CSV	Timestamp (*time zone*)	Timestamp of the report.
		Node	Name of the node.
		Serial Number	Serial number of the chassis.
		Subscriber Count	Number of subscribers per node.
	Graph	Expand to Full Screen	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing
		Hide Summary Table	If Output Type is Graph, this text link hides the summary table at the top of the report and only shows the graph.
		Subscriber Count	If Output Type is Graph, the Y-axis label shows Daily statistics over time.
		Server Time	If Output Type is Graph, the X-axis label shows a historical time scale and the server time zone.
		Legend	If Output Type is Graph, this text link displays the graph in a new, full-screen window for easier viewing

Viewing File Archive Inventory Reports

Inventory Reports that have been archived are located within **File Archive > Inventory** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view any of the following Inventory archived reports:

- Chassis Inventory Archived Reports, page 13-233
- Element Inventory Archived Reports, page 13-233

Chassis Inventory Archived Reports

You can access these following Chassis Inventory Archived Reports:

- Chassis Inventory Daily Archived Reports, page 13-233

Chassis Inventory Daily Archived Reports

The Daily Chassis Inventory Archived Reports page shows summary reports for all archived MWTM daily chassis inventory statistics reports for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *servername_version_ChassisInventory.2010-06-17.csv.zip* file contains the summary report for daily chassis inventory statistics for June 17, 2010.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily chassis inventory statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Element Inventory Archived Reports

You can access these following Element Inventory Archived Reports:

- Element Inventory Daily Archived Reports, page 13-233

Element Inventory Daily Archived Reports

The Daily Element Inventory Archived Reports page shows summary reports for all archived MWTM daily element inventory statistics reports for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *servername_version_ElementInventory.2010-06-17.xml.zip* file contains the summary report for daily element inventory statistics for June 17, 2010.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily element inventory statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Viewing File Archive Common Statistics Reports

Common Reports that have been archived are located within **File Archive > Common Statistics** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view any of the following Common archived reports:

- AAA Archived Reports, page 13-234
- CPU Archived Reports, page 13-236
- IP Local Pool Archived Reports, page 13-237
- Interface Archived Reports, page 13-238
- Memory Archived Reports, page 13-239

AAA Archived Reports

You can access these following AAA Archived Reports:

- AAA Accounting Statistics 15 Minute Archived Reports, page 13-234
- AAA Accounting Statistics Hourly Archived Reports, page 13-234
- AAA Accounting Statistics Daily Archived Reports, page 13-235
- AAA Authentication Statistics 15 Minute Archived Reports, page 13-235
- AAA Authentication Statistics Hourly Archived Reports, page 13-235
- AAA Authentication Statistics Daily Archived Reports, page 13-236

AAA Accounting Statistics 15 Minute Archived Reports

The 15 minute AAA Accounting Statistics Archived Reports page shows summary reports for all archived MWTM 15 minute AAA accounting statistics reports for the server to which you connect, stored as downloadable.*zip* files.

The .*zip* files are archived by type, date, hour, and minute; for example, the *AAAAccounting.2009-06-22-16-00.csv.zip* file contains the summary report of archived 15 minute AAA accounting statistics for June 22, 2009.

Each archived .*zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute AAA accounting statistics on that date, hour, and minute. You can download the .*zip* files and extract them.

To download a .*zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AAA Accounting Statistics Hourly Archived Reports

The Hourly AAA Accounting Statistics Archived Reports page shows all summary reports for archived MWTM hourly AAA accounting statistics for the server to which you connect, stored as downloadable .*zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *AAAAccounting2009-06-22-11.csv.zip* file contains the summary report for hourly AAA accounting statistics for the11th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly AAA accounting statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AAA Accounting Statistics Daily Archived Reports

The Daily AAA Accounting Statistics Archived Reports page shows all summary reports for archived MWTM daily AAA accounting statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the daily *AAAAccounting.2009-06-22-16-00.csv.zip* file contains the summary report of archived daily AAA accounting statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily AAA accounting statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AAA Authentication Statistics 15 Minute Archived Reports

The 15 minute AAA Authentication Statistics Archived Reports page shows summary reports for all archived MWTM 15 minute AAA authentication statistics reports for the server to which you connect, stored as downloadable*.zip* files.

The *.zip* files are archived by type, date, hour, and minute; for example, the *AAAAuthentication.2009-06-22-16-00.csv.zip* file contains the summary report of archived 15 minute AAA authentication statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute AAA authentication statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AAA Authentication Statistics Hourly Archived Reports

The Hourly AAA Authentication Statistics Archived Reports page shows all summary reports for archived MWTM hourly AAA authentication statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *AAAAuthentication.2009-06-22-11.csv.zip* file contains the summary report for hourly AAA authentication statistics for the11th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly AAA authentication statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AAA Authentication Statistics Daily Archived Reports

The Daily AAA Authentication Statistics Archived Reports page shows all summary reports for archived MWTM daily AAA authentication statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the daily *AAAAuthentication.2009-06-22.csv.zip* file contains the summary report of archived daily AAA authentication statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily AAA authentication statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

CPU Archived Reports

You can access these following CPU Archived Reports:

- CPU Utilization 15 Minute Archived Reports, page 13-236
- CPU Utilization Hourly Archived Reports, page 13-236
- CPU Utilization Daily Archived Reports, page 13-237

CPU Utilization 15 Minute Archived Reports

The CPU Utilization 15 Minute Archived Reports page shows all summary reports for archived MWTM 15 minute CPU statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, hour, and minute; for example, the *CPUStats.2009-06-22-11-20.csv.zip* file contains the summary report of archived 15 minute CPU statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute CPU statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

CPU Utilization Hourly Archived Reports

The CPU Utilization Hourly Archived Reports page shows all summary reports for archived MWTM hourly CPU statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *CPUStats.2009-06-22-11.csv.zip* file contains the summary report for hourly CPU statistics for the 11th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly CPU statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

CPU Utilization Daily Archived Reports

The CPU Utilization Daily Archived Reports page shows summary reports for all archived MWTM daily CPU statistics reports for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *CPUStats.2009-06-22.csv.zip* file contains the summary report for daily CPU statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily CPU statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

IP Local Pool Archived Reports

You can access the following IP Local Pool Archived Reports. These reports are supported on mSEF platforms only:

- IP Local Pool Statistics 15 Minute Archived Reports, page 13-237
- IP Local Pool Statistics Hourly Archived Reports, page 13-237
- IP Local Pool Statistics Daily Archived Reports, page 13-237

IP Local Pool Statistics 15 Minute Archived Reports

The IP Local Pool 15 Minute Archived Reports page shows summary reports of 15-minute statistical details of the IP Local Pool. The 15 Minute IP Local Pool Statistics Archived Report has the file name IpLocalPoolStats.*year-month-day-hour-minute*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15-minute IP local pool statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

IP Local Pool Statistics Hourly Archived Reports

The IP Local Pool Hourly Archived Reports page shows summary reports of hourly statistical details of the IP Local Pool. The Hourly IP Local Pool Statistics Archived Report has the filename IpLocalPoolStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly IP local pool statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

IP Local Pool Statistics Daily Archived Reports

The IP Local Pool Daily Archived Reports page shows summary reports of daily statistical details of the IP Local Pool. The Daily IP Local Pool Statistics Archived Report has the filename IpLocalPoolStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily IP local pool statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Interface Archived Reports

You can access the following Interface Archived Reports. These reports are supported on mSEF platforms only:

- Interface Statistics 15 Minute Archived Reports, page 13-238
- Interface Statistics Hourly Archived Reports, page 13-238
- Interface Statistics Daily Archived Reports, page 13-238
- Extended Interface Statistics 15 Minute, page 13-239
- Extended Interface Statistics Hourly, page 13-239
- Extended Interface Statistics Daily, page 13-239

Interface Statistics 15 Minute Archived Reports

The Interface Statistics 15 Minute Archived Reports page shows all summary reports for archived MWTM 15 minute interface statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, hour, and minute; for example, the *InterfaceStats.2009-06-22-16-00.csv.zip* file contains the summary report of archived 15 minute interface statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minutes Interface statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Interface Statistics Hourly Archived Reports

The Interface Statistics Hourly Archived Reports page shows all summary reports for archived MWTM hourly interface statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *InterfaceStats.2009-06-22-11.csv.zip* file contains the summary report for hourly interface statistics for the 11th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly Interface statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Interface Statistics Daily Archived Reports

The Interface Statistics Daily Archived Reports page shows summary reports for all archived MWTM daily interface statistics reports for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *InterfaceStats.2009-06-22.csv.zip* file contains the summary report for daily interface statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily Interface statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Extended Interface Statistics 15 Minute

The Extended Interface Statistics 15 Minute Reports page shows summary reports for all archived MWTM 15 minute extended interface statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, hour, and minute; for example, the *InterfaceExtStats.2011-01-05-15-00.csv.zip* file contains the summary report of archived 15 minute extended interface statistics for January 05, 2011.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minutes extended interface statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Extended Interface Statistics Hourly

The Extended Interface Statistics Hourly Reports page shows summary reports for all archived MWTM hourly extended interface statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *InterfaceExtStats.2011-01-05-11.csv.zip* file contains the summary report for hourly extended interface statistics for the 11th hour on January 05, 2011.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly extended interface statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Extended Interface Statistics Daily

The Extended Interface Statistics Daily Reports page shows summary reports for all archived MWTM dailyextended interface statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *InterfaceExtStats.2011-01-05.csv.zip* file contains the summary report for daily extended interface statistics for January 05, 2011.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily extended interface statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Memory Archived Reports

You can access the following Memory Archived reports:

- Memory Utilization 15 Minute Archived Reports, page 13-240
- Memory Utilization Hourly Archived Reports, page 13-240
- Memory Utilization Daily Archived Reports, page 13-240

Memory Utilization 15 Minute Archived Reports

The Memory Utilization 15 Minute Archived Reports page shows summary reports for all archived MWTM 15 minute memory statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, hour, and minute; for example, the *MemStats.2009-06-22-16-00.csv.zip* file contains the summary report for 15 minute memory statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute memory statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Memory Utilization Hourly Archived Reports

The Memory Utilization Hourly Archived Reports page shows all summary reports for archived MWTM hourly memory statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *MemStats.2009-06-22-08.csv.zip* file contains the summary report for hourly memory statistics for the 8th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly memory statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Memory Utilization Daily Archived Reports

The Memory Utilization Daily Archived Reports page shows summary reports for all archived MWTM daily memory statistics for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *MemStats.2009-06-22.csv.zip* file contains the summary report for daily memory statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily memory statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Viewing File Archive ITP Statistics Reports

ITP Reports that have been archived are located within **File Archive > ITP Statistics** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view any of the following ITP archived reports:

- Custom Archived Reports, page 13-241
- Rolling Archived Reports, page 13-244

Custom Archived Reports

The Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

Note Custom archive reports are supported on ITP platforms only.

Note Custom reports are *custom* because you can specify that they run at custom time intervals. The content of custom reports is the same as regularly scheduled reports.

Custom archived reports are those that you enable by using these commands:

Command	Generates these custom statistics:
mwtm accstats	MTP3/AS accounting
mwtm gttstats	GTT
mwtm linkstats	Link and linkset
mwtm mlrstats	MLR
mwtm msustats	MSU rates
mwtm mtpevents	MTP3/AS events
mwtm q752stats	Q.752
mwtm xuastats	Application server and application server process

Note For detailed descriptions of these commands, see Appendix B, "Command Reference."

Note Custom ITP reports can be run manually from the command line or setup to run at custom intervals by creating crontab entries. See Generating Custom ITP Statistics Reports Using the CLI, page 13-285 and Including or Excluding Specified Objects in ITP Reports, page 13-287 for more information.

The Custom Report tables are sorted based on the information in the Export File column. However, you can sort a table based on the information in one of the other columns (see Navigating Table Columns, page 4-23).

The Custom Report tables contain:

Column	Description
Export File	Name of the custom statistics export *.zip* file, archived by type, date, and hour; for example, the *sgmLinksetStats.custom.20867.2009-06-24-16:15.csv.zip* file contains the summary report of custom linkset statistics with the ID tag 20867 for the 15th minute of the 16th hour on June 24, 2009. Each archived *.zip* file contains a comma-separated value (CSV) text file with a daily statistics report for that date. You can download the *.zip* files and extract them. To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.
Report Date (*time zone*)	Date the custom report began.
Report Hour	Time the custom report began.
Last Modified Date (*time zone*)	Date and time the custom report was last modified.
View	Shows the detail report for the object. Not available for Q.752 reports.

To show details in HTML for custom archived reports, click on a link in the View column of the Custom Archived Report page:

Link	Description
Application Servers	AS Statistics Custom Archived Reports, page 13-245
Application Server Processes	ASP Statistics Custom Archived Reports, page 13-246
Links	Link Statistics Custom Archived Reports, page 13-247
Linksets	Linkset Statistics Custom Archived Reports, page 13-248
Aborts and Continues	•MLR Aborts & Continuous Statistics Custom Archived Reports, page 13-249
Processed	•MLR Processed Statistics Custom Archived Reports, page 13-249
ResultInvokes	•MLR ResultInvokes Statistics Custom Archived Reports, page 13-249
RuleMatches	•MLR RuleMatches Statistics Custom Archived Reports, page 13-249
SubTriggers	•MLR Sub Triggers Statistics Custom Archived Reports, page 13-249
Triggers	•MLR Triggers Statistics Custom Archived Reports, page 13-249

Link	Description
MTP3/AS Events	MTP3/AS Events Custom Archived Reports, page 13-251
Q752	Q752 Statistics Custom Archived Reports, page 13-252

All custom detail reports contain these headings and general menu options:

Heading/ Menu Option	Description
Date and Hour (in heading)	Date and hour of the report.
Offset (in heading)	Shows the number of rows in the table, prior to the first visible row; for example, if the first visible row is 501, the **Offset** is 500.
Number and Sort Order (in heading)	Shows the number of records (rows) in the table, the column by which the table is sorted, and whether the sort is in ascending or descending order.
10/Page	Shows 10 rows in the table.
20/Page	Shows 20 rows in the table.
50/Page	Shows 50 rows in the table.
100/Page	Shows 100 rows in the table.
300/Page	Shows 300 rows in the table.
500/Page	Shows 500 rows in the table.
Max/Page	Shows up to 15,000 rows in the table. **Note** Depending on the number of rows, this could take up to 15 minutes.
DefPrefs	Resets the **/Page** preferences for this web page to the default settings for the MWTM server.
First (at bottom of table)	Shows the first page of entries for the table. For example, if the table is sorted by **Total Aborted** in descending order, clicking this field shows the entries with the highest number of MSUs aborted by MLR. You cannot click this field if the first page of entries is already visible.
Previous (Rows) (at bottom of table)	Shows the previous page of entries for the table. You cannot click this field if the first page of entries is already visible.
Next (Rows) (at bottom of table)	Shows the next page of entries for the table. You cannot click this field if the last page of entries is already visible.
Last (at bottom of table)	Shows the last page of entries for the table. For example, if the table is sorted by **Total Aborted** in descending order, clicking this field shows the entries with the lowest number of MSUs aborted by MLR. You cannot click this field if the last page of entries is already visible.
Total (at bottom of table)	Shows the total number of entries in the table.

Rolling Archived Reports

The All Rolling Reports page shows summary reports of concatenated MWTM hourly and daily network statistics for all of the following objects detected by the MWTM for the server you are connected to:

- Application servers
- Application server processes
- Links
- Linksets

These statistics are stored as downloadable *.zip* files. The *.zip* files are archived by type and number of days (7 or 30). For example:

- *sgmLinkStats.RollingSevenDayAllHours.csv.zip*
- *sgmLinkStats.Rolling30DayAllDays.csv.zip*
- *sgmASEStats.Rolling30DayAllDays.csv.zip*
- *sgmASEStats.RollingSevenDayAllHours.csv.zip*
- *sgmASPStats.Rolling30DayAllDays.csv.zip*
- *sgmASPStats.RollingSevenDayAllHours.csv.zip*

Note To limit the maximum number of rows in export CSV files (for example, Excel can only handle 65,535 rows.) See mwtm statreps, page B-77.

Note Rolling Archived Reports are supported for ITP platforms only.

The MWTM creates a new set of files every hour.

You can download the *.zip* files and extract them. To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Application Server Archived Reports

You can access the following Application Server Archived Reports. These reports are supported on ITP platforms only:

- AS Statistics Hourly Archived Reports, page 13-244
- AS Statistics Daily Archived Reports, page 13-245
- AS Statistics Custom Archived Reports, page 13-245

AS Statistics Hourly Archived Reports

The AS Statistics Hourly Archived Reports page shows all summary reports for archived MWTM hourly network statistics for all application servers that the MWTM detects for the server to which you connect. The information is stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *sgmASEStats.2009-06-22-08.csv.zip* file contains the summary report for hourly application server statistics for the 8th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly network statistics for all application servers that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AS Statistics Daily Archived Reports

The AS Statistics Daily Archived Reports page shows summary reports for all archived MWTM daily network statistics for all application servers that the MWTM detects for the server to which you connect. The information is stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *sgmASEStats.DailySum.2009-06-22.csv.zip* file contains the summary report for daily application server statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all application servers that the MWTM detects on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

AS Statistics Custom Archived Reports

The Application Server Statistics Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for all application servers that the MWTM detects for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

The detailed information about custom archived reports is available in Custom Archived Reports.

Application Server Process Archived Reports

You can access the following Application Server Process Archived Reports. These reports are supported on ITP platforms only:

- ASP Statistics Hourly Archived Reports, page 13-245
- ASP Statistics Daily Archived Reports, page 13-246
- ASP Statistics Custom Archived Reports, page 13-246

ASP Statistics Hourly Archived Reports

The ASP Hourly Statistics Archived Reports page shows the summary reports of all archived MWTM hourly network statistics for all application server processes that the MWTM detects for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *sgmASPStats.2009-06-22-11.csv.zip* file contains the summary report of hourly application server process statistics for the 11th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with the summary report for hourly network statistics for all application server processes that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

ASP Statistics Daily Archived Reports

The ASP Daily Statistics Archived Reports page shows summary reports of all archived MWTM daily network statistics for all application server processes that the MWTM detects for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *sgmASPStats.DailySum.2009-06-22.csv.zip* file contains the summary report of daily application server process statistics for June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all application server processes that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

ASP Statistics Custom Archived Reports

The ASP Statistics Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for all application server processes that the MWTM detects for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

The detailed information about custom archived reports is available in Custom Archived Reports.

GTT Rates Archived Reports

You can access the following GTT Rates Archived Report. This report is supported on ITP platforms only:

- GTT Rates Statistics Hourly Archived Reports, page 13-246.

GTT Rates Statistics Hourly Archived Reports

The GTT Rates Statistics Hourly Archived Reports page shows all archived MWTM hourly GTT rates statistics reports for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *sgmGTTRates.2009-06-22-11.csv.zip* file contains the hourly GTT rates statistics report for the 11th hour on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with an hourly GTT rates statistics report for that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Link Archived Reports

You can access the following Link Archived Reports. These reports are supported on ITP platforms only:

- Link Statistics Hourly Archived Reports, page 13-247
- Link Statistics Daily Archived Reports, page 13-247

- Link Statistics Custom Archived Reports, page 13-247

Link Statistics Hourly Archived Reports

The Link Statistics Hourly Archived Reports page shows summary reports for all archived MWTM hourly network statistics for all links that the MWTM detected for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *sgmLinkStats.2009-06-24-09.csv.zip* file contains the summary reports for hourly link statistics for June 24, 2009 at 9:00 a.m.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of an hourly network statistics for all links that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Link Statistics Daily Archived Reports

The Link Statistics Daily Archived Reports page shows summary reports for all archived MWTM daily network statistics for all links that the MWTM detected for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *sgmLinkStats.DailySum.2009-06-24.csv.zip* file contains the summary report of daily link statistics for June 24, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all links that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Link Statistics Custom Archived Reports

The Link Statistics Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for all Link statistics servers that the MWTM detects for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

The detailed information about custom archived reports is available in Custom Archived Reports.

Linkset Archived Reports

You can access the following Linkset Archived Reports. These reports are supported on ITP platforms only:

- Linkset Statistics Hourly Archived Reports, page 13-248
- Linkset Statistics Daily Archived Reports, page 13-248
- Linkset Statistics Custom Archived Reports, page 13-248

Linkset Statistics Hourly Archived Reports

The Linkset Statistics Hourly Archived Reports page shows summary reports of all archived MWTM hourly network statistics for all linksets that the MWTM detects for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *sgmLinksetStats.2009-06-24-09.csv.zip* file contains the summary report for the hourly linkset statistics for June 24, 2009 at 9:00 a.m.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly network statistics for all linksets that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Linkset Statistics Daily Archived Reports

The Linkset Statistics Daily Archived Reports page shows the summary report of all archived MWTM daily network statistics for all linksets that the MWTM detected for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *sgmLinksetStats.DailySum.2009-06-24.csv.zip* file contains the summary reports of daily linkset statistics for June 24, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all linksets that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Linkset Statistics Custom Archived Reports

The Link Statistics Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for all Linkset statistics servers that the MWTM detects for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

The detailed information about custom archived reports is available in Custom Archived Reports.

MLR Archived Reports

You can access the following MLR Archived Reports. These reports are supported on ITP platforms only:

- MLR Daily Archived Reports, page 13-248
- MLR Custom Archived Reports, page 13-249

MLR Daily Archived Reports

The MLR Daily Archived Reports pages show all archived MWTM daily MLR statistics for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following MLR archived report files:

- MLR Abort & Continues Statistics Daily Archived Reports

- MLR Processed Statistics Daily Archived Reports
- MLR ResultInvokes Statistics Daily Archived Reports
- MLR RuleMatches Statistics Daily Archived Reports
- MLR SubTriggers Statistics Daily Archived Reports
- MLR Triggers Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a daily MLR statistics report for that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

MLR Custom Archived Reports

The MLR Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for all MLR servers that the MWTM detects for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

MWTM displays the following MLR Custom archived reports:

- MLR Aborts & Continuous Statistics Custom Archived Reports
- MLR Processed Statistics Custom Archived Reports
- MLR ResultInvokes Statistics Custom Archived Reports
- MLR RuleMatches Statistics Custom Archived Reports
- MLR Sub Triggers Statistics Custom Archived Reports
- MLR Triggers Statistics Custom Archived Reports

The detailed information about custom archived reports is available in Custom Archived Reports.

MSU Archived Reports

You can access the following MSU Archived Reports. These reports are supported on ITP platforms only:

- MSU Statistics Hourly Archived Reports, page 13-249
- MSU Statistics Daily Archived Reports, page 13-250

MSU Statistics Hourly Archived Reports

The MSU Statistics Hourly Archived Reports page shows summary reports of all archived MWTM hourly MSU rates that the MWTM detects for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type, date, and hour; for example, the *itpHourlyMsuLoad.2009-06-24-09.csv.zip* file contains the summary report for the hourly MSU rates for June 24, 2009 at 9:00 a.m.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly MSU rates that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

MSU Statistics Daily Archived Reports

The MSU Daily Archived Reports page shows the summary report of all archived MWTM daily MSU rates that the MWTM detected for the server to which you connect, stored as downloadable *.zip* files.

The *.zip* files are archived by type and date; for example, the *itpDailyMsuLoad.2009-06-24.csv.zip* file contains the summary reports of daily MSU rates for June 24, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily MSU rates that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

MTP3/AS Events Archived Reports

You can access the following MTP3/AS Events Reports. These reports are supported on ITP platforms only:

- MTP3/AS Events Hourly Archived Reports, page 13-250
- MTP3/AS Events Custom Archived Reports, page 13-251

MTP3/AS Events Hourly Archived Reports

To create hourly MTP3/AS event reports for the MWTM:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter these commands:

```
# cd /opt/CSCOsgm/bin
# ./mwtm evreps enable
# ./mwtm evreps mtp
```

For more details on the **mwtm evreps** commands, see Appendix B, "Command Reference."

Field or Column	Description
Export File	Name of the network events export *.zip* file, archived by type, date, and hour; for example, the *sgmMTP3Events.custom.20867.2009-06-24-16-15.csv.zip* file contains the summary report of custom network events with ID tag 20867 for the 15th minute of the 16th hour on June 24, 2009. Each archived *.zip* file contains a comma-separated value (CSV) text file with a daily statistics report for that date. You can download the *.zip* files and extract them. To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.
Report Start Date (*time zone*)	Date and time the custom report began.
Report Finish Date (*time zone*)	Date and time the custom report ended.
Last Modified Date (*time zone*)	Date and time the custom report was last modified.
View	Shows the custom detail report for the object.

MTP3/AS Events Custom Archived Reports

The MTP3/AS Custom Archived Report pages show all archived MWTM custom network and accounting statistics reports for all MTP3/AS servers that the MWTM detects for the server to which you connect. These reports can be viewed on the web, or downloaded as *.zip* files. These *.zip* files are also stored in the default directory (*/opt/CSCOsgm* by default) in the */reports/custom* directory.

The detailed information about custom archived reports is available in Custom Archived Reports.

Point Code Archived Reports

You can access the following Point Code Archived Report. This report is supported on ITP platforms only:

- Point Codes Daily Archived Reports, page 13-251

Point Codes Daily Archived Reports

The Point Codes Daily Archived Reports page shows all archived MWTM daily point code inventory reports for the server to which you connect, stored as downloadable *.zip* files.

On the Point Codes Daily Archived Reports page, the *.zip* files are archived by date; for example, the *sgmPointCodes.DailyInv.2009-06-24.csv.zip* file contains the daily point code inventory report for June 24, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a list of all point codes that were being used by all nodes that the MWTM detected on that date. You can download the The *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Q752 Archived Reports

You can access the following Q752 Archived Reports:

- Q752 Statistics Hourly Archived Reports, page 13-252
- Q752 Statistics Daily Archived Reports, page 13-252
- Q752 Statistics Custom Archived Reports, page 13-252

Q752 Statistics Hourly Archived Reports

The Q752 Statistics Archived Reports page shows all archived MWTM hourly Q752 reports for the server to which you connect, stored as downloadable *.zip* files. The MWTM creates the following Q752 hourly archived report files each hour:

- Q752 Statistics Hourly
- Q752 Table 4 Statistics Hourly
- Q752 Table 5 Destination Congestion Statistics Hourly
- Q752 Table 5 Routing Drops Statistics Hourly
- Q752 Table 5 User Part Unavailable Statistics Hourly

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of all Q752 links that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Q752 Statistics Daily Archived Reports

The Q752 Statistics Archived Reports page shows all archived MWTM daily Q752 reports for the server to which you connect, stored as downloadable *.zip* files. The MWTM creates the following Q752 daily archived report files each day:

- Q752 Statistics Daily
- Q752 Table 4 Statistics Daily
- Q752 Table 5 Destination Congestion Statistics Daily
- Q752 Table 5 Routing Drops Statistics Daily
- Q752 Table 5 User Part Unavailable Statistics Daily

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of all Q752 links that the MWTM detected on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Q752 Statistics Custom Archived Reports

The Q752 Statistics Custom Archived Reports page shows all archived MWTM hourly Q752 reports for the server to which you connect, stored as downloadable *.zip* files.

On the Q752 Custom Archived Reports page, the *.zip* files are archived by date; for example, the *sgmQ752Stats.2009-06-24.csv.zip* file contains the Custom Q752 report for June 24, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of all Q752 links that the MWTM detected on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

SCTP Archived Reports

You can access the following SCTP Archived Report:

- SCTP Statistics 15 Minute Archived Reports, page 13-253
- SCTP Statistics Hourly Archived Reports, page 13-253
- SCTP Statistics Daily Archived Reports, page 13-253

SCTP Statistics 15 Minute Archived Reports

The SCTP Statistics 15 Minute Archived Reports page shows all archived MWTM SCTP 15 minute reports for the server to which you connect, stored as downloadable *.zip* files.

On the SCTP Statistics 15 Minute Archived Reports page, the *.zip* files are archived by date; for example, the *sgmSCTPStats.2009-06-22-11-30.csv.zip* file contains the SCTP 15-minute report for the 11th hour, 30 minutes on June 22, 2009.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of all SCTP links that the MWTM detected on that date, hour, and minute. You can download the The *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

SCTP Statistics Hourly Archived Reports

The SCTP Statistics Hourly Archived Reports page shows all archived MWTM SCTP hourly reports for the server to which you connect, stored as downloadable *.zip* files.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of all SCTP links that the MWTM detected on that date and hour. You can download the The *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

SCTP Statistics Daily Archived Reports

The SCTP Statistics Daily Archived Reports page shows all archived MWTM SCTP daily reports for the server to which you connect, stored as downloadable *.zip* files.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of all SCTP links that the MWTM detected on that date. You can download the The *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Viewing File Archive Mobile Statistics Reports

Mobile Reports that have been archived are located within **File Archive > Mobile Statistics** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view any of the following Mobile archived reports:

- CSG Archived Reports, page 13-254
- GGSN Archived Reports, page 13-256
- HA Archived Reports, page 13-258
- PDNGW Archived Reports, page 13-259
- PDSN Archived Reports, page 13-262
- SGW Archived Reports, page 13-263
- SLB Archived Reports, page 13-265

CSG Archived Reports

You can access the following CSG Archived Reports:

- CSG 15 Minute Archived Reports, page 13-254
- CSG Hourly Archived Reports, page 13-255
- CSG Daily Archived Reports, page 13-256

CSG 15 Minute Archived Reports

The 15 minute CSG Archived Reports page shows summary reports of all archived MWTM 15 minute CSG statistics. MWTM creates the following CSG 15 Minute archived report files for every 15 Minutes:

- CSG BMA Statistics 15 Minute Archived Reports
- CSG Global Peak Rates 15 Minute Archived Reports
- CSG Protocol Rates 15 Minute Archived Reports
- CSG Load Session Rates 15 Minute Archived Reports
- CSG Load Radius Rates 15 Minute Archived Reports
- CSG Load BMA Rates 15 Minute Archived Reports
- CSG Load User DB Rates 15 Minute Archived Reports
- CSG Load Quota Manager Rates 15 Minute Archived Reports
- CSG Load Gx Event Statistics 15 Minute Archived Reports
- CSG Quota Manager Statistics 15 Minute Archived Reports
- CSG Billing Plan Statistics 15 Minute Archived Reports
- CSG Gx Global Message Statistics 15 Minute Archived Reports
- CSG Gx Global Message Errors 15 Minute Archived Reports

- CSG Gx PCRF Method List Message Statistics 15 Minute Archived Reports
- CSG Gx PCRF Method List Message Errors 15 Minute Archived Reports
- CSG Gx Policy Preload Statistics 15 Minute Archived Reports
- CSG Gx Policy Preload Errors 15 Minute Archived Reports
- CSG Gx Policy Preload Accounting Policy Statistics 15 Minute Archived Reports
- CSG Gx Policy Preload Billing Plan Statistics 15 Minute Archived Reports
- CSG Gx Policy Preload Billing Services Statistics 15 Minute Archived Reports
- CSG Gx Policy Preload Content Policy Statistics 15 Minute Archived Reports
- CSG Gx Policy Preload Service Content Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute CSG statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

CSG Hourly Archived Reports

The CSG Hourly Archived Reports page shows the summary reports of all archived MWTM hourly CSG statistics. MWTM creates the following CSG hourly archived report files each hour:

- CSG BMA Statistics Hourly Archived Reports
- CSG Global Peak Rates Hourly Archived Reports
- CSG Protocol Rates Hourly Archived Reports
- CSG Load Session Rates Hourly Archived Reports
- CSG Load Radius Rates Hourly Archived Reports
- CSG Load BMA Rates Hourly Archived Reports
- CSG Load User DB Rates Hourly Archived Reports
- CSG Load Quota Manager Rates Hourly Archived Reports
- CSG Load Gx Event Statistics Hourly Archived Reports
- CSG Quota Manager Statistics Hourly Archived Reports
- CSG Billing Plan Statistics Hourly Archived Reports
- CSG Gx Global Message Statistics Hourly Archived Reports
- CSG Gx Global Message Errors Hourly Archived Reports
- CSG Gx PCRF Method List Message Statistics Hourly Archived Reports
- CSG Gx PCRF Method List Message Errors Hourly Archived Reports
- CSG Gx Policy Preload Statistics Hourly Archived Reports
- CSG Gx Policy Preload Errors Hourly Archived Reports
- CSG Gx Policy Preload Accounting Policy Statistics Hourly Archived Reports
- CSG Gx Policy Preload Billing Plan Statistics Hourly Archived Reports
- CSG Gx Policy Preload Billing Services Statistics Hourly Archived Reports
- CSG Gx Policy Preload Content Policy Statistics Hourly Archived Reports
- CSG Gx Policy Preload Service Content Statistics Hourly Archived Reports

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

CSG Daily Archived Reports

The Daily CSG Archived Reports page shows summary reports of all archived MWTM daily CSG statistics. MWTM creates the following CSG daily archived report files each day:

- CSG BMA Statistics Daily Archived Reports
- CSG Global Peak Rates Daily Archived Reports
- CSG Protocol Rates Daily Archived Reports
- CSG Load Session Rates Daily Archived Reports
- CSG Load Radius Rates Daily Archived Reports
- CSG Load BMA Rates Daily Archived Reports
- CSG Load User DB Rates Daily Archived Reports
- CSG Load Quota Manager Rates Daily Archived Reports
- CSG Load Gx Event Statistics Daily Archived Reports
- CSG Quota Manager Statistics Daily Archived Reports
- CSG Billing Plan Statistics Daily Archived Reports
- CSG Gx Global Message Statistics Daily Archived Reports
- CSG Gx Global Message Errors Daily Archived Reports
- CSG Gx PCRF Method List Message Statistics Daily Archived Reports
- CSG Gx PCRF Method List Message Errors Daily Archived Reports
- CSG Gx Policy Preload Statistics Daily Archived Reports
- CSG Gx Policy Preload Errors Daily Archived Reports
- CSG Gx Policy Preload Accounting Policy Statistics Daily Archived Reports
- CSG Gx Policy Preload Billing Plan Statistics Daily Archived Reports
- CSG Gx Policy Preload Billing Services Statistics Daily Archived Reports
- CSG Gx Policy Preload Content Policy Statistics Daily Archived Reports
- CSG Gx Policy Preload Service Content Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily CSG statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

GGSN Archived Reports

You can access these reports:

- GGSN 15 Minute Archived Reports, page 13-257
- GGSN Hourly Archived Reports, page 13-257
- GSGN Daily Archived Reports, page 13-258

GGSN 15 Minute Archived Reports

The 15 minute GGSN Archived Reports page shows summary reports of all archived MWTM 15 minute GGSN statistics. MWTM creates the following GGSN 15 Minute archived report files for every 15 Minutes:

- APN Aggregate Miscellaneous Statistics 15 Minute Archived Reports
- APN Aggregate PDP/Bearer Statistics 15 Minute Archived Reports
- APN Aggregate PDP/Bearer Extended Statistics 15 Minute Archived Reports
- APN Aggregate Throughput Statistics 15 Minute Archived Reports
- APN Instance Miscellaneous Statistics 15 Minute Archived Reports
- APN Instance PDP/Bearer Statistics 15 Minute Archived Reports
- APN Instance PDP/Bearer Extended Statistics 15 Minute Archived Reports
- APN Instance Throughput Statistics 15 Minute Archived Reports
- GTP Active Statistics 15 Minute Archived Reports
- GTP Error Statistics 15 Minute Archived Reports
- GTP PDP Statistics 15 Minute Archived Reports
- GTP Throughput Statistics 15 Minute Archived Reports
- GTP Path Throughput Statistics 15 Minute Archived Reports
- GTP Charging Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute network statistics for all application servers that the MWTM detects on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

GGSN Hourly Archived Reports

The Hourly GGSN Archived Reports page shows all summary reports for archived MWTM hourly statistics. MWTM creates the following GGSN hourly archived report files for each hour:

- APN Aggregate Miscellaneous Statistics Hourly Archived Reports
- APN Aggregate PDP/Bearer Statistics Hourly Archived Reports
- APN Aggregate PDP/Bearer Extended Statistics Hourly Archived Reports
- APN Aggregate Throughput Statistics Hourly Archived Reports
- APN Instance Miscellaneous Statistics Hourly Archived Reports
- APN Instance PDP/Bearer Statistics Hourly Archived Reports
- APN Instance PDP/Bearer Extended Statistics Hourly Archived Reports
- APN Instance Throughput Statistics Hourly Archived Reports
- GTP Active Statistics Hourly Archived Reports
- GTP Error Statistics Hourly Archived Reports
- GTP PDP Statistics Hourly Archived Reports
- GTP Throughput Statistics Hourly Archived Reports

- GTP Path Throughput Statistics Hourly Archived Reports
- GTP Charging Statistics Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly network statistics for all application servers that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

GSGN Daily Archived Reports

The GGSN Daily Archived Reports page shows summary reports for all archived MWTM daily statistics. MWTM creates the following GGSN daily archived report files for each day:

- APN Aggregate Miscellaneous Statistics Daily Archived Reports
- APN Aggregate PDP/Bearer Statistics Daily Archived Reports
- APN Aggregate PDP/Bearer Extended Statistics Daily Archived Reports
- APN Aggregate Throughput Statistics Daily Archived Reports
- APN Instance Miscellaneous Statistics Daily Archived Reports
- APN Instance PDP/Bearer Statistics Daily Archived Reports
- APN Instance PDP/Bearer Extended Statistics Daily Archived Reports
- APN Instance Throughput Statistics Daily Archived Reports
- GTP Active Statistics Daily Archived Reports
- GTP Error Statistics Daily Archived Reports
- GTP PDP Statistics Daily Archived Reports
- GTP Throughput Statistics Daily Archived Reports
- GTP Path Throughput Statistics Daily Archived Reports
- GTP Charging Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all application servers that the MWTM detects on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

HA Archived Reports

You can access these HA Archived Reports:

- HA Registration Statistics 15 Minute Archived Reports, page 13-259
- HA Registration Statistics Hourly Archived Reports, page 13-259
- HA Registration Statistics Daily Archived Reports, page 13-259

HA Registration Statistics 15 Minute Archived Reports

The HA Registration Statistics 15 Minute Archived Reports page shows summary reports of 15-minute statistical details on Home Agent registration and binding updates. The HA 15 Minute Archived Report has the file name HomeAgentRegistrationStatsEntry.*year.month-day-hour-minute*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15-minute registration statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

HA Registration Statistics Hourly Archived Reports

The HA Registration Statistics Hourly Archived Reports page shows summary reports of hourly statistical details on Home Agent registration and binding updates. The HA Hourly Archived Report has the file name HomeAgentRegistrationStatsEntry.*year-month-day-hour*.csv.zip

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly registration statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

HA Registration Statistics Daily Archived Reports

The HA Registration Statistics Daily Archived Reports page shows summary reports of daily statistical details on Home Agent registration and binding updates. The HA Daily Archived Report has the file name HomeAgentRegistrationStatsEntry.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily registration statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDNGW Archived Reports

You can access these reports

- PDNGW 15 Minute Archived Reports, page 13-259
- PDNGW Hourly Archived Reports, page 13-260
- PDNGW Daily Archived Reports, page 13-261

PDNGW 15 Minute Archived Reports

The 15 minute PDNGW Archived Reports page shows summary reports of all archived MWTM 15 minute PDNGW statistics. MWTM creates the following PDNGW 15 Minute archived report files for every 15 Minutes:

- APN Aggregate Miscellaneous Statistics 15 Minute Archived Reports
- APN Aggregate PDP/Bearer Statistics 15 Minute Archived Reports
- APN Aggregate PDP/Bearer Extended Statistics 15 Minute Archived Reports
- APN Aggregate Throughput Statistics 15 Minute Archived Reports

- APN Instance Miscellaneous Statistics 15 Minute Archived Reports
- APN Instance PDP/Bearer Statistics 15 Minute Archived Reports
- APN Instance PDP/Bearer Extended Statistics 15 Minute Archived Reports
- APN Instance Throughput Statistics 15 Minute Archived Reports
- EPC Gateway Protection Statistics 15 Minute Archived Reports
- EPC Gateway Buffering Statistics 15 Minute Archived Reports
- GTP Active Statistics 15 Minute Archived Reports
- GTP Error Statistics 15 Minute Archived Reports
- GTP Path Errors 15 Minute Archived Reports
- GTP PDP/Bearer Statistics 15 Minute Archived Reports
- GTP Throughput Statistics 15 Minute Archived Reports
- GTP Path Throughput Statistics 15 Minute Archived Reports
- GTP Charging Statistics 15 Minute Archived Reports
- GTPv2 Bearer Statistics 15 Minute Archived Reports
- GTPv2 Session Statistics 15 Minute Archived Reports
- GTPv2 Path Bearer Statistics 15 Minute Archived Reports
- GTPv2 Path Session Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute network statistics for all application servers that the MWTM detects on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDNGW Hourly Archived Reports

The Hourly PDNGW Archived Reports page shows all summary reports for archived MWTM hourly statistics. MWTM creates the following PDNGW hourly archived report files for each hour:

- APN Aggregate Miscellaneous Statistics Hourly Archived Reports
- APN Aggregate PDP/Bearer Statistics Hourly Archived Reports
- APN Aggregate PDP/Bearer Extended Statistics Hourly Archived Reports
- APN Aggregate Throughput Statistics Hourly Archived Reports
- APN Instance Miscellaneous Statistics Hourly Archived Reports
- APN Instance PDP/Bearer Statistics Hourly Archived Reports
- APN Instance PDP/Bearer Extended Statistics Hourly Archived Reports
- APN Instance Throughput Statistics Hourly Archived Reports
- EPC Gateway Protection Statistics Hourly Archived Reports
- EPC Gateway Buffering Statistics Hourly Archived Reports
- GTP Active Statistics Hourly Archived Reports
- GTP Error Statistics Hourly Archived Reports
- GTP Path Errors Hourly Archived Reports

- GTP PDP/Bearer Statistics Hourly Archived Reports
- GTP Throughput Statistics Hourly Archived Reports
- GTP Path Throughput Statistics Hourly Archived Reports
- GTP Charging Statistics Hourly Archived Reports
- GTPv2 Bearer Statistics Hourly Archived Reports
- GTPv2 Session Statistics Hourly Archived Reports
- GTPv2 Path Bearer Statistics Hourly Archived Reports
- GTPv2 Path Session Statistics Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly network statistics for all application servers that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

PDNGW Daily Archived Reports

The PDNGW Daily Archived Reports page shows summary reports for all archived MWTM daily statistics. MWTM creates the following PDNGW daily archived report files for each day:

- APN Aggregate Miscellaneous Statistics Daily Archived Reports
- APN Aggregate PDP/Bearer Statistics Daily Archived Reports
- APN Aggregate PDP/Bearer Extended Statistics Daily Archived Reports
- APN Aggregate Throughput Statistics Daily Archived Reports
- APN Instance Miscellaneous Statistics Daily Archived Reports
- APN Instance PDP/Bearer Statistics Daily Archived Reports
- APN Instance PDP/Bearer Extended Statistics Daily Archived Reports
- APN Instance Throughput Statistics Daily Archived Reports
- EPC Gateway Protection Statistics Daily Archived Reports
- EPC Gateway Buffering Statistics Daily Archived Reports
- GTP Active Statistics Daily Archived Reports
- GTP Error Statistics Daily Archived Reports
- GTP Path Errors Daily Archived Reports
- GTP PDP/Bearer Statistics Daily Archived Reports
- GTP Throughput Statistics Daily Archived Reports
- GTP Path Throughput Statistics Daily Archived Reports
- GTP Charging Statistics Daily Archived Reports
- GTPv2 Bearer Statistics Daily Archived Reports
- GTPv2 Session Statistics Daily Archived Reports
- GTPv2 Path Bearer Statistics Daily Archived Reports
- GTPv2 Path Session Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all application servers that the MWTM detects on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

PDSN Archived Reports

You can access the following PDSN Archived Reports:

- PDSN 15 Minute Archived Reports, page 13-262
- PDSN Hourly Archived Reports, page 13-262
- PDSN Daily Archived Reports, page 13-263

PDSN 15 Minute Archived Reports

The PDSN 15 Minute Archived Reports page shows summary reports of 15-minute statistical details of the PDSN. The MWTM creates the following PDSN 15 minute archived report files for every 15 minutes:

- PDSN Session Statistics 15 Minute Archived Reports
- PDSN Session Bandwidth Statistics 15 Minute Archived Reports
- PDSN Flow Statistics 15 Minute Archived Reports
- PDSN Flow Extended Statistics 15 Minute Archived Reports
- PDSN Packet Control Function Statistics 15 Minute Archived Reports
- PDSN Traffic Statistics 15 Minute Archived Reports
- PDSN Traffic Extended Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15-minute PDSN statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDSN Hourly Archived Reports

The PDSN Hourly Archived Reports page shows summary reports of hourly statistical details of the PDSN. MWTM creates the following PDSN hourly archived reports every hour:

- PDSN Session Statistics Hourly Archived Reports
- PDSN Session Bandwidth Statistics Hourly Archived Reports
- PDSN Flow Statistics Hourly Archived Reports
- PDSN Flow Extended Statistics Hourly Archived Reports
- PDSN Packet Control Function Statistics Hourly Archived Reports
- PDSN Traffic Statistics Hourly Archived Reports
- PDSN Traffic Extended Statistics Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly PDSN statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDSN Daily Archived Reports

The PDSN Daily Archived Reports page shows summary reports of daily statistical details of the PDSN. MWTM creates the following PDSN daily archived reports each day:

- PDSN Session Statistics Daily Archived Reports
- PDSN Session Bandwidth Statistics Daily Archived Reports
- PDSN Flow Statistics Daily Archived Reports
- PDSN Flow Extended Statistics Daily Archived Reports
- PDSN Packet Control Function Statistics Daily Archived Reports
- PDSN Traffic Statistics Daily Archived Reports
- PDSN Traffic Extended Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily PDSN statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SGW Archived Reports

You can access these reports

- SGW 15 Minute Archived Reports, page 13-263
- SGW Hourly Archived Reports, page 13-264
- SGW Daily Archived Reports, page 13-265

SGW 15 Minute Archived Reports

The 15 minute SGW Archived Reports page shows summary reports of all archived MWTM 15 minute SGW statistics. MWTM creates the following SGW 15 Minute archived report files for every 15 Minutes:

- APN Aggregate Bearer Statistics 15 Minute Archived Reports
- APN Aggregate Throughput Statistics 15 Minute Archived Reports
- APN Instance Bearer Statistics 15 Minute Archived Reports
- APN Instance Throughput Statistics 15 Minute Archived Reports
- EPC Gateway Protection Statistics 15 Minute Archived Reports
- EPC Gateway Buffering Statistics 15 Minute Archived Reports
- GTP Active Statistics 15 Minute Archived Reports
- GTP Error Statistics 15 Minute Archived Reports
- GTP Path Errors 15 Minute Archived Reports
- GTP Bearer Statistics 15 Minute Archived Reports
- GTP Throughput Statistics 15 Minute Archived Reports

- GTP Path Throughput Statistics 15 Minute Archived Reports
- GTP Charging Statistics 15 Minute Archived Reports
- GTPv2 Bearer Statistics 15 Minute Archived Reports
- GTPv2 Session Statistics 15 Minute Archived Reports
- GTPv2 Path Bearer Statistics 15 Minute Archived Reports
- GTPv2 Path Session Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute network statistics for all application servers that the MWTM detects on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SGW Hourly Archived Reports

The Hourly SGW Archived Reports page shows all summary reports for archived MWTM hourly statistics. MWTM creates the following SGW hourly archived report files for each hour:

- APN Aggregate Bearer Statistics Hourly Archived Reports
- APN Aggregate Throughput Statistics Hourly Archived Reports
- APN Instance Bearer Statistics Hourly Archived Reports
- APN Instance Throughput Statistics Hourly Archived Reports
- EPC Gateway Protection Statistics Hourly Archived Reports
- EPC Gateway Buffering Statistics Hourly Archived Reports
- GTP Active Statistics Hourly Archived Reports
- GTP Error Statistics Hourly Archived Reports
- GTP Path Errors Hourly Archived Reports
- GTP Bearer Statistics Hourly Archived Reports
- GTP Throughput Statistics Hourly Archived Reports
- GTP Path Throughput Statistics Hourly Archived Reports
- GTP Charging Statistics Hourly Archived Reports
- GTPv2 Bearer Statistics Hourly Archived Reports
- GTPv2 Session Statistics Hourly Archived Reports
- GTPv2 Path Bearer Statistics Hourly Archived Reports
- GTPv2 Path Session Statistics Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly network statistics for all application servers that the MWTM detected on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

SGW Daily Archived Reports

The SGW Daily Archived Reports page shows summary reports for all archived MWTM daily statistics. MWTM creates the following SGW daily archived report files for each day:

- APN Aggregate Bearer Statistics Daily Archived Reports
- APN Aggregate Throughput Statistics Daily Archived Reports
- APN Instance Bearer Statistics Daily Archived Reports
- APN Instance Throughput Statistics Daily Archived Reports
- EPC Gateway Protection Statistics Daily Archived Reports
- EPC Gateway Buffering Statistics Daily Archived Reports
- GTP Active Statistics Daily Archived Reports
- GTP Error Statistics Daily Archived Reports
- GTP Path Errors Daily Archived Reports
- GTP Bearer Statistics Daily Archived Reports
- GTP Throughput Statistics Daily Archived Reports
- GTP Path Throughput Statistics Daily Archived Reports
- GTP Charging Statistics Daily Archived Reports
- GTPv2 Bearer Statistics Daily Archived Reports
- GTPv2 Session Statistics Daily Archived Reports
- GTPv2 Path Bearer Statistics Daily Archived Reports
- GTPv2 Path Session Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily network statistics for all application servers that the MWTM detects on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

SLB Archived Reports

The SLB archived reports shows all the archived MWTM reports for the server to which you connected.

You can access these reports:

- SLB 15 Minute Archived Reports, page 13-265
- SLB Hourly Archived Reports, page 13-266
- SLB Daily Archived Reports, page 13-266

SLB 15 Minute Archived Reports

The 15 Minute SLB Archived Reports page shows all archived MWTM SLB 15 minute reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following SLB15 Minute archived report files for every 15 minutes:

- SLB Global Statistics 15 Minute Archived Reports
- SLB Real Server Statistics 15 Minute Archived Reports

- SLB Virtual Server Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly SLB statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SLB Hourly Archived Reports

The SLB Hourly Archived Reports page shows the summary reports of all archived MWTM hourly SLB statistic. MWTM creates the following SLB hourly archived report files for each hour:

- SLB Global Statistics Hourly Archived Reports
- SLB Real Server Statistics Hourly Archived Reports
- SLB Virtual Server Statistics Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly SLB statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SLB Daily Archived Reports

The SLB Daily Archived Reports page shows summary reports of all archived MWTM daily SLB statistics. MWTM creates the following SLB daily archived report files each day:

- SLB Global Statistics Daily Archived Reports
- SLB Real Server Statistics Daily Archived Reports
- SLB Virtual Server Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly SLB statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Viewing File Archive RAN Statistics Reports

RAN Reports that have been archived are located within **File Archive > RAN Statistics** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view any of the following RAN archived reports:

- Ethernet Archived Reports, page 13-267
- PWE3 Archived Reports, page 13-267
- QOS Archived Reports, page 13-268
- RAN-Optimized Archived Reports, page 13-269

Ethernet Archived Reports

The Ethernet archived reports shows all the archived MWTM reports for the server to which you connected.

You can access these reports:

- Ethernet Statistics 15 Minute Archived Reports, page 13-267
- Ethernet Statistics Hourly Archived Reports, page 13-267
- Ethernet Statistics Daily Archived Reports, page 13-267

Ethernet Statistics 15 Minute Archived Reports

The Ethernet Statistics 15 Minute Archived Reports page shows summary reports of 15-minute statistical details of the Ethernet.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15-minute Ethernet statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Ethernet Statistics Hourly Archived Reports

The Ethernet Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the Ethernet

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly Ethernet statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Ethernet Statistics Daily Archived Reports

The Ethernet Statistics Daily Archived Reports page shows summary reports of daily statistical details of the Ethernet.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily Ethernet statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PWE3 Archived Reports

The PWE3 archived reports shows all the archived MWTM reports for the server to which you connected.

Note PWE3 reports are available for IPRAN platforms with PWE3 data tunnels configured only. All other RAN reports are available for RAN-O platforms only.

You can access these reports:

- PWE3 Performance 15 Minute Archived Reports, page 13-268

- PWE3 Performance Hourly Archived Reports, page 13-268
- PWE3 Performance Daily Archived Reports, page 13-268

PWE3 Performance 15 Minute Archived Reports

The PWE3 Performance15 Minute Archived Reports page shows summary reports of 15-minute statistical details of the PWE3 performance.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15-minute PWE3 Performance statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PWE3 Performance Hourly Archived Reports

The PWE3 Performance Hourly Archived Reports page shows summary reports of hourly statistical details of the PWE3 Performance.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly PWE3 Performance statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PWE3 Performance Daily Archived Reports

The PWE3 Performance Daily Archived Reports page shows summary reports of daily statistical details of the PWE3 performance.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily PWE3 Performance statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

QOS Archived Reports

The QOS archived reports shows all the archived MWTM reports for the server to which you connected.

You can access these reports:

- QOS 15 Minute Archived Reports, page 13-268
- QOS Hourly Archived Reports, page 13-269
- QOS Daily Archived Reports, page 13-269

QOS 15 Minute Archived Reports

The 15 Minute QOS Archived Reports page shows all archived MWTM QOS 15 minute reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following QOS 15 Minute archived report files for every 15 minutes:

- QOS Class Map Statistics 15 Minute Archived Reports
- QOS Match Statement Statistics 15 Minute Archived Reports

- QOS Packet Marking Statistics 15 Minute Archived Reports
- QOS Policing Statistics 15 Minute Archived Reports
- QOS Queuing Statistics 15 Minute Archived Reports
- QOS Traffic Shaping Statistics 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute QOS statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

QOS Hourly Archived Reports

The Hourly QOS Archived Reports page shows all archived MWTM QOS hourly reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following QOS hourly archived report files for every hour:

- QOS Class Map Statistics Hourly Archived Reports
- QOS Match Statement Statistics Hourly Archived Reports
- QOS Packet Marking Statistics Hourly Archived Reports
- QOS Policing Statistics Hourly Archived Reports
- QOS Queuing Statistics Hourly Archived Reports
- QOS Traffic Shaping Statistics Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly QOS statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

QOS Daily Archived Reports

The daily QOS Archived Reports page shows all archived MWTM QOS daily reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following QOS daily archived report files each day:

- QOS Class Map Statistics Daily Archived Reports
- QOS Match Statement Statistics Daily Archived Reports
- QOS Packet Marking Statistics Daily Archived Reports
- QOS Policing Statistics Daily Archived Reports
- QOS Queuing Statistics Daily Archived Reports
- QOS Traffic Shaping Statistics Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily QOS statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

RAN-Optimized Archived Reports

The QOS archived reports shows all the archived MWTM reports for the server to which you connected.

You can access these reports:

- RAN-Optimized 15 Minute Archived Reports, page 13-270
- RAN-Optimized Hourly Archived Reports, page 13-270
- RAN-Optimized Daily Archived Reports, page 13-270

RAN-Optimized 15 Minute Archived Reports

The 15 Minute RAN-Optimized Archived Reports page shows all archived MWTM RAN-Optimized 15 minute reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following RAN-Optimized 15 Minute archived report files for every 15 minutes:

- RAN-O Backhaul Statistics 15 Minute Archived Reports
- RAN-O Congestion Statistics 15 Minute Archived Reports
- RAN-O GSM Errors 15 Minute Archived Reports
- RAN-O Shorthaul Performance15 Minute Archived Reports
- RAN-O UMTS Errors 15 Minute Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of 15 minute RAN-Optimized statistics on that date, hour, and minute. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

RAN-Optimized Hourly Archived Reports

The Hourly RAN-Optimized Archived Reports page shows all archived MWTM RAN-Optimized hourly reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following RAN-Optimized hourly archived report files for every hour:

- RAN-O Backhaul Statistics Hourly Archived Reports
- RAN-O Congestion Statistics Hourly Archived Reports
- RAN-OGSM Errors Hourly Archived Reports
- RAN-O Shorthaul Performance Hourly Archived Reports
- RAN-O UMTS Errors Hourly Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly RAN-Optimized statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

RAN-Optimized Daily Archived Reports

The daily RAN-Optimized Archived Reports page shows all archived MWTM RAN-Optimized daily reports for the server to which you connect, stored as downloadable *.zip* files. MWTM creates the following RAN-Optimized daily archived report files each day:

- RAN-O Backhaul Statistics Daily Archived Reports
- RAN-O Congestion Statistics Daily Archived Reports
- RAN-OGSM Errors Daily Archived Reports

- RAN-O Shorthaul Daily Archived Reports
- RAN-O UMTS Errors Daily Archived Reports

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily RAN-Optimized statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, click a filename, then save the file to a location of your choice. You can also import the file directly into Microsoft Excel.

Viewing File Archive ITP Accounting Reports

ITP Accounting Reports that have been archived are located within **File Archive > ITP Accounting** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view any of the following ITP Accounting archived reports:

- GTT Accounting Archived Reports, page 13-271
- MTP3/AS Accounting Archived Reports, page 13-272

GTT Accounting Archived Reports

The GTT accounting archived reports shows all the archived MWTM reports for the server to which you connected. You can access these reports:

- GTT Accounting Daily Archived Reports, page 13-271
- GTT Accounting Custom Archived Reports, page 13-271

GTT Accounting Daily Archived Reports

The GTT Accounting Daily Archived Reports page shows summary reports of daily statistical details of the GTT Accounting Daily Reports.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily GTT accounting statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

GTT Accounting Custom Archived Reports

The GTT Accounting Custom Archived Reports page shows summary reports of daily statistical details of the GTT accounting custom reports.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily GTT accounting custom statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

MTP3/AS Accounting Archived Reports

The MTP3/AS Accounting archived reports shows all the archived MWTM reports for the server to which you connected. You can access these reports:

- MTP3/AS Accounting Daily Archived Reports, page 13-272
- MTP3/AS Accounting Custom Archived Reports, page 13-272

MTP3/AS Accounting Daily Archived Reports

The MTP3/AS Accounting Daily Archived Reports page shows summary reports of daily statistical details of the MTP3/AS Accounting Daily Reports.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily MTP3/AS accounting statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

MTP3/AS Accounting Custom Archived Reports

The MTP3/AS Accounting Custom Archived Reports page shows summary reports of daily statistical details of the GTT accounting custom reports.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily MTP3/AS accounting custom statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Viewing File Archive Mobile Subscribers Reports

Mobile Subscribers Reports that have been archived are located within **File Archive > Mobile Subscribers** in the MWTM web interface. You can also find archived reports in the */opt/CSCOsgm/reports* directory on the MWTM server or an alternate location as configured by the MWTM system administrator. All archived reports are saved as export files in .csv format.

You can view full descriptions of all fields in export file archive reports by clicking **Administrative** from the MWTM web interface, then clicking **Export Reports README** under System Information.

You can view the following Mobile Subscribers archived reports:

- BWG Subscriber Statistics Archived Reports, page 13-272
- CSG Subscriber Statistics Archived Reports, page 13-273
- GGSN Subscriber Statistics Archived Reports, page 13-274
- HA Subscriber Statistics Archived Reports, page 13-275
- PDNGW Subscriber Statistics Archived Reports, page 13-276
- PDSN Subscriber Statistics Archived Reports, page 13-276
- SGW Subscriber Statistics Archived Reports, page 13-277

BWG Subscriber Statistics Archived Reports

You can access the following BWG Subscribers Archived Reports:

BWG Subscriber Statistics Hourly Archived Reports

The BWG Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the BWG. The Hourly BWG Subscriber Statistics Archived Report has the filename BWGSubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly BWG Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

BWG Subscriber Statistics Daily Archived Reports

The BWG Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the BWG. The Daily BWG Subscriber Statistics Archived Report has the filename BWGSubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily BWG Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

BWG Subscriber Statistics Monthly Archived Reports

The BWG Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the BWG. The monthly BWG Subscriber Statistics Archived Report has the filename BWGSubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly BWG Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

CSG Subscriber Statistics Archived Reports

You can access the following CSG Subscribers Archived Reports:

CSG Subscriber Statistics Hourly Archived Reports

The CSG Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the CSG. The Hourly CSG Subscriber Statistics Archived Report has the filename CSGSubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly CSG Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

CSG Subscriber Statistics Daily Archived Reports

The CSG Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the CSG. The Daily CSG Subscriber Statistics Archived Report has the filename CSGSubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily CSG Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

CSG Subscriber Statistics Monthly Archived Reports

The CSG Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the CSG. The monthly CSG Subscriber Statistics Archived Report has the filename CSGSubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly CSG Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

GGSN Subscriber Statistics Archived Reports

You can access the following GGSN Subscribers Archived Reports:

- GGSN Subscriber Statistics Hourly Archived Reports, page 13-274
- GGSN Subscriber Statistics Daily Archived Reports, page 13-274
- GGSN Subscriber Statistics Monthly Archived Reports, page 13-275

GGSN Subscriber Statistics Hourly Archived Reports

The GGSN Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the GGSN. The Hourly GGSN Subscriber Statistics Archived Report has the filename GGSNSubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly GGSN Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

GGSN Subscriber Statistics Daily Archived Reports

The GGSN Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the GGSN. The Daily GGSN Subscriber Statistics Archived Report has the filename GGSNSubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily GGSN Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

GGSN Subscriber Statistics Monthly Archived Reports

The GGSN Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the GGSN. The monthly GGSN Subscriber Statistics Archived Report has the filename GGSNSubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly GGSN Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

HA Subscriber Statistics Archived Reports

You can access the following HA Subscribers Archived Reports:

- HA Subscriber Statistics Hourly Archived Reports, page 13-275
- HA Subscriber Statistics Daily Archived Reports, page 13-275
- HA Subscriber Statistics Monthly Archived Reports, page 13-275

HA Subscriber Statistics Hourly Archived Reports

The HA Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the HA. The Hourly HA Subscriber Statistics Archived Report has the filename HASubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly HA Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

HA Subscriber Statistics Daily Archived Reports

The HA Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the HA. The Daily HA Subscriber Statistics Archived Report has the filename HASubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily HA Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

HA Subscriber Statistics Monthly Archived Reports

The HA Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the HA. The monthly HA Subscriber Statistics Archived Report has the filename HASubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly HA Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDNGW Subscriber Statistics Archived Reports

You can access the following PDNGW Subscribers Archived Reports:

- PDNGW Subscriber Statistics Hourly Archived Reports, page 13-276
- PDNGW Subscriber Statistics Daily Archived Reports, page 13-276
- PDNGW Subscriber Statistics Monthly Archived Reports, page 13-276

PDNGW Subscriber Statistics Hourly Archived Reports

The PDNGW Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the PDNGW. The Hourly PDNGW Subscriber Statistics Archived Report has the filename PDNGWSubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly PDNGW Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDNGW Subscriber Statistics Daily Archived Reports

The PDNGW Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the PDNGW. The Daily PDNGW Subscriber Statistics Archived Report has the filename PDNGWSubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily PDNGW Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDNGW Subscriber Statistics Monthly Archived Reports

The PDNGW Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the PDNGW. The monthly PDNGW Subscriber Statistics Archived Report has the filename PDNGWSubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly PDNGW Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDSN Subscriber Statistics Archived Reports

You can access the following PDSN Subscribers Archived Reports:

- PDSN Subscriber Statistics Hourly Archived Reports, page 13-277

- PDSN Subscriber Statistics Daily Archived Reports, page 13-277
- PDSN Subscriber Statistics Monthly Archived Reports, page 13-277

PDSN Subscriber Statistics Hourly Archived Reports

The PDSN Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the PDSN. The Hourly PDSN Subscriber Statistics Archived Report has the filename PDSNSubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly PDSN Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDSN Subscriber Statistics Daily Archived Reports

The PDSN Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the PDSN. The Daily PDSN Subscriber Statistics Archived Report has the filename PDSNSubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily PDSN Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

PDSN Subscriber Statistics Monthly Archived Reports

The PDSN Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the PDSN. The monthly PDSN Subscriber Statistics Archived Report has the filename PDSNSubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly PDSN Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SGW Subscriber Statistics Archived Reports

You can access the following SGW Subscribers Archived Reports:

- SGW Subscriber Statistics Hourly Archived Reports, page 13-277
- SGW Subscriber Statistics Daily Archived Reports, page 13-278
- SGW Subscriber Statistics Monthly Archived Reports, page 13-278

SGW Subscriber Statistics Hourly Archived Reports

The SGW Subscriber Statistics Hourly Archived Reports page shows summary reports of hourly statistical details of the SGW. The Hourly SGW Subscriber Statistics Archived Report has the filename SGWSubsStats.*year-month-day-hour*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of hourly SGW Subscriber statistics on that date and hour. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SGW Subscriber Statistics Daily Archived Reports

The SGW Subscriber Statistics Daily Archived Reports page shows summary reports of daily statistical details of the SGW. The Daily SGW Subscriber Statistics Archived Report has the filename SGWSubsStats.*year-month-day*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of daily SGW Subscriber statistics on that date. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

SGW Subscriber Statistics Monthly Archived Reports

The SGW Subscriber Statistics Monthly Archived Reports page shows summary reports of monthly statistical details of the SGW. The monthly SGW Subscriber Statistics Archived Report has the filename SGWSubsStats.*year-month*.csv.zip.

Each archived *.zip* file contains a comma-separated value (CSV) text file with a summary report of monthly SGW Subscriber statistics on that month. You can download the *.zip* files and extract them.

To download a *.zip* file, right-click a filename, then save the file to a location of your choice. You can also import the file into Microsoft Excel.

Viewing the MWTM Statistics Reports Logs

You can view a log that contains all messages pertaining to MWTM reports, and a display of the current values of MWTM report parameters and timers.

This section contains this information:

- Viewing the MWTM Report Log, page 13-278
- Viewing the MWTM Report Parameters and Timers, page 13-278

Viewing the MWTM Report Log

For details on viewing the MWTM report log, see Viewing the Report Log, page 12-13.

Viewing the MWTM Report Parameters and Timers

The Report Parameters and Timers page shows the current values of report parameters and timers for the server to which you connect, and which is currently running the MWTM server.

To access the Report Parameters and Timers page, you must run the **mwtm statrep** CLI command on the server. You can also see this information from the Administrative page of the MWTM web interface (**Administrative > General > Properties > Reports**).

Column	Description
AAAReports	Indicates whether the MWTM should generate AAA statistics reports. For more information, see the description of the **mwtm statreps** [**aaa** | **noaaa**] command in mwtm statreps, page B-77
APNReports	Indicates whether the MWTM should APN reports. For more information, see the description of the **mwtm statreps** [**apn** | **noapn**] command in mwtm statreps, page B-77.
AcctReports	Indicates whether the MWTM should generate MTP3 accounting statistics reports. For more information, see the description of the **mwtm statreps** [**acct** | **noacct**] command in mwtm statreps, page B-77.
ChassisInventory	Indicates whether the MWTM should generate chassis inventory reports. For more information, see the description of the **mwtm statreps** [**chassisinventory** | **nochassisinventory**] command in mwtm statreps, page B-77.
CPUReports	Indicates whether the MWTM should generate CPU statistics reports. For more information, see the description of the **mwtm statreps [ggsn | noggsn]** command in mwtm statreps, page B-77.
CSGReports	Indicates whether the MWTM should generate CSG statistics reports. For more information, see the description of the **mwtm statreps [ggsn | noggsn]** command in mwtm statreps, page B-77.
Custom Age	Indicates the maximum number of days the MWTM should archive custom network statistics reports. For more information, see the description of the **mwtm statreps custage** and **mwtm repcustage** commands in mwtm statreps, page B-77.
Daily Age	Indicates the maximum number of days the MWTM should archive daily network statistics reports. For more information, see the description of the **mwtm statreps dailyage** command in mwtm statreps, page B-77.
Daily CSV Age	Indicates the maximum number of days the MWTM should archive daily CSV reports. For more information, see the description of the **mwtm statreps dailycsvage** command in mwtm statreps, page B-77.
DiskCheck	Indicates whether the MWTM should verify that a disk has at least 10 MB of space remaining before enabling network statistics reports. For more information, see the description of the **mwtm statreps** [**diskcheck** | **nodiskcheck**] command in mwtm statreps, page B-77.
EPCReports	Indicates whether the MWTM should generate EPC reports. For more information, see the description of the **mwtm statreps** [**epc** | **noepc**] command in mwtm statreps, page B-77.
ExportReports	Indicates whether the MWTM should generate network statistics reports in export format. For more information, see the description of the **mwtm statreps** [**export** | **noexport**] command in mwtm statreps, page B-77.
GTPReports	Indicates whether the MWTM should generate GTP reports. For more information, see the description of the **mwtm statreps** [**gtp** | **nogtp**] command in mwtm statreps, page B-77.
GTTRatesReports	Indicates whether the MWTM should generate GTT Rates statistics reports. For more information, see the description of the **mwtm statreps [gttrates | nogttrates]** command in mwtm statreps, page B-77.

Column	Description
GTTReports	Indicates whether the MWTM should generate GTT accounting statistics reports. For more information, see the description of the **mwtm statreps** [**gtt** | **nogtt**] command in mwtm statreps, page B-77.
HAReports	Indicates whether the MWTM should generate HA statistics reports. For more information, see the description of the **mwtm statreps [ha | noha]** command in mwtm statreps, page B-77.
Hourly Age	Indicates the maximum number of days the MWTM should archive hourly network statistics reports. For more information, see the description of the **mwtm statreps hourlyage** command in mwtm statreps, page B-77.
Hourly CSV Age	Indicates the maximum number of days the MWTM should archive hourly CSV reports. For more information, see the description of the **mwtm statreps hourlycsvage** command in mwtm statreps, page B-77.
InterfaceReports	Indicates whether the MWTM should generate interface reports. For more information, see the description of the **mwtm statreps** [**interface** | **nointerface**] command in mwtm statreps, page B-77.
Inventory Age	Indicates the maximum number of days the MWTM should archive inventory statistics reports. For more information, see the description of the **mwtm statreps invage** command in mwtm statreps, page B-77.
IPLinks	*For ITP link and linkset reports only.* Indicates whether the MWTM should include links that use the Stream Control Transmission Protocol (SCTP) IP transport protocol in network statistics reports. For more information, see the description of the **mwtm statreps** [**iplinks** | **noiplinks**] command in mwtm statreps, page B-77.
IpLocalPoolReports	Indicates whether the MWTM should generate IP Local Pool statistics reports. For more information, see the description of the **mwtm statreps [iplocalpool | noiplocalpool]** command in mwtm statreps, page B-77.
LinkReports	Reports of ITP link and linkset statistics.
Max CSV Rows	Indicates the maximum number of rows the MWTM should include in export CSV files. For more information, see the description of the **mwtm statreps maxcsvrows** command in mwtm statreps, page B-77.
MEMReports	Indicates whether the MWTM should generate Memory statistics reports. For more information, see the description of the **mwtm statreps** [**mem** | **nomem**] command in mwtm statreps, page B-77.
MLRReports	Indicates whether the MWTM should generate MLR statistics reports. For more information, see the description of the **mwtm statreps** [**mlr** | **nomlr**] command in mwtm statreps, page B-77.
Monthly Age	Indicates the maximum number of days the MWTM should archive monthly network statistics reports. For more information, see the description of the **mwtm statreps monthlyage** command in mwtm statreps, page B-77.
Monthly CSV Age	Indicates the maximum number of days the MWTM should archive monthly CSV reports. For more information, see the description of the **mwtm statreps monthlycsvage** command in mwtm statreps, page B-77.

Column	Description
MSUReports	Indicates whether the MWTM should generate MSU rates reports. For more information, see the description of the **mwtm statreps** [**msu** | **nomsu**] command in mwtm statreps, page B-77.
NullCaps	Indicates whether the MWTM should include SCTP links that do not have planned send and receive capacities in network statistics reports. For more information, see the description of the **mwtm statreps** [**nullcaps** | **nonullcaps**] command in mwtm statreps, page B-77.
Node Name Type	Indicates the name type for the Node column of the CSV reports. The valid values are: • DNS Name • Custom Name • Sys Name
PDSNReports	Indicates whether the MWTM should generate PDSN statistics reports. For more information, see the description of the **mwtm statreps** [**pdsn** | **nopdsn**] command in mwtm statreps, page B-77.
PWE3Reports	Indicates whether the MWTM should generate PWE3 statistics reports. For more information, see the description of the **mwtm statreps [pwe3 | nopwe3]** command in mwtm statreps, page B-77.
QOSReports	Indicates whether the MWTM should generate QOS statistics reports. For more information, see the description of the **mwtm statreps [qos | noqos]** command in mwtm statreps, page B-77.
Q752Reports	Indicates whether the MWTM should generate Q752 reports. For more information, see the description of the **mwtm statreps** [**q752** | **noq752**] command in mwtm statreps, page B-77.
RANOReports	Indicates whether the MWTM should generate RANO statistics reports. For more information, see the description of the **mwtm statreps [rano | norano]** command in mwtm statreps, page B-77.
SCTPReports	Indicates whether the MWTM should generate SCTP statistics reports. For more information, see the description of the **mwtm statreps [sctp | nosctp]** command in mwtm statreps, page B-77.
ServRatio	*For ITP link and linkset reports only.* In-Service values that are outside a normal range are indicated with a red status ball icon in the In-Service cell. An In-Service value is outside the normal range if the following condition is met: **Current In-Service <** *factor* *** Long-Term In-Service** This inequality is used to recognize drops in the In-Service value. Assuming the default factor of 0.95, the Current In-Service value must be greater than or equal to 95% of the Long-Term In-Service value to be in the normal range. For more information, see the description of the **mwtm statreps servratio** command in mwtm statreps, page B-77.
SLBReports	Indicates whether the MWTM should generate SLB statistics reports. For more information, see the description of the **mwtm statreps** [**slb** | **noslb**] command in mwtm statreps, page B-77.

Column	Description
Status	Indicates whether the MWTM should generate network statistics reports. For more information, see the description of the **mwtm statreps** [**disable** | **enable**] command in mwtm statreps, page B-77.
TimeMode	Indicates the time mode for dates in network statistics reports. For more information, see the description of the **mwtm statreps timemode** [**12** | **24**] command in mwtm statreps, page B-77.
Timer files	Indicates timer activities during the last report run by the MWTM. The timer file is useful for identifying how much time the MWTM spends gathering report data and generating reports.
UtilRatio	*For ITP link and linkset reports only.* Values that are outside a normal range are indicated with a red status ball icon in the Send or Receive cell. A value is outside the normal range if the following condition is met: **Current** > *factor* * **Long-Term** This inequality is used to recognize increases in the value. Assuming the default factor of 1.5, the Current value must be less than or equal to 150% of the Long-Term value to be in the normal range. The default value for *factor* is **1.5**. For more information, see the description of the **mwtm statreps utilratio** command in mwtm statreps, page B-77.
Web Names	Indicates whether the MWTM should show real node names or display names in web pages. For more information, see the description of the **mwtm webnames** [**display** | **real**] command in the mwtm webnames, page B-95.
Web Util	*For ITP link and linkset reports only.* Indicates whether the MWTM should display send and receive for linksets and links as percentages or in Erlangs (E), in web pages. For more information, see the description of the **mwtm webutil** [**percent** | **erlangs**] command in mwtm who, page B-96.
XUAReports	Indicates whether the MWTM should generate accounting statistics reports for application servers and application server processes. For more information, see the description of the **mwtm statreps** [**xua** | **noxua**] command in mwtm statreps, page B-77.
15 Min Age	Indicates the maximum number of days the MWTM should archive 15 minute statistics reports. For more information, see the description of the **mwtm statreps 15minage** command in mwtm statreps, page B-77.
15 Min CSV Age	Indicates the maximum number of days the MWTM should archive 15 minute CSV statistics reports. For more information, see the description of the **mwtm statreps 15mincsvage** command in mwtm statreps, page B-77.

Viewing Graph Series Editor Details

The Graph Series Editor window allows you to select data series to show or hide. This window box is available when you select the report output as *Graph*. Most network-level reports contain more than 12 series.

The Graph Series Editor window contains:

Column or Buttons	Description
Selected Series	Displays the FQDN IDs for the data that is used to create the report.
Available Series	Displays the list of available objects for this report. **Note** If there are many objects in the report, the objects in the Available Series column span multiple pages and not all objects are shown on one page. See Using the Toolbar, page 11-6 for more information on using the paging features. To view all selected objects, sort the table by the Display column.
Display **Note** Depending on the report type you select, other columns displayed will differ.	Column of check boxes that allow you to display (by checking) or hide (by unchecking) the data series associated with the chosen backhaul. The MWTM displays no more than 12 series by default. You can change this setting for the MWTM Client Display or the MWTM Web Display: **MWTM Client Display** To change the maximum number of data series that the MWTM client interface displays by default, edit the MAX_CHART_SERIES parameter in the client-side *System.properties* file: • For the Windows client: *C:\Program Files\Cisco Systems\MWTM Client \properties\System.properties* • For Solaris or Linux client: */opt/CSCOsgmClient/System.properties* **Caution** Depending on the processing power and memory of your client system, setting the MAX_CHART_SERIES parameter too high can cause the client display to become unresponsive. If the client becomes unresponsive, set the MAX_CHART_SERIES to a lower value. Remember to restart the client to activate the new MAX_CHART_SERIES value. **MWTM Web Display** To change the maximum number of data series that the MWTM web interface displays by default, edit the MAX_CHART_SERIES parameter in the server-side *System.properties* file: */opt/CSCOsgm/properties/System.properties.* **Caution** Depending on the number of shorthauls that you display, setting the MAX_CHART_SERIES parameter too high can cause the web display to become unresponsive. If the web become unresponsive, set the MAX_CHART_SERIES to a lower value. Remember to restart the client to activate the new MAX_CHART_SERIES value.
Clear Selection	Deselects the selected list of series and then the **OK** button is grayed out. This is a simple way to deselect all the display check boxes.
OK	Applies the selections you made. If you deselect all items in the dialog box, the **OK** and **Clear Selection** buttons are grayed out.
Cancel	Cancels your selections and closes the Graph Series Editor window.
Help	Opens the help system for the Graph Series Editor window.

Locating Stored Reports

The MWTM stores all reports in the report files directory on the */reports* directory. If you installed the MWTM in:

- The default directory, */opt*, then the default report files directory is */opt/CSCOsgm/reports*.
- A different directory or used the **mwtm repdir** command to specify a new directory in which the MWTM should store report files, then the default report files directory resides in that directory.

Note For details on changing the default reports directory by using the **mwtm repdir** command, see Changing the MWTM Reports Directory, page 13-284.

The */reports* directory contains these subdirectories:

Subdirectory	Description
/custom	Contains all custom report files. These are the report files that you generate using these commands: **mwtm accstats**, **mwtm gttstats**, **mwtm linkstats**, **mwtm mlrstats**, **mwtm mtpevents**, **mwtm q752stats**, and **mwtm xuastats** **Note** A unique ID tag, specified when you enter the command, identifies each file. If the user does not specify an ID tag, the MWTM uses the process ID of the command.
/etc	Contains additional files that the MWTM reporting scripts and web pages use, including the *nodes.include*, *linksets.include*, *nodes.exclude*, *linksets.exclude* and *filter.include* files, if they exist.
/export15min	Contains all 15 minute report files exported in *csv.zip* format.
/exportdaily	Contains all daily report files exported in *csv.zip* format.
/exporthourly	Contains all hourly report files exported in *csv.zip* format.
/exportmonthly	Contains all monthly report files exported in *csv.zip* format.
/exportrolling	Contains all rolling report files for these statistics: • Application server • Application server process • Link • Linkset Files are edited and formatted for export and stored as *.zip* files in CSV format. The MWTM rebuilds the files in this subdirectory every hour.

Changing the MWTM Reports Directory

On the server, you can change the directory in which the MWTM stores reports.

To change the MWTM report files directory, log in as the root user, as described in Starting the MWTM Client, page 3-3; or, as a superuser, as described in Specifying a Super User (Server Only), page 2-19, and enter:

```
# cd /opt/CSCOsgm/bin
```

```
# ./mwtm repdir directory
```

where *directory* is the new directory.

Note This command copies all files in the current directory to the new directory. If you log in as the superuser and you do not own the new directory, you might not be able to copy the files. In that case, you must specify a directory that you own or log in as the root user.

Customizing ITP Reports

The following sections include information about generating and modifying ITP reports:

- Generating Custom ITP Statistics Reports Using the CLI, page 13-285
- Including or Excluding Specified Objects in ITP Reports, page 13-287

Generating Custom ITP Statistics Reports Using the CLI

In the MWTM, you can use custom ITP CLI commands to create summary reports of custom ITP statistics and open them as an export file. To create a custom report:

Step 1 Log in as the root user, as described in Starting the MWTM Client, page 3-3, or as a superuser, as described in Specifying a Super User (Server Only), page 2-19.

Step 2 Enter:

```
# cd /opt/CSCOsgm/bin
```

Step 3 Based on the type of custom report you want to generate, enter one of these commands to enable the report:

Note For complete information about these commands, see Appendix B, "Command Reference."

Table 13-1 Custom Report Commands

Custom Report	Command
Application server and application server processes custom statistics	mwtm xuastats
GTT accounting statistics	mwtm gttstats
Link and linkset summary	mwtm linkstats
MLR statistics	mwtm mlrstats
MTP3 accounting statistics	mwtm accstats
MTP3 event summary	mwtm mtpevents
Q.752 statistics	mwtm q752stats

For example, if you entered the command:

```
# ./mwtm accstats mwtm-2600a.cisco.com test1
```

where *test1* is name tag added to the file name to make it easier to find the report.

The MWTM generates these reports:

```
mwtmAccStats.custom.test1.2004-02-13:15.csv.zip
mwtmAccStats.custom.test1.2004-02-13:15.csv.zip
```

To generate a report for all nodes, do not specify a node name as shown in the following example:

```
# ./mwtm accstats
```

Step 4 (Optional) To include or exclude specific nodes, signaling points or linksets in the report, see NoteThe MWTM processes the include files first, then the exclude files., page 13-287.

Step 5 (First-time users only) If this is your first time using the **mwtm accstats**, **mwtm gttstats**, **mwtm mlrstats**, **mwtm mtpevents**, **mwtm q752stats**, or **mwtm xuastats** command to generate a custom ITP report, you must enter the command one more time. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the data being collected appears valid, begins generating the report.

or

If this is your first time using the **mwtm linkstats** command to generate a custom ITP report, you must enter the command two more times. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful link and linkset statistics.
- Third entry continues to calculate statistics, calculates long-term averages, and, if the data being collected appears to be valid, begins generating the report.

Thereafter, you need only enter these commands once to generate the ITP custom report.

Step 6 (Optional) You can automate custom ITP report generation using crontab. For example, to run custom MTP3 accounting statistics every 30 minutes, enter:

```
00, 30 * * * *  /opt/CSCOsgm/bin/mwtm accstats quiet
```

or, to run custom link statistics every 15 minutes, enter:

```
00,15,30,45 * * * *  /opt/CSCOsgm/bin/mwtm linkstats quiet
```

Step 7 You can view custom ITP reports on the MWTM Web interface under **File Archive > Reports > Custom**. Click on the respective link in the View column to see the data in HTML, or click on a *.zip* file to see the data in .csv format.

Note You can only view Q752 reports in .csv format.

The MWTM also stores custom reports in the */custom* directory (for details, see Locating Stored Reports, page 13-284.)

Including or Excluding Specified Objects in ITP Reports

You can include or exclude specific nodes, signaling points, or linksets in ITP reports by creating user-defined files. The nodes, signaling points, and/or linksets that you specify in these files will be included or excluded from enabled MWTM statistics reports and in custom reports enabled with the **default** keyword (or no *node-list* keyword at all), which include:

Command	Filename[1]
mwtm linkstats	nodes.include.linkstats or nodes.include
	nodes.exclude.linkstats or nodes.exclude
	linksets.include.linkstats or linkstats.include
	linksets.exclude.linkstats or linkstats.exclude
mwtm q752stats	nodes.include.q752stats or nodes.include
	nodes.exclude.q752stats or nodes.exclude
	linksets.include.q752stats or linkstats.include
	linksets.exclude.q752stats or linkstats.exclude
mwtm accstats	nodes.include.accstats or nodes.include
	nodes.exclude.accstats or nodes.exclude
	linksets.include.accstats or linkstats.include
	linksets.exclude.accstats or linkstats.exclude
	filter.include.accstats or filter.include[2]
mwtm gttstats	nodes.include.gttstats or nodes.include
	nodes.exclude.gttstats or nodes.exclude
	linksets.include.gttstats or linkstats.include
	linksets.exclude.gttstats or linkstats.exclude
	filter.include.gttstats or filter.include[3]
mwtm mtpevents	nodes.include.mtpevents or nodes.include
	nodes.exclude.mtpevents or nodes.exclude
mwtm mlrstats	nodes.include.mlrstats or nodes.include
	nodes.exclude.mlrstats or nodes.exclude
mwtm xuastats	nodes.include.xuastats or nodes.include
	nodes.exclude.xuastats or nodes.exclude

1. Files on the command line override system files. For example, nodes.include.accstats overrides nodes.include.
2. Format is opc:dpc (originating point code and destination point code).
3. Format is gta:sel (global title address and selector).

Note The MWTM processes the include files first, then the exclude files.

When creating user-defined files, remember that if you installed the MWTM in:

- The default directory, */opt*, then the user-defined file resides in */opt/CSCOsgm/reports/etc/<user-defined file>*.

  A different directory, or if you moved the report files directory using the **mwtm repdir** command, then the */reports/etc/<user-defined file>* resides in that directory.
- Wildcard matching is not supported.
- If a node, signaling point, or linkset appears in both the *include* file and the *exclude* file, it is excluded. That is, excluding an object overrides including the same object.
- If you specify a special *include* file on the **mwtm accstats**, **mwtm gttstats**, **mwtm linkstats**, **mwtm mlrstats**, **mwtm mtpevents**, **mwtm q752stats**, or **mwtm xuastats** command, the MWTM ignores the *include* or *exclude* file.

When creating a *nodes.include* or *nodes.exclude* file:

Each line in the file must contain a single node name, or node name and signaling point name, separated by a colon (**:**) that matches exactly the real, fully qualified name of the node; for example:

```
mwtm-75-59a.cisco.com
mwtm-26-51a.cisco.com
```

To include a specific signaling point, specify the node name and signaling point:

```
mwtm-75-59a.cisco.com;net0
mwtm-26-51a.cisco.com;net0
```

When creating a *linksets.include* or *linksets.exclude* file:

Each line in the file must contain a single linkset name that matches exactly the real, fully qualified linkset name of the linkset, including the node name and signaling point name; for example:

```
mwtm-75-59a.cisco.com;net0:linkset2
mwtm-26-51a.cisco.com;net0:linkset1
```

When creating a *filter.include* file:

Each line in the file must contain a single originating point code and destination point code (for accounting statistics) that matches the current point code format; or a single phone number and selector name (for GTT statistics); for example:

```
1.2.3:5.6.7
8882214040:Selector_1
```

CHAPTER 14

Editing an ITP Route Table File

Cisco IP Transfer Points (ITPs) use a route table to select the appropriate signaling path for each message, or signal unit, that it must forward. The route table provides the destination point code of the packet and the linkset name that it uses to forward the packet.

Note ITP route tables do not support Virtual linksets, and the Cisco Mobile Wireless Transport Manager (MWTM) does not display Virtual linksets in the Route Table dialog box.

This chapter contains:

Editing an MWTM ITP Route Table File

You use the MWTM to edit ITP route table files for an ITP.

To edit a route table file by using the MWTM, open the route table file by using one of these procedures:

Opening a Route Table File from a File

To open a route table file from a file, choose **Tools > Route Table Editor > From File** from the MWTM main menu, select the name of a route table file, then click **OK**.

Note When you open a route table from a file or archive, the MWTM preserves the order of entries that have the same Destination Point Code, Mask, and Cost.

If the chosen route table file contains incorrect linkset entries (for example, if your network configuration changed since the last time the route table file was saved), the Replace Linkset dialog box appears.

You can use the Replace Linkset dialog box to quickly replace incorrect linkset entries in route table files when your network configuration changes.

Field or Button	Description
Linksets That Are No Longer Valid	Indicates the incorrect linksets in the route table file.
Auto Replace with Linkset	Replaces the highlighted incorrect linkset with a correct linkset, chosen from the drop-down list box, in all affected entries in the route table file. To replace an incorrect linkset with a correct linkset, select an incorrect linkset in the Linksets That Are No Longer Valid table, then select a correct linkset from the Auto Replace with Linkset drop-down list box, then click **Apply**. The MWTM automatically replaces the incorrect linkset with the chosen correct linkset in all affected entries in the route table file.
Remove Entries Containing Selected Linkset	Removes all entries that contain the highlighted incorrect linkset from the route table file. To remove all entries that contain an incorrect linkset from the route table fie, select an incorrect linkset in the Linksets That Are No Longer Valid table, then check the Remove Entries Containing Selected Linkset check box, then click **Apply**. The MWTM automatically removes all entries that contain the incorrect linkset from the route table file.
Apply	Applies any changes you made to the route table file and closes the Replace Linkset dialog box. When you have corrected all incorrect linkset entries in the route table file, the **Apply** button becomes the **Done** button.
Done	Closes the Replace Linkset dialog box and opens the Route Table dialog box. When you have corrected all incorrect linksets in the route table file, click **Done**. The Route Table dialog box appears.
Cancel	Closes the Replace Linkset dialog box without saving any changes to the route table file.
Help	Shows online help for the current window.

If the chosen route table file does not contain any incorrect linkset entries, the MWTM skips the Replace Linkset dialog box and the Route Table dialog box appears.

Related Topic:

Editing ITP Route Tables, page 14-5.

Opening a Route Table File from a Node

To open a route table file from a node, use one of these procedures:

- Select a network object in a window, then choose **Tools > Route Table Editor > From Node** from the MWTM main menu. (If you select an Unmanaged node, this option is dimmed and cannot be chosen.)
- Right-click a signaling point in a window, then choose **Edit > Route Table** from the right-click menu. (If you select an Unmanaged signaling point, this option is dimmed and cannot be chosen.)

Note When you open a route table from a node, the MWTM cannot preserve the order of entries that have the same Destination Point Code, Mask, and Cost. Instead, the MWTM loads the entries based on the Destination Linkset. If you need to preserve the order of entries that have the same Destination Point Code, Mask, and Cost, right-click one of the entries and select **Move Up** or **Move Down** to move the entry up or down in the route table. The MWTM preserves the new order of the entries when you save the route table.

If more than one signaling point is associated with the node, the Choose Signaling Point dialog box appears, which you use to select the signaling point whose route table you want to edit.

Field or Button	Description
Signaling Point List	Drop-down list box of signaling points. Select the signaling point with the point code, variant, and network name that matches the route table file you want to edit. If you select a signaling point that has the: • Wrong variant, the MWTM shows the message: `Point code out of range.` • Correct variant but the wrong instance, the Replace Linkset dialog box appears, prompting you to replace or remove most or all of the linksets.
OK	Opens the route table associated with the chosen signaling point. The MWTM reads the active route table from the node and shows it in the Route Table dialog box
Cancel	Closes the Choose Signaling Point dialog box without selecting a signaling point.
Help	Shows online help for the Choose Signaling Point dialog box.

Related Topic:

Editing ITP Route Tables, page 14-5.

Opening a Route Table File from an Archive

To open a route table file from an archive, use one of these procedures:

- Select a network object in a window, then choose **Tools > Route Table Editor > From Archive** from the MWTM main menu. (If you select an **Unmanaged** node, this option is dimmed and cannot be chosen.)
- From the Route Table dialog box, choose **File > Load from Archive**.
- From the Archive Management window, select a route table file from the list, then choose **File > Open File**.

Note When you open a route table from a file or archive, the MWTM preserves the order of entries that have the same Destination Point Code, Mask, and Cost.

The Load Route Table from Archive wizard appears. If more than one signaling point is associated with the node, the Select Node/SP dialog box appears, which you use to select the node and signaling point whose route table you want to edit.

The left pane of the Load Route Table from Archive wizard contains:

Field or Button	Description
Select Node/SP	You can select the signaling point from which the route table file should be loaded. You can optionally check the **Filter by Node** check box, which limits signaling point selection to a specific node. Select a signaling point and node (optional) from the drop-down list boxes in the right pane. The MWTM retrieves route table filenames from the chosen signaling point. If no route table filenames are available, the process ends with errors. If route table filenames are available, the MWTM proceeds directly to the **Select Version** step.
Select Version	You can select the version you want to load. Click a version to highlight it, then select **Next**. The table includes: • **Rev**—Revision number. • **Date**—Date and time the version was created. • **Comments**—Provided at the time of creation, if applicable. • **Author**—Initiator of the comments.
Load	Loads the chosen file.
Next>	Advances to the next step in the Deployment wizard.
Cancel	Closes the wizard without loading a file.
Help	Shows online help for the Load Route Table from Archive wizard.

Related Topic:

Editing ITP Route Tables, page 14-5.

Editing ITP Route Tables

You use the MWTM to edit ITP route tables for an ITP. ITP uses route tables to locate a destination linkset for a packet whose destination point code does not match the ITP's local point code.

The Route Table dialog box appears when you open a route table from one of these objects:

- **File**—See Opening a Route Table File from a File, page 14-2
- **ITP**—See Opening a Route Table File from a Node, page 14-3
- **Archive**—See Opening a Route Table File from an Archive, page 14-4

The Route Table dialog box appears, which contains

- Route Table Dialog Menu, page 14-5
- Route Table Dialog Right-Click Menu, page 14-7
- Route Table, page 14-7

Related Topic:

Editing an MWTM ITP Route Table File, page 14-1

Route Table Dialog Menu

The menu on the Route Table dialog box contains:

Menu Command	Description
File > Load from Archive (Ctrl-H)	Opens the Load Route Table from Archive wizard, which you use to load an archived route table.
File > Load from File (Ctrl-L)	Opens the Load File dialog, which you use to load an already existing route table.
File > Load from Signaling Point (Ctrl-F)	Opens the Choose Signaling Point dialog box, which you use to select the signaling point whose route table you want to edit.
File > Revert (Ctrl-R)	Reverts to the last saved version of the route table file.

Menu Command	Description
File > Save to File (Ctrl-S)	Saves changes you made to the route table. If you are editing a route table from: • An ITP (that is, if you chose **Tools > Route Table Editor > From ITP** from the MWTM main menu), the default filename is the name of the signaling point. • A file (that is, if you chose **Tools > Route Table Editor > From File** from the MWTM main menu), the default filename is the name of the file that you are currently editing. The MWTM stores the modified route table file in the route table directory on the MWTM server. If you installed the MWTM in: • The default directory, */opt*, then the MWTM route table directory is */opt/CSCOsgm/routes*. • A different directory, then the MWTM route table directory resides in that directory.
File > Save As	Opens the Save File dialog: Route Table file list, which you use to save the route table file with a new name, or overwrite an existing route table file.
File > Print (Ctrl-P)	Opens the Print window where you can: • Specify options for printing. • Print the current window. • Save the current window to a file. The MWTM printing options require that you define a printer on your system. If you click **Print** and the Print window does not appear, ensure that you defined a printer on your system.
File > Find (Ctrl-F)	Opens the Find dialog box, which you use to find a specific character string in the window (see Finding Information in a Window, page 4-22).
File > Deploy (Ctrl-Y)	Opens the Deployment wizard, which you use to validate a route table file, upload it to an ITP, and activate it on the ITP.
File > Close (Ctrl-W)	Closes the Route Table dialog box. If you made any changes, the MWTM asks if you want to apply the changes before leaving the window. Click: • **Yes** to apply the changes and close the prompt window and the Route Table dialog box. • **No** to close the prompt window and the Route Table dialog box without applying or saving any changes. • **Cancel** to close the prompt window without applying any changes. The Route Table dialog box remains open.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

Route Table Dialog Right-Click Menu

The right-click menu on the Route Table dialog box contains:

Menu Command	Description
Move Up	Moves the chosen entry up in the route table. The MWTM preserves the new order of the entries when you save the route table.
Move Down	Moves the chosen entry down in the route table. The MWTM preserves the new order of the entries when you save the route table.

Note The only entries that you can move up or down in the route table are adjacent entries that have the same **Destination Point Code**, **Mask**, and **Cost**.

Route Table

The route table lists destination point codes and associated destination linkset names, as well as other important information used to route packets on a node.

Press **Enter** to move down to the next row in the route table; press **Tab** to move to the next field.

You can resize each column in the route table, but you cannot sort the table based on the information in one of the columns (see Navigating Table Columns, page 4-23).

Column or Button	Description

Title Bar	When you first open a route table, the title bar of the Route Table dialog box shows:
	`MWTM: Route Table Dialog -- SP: <point code:optional network name>`
	If you save the route table, the title bar shows:
	`MWTM: Route Table Dialog -- SP: <point code:optional network name> -- File: <filename>`
	If MWTM user access is enabled, and you do not have permission to edit the route table, the title bar shows:
	`MWTM: Route Table Dialog (view only mode) -- SP: <point code:optional network name>`

Row Num	Unique number identifying each entry in the route table. You cannot edit this field, but the number might change as you add entries to or delete entries from the route table.

Column or Button	Description
Destination Point Code	Destination point code for packets on the chosen node. The destination point code is the point code to which a given packet is routed. To edit the destination point code, enter the new code in this field. If you enter a new destination point code that is less restrictive than the mask, the MWTM shows a message to that effect at the bottom of the Route Table dialog box, and performs one of these actions. If you: • Modified an existing point code, the MWTM restores the previous point code. • Entered an entirely new point code, the MWTM leaves this field blank. For example, a destination point code of **7.7.7**, which specifies 14 bits, is less restrictive than a mask of **7.255.0**, which specifies only 11 bits. The MWTM ignores the extra bits in the last digit of the destination point code and converts it to **7.7.0**. To add a new route to the route table, select the Destination Point Code field in a blank row, then fill in the field with the destination point code for the new route. When you move the cursor to another field in the row, the MWTM automatically populates the rest of the fields with the default values for those fields. **Note** You can prevent the MWTM from automatically populating the fields with default values (see mwtm routetabledefs, page B-125). You can specify the point code mask when you enter a destination point code. To do so, enter the destination point code, then a slash (**/**), then the number of bits in the mask. For example, if you specify **7.255.6/14**, the MWTM shows **7.255.7** in the Destination Point Code field and **7.255.7** (or **14**) in the Mask field.

Column or Button	Description
Mask	Mask specifying the significant bits of the point code. The MWTM can display point code masks in dotted-decimal format (the default setting) or as a number of bits (see General Display Settings, page 4-4). For: • ANSI and China standard networks using the default 24-bit point code format, the default mask is **255.255.255** (or **24**). If the Destination Point Code is a network route with the format **x.x.0**, the default mask is **255.255.0** (or **16**). If the Destination Point Code is a cluster route with the format **x.0.0**, the default mask is **255.0.0** (or **8**). • ITU networks using the default 14-bit point code format, the default mask is **7.255.7** (or **14**). If the Destination Point Code is a network route with the format **x.x.0**, the default mask is **7.255.0** (or **11**). If the Destination Point Code is a cluster route with the format **x.0.0**, the default mask is **7.0.0** (or **3**). • NTT and TTC networks using the default 16-bit point code format, the default mask is **31.15.127** (or **16**). If the Destination Point Code is a network route with the format **x.x.0**, the default mask is **31.15.0** (or **9**). If the Destination Point Code is a cluster route with the format **x.0.0**, the default mask is **31.0.0** (or **5**). To edit the mask, make the changes in this field.

Column or Button	Description
Mask (continued)	If you enter a new mask, the binary conversion of the mask cannot contain ones (1) to the right of zeros (0). For example: • **7.255.7** is a valid mask because it converts to binary **111.11111111.111.** • **7.255.1** is *not* a valid mask because it converts to binary **111.11111111.001**. If you enter an invalid mask, such as **7.255.1**, a message appears to that effect at the bottom of the Route Table dialog box, and performs one of these actions. If you: • Modified an existing mask, the MWTM restores the previous mask. • Entered an entirely new mask, the MWTM leaves this field blank. If you enter a new mask that is more restrictive than the destination point code, the MWTM asks if you want to adjust the point code automatically based on the new mask. Click: • **Yes** if you want to adjust the point code. For example, if the point code is **7.7.7**, and you enter the new mask **7.255.0**, the MWTM automatically adjusts the point code to **7.7.0**. • **No** if you do not want to adjust the point code. If you: – Modified an existing mask, the MWTM restores the previous mask. – Entered an entirely new mask, the MWTM leaves this field blank. If the MWTM is displaying point code masks in dotted-decimal format and you enter a number of bits, the MWTM automatically converts the number of bits to dotted-decimal format. For example, if you enter **24**, the MWTM automatically converts the mask to **255.255.255**. If the MWTM is displaying point code masks in bits format and you enter a mask in dotted-decimal format, the MWTM automatically converts the mask to a number of bits. For example, if you enter **255.255.255**, the MWTM automatically converts the mask to **24**.
Cost	Cost of the route to the destination, relative to other routes. Select a cost from the drop-down list box. The valid costs range from **1** (lowest cost and highest priority) through **9** (highest cost and lowest priority). **Note** If you configure two routes to the same node and do not specify a cost for one of them, then the cost for that node defaults automatically to **5**. The default cost appears here in the Cost column, and in the output of the **show cs7 route** command. Similarly, if you add a new line to this table and leave the Cost column blank, the MWTM automatically enters a default cost of **5**. Linksets with the same cost form a combined linkset. Do not specify more than two linksets with the same cost, under the same destination point code and mask. If the Destination Point Code is an adjacent point code, the default Cost is **1**.
Destination Linkset	Destination linkset associated with the destination point code. The destination linkset is also called the output linkset. To edit the destination linkset, select a destination linkset from the drop-down list box. **None** is the default setting.

Column or Button	Description
QoS	Quality of service (QoS) class of the route, that the network administrator configured. To edit the QoS class of the route, select a QoS class from the drop-down list box. Valid QoS classes range from **1** through **7**. Select **ALL** if you want the route to accept all QoS classes. **ALL** is the default value. When you change the QoS class for a route, the MWTM automatically changes the QoS classes for all other routes in that route set (that is, all other routes with the same Destination Point Code) to the new class.
Sort Table	Sorts the entries in the route table field-by-field, beginning with Dest. Point Code, then Mask, Cost, Dest.Linkset, and finally QoS.
Add Entry	Scrolls to a blank row in the route table and selects the Destination Point Code field. Fill in the field with the destination point code for the new route, then fill in the rest of the fields in the row.
Delete Entry	Deletes one or more chosen rows from the table. The Confirm Deletion dialog box appears. To: • Delete the chosen rows, click **Yes**. The rows are deleted from the table and the Confirm Deletion dialog box closes. • Retain the chosen rows, click **No**. The rows are kept in the table and the Confirm Deletion dialog box closes. • Prevent MWTM from displaying the Confirm Deletion dialog box, check the **Do not show this again** check box. **Note** If you check the **Do not show this again** check box, and you later decide you want MWTM to begin displaying the Confirm Deletion dialog box again, you must check the **Confirm Deletions** check box in the General GUI settings in the Preferences window. For more information, see the description of the **Confirm Deletions** check box in Startup/Exit Settings, page 4-3. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

Loading an Existing Route Table File

You use the MWTM to load a specific route table file and change the list of route table files. To load an existing route table file, use one of these procedures. Choose:

- **File > Load from Archive** from the route table menu. The Load Route Table from Archive wizard appears. For details, see Opening a Route Table File from an Archive, page 14-4.
- **File > Load from Signaling Point** from the route table menu. The Choose Signaling Point dialog box appears. For details, see Opening a Route Table File from a Node, page 14-3. In the Signaling Point List drop-down list box, select the signaling point with the point code, variant, and network name that matches the route table file that you want to edit, then click **OK**. The MWTM reads the active route table from the ITP and shows it in the Route Table dialog box. For details, see Editing ITP Route Tables, page 14-5.
- **File > Load from File** from the route table menu. The Load File dialog: Route Table file list appears.

Field, Button, or Icon	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the route table file or folder.
Last Modified	Date and time the route table file or folder was last modified.
Size (bytes)	Size of the route table file or folder, in bytes.
Number of Files (visible in bottom left corner)	Total number of route table files and folders.
OK	Loads the chosen route table file, saves any changes you made to the list of files, and closes the dialog box. To load a route table file, double-click it in the list, select it in the list and click **OK**; or, enter the name of the file and click **OK**. The MWTM loads the route table file, saves any changes you made to the list of files, closes the Load File dialog: Route Table file list, and returns to the Route Table dialog box.
Delete	Deletes the chosen file from the route table file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without loading a route table file or saving any changes to the route table file list.
Help	Shows online help for the dialog box.

Deploying a Route Table File

You use the Deployment wizard to validate a route table file, upload it to an ITP, archive the file, and activate it on the ITP. To launch the Deployment wizard for a route table file, choose **File > Deploy** from the route table menu (see Deploying ITP Files, page 4-33).

Saving a Route Table File

You use the MWTM to save a specific route table file and change the list of route table files.

Use one of these procedures. To save the changes you made to the route table file:

- Without changing the name of the file, choose **File > Save** from the route table menu.
- With a new name, choose **File > Save As** from the route table menu. The Save File dialog: Route Table file list dialog box appears.

The MWTM stores the modified route table file in the route table file directory on the MWTM server. If you installed the MWTM in:

- The default directory, */opt*, then the MWTM route table file directory is */opt/CSCOsgm/routes*.
- A different directory, then the MWTM route table file directory resides in that directory.

You can use the **mwtm routedir** command to change the directory in which the MWTM stores ITP route table files (and to enable the TFTP path to deploy a route table; see mwtm routedir, page B-124).

Note If another user modifies and saves the route table file before you save your changes, the MWTM asks if you want to overwrite that user's changes. If you do, the other user's changes are overwritten and lost. If you do not, your changes are lost, unless you save the route table file to a different filename.

Field, Button, or Icon	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the route table file or folder.
Last Modified	Date and time the route table file or folder was last modified.
Size (bytes)	Size of the route table file or folder, in bytes.
Filename	Name by which you want to save the route table file. If you create a new route table filename, you can use any letters, numbers, or characters in the name that your operating system allows. However, if you include any spaces in the new name, the MWTM converts those spaces to dashes. For example, the MWTM saves file *a b c* as *a-b-c*.
Number of Files (visible in bottom left corner)	Total number of route table files and folders.
OK	Saves any changes you made to the route table file being edited and any changes you made to the list of files and closes the dialog box. To save the route table file with a new name, use one of these procedures. To save the file with: • A completely new name, enter the new name and click **OK**. • An existing name, overwriting an old route table file, select the name in the list and click **OK**. The MWTM saves the route table file with the new name, saves any changes you made to the list of files, closes the Save File dialog: Route Table file list dialog box, and returns to the Route Table dialog box. If two or more entries in the route table have the same Destination Point Code, Mask, and Cost, the MWTM preserves the order of the entries when you save the route table.
Delete	Deletes the chosen file from the route table file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without saving the route table file or saving any changes to the route table file list.
Help	Shows online help for the dialog box.

Reverting to the Last Saved Route Table File

To revert to the last saved version of the route table file, choose **File > Revert** from the route table menu. The MWTM shows the last saved version of the file.

Editing a Non-MWTM ITP Route Table

You use the MWTM to create and edit ITP route table files for an ITP (see Editing an MWTM ITP Route Table File, page 14-1).

If you want to edit a route table file that was created with a product other than the MWTM, to ensure that the MWTM can use the file, you must:

Step 1 Ensure that the route table file uses the MWTM route table file extension, *.rou*.

Step 2 Place the route table file in the MWTM route table directory on the MWTM server. If you installed the MWTM in:

- The default directory, */opt*, then the MWTM route table directory is */opt/CSCOsgm/routes*.
- A different directory, then the MWTM route table directory resides in that directory.

Step 3 Ensure that the MWTM header lines in the file precede the ITP route table entries. The MWTM header lines use this format:

```
!! Created by MWTM 6.1.2
!! on June 12, 2009 6:42:54 PM
!! Do not edit this file by hand.
!v6.1.0
!ted220dbc4a
!p800:ITU:National:[net0]
```

where:

- Comment lines begin with double exclamation points (!!).
- The version line begins with **!v**. This line indicates the version of MWTM that was used to create the file.
- The timestamp line begins with **!t**. This line indicates the date and time, in hexadecimal, that the file was created.
- The point code line begins with **!p**. This line indicates the point code that the ITP used, in hexadecimal, followed by the point code variant (ANSI, China, ITU, NTT, or TTC), the network indicator (National, NationalSpare, International, or InternationalSpare), and the network name. In this example:

  !p8b0:ITU:National:[net0]

  the point code is **1.22.0**, the point code variant is **ITU**, the network indicator is **National**, and the network name is **net0**.

CHAPTER 15

Editing an ITP Global Title Translation Table

You can use the Global Title Translation (GTT) Editor of the Cisco Mobile Wireless Transport Manager (MWTM) to configure GTT entries.

A global title is an application address, such as a toll-free telephone number, calling card number, or mobile subscriber identification number. GTT is the process by which the Signaling Connection Control Part (SCCP) translates a global title into the point code and subsystem number (SSN) of the destination service switching point (SSP), where higher-layer protocol processing occurs. GTT entries reside in GTT files, which are comma-separated value (CSV) text files with point codes written in hexadecimal notation.

Note The MWTM 6.1.5 supports GTT files with file format versions 3.1, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, or 4.6. You can load GTT files that use lower or higher file-format versions; but, fields or features that are unique to the lower or higher version are not visible and they disappear from the GTT file the next time you save the file. The file is saved as a version 3.1 file if the file is lower than version 3.1; or, as a version 4.6 file if the file is higher than version 4.6.

For more detailed information about GTT, including configuration procedures and scenarios, see the IP Transfer Point (ITP) feature module for Cisco IOS software release 12.2(25)SW4 or later.

This chapter contains:

Launching the GTT Editor

The MWTM provides you with a GTT Editor to edit GTT files. The GTT Editor runs as a separate application in the MWTM; so, it requires a separate login, just like the MWTM client.

To launch the GTT Editor, use one of these procedures:

- Choose **Tools > Global Title Translator Editor** from the MWTM main menu.
- Enter the **mwtm gttclient** command (see mwtm gttclient, page B-110).

The Startup Options dialog box appears, which you use to load a specific GTT file or create a new GTT file.

The Startup Options dialog box provides options to load GTT data from:

Field or Button	Description
New File	Opens the Create New Table dialog box, which you use to create a new GTT file (see Creating a New GTT File, page 15-27). Create the new GTT file.
File	Opens the Load File dialog box: GTT File List, which you use to load a specific GTT file and change the list of GTT files (see Loading an Existing GTT File, page 15-29). Select a GTT file to load.
ITP	Opens the Load GTT from ITP wizard, which you use to choose the node and signaling point whose GTT file you want to edit (see Loading a GTT File from a Node, page 15-30).
Archive	Opens the Load GTT from Archive wizard, which you use to choose the node and signaling point whose GTT file you want to edit (see Loading a GTT File from the Archive, page 15-31).

When you close the Startup Options dialog box by creating a new GTT file or loading an existing GTT file, the GTT Editor window appears with the Selectors and GTA tab clicked.

The GTT Editor window provides a set of tabs. Each tab contains a series of tables with GTT data. Some of the tables may be blank at first, while others contain rows of data.

In each table, you can edit the values in each row by typing over the current value or selecting a new value from a drop-down list box.

To reset a cell to its previous value, press **Esc**. (If you have edited more than one cell in a row, pressing **Esc** resets all cells in the row.) To save your changes, click outside the row. Once you save your changes, pressing **Esc** does not reset the cells in the row.

To add a row to a table, select the table, then choose **Edit > Add** from the GTT menu or **Add** from the right-click menu.

To delete one or more rows from a table, select the rows, then choose **Edit > Delete** from the GTT menu or **Delete** from the right-click menu (see Deleting Rows from a Table, page 15-26).

The GTT Editor window contains:

GTT Menu

The menu on the GTT Editor window contains:

Menu Command	Description
File > New Table (Ctrl-N)	Opens the Create New Table dialog box.
File > Load > Load From Archive (Ctrl-H)	Opens the Load GTT from Archive wizard from which you choose the node and signaling point whose GTT file you want to edit (see Loading a GTT File from the Archive, page 15-31). If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
File > Load > Load From File (Ctrl-L)	Loads an already existing GTT file. The MWTM prompts you for the name of the GTT file you want to load: • Enter the name of the GTT file; or, choose the file from the list, then click **OK** to load the GTT file. • Click **Cancel** to close the prompt window without loading a GTT file. See Loading an Existing GTT File, page 15-29.
File > Load > Load From Node (Ctrl-T)	Opens the Load GTT from Node wizard, which you use to choose the node and signaling point whose GTT file you want to edit (see Loading a GTT File from a Node, page 15-30). If you implement MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
File > Revert (Ctrl-R)	Reverts to the last saved version of the GTT file.

Menu Command	Description
File > Save (Ctrl-S)	Saves the changes you made to the GTT file.
File > Save As	Opens the Save File dialog box: GTT File List, which you use to save the GTT file with a new name or overwrite an existing GTT file.
File > Semantic Check (Ctrl-K)	Opens the Semantic Check GTT dialog box, which you use to check the semantics of a GTT file against a specific ITP.
File > Deploy (Ctrl-Y)	Opens the Deployment wizard, which you use to validate a GTT file, upload it to an ITP, and activate it on the ITP.
File > Exit (Ctrl-Q)	Closes the GTT Editor window. If you make any changes to the GTT file, the MWTM asks if you want to save the changes before leaving the window. Click: • **Yes** to save the changes. The MWTM opens the Save File dialog box: GTT File List, which you use to save the GTT file with a new name, or overwrite an existing GTT file. • **No** to close the prompt window. The MWTM closes the GTT Editor window without saving any changes to the GTT file.
Edit > Version and Instance (Ctrl-I)	Opens the Edit GTT Table dialog box, which you use to change the variant, version, and instance number of a GTT file.
Edit > Add (Ctrl-E)	Opens the Add dialog box for the chosen table. For example, if you click the Selector Table, opens the Selector Add dialog box.
Edit > Delete (Ctrl-Delete)	Deletes one or more chosen rows from a GTT table. The Confirm Delete dialog box appears, in which you confirm the deletion. To: • Delete the chosen rows, click **Yes**. The rows disappear from the table and the Confirm Delete dialog box closes. • Retain the chosen rows, click **No**. The rows remain in the table and the Confirm Delete dialog box closes. You can select more than one row to delete; but, all chosen rows must reside in the same table. For example, you cannot simultaneously delete rows from the Selector Table and the MAP (mated application) Table. If deleting a row from a table causes one or more rows in the table to remain at the top of the page or the bottom of the next, such that no remaining entries reference the single rows, the MWTM shows the number of single rows and asks whether you also want to delete the single rows. (The MWTM shows the number of rows and not the rows themselves; because, a document could contain thousands of single rows.)

Menu Command	Description
Edit > Node Archive Management	Opens the Archive Management dialog box, which you use to manage archived GTT, route table, and MLR address table files. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Edit > Node File Management	Opens the Node File Management dialog box, which you use to manage GTT files and route table files. If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
View > Phone Number Config (Ctrl-P)	Opens the Phone Number Lookup dialog box in which you search the GTA Table for the Global Title Address Digits for a specific selector.
View > GTT Table Info (Ctrl-G)	Opens the GTT Table Info dialog box, which shows basic information about the currently visible GTT file.
View > Network Name Configuration (Ctrl-F)	Opens the Network Name Configuration dialog box, which maps network names to variants and network indicators, in support of cross-instance GTT files.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

GTT Editor: Selectors and GTA Tab

Click the **Selectors and GTA** tab to display data for a specific GTT selector and see the GTA entries for that selector.

A GTT selector defines the parameters that select the translation table that the MWTM uses to translate an SCCP message to its next or final destination.

A Global Title Address (GTA) entry is associated with a selector and defines the result of a translation for a particular address mask. The result of a GTA entry can be a final translation or an intermediate translation.

The GTT Editor: Selectors and GTA tab contains:

- Selector Table, page 15-6
- GTA Table, page 15-7
- App Group Table, page 15-8
- MAP Table, page 15-9
- CPC List, page 15-9

When you click the GTT Editor: Selectors and GTA tab, the MWTM might populate the Selector Table and the other tables with data. To populate the:

- Selector Table, right-click in the table and choose **Add**. See Adding a Selector to a Selector Table, page 15-16.
- GTA Table, select a row in the Selector Table. The MWTM populates the GTA Table with all associated GTA entries.

  If the GTA Table remains blank, the chosen row has no associated GTA entries. You can also add entries to the GTA Table, by right-clicking in the table and choosing **Add** from the right-click menu (see Adding a GTA Entry to a GTT, page 15-17).
- App Group Table, select a row in the GTA Table that has an associated Application Group. The MWTM populates the App Group Table with all application group entries for that application group name.

  You can also add entries to the App Group Table, by right-clicking in the table and choosing **Add** from the right-click menu (see Adding an Application Group Entry to an App Group Table, page 15-21).
- MAP Table, select a row in the GTA Table that does not have an associated Application Group. The MWTM populates the MAP Table with all MAP entries that match the chosen row's point code-SSN combination.

  To add entries to the MAP Table, right-click in the table and choose **Add** from the right-click menu (see Adding a MAP Entry to a GTT, page 15-22).
- CPC List, select a row in the MAP Table that has an associated CPC List Name. The MWTM populates the CPC List with all point codes in that CPC list.

  To add entries to the CPC List, right-click in the list and choose **Add** from the right-click menu (see Adding a CPC List to a GTT, page 15-23).

Selector Table

The Selector Table contains:

Column	Description
Name	Name of the selector.
Translation Type	Translation type that the selector uses. Valid values are in the range 0 through 255.
Global Title Indicator	(China, ITU, NTT, and TTC only) Global title indicator for the selector. Valid values are in the range 2 and 4.
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan for the selector. Valid values are in the range 0 through 15.
Nature of Address Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator for the selector. Valid values are in the range 0 through 127.
Pre-Address Conversion	GTT address conversion table to apply prior to performing local GTT translation. If: • This field contains an address conversion table name, the referenced table must exist and contain at least one address-conversion entry. • This field is blank, no address conversion is necessary.

Column	Description
Post-Address Conversion	GTT address conversion table to apply after performing local GTT translation. If: • This field contains an address conversion table name, the referenced table must exist and contain at least one address conversion entry. • This field is blank, no address conversion is necessary.
QoS	Quality of service (QoS) class of the selector. Valid QoS classes range from 1 through 7. **ALL** indicates that the selector accepts all QoS classes.
Next Table	(This column appears only for the GTT file with version **4.6**) MWTM supports the Next Table option within an instance/signaling point.

GTA Table

The GTA Table contains:

Column	Description
Name	Selector name for this GTA.
Global Title Address Digits	Address digits for the GTA.
Point Code	Destination point code for the GTA.
Routing Indicator	Routing indicator for the GTA. Valid values are: • **none**—No routing indicator. • **gt**—Route on the global title. • **pcssn**—Route on the point code and SSN. This field is dimmed if you check Configure By App Group (see Adding a GTA Entry to a GTT, page 15-17).
Subsystem Number	Destination SSN for the GTA. Valid values are in the range 2 through 255.
New Translation Type	Translation type that the GTA uses. Valid values are in the range 0 through 255.
Application Group	Name of the application group that should provide the point code, routing indicator, and SSN that the GTA uses.
Application Server Name	Name of the application server that should provide the point code, routing indicator, and SSN that the GTA uses.
QoS	Quality of service (QoS) class of the GTA. Valid QoS classes range from 1 through 7. ALL indicates that the GTA accepts all QoS classes.

App Group Table

The App Group Table contains:

Column	Description
Name	Name of the application group. For ITPs with multiple instances enabled, do not use the same application group name in two or more different instances. For example, if you use application group name *appgrp1* in instance 1, then do not use *appgrp1* in instance 0, or any other instance.
Multiplicity	Multiplicity setting for the application group. Valid values are: • **cgp**—Use SCCP calling party address (CGPA) load sharing, if available. CGPA load sharing uses a weighting factor to choose the destination. This is applicable to GTT versions 4.0 and higher. • **cos**—Use the destination with the least cost, if available. • **sha**—Share equally among all destinations. • **wrr**—Weighted balancing sccp class 0 and class 1 traffic based on weighed factor. This is applicable to GTT versions 4.5 and higher.
Weight Factor or Cost	If you set multiplicity to **cgp**, this field specifies the relative weighting factor of the application group. Choose a relative cost, **1** through **999**, from the drop-down list box. The default value is **1**. If you set multiplicity to **cos** or **sha**, this field specifies the relative cost of the application group. Choose a relative cost, **1** through **8**, from the drop-down list box. The default value is **1**. If you set multiplicity to **wrr**, this field specifies the relative cost of the application group. Choose a relative cost, **1** through **10**, from the drop-down list box. The default value is **1**. For file format 4.4, the cost range is from **1** through **64**.
Point Code	Destination point code for the application group.
Routing Indicator	Routing indicator for the application group. Valid values are: • **none**—No routing indicator. • **gt**—Route on the global title. This is the default routing indicator. • **pcssn**—Route on the point code and SSN.
Subsystem Number	Destination SSN for the application group. Valid values are in the range 2 through 255.
Application Server Name	Name of the application server.
Network Name	Network name that the application group uses.
New Translation Type	(Available in version 4.4 and later) Translation type that the selector uses. Valid values are in the range 0 through 255.
Rate Limit	(Available in version 4.5 and later) Traffic rate limitation (MSU/sec) for the associated PC/SSN or AS directing over-flow traffic to the higher cost DPC/ASNAME. Rate-limit is only valid for multiplicity cost mode.

MAP Table

The MAP Table contains:

Column	Description
Primary Pt. Code	Primary point code for the MAP.
Primary SSN	Primary SSN for the MAP. Valid values are in the range 2 through 255.
Multiplicity	Multiplicity setting for the MAP. Valid values are: • **dom**—Dominant. Always translate to the primary point-code-SSN combination if it is available. Translate to the backup point code-SSN combination only if the primary combination is not available. • **sha**—Share equally between the primary point-code-SSN combination and the backup point-code-SSN combination. • **sol**—Solitary MAP. No alternate if the point code or SSN is not available.
Backup Pt. Code	Backup point code for the MAP.
Backup SSN	Backup SSN for the MAP. Valid values are in the range 2 through 255.
Re-route if Congested	Indicates whether to route the MAP to the backup point-code-SSN combination if the primary combination is congested. If you: • Check the check box, you route the MAP to the backup combination when the primary combination is congested. • Uncheck the check box, you do not route the MAP to the backup.
Adjacency	Indicates whether to consider a point-code-SSN combination adjacent to the local node for SCCP management. If you: • Check the check box, you do consider the point code-SSN combination adjacent to the local node. • Uncheck the check box, you do not consider the point code-SSN combination adjacent to the local node.
CPC List Name	Name of the CPC list associated with this MAP.

CPC List

The CPC List contains:

Field	Description
Point Code	Point codes in the chosen CPC list.

GTT Editor: App Group Tab

Click the **App Group** tab to display data for application groups. The App Group tab shows the same information as the Selectors and GTA tab; but, from the perspective of the application groups.

An application group is an alternative result for the explicit point code and SSN in a GTA entry. You can use an application group entry for:

- Intermediate translation.
- Load-sharing across more than two destinations.
- Load-sharing of intermediate translation.

The GTT Editor: App Group tab contains:

- App Group Table, page 15-8
- MAP Table, page 15-9
- CPC List, page 15-9
- Selector Table, page 15-6
- GTA Table, page 15-7

When you click the **GTT Editor: App Group** tab, the App Group Table and Selector Table might contain data. To:

- Add entries to the App Group Table, right-click in the table and choose **Add** from the right-click menu (see Adding an Application Group Entry to an App Group Table, page 15-21).
- Add entries to the Selector Table, right-click in the table and choose **Add** from the right-click menu (see Adding a Selector to a Selector Table, page 15-16).
- Populate the MAP Table, select a row in the App Group Table. The MAP Table contains all MAP entries that match the chosen row's point code-SSN combination.

  You can also add entries to the MAP Table, by right-clicking in the table and choosing **Add** from the right-click menu (see Adding a MAP Entry to a GTT, page 15-22).
- Populate the CPC List, select a row in the MAP Table that has an associated CPC List Name. The CPC List contains all point codes in that CPC list.

  You can also add entries to the CPC List, by right-clicking in the list and choosing **Add** from the right-click menu (see Editing an ITP Global Title Translation Table, page 15-1).
- Populate the GTA Table, select a row in the Selector Table. The GTA Table contains all associated GTA entries.

  If the GTA Table remains blank, the chosen row has no associated GTA entries. You can also add entries to the GTA Table, by right-clicking in the table and choosing **Add** from the right-click menu (see Editing an ITP Global Title Translation Table, page 15-1).

  You can also add entries to the Selector Table, by right-clicking in the list and choosing **Add** from the right-click menu (see Adding a Selector to a Selector Table, page 15-16).

GTT Editor: MAPs Tab

Click the **MAPs** tab if you are primarily interested in displaying data for MAPs. The MAPs tab shows the same information as the Selectors and GTA tab, but from the perspective of the MAPs.

A mated application (MAP) entry has two uses:

- The SCCP application uses MAP entries internally to track point code states and SSN states, such as congestion and availability.
- To define backups or alternates for point code-SSN combination.

The GTT Editor: Maps tab contains:

- MAP Table, page 15-9
- CPC List, page 15-9

- Selector Table, page 15-6
- GTA Table, page 15-7
- App Group Table, page 15-8

When you launch the GTT Editor: MAPs tab, the MAP Table and Selector Table might or might not be populated with data. To:

- Add entries to the MAP Table, right-click in the table and choose **Add** from the right-click menu (see Adding a MAP Entry to a GTT, page 15-22).
- Add entries to the Selector Table, right-click in the table and choose **Add** from the right-click menu (see Adding a Selector to a Selector Table, page 15-16).
- Populate the CPC List, select a row in the MAP Table that has an associated CPC List Name. The CPC List contains all point codes in that CPC list.

  You can also add entries to the CPC List, by right-clicking in the list and choosing **Add** from the right-click menu (see Editing an ITP Global Title Translation Table, page 15-1).
- Populate the App Group Table and GTA Table, select a row in the MAP Table. The App Group Table and GTA Table contain all application group and GTA entries that match the chosen row's point code-SSN combination.

  If the App Group Table or GTA Table remains blank, the chosen row has no associated application group or GTA entries.

  You can add entries to the App Group Table, by right-clicking in the table and choosing **Add** from the right-click menu (see Adding an Application Group Entry to an App Group Table, page 15-21).

  You can add entries to the GTA Table, by right-clicking in the table and choosing **Add** from the right-click menu (see Editing an ITP Global Title Translation Table, page 15-1).

GTT Editor: CPC Tab

A concerned point code (CPC) is a node that should be notified when the status of the associated SSN changes.

Click the **CPC** tab if you are primarily interested in displaying data for concerned point code names. The CPC tab appears.

The GTT Editor: CPC tab contains:

- Concerned Pt. Code Name List, page 15-12
- CPC List, page 15-9
- MAP Table, page 15-9

When you launch the GTT Editor: CPC tab, the Concerned Pt. Code Name List contains data. To populate the CPC List and MAP Table, select a row in the Concerned Pt. Code Name List. The CPC List and MAP Table contain all point codes and MAP entries that match that concerned point code name.

Concerned Pt. Code Name List

The Concerned Pt. Code Name List contains:

Field	Description
CPC List Name	Name of the CPC list to add. Enter an alphanumeric string between 1 and 12 characters.
CPC List	List of point codes associated with the entered CPC list name.

To copy one or more point codes from one CPC list to another, select a CPC list in the CPC List Name column. The MWTM shows the point codes that are associated with that CPC list in the Point Code column. Select one or more of the point codes and drag them to the new CPC list.

Note The MWTM copies the point codes to the new CPC list; it does not move them from the old CPC list. If you want to move the point codes, you must copy them to the new CPC list, then delete them from the old CPC list.

GTT Editor: Address Conversion Tab

You use GTT address conversion tables to specify mappings such as E.212-to-E.214 address conversion and E.212-to-E.164 address conversion in ITU networks.

Click the **Address Conversion** tab to display GTT address conversion tables. The Address Conversion tab appears.

The GTT Editor: Address Conversion tab contains:

- Address Conversion Table, page 15-12
- Conversion Entry Table, page 15-13
- Selector Table for Address Conversion, page 15-14

Address Conversion Table

The Address Conversion Table contains:

Field	Description
Name	Name of the GTT address conversion table. Enter a 1- to 12-character name.

Field	Description
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan associated with the address conversion table. For all addresses that are converted, the numbering plan is converted to the value of this field. The valid range is 0 to 15.
Nature of Address Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator associated with the address conversion table. For all addresses that are converted, the nature of address indicator is converted to the value of this field. The valid range is 0 to 127.

Conversion Entry Table

The Conversion Entry Table contains:

Field	Description
In Address	Input SCCP address entry. Enter an address as a 1- to 15-digit hexadecimal string.
Out Address	Output SCCP address entry. Enter an address as a 1- to 15-digit hexadecimal string.
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan associated with this entry in the address conversion table. If specified, the value of this field overrides the value of the Numbering Plan field in the Address Conversion Table for this entry. The valid range is 0 to 15.
Nature of Address Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator associated with this entry in the address conversion table. If specified, the value of this field overrides the value of the Nature of Address Indicator field in the Address Conversion Table for this entry. The valid range is 0 to 127.
Encoding Scheme	The encoding scheme to be used for output GTT address: • Unknown—Encoding scheme is not specified at the address level • bcdOdd—Use BCD odd encoding scheme • bcdEven—Use BCD even encoding scheme • National—National specific
Remove Digits	Specifies the number of digits that should be removed from the original address prefix when the in-address prefix is matched

Selector Table for Address Conversion

The Selector Table for Address Conversion contains:

Column	Description
Name	Name of the selector.
Translation Type	Translation type that the selector uses. Valid values are in the range 0 through 255.
Global Title Indicator	(China, ITU, NTT, and TTC only) Global title indicator for the selector. Valid values are in the range 2 and 4.
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan for the selector. Valid values are in the range 0 through 15.
Nature of Address Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator for the selector. Valid values are in the range 0 through 127.
Pre-Address Conversion	GTT address conversion table to apply prior to performing local GTT translation. If this field contains an address conversion table name, the referenced table must exist and it must contain at least one address-conversion entry. If this field is blank, no address conversion is necessary.
Post-Address Conversion	GTT address conversion table to apply after performing local GTT translation. If this field contains an address-conversion table name, the referenced table must exist and it must contain at least one address conversion entry. If this field is blank, no address conversion is necessary.
QoS	Quality of service (QoS) class of the selector. Valid QoS classes range from 1 through 7. ALL indicates that the selector accepts all QoS classes.
Next Table	(This column appears only for the GTT file with version **4.6)** MWTM supports the Next Table option within an instance/signaling point.

Editing a GTT Table

You use the MWTM to change the variant and instance number associated with a GTT file.

To change the variant and instance number associated with a GTT file choose **Edit > Version and Instance** from the GTT menu. The Edit GTT Table dialog box appears.

Field or Button	Description
Variant	SS7 protocol variant. You cannot edit this field.
Version	Version of the file format that the GTT uses. Valid versions are: • **3.1**—Corresponds to ITP software releases 12.2(4)MB9 and 12.2(4)MB9a. Two or more entries in the same application group can have the same cost. This version is the default in the MWTM. • **4.0**—Corresponds to ITP software release 12.2(4)MB10 or higher. Supports multiple instances on a single node. • **4.1**—Corresponds to ITP software release 12.2(20)SW or higher. Supports multiple instances on a single node. • **4.2**—Corresponds to ITP software release 12.2(21)SW1 or higher. Supports subsystem numbers equal to zero (0) for GTA entries and application group entries. • **4.3**—Corresponds to these ITP software releases: – 12.2(25)SW1 or higher – 12.2(18)IXA or higher – 12.4(11)SW or higher Supports latest encoding scheme (not for ANSI). • **4.4**—Corresponds to these ITP software releases: – 12.2(18)IXE or higher – 12.4(15)SW or higher Supports higher destination cost and removing digits. • **4.5**—Corresponds to these ITP software releases: – 12.2(33)IRD or higher – 12.4(15)SW4 or higher • **4.6**—Corresponds to these ITP software releases: – 12.2(33) IRE or higher – 12.4(15) SW5 or higher The MWTM 6.1.5 supports GTT files with file format versions 3.1, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, or 4.6. You can load GTT files that use lower or higher file format versions; but, fields or features that are unique to the lower or higher version are not visible and they disappear from the GTT file the next time you save. The MWTM automatically saves the file as a version 3.1 file if the file is lower than version 3.1; or, as a version 4.6 file if the file is higher than version 4.6.

Field or Button	Description
Instance Number	Number of the instance that the GTT uses. Valid IDs are 0 to 7. The default instance number is 0. This list box is available only if you choose version 4.0.
Network Name	Network name that the GTT uses. If you change the network name for an existing GTT file, the new network name must use the same variant. This field is available only if you choose version 4.1 or higher.
OK	Saves the changes to the GTT file. Enter or choose values for the new variant and instance number, then click **OK**. The MWTM saves your changes to the GTT file.
Cancel	Closes the Edit GTT Table dialog box without saving any changes to the GTT file. To close the Edit GTT Table dialog box at any time without saving any changes to the GTT file, click **Cancel**.
Help	Shows online help for the current window.

Adding a Selector to a Selector Table

You use the MWTM to add a selector to a GTT. A GTT selector defines the parameters that select the translation table used to translate an SCCP message to its next or final destination.

To add a new selector to a Selector Table, choose a Selector Table in the GTT Editor window, then use one of these procedures. From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The Selector Add dialog box appears.

Field or Button	Description
Selector Name	Name of the selector to add. Enter 1- to 12-character alphanumeric string.
Translation Type	Translation type that the selector uses. Enter a value in the range **0** through **255**.
Global Title Indicator	(China, ITU, NTT, and TTC only) Global title indicator for the selector. Choose a value from the drop-down list box. Valid values are: • **2** • **4** The default value is 4.
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan for the selector. Enter a value in the range **0** through **15**. This field is dimmed if Global Title Indicator is set to 2.

Field or Button	Description
Nature of Addr. Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator for the selector. Enter a value in the range **0** through **127**. This field is dimmed if Global Title Indicator is set to 2.
Pre-Conversion Table Name	GTT address conversion table to apply prior to performing local GTT translation. If this field contains an address conversion table name, the referenced table must exist and it must contain at least one address conversion entry. If this field is blank, no address conversion is necessary.
Post-Conversion Table Name	GTT address conversion table to apply after performing local GTT translation. If this field contains an address conversion table name, the referenced table must exist and it must contain at least one address conversion entry. If this field is blank, no address conversion is necessary.
QoS	Quality of service (QoS) class of the selector. Choose a value from the drop-down list box. Valid QoS classes range from 1 through 7. Choose **ALL** if you want the selector to accept all QoS classes. The default value is ALL.
Next Table	(This column appears only for the GTT file with version **4.6)** MWTM supports the Next Table option within an instance/signaling point.
Add	Adds the selector to the GTT. Enter or choose values for the new selector, then click **Add**. The MWTM adds the selector to the Selector Table.
Close	Closes the Selector Add dialog box. When you finish adding selectors, click **Close**.
Help	Shows online help for the current window.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Adding a GTA Entry to a GTT

You use the MWTM to add a Global Title Address (GTA) entry to a GTT. A GTA entry is associated with a selector and defines the result of a translation for a particular address mask. The result of a GTA entry can be a final translation or an intermediate translation.

To add a new GTA entry to a GTA Table, choose a selector in the GTT Editor window and a GTA Table; then, use one of these procedures.

From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The GTA Add dialog box appears.

Field	Description
Selector Name	Name of the selector associated with this GTA. You cannot edit this field.
Global Title Addr. Digits	Address digits for the GTA. Enter a 1- to 15-digit hexadecimal string. Enter 'default' to create a default GTA.
QoS	Quality of service (QoS) class of the GTA. Choose a value from the drop-down list box. Valid QoS classes range from 1 through 7. Choose **ALL** if you want the GTA to accept all QoS classes. The default value is ALL.
Configure By Point Code	Indicates whether to configure the GTA by point code. To configure the GTA by point code, click this radio button. The MWTM makes the Config By Point Code fields available, and dims the Config By App Group fields. This is the default setting.
Configure By App Group	Indicates whether to configure the GTA by application group. To configure the GTA by application group, click this radio button. The MWTM makes the Config By App Group fields available and, dims the Config By Point Code fields.
Configure By Application Server Name	Indicates whether to configure the GTA by application server name. To configure the GTA by application server name, click this radio button. The MWTM replaces the Config By Point Code fields with the Config By Application Server name fields, and dims the Config By App Group fields.
Point Code	Destination point code for the GTA. Enter a point code. This field is available only if you choose Configure By Point Code.
Routing Indicator	Routing indicator for the GTA. Choose a value from the drop-down list box. Valid values are: • **gt**—Route on the global title. This is the default routing indicator. • **pcssn**—Route on the point code and SSN. This field is available only if you chose Configure By Point Code or Configure By Application Server Name.
Subsystem Number	Destination SSN for the GTA. Enter a value in the range **2** through **255**. This field is mutually exclusive with the New Translation Type field. This field is available only if you chose Configure By Point Code or Configure By Application Server Name.
New Translation Type	Translation type that the GTA uses. Enter a value in the range **0** through **255**. This field is mutually exclusive with the Subsystem Number field. This field is available only if you chose Configure By Point Code or Configure By Application Server Name.

Field	Description
App. Group	Name of the application group that should provide the point code, routing indicator, and SSN that the GTA uses. Enter the name of an application group. This field is available only if Configure By App Group is checked (see Adding a GTA Entry to a GTT, page 15-17).
Application Server Name	Name of the application server that should provide the point code, routing indicator, and SSN that the GTA uses. Enter the name of an application server. This field is available only if you chose Configure By Application Server Name.
Add	Adds the GTA to the GTT. Enter or choose values for the new GTA entry, then click **Add**. The MWTM adds the GTA entry to the GTA Table.
Close	Closes the GTA Add dialog box. When you finish adding GTA entries, click **Close** to close the GTA Add dialog box.
Help	Shows online help for the current window.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Searching the GTA Table for GTA Digits

You use the MWTM to search the GTA Table for the Global Title Address Digits for a specific selector. The MWTM shows the entries that contain the GTA digits in the GTA Table.

To search the GTA Table, click the **Selectors and GTA** tab in the GTT Editor window, then choose **View > Phone Number Config** from the GTT menu. The Phone Number Lookup dialog box appears.

Table, Field, or Button	Description
Selector Table	Selector Table associated with the GTA Table to search. Choose one or more Selector Tables. For descriptions of the fields in this table, see Selector Table, page 15-6.
Phone Number	GTA digits to search for in the GTA Table. Choose a Selector Table and enter a telephone number or prefix as a 1- to 15-digit hexadecimal string with no spaces, dashes, or other special characters. For example, to search for a specific telephone number, such as 919-555-6384, enter **9195556384**. To search for all entries that begin with the 919-555 telephone prefix, enter **919555**.

Table, Field, or Button	Description
Perform Lookup	Launches the search for the GTA digits. If: • It finds one or more matching entries, shows the entries that contain the GTA digits in the GTA Table. • The Selector Table being searched performs pre-address conversion, the converted address, numbering plan, and nature of address indicator are visible in the **Pre-Address Conversion Results** field. • The Selector Table being searched performs post-address conversion, the converted address, numbering plan, and nature of address indicator are visible in the Post-Address Conversion Results field. • It does not find matching entries or the Selector Table has no associated GTA Table, an error message appears at the bottom of the window: `Could not find GTA for selector and phone number`
Pre-Address Conversion Entry Used	Entry in the GTT address conversion table used for pre-address conversion, if the Selector Table being searched performs pre-address conversion. For China, ITU, NTT, and TTC variants, pre-address conversion might result in a numbering plan or nature of address indicator that is different from the chosen Selector Table. If this occurs, the MWTM searches for a selector in the Selector Table that matches the new numbering plan and nature of address indicator. If the MWTM: • Finds a matching selector, it uses that selector to complete the search. • Does not find a matching selector, the search fails.
Pre-Address Conversion Results	Results of the pre-address conversion (converted address, numbering plan, and nature of address indicator), if the Selector Table being searched performs pre-address conversion.
Selector Entry Used	Selector Entry that was searched. For descriptions of the fields in this table, see Selector Table, page 15-6.
GTA Entry Found	GTA Table in which the GTA digits reside. For descriptions of the fields in this table, see GTA Table, page 15-7.
MAP Table	MAP Table, if any, associated with the GTA Table in which the GTA digits were found. For descriptions of the fields in this table, see MAP Table, page 15-9.
CPC List	CPC List, if any, associated with the GTA Table in which the GTA digits reside. For descriptions of the fields in this list, see CPC List, page 15-9.
Post-Address Conversion Entry Used	Entry in the GTT address conversion table used for post-address conversion, if the Selector Table being searched performs post-address conversion.
Post-Address Conversion Results	Results of the post-address conversion (converted address, numbering plan, and nature of address indicator), if the Selector Table being searched performs post-address conversion.

Related Topic:

Launching the GTT Editor, page 15-2.

Adding an Application Group Entry to an App Group Table

You use the MWTM to add an application group to a GTT. An application group is an alternative result for the explicit point code and SSN in a GTA entry. You can use an application group entry for:

- Intermediate translation.
- Load-sharing across more than two destinations.
- Load-sharing of intermediate translation.

To add an application group to a GTT, choose an App Group Table in the GTT Editor window, then use one of these procedures.

From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The App Group Add dialog box appears.

Field or Button	Description
App. Group	Name of the application group to add. Enter 1- to 12-character alphanumeric string.
Multiplicity	Multiplicity setting for the application group. Choose a value from the drop-down list box. Valid values are: • **cos**—Use the destination with the least cost, if available. • **sha**—Share equally between all destinations. This is the default value. • **wrr**—Weighted balancing sccp class 0 and class 1 traffic based on weighed factor. This is applicable to GTT versions 4.5 and higher.
Weight Factor or Cost	If Multiplicity is set to **cgp**, this field specifies the relative weighting factor of the application group. Choose a relative cost, **1** through **999**, from the drop-down list box. The default value is **1**. If Multiplicity is set to **cos** or **sha**, this field specifies the relative cost of the application group. Choose a relative cost, **1** through **8**, from the drop-down list box. The default value is **1**. If Multiplicity is set to **wrr**, this field specifies the relative cost of the application group. Choose a relative cost, **1** through **10**, from the drop-down list box. The default value is **1**.
Configure By Pt Code or AS Name: Point Code	Destination point code for the application group. Click this radio button and enter a point code. This field is mutually exclusive with the Application Server Name field.
Configure By Pt Code or AS Name: Application Server Name	Name of the application server. Click this radio button and enter an application server name. This field is mutually exclusive with the Point Code field.
Routing Indicator	Routing indicator for the application group. Choose a value from the drop-down list box.
Network Name	Network name that the application group uses. Choose a network name from the drop-down list box.

Field or Button	Description
Subsystem Number	Destination SSN for the application group. Enter a value in the range **2** through **255**.
New Translation Type	(Available in version 4.4 and later) Translation type that the selector uses. Valid values are in the range 0 through 255.
Rate Limit	(Available in version 4.5 and later) Traffic rate limitation (MSU/sec) for the associated PC/SSN or AS directing over-flow traffic to the higher cost DPC/ASNAME. Rate-limit is only valid for multiplicity cost mode.
Add	Adds the application group to the GTT. Enter or choose values for the new application group entry, then click **Add**. The MWTM adds the application group entry to the App Group Table.
Close	Closes the App Group Add dialog box. When you finish adding application group entries, click **Close** to close the App Group Add dialog box.
Help	Shows online help for the current window.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Adding a MAP Entry to a GTT

You use the MWTM to add a mated application (MAP) entry to a GTT.

A MAP entry has two purposes:

- The SCCP application uses them internally to track point-code states and SSN states, such as congestion and availability.
- To define backups or alternates for point-code-SSN combination.

To add a MAP entry, choose a MAP Table in the GTT Editor window, then use one of these procedures.

From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

(Optional) To add a new MAP entry to a MAP Table, choose a MAP Table, then use one of these procedures.

From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The MAP Add dialog box appears.

Field or Button	Description
Primary Pt. Code	Primary point code for the MAP. Enter a point code.
Primary SSN	Primary SSN for the MAP. Enter a value in the range **2** through **255**.

Field or Button	Description
Multiplicity	Multiplicity setting for the MAP. Choose a value from the drop-down list box. Valid values are: • **dom**—Dominant. Always translate to the primary point-code-SSN combination if it is available. Translate to the backup point-code-SSN combination only if the primary combination is not available. • **sha**—Share equally between the primary point-code-SSN combination and the backup point code-SSN combination. This is the default value. • **sol**—Solitary MAP. No alternate if the point code or SSN is not available.
Backup Pt. Code	Backup point code for the MAP. Enter a point code.
Backup SSN	Backup SSN for the MAP. Enter an a value in the range **2** through **255**.
CPC List Name	Name of the CPC list to be associated with this MAP. Enter a CPC list name.
Re-route if Congested	Indicates whether the MAP should be routed to the backup point code-SSN combination if the primary combination is congested. If you: • Want to route the MAP to the backup combination when the primary combination is congested, check the check box. • Do not want to route the MAP to the backup, uncheck the check box. This is the default setting.
Adjacency	Indicates whether a point code-SSN combination should be considered adjacent to the local node for SCCP management. If you: • Want the point code-SSN combination be considered adjacent to the local node, check the check box. • Do not want the point code-SSN combination be considered adjacent to the local node, uncheck the check box. This is the default setting.
Add	Adds the MAP to the GTT. Enter or choose values for the new MAP entry, then click **Add**. The MWTM adds the MAP entry to the MAP Table.
Close	Closes the MAP Add dialog box. When you finish adding MAP entries, click **Close** to close the MAP Add dialog box.
Help	Shows online help for the current window.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Adding a CPC List to a GTT

You use the MWTM to add a new concerned point code (CPC) list to a GTT. A CPC is a node that should be notified when the status of the associated SSN changes.

To add a new CPC list, choose a Concerned Pt. Code Name List or a CPC List in the GTT Editor window, then use one of these procedures. From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The CPC Add dialog box appears.

Field or Button	Description
CPC List Name	Name of the CPC list to be added. Enter 1- to 12-character alphanumeric string.
Concerned Pt. Code List	One or more CPCs to be added to the new CPC list. Enter one or more CPCs, separated by spaces.
Add	Adds the CPC list to the GTT. Enter or choose values for the new CPC list, then click **Add**. The MWTM adds the CPC list to the MAP Table.
Close	Closes the CPC Add dialog box. When you finish adding CPC lists, click **Close** to close the CPC Add dialog box.
Help	Shows online help for the current window.

Adding a GTT Address Conversion Table

You use the MWTM to add a new address conversion table to a GTT. To do so, choose an Address Conversion Table in the GTT Editor window, then use one of these procedures. From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The Address Conversion Add dialog for a Table window appears.

Field or Button	Description
Name	Name of the GTT address conversion table. Enter a 1- to 12-character name.
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan associated with the address conversion table. For all addresses that are converted, the numbering plan is converted to the value of this field. The valid range is 0 to 15.
Nature of Addr. Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator associated with the address conversion table. For all addresses that are converted, the nature of address indicator is converted to the value of this field. The valid range is 0 to 127.
Add	Adds the address conversion table to the GTT. Enter or choose values for the new Address Conversion Table, then click **Add**. The MWTM adds the Address Conversion Table to the GTT file.

Field or Button	Description
Close	Closes the Address Conversion Add dialog box for a table. When you finish adding Address Conversion Tables, click **Close** to close the Address Conversion Add dialog box for a table.
Help	Shows online help for the current window.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Adding an Entry to a GTT Conversion Table Entry

You use the MWTM to add a new entry to a GTT Conversion Entry Table. To do so, choose a Conversion Entry Table in the Address Conversion tab of the GTT Editor, then use one of these procedures. From the:

- GTT menu, choose **Edit > Add**.
- Right-click menu, choose **Add**.

The Address Conversion Add dialog for an entry window appears.

Field or Button	Description
Name	Name of the GTT address conversion table. Enter a 1- to 12-character name. If the table name does not already exist, the MWTM creates a new address conversion table with this name.
Table Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan associated with the address conversion table. For all addresses that are converted, the numbering plan is converted to the value of this field. The valid range is 0 to 15.
Table Nature of Addr. Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator associated with the address conversion table. For all addresses that are converted, the nature of address indicator is converted to the value of this field. The valid range is 0 to 127.
In Address	Input SCCP address entry. Enter an address as a 1- to 15-digit hexadecimal string.
Out Address	Output SCCP address entry. Enter an address as a 1- to 15-digit hexadecimal string.
Numbering Plan	(China, ITU, NTT, and TTC only) Numbering plan associated with this entry in the address conversion table. If specified, the value of this field overrides the value of the Numbering Plan field in the Address Conversion Table, for this entry. The valid range is 0 to 15.

Field or Button	Description
Nature of Address Indicator	(China, ITU, NTT, and TTC only) Nature of address indicator associated with this entry in the address conversion table. If specified, the value of this field overrides the value of the Nature of Address Indicator field in the Address Conversion Table, for this entry. The valid range is 0 to 127.
Encoding Scheme	• Unknown - encoding scheme is not specified at the address level. • bcdOdd - Use BCD odd encoding scheme • bcdEven - Use BCD even encoding scheme • National - national specific
Remove Digits	Specifies the number of digits that should be removed from the original address prefix when the in-address prefix is matched.
Add	Adds the address conversion table to the GTT. Enter or choose values for the new entry, then click **Add**. The MWTM adds the entry to the Conversion Entry Table.
Close	Closes the Address Conversion Add dialog box for a table. When you finish adding entries, click **Close** to close the Address Conversion Add dialog box for an entry.
Help	Shows online help for the current window.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Deleting Rows from a Table

To delete one or more rows from a table, select the rows, then choose **Edit > Delete** from the GTT menu or **Delete** from the right-click menu. The Confirm Delete dialog box appears to confirm the deletion. To:

- Delete the chosen rows, click **Yes**. The rows are deleted from the table and the Confirm Delete dialog box closes.
- Retain the chosen rows, click **No**. The rows are kept in the table and the Confirm Delete dialog box closes.

You can select more than one row to delete, but all chosen rows must be in the same table. For example, you cannot delete rows from both the Selector Table and the MAP Table at the same time.

If deleting a row from a table causes one or more rows in the table to remain at the top of the page or the bottom of the next, such that no remaining entries reference the single rows, the MWTM shows the number of single rows and asks whether you want to also delete the single rows. (The MWTM shows the number of rows and not the rows themselves, because there could be thousands of single rows.)

Creating a New GTT File

You use the MWTM to create a new GTT file. To do so, choose **File > New Table** from the GTT menu.

The Create New Table dialog box appears.

Field or Button	Description
Variant	SS7 protocol variant. Choose a variant from the drop-down list box. Valid variants are: • **ANSI** • **China** • **ITU** • **NTT** • **TTC**
Version	Version of the file format that the GTT uses. Choose a version from the drop-down list box. Valid versions are: • **3.1**—Corresponds to ITP software releases 12.2(4)MB9 and 12.2(4)MB9a. Two or more entries in the same application group can have the same cost. This is the default version in the MWTM. • **4.0**—Corresponds to ITP software release 12.2(4)MB10 or higher. Supports multiple instances on a single node. • **4.1**—Corresponds to ITP software release 12.2(20)SW or higher. Supports multiple instances on a single node.

Field or Button	Description
Version (continued)	• **4.2**—Corresponds to ITP software release 12.2(21)SW1 or higher. Supports subsystem numbers equal to zero (0) for GTA entries and application group entries. • **4.3**—Corresponds to these ITP software releases: – 12.2(25)SW1 or higher – 12.2(18)IXA or higher – 12.4(11)SW or higher Supports latest encoding scheme (not for ANSI). • **4.4**—Corresponds to these ITP software releases: – 12.2(18)IXE or higher – 12.4(15)SW or higher Supports higher destination cost and removing digits. • **4.5**—Corresponds to these ITP software releases: – 12.2(33)IRD or higher – 12.4(15)SW4 or higher • **4.6**—Corresponds to these ITP software releases: – 12.2(33) IRE or higher – 12.4(15) SW5 or higher The MWTM 6.1.5 supports GTT files with file format versions 3.1, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, or 4.6. You can load GTT files that use lower or higher file format versions; but, fields or features that are unique to the lower or higher version are not visible and they are removed from the GTT file the next time it is saved. The file is saved as a version 3.1 file if the file is lower than version 3.1, or as a version 4.6 file if the file is higher than version 4.6.
Instance Number	Number of the instance that the GTT uses. Choose an instance number from the drop-down list box. Valid IDs are **0** to **7**. The default instance number is **0**. This list box is available only if you chose version 4.0.
Network Name	Network name that the GTT uses. Choose a network name from the drop-down list box. When you choose the network name, The MWTM automatically sets the corresponding variant in the Variant field. If you change the network name for an existing GTT file, the new network name must use the same variant. This list box is available only if you chose version 4.1 or higher.
OK	Creates the new GTT file and closes the Create New Table dialog box. Choose a variant, version, and instance for the new GTT file, then click **OK**. The MWTM creates the new GTT file and closes the Create New Table dialog box.
Cancel	Closes the Create New Table dialog box without creating a new GTT file.
Help	Shows online help for the current window.

Loading an Existing GTT File

You use the MWTM to load a specific GTT file and change the list of GTT files.

When you load a GTT file, the name of the server associated with the GTT Editor and the filename are visible in the window name:

```
MWTM: GTT Editor -- mwtm-sun8 -- GTT.File.1
```

If you have not yet loaded or saved a GTT file, the MWTM displays a No File Loaded message in place of the GTT filename.

Note The MWTM 6.1.5 supports GTT files with file format versions 3.1, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, or 4.6. You can load GTT files that use lower or higher file-format versions; but, fields or features that are unique to the lower or higher version are not visible and they disappear from the GTT file the next time you save. The file is saved as a version 3.1 file if the file is lower than version 3.1, or as a version 4.6 file if the file is higher than version 4.6.

To load an existing GTT file, or to change the list of GTT files, choose **File > Load > Load From File** from the GTT menu. The Load File dialog box: GTT File List appears.

Field or Button	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the GTT file or folder.
Last Modified	Date and time the GTT file or folder was last modified.
Size (bytes)	Size of the GTT file or folder, in bytes.
Number of Files (visible in bottom left corner)	Total number of GTT files and folders.
OK	Loads the chosen GTT file, saves any changes you make to the list of files, closes the Load File dialog box: GTT File List, opens the Progress dialog box, and begins loading the GTT file. To load a GTT file, double-click it in the list; select it in the list and click **OK**; or enter the name of the file and click **OK**. The MWTM closes the Load File dialog box: GTT File List and the Progress dialog box appears. The Progress dialog box shows the progress of the GTT file load, as well as any messages that appear while loading the file. When the file is loaded, click **OK**. The MWTM closes the Progress dialog box, loads the GTT file, and returns to the GTT Configuration window.
Delete	Deletes the chosen file from the GTT file list. The MWTM issues an informational message containing the name and location of the deleted file.

Field or Button	Description
Cancel	Closes the dialog box without loading a GTT file or saving any changes to the GTT file list.
Help	Shows online help for the dialog box.

Related Topics

- Launching the GTT Editor, page 15-2
- Loading a GTT File from a Node, page 15-30
- Loading a GTT File from the Archive, page 15-31

Loading a GTT File from a Node

You use the Load GTT from Node wizard to choose the node and signaling point whose GTT file you want to edit.

To launch the Load GTT from Node wizard, choose **File > Load > Load From Node** from the GTT menu. Or, from the Startup Options dialog box, choose **Load GTT Data From: Node**. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

The Load GTT from Node wizard appears. The left pane of the Load GTT from Node wizard contains:

Step	Description
Select Node/SP	You can choose the signaling point from which to load the GTT file. You can optionally check the **Filter by Node** check box, which limits signaling point selection to a specific node. Choose a signaling point and node (optional) from the drop-down list boxes. The MWTM retrieves GTT filenames from the chosen signaling point. If no GTT filenames are available, the process ends with errors. If GTT filenames are available, the MWTM proceeds directly to the Login step.
Login	You can log in to the signaling point. Once you have logged in initially, the MWTM skips this step. Enter the: • Log in username and password. • Enable username and password. **Note** To avoid entering username and password information each time, you can set up credentials (see Configuring Login Credentials, page 5-19).
Load	Reads the GTT table from the node and loads it into the GTT Editor.

The bottom line of the Load GTT from Node wizard contains:

Field or Button	Description
Progress Bar	Indicates that the file is being validated or uploaded.
Show Log/Hide Log	Shows or hides the session between the MWTM and the node.

Field or Button	Description
Next >	Advances to the next step in the wizard.
Finish	Closes the wizard. The **Finish** button appears when deployment completes successfully; or, when it detects errors and cancels the process.
Cancel	Closes the wizard without deploying the file.
Help	Shows online help for the wizard.

Related Topics

- Launching the GTT Editor, page 15-2
- Loading a GTT File from the Archive, page 15-31

Loading a GTT File from the Archive

You use the Load GTT from Archive wizard to choose the node and signaling point whose archived GTT file you want to edit.

To launch the Load GTT from Archive wizard, choose **File > Load > Load From Archive** from the GTT menu; or, from the Startup Options dialog box, choose **Load GTT Data From: Archive**. If you implement MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

The Load GTT from Archive wizard appears.

The left pane of the Load GTT from Archive wizard contains:

Step	Description
Select Node/SP	You can choose the signaling point from which to load the GTT file. You can optionally check the **Filter by Node** check box, which limits signaling-point selection to a specific node. Choose a signaling point and node (optional) from the drop-down list boxes. The MWTM retrieves GTT filenames from the chosen signaling point. If no GTT filenames are available, the process ends with errors. If GTT filenames are available, the MWTM proceeds directly to the Select Version step.
Select Version	Select a previously deployed version of the configuration from the archive.
Load	Checks the archived GTT file for errors and loads the file into the GTT Editor.

The bottom line of the Load GTT from Archive wizard contains:

Field or Button	Description
Progress Bar	Indicates that the file is being validated or uploaded.
Next >	Advances to the next step in the wizard.
Finish	Closes the wizard. The Finish button appears when deployment is successful; or, it encounters errors and cancels the process.

Field or Button	Description
Cancel	Closes the wizard without deploying the file.
Help	Shows online help for the wizard.

Displaying the Progress Dialog Box

The Progress dialog box shows the percent of a GTT file that was loaded, saved, or checked semantically, as well as any messages that appear while loading or checking the file.

To display the Progress dialog box, use one of these procedures.

Choose:

- **File > Load > Load From File** or **Load From ITP** from the GTT menu, then select a GTT file from the Load File dialog box: GTT File List and click **OK**.
- **File > Save As** from the GTT menu, then select a GTT file from the Load File dialog box: GTT File List and click **OK**.
- **File > Semantic Check** from the GTT menu, then enter an ITP's name or IP address in the Semantic Check GTT dialog box and click **OK**.

The Progress dialog box appears.

Field or Button	Description
Progress Bar	Indicates the percent of the GTT file that was loaded, saved, or checked.
Messages	Messages that appear while loading, saving, or checking the GTT file.
OK	Closes the Progress dialog box. This button is dimmed until the MWTM finishes loading, saving, or checking the GTT file; or, until you click **Cancel** to stop loading, saving, or checking the file. When the file is loaded, saved, or checked, click **OK**. The MWTM closes the Progress dialog box and returns to the GTT Configuration window.
Cancel	Stops loading, saving, or checking the GTT file. This button is dimmed when the MWTM finishes loading, saving, or checking the GTT file; or, if loading, saving, or checking stops.
Help	Shows online help for the current window.

Related Topics

- Checking the Semantics of a GTT File, page 15-33
- Launching the GTT Editor, page 15-2
- Loading an Existing GTT File, page 15-29
- Saving a GTT File, page 15-38

Checking the Semantics of a GTT File

The MWTM strongly recommends that you check the semantics of a GTT file against a specific ITP and validate this data in the GTT file:

- **ITP Point Code**—For version 2.0 GTT files, the point code in the GTT file must differ from the primary, secondary, or capability point code of the ITP. If the file is the same, the MWTM generates an error. This restriction is not for GTT files of version 3.0 or later.
- **Route Table**—The ITP route table must contain all point codes in the GTT file, other than the primary, secondary, or capability point code of the ITP. If the route table does not contain the point codes, the MWTM generates an error.
- **Route Status**—All route entries for point codes in the GTT file, other than the ITP's primary, secondary, or capability point code, must be available. If they are not, the MWTM generates a warning.
- **GTA and Application Group**—If an application server configures the GTA or the application group, then that application server must reside on the ITP. If it does not, the MWTM generates an error.

  If the application server resides on the ITP, but it is not available, the MWTM generates a warning.

For example, ITP limits XUA configuration to instance 0. The MWTM semantic check verifies that XUA is not configured on any other instance.

To check the semantics of a GTT file, choose **File > Semantic Check** from the GTT menu. The Semantic Check GTT dialog box appears.

Field or Button	Description
ITP Name or IP Address	Name or IP address of the ITP against which to check the GTT file.
OK	Closes the Semantic Check GTT dialog box and opens the Progress dialog box, which shows the progress of the semantic check for the GTT file. Enter the name or IP address of an ITP, and click **OK**. The MWTM closes the Semantic Check GTT dialog box and opens the Progress dialog box. The Progress dialog box shows the progress of the semantic check for the GTT file and any messages that appear while checking the file. After the check, click **OK**. The MWTM closes the Progress dialog box and returns to the Semantic Check GTT dialog box.
Cancel	Closes the Semantic Check GTT dialog box without checking the semantics of the GTT file.

Note You can also use the **mwtm checkgtt** command to semantics of a GTT file (see mwtm checkgtt, page B-102).

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Deploying a GTT File

You use the Deployment wizard to validate a GTT file, upload it to an ITP, archive the file, and activate it on the ITP. To launch the Deployment wizard for a GTT file, choose **File > Deploy** from the GTT menu (see Deploying ITP Files, page 4-33).

Displaying Basic Information About a GTT File

You use the MWTM to view basic information about the current GTT file. Choose **View > GTT Table Info** from the GTT menu. The GTT Table Info dialog box appears.

Field or Button	Description
Filename	Name of the GTT file.
Version	Version of the file format that the GTT uses. Valid versions are: • **3.1**—Corresponds to ITP software releases 12.2(4)MB9 and 12.2(4)MB9a. Two or more entries in the same application group can have the same cost. This is the default version in the MWTM. • **4.0**—Corresponds to ITP software release 12.2(4)MB10 or higher. Supports multiple instances on a single node. • **4.1**—Corresponds to ITP software release 12.2(20)SW or higher. Supports multiple instances on a single node. • **4.2**—Corresponds to ITP software release 12.2(21)SW1 or higher. Supports subsystem numbers equal to zero (0) for GTA entries and application group entries. • **4.3**—Corresponds to these ITP software releases: – 12.2(25)SW1 or higher – 12.2(18)IXA or higher – 12.4(11)SW or higher Supports latest encoding scheme (not for ANSI). • **4.4**—Corresponds to these ITP software releases: – 12.2(18)IXE or higher – 12.4(15)SW or higher • **4.5**—Corresponds to these ITP software releases: – 12.2(33)IRD or higher – 12.4(15)SW4 or higher • **4.6**—Corresponds to these ITP software releases: – 12.2(33) IRE or higher – 12.4(15) SW5 or higher Supports higher destination cost and removing digits. The MWTM 6.1.5 supports GTT files with file format versions 3.1, 4.0, 4.1, 4.2, 4.3,4.4, 4.5, or 4.6. You can load GTT files that use lower or higher file format versions; but, fields or features that are unique to the lower or higher version are not visible and they disappear from the GTT file the next time you save. The file is saved as a version 3.1 file if the file is lower than version 3.1 or as a version 4.6 file if the file is higher than version 4.6.
Variant	SS7 protocol variant. Valid variants are: • **ANSI** • **China** • **ITU** • **NTT** • **TTC**

Field or Button	Description
Network Name	Network name that the GTT file uses. This field appears only for GTT files of version 4.1 or higher.
Instance Number	Number of the instance that the GTT uses. Valid numbers are **0** to **7**. The default instance number is **0**. If no instance is associated with the GTT, this field contains N/A. This field appears only for GTT files of version 4.0.
Last Modified	Date and time the GTT file was last modified.
Total Entries	Total number of entries in the GTT file.
OK	Closes the GTT Table Info dialog box.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1.

Supporting Cross-Instance GTT Files

You use the ITP Multiple Instance feature to connect an ITP to more than one network at the same time, each with specific variant and network indicator values. The ITP treats each combination of variant and network indicator as a separate instance with its own local point code, routing table, and GTT file on the ITP. Instances in the same network must have the same network name.

In support of the Multiple Instance feature, ITP Instance Translation enables the conversion of packets between instances of any variants. Each instance is a separate domain with a defined variant, network indicator, ITP point code, optional capability point code, and optional secondary point code.

For more information about the ITP Multiple Instance and Instance Translation features, see the IP Transfer Point (ITP) feature module for Cisco IOS software release 12.2(4)MB10 or later.

GTT files that support the Multiple Instance and Instance Translation features are called cross-instance GTT files, because they contain application groups that reference point codes in other GTT files.

To handle cross-instance GTT files, the MWTM uses a server-wide network name mapping file, which maps the available network names to GTT variants and network indicators. The MWTM looks up network names in the file to parse point codes correctly, based on the user's cross-instance configuration.

When the MWTM discovers your network, it automatically creates and populates the network name-mapping file. Therefore, in most cases, you do not need to manually create the network name mapping file. For more information about running Discovery, see Managing and Deploying ITP Files, page 4-24.

In some cases, you might want to create the network name mapping file manually; for example, if you have not run Discovery yet, but you want to prepare for a future GTT configuration. Also, while you cannot change or delete entries that the MWTM automatically populated, you can add entries manually, and you can change or delete those manual entries.

To create the network name mapping file manually; or, to add, change, or delete manual entries, choose **View > Network Name Configuration** from the GTT menu. If you have implemented MWTM User-Based Access, this option is available to users with authentication level System Administrator (level 5). The Network Name Configuration dialog box appears.

The Network Name Configuration dialog box contains:

Network Name Configuration Dialog Box Menu

The menu on the Network Name Configuration dialog box contains:

Menu Command	Description
File > Revert (Ctrl-R)	Loads the most recent network name mapping file from the MWTM server. If the MWTM discovers new entries for the network name mapping file while you are editing a GTT file (for example, if it adds a new network instance or it discovers a new network), the GTT Editor is unaware of the new entries and they are not visible in the Network Name Configuration dialog box. To see the new entries in the dialog box, choose **File > Revert**. (You can also restart the GTT Editor to automatically load the most recent network name mapping file from the MWTM server.)
File > Save (Ctrl-S)	Saves the changes you make to the network name mapping file. After you add, change, or delete entries and save the file, the MWTM uses the file the next time it discovers the network. However, if the MWTM discovers entries that conflict with manual entries in the file, the MWTM uses (and shows in the Network Name Configuration dialog box) the discovered entries, not the manual entries.
File > Print (Ctrl-P)	Prints the contents of the network name mapping file.
File > Close (Ctrl-W)	Closes the network name mapping file without saving any additions, changes, or deletions.
Edit > Add (Alt-A)	Adds an entry to the network name mapping file.
Edit > Delete (Delete)	Deletes the chosen entry from the network name mapping file.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

Network Name Configuration Dialog Box Table

The Network Name Configuration dialog box table contains:

Field	Description
Network Name	Network name that the GTT file uses. If you change the network name for an existing GTT file, the new network name must use the same variant.
Variant	SS7 protocol variant. Valid variants are: • ANSI • China • ITU • NTT • TTC
Network Indicator	Type of call that is placed. Valid values are: • **National**—National-bound call. The MWTM routes national calls through the national network. • **NationalSpare**—National-bound call, used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates networks. • **International**—International-bound call. The MWTM forwards international-bound calls to an STP pair that acts as an international gateway. • **InternationalSpare**—International-bound call, used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates networks.
Discovered	Indicates whether the MWTM (Yes) or a user manually (No) discovered the entry.

Related Topic:

Editing an ITP Global Title Translation Table, page 15-1

Saving a GTT File

You use the MWTM to save a specific GTT file and change the list of GTT files.

Note The MWTM 6.1.5 supports GTT files with file format versions 3.1, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, or 4.6. You can load GTT files that use lower or higher file format versions; but, fields or features that are unique to the lower or higher version are not visible and they disappear from the GTT file the next time you save. The file is saved as a version 3.1 file if the file is lower than version 3.1 or as a version 4.6 file if the file is higher than version 4.6.

To save the changes make to a GTT file or change the list of GTT files, use one of these procedures. To save the changes you have made to the GTT file:

- Without changing the name of the file, choose **File > Save** from the GTT menu.
- With a new name, choose **File > Save As** from the GTT menu. The Save File dialog box: GTT File List appears.

Field or Button	Description
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the GTT file or folder.
Last Modified	Date and time the GTT file or folder was last modified.
Size (bytes)	Size of the GTT file or folder, in bytes.
Filename	Name by which you want to save the GTT file. If you create a new GTT filename, you can use any letters, numbers, or characters in the name that your operating system allows. However, if you include any spaces in the new name, the MWTM converts those spaces to hyphens (-). For example, the MWTM saves file *a b c* as *a-b-c*.
Number of Files (visible in bottom left corner)	Total number of GTT files and folders.
OK	Saves the GTT file or any changes you make to the list of files and closes the dialog box. To save the GTT file with a new name, use one of these procedures. To save the file with: • A completely new name, enter the new name and click **OK**. • An existing name, overwriting an old GTT file, choose the name from the list and click **OK**. The MWTM closes the Save File dialog box: GTT File List and the Progress dialog box appears. The Progress dialog box shows the progress of the GTT file save, as well as any messages that appear while saving the file. When the file is saved, click **OK**. The MWTM closes the Progress dialog box, saves the GTT file with the new name, and returns to the GTT Configuration window. **Note** If another user modifies and saves the GTT file before you save your changes, the MWTM asks if you want to overwrite that user's changes. If you do, the other user's changes are overwritten and lost. If you choose not to, your changes are lost; unless you save the GTT file to a different filename.
Delete	Deletes the chosen file from the GTT file list. An informational message appears that contains the name and location of the deleted file.

Field or Button	Description
Cancel	Closes the dialog box without saving the GTT file or any changes to the GTT file list.
Help	Shows online help for the dialog box.

When you are ready to exit the GTT Editor window, choose **File > Exit** from the GTT menu.

If you make any changes to the GTT file, the MWTM asks if you want to save the changes before leaving the window. Click:

- **Yes** to save the changes.

  The MWTM opens the Save File dialog box: GTT File List, which you use to save the GTT file with a new name, or overwrite an existing GTT file.

- **No** to close the prompt window.

  The MWTM closes the GTT Editor window without saving any changes to the GTT file.

By default, GTT files reside in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the default directory is */opt/CSCOsgm/gtt*.
- A different directory, then the default directory resides in that directory.

To change the directory in which the MWTM stores GTT files, use the **mwtm gttdir** command (see mwtm gttdir, page B-111).

Reverting to the Last Saved GTT File

To revert to the last saved version of the GTT file, choose **File > Revert** from the GTT menu. The MWTM shows the last saved version of the file.

CHAPTER 16

Editing ITP MLR Address Table Files

You use the Cisco Mobile Wireless Transport Manager (MWTM) to configure Multi-Layer Routing (MLR) address table files by using the MWTM Address Table Editor. You can:

- Create new address table files.
- Load existing address table files.
- Edit address table files.
- Perform semantic checks on address table files.
- Deploy address table files to an ITP.
- Save address table files.

If you implement MWTM User-Based Access, the Address Table Editor is available to users with authentication level Network Operator (level 3) and higher.

For more detailed information about address tables, including configuration procedures and scenarios, see the *IP Transfer Point (ITP)* feature module for Cisco IOS software release 12.2(25)SW3 or later.

This chapter contains:

Launching the Address Table Editor

The Address Table Editor runs as a separate application in the MWTM, so it requires a separate log in, just like the MWTM client.

If you implement MWTM User-Based Access, the Address Table Editor is available to users with authentication level Network Operator (level 3) and higher.

To launch the Address Table Editor, use one of these procedures:

- Choose **Tools > Address Table Editor** from the MWTM main menu.
- Enter the **mwtm atblclient** command (see mwtm atblclient, page B-100) from the command prompt.

The Startup Options dialog box appears, which you use to load a specific address-table file or create a new address table file.

The Startup Options dialog box contains options for loading or creating the address table data from:

Field or Button	Description
New File	Opens the Address Table Properties dialog box, which you use to create a new address table file (see Creating a New Address Table File, page 16-5). Create the new address table file. If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
From File	Opens the Load File Dialog: Address Table File list, which you use to load a specific address table file and change the list of address table files (see Loading an Existing Address Table File, page 16-6). Select an address table file to load.
From ITP	Opens the Load Address Table from ITP wizard, which you use to select the ITP release 12.2(25)SW3 or later signaling point whose address table file you want to edit (see Loading an Address Table File from a Node, page 16-8). Select a signaling point. If you implement MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.
From Archive	Opens the Load Address Table from Archive wizard, which you use to select the ITP release 12.2(25)SW3 or later node and signaling point whose address table file you want to edit (see Loading an Address Table File from the Archive, page 16-9). Select a signaling point and table type. If you implement MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

Once you close the Startup Options dialog box by creating a new address table file or loading an existing address table file, the Address Table Editor window appears. If you have created a new address table file, the table will be blank. If you have opened an existing address table file, the table will be populated.

Address Table Menu

The menu on the Address Table Editor window contains:

Menu Command	Description
File > New Table (Ctrl-N)	Opens the Address Table Properties dialog box. The MWTM prompts you to: • Enter the table name, variant, instance number, and network name, then click **OK** to create the address table file. • Click **Cancel** to close the prompt window without creating an address table file. For more information, see Creating a New Address Table File, page 16-5. If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
File > Load > Load From File (Ctrl-L)	Opens the Load File dialog box, allowing you to load an already existing address table file. The MWTM prompts you to: • Select the file from the list, then click **OK** to load the address table file. • Click **Cancel** to close the prompt window without loading an address table file. For more information, see Loading an Existing Address Table File, page 16-6.
File > Load > Load From Node (Ctrl-T)	Opens the Load Address Table from ITP Wizard, which you use to select the ITP release 12.2(25)SW3 or later signaling point whose address table file you want to edit, as well as the table type. **Tip** Click **Show Log** at any time to view the process details. To load the address table from a node: 1. Select a node and signaling point from the drop-down list boxes, then click **Next** to load the address table list. 2. Select an address table list from the drop-down list box, then click **Next** to enter your passwords. 3. Enter the login password, then click **Next**. 4. Enter the enable password, then click **Next**. 5. Click **Finish** to complete the loading process. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher. For more information, see Loading an Address Table File from a Node, page 16-8.

Menu Command	Description
File > Load > Load From Archive (Ctrl-H)	Opens the Load Address Table from Archive Wizard, which you use to select the ITP release 12.2(25)SW3 or later node and signaling point whose address table file you want to edit. To load the address from archive: 1. Select a node and signaling point from the drop-down list boxes, then click **Next** to load the address table list. 2. Select the address table list from the drop-down list box, then click **Next** to enter your passwords. 3. Select the version from the table by clicking on it, then click **Next**. 4. Click **Finish** to complete the loading process. If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher. For more information, see Loading an Address Table File from the Archive, page 16-9.
File > Revert (Ctrl-R)	Reverts to the last saved version of the address table file.
File > Save (Ctrl-S)	Saves the changes that you make to the address table file.
File > Save As	Opens the Save File Dialog: Address Table File list, which you use to save the address table file with a new name or overwrite an existing address table file.
File > Semantic Check (Ctrl-K)	Opens the Semantic Check address table dialog box, which you use to check the semantics of an address table file against a specific ITP (see Checking the Semantics of an Address Table File, page 16-14).
File > Deploy (Ctrl-Y)	Opens the Deployment wizard, which you use to validate an address table file, upload it to an ITP, and activate it on the ITP. **Note** If you have not saved the current address table file, the Save File Dialog: Address Table File List appears, prompting you to save the file before continuing. For more information, see Deploying an Address Table File, page 16-15.
File > Exit (Ctrl-Q)	Closes the Address Table Editor window. The MWTM prompts you to confirm this action. Ensure that you save any changes before exiting, if necessary. Click: • **Yes** to exit. • **No** to close the window.
Edit > Address Table Properties (Ctrl-P)	Opens the Edit Address Table Properties dialog box, which you use to change the name, variant, version, instance ID, and network name associated with an address table file (see Editing Address Table Properties, page 16-13).
Edit > Add (Ctrl-E)	Adds a row to the address table.
Edit > Delete (Ctrl-Delete)	Deletes one or more chosen rows from an address table. The Confirm Delete dialog box appears. To: • Delete the chosen rows, click **Yes**. The rows disappear from the table and the Confirm Delete dialog box closes. • Retain the chosen rows, click **No**. The rows remain in the table and the Confirm Delete dialog box closes.

Menu Command	Description
Edit > Node Archive Management	Opens the Node Archive Management dialog box, which you use to view the contents of the archive, open a version with its corresponding editor, and delete all versions of a file (see Node Archive Management, page 4-31). If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
Edit > Node File Management	Opens the Node File Management dialog box, which you use to transfer address table files to and from the ITP (see Node File Management, page 4-24). If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.
View > Address Table Info (Ctrl-I)	Opens the Address Table Information dialog box, which shows basic information about the currently visible address table file.
View > Network Name Configuration (Ctrl-F)	Opens the Network Name Configuration dialog box, which maps network names to variants and network indicators, in support of cross-instance address table files.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

Creating a New Address Table File

You use the MWTM to create a new address table file. If you:

- Launch the Address Table Editor from the Startup Options window, click **New File**.
- Are already in the Address Table Editor, choose **File > New Table** from the Address Table Editor menu. You are prompted to save changes if you are currently working on an unsaved file.

Note If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

The Address Table Properties dialog box appears.

Field or Button	Description
Table Name	User-defined unique table name.
Variant	SS7 protocol variant. Select a variant from the drop-down list box. Valid variants are: • ANSI • China • ITU • TTC

Field or Button	Description
Version	Version of the file format that the address table uses. Choose either: • 1.1—Available beginning with 12.2(25)SW4a or 12.2(18)IXA • 1.3—Available beginning with 12.2(25)SW9, 12.2(18)IXC, 12.4(11)SW, or 12.2(33)IRA • 1.5—Available beginning with 12.2(18)IXG, 12.4(15)SW2, or 12.2(33)IRB. This version supports optional specification of instance number with a point code result.
Instance Number	Number of the instance that the address table uses. Select an instance number from the drop-down list box. Valid numbers are **0** to **7**. The default instance number is **0**.
Network Name	Network name that the address table uses. Select a network name from the drop-down list box. When you select the network name, the MWTM automatically sets the corresponding variant in the Variant field. If you change the network name for an existing address table file, the new network name must use the same variant.
OK	Creates the new address table file and closes the Address Table Properties dialog box. Enter or select values for the new address table file, then click **OK**. The MWTM creates the new address table file and closes the Address Table Properties dialog box.
Cancel	Closes the Address Table Properties dialog box without creating a new address table file. To close the Address Table Properties dialog box without creating a new address table file, click **Cancel**.
Help	Shows online help for the current window.

Related Topics

- Loading an Existing Address Table File, page 16-6
- Loading an Address Table File from a Node, page 16-8

Loading an Existing Address Table File

You use the MWTM to load a specific address table file and change the list of address table files. If you:

- Launch the Address Table Editor from the Startup Options window, click **From File**.
- Are already in the Address Table Editor, choose **File > Load > Load From File** from the Address Table Editor menu. You are prompted to save changes if you are currently working on an unsaved file.

Note When you load an address table file, the name of the server that is associated with the address table client and the filename, as well as the table type and mode (can be edit or view only), appear in the window name:

```
MWTM: Address Table Editor -- mwtm-sun8 -- address table.File.1 (MLR edit mode)
```

If you have not yet loaded or saved an address table file, the message `No File Loaded` appears in place of the address-table filename.

The Load File Dialog: Address Table File List appears.

Field or Button	Description
File Types	Drop-down list only includes MLR.
 Go up one Folder	Click this icon to go up one folder in the directory structure.
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the address table file or folder.
Last Modified	Date and time the address table file or folder was last modified.
Size (bytes)	Size of the address table file or folder, in bytes.
Number of Files (in lower-left corner)	Total number of address table files and folders.
OK	When you click this button, it: • Loads the chosen address table file. • Saves any changes you made to the list of files. • Closes the Load File Dialog: Address Table File list. • Opens the Progress dialog box • Begins loading the address table file. To load an address table file: • Double-click it in the list • Select it in the list and click **OK**. – Or, enter the name of the file and click **OK**. The MWTM closes the Load File Dialog: Address Table File list and the Progress dialog box appears, which shows the progress of the address table file load, as well as any messages that appear while loading the file. • When the file has been loaded, click **OK**. The MWTM closes the Progress dialog box, loads the address table file, and returns to the Address Table Editor window.
Delete	Deletes the chosen file from the address table file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without loading an address table file or saving any changes to the address table file list.
Help	Shows online help for the dialog box.

Related Topics

- Launching the Address Table Editor, page 16-2
- Loading an Address Table File from a Node, page 16-8

Loading an Address Table File from a Node

Note Before using the Load Address Table From ITP wizard to load address table files, you must enable TFTP file transfer for the address table staging directory by using the **mwtm atbldir** command (see mwtm atbldir, page B-101).

You use the Load Address Table From ITP wizard to load an existing address table file from a node. If you:

- Launch the Address Table Editor from the Startup Options window, click **From Node**.
- Are already in the Address Table Editor, choose **File > Load > Load From Node** from the Address Table Editor menu.

If you implement MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

The Load Address Table From ITP wizard appears. The left pane of the Load Address Table From ITP wizard contains:

Step	Description
Select Node/SP	You can select the signaling point from which the address table should be loaded. You can optionally check the **Filter by Node** check box, which limits signaling point selection to a specific node. Select a signaling point and node (optional) from the drop-down list boxes, then click **Next** . The MWTM retrieves address table names from the chosen signaling point. If no address table names are available, the process ends with errors. If address table names are available, the MWTM proceeds directly to the Select Table step.
Select Table	The MWTM retrieves address table names from the chosen signaling point.
Login	You can log in to the ITP. Enter the: • Log in password, if required. • Enable password, if required. **Note** To avoid entering username and password information each time, you can set up credentials (see Configuring Login Credentials, page 5-19).
Load	Uploads the address table file to the MWTM. If the file upload ends with no errors, the process is successful. Click **Finish**.

The bottom line of the Load Address Table From ITP wizard contains:

Field or Button	Description
Progress Bar	Indicates that the address table file is being uploaded.
Show Log/Hide Log	Shows or hides the log file for the Load Address Table From ITP wizard.
Next >	Advances to the next step in the Load Address Table From ITP wizard.
Finish	Closes the Load Address Table From ITP wizard. The Finish button appears when loading ends successfully or the wizard detects errors and the process is cancelled.

Field or Button	Description
Cancel	Closes the Load Address Table From ITP wizard without loading the file.
Help	Shows online help for the Load Address Table From ITP wizard.

Related Topics

- Launching the Address Table Editor, page 16-2
- Loading an Existing Address Table File, page 16-6
- Editing Address Table Properties, page 16-13

Loading an Address Table File from the Archive

Note Before using the Load Address Table From Archive wizard to load address table files, you must use the **mwtm atbldir** command to enable TFTP file transfer for the address table staging directory (see mwtm atbldir, page B-101).

You can use the Load Address Table From Archive wizard to load an existing address table file from the archive. If you:

- Launch the Address Table Editor, from the Startup Options window, click **From Archive**.
- Are already in the Address Table Editor, choose **File > Load > Load From Archive** from the Address Table Editor menu.

If you implement MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

The Load Address Table From Archive wizard appears. The left pane of the Load Address Table From Archive wizard contains:

Step	Description
Select Node/SP	You can select the signaling point from which to load the address table. You can optionally check the **Filter by Node** check box, which limits signaling point selection to a specific node. Select a signaling point and node (optional) from the drop-down list boxes, then click **Next**. The MWTM retrieves address table names from the chosen signaling point. If no address table names are available, the process completes with errors. If address table names are available, the MWTM proceeds directly to the Select Table step.
Select Table	The MWTM retrieves address table names from the chosen signaling point.

Step	Description
Select Version	You can select the version you want to load. Click a version to highlight it, then click **Next**. The table contains: • **Rev**—Revision number. • **Date**—Date and time the version was created. • **Comments**—Provided at the time of creation, if applicable. • **Author**—Initiator of the comments.
Load	Uploads the address table file to the MWTM. If the file upload ends with no errors, the process is successful. Click **Finish**.

The bottom line of the Load Address Table From Archive wizard contains:

Field or Button	Description
Progress Bar	Indicates that the address table file is being uploaded.
Next >	Advances to the next step in the Load Address Table From ITP wizard.
Finish	Closes the Load Address Table From ITP wizard. The Finish button appears when loading completes successfully or it detects errors and the process is cancelled.
Cancel	Closes the Load Address Table From ITP wizard without loading the file.
Help	Shows online help for the Load Address Table From ITP wizard.

Related Topics

- Launching the Address Table Editor, page 16-2
- Loading an Existing Address Table File, page 16-6
- Loading an Address Table File from a Node, page 16-8

Working in Address Table Files

After you create a new address table file or load an existing address table file, you can manage the address table entries.

If you implement MWTM User-Based Access, these options are available to users with authentication level Network Administrator (level 4) and higher. To:

- Add a row to a table, select the table and choose **Edit > Add** from the address table menu; or, **Add** from the right-click menu.
- Delete one or more rows from a table, select the rows and choose **Edit > Delete** from the address table menu; or, **Delete** from the right-click menu.
- Edit the values in each row in each table, type over the current value or select a new value from a drop-down list box. If you are editing a row, you cannot move on until all fields in the row are completed.
- Reset a cell to its previous value. Press **Esc**. Press **Esc** twice to reset the entire row.
- Commit your changes, click outside the row or press **Enter**.

Note Once you commit your changes, pressing **Esc** does not reset the cells in the row.

The Address Table Editor window contains:

Heading	Description
Address Digits	Address digits for the address table. Enter a 1- to 20-digit hexadecimal string. The value must be unique in an address table.
Exact Match	Considers the address an exact match.
Result Type	Type of action to perform on a match.
Result Value	Values to use with the matching action.

Result Types and Values

This table defines the list of result types from which to choose when you click in the Result Types column and the drop-down arrow that appears, also the corresponding result values that you enter for MLR address tables:

Result Type	Result Value	Description
asname	Route to the specified application server.	Message is routed to a particular destination M3UA or SUA application server.
block	(Optional, version 1.3 and higher) The Edit SCCP Error window appears. Enter a value: • 0—No data for TT • 1—No translation for address • 2—Subsystem congestion • 3—Subsystem is failed • 4—Subsystem is unequipped • 5—SS7 network failure • 6—SS7 network congestion • 7—Unqualified • 8—XUDTS error in message transport • 9—XUDTS error in local processing • A—XUDTS cannot perform reassembly • B—SCCP failure • C—SCCP hop counter violation • D—Segmentation not supported • E—Segmentation failure • WORD ITU SCCP Spare Error Codes in Hex {F..FF} Click **Add** to accept the value.	Indicates that you should discard the short message.
continue	None	Message that the normal SCCP routing will process the message.
group	Specify the name of the result group to which to route.	Indicates that a result group is used for routing.

Result Type	Result Value	Description
gt	<SCCP address> **tt** <number> **gti** <number>	Indicates that the message is routed by using SCCP global title. Places the specified address in the SCCP Called Party Address. The routing indicator changes to **RI=GT**. Then routed based on the locally provisioned global-title translation table. When you select this parameter and click the corresponding space in the Result Value column, the Edit GTT dialog box appears and contains: • **SCCP Address**—An address string of 1-15 hexadecimal characters. The string is not input in `BCD-String format`, but in normal form. • **Translation Type**—Identifies the translation type that the address specifies. Valid values are 0-255. • **Global Title Indicator**—Identifies the global title indicator value for the specified address. This value is always **2** for an ANSI variant and might be 2 or 4 for other variant types. • **Numbering Plan**—Identifies the numbering plan of the specified address. This value is only specified when the **gti** parameter value is 4. Valid values are 0-15. • **Nature of Address Indicator**—Identifies the nature of the specified address. This value is only specified when the **gti** parameter value is 4. Valid values are 0-127. • **Add**—Adds the current values. • **Close**—Closes the dialog box. • **Help**—Launches the online help window for the current dialog box.
none	none	A result is not specified.
pc	<point code> **ssn** <number>	Indicates that **pc** or **pc/ssn** routing is used. When you select this parameter and click the corresponding space in the Result Value column, the Edit Point Code dialog box appears and displays these fields and buttons: • **Point Code**—Point code to route the message. • **Instance**—(version 1.5 and higher) Number of instances in which the point code is defined. Valid instance values are 0-7. • **SSN** —Specify a subsystem number. Valid values are 2-255. • **Add**—Adds the current values. • **Close**—Closes the dialog box. • **Help**—Launches the online help window for the current dialog box.

Editing Address Table Properties

You can use the MWTM to edit the address table properties associated with an address table file. Choose **Edit > Address Table Properties** from the Address Table Editor menu. The Edit Address Table Properties dialog box appears.

Field or Button	Description
Table Name	User-defined unique table name.
Variant	SS7 protocol variant. You cannot edit this field.
Version	Version of the file format that the address table uses. You cannot edit this field.
Instance Number	Number of the instance that the address table uses. Valid numbers are **0** to **7**; the default instance number is **0**.
Network Name	Network name that the address table uses. If you change the network name for an existing address table file, the new network name must use the same variant.
OK	Saves the changes to the address table file. Enter or select values, then click **OK**. The MWTM saves your changes to the address table file.
Cancel	Closes the Edit Address Table Properties dialog box without saving any changes to the address table file. To close the Edit Address Table Properties dialog box at any time without saving any changes to the address table file, click **Cancel**.
Help	Shows online help for the current window.

Checking the Semantics of an Address Table File

In using the MWTM, Cisco strongly recommends that you check the semantics of an address table file against a specific ITP, validating these data in the address table file:

Group Name—In the Address Table entries, when the result type is *group* the result value is a group name. You must configure the group name in the address entry on the ITP prior to the deployment of the address table. During the validation process, if the group name in the address entry does not have a corresponding match on the ITP, the MWTM generates an error.

To check the semantics of an address table file, choose **File > Semantic Check** from the Address Table Editor menu. The Semantic Check Address Table dialog box appears.

Field or Button	Description
Filter by Node	You can check the **Filter by Node** check box, which limits signaling point selection to a specific node.
Signaling Point	Name of the associated signaling point.
OK	Closes the Semantic Check Address Table dialog box and opens the Progress dialog box, which shows the progress of the semantic check for the address table file. Enter the name or IP address of an ITP, and click **OK**. The the Semantic Check Address Table dialog box closes and the Progress dialog box opens, which shows the progress of the semantic check for the address table file and any messages that appear while checking the file. When the check ends, click **OK**. The Progress dialog box closes and returns to the Semantic Check Address Table dialog box.
Cancel	Closes the Semantic Check Address Table dialog Box without checking the semantics of the address table file.

Note You can also use the **mwtm checkmlr** command to check the semantics of an MLR address table file (see mwtm checkmlr, page B-103).

Deploying an Address Table File

You use the Deployment wizard to validate an address table file, upload it to an ITP, archive the file, and activate it on the ITP. To launch the Deployment wizard for an address table file, use one of these procedures:

- Choose **File > Deploy** from the Address Table Editor menu (see Deploying ITP Files, page 4-33).
- Enter the **mwtm pushmlr** command (see mwtm pushmlr, page B-121).

Displaying Basic Information About an Address Table File

You use the MWTM to view basic information about the current address table file. Choose **View > Address Table Info** from the address table menu. The Address Table Information dialog box appears.

The Address Table Information dialog box is read-only.

Field or Button	Description
Table Name	User-defined unique table name.
Filename	Name of the address table file.
Version	Version of the file format that the address table uses.
Variant	SS7 protocol variant. Valid variants are: • ANSI • China • ITU • NTT • TTC
Network Name	Network name that the address table file uses.
Instance Number	Number of the instance that the address table uses. Valid numbers are 0 to 7. The default instance number is 0.
Last Modified	Date and time that someone last modified the address table file.
Total Entries	Total number of entries in the address table file.
OK	Closes the address table Table Info dialog box.

Listing Archived Address Tables

To view a list of deployed and archived MLR address tables, do one of the following:

- Enter the **mwtm listarchive** command (see mwtm listarchive, page B-115).

- In the MWTM Address Table Editor, choose **Edit > Node Archive Management** (see Node Archive Management, page 4-31).

For a list of current MLR address table files in the address table staging directory, enter the **mwtm listmlr** command (see mwtm listmlr, page B-116).

Creating Network Name Mapping Files

When the MWTM discovers your network, it automatically creates and populates the network name-mapping file; therefore, in most cases, you do not need to manually create the network name-mapping file. For more information about running Discovery, see Discovering Your Network, page 3-4.

In some cases, you might want to manually create the network name-mapping file; for example, you might not have run **Discovery** yet, but you want to prepare for a future address table configuration. Also, while you cannot change or delete entries that have been populated automatically by the MWTM, you can add entries manually; and, you can change or delete those manual entries.

To create the network name-mapping file manually; or, add, change, or delete manual entries, choose **View > Network Name Configuration** from the address table menu. If you implement MWTM User-Based Access, this option is available to users with authentication level System Administrator (level 5). The Network Name Configuration dialog box appears.

The Network Name Configuration dialog box contains:

- Network Name Configuration Dialog Menu, page 16-16
- Network Name Configuration Dialog Table, page 16-17

Network Name Configuration Dialog Menu

The menu on the Network Name Configuration dialog box contains:

Menu Command	Description
File > Revert (Ctrl-R)	Loads the most recent network name-mapping file from the MWTM server. If the MWTM discovers new entries for the network name-mapping file while you are editing an address table file (for example, if a new network instance is added, or a new network is discovered), the Address Table Editor does not detect the new entries and they do not appear in the Network Name Configuration dialog box. To see the new entries in the dialog box, choose **File > Revert**. (You can also restart the Address Table Editor to automatically load the most recent network name-mapping file from the MWTM server.)
File > Save (Ctrl-S)	Saves the changes that you make to the network name-mapping file. After you add, change, or delete entries and save the file, the MWTM uses the file the next time it discovers the network. However, if the MWTM discovers entries that conflict with manual entries in the file, the MWTM uses (and shows in the Network Name Configuration dialog box) the discovered entries; not the manual entries.
File > Print (Ctrl-P)	Prints the contents of the network name-mapping file.
File > Close (Ctrl-W)	Closes the network name-mapping file without saving any additions, changes, or deletions.

Menu Command	Description
Edit > Add (Alt-A)	Adds an entry to the network name-mapping file.
Edit > Delete (Delete)	Deletes the chosen entry from the network name-mapping file.
Help > Topics (F1)	Shows the table of contents for the MWTM online help.
Help > Window (Shift-F1)	Shows online help for the current window.
Help > About (F3)	Shows build date, version, SSL support, and copyright information about the MWTM application.

Network Name Configuration Dialog Table

The Network Name Configuration Dialog table contains:

Field	Description
Network Name	Network name that the address table file uses. If you change the network name for an existing address table file, the new network name must use the same variant.
Variant	SS7 protocol variant. Valid variants are: • ANSI • China • ITU • NTT • TTC
Network Indicator	Type of call that a user places. Valid values are: • **National**—National-bound call. The MWTM routes national calls through the national network. • **NationalSpare**—National-bound call, used in countries in which more than one carrier can share a point code. In those countries, the Network Indicator differentiates networks. • **International**—International-bound call. The MWTM forwards international-bound calls to an STP pair that acts as an international gateway. • **InternationalSpare**—International-bound call, used in countries in which more than one carrier can share a point code. In those countries, networks are differentiated by the Network Indicator.
Discovered	Indicates whether the: • MWTM (Yes) discovered the entry. • A user entered it manually (No).

Saving an Address Table File

You use the MWTM to save a specific address table file and change the list of address table files.

If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

To save the changes that you make to an address table file or change the list of address table files, use one of these procedures. To save the changes that you make to the address table file:

- Without changing the name of the file, choose **File > Save** from the address table menu.
- With a new name, choose **File > Save As** from the address table menu. The Save File Dialog: Address Table File List appears.

Field or Button or Icon	Description
 Go up one Folder	Click this icon to go up one folder in the directory structure.
 Create New Folder	Click this icon to create a new folder in the current directory. This action opens the Input dialog box. Enter a folder name and click **OK**. The new folder appears in the Save File dialog box. Double-click the folder to open it. You can save files in this folder or create another folder at this level.
Type	Icon indicating whether the item in the table is a file or a folder.
Name	Name of the address table file or folder.
Last Modified	Date and time a user last modified the address table file or folder.
Size (bytes)	Size of the address table file or folder, in bytes.
Filename	Name by which you want to save the address table file. If you create a new address table filename, you can use any letters, numbers, or characters in the name that your operating system allows. However, if you include spaces in the new name, the MWTM converts those spaces to hyphens (-); for example, the MWTM saves file *a b c* as *a-b-c*.
Number of Files (visible in bottom left corner)	Total number of address table files and folders.

Field or Button or Icon	Description
OK	Saves the address table file or any changes you made to the list of files and closes the dialog box. To save the address table file with a new name, use one of these procedures. To save the file with: • A completely new name, enter the new name and click **OK**. • An existing name, overwriting an old address table file, select the name in the list and click **OK**. The MWTM closes the Save File Dialog: Address Table File List and the Progress dialog box appears, which shows the progress of the address table file save, as well as any messages that appear while saving the file. When the file is saved, click **OK**. The MWTM: • Closes the Progress dialog box. • Saves the address table file with the new name • Returns to the Address Table Editor window. **Note** If another user modifies and saves the address table file before you save your changes, the MWTM asks if you want to overwrite that user's changes. If you do, the other user's changes are overwritten and lost. If you choose not to, your changes are lost; unless you save the address table file to a different filename.
Delete	Deletes the chosen file from the address table file list. The MWTM issues an informational message containing the name and location of the deleted file.
Cancel	Closes the dialog box without saving the address table file or any changes to the address table file list.
Help	Shows online help for the dialog box.

When you are ready to exit the Address Table Editor window, choose **File > Exit** from the address table menu.

If you made any changes to the address table file, the MWTM asks if you want to save the changes before leaving the window. Click:

- **Yes** to save the changes.

  The MWTM opens the Save File Dialog: Address Table File List, which you use to save the address table file with a new name, or overwrite an existing address table file.

- **No** to close the prompt window.

  The MWTM closes the Address Table Editor window without saving any changes to the address table file.

By default, address table files reside in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the default directory is */opt/CSCOsgm/atbl*.
- A different directory, then the default directory resides in that directory.

To change the directory in which the MWTM stores address table files, use the **mwtm atbldir** command (see mwtm atbldir, page B-101).

Reverting to the Last Saved Address Table File

To revert to the last saved version of the address table file, choose **File > Revert** from the address table menu. The MWTM shows the last saved version of the file.

If you implement MWTM User-Based Access, this option is available to users with authentication level Network Administrator (level 4) and higher.

APPENDIX A

Client Object Map Reference

In the Mobile Wireless Transport Manager (MWTM) web interface, if you click on a node in the left pane, the associated tabs appear in the content area in the right pane. This appendix provides an overview of the tabs available for each MWTM object, and contains:

Note The MWTM client has a subset of the tabs described in this section.

Object Type	Related Content	Applicable To
Nodes	• BWG Node Tabs, page A-2 • CSG1 and CSG2 Node Tabs, page A-3 • CSR Node Tabs, page A-4 • Generic Node Tabs, page A-4 • GGSN Node Tabs, page A-5 • HA Node Tabs, page A-5 • IP-RAN Node Tabs, page A-6 • ITP Node Tabs, page A-7 • Metro Ethernet Node Tabs, page A-8 • mSEF Node Tabs, page A-8 • ONS Node Tabs, page A-9 • PDNGW Node Tabs, page A-9 • SGW Node Tabs, page A-10 • PDSN Node Tabs, page A-11 • PCRF Node Tabs, page A-12 • RAN Service Card Node Tabs, page A-12 • Unknown Node Tabs, page A-13	• BWG: mSEF networks • CSG1 and CSG2: mSEF networks • CSR: IP-RAN networks • Generic: All networks • GGSN: mSEF networks • HA: mSEF networks • IP-RAN: IP-RAN networks • ITP: ITP networks • Metro Ethernet: IP-RAN networks • mSEF: mSEF networks • ONS: IP-RAN networks • PDNGW: mSEF networks • SGW: mSEF networks • PDSN: mSEF networks • PCRF: PCRF networks • RAN Service: IP-RAN networks • Unknown: All networks

Object Type	Related Content	Applicable To
Signaling Points	Signaling Point Tabs, page A-13	ITP networks only
Linksets	Linkset Tabs, page A-14	
Links	Link Tabs, page A-14	
Application Servers	Application Server Tabs, page A-15	
Application Server Processes	Application Server Process Tabs, page A-15	
Application Server Process Associations	Application Server Process Association Tabs, page A-16	
Signaling Gateway-Mated Pairs	Signaling Gateway-Mated Pair Tabs, page A-16	
Interfaces	Interface Tabs, page A-17	All networks
Cards	Card Tabs, page A-18	IP-RAN networks
RAN Backhauls	RAN Backhaul Tabs, page A-18	IP-RAN networks
RAN Shorthauls	UMTS and GSM Interface Tabs, page A-18	
PWE3 Backhauls	PWE3 Backhaul Tabs, page A-19	
PWE3 Virtual Circuits	PWE3 Virtual Circuits Tabs, page A-19	
Access Point Names (APN)	Access Point Name Node Tabs, page A-20	mSEF networks
Access Point Name Instance (APMN Instance)	Access Point Name Node Tabs, page A-20	mSEF networks
Folders	Physical and Management Interface Folder Tabs, page A-20	All networks

BWG Node Tabs

Clicking a Broadband Wireless Gateway (BWG) node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics	Displaying BWG Real-Time Statistics, page 11-54
NSO	Viewing Non-Stop Operation, page 7-99

Tab	Related Content
HSRP **Note** This tab is available only for the BWG devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

CSG1 and CSG2 Node Tabs

Clicking a CSG node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics **Note** This tab is available only for CSG2 devices.	Displaying CSG2 Real-Time Statistics, page 11-41
NSO **Note** This tab is available only for CSG2 devices.	Viewing Non-Stop Operation, page 7-99
HSRP **Note** This tab is available only for the CSG2 devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

CSR Node Tabs

Clicking a Cell Site Router (CSR) node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
PWE3 Stats **Note** This tab is only available for CSR nodes operating Pseudo Wires.	Viewing PWE3 Statistics, page 7-119
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Traps	Viewing Trap Settings, page 7-63
QOS	Displaying QoS Statistics, page 11-109
PWE3 Stats	Viewing PWE3 Statistics, page 7-119
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

Generic Node Tabs

Clicking a generic node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Tab	Related Content
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Reports	Viewing Reports, page 13-4

GGSN Node Tabs

Clicking a GGSN node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
Syslog **Note** The syslog tab is available for GGSN R8 and later.	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics **Note** The Statistics tab is available for GGSN R8 and later.	Displaying GGSN Real-Time Statistics, page 11-68
APNs	Viewing APNs, page 7-145
NSO	Viewing Non-Stop Operation, page 7-99
HSRP **Note** This tab is available only for the GGSN devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

HA Node Tabs

Clicking an HA node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics	Displaying HA Real-Time Statistics, page 11-65
NSO	Viewing Non-Stop Operation, page 7-99
HSRP **Note** This tab is available only for the HA devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

IP-RAN Node Tabs

Clicking an IP-RAN node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55

Tab	Related Content
PWE3 Stats **Note** The PWE3 Statistics tab is only available for devices running Pseudo Wire.	Viewing PWE3 Statistics, page 7-119
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

ITP Node Tabs

Clicking an IP Transfer Point (ITP) node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis **Note** This tab is available for the 7600 devices.	Viewing Chassis, page 7-142
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Traps	Viewing Trap Settings, page 7-63
MTP3 Errors	Viewing ITP MTP3 Errors, page 7-97
MSU Rates **Note** Only available for ITPs that have an IOS that implements the CISCO-ITP-MSU-RATES-MIB.	Viewing ITP MSU Rates, page 7-98
NSO	Viewing Non-Stop Operation, page 7-99
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

Metro Ethernet Node Tabs

Clicking a Metro Ethernet node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Reports	Viewing Reports, page 13-4

mSEF Node Tabs

This is a 7600 supervisor card in a chassis that contains SAMI cards.

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics **Note** Only available for mSEF devices supporting Server Load Balancing (SLB).	Viewing Statistics, page 11-34
NSO	Viewing Non-Stop Operation, page 7-99
HSRP **Note** This tab is available only for the mSEF devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

ONS Node Tabs

Clicking an Optical Networking System (ONS) node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Note To view all nodes in your system, see Nodes Table, page 8-8.

PDNGW Node Tabs

Clicking a Packet Data Node Gateway (PDNGW) in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics	Viewing Statistics, page 11-34
APNs	Viewing APNs, page 7-145
NSO	Viewing Non-Stop Operation, page 7-99

Tab	Related Content
HSRP **Note** This tab is available only for the PDNGW devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

SGW Node Tabs

Clicking a Serving Gateway (SGW) in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics	Viewing Statistics, page 11-34
APNs	Viewing APNs, page 7-145
NSO	Viewing Non-Stop Operation, page 7-99
HSRP **Note** This tab is available only for the SGW devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

PDSN Node Tabs

Clicking a Packet Data Serving Node (PDSN) in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Chassis	Viewing Chassis, page 7-142
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Statistics	Viewing Statistics, page 11-34
NSO	Viewing Non-Stop Operation, page 7-99
HSRP **Note** This tab is available only for the PDSN devices having 7600 chassis and the SAMI cards.	Viewing HSRP details, page 7-139
Reports	Viewing Reports, page 13-4

PCRF Node Tabs

Clicking a Policy and Charging Rules Function (PCRF) node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

RAN Service Card Node Tabs

Clicking a Radio Access Network (RAN) Service Card (SVC) node in MWTM provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Syslog	Viewing the Syslog, page 7-54
CPU/Mem	Viewing CPU and Memory Performance, page 7-55
Traps	Viewing Trap Settings, page 7-63
QOS	Displaying QoS Statistics, page 11-109
Reports	Viewing Reports, page 13-4

Note To view all nodes in your system, see Nodes Table, page 8-8.

CDT Node Tabs

Clicking a CDT node tab provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36

Tab	Related Content
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Note To view all nodes in your system, see Nodes Table, page 8-8.

Unknown Node Tabs

Note Unknown nodes will show a performance tab when the unknown node implements the CISCO-PROCESS-MIB and either the CISCO-ENHANCED-MEMPOOL-MIB or CISCO-MEMORY-POOL-MIB.

Clicking a node in a MWTM view with unknown node status provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Note To view all nodes in your system, see Nodes Table, page 8-8.

Signaling Point Tabs

Clicking on a signaling point in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Tab	Related Content
ITP Access Lists	Viewing Route Detail, page 7-123
Route Detail	Viewing Route Detail, page 7-123
GTT MAP Status	Viewing GTT MAP Status, page 7-124
GTT Statistics	Viewing GTT Statistics, page 7-126
MLR Details	Viewing MLR Details, page 7-129
Reports	Viewing Reports, page 13-4

Note To view all signaling points in your system, see Signaling Points Table, page 8-18.

Linkset Tabs

Clicking on a linkset in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Linkset Access Lists	Viewing ITP Linkset Access Lists, page 7-121
Reports	Viewing Reports, page 13-4
Statistics	Viewing ITP Linkset Statistics, page 7-122

Note To view all linksets in your system, see Linksets Table, page 8-20.

Link Tabs

Clicking on a link in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41

Tab	Related Content
Alarms	Viewing Alarms and Recent Events, page 7-41
Reports	Viewing Reports, page 13-4
Interface Details	Interface Details, page 7-79
Statistics	Statistics: Application Server Process Associations, page 7-88
SCTP Assoc. Config Details	SCTP Association Configuration Details, page 7-84
SCTP Assoc. Stats Details	SCTP Association Statistics Details, page 7-86
Q.752 Measurements	Q.752 Measurements, page 7-82
Status Details	Status Details, page 7-93

Note To view all links in your system, see Links Table, page 8-23.

Application Server Tabs

Clicking on an application server in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Statistics	Statistics: Application Servers, page 7-87
Reports	Viewing Reports, page 13-4

Note To view all application servers in your system, see Application Servers Table, page 8-25.

Application Server Process Tabs

Clicking on an application server process in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Note To view all application server processes in your system, see Application Server Processes Table, page 8-28.

Application Server Process Association Tabs

Clicking on an application server process association in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Statistics	Statistics: Application Server Process Associations, page 7-88
SCTP Assoc. Config Details	SCTP Association Configuration Details, page 7-84
SCTP Assoc. Stats Details	SCTP Association Statistics Details, page 7-86
Interface Details	Interface Details, page 7-79
Reports	Viewing Reports, page 13-4

Note To view all application server process associations in your system, see Application Server Process Associations Table, page 8-29.

Signaling Gateway-Mated Pair Tabs

Clicking on a signaling gateway-mated pair in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Notes	Viewing Notes, page 8-55

Tab	Related Content
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
SCTP Assoc. Config Details	SCTP Association Configuration Details, page 7-84
SCTP Assoc. Stats Details	SCTP Association Statistics Details, page 7-86
Interface Details	Interface Details, page 7-79

Note To view all signaling gateway-mated pairs in your system, see Signaling Gateway Mated Pairs Table, page 8-31.

Interface Tabs

Clicking on an interface in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Troubleshoot	Viewing Troubleshoot, page 7-39
Performance [1]	Viewing Data for Interfaces, page 7-65
Errors/Discards[2]	Viewing Data for Interfaces, page 7-65
Advanced Details[3]	Viewing Data for Interfaces, page 7-65
TDM Stats **Note** TDM statistics are available only on some interfaces on nodes that implement either the CISCO-ICSUDSU-MIB or RFC1406-MIB.	Viewing TDM Statistics, page 7-105

1. May not be applicable for interfaces that do not collect statistics.
2. May not be applicable for interfaces that do not collect statistics.
3. May not be applicable for interfaces that do not collect statistics.

Note To view all interfaces in your system, see Interfaces Table, page 8-33.

UMTS and GSM Interface Tabs

Clicking on a RAN shorthaul (either UMTS or GSM) in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Shorthaul Performance	Viewing Shorthaul Performance Data, page 7-110
Shorthaul Errors	Viewing Shorthaul Errors, page 7-115

Note To view all interfaces in your system, see Interfaces Table, page 8-33.

Card Tabs

Clicking on a card in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status **Note** Only available when the card has child objects such as interfaces.	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

Note To view all cards in your system, see Cards Table, page 8-36.

RAN Backhaul Tabs

Clicking on a RAN backhaul in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
RAN Shorthauls	Viewing RAN Shorthauls, page 7-142
Backhaul Performance	Viewing Backhaul Performance Data, page 7-111 (Real-time data on the MWTM client) Displaying Backhaul Performance Statistics, page 11-36 (Historical data on the MWTM web interface)
Backhaul Errors	Viewing Backhaul Errors, page 7-119 (Real-time data on the MWTM client) Displaying Backhaul Error Statistics, page 11-40 (Historical data on the MWTM web interface)

Note To view all RAN backhauls in your system, see RAN Backhauls Table, page 8-38.

PWE3 Backhaul Tabs

Clicking on a PWE3 backhaul in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Troubleshoot	Viewing Troubleshoot, page 7-39
PWE3 VCs	PWE3 Virtual Circuits Table, page 8-44
PWE3 Stats	Viewing PWE3 Statistics, page 7-119
Reports	Viewing Reports, page 13-4

PWE3 Virtual Circuits Tabs

Clicking on a PWE3 virtual circuit in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Troubleshoot	Viewing Troubleshoot, page 7-39
PWE3 Stats	Viewing PWE3 Statistics, page 7-119
Reports	Viewing Reports, page 13-4

Access Point Name Node Tabs

This section provides information about the tabs available for Access Point Name nodes.

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Troubleshoot	Viewing Troubleshoot, page 7-39
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41
Reports	Viewing Reports, page 13-4
APNs	Viewing APNs, page 7-145
Nodes	Viewing APN Specific Nodes, page 7-146

Physical and Management Interface Folder Tabs

The Physical folder that contains a list of the physical interfaces and cards that belong to the node. The Management Interface folder contains a list of interfaces that the MWTM uses to manage the node.

Clicking on a Physical or Management Interface folder in a MWTM view provides you with the following tabs:

Tab	Related Content
Details	Viewing Details, page 7-7
Status	Viewing Status, page 7-36
Notes	Viewing Notes, page 8-55
Events	Viewing Alarms and Recent Events, page 7-41
Alarms	Viewing Alarms and Recent Events, page 7-41

APPENDIX B

Command Reference

This appendix provides the format and a brief description of these Cisco Mobile Wireless Transport Manager (MWTM) commands, listed alphabetically. Each command is available on the:

- Server only (including Solaris and Linux).
- Server and Solaris or Linux clients only.
- Server and all clients (including windows) as indicated.

You can run commands from:

- *install_directory/bin*

  where *install_directory* is the directory where the MWTM server is installed (by default, */opt/CSCOsgm*).

- Alternatively, if you have the *install_directory/bin* in your path, you can simply run commands from in your path.

This appendix contains:

Note General commands are for ITP, IP-RAN, and mSEF networks; ITP commands are only for ITP networks. mSEF commands are only for mSEF networks.

General Commands

General commands for the MWTM include:

mwtm

Server and Solaris or Linux Clients Only

Command Description

Displays the command syntax for the **mwtm** command and all of its options. The function of this command is identical to **mwtm help**.

MWTM help is network specific, so only the commands pertaining to each network type appear. If you set all network types, you can see all the commands.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm addcreds

Server Only

Full Syntax

mwtm addcreds [**-d** *nodetype*] [**-u** *username* **-n** *enable username*] [**-i** *ipaddress*] [**-r** *protocoltype*]

Command Description

Adds credentials for a given IP address, if specified. Otherwise, credentials are added to the system as Default, which applies the specified credentials to all nodes in the MWTM database.

- To add credentials for a specific node type, specify **-d** and the **nodetype**, which can be:
  - **itp**—ITP nodes
  - **ons**—ONS nodes
  - **csr**—Cell Site Router (CSR) nodes (Cisco MWR and Cisco 3825)
  - **ran_svc**—RAN_SVC nodes
  - **ip-ran**—IP-RAN nodes
- To add username credentials, specify **-u** and the username.
- To add **enable** username credentials, specify **-n** and the **enable** username.
- To add credentials for a particular IP address only, specify **-i** and the IP address of the node.

- To add the protocol type, specify **-r** and one protocol, which can be:
  - **telnet**—Telnet access
  - **ssh**—Secure shell access

You must log in as the root user or superuser to use this command.

Related Topic

Configuring Login Credentials, page 5-19

mwtm addsnmpcomm

Full Syntax

mwtm addsnmpcomm -i *ipaddress* [**-r** *retry* | **-t** *timeout* | **-p** *poll*] **-c** *community*

Command Description

Adds an SNMP configuration to the MWTM server.

- **-i** *ipaddress*—the IP address of the device (required)
- **-r** *retry*—the number of times to retry connecting to the device (optional)
- **-t** *timeout*—the timeout value, in seconds (optional)
- **-p** *poll*—the poll interval, in minutes (optional)
- **-c** *community*—the read community string of the device (required)

You do not need to restart the MWTM server.

Related Topic

- mwtm deletesnmpcomm, page B-26
- mwtm modifysnmpcomm, page B-48
- mwtm showsnmpcomm, page B-64
- mwtm snmpsetup, page B-71

mwtm adduser

Server Only

Full Syntax

mwtm adduser [*username*]

Command Description

If you enable MWTM User-Based Access, adds the specified user to the authentication list.

When you add a user, the MWTM prompts you for this information:

- User's password. When setting the password, follow the rules and considerations in Creating Secure Passwords, page 2-7.
- Whether to force the user to change the password at the next log in. The default is not to force the user to change the password.

- Authentication level for the user. Valid levels are:
  - **1**—Basic User
  - **2**—Power User
  - **3**—Network Operator
  - **4**—Network Administrator
  - **5**—System Administrator
  - **11**—Custom Level 1
  - **12**—Custom Level 2

You must log in as the root user or superuser to use this command.

Note If you enable Solaris authentication, you must log in as the root user, not as superuser, to use this command (see Implementing Secure User Access (Server Only), page 2-2).

Related Topic

- Configuring User Access, page 2-1
- Implementing Secure User Access (Server Only), page 2-2

mwtm archivedirsize

Server Only

Full Syntax

mwtm archivedirsize [*megs*]

Command Description

Sets the maximum size (in megabytes) of the console log archive directory.

To view help for this command, include the following parameter: -h.

mwtm authtype

Server Only

Full Syntax

mwtm authtype [**local | solaris | linux**]

Command Description

Configures MWTM security authentication:

- **local**—Allows creation of user accounts and passwords that are local to the MWTM system. When using this method, you manage usernames, passwords, and access levels by using MWTM commands.

- **solaris**—Uses standard Solaris-based user accounts and passwords, as the */etc/nsswitch.conf* file specifies. You can provide authentication with the local */etc/passwd* file; from a distributed Network Information Services (NIS) system; or with any other authentication tool, such as RADIUS or TACACS+ (for details, see Additional Authentication Tools, page 2-4).
- **linux**—Uses standard Linux-based user accounts and passwords, as the */etc/nsswitch.conf* file specifies. You can provide authentication with the local */etc/passwd* file; from a distributed NIS system; or with any other authentication tool, such as RADIUS or TACACS+ (for details, see Additional Authentication Tools, page 2-4).

Note When using the solaris or linux options, if you have enabled user access, you must enable SSL (see Implementing SSL Support in the MWTM, page 2-21 to ensure secure passwords between the MWTM client and server.)

You must log in as the root user to use this command.

Related Topic

- Configuring User Access, page 2-1
- Implementing Secure User Access (Server Only), page 2-2

mwtm backup

Server Only

Command Description

Note Since backups can be large, ensure that your file system has enough space to handle them.

Backs up MWTM data files to the MWTM installation directory. The MWTM automatically backs up all data files nightly at 2:30 AM; but, you can use this command to back up the files at any other time. If you installed the MWTM in:

- The default directory, */opt*, then the locations of the backup files are */opt/mwtm61-client-backup.tar.Z* and */opt/mwtm61-server-backup.tar.Z*.
- A different directory, then the backup files reside in that directory.

To restore the MWTM data files from the previous night's backup, use the **mwtm restore** command. Do not try to extract the backup files manually.

You must log in as the root user (not as a superuser) to use this command.

Note The MWTM performs a database integrity check during the backup. If the check fails, the previous backup is not overwritten. Instead, the MWTM creates a new failed file (for example: *mwtm61-server-backup-failed.tar.Z*).

Related Topic

- Configuring a Backup MWTM Server, page 5-9
- mwtm backupdays, page B-10

- mwtm backupdir, page B-11
- mwtm restore, page B-58

mwtm backupdays

Server Only

Full Syntax

mwtm backupdays [*days*]

Command Description

This command sets the number of days to save backup files on the MWTM server and client. The default value is 1 day, but you can configure the MWTM to save multiple days of backup files.

This command accepts values from 1 to 30 days. If you attempt to set a value outside of this range, the MWTM responds with this message:

```
Value out of range of 1-30.
```

The MWTM stores backup files in the backup directory (see mwtm backupdir, page B-11). The MWTM uses this file naming convention when there are multiple backup files:

mwtm<*releasenumber*>-[server|client]-backup.tar.[*date*].Z

For example:

mwtm61-client-backup.tar.[*date*].Z

mwtm61-server-backup.tar.[*date*].Z

If the number of backup days is more than one, and you run the **mwtm restore** command, the MWTM will prompt you for a server or client backup file to restore from (because there would be more than one backup file to choose from). See mwtm restore, page B-58.

Here is an example of setting the number of backup days to 5 days:

```
# ./mwtm backupdays

Current value is: 1

Enter number of days to save backup files <1-30>: [1] 5

Setting number of days to save backup files to 5 days.
```

In this example, the MWTM saves backup files for the last five days. The MWTM deletes backup files that are older than five days.

Note If you notice multiple backups, ensure that there is enough free space in the backupdir file system (see mwtm backupdir, page B-11).

Related Topic

- Backing Up or Restoring MWTM Files (Server Only), page 2-30
- mwtm backupdir, page B-11
- mwtm restore, page B-58

mwtm backupdir

Server Only

Full Syntax

mwtm backupdir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. You are prompted whether to continue.

You can change the directory in which the MWTM stores its nightly backup files. The default backup directory is the directory in which the MWTM is installed. If you installed the MWTM in:

- The default directory, */opt*, then the default backup directory is also */opt*.
- A different directory, then the default backup directory is that directory.

If you specify a new directory that does not exist, the MWTM does not change the directory and issues an appropriate message.

You must log in as the root user to use this command.

Related Topic

- Configuring a Backup MWTM Server, page 5-9
- mwtm backupdays, page B-10

mwtm backuplog

Server Only

Full Syntax

mwtm backuplog [**clear** | **-r**]

Command Description

Uses PAGER to display the contents of the system backup log.

To clear the log, enter **mwtm backuplog clear**.

To display the contents of the log in reverse order, with the most recent commands at the beginning of the log, enter **mwtm backuplog -r**.

You must log in as the root user or superuser to use this command.

mwtm backupstats

Server Only

Full Syntax

mwtm backupstats

Command Description

This command displays statistics on backup process.

You must log in as the root user or superuser to use this command.

mwtm badloginalarm

Server Only

Full Syntax

mwtm badloginalarm [*number-of-attempts* | **clear**]

Command Description

If you enable MWTM User-Based Access, number of unsuccessful log-in attempts allowed before the MWTM generates an alarm.

The valid range is 1 unsuccessful attempt to an unlimited number of unsuccessful attempts. The default value is 5 unsuccessful attempts.

The MWTM records alarms in the system security log file. The default path and filename for the system security log file is */opt/CSCOsgm/logs/sgmSecurityLog.txt*. If you installed the MWTM in a directory other than */opt*, then the system security log file resides in that directory.

To view the system security log file, enter **mwtm seclog**. You can also view the system security log on the MWTM System Security Log web page (see Displaying the Contents of the System Security Log (Server Only), page 2-17).

To disable this function (that is, to prevent the MWTM from automatically generating an alarm after unsuccessful log-in attempts), enter **mwtm badloginalarm clear**.

You must log in as the root user or superuser to use this command.

Related Topic

Automatically Disabling Users and Passwords (Server Only), page 2-10

mwtm badlogindisable

Server Only

Full Syntax

mwtm badlogindisable [*number-of-attempts* | **clear**]

Command Description

If you enable MWTM User-Based Access, number of unsuccessful log-in attempts by a user allowed before the MWTM disables the user's authentication. The MWTM does not delete the user from the authentication list, the MWTM only disables the user's authentication. To re-enable the user's authentication, use the **mwtm enableuser** command.

The valid range is 1 unsuccessful attempt to an unlimited number of unsuccessful attempts. The default value is 10 unsuccessful attempts.

To disable this function (that is, to prevent the MWTM from automatically disabling a user's authentication after unsuccessful log-in attempts), enter **mwtm badlogindisable clear**.

You must log in as the root user or superuser to use this command.

Related Topic

Automatically Disabling Users and Passwords (Server Only), page 2-10

mwtm browserpath

Server and Solaris or Linux Clients Only

Command Description

Sets a user-defined MWTM web browser path and verifies that the browser specified by the user exists.

You must log in as the root user (not as a superuser) to use this command.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm certgui

Solaris Clients Only

Command Description

If you enable the Secure Sockets Layer (SSL) on your MWTM system, opens the MWTM Certificate Tool window in which you manage SSL certificates on the MWTM client.

Note If you installed the MWTM server and client on the same workstation, running this command is not necessary. Instead, when you use the **mwtm keytool** command to manage SSL certificates on the server, the MWTM automatically manages the certificates on the client.

You must log in as the root user (not as a superuser) to use this command in Solaris.

Related Topic

Launching the MWTM Certificate Tool for SSL, page 2-24

mwtm certtool

Server and Solaris Clients Only

Full Syntax

mwtm certtool [**clear** | **delete** *alias* | **export** *alias* [**-file** *filename*] | **import** *alias* [**-file** *filename*] | **list**]

Command Description

If you enable the Secure Sockets Layer (SSL) ion your MWTM system, you can use this command to manage SSL certificates on the MWTM client from the command line.

Note If you installed the MWTM server and client on the same workstation, running this command is not necessary. Instead, when you use the **mwtm keytool** command to manage SSL certificates on the server, the MWTM automatically manages the certificates on the client.

Use these keywords and arguments with this command:

- **import** *alias* [**-file** *filename*]—Imports a signed SSL certificate in X.509 format. This is the most common use for this command.

  The *alias* argument can be any character string; the hostname of the server from which you are importing the certificate is a good choice.

  To import the certificate from a file, specify the optional **-file** keyword and a filename.
- **export** *alias* [**-file** *filename*]—Exports the specified SSL certificate in X.509 format.

  To export the certificate to a file, specify the optional **-file** keyword and a filename.
- **list**—Lists all SSL certificates on the MWTM client.
- **delete** *alias*—Removes the specified SSL certificate from the MWTM client.
- **clear**—Removes all SSL certificates from the MWTM client.

Solaris Only: You must log in as the root user (not as a superuser) to use this command in Solaris.

Related Topic

Importing an SSL Certificate to an MWTM Client, page 2-25

mwtm changes

Server Only

Command Description

Displays the contents of the MWTM CHANGES file. The CHANGES file lists all bugs that have been resolved in the MWTM, sorted by release. If you installed the MWTM in:

- The default directory, */opt*, then the MWTM CHANGES file resides in the */opt/CSCOsgm/install* directory.
- A different directory, then the file resides in that directory.

mwtm chartwindow

Server Only

Full Syntax

mwtm chartwindow [*mins* | **clear**]

Command Description

Specifies the maximum amount of data appearing (in minutes) for real-time ITP charts.

For example, if you set this command to 20 minutes, the charts are refreshed every 20 minutes to show the latest data. The valid range is between 5 and 120 minutes, and the default setting is 15 minutes.

To return to the default setting, enter the **mwtm chartwindow clear** command.

You must log in as the root user or superuser to use this command.

mwtm checksystem

Server Only

Command Description

Checks the system for a server installation and reviews the:

- System requirements
- TCP/IP address and port usage checks
- Disk space usage check
- Server summary
- Error summary

You must log in as the root user (not as a superuser) to use all features of this command. The *logs/troubleshooting* folder has limited permissions to read when the user is not a root user.

mwtm clean

Server Only

Command Description

Removes all MWTM data from the MWTM server, excluding message log files, backup files, and report files. This command restores the MWTM server to a state that would exist after a new installation of the MWTM; *except for the message log files, backup files, and report files*.

Removed data includes all:

- MWTM data
- Notes
- Preferences
- Security settings
- Route files

- GTT files
- Address table files
- Seed files
- Event filters
- Report control files
- Views
- Any user-created files stored in the MWTM directories

You must log in as the root user (not as a superuser) to use this command.

mwtm cleanall

Server Only

Full Syntax

mwtm cleanall [**nostart**]

Command Description

Removes all MWTM data from the MWTM server, including message log files, backup files, report files, configuration settings, and security settings. This command restores the MWTM server to a state that would exist after a new installation of the MWTM.

The server is restarted automatically after running **mwtm cleanall** command.

The server is not started automatically after running **mwtm cleanall nostart** command.

Data removed includes all:

- MWTM data
- Notes
- Preferences
- Security settings
- Route files
- GTT files
- Address table files
- Seed files
- Event filters
- Report control files
- Views
- Any user-created files stored in the MWTM directories

You must log in as the root user (not as a superuser) to use this command.

mwtm cleandb

Server Only

Command Description

Removes all MWTM data from the MWTM server, including the:

- Core data model database
- All view files
- Notes associated with objects
- Event filters
- MWTM data
- Any user-created files stored in the MWTM directories

This command restores the MWTM server to a state that would exist after a new installation of the MWTM; *except for the presence of the retained files*.

The following data is excluded:

- Message log files
- Backup files
- Report files
- Configuration settings
- Security settings
- User credentials
- Route files
- GTT files
- Address table files

You must log in as the root user (not as a superuser) to use this command.

mwtm cleandiscover

Server Only

Full Syntax

mwtm cleandiscover [*seed-node*] [*seed-node*]...

Command Description

You can use this command to delete all current network data and begin a clean discovery of the network from the command line. Use the *seed-node* arguments to specify the DNS names or IP addresses of one or more seed nodes.

Note When you begin a clean discovery, the MWTM stops any real-time polls that are running and issues appropriate messages.

Running this command does not remove any notes, preferences, route files, views, message log files, backup files, or report files, nor any user-created files stored in the MWTM directories.

You must log in as the root user or superuser to use this command.

Related Topic

Discovering Your Network, page 3-4

mwtm cliconntimer

Server Only

Full Syntax

mwtm cliconntimer [*number-of-seconds* | **clear**]

Command Description

Specifies how long, in seconds, an MWTM client should wait for a message from the MWTM server before the client attempts to contact the server and takes one of these actions. If the server:

- Responds to the client, the client reconnects to the server.
- Does not respond to the client, but a backup server is configured, the client attempts to connect to the backup server.
- Does not respond to the client and no backup server is configured, the client displays a dialog box with this message:

```
Connection to the server has timed out.
Client could not establish 2-way communications with the server.
If you are running through a VPN you may have entered the wrong client IP address.
```

  Click **OK** to exit the client.

  The MWTM writes this message to the client console log:

  - Solaris client—*/opt/CSCOsgmClient/logs/sgmConsoleLog.txt*
  - Windows client—*C:\Program Files\Cisco Systems\MWTM Client\logs\consoleLog.txt*

The valid range is 10 seconds to an unlimited number of seconds. The default value is 60 seconds.

To restore the default timeout of 60 seconds, enter the **mwtm cliconntimer clear** command.

Any changes you make take effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

mwtm client

Solaris or Linux Clients Only

Full Syntax

mwtm client [*hostname*]

Command Description

Starts an MWTM client on the specified host. If no hostname is specified, starts an MWTM client on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

If you access a remote workstation by Telnet, the DISPLAY variable must be set to your local display or you cannot use this command. If the DISPLAY variable is not set automatically, you must set it manually. See Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3 for details.

Related Topic

Starting the MWTM Client, page 3-3

mwtm clientfailoverprompt

Solaris or Linux Clients Only

Full Syntax

mwtm clientfailoverprompt [**enable** | **disable** | **status**]

Command Description

Indicates whether or not a prompt is issued when the primary server fails over to the secondary server:

- **enable**—Enables the prompt, and you are prompted to provide credentials before failing over to the secondary server.

Note MWTM user access must be enabled, and your user ID and password must be the same on both servers. Also, ensure that the backup server is defined (see Configuring a Backup MWTM Server, page 5-9).

- **disable**—Disables the prompt, and you are connected to the secondary server automatically.
- **status**—Displays the current status of prompt (whether enabled or disabled).

You must log in as the root user or superuser to use this command.

mwtm clientlogs

Server Only

Command Description

Uses PAGER to display the MWTM client log files.

The MWTM client log files contain client console output for all MWTM clients, one file per local or remote client. The MWTM automatically creates the file for a client when the client starts. If you installed the MWTM in:

- The default directory, */opt*, then the MWTM client log file resides in the */opt/CSCOsgm/logs/clientLogs* directory.
- A different directory, then the file resides in that directory.

mwtm clitimeout

Server Only

Full Syntax

mwtm clitimeout [*mins* | **clear**]

Command Description

Specifies how long, in minutes, an MWTM client can be inactive before the MWTM automatically disconnects it.

This function is disabled by default. If you do not specify this command, clients are never disconnected as a result of inactivity.

If you enter the **mwtm clitimeout** command, the valid range is 1 minute to an unlimited number of minutes. No default value exists.

If you enable this function and you want to disable it (that is, never disconnect a client as a result of inactivity), enter the **mwtm clitimeout clear** command.

You must log in as the root user or superuser to use this command.

Related Topic

Automatically Disabling Users and Passwords (Server Only), page 2-10

mwtm clientviewsize

Solaris or Linux Clients Only

Full Syntax

mwtm clientviewsize [*viewsize*]

Command Description

Use this command to set the maximum number of nodes to display in a Java client view. By default, 1,000 nodes are allowed. Legal values are between 1 and 1,000. The Java client displays a warning message and terminates after startup, if its view contains more than the number of nodes specified by this command.

You must log in as the root user or superuser to use this command.

mwtm cmdlog

Server Only

Full Syntax

mwtm cmdlog [**clear** | **-r**]

Command Description

Uses PAGER to display the contents of the system command log. The system command log lists:

- All **mwtm** commands that were entered for the MWTM server.
- The time each command was entered.
- The user who entered the command.

To clear the log, enter **mwtm cmdlog clear**.

To display the contents of the log in reverse order, with the most recent commands at the beginning of the log, enter **mwtm cmdlog -r**.

You must log in as the root user or superuser to use this command.

mwtm collectstats

Server Only

Full Syntax

mwtm collectstats [**-h** *hostname(s)*] {**-d** *date(s)* | **-s** *starttime* **-e** *endtime*} [**clean**]

Command Description

Gathers report and event information from the database for the input criteria. The output appears here:

/opt/CSCOsgm/tmp/cisco_mwtm_stats_<date>_<timestamp>.zip

Use the following keywords and arguments with this command:

- **-h** *hostname(s)*—Narrow your search to specific devices by entering each hostname individually. For example:

  ```
  ./mwtm collectstats -h hostname1 hostname2 hostname3
  ```

- **-d** *date(s)*—Collects reports and events for the devices indicated for the given specific dates. The date format must be in YYYYMMDD. Enter each date individually. For example:

  ```
  ./mwtm collectstats -h hostname1 hostname2 hostname3 20070621 20070622 20070623
  ```

- **-s** *starttime* and **-e** *endtime*— Collects reports and events for the devices indicated from a start time to an end time. The date format must be in YYYYMMDD-HHMM. For example:

  ```
  ./mwtm collectstats -h hostname1 hostname2 hostname3 -s 02232008-1500 -e 03012008-2300
  ```

- **clean**—Removes older *.zip* files.

If no data is available, a message appears, and the MWTM does not create a *.zip* file.

If you specify hostnames, the MWTM creates a separate log file for each hostname with the events and trap details. For each report category, the MWTM creates a log file in *.csv* format, with a name similar to:

```
cisco_mwtm_stats_report_<NameOfReport>.csv
```

```
cisco_mwtm_stats_event_trap_<Hostname>.csv
```

In addition, the MWTM creates a consolidated log file for all events and all report data separately.

You must log in as the root user or superuser to use this command.

mwtm compressdb

Server only

Full syntax

mwtm compressdb

Command Description

Compresses the MWTM database tables.

You must log in as the root user or superuser to use this command.

mwtm console

Server Only

Command Description

Displays the contents of the console log file, *sgmConsoleLog.latest*. The console log file contains unexpected error and warning messages from the MWTM server, such as those that might occur if the MWTM server cannot start.

You must log in as the root user or superuser to use this command.

mwtm consolelogsize

Server Only

Full Syntax

mwtm consolelogsize [*megs*]

Command Description

Sets the maximum size (in megabytes) of the console log file.

To view help for this command, include the following parameter: -h.

mwtm countnodes

Server Only

Command Description

Displays the number of nodes in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countobjects

Server Only

Command Description

Displays a count of all objects in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm cwsetup

Solaris Server Only

Full Syntax

mwtm cwsetup [**install** | **uninstall**]

Command Description

Manages the integration of the MWTM with CiscoWorks:

- **install**—Checks to see which CiscoWorks files are installed and installs additional files as necessary. Use this command to integrate the MWTM and CiscoWorks in these instances:
  - You installed CiscoWorks after you installed the MWTM.
  - The MWTM and CiscoWorks are no longer integrated for some reason.
- **uninstall**—Removes MWTM files from the CiscoWorks area.

Note Always run **mwtm cwsetup uninstall** before uninstalling CiscoWorks from your system.

- The command prompts you to enter:
  - The CiscoWorks server name
  - The port number for the CiscoWorks web server (the default setting is 1741)
  - The secure port number for the CiscoWorks web server (the default setting is 443)
  - Whether or not CiscoWorks security is enabled

Note Changing CiscoWorks settings by using the **mwtm cwsetup** command sets all clients on the MWTM server to use these settings. You can configure a particular MWTM client to use different CiscoWorks settings by changing the client's preferences. See Changing CiscoWorks Server Settings, page 4-13.

You must log in as the root user (not as a superuser) to use this command.

You must restart the MWTM server for your changes to take effect. After the server restart, you can launch these applications from the MWTM Tools menu:

- CiscoWorks Device Center
- CiscoView

Also, you can launch the MWTM web interface from the CiscoWorks dashboard. In this scenario, CiscoWorks and MWTM are running on the same server.

Related Topic

Changing CiscoWorks Server Settings, page 4-13

mwtm datadir

Server Only

Full Syntax

mwtm datadir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. You are prompted whether to continue.

Sets the directory in which the MWTM stores data files. Use this command when you want to move the data directory to a larger filing system to accommodate the increasing size of the directory.

The default directory for data files resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the default directory is */opt/CSCOsgm/data*.
- A different directory, then the default directory resides in that directory.

Use this command if you want to store data files in a different directory; for example, in a Network File System location on another server.

Note This command copies all files in the current directory to the new directory. If you are not logged in as the superuser and you do not own the new directory, you might not be able to copy the files. In that case, you must specify a directory that you own or log in as the root user.

Do not set the new directory to any of these: */usr*, */var*, */opt*, or */tmp*.

Do not set the new directory to the same directory in which you are storing GTT files (**mwtm gttdir**), message log files (**mwtm msglogdir**), route table files (**mwtm routedir**), or address table files (**mwtm atbldir**).

After you change the directory, the MWTM asks if you want to restart the MWTM server. The new directory takes effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

mwtm dbcheckdir

Server Only

Full Syntax

mwtm dbcheckdir [*directory*]

Command Description

Sets the directory used for database checks.

You must log in as the root user or superuser to use this command.

mwtm dbtool

Server Only

Full Syntax

mwtm dbtool {*SQL*}

Command Description

Issues a SQL query against the MWTM database. Use a standard SQL query, except replace any instances of the asterisk (*) with a question mark (?). For example, a sample SQL query might be:

```
"select * from events"
```

Using the mwtm **dbtool** command, this SQL query would be:

```
mwtm dbtool "select ? from events"
```

You must log in as the root user or superuser to use this command.

mwtm delete

Server Only

Full Syntax

mwtm delete [**all** | **node** [**all** | *node* [*node*]...] | **sp** [**all** | *point-code*:*net* [*point-code*:*net*]...] | **linkset** [**all** | *node*/*linkset* [*node*/*linkset*]...]

Command Description

Deletes objects from the MWTM database.

- **all**—Deletes all objects from the MWTM database.
- **node all**—Deletes all nodes from the MWTM database.
- **node** *node* [*node*]...—Deletes one or more nodes from the MWTM database. Use the *node* arguments to specify one or more nodes.
- **sp all**—Deletes all nodes from the MWTM database.

- **sp** *point-code*:*net* [*point-code*:*net*]...—Deletes one or more signaling points from the MWTM database. Use the *point-code*:*net* arguments to specify one or more signaling points, which the point code and network name identify; for example, 1.22.0:net0.
- **linkset all**—Deletes all linksets from the MWTM database.
- **linkset** *node*/*linkset* [*node*/*linkset*]...—Deletes one or more linksets from the MWTM database. Use the *node*/*linkset* arguments to specify one or more linksets associated with specific nodes.

You must log in as the root user or superuser to use this command.

Related Topic

Deleting Objects, page 8-56

mwtm deletecreds

Server Only

Full Syntax

mwtm deletecreds [**-d** *nodetype*] [**-i** *ipaddress*] [**-a**]

Command Description

Deletes credentials for a given IP address, if specified. Otherwise, Default credentials are deleted. To delete:

- Credentials for a specific node type, specify **-d** and the nodetype:
  - **itp**—ITP nodes
  - **ons**—ONS nodes
  - **csr**—Cell Site Router (CSR) nodes
  - **ran_svc**—RAN_SVC nodes
  - **ip-ran**—IP-RAN nodes
- Credentials for a particular IP address only, specify **-i** and the IP address of the node.
- All credentials, specify **-a**.

Related Topic

Configuring Login Credentials, page 5-19

mwtm deletesnmpcomm

Full Syntax

mwtm deletesnmpcomm -i *ipaddress*

Command Description

Deletes an SNMP configuration from the MWTM server.

-i *ipaddress*—the IP address of the device (required)

You do not need to restart the MWTM server.

Related Topic

- mwtm addsnmpcomm, page B-7
- mwtm modifysnmpcomm, page B-48
- mwtm showsnmpcomm, page B-64
- mwtm snmpsetup, page B-71

mwtm deluser

Server Only

Full Syntax

mwtm deluser [*username*]

Command Description

If you enable MWTM user-based access, deletes the specified user from the authentication list. To add the user back to the list, use the **mwtm adduser** command.

You must log in as the root user or superuser to use this command.

Related Topic

Manually Disabling Users and Passwords (Server Only), page 2-12

mwtm disablepass

Server Only

Full Syntax

mwtm disablepass [*username*]

Command Description

If you enable the MWTM User-Based Access, and set **mwtm authtype** to **local**, disables the specified user's authentication and password. The MWTM does not delete the user from the authentication list; rather, the MWTM only disables the user's authentication and password. To re-enable the user's authentication with:

- The same password as before, use the **mwtm enableuser** command.
- A new password, use the **mwtm userpass** command.

Note The user can re-enable authentication with a new password by attempting to log in by using the old password; the MWTM then prompts the user for a new password.

If you set **mwtm authtype** to **solaris** or **linux**, you cannot use this command; instead, you must manage passwords on the external authentication servers.

You must log in as the root user or superuser to use this command. You must also set the **mwtm authtype** to **local**.

Related Topic

Manually Disabling Users and Passwords (Server Only), page 2-12

mwtm disableuser

Server Only

Full Syntax

mwtm disableuser [*username*]

Command Description

If you enable MWTM User-Based Access, disables the specified user's authentication.The MWTM does not delete the user from the authentication list, the MWTM only disables the user's authentication. To re-enable the user's authentication with:

- The same password as before, use the **mwtm enableuser** command.
- A new password, use the **mwtm userpass** command.

You must log in as the root user or superuser to use this command.

Related Topic

Manually Disabling Users and Passwords (Server Only), page 2-12

mwtm discover

Server Only

Full Syntax

mwtm discover [*seed-node*] [*seed-node*]...

Command Description

You use this command to discover the network from the command line. Use the *seed-node* arguments to specify the DNS names or IP addresses of one or more seed nodes.

Note This command does not perform a clean discovery. To do so, see the **mwtm cleandiscover** command.

You must log in as the root user or superuser to use this command.

Related Topic

Discovering Your Network, page 3-4

mwtm diskmonitor

Server Only

Full Syntax

mwtm diskmonitor [**enable** | **disable** | **status**] | **warning** [*megs*] | **shutdown** [*megs*] | **stopscript** [*path*]

Command Description

Monitors the disk space usage of the MWTM installed directories. When enabled, a script (*diskWatcher.sh*) runs every hour to check two thresholds:

- Warning—Warns the MWTM operator when the disk space usage exceeds the threshold value. The MWTM logs the warning in the *sgmConsoleLog.txt* file. For example:

```
WARNING: The following partition is getting low on free disk space:
                          /opt
                          Space left = 905 MB
```

- Shutdown—Shuts down the MWTM server when the disk space usage exceeds the threshold value.

The parameters of the **mwtm diskmonitor** command are:

- **enable**—Enables the hourly check of disk space usage of MWTM installed directories.
- **disable**—Disables the hourly check of disk space usage of MWTM installed directories.
- **status**—Displays the current status of the disk monitor feature (whether enabled or disabled).
- **warning** [*megs*]—Sets the warning threshold in MBs. The default setting is 1000 MB.
- **shutdown** [*megs*]—Sets the shutdown threshold in MBs. The default setting is 100 MB.
- **stopscript** [*path*]—Sets the custom script to call for stop.

You must log in as the root user or superuser to use this command.

mwtm enableuser

Server Only

Full Syntax

mwtm enableuser [*username*]

Command Description

If you enable MWTM user-based access, re-enables the specified user's authentication, which had been disabled either automatically by the MWTM or by a superuser.

The user's authentication is re-enabled with the same password as before.

You must log in as the root user or superuser to use this command.

Related Topic

Enabling and Changing Users and Passwords (Server Only), page 2-13

mwtm eventautolog

Server Only

Full Syntax

mwtm eventautolog [**clear** | **-r**]

Command Description

Uses PAGER to display the contents of the MWTM event automation log. The event automation log lists all messages generated by scripts launched by event automation.

To clear the log and restart the server, enter **mwtm eventautolog clear**.

To display the contents of the log in reverse order, with the most recent events at the beginning of the log, enter **mwtm eventautolog -r**.

You must log in as the root user or superuser to use this command.

mwtm eventconfig

Server Only

Full Syntax

mwtm eventconfig [**view** | **edit** |**restore** | **master**]

Command Description

Allows you to manage the event configuration:

- To view the event configuration file, use the **mwtm evenconfig view** command.
- To edit the event configuration file in your environment with a text editor, use the **mwtm eventconfig edit** command. (The default text editor is 'vi'.)
- To restore the event configuration file to the last active copy, use the **mwtm eventconfig restore** command.
- To restore the event configuration file to the master copy (the default copy shipped with the MWTM), use the **mwtm eventconfig master** command.

You must log in as the root user or superuser to use this command.

mwtm eventeditor

Solaris or Linux Clients Only

Full Syntax

mwtm eventeditor [*hostname*]

Command Description

Starts an MWTM Event Editor on the specified host. If no hostname is specified, starts an MWTM Event Editor on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

For more information about the MWTM Event Editor, see Changing the Way the MWTM Processes Events, page 9-24.

If you Telnet into a remote workstation, the DISPLAY variable must be set to your local display, or you cannot use this command. If the DISPLAY variable is not set automatically, you must set it manually (see Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3).

Related Topic

- Chapter 9, "Managing Alarms and Events"

mwtm eventtool

Server Only

Full Syntax

mwtm eventtool {**-a** *actionName*} {*parameters*}

Command Description

Invokes MWTM event API operations.

These action names (and any corresponding required parameters) can be specified with the **-a** option:

Option	Action Names	Required Parameters
-a	acknowledgeEvents	-l or -L -u -n
	appendNote	-e -n -u
	changeSeverities	-s -l or -L -u -n
	clearEvents	-l or -L -u -n
	deleteEvents	-l or -L -u -n

Option	Action Names	Required Parameters
	getAllEventsAsTraps	-t
	getFilteredEventsAsTraps	-t -f
	getNote	-e
	setNote	-e -n -u

These parameters can be used:

Parameter	Description
-e	Specifies an event ID parameter.
-f	Specifies a file name for EventFilter, which is an XML element defined in MWTM WSDL definitions.
-l	Specifies a file name for EventIDList, which is an XML element defined in MWTM WSDL definitions.
-n	Specifies an event note string.
-s	Specifies an event severity.
-t	Specifies a file name for TrapTarget, which is an XML element defined in MWTM WSDL definitions.
-u	Specifies a user ID for event operation.
-H	Specifies a hostname to connect to. If unspecified, the default value is obtained from the MWTM server *System.properties* file, SERVER_NAME property.
-p	Specifies a port to connect to. If unspecified, the default value is obtained from the MWTM server *System.properties* file, WEB_PORT property.
-L	Specifies a list of event IDs, separated by '|'.
-S	Specifies whether to use SSL (https) for NBAPI access. Default is no SSL.
-h	Prints help information.

You must log in as the root user or superuser to use this command.

Related Documentation

See the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

mwtm evilstop

Server Only

Command Description

Forcefully stops all MWTM servers on the local host. This command can be useful if a normal **mwtm stop** does not stop the servers.

You must log in as the root user (not as a superuser) to use this command.

mwtm export

Server Only

Full Syntax

mwtm export [**-d** {**bar** | **comma** | **tab**}] [**all** | **as** | **asp** | **aspa** | **links** | **linksets** | **nodes** | **mwtmp** | **sps**]

Command Description

Exports current MWTM data.

By default, the MWTM separates data fields with vertical bars (|). However, you can specify commas (,) or tabs as the separator:

- **-d bar**—Separate data fields with vertical bars (|). This is the default setting.
- **-d comma**—Separate data fields with commas (,).
- **-d tab**—Separate data fields with tabs.

By default, the MWTM exports all data. However, you can limit the data that the MWTM exports:

- **all**—Exports all current MWTM data. This is the default selection.
- **as**—Exports application server data only.
- **asp**—Exports application server process data only.
- **aspa**—Exports application server process association data only.
- **links**—Exports link data only.
- **linksets**—Exports linkset data only.

Note Links and linkset output totals might not match what appears in the MWTM client (see ITP Specific FAQs, page C-15).

- **nodes**—Exports node data only.
- **mwtmp**—Exports signaling gateway-mated pair data only.
- **sps**—Exports signaling point data only.

You must log in as the root user or superuser to use this command.

Related Topic

Exporting Data, page 4-35

mwtm export cw

Server Only

Full Syntax

mwtm export cw

Command Description

Exports current MWTM node names, and read and write SNMP community names, in CiscoWorks v2 import format, with fields separated by commas (,). You can export this data to a file, then use the file to import the nodes into the CiscoWorks database.

You must log in as the root user or superuser to use this command.

Related Topic

Exporting Data, page 4-35

mwtm export cwv3

Server Only

Full Syntax

mwtm export cwv3

Command Description

Exports current MWTM node names, and read and write SNMP community names, in CiscoWorks v3 import format, with fields separated by commas (,). You can export this data to a file, then use the file to import the nodes into the CiscoWorks database.

You must log in as the root user or superuser to use this command.

Related Topic

Exporting Data, page 4-35

mwtm groups

You must log in as the root user to use this command.

Full Syntax

mwtm groups [**list** [**all** |*groupType*] | **detail** *groupName* | **create** *groupName groupType nodeName1 nodeName2 ...* | **add** *groupName nodeName1 nodeName2 ...* | **remove** *groupName nodeName1* | **delete** *groupName* | **master** *groupName nodeName* | **import** *filename* | **export** *filename* | **autocreatebytype** [**on** | **off** | **now**]]

Command Description

Allows you to manage groups:

- *GroupType* can be one of the following:
  - ggsn_config

  - csg_config
  - ha_config
  - ipran_config
  - rano_config
  - pdngw_config
  - sgw_config
  - msef_config
  - ggsn_report
  - csg_report
  - ha_report
  - pdngw_report
  - sgw_report
  - general
- To view all groups, use the **mwtm groups list all** command. You can also specify to view specific groups by using **mwtm group list** *groupName.*
- To view group details, use the **mwtm groups detail** *groupName* command.
- To create a group, use the **mwtm groups create** *groupName groupType nodeName1 nodeName 2 ...* command.
- To add node(s) to a group, use the **mwtm groups add** *groupName nodeName1 nodeName 2 ...* command. The group must exist before you execute this command.
- To remove node(s) from a group, use the **mwtm groups remove** *groupName nodeName1 nodeName 2 ...* command. The group must exist before you execute this command.
- To delete a group, use the **mwtm groups delete** *groupName* command.
- To assign a master group, use the **mwtm groups master** *groupName nodeName* command.
- To import a group, use the **mwtm groups import** *filename* command, where the format of *filename* is:

  GroupName1, groupType1, nodeName1, nodeName2, nodeName3

  GroupName2, groupType2, nodeName1, nodeName4, ...

  GroupName3, groupType3

  The last example creates *GroupName3* with zero nodes.

  The *groupName* you want to import must be new; it cannot already exist. If a group with the specified name already exists, you get an error message.
- To export a group, use the **mwtm groups export** *filename* command, where the format of *filename* is:

  GroupName1, groupType1, nodeName1, nodeName2, nodeName3

  GroupName2, groupType2, nodeName1, nodeName4, ...

  GroupName3, groupType3
- To automatically create the groups based on the device type, use the **mwtm groups autocreatebytype** command.
  - **on—**The groups are created automatically for the discovered devices during daily backups.

- **off—**The groups are not created automatically for the discovered devices during daily backups.
- **now—**The groups are created automatically for the discovered devices after running this command.

Related Topic

- Understanding Groups, page 11-29

mwtm help

Server and Solaris or Linux Clients Only

Full Syntax

mwtm help [*keyword*]

Command Description

Displays the command syntax for the **mwtm** command and all of its options. The function of this command is identical to **mwtm**.

MWTM help is network specific, so only the commands pertaining to each network type appear. If you set all network types, you can see all the commands.

To see the syntax for a specific command, enter **mwtm help** and that command. For example, if you enter **mwtm help restart**, the MWTM displays:

```
mwtm restart     - Restarts all MWTM Servers on the local host.
mwtm restart web - Restarts Web servers on the local host.
mwtm restart jsp - Restarts JSP servers on the local host.
mwtm restart pm  - Restarts Process Manager on the local host.
```

Related Topic

Chapter 11, “Accessing Data from the Web Interface”

mwtm ignorephysicalfolders

Server and Solaris or Linux Clients Only

Full Syntax

mwtm ignorephysicalfolders [**true** | **false**]

Command Description

Specifies whether MWTM should set alarm aggregation path preferences.

- **true**—Sets alarm aggregation path preferences.
- **false**—Does not set alarm aggregation path preferences.

You must log in as the root user or superuser to use this command.

mwtm importcw

Full Syntax

mwtm importcw [*cwfile*]

Command Description

Imports node hostname and read-community strings from the CiscoWorks server to MWTM.

cwfile—File name of the CiscoWorks export file (export format must be in CSV file format).

You must log in as the root user or superuser to use this command. You do not need to restart the server to activate this command. After running this command, the MWTM discovers the imported nodes.

mwtm inactiveuserdays

Server Only

Full Syntax

mwtm inactiveuserdays [*number-of-days* | **clear**]

Command Description

If you enable MWTM user-based access, number of days a user can be inactive before disabling that user account.

This function is disabled by default. If you do not specify this command, user accounts are never disabled as a result of inactivity.

If you enter the **mwtm inactiveuserdays** command, the valid range is 1 day to an unlimited number of days. There is no default setting.

If you have enabled this function and you want to disable it (that is, prevent the MWTM from automatically disabling user accounts as a result of inactivity), enter **mwtm inactiveuserdays clear**.

To re-enable the user's authentication, use the **mwtm enableuser** command.

You must log in as the root user or superuser to use this command.

Related Topics

- Chapter 2, "Configuring Security"
- Automatically Disabling Users and Passwords (Server Only), page 2-10

mwtm installlog

Server and Solaris or Linux Clients Only

Full Syntax

mwtm installlog [**server** | **client**]

Command Description

Displays the latest install log for the **server** or **client**. If you do not specify **server** or **client**, displays the latest install log for both the server and client.

You must log in as the root user or superuser to use this command.

mwtm inventorytool

Server Only

Full Syntax

mwtm inventorytool -a *actionName* [*parameters*]

Command Description

Invokes inventory API operations.

These action names (and any corresponding required parameters) can be specified with the **-a** option:

Option	Action Names	Parameters
-a	getAllNEs	-c
	getRootNEs	-H
		-p
		-S
		-h
	getAllNEsWithFeature	-F
	getRootNEsWithFeature	-c
		-H
		-p
		-S
		-h
	getNE	-f
	getChildNEs	-c
	getDescendantNEs	-H
	getNote	-p
		-S
		-h
	getChildNEsWithFeature	-f
	getDescendantNEsWithFeature	-F
		-c
		-H
		-p
		-S
		-h
	setNote	-f
	appendNote	-u
		-n
		-H
		-p
		-S
		-h

You can use these parameters:

Parameter	Description
-c	(Optional) Specifies the context of the inventory. Valid contexts include: **config**, **monitor**, **physical**, and **all**. If unspecified, the default value is **all**.
-f	Specifies a fully qualified domain name (FQDN).
-F	Specifies a feature name.
-S	(Optional) Specifies whether to use SSL (https) for NBAPI access. The default is no SSL.
-n	Specifies a note string. Enclose the string in double quotes.
-u	Specifies a user ID for inventory operation.
-H	(Optional) Specifies a hostname to connect to. If unspecified, the system obtains the default value from the MWTM server *System.properties* file, SERVER_NAME property.
-p	(Optional) Specifies a port to which to connect. If unspecified, the system obtains the default value from the MWTM server *System.properties* file, WEB_PORT property.
-h	(Optional) Prints help information.

You must log in as the root user or superuser to use this command.

Related Documentation

See the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

mwtm iosreport

Server Only

Full Syntax

mwtm iosreport

Command Description

You use this command to create a report, in CSV format, of the IOS versions of all the nodes that the MWTM is managing. The format for the output is:

```
node name, custom name, node type, IOS version, serial number
```

For example:

```
# ./mwtm iosreport
'NODE NAME','Custom Name','NODE TYPE','IOS VERSION','SERIAL NUMBER',
'ems15454ec.cisco.com',null,'CiscoONS15454','7.2','SMA08040634',
'ems1900ke.cisco.com',null,'CiscoMWR-1900','12.4(20070313:074027)','JMX0650L264',
```

You must log in as the root user or superuser to use this command.

mwtm ipaccess

Server Only

Full Syntax

mwtm ipaccess [**add** [*ip-addr*] | **clear** | **edit** | **list** | **rem** [*ip-addr*] | **sample**]

Command Description

You use this command to create and manage a list of client IP addresses that can connect to the MWTM server.

The list of allowed client IP addresses resides in the *ipaccess.conf* file. By default, when you first install the MWTM, the *ipaccess.conf* file does not exist and all client IP addresses can connect to the MWTM server. To create the *ipaccess.conf* file and specify the list of allowed client IP addresses, use one of these keywords:

- **add**—Add the specified client IP address to the *ipaccess.conf* file. If the *ipaccess.conf* file does not already exist, this command creates a file with the first entry.
- **clear**—Remove all client IP addresses from the *ipaccess.conf* file and allow connections from any MWTM client IP address.
- **edit**—Open and edit the *ipaccess.conf* file directly. If the *ipaccess.conf* file does not already exist, this command creates an empty file.
- **list**—List all client IP addresses currently in the *ipaccess.conf* file. If no client IP addresses appear (that is, the list is empty), connections from any MWTM client IP address are allowed.
- **rem**—Remove the specified client IP address from the *ipaccess.conf* file.
- **sample**—Print out a sample *ipaccess.conf* file.

Any changes you make take effect when you restart the MWTM server.

See Implementing Secure User Access (Server Only), page 2-2 for more information about using this command.

You must log in as the root user or superuser to use this command.

mwtm jspport

Server Only

Full Syntax

mwtm jspport [*port-number*]

Command Description

Sets a new port number for the JSP server, where *port-number* is the new, numeric port number. The MWTM verifies that the new port number is not already in use.

This command is needed only if you must change the port number after you install the MWTM; because another application must use the current port number.

The new port number must contain only numbers. If you enter a port number that contains nonnumeric characters, such as **mwtm13**, an error message appears, and the MWTM returns to the command prompt without changing the port number.

You must log in as the root user (not as a superuser) to use this command.

mwtm keytool

Solaris Server Only

Full Syntax

mwtm keytool [**clear** | **genkey** | **import_cert** *cert_filename* | **import_key** *key_filename cert_filename* | **list** | **print_csr** | **print_crt**]

Command Description

If you implement SSL in your MWTM system, manages SSL keys and certificates on the MWTM server.

If you installed the MWTM server and client on the same workstation, it also automatically manages the certificates on the client.

Use these keywords and arguments with this command:

- **clear**—Stops the MWTM server, if necessary, and removes all SSL keys and certificates from the server. Before restarting the server, you must either generate new SSL keys by using the **mwtm keytool genkey** command; or, you must completely disable SSL by using the **mwtm ssl disable** command.
- **genkey**—Stops the MWTM server, if necessary, and generates a new self-signed public or private SSL key pair on the MWTM server. The new keys take effect when you restart the server.
- **import_cert** *cert_filename*—Imports the specified signed SSL certificate in X.509 format.
- **import_key** *key_filename cert_filename*—Imports the specified SSL key in OpenSSL format and the specified signed SSL certificate in X.509 format.
- **list**—Lists all SSL key-certificate pairs on the MWTM server.
- **print_csr**—Prints a certificate signing request (CSR) in X.509 format.
- **print_crt**—Prints the MWTM server's SSL certificate in X.509 format.

You must log in as the root user (not as a superuser) to use this command.

Related Topic

Implementing SSL Support in the MWTM, page 2-21

mwtm killclients

Server Only

Command Description

Forcefully stops all MWTM clients on the local host, including all GTT clients and Event Editors.

You must log in as the root user (not as a superuser) to use this command.

mwtm licenseinfo

Server Only

Full Syntax

mwtm licenseinfo

Command Description

Displays the MWTM licensable object count. This generates mSEF, IP-RAN, and ITP licensing reports.

You must log in as the root user or superuser to use this command.

mwtm listusers

Server Only

Full Syntax

mwtm listusers [*username*]

Command Description

If you enable MWTM User-Based Access, lists all currently defined users in the authentication list, including this information for each user:

- username.
- Last time the user logged in.
- User's authentication access level.
- User's current authentication status, such as **Account Enabled** or **Password Disabled**.

To list information for a specific user, use the *username* argument to specify the user.

You must log in as the root user or superuser to use this command.

Related Topic

Listing All Currently Defined Users (Server Only), page 2-16

mwtm logger

Server Only

Command Description

Displays the system messages *messageLog.txt* file with tail -f.

To stop the display, press **Ctrl-C**.

mwtm logincreds

Server Only

Full Syntax

mwtm logincreds [**prompt | stored | status**]

Command Description

Requires the user to always provide credentials upon log in:

- **prompt**—User is always prompted for credentials in the following instances:
  - Running these commands—mwtm pushgtt, mwtm pushroute, mwtm pushmlr, and mwtm deployarchive
  - Deployment in the Route Table Editor, GTT Editor, and Address Table Editor
  - SSH connection protocol
  - Provisioning
- **stored**—If credentials are cached/configured, the user is not prompted to enter them. However, the user will be prompted if credentials are not cached or configured.
- **status**—Reflects the current status of the command (whether it is set to prompt or stored)

You must log in as the root user or superuser to use this command.

Related Topic

Configuring Login Credentials, page 5-19

mwtm logsize

Server Only

Full Syntax

mwtm logsize [*number-of-lines*]

Command Description

Sets the maximum size for truncating and rolling log files.

- Message log files are in *$LOGDIR/messageLog-archives* (typically, */opt/CSCOsgm/logs/messageLog-archives*).
- Network log files are in *$LOGDIR/netStatus/archive*

If you enter this command without the *number-of-lines* argument, the MWTM displays the current maximum number of lines. You can then change that value or leave it (by pressing the Enter key).

The message and network log process archives the log file when the maximum number of lines is reached. The filename format of archived log files is:

messageLog.*YYYY*:*MMDD*:*hhmm*:*y*.txt.Z

or

networkLog.*YYYY*:*MMDD*:*hhmm*:*y*.txt.Z

where:

- *YYYY* is the year
- *MM* is the month in a two-digit format
- *DD* is the day of the month
- *hh* is the hour of the day in 24-hour notation
- *mm* is the minute within the hour
- *y* is one of these variables:

Variable	Meaning	Example
r	The log file was created because the MWTM server restarted.	messageLog.2008:0328:1427:r.txt.Z networkLog.2008:0328:1427:r.txt.Z
c	The log file was created because a user ran the **mwtm msglog clear** command.	messageLog.2008:0328:1433:c.txt.Z networkLog.2008:0328:1433:c.txt.Z
o	The log file was created from a pre-existing *messageLog-old.txt* file (used in previous MWTM releases).	messageLog.2008:0328:1413:o.txt.Z networkLog.2008:0328:1413:o.txt.Z
0 (or higher number)	A counter that starts at 0 and increments sequentially. The number resets to 0 when the server restarts.	messageLog.2008:0328:1427:3.txt.Z networkLog.2008:0328:1427:3.txt.Z

When *messageLog.txt* or *networkLog.txt* reaches the number of lines specified by the **mwtm logsize** command, the MWTM creates a new log archive file by using the filename format above. When the maximum number of lines is reached, the log filename contains a counter value to differentiate itself from other archived files (for example, messageLog.2008:0328:1427:1.txt.Z and messageLog.2008:0328:1427:2.txt.Z).

The default value for *number-of-lines* is 500,000 lines.

The valid range is 1,000 lines to an unlimited number of lines. The default value is 500,000 lines. If you specify a larger file size for the log file, the log file and its copy require proportionally more disk space.

When changing the number of lines to display, remember that every 5,000 lines require approximately 1 MB of disk space. You need to balance your need to refer to old messages against the amount of disk space they occupy.

Note All log files are aged out by a timing mechanism (**mwtm msglogage**). You can estimate a size for the *$LOGDIR/messageLog-archives* directory based on the number of lines, the amount of data that is logged (**mwtm mldebug**), and the log age.

You must log in as the root user or superuser to use this command. If you change the *number-of-lines* value, you must restart the server (**mwtm restart**).

mwtm logtimemode

Server Only

Full Syntax

mwtm logtimemode [**12** | **24**]

Command Description

Sets the time mode for dates in log files:

- **12**—Use 12-hour time, with AM and PM so that 1:00 in the afternoon is 1:00 PM.
- **24**—Use 24-hour time, also called military time so that 1:00 in the afternoon is 13:00. This is the default setting.

You must log in as the root user or superuser to use this command.

mwtm manage

Full Syntax

mwtm manage [**itp** | **ip-ran** | **csg1** | **csg2** | **ggsn** | **bwg** | **ha** | **pdngw** | **sgw** | **pcrf** | **pdsn**] [**enable** | **disable** | **status**]

Command Description

Enables, disables, or checks the status of managed network(s):

- **itp**, **ipran**, **csg1**, **csg2**, **ggsn**, **bwg**, **ha**, **pdngw, sgw, pcrf,** or **pdsn**—Type of network.
- **disable**—Disables the MWTM from managing the chosen network.
- **enable**—Enables the MWTM to manage the chosen networks.
- **status**—Displays the status of networks (whether enabled or disabled).

You must log in as the root user or superuser to use this command.

mwtm maxasciirows

Server Only

Full Syntax

mwtm maxasciirows [*number-of-rows*]

Command Description

Sets the maximum number of rows for MWTM ASCII web output; for example, detailed debugging information.

If you enter this command without the *number-of-rows* argument, the MWTM displays the current maximum number of rows. You can then change that value or leave it. The valid range is 1 row to an unlimited number of rows. The default value is 6000 rows.

You must log in as the root user or superuser to use this command.

Related Topic

Chapter 11, “Accessing Data from the Web Interface”

mwtm maxevhist

Server Only

Full Syntax

mwtm maxevhist [*number-of-rows*]

Command Description

Sets the maximum number of rows for the MWTM to search in the event history logs. The event history logs are the current and archived MWTM network status logs for status change and SNMP trap messages. The MWTM sends the results of the search to the web browser, where the setting of the *mwtm maxhtmlrows* command further limits the results.

If you enter this command without the *number-of-rows* argument, the MWTM displays the current maximum number of rows. You can then change that value or leave it. The valid range is 1 row to an unlimited number of rows. The default value is 15,000 rows.

The default setting is sufficient in most MWTM environments. However, you might need to increase the setting if the MWTM has archived a large number of event history logs, each log contains thousands of messages, and you want to search more than 15,000 rows. Remember that increasing this setting can increase the search time.

You must log in as the root user or superuser to use this command.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm maxhtmlrows

Server Only

Full Syntax

mwtm maxhtmlrows [*number-of-rows*]

Command Description

Sets the maximum number of rows for MWTM HTML web output; for example, statistics reports, status change messages, or SNMP trap messages.

Note If you have set the Page Size on the MWTM web interface, this command does not override that setting. When you set the Page Size feature on the MWTM web interface, browser cookies store the setting until the cookie expires or the MWTM deletes it.

If you enter this command without the *number-of-rows* argument, the MWTM displays the current maximum number of rows. You can then change that value or leave it. The valid range is 1 row to an unlimited number of rows. The default value is 200 rows.

You must log in as the root user or superuser to use this command.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm mldebug

Server Only

Full Syntax

mwtm mldebug [*mode*]

Command Description

Sets the mode for logging MWTM debug messages:

- **normal**—Logs all action, error, and info messages. Use **mwtm mldebug normal** to revert to the default settings if you accidentally enter the **mwtm mldebug** command.
- **list**—Displays the current settings for the **mwtm mldebug** command.
- **all**—Logs all messages, of any type.
- **none**—Logs no messages at all.
- **minimal**—Logs all error messages.
- **action**—Logs all action messages.
- **debug**—Logs all debug messages.
- **dump**—Logs all dump messages.
- **error**—Logs all error messages.
- **info**—Logs all info messages.
- **NBAPI-SOAP**—Logs all northbound SOAP messages.
- **snmp**—Logs all SNMP messages.
- **trace**—Logs all trace messages.
- **trapsIn**—Logs all incoming trap messages.
- **trapsOut**—Logs all outgoing trap messages.

This command can adversely affect the MWTM performance. Use this command **only** under guidance from the Cisco Technical Assistance Center (TAC).

You must log in as the root user or superuser to use this command.

mwtm modifysnmpcomm

Full Syntax

mwtm modifysnmpcomm -i *ipaddress* {**-r** *retry* | **-t** *timeout* | **-p** *poll* **-c** *community*}

Command Description

Modifies an existing SNMP configuration on the MWTM server.

- **-i** *ipaddress*—the IP address of the device (required)
- At least one of the following:
  - **-r** *retry*—the number of times to retry connecting to the device
  - **-t** *timeout*—the timeout value, in seconds
  - **-p** *poll*—the poll interval, in minutes

– **-c** *community*—the read community string of the device

You do not need to restart the MWTM server.

Related Topic

- mwtm addsnmpcomm, page B-7
- mwtm deletesnmpcomm, page B-26
- mwtm showsnmpcomm, page B-64
- mwtm snmpsetup, page B-71

mwtm motd

Full Syntax

mwtm motd [**cat** | **disable** | **edit** | **enable**]

Command Description

Manages the MWTM message of the day file, which is a user-specified MWTM system notice. You can set the message of the day to inform users of important changes or events in the MWTM system. The message of the day also provides users with the chance to exit the MWTM or GTT client before launching.

If you enable the message of the day, it appears whenever a user attempts to launch an MWTM or GTT client. If the user:

- Accepts the message, the client launches.
- Declines the message, the client does not launch.

Use these keywords with this command:

- **enable**—Enables the message of the day function. Initially, the message of the day file is blank; use the **mwtm motd edit** command to specify the message text.
- **edit**—Edits the message of the day.
- **cat**—Displays the contents of the message of the day file.
- **disable**—Disables this function (that is, stops displaying the message of the day whenever a user attempts to launch an MWTM or GTT client).

You must log in as the root user or superuser to use this command.

Related Topic

Displaying a Message of the Day, page 2-15

mwtm msglog

Server Only

Full Syntax

mwtm msglog [**clear** | **-r**]

Command Description

Uses PAGER to display the contents of the system message log.

To save the current contents of the log, clear the log, and restart the server, enter **mwtm msglog clear**.

To display the contents of the log in reverse order, with the most recent messages at the beginning of the log, enter **mwtm msglog -r**.

You must log in as the root user or superuser to use this command.

mwtm msglogage

Server Only

Full Syntax

mwtm msglogage [*number-of-days*]

Command Description

Sets the maximum number of days to archive all types of log files before deleting them from the MWTM server.

If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 31 days.

The start date for aging out and deleting files is always yesterday at 12 AM. For example, say that you set the value to 1 day. You run the mwtm msglogage command at 3 PM on January 10th. To find files that will be deleted by the aging process, count back to 12 AM on January 10th, then add the number of days set in the command. In this example, we added 1 more day, so any file with an earlier timestamp than January 9th at 12 AM will be removed.

You must log in as the root user or superuser to use this command.

mwtm msglogdir

Server Only

Full Syntax

mwtm msglogdir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. You are prompted whether to continue.

Changes the default location of all MWTM system message log files. By default, the system message log files reside on the MWTM server at */opt/CSCOsgm/logs*.

Note Do not set the new directory to any of these: */usr*, */var*, */opt*, or */tmp*. Also, do not set the new directory to the same directory in which you are storing GTT files (**mwtm gttdir**), report files (**mwtm repdir**), route table files (**mwtm routedir**), or address table files (**mwtm atbldir**).

After you change the directory, the MWTM asks if you want to restart the MWTM server. The new directory takes effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command. If you change to a default location outside the MWTM, you must have appropriate permissions for that location.

mwtm netlog

Server Only

Full Syntax

mwtm netlog [clear | -r]

Command Description

Uses PAGER to display the contents of the network status log. To:

- Save the current contents of the log, clear the log, and restart the server, enter **mwtm netlog clear**.
- Display the contents of the log in reverse order, with the most recent network status messages at the beginning of the log, enter **mwtm netlog -r**.

You must log in as the root user or superuser to use this command.

mwtm netlogger

Server Only

Command Description

Displays the current contents of the network status log file with tail -f.

To stop the display, enter **Ctrl-c**.

mwtm newlevel

Server Only

Full Syntax

mwtm newlevel [*username*]

Command Description

If you enable MWTM User-Based Access, changes the authentication level for the specified user. Valid levels are:

- **1**—Basic User
- **2**—Power User

- **3**—Network Operator
- **4**—Network Administrator
- **5**—System Administrator

You must log in as the root user or superuser to use this command.

Related Topic

Enabling and Changing Users and Passwords (Server Only), page 2-13

mwtm osinfo

Server Only

Command Description

Depending on the network(s) that you have set, displays the operating system versions of software that the MWTM supports.

mwtm passwordage

Note You must have already changed your password at least once for this command to properly age the password.

Server Only

Full Syntax

mwtm passwordage [*number-of-days* | **clear**]

Command Description

If you enable MWTM User-Based Access and you set **mwtm authtype** to **local**, number of days allowed before forcing users to change passwords. The number of days start to accrue beginning yesterday at 12 AM.

Note For more details on how this works, see mwtm msglogage, page B-50.

This function is disabled by default. If you do not specify this command, users will never need to change their passwords.

If you enter the **mwtm passwordage** command, the valid range is 1 day to an unlimited number of days. No default setting exists.

If you enabled this function and you want to disable it (that is, prevent the MWTM from forcing users to change passwords), enter **mwtm passwordage clear**.

Note If **mwtm authtype** is set to **solaris**, you cannot use this command; instead, you must manage passwords on the external authentication servers.

You must log in as the root user or superuser to use this command.

Related Topic

Automatically Disabling Users and Passwords (Server Only), page 2-10

mwtm patchlog

Server Only

Full Syntax

mwtm patchlog

Command Description

Uses PAGER to display the contents of the patch log, which lists the patches that you installed on the MWTM server.

The default path and filename for the patch log file is */opt/CSCOsgm/install/sgmPatch.log*. If you installed the MWTM in a directory other than */opt*, then the patch log file resides in that directory.

You must log in as the root user or superuser to use this command.

mwtm poll

Server Only

Full Syntax

mwtm poll [*node*] [*node*]...

Command Description

You use this command to poll one or more known nodes from the command line. Use the *node* arguments to specify the DNS names or IP addresses of one or more known nodes.

You must log in as the root user or superuser to use this command.

mwtm pollertimeout

Server Only

Full Syntax

mwtm pollertimeout [*number-of-seconds*]

Command Description

Specifies how long, in seconds, MWTM clients that are connected to the MWTM server can run a demand poller, as in a real-time data window or web page, before the MWTM automatically stops the poller to prevent unnecessary traffic on the network. When the demand poller times out, the MWTM stops the poller and sends an appropriate error message to the client.

The valid range is 1 second to an unlimited number of seconds. The default timeout is 8 hours (28800 seconds).

After you change the timeout, the MWTM asks if you want to restart the MWTM server. The new poller timeout takes effect when you restart the MWTM server.

See Server Status Information: Pollers, page 4-41 for more information on demand pollers.

You must log in as the root user or superuser to use this command.

mwtm print

Server Only

Full Syntax

mwtm print {**all** | **device** | **snmp** | **task** | **alarmsummary** [*severity*] [**quiet**]}

Command Description

Displays information about device versions, SNMP settings, running tasks, summary of alarms, or all of this information.

Use these keywords with this command:

- **device**—Prints name, state, and system description of all nodes in the network.
- **snmp**—Prints SNMP information such as read and write community strings.
- **task**—Prints a list of task IDs and related information.
- **alarmsummary**—Prints a list of alarms sorted by severity types (critical, major, minor, and so on).
  - *severity*—Prints a list of alarms of a specified severity type. The *severity* takes one of these values: critical, major, minor, warning, informational, or indeterminate.
  - **quiet**—Use this keyword to print only the alarm counts (without the severity label)
- **all**—Prints the information available in all of the keywords of this command.

You must log in as the root user or superuser to use this command.

mwtm props

Server and Solaris or Linux Clients Only

Command Description

Displays the contents of the *System.properties* files for both MWTM server and client installs.

You must log in as the root user or superuser to use this command.

mwtm provisiontool

Server Only

Full Syntax

mwtm provisiontool -a *actionName* [*parameters*]

Command Description

Invokes provisioning API operations.

You can specify these action names (and any corresponding required parameters) by using the **-a** option:

Option	Action Names	Parameters
-a	provision	-r -H -p -S -h
	syncFromDevice	-f
	iosWriteToStartup	-H -p -S -h

You can use these parameters:

Parameter	Description
-r	Specifies a file name for **ProvisionRequest**, which is an XML element from the MWTM WSDL definitions.
-f	Specifies a fully qualified domain name (FQDN).
-H	(Optional) Specifies a hostname to connect to. If unspecified, the system obtains the default value from the MWTM server *System.properties* file, SERVER_NAME property.
-p	(Optional) Specifies a port to which to connect. If unspecified, the system obtains the default value from the MWTM server *System.properties* file, WEB_PORT property.
-S	(Optional) Specifies whether to use SSL (https) for NBAPI access. The default is no SSL.
-h	(Optional) Print help information.

You must log in as the root user or superuser to use this command.

Related Documentation

See the *OSS Integration Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

mwtm purgedb

Server Only

Command Description

Permanently deletes all components in the MWTM database marked for deletion.

The MWTM keeps information about older objects in its database even after they have been deleted. This is considered a logically deleted state. MWTM retains this information to try and maintain any user customized data associated with an object (for instance, a customized name) in case the object is rediscovered at some point in the future. Logically deleted data is physically deleted after seven days if it is not reused by then. You can use the mwtm purgedb command to immediately remove this logically deleted data from the MWTM database.

Unfortunately, this benefit may have a side effect. In certain cases, rediscovery of a deleted object may cause the MWTM to use obsolete information in the database, rather than the new information. Ultimately, some configuration changes are not detected, and the viewable data from the client application is incorrect.

Note The **mwtm purgedb** command does not cause the loss of any collected statistical data.

You must log in as the root user or superuser to use this command.

mwtm readme

Server and Solaris or Linux Clients Only

Command Description

Displays the contents of the README file for the MWTM.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm reboot

Server Only

Command Description

Reboots the Solaris MWTM system.

Note Use this command with care. Rebooting the Solaris MWTM system disconnects all MWTM clients that are using the system. Before using this command, use the **mwtm who** command to list all current users; and, the **mwtm wall** command to warn all current users that you are rebooting the system.

You must log in as the root user (not as a superuser) to use this command.

mwtm repdir

Server Only

Full Syntax

mwtm repdir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. You are prompted whether to continue.

Sets the directory in which the MWTM stores report files. See Chapter 13, "Managing Reports" for information about MWTM reports.

The default directory for report files resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the default directory is */opt/CSCOsgm/reports*.
- A different directory, then the default directory resides in that directory.

Use this command if you want to store report files in a different directory; for example, in a Network File System location on another server.

Note This command copies all files in the current directory to the new directory. If you are not logged in as the superuser and you do not own the new directory, you might not be able to copy the files. In that case, you must specify a directory that you own or log in as the root user.

Do not set the new directory to any of these: */usr*, */var*, */opt*, or */tmp*.

Do not set the new directory to the same directory in which you are storing GTT files (**mwtm gttdir**), message log files (**mwtm msglogdir**), route table files (**mwtm routedir**), or address table files (**mwtm atbldir**).

After you change the directory, the MWTM asks if you want to restart the MWTM server. The new directory takes effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

mwtm rephelp

Server Only

Command Description

Displays help for all commands that are related to MWTM reports.

You must log in as the root user or superuser to use this command.

mwtm replog

Server Only

Full Syntax

mwtm replog [**clear** | **-r**]

Command Description

Uses PAGER to display the contents of the system reports log. The reports log lists all messages that you use for the creation and maintenance of MWTM reports.

To clear the log and restart the server, enter **mwtm replog clear**.

To display the contents of the log in reverse order, with the most recent commands at the beginning of the log, enter **mwtm replog -r**.

The default path and filename for the system reports log file is */opt/CSCOsgm/logs/sgmReportLog.txt*. If you installed the MWTM in a directory other than */opt*, then the system reports log file resides in that directory.

You must log in as the root user or superuser to use this command.

mwtm restart

Server Only

Full Syntax

mwtm restart [**jsp** | **pm** | **web**]

Command Description

Restarts MWTM servers on the local host:

- **jsp**—Restarts the MWTM JSP Server.
- **pm**—Restarts the MWTM Application Server and all managed processes.
- **web**—Restarts the MWTM web Server.

If you do not specify a keyword, **mwtm restart** restarts all MWTM servers.

You must log in as the root user or superuser to use this command.

mwtm restore

Server Only

Full Syntax

mwtm restore [**archive** | **atbl** | **data** | **gtt** | **logs** | **reports** | **routes** | **security**]

Command Description

Restores the MWTM data files from a previous backup, stored in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the locations of the backup files are */opt/mwtm61-client-backup.tar.Z* and */opt/mwtm61-server-backup.tar.Z*.
- A different directory, then the backup files reside in that directory.

You can restore data files on the same Solaris or Linux server; or, on a different Solaris or Linux server that is running MWTM 6.1.*x*.

To restore only specific parts of the MWTM data files, use these keywords:

- **archive**—Restores the MWTM archive repository.

- **atbl—**Restores only MWTM Address Table Editor files.
- **gtt**—Restores only MWTM GTT files.
- **logs**—Restores only MWTM log files, such as the message log files.
- **reports**—Restores only MWTM report files, such as the statistics report files.
- **routes**—Restores only MWTM ITP route table files.
- **security**—Restores only the security-related parts of the MWTM data files. This command is useful if you inadvertently delete your user accounts or make other unwanted changes to your MWTM security information.

Note If **mwtm backupdays** was previously used to set the number of backup days to more than one day, the **mwtm restore** command will prompt you for a server or client backup file to restore from (because there would be more than one backup file to choose from).

To change the directory in which the MWTM stores these backup files, use the **mwtm backupdir** command.

The server is restarted automatically after running **mwtm restore** command.

You must log in as the root user (not as a superuser) to use this command.

Related Topic

- Backing Up or Restoring MWTM Files (Server Only), page 2-30
- mwtm backupdays, page B-10
- mwtm backupdir, page B-11

mwtm restore all

Server Only

Full Syntax

mwtm restore all [**nostart**]

Command Description

Restores all system files.

The server is restarted automatically after running **mwtm restore all** command.

The server is not restarted automatically after running **mwtm restore all nostart** command.

You must log in as the root user (not as a superuser) to use this command.

mwtm restoreprops

Server and Solaris or Linux Clients Only

Command Description

Restores the MWTM server and client *System.properties* files and other important configuration files to the backup versions of the files.

You must log in as the root user (not as a superuser) to use this command.

mwtm rootvars

Server and Solaris or Linux Clients Only

Command Description

Displays the contents of the */etc/CSCOsgm.sh* file, which determines the root location of the MWTM server and client installation.

mwtm sechelp

Server Only

Command Description

Displays help for all commands that are related to MWTM security.

You must log in as the root user or superuser to use this command.

Related Topic

Chapter 2, "Configuring Security"

mwtm seclog

Server Only

Full Syntax

mwtm seclog [**clear** | **-r**]

Command Description

Uses PAGER to display the contents of the system security log.

These security events are recorded in the log:

- All changes to system security, including adding users.
- Log-in attempts, whether successful or unsuccessful, and logoffs.
- Attempts to switch to another user's account, whether successful or unsuccessful.
- Attempts to access files or resources of higher authentication level.
- Access to all privileged files and processes.
- Operating system configuration changes and program changes, at the Solaris level.
- The MWTM restarts.
- Failures of computers, programs, communications, and operations, at the Solaris level.

To clear the log, enter **mwtm seclog clear**.

To display the contents of the log in reverse order, with the most recent security events at the beginning of the log, enter **mwtm seclog -r**.

The default path and filename for the system security log file is */opt/CSCOsgm/logs/sgmSecurityLog.txt*. If you installed the MWTM in a directory other than */opt*, then the system security log file resides in that directory.

You must log in as the root user or superuser to use this command.

Related Topic

Displaying the Contents of the System Security Log (Server Only), page 2-17

mwtm secondaryserver

Server Only

Full Syntax

mwtm secondaryserver [*hostname naming-port webport*] | [**list**] | [**clear**]

Command Description

Configures a secondary MWTM server, where:

- *hostname* is the name of the host on which you installed the secondary MWTM server.
- *naming-port* is the MWTM Naming Server port number for the secondary MWTM server. The default port number is 44742.
- *webport* is the MWTM web port number for the secondary MWTM server. The default port number is 1774.

For best results, Cisco recommends that you configure the primary server and the secondary server as secondaries for each other.

If you use the **mwtm secondaryserver** command to configure a secondary MWTM server, but the primary MWTM server fails before you launch the MWTM client, the MWTM client does not detect the secondary server.

To list the secondary MWTM server that you configured for this primary MWTM server, enter the **mwtm secondaryserver list** command. If a secondary server is not yet configured, an informative message appears.

To remove the current settings for the secondary server, enter the **mwtm secondaryserver clear** command. This command stops the server and removes the current values for these properties in the *System.properties* file:

- BACKUP_SERVER
- BACKUP_RMIPORT
- BACKUP_WEBPORT

The **mwtm secondaryserver clear** command also restarts the server to activate the changes.

You must log in as the root user or superuser to use this command.

Related Topic

Configuring a Backup MWTM Server, page 5-9

mwtm serverlist add

Server Only

Full Syntax

mwtm serverlist list add [*servername*] [*port number*]

Command Description

Adds new MWTM server to the list, where *servername* is the name of the new server added and *port number* is the port number of the corresponding client.

You must log in as the root user or superuser to use this command.

mwtm serverlist delete

Server Only

Full Syntax

mwtm serverlist delete [*servername* | **all**]

Command Description

Deletes the MWTM server from the list, where *servername* is the name of the server deleted.

You must log in as the root user or superuser to use this command.

mwtm serverlist list

Server Only

Full Syntax

mwtm serverlist list

Command Description

Lists all the MWTM servers configured.

- Add—Adds new MWTM server to the list, where *servername* is the name of the new server added and *port number* is the port number of the corresponding client.
- Delete—Deletes the MWTM server from the list, where *servername* is the name of the server deleted.

You must log in as the root user or superuser to use this command.

mwtm servername

Server and Solaris or Linux Clients Only

Full Syntax

mwtm servername [*hostname*] [**nostopstart**]

Command Description

Resets the MWTM server' default hostname, where *hostname* is the new default hostname.

- Ensure that the new default hostname is valid and defined in your */etc/hosts* file. If not, you might not be able to start the MWTM server.
- If you are not logged in as the root user or as a superuser when you enter this command from an MWTM client, the default hostname changes only for that MWTM client and the user who entered the command.
- If you are logged in as the root user or superuser when you enter this command, the default hostname changes for the MWTM server and client, and it restarts the MWTM server. The MWTM server uses the new default hostname to register RMI services, and MWTM clients use the new default hostname to connect to the server.
- If you are logged into a *client-only* installation as the root user or as a superuser when you enter this command, the default hostname changes only for that MWTM client. The MWTM client uses the new default hostname to connect to the MWTM server.

Note Using the **mwtm servername** command to reset the MWTM server's default hostname does not affect communication between the MWTM server and the ITPs.

- **nostopstart**—The server is not stopped and started automatically while running this command.

Related Topic

- Appendix C, "FAQs"
- Appendix H, "Configuring MWTM to Run with Various Networking Options"

mwtm setpath

Server and Solaris or Linux Clients Only

Full Syntax

mwtm setpath [*username*]

Command Description

Appends binary (*bin*) directories to the path for a user. Users can then append the proper MWTM binary directories to their paths without manually editing the *.profile* and *.cshrc* files.

This command appends lines such as these to the user's *.profile* file:

PATH=$PATH:/opt/CSCOsgm/bin:/opt/CSCOsgmClient/bin # CiscoSGM

and appends lines such as these to the user's *.cshrc* file:

set path=($path /opt/CSCOsgm/bin /opt/CSCOsgmClient/bin) # CiscoSGM

Thereafter, you can enter MWTM commands as:

mwtm help

instead of:

/opt/CSCOsgm/bin/mwtm help

When entering this command, remember that:

- If you enter this command and you do not specify a *username*, the MWTM appends the *bin* directories to your path (that is, to the path for the user who is currently logged in and entering the **mwtm setpath** command).
- If you enter this command and you specify a *username*, the MWTM appends the *bin* directories to the path for the specified user. To specify a *username*, follow these conditions:
  - You must log in as the root user.
  - The specified *username* must exist in the local */etc/passwd* file.
  - You cannot specify a *username* that is defined in a distributed Network Information Services (NIS) system or in an Network File System-mounted (NFS-mounted) home directory.
- If you enter this command more than once for the same user, each command overwrites the previous command. The MWTM does not append multiple *bin* directories to the same path.
- You might have to use the **su -** command when you enter root-level commands. If you use the **su** command to become the root user, rather than logging in as the root user, then you must use the **-** option.

mwtm showcreds

Server Only

Full Syntax

mwtm showcreds [**-i** *ipaddress*] [**-d** *nodetype*]

Command Description

Displays credentials for a given IP address, if specified. Otherwise, the Default credentials are used. To:

- Display credentials for a particular IP address only, use **-i** and the IP address of the node.
- Add credentials for a specific node type, specify **-d** and the nodetype, which can be:
  - **itp**—ITP nodes.
  - **ons**—ONS nodes.
  - **csr**—Cell Site Router (CSR) nodes.
  - **ran_svc**—RAN_SVC nodes.
  - **ip-ran**—IP-RAN nodes

You must log in as the root user or superuser to use this command.

Related Topic

Credentials Commands, page 5-21

mwtm showsnmpcomm

Full Syntax

mwtm showsnmpcomm [**-i** *ipaddress*]

Command Description

Shows the specified SNMP configuration, or all SNMP configurations, on the MWTM server.

-i *ipaddress*—the IP address of the device (optional). If not specified, displays all SNMP configurations on the server.

Related Topic

- mwtm addsnmpcomm, page B-7
- mwtm deletesnmpcomm, page B-26
- mwtm modifysnmpcomm, page B-48
- mwtm snmpsetup, page B-71

mwtm singlesess

Server Only

Full Syntax

mwtm singlesess [enable | disable | status]

Command Description

This command restricts a user to logging into one client session at a time when the user access is enabled.

- **enable**—Enables the single session per user.

  Logging into a web client as a user ends all the existing web client sessions for that user.
- **disable**—Disables the single session per user.

  This command allows logging in as the same user from multiple web clients.
- **status**—Shows the status of the single session per user.

You must log in as the root user or superuser to use this command.

mwtm snmpcomm

Server Only

Full Syntax

mwtm snmpcomm [*name*]

Command Description

You use this command to set a new default SNMP read community name. The MWTM automatically updates the name in the SNMP parameters file. The default path and filename for the SNMP parameters file is */opt/CSCOsgm/etc/communities.conf*.

You must log in as the root user or superuser to use this command.

Related Topic

SNMP Configuration Commands, page 5-17

mwtm snmpconf

Server Only

Full Syntax

mwtm snmpconf [*filename*]

Command Description

Sets the file used for SNMP parameters, such as community names, timeouts, and retries.

The default path and filename for the SNMP parameters file is */opt/CSCOsgm/etc/communities.conf*. If you installed the MWTM in a directory other than */opt*, then the file resides in that directory.

When you specify a new path or filename, the MWTM restarts the servers.

Note The SNMP parameters file uses the HP OpenView format; therefore, you can set this path and filename to point to the HP OpenView *ovsnmp.conf* file in an existing OpenView system. For information about exporting SNMP community names from CiscoWorks Resource Manager Essentials (RME), see Importing SNMP Community Names from CiscoWorks (Solaris Only), page 5-1.

You must log in as the root user or superuser to use this command.

Related Topic

SNMP Configuration Commands, page 5-17

mwtm snmpget

Server Only

Full Syntax

mwtm snmpget [**-J***JVM_ARG1* [**-J***JVM_ARG2*]...] [**-v** *snmp_version*] [**-c** *community_string*] [**-r** *retry*] [**-t** *timeout*] [**-d** *output_delimiter*] [**--header**|**--no-header**] [**--raw-octets**|**--no-raw-octets**] [**--str-octets**|**--no-str-octets**] [**--raw-timeticks**|**--no-raw-timeticks**] [**--resolve-integer**|**--no-resolve-integer**] [**--resolve-bits**|**--no-resolve-bits**] [**--get-sysuptime**|**--no-get-sysuptime**] [**--detect-mib-error**] [**--instance** *oids*] [**--int-instance** *integer*] [**--str-instance** *string*] [*hostname*] [*oid*] [*oid*]...

Command Description

Queries the specified *hostname* by using SNMP **GetRequests**. Use these optional keywords and arguments with this command:

- **-J***JVM_ARG1*—JVM options. You must specify the **-J** keyword and arguments before any other keywords and arguments.

  For example, by default JVM uses a maximum of 64 MB of memory; however, if you are walking a large table, JVM might require more memory. To enable JVM to use a maximum of 256 MB of memory, use this syntax:

  -J-Xmx256m

- **-v** *snmp_version*—SNMP protocol version. Valid versions are **1** or **2c**. The default version is **2c**.

- **-c** *community_string*—SNMP community string. You specify the default community string in the SNMP parameters file, *communities.conf*.
- **-r** *retry*—SNMP retry count. You specify the default retry count in the SNMP parameters file, *communities.conf*.
- **-t** *timeout*—SNMP timeout, in seconds. You specify the default timeout in the SNMP parameters file, *communities.conf*.
- **-d** *output_delimiter*—Output delimiter. The default output delimiter is a colon (**:**).
- **--header|--no-header**—Specifies whether to display variable names as table headers:
  - Specify **--header** to display variable names as table headers for tabular output, or to display MIB variable OIDs with the value for nontabular output. This is the default setting.
  - Specify **--no-header** if you do not want to display variable names as table headers for tabular output, or MIB variable OIDs with the value for nontabular output.
- **--raw-octets|--no-raw-octets**—Specifies whether to display octets as raw octets:
  - Specify **--raw-octets** to display raw octets, such as **6c 69 6e 6b**, for octet strings.
  - Specify **--no-raw-octets** if you do not want to display raw octets for octet strings. This is the default setting.

  The other option for displaying octets is **--str-octets|--no-str-octets**.
- **--str-octets|--no-str-octets**—Specifies whether to display octets as strings:
  - Specify **--str-octets** to display octets as strings, such as **link**. This is the default setting.
  - Specify **--no-str-octets** if you do not want to display octets as strings.

  The other option for displaying octets is **--raw-octets|--no-raw-octets**.
- **--raw-timeticks|--no-raw-timeticks**—Specifies the time format:
  - Specify **--raw-timeticks** to specify raw timeticks, such as **2313894**.
  - Specify **--no-raw-timeticks** to specify formatted timeticks, such as **6 Hours 26 Mins 12 Secs**. This is the default setting.
- **--resolve-integer|--no-resolve-integer**—Specifies the time format. Use:
  - **--resolve-integer** to display integers using the string description in the MIB, such as **available** or **unavailable**.
  - **--no-resolve-integer** to display integers as numbers. This is the default setting.
- **--resolve-bits|--no-resolve-bits**—Specifies the time format. Use:
  - **--resolve-bits** to display bits using the string description in the MIB, such as **continue** or **ruleset**.
  - **--no-resolve-bits** to display bits as numbers, such as **1** or **14**. This is the default setting.
- **--get-sysuptime|--no-get-sysuptime**—Specifies whether to retrieve the **sysuptime**. Use:
  - **--get-sysuptime** to retrieve the sysuptime in the same packet as each SNMP operation.
  - **--no-get-sysuptime** if you do not want to retrieve the sysuptime in the same packet. This s the default setting.
- **--detect-mib-error**—Detects errors in returned MIB variables, such as **noSuchInstance**, **noSuchObject**, and **endOfMibView**. If the system detects any such errors, an error message and error code appear.

Sometimes multiple MIB variables are returned at the same time, some of which are in error; others are not. If this occurs and you:

  - Specified **--detect-mib-error**, none of the correct values appear, only the error message, and it returns an error code.
  - Did not specify **--detect-mib-error**, a return code of 0 is returned and all MIB variables appear. (Even noSuchInstance appears as a returned value.) This is the default setting, with **--detect-mib-error** not specified.

- **--instance** *oids*—Appends instance OIDs to each polling MIB variable. For example, these commands perform the same function:

  mwtm snmpget --instance 172.18.16.10 node_1 ipAdEntIfIndex ipAdEntNetMask

  mwtm snmpget node_1 ipAdEntIfIndex.172.18.16.10 ipAdEntNetMask.172.18.16.10

- **--int-instance** *integer*—Appends the specified integer instance OID to each polling MIB variable.
- **--str-instance** *string*—Appends string instance OIDs to each polling MIB variable; for example, these commands perform the same function:

  mwtm snmpget --str-instance link_1 node_1 cItpSpLinksetState

  mwtm snmpget node_1 cItpSpLinksetState.6.108.115.110.97.109.101

- *hostname*—Name of the host to query.
- *oid*—One or more OIDs or variable names.

The default path for the SNMP parameters file, *communities.conf*, is */opt/CSCOsgm/etc/communities.conf*. If you installed the MWTM in a directory other than */opt*, then the file resides in that directory. You can edit the file manually or using the MWTM client (see Launching the Discovery Dialog, page 3-6).

You must log in as the root user or superuser to use this command.

Related Topic

SNMP Configuration Commands, page 5-17

mwtm snmphelp

Server Only

Command Description

Displays help for all commands that are related to SNMP queries.

You must log in as the root user or superuser to use this command.

Related Topic

SNMP Configuration Commands, page 5-17

mwtm snmpmaxrows

Server Only

Full Syntax

mwtm snmpmaxrows [*number-of-rows*]

Command Description

Sets the value of maximum rows for SNMP walk.

The MWTM collects network information from device MIBs using SNMP protocol. In certain ITP networks, some MIB tables can be very large (such as GTT tables, MTP3 accounting statistics tables, etc.) The default value of 100,000 rows is usually sufficient even for large networks. However, for very large networks, if the limit needs to be increased, you can customize the this parameter. It is not recommended to exceed 300,000 rows.

If you enter this command without the *number-of-rows* argument, the MWTM displays the current maximum number of rows. You can then change that value or leave it. The valid range is 1 row to an unlimited number of rows; however, it is not recommended to set this number at less than 10,000. The default value is 100,000 rows.

You must log in as the root user or superuser to use this command.

mwtm snmpnext

Server Only

Full Syntax

mwtm snmpnext [**-J***JVM_ARG1* [**-J***JVM_ARG2*]...] [**-v** *snmp_version*] [**-c** *community_string*] [**-r** *retry*] [**-t** *timeout*] [**-d** *output_delimiter*] [**--header**|**--no-header**] [**--raw-octets**|**--no-raw-octets**] [**--str-octets**|**--no-str-octets**] [**--raw-timeticks**|**--no-raw-timeticks**] [**--resolve-integer**|**--no-resolve-integer**] [**--resolve-bits**|**--no-resolve-bits**] [**--get-sysuptime**|**--no-get-sysuptime**] [**--detect-mib-error**] [**--instance** *oids*] [**--int-instance** *integer*] [**--str-instance** *string*] [*hostname*] [*oid*] [*oid*]...

Command Description

Queries the specified *hostname* by using SNMP **GetNextRequests**. Use these optional keywords and arguments with this command:

- **-J***JVM_ARG1*—JVM options. You must specify the **-J** keyword and arguments before any other keywords and arguments.

  For example, by default JVM uses a maximum of 64 MB of memory; however, if you explore a large table, JVM might require more memory. To enable JVM to use a maximum of 256 MB of memory, use this option:

  -J-Xmx256m

- **-v** *snmp_version*—SNMP protocol version. Valid versions are **1** or **2c**. The default version is **2c**.
- **-c** *community_string*—SNMP community string. You specify the default community string in the SNMP parameters file, *communities.conf*.

- **-r** *retry*—SNMP retry count. You specify the default retry count in the SNMP parameters file, *communities.conf*.
- **-t** *timeout*—SNMP timeout, in seconds. You specify the default timeout in the SNMP parameters file, *communities.conf*.
- **-d** *output_delimiter*—Output delimiter. The default output delimiter is a colon (**:**).
- **--header|--no-header**—Specifies whether to display variable names as table headers:
  - Specify **--header** to display variable names as table headers for tabular output or MIB variable OIDs with the value for nontabular output. This is the default setting.
  - Specify **--no-header** if you do not want to display variable names as table headers for tabular output or MIB variable OIDs with the value for nontabular output.
- **--raw-octets|--no-raw-octets**—Specifies whether to display octets as raw octets. Use:
  - **--raw-octets** to display raw octets, such as **6c 69 6e 6b**, for octet strings.
  - **--no-raw-octets** if you do not want to display raw octets for octet strings. This is the default setting.

  The other option for displaying octets is **--str-octets|--no-str-octets**.
- **--str-octets|--no-str-octets**—Specifies whether to display octets as strings. Use:
  - **--str-octets** to display octets as strings, such as **link**. This is the default setting.
  - **--no-str-octets** if you do not want to display octets as strings.

  The other option for displaying octets is **--raw-octets|--no-raw-octets**.
- **--raw-timeticks|--no-raw-timeticks**—Specifies the time format:
  - Specify **--raw-timeticks** to specify raw timeticks, such as **2313894**.
  - Specify **--no-raw-timeticks** to specify formatted timeticks, such as **6 Hours 26 Mins 12 Secs**. This is the default setting.
- **--resolve-integer|--no-resolve-integer**—Specifies the time format. Use:
  - **--resolve-integer** to display integers using the string description in the MIB, such as **available** or **unavailable**.
  - **--no-resolve-integer** to display integers as numbers. This is the default setting.
- **--resolve-bits|--no-resolve-bits**—Specifies the time format:
  - Specify **--resolve-bits** to display bits using the string description in the MIB, such as **continue** or **ruleset**.
  - Specify **--no-resolve-bits** to display bits as numbers, such as **1** or **14**. This is the default setting.
- **--get-sysuptime|--no-get-sysuptime**—Specifies whether to retrieve the **sysuptime**. Use:
  - **--get-sysuptime** to retrieve the sysuptime in the same packet as each SNMP operation.
  - **--no-get-sysuptime** if you do not want to retrieve the sysuptime in the same packet. This is the default setting.
- **--detect-mib-error**—Detects errors in returned MIB variables, such as **noSuchInstance**, **noSuchObject**, and **endOfMibView**. If the system detects any such errors, an error message appears and an error code is returned.

  Sometimes multiple MIB variables are returned at the same time, some of which are in error; others are not. If this occurs and you:

  - Specified **--detect-mib-error**, none of the correct values appear, only the error message and it returns an error code.
  - Did not specify **--detect-mib-error**, a return code of 0 is returned and all MIB variables appear (even noSuchInstance appears as a returned value). This is the default setting, with **--detect-mib-error** not specified.
- **--instance** *oids*—Appends instance OIDs to each polling MIB variable. For example, these commands perform the same function:

  mwtm snmpget --instance 172.18.16.10 node_1 ipAdEntIfIndex ipAdEntNetMask

  mwtm snmpget node_1 ipAdEntIfIndex.172.18.16.10 ipAdEntNetMask.172.18.16.10
- **--int-instance** *integer*—Appends the specified integer instance OID to each polling MIB variable.
- **--str-instance** *string*—Appends string instance OIDs to each polling MIB variable. For example, these commands perform the same function:

  mwtm snmpget --str-instance link_1 node_1 cItpSpLinksetState

  mwtm snmpget node_1 cItpSpLinksetState.6.108.115.110.97.109.101
- *hostname*—Name of the host to be queried.
- *oid*—One or more OIDs or variable names.

The default path for the SNMP parameters file, *communities.conf*, is */opt/CSCOsgm/etc/communities.conf*. If you installed the MWTM in a directory other than */opt*, then the file resides in that directory. You can edit the file manually or by using the MWTM client (see Launching the Discovery Dialog, page 3-6).

You must log in as the root user or superuser to use this command.

Related Topic

SNMP Configuration Commands, page 5-17

mwtm snmpsetup

Server Only

Full Syntax

mwtm snmpsetup

Command Description

Sets up SNMP configurations on the MWTM server for multiple devices and optionally discovers the new nodes. This command interactively prompts you to add, modify, or delete one or more SNMP configurations, which include values for:

- Hostname
- Read community string
- Poll interval (in minutes)
- Timeout (in seconds)
- Number of retries

When modifying poll interval, retry, and timeout values, this command displays the currently available value in brackets [ ]. When adding new SNMP configurations, this command displays default values.

After adding, modifying, or deleting an SNMP configuration, this command prompts you to discover the node (only this node is discovered).

You do not need to restart the server when using this command.

Related Topic

- mwtm addsnmpcomm, page B-7
- mwtm deletesnmpcomm, page B-26
- mwtm modifysnmpcomm, page B-48
- mwtm showsnmpcomm, page B-64

mwtm snmpwalk

Server Only

Full Syntax

mwtm snmpwalk [**-J***JVM_ARG1* [**-J***JVM_ARG2*]...] [**-v** *snmp_version*] [**-c** *community_string*] [**-r** *retry*] [**-t** *timeout*] [**-x** *maximum_rows*] [**-d** *output_delimiter*] [**--tabular**|**--no-tabular**] [**--getbulk**|**--no-getbulk**] [**--header**|**--no-header**] [**--raw-octets**|**--no-raw-octets**] [**--str-octets**|**--no-str-octets**] [**--raw-timeticks**|**--no-raw-timeticks**] [**--resolve-integer**|**--no-resolve-integer**] [**--resolve-bits**|**--no-resolve-bits**] [**--get-sysuptime**|**--no-get-sysuptime**] [**--detect-mib-error**] [**--instance** *oids*] [**--int-instance** *integer*] [**--str-instance** *string*] [*hostname*] [*oid*] [*oid*]...

Command Description

Queries the specified *hostname* by using SNMP **GetNextRequests** to go through the MIB. Use these optional keywords and arguments with this command:

- **-J***JVM_ARG1*—JVM options. You must specify the **-J** keyword and arguments before any other keywords and arguments.

  For example, by default JVM uses a maximum of 64 MB of memory; however, if you are going through a large table, JVM might require more memory. To enable JVM to use a maximum of 256 MB of memory, use this option:

  -J-Xmx256m

- **-v** *snmp_version*—SNMP protocol version. Valid versions are **1** or **2c**. The default version is **2c**.
- **-c** *community_string*—SNMP community string. You specify the default community string in the SNMP parameters file, *communities.conf*.
- **-r** *retry*—SNMP retry count. You specify the default retry count in the SNMP parameters file, *communities.conf*.
- **-t** *timeout*—SNMP timeout, in seconds. You specify the default timeout in the SNMP parameters file, *communities.conf*.
- **-x** *maximum_rows*—Maximum number of rows to go through. If a table has more than the maximum number of rows, the **mwtm snmpwalk** command fails. You can use the **-m** keyword and argument to increase the maximum number of rows to go through. The default setting is 10,000 rows.

However, for every 10,000 rows gone through, JVM requires an additional 10 MB of memory. You can use the **-J** keyword and argument to increase the memory available to JVM.

- **-d** *output_delimiter*—Output delimiter. The default output delimiter is a colon (**:**).
- **--tabular|--no-tabular**—Specifies whether to print the result of the query in tabular format. Use:
  - **--tabular** to print the result in tabular format. This is the default setting.
  - **--no-tabular** if you do not want to print the result in tabular format.
- **--getbulk|--no-getbulk**—(SNMP version 2c only) Specifies whether to use the **getbulk** command to go through the table. Use:
  - **--getbulk** to use the **getbulk** command. This is the default setting.
  - **--no-getbulk** if you do not want to use the **getbulk** command.
- **--header|--no-header**—Specifies whether to display variable names as table headers. Use:
  - **--header** to display variable names as table headers for tabular output or to display MIB variable OIDs with the value for nontabular output. This is the default setting.
  - **--no-header** if you do not want to display variable names as table headers for tabular output or MIB variable OIDs with the value for nontabular output.
- **--raw-octets|--no-raw-octets**—Specifies whether to display octets as raw octets. Use:
  - **--raw-octets** to display raw octets, such as **6c 69 6e 6b**, for octet strings.
  - **--no-raw-octets** if you do not want to display raw octets for octet strings. This is the default setting.

  The other option for displaying octets is **--str-octets|--no-str-octets**.
- **--str-octets|--no-str-octets**—Specifies whether to display octets as strings. Use:
  - **--str-octets** to display octets as strings, such as **link**. This is the default setting.
  - **--no-str-octets** if you do not want to display octets as strings.

  The other option for displaying octets is **--raw-octets|--no-raw-octets**.
- **--raw-timeticks|--no-raw-timeticks**—Specifies the time format. Use:
  - **--raw-timeticks** to specify raw timeticks, such as **2313894**.
  - **--no-raw-timeticks** to specify formatted timeticks, such as **6 Hours 26 Mins 12 Secs**. This is the default setting.
- **--resolve-integer|--no-resolve-integer**—Specifies the time format. Use:
  - **--resolve-integer** to display integers using the string description in the MIB, such as **available** or **unavailable**.
  - **--no-resolve-integer** to display integers as numbers. This is the default setting.
- **--resolve-bits|--no-resolve-bits**—Specifies the time format. Use:
  - **--resolve-bits** to display bits using the string description in the MIB, such as **continue** or **ruleset**.
  - **--no-resolve-bits** to display bits as numbers, such as **1** or **14**. This is the default setting.
- **--get-sysuptime|--no-get-sysuptime**—Specifies whether to retrieve the sysuptime. Use:
  - **--get-sysuptime** to retrieve the sysuptime in the same packet as each SNMP operation.
  - **--no-get-sysuptime** if you do not want to retrieve the **sysuptime** in the same packet. This is the default setting.

- **--detect-mib-error**—Detects errors in returned MIB variables, such as **noSuchInstance**, **noSuchObject**, and **endOfMibView**. If the system detects any such errors, an error message and error code appear.

  Sometimes multiple MIB variables are returned at the same time, some of which are in error; others are not. If this occurs and you:

  - Specified **--detect-mib-error**, none of the correct values appear, only the error message and an error code is returned.
  - Did not specify **--detect-mib-error**, a return code of 0 and all MIB variables appear; even noSuchInstance appears as a returned value. This is the default setting, with **--detect-mib-error** not specified.
- **--instance** *oids*—Appends instance OIDs to each polling MIB variable. For example, these commands perform the same function:

  mwtm snmpget --instance 172.18.16.10 node_1 ipAdEntIfIndex ipAdEntNetMask

  mwtm snmpget node_1 ipAdEntIfIndex.172.18.16.10 ipAdEntNetMask.172.18.16.10
- **--int-instance** *integer*—Appends the specified integer instance OID to each polling MIB variable.
- **--str-instance** *string*—Appends string instance OIDs to each polling MIB variable. For example, these commands perform the same function:

  mwtm snmpget --str-instance link_1 node_1 cItpSpLinksetState

  mwtm snmpget node_1 cItpSpLinksetState.6.108.115.110.97.109.101
- *hostname*—Name of the host to query.
- *oid*—One or more OIDs or variable names.

The default path for the SNMP parameters file, *communities.conf*, is */opt/CSCOsgm/etc/communities.conf*. If you installed the MWTM in a directory other than */opt*, then the file resides in that directory. You can edit the file manually or using the MWTM client (see Launching the Discovery Dialog, page 3-6).

You must log in as the root user or superuser to use this command.

Related Topic

SNMP Configuration Commands, page 5-17

mwtm sounddir

Server Only

Full Syntax

mwtm sounddir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. You are prompted whether to continue.

Sets the directory in which the MWTM server stores event automation sound files (see Changing the Way the MWTM Processes Events, page 9-24 for information about sound files).

The default directory for sound files resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the default directory is */opt/CSCOsgm/sounds*.
- A different directory, then the default directory resides in that directory.

Use this command if you want to use a different directory for MWTM server event automation sound files, such as a Network File System location on another server.

Note This command copies all files in the current directory to the new directory. If you are not logged in as the superuser and you do not own the new directory, you might not be able to copy the files. In that case, you must specify a directory that you own, or you must log in as the root user.

You must log in as the root user to use this command.

mwtm ssl

Server Only

Full Syntax

mwtm ssl [**enable** | **disable** | **status**]

Command Description

If you enable the SSL on the MWTM and you have an SSL key-certificate pair on the MWTM, you can use this command to manage SSL support in the MWTM:

- **enable**—Enables SSL support.
- **disable**—Disables SSL support.
- **status**—Displays the current status of SSL support in the MWTM, including whether you enabled or disabled SSL support, and which SSL keys and certificates exist.

You must log in as the root user (not as a superuser) to use this command. See Implementing SSL Support in the MWTM, page 2-21 for more information.

mwtm sslstatus

Server Only

Command Description

Displays the current status for SSL that the MWTM supports, including whether you enabled or disabled SSL support; and, which SSL keys and certificates exist.

You must log in as the root user to use this command.

Related Topic

Implementing SSL Support in the MWTM, page 2-21

mwtm start

Server Only

Command Description

Starts all MWTM servers on the local host.

You must log in as the root user or superuser to use this command.

Note If the database has an exception during start up, the server will fail to start.

Related Topic

Starting the MWTM Server, page 3-1

mwtm start client

Server and all Clients

Full Syntax

mwtm start client [*hostname*]

Command Description

Starts an MWTM client on the specified host. If you did not specify a hostname, starts an MWTM client on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

If you log in to a remote workstation through Telnet or SSH, you must set the DISPLAY variable to your local display, or you cannot use this command. If the DISPLAY variable is not set automatically, you must set it manually (see Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3).

This command has the same function as the **mwtm client** command.

mwtm start jsp

Server Only

Command Description

Starts the MWTM JSP Server on the local host.

You must log in as the root user or superuser to use this command.

mwtm start pm

Server Only

Command Description

Starts the MWTM Application Server and all managed processes on the local host.

You must log in as the root user or superuser to use this command.

mwtm start web

Server Only

Command Description

Starts the MWTM web server on the local host.

You must log in as the root user or superuser to use this command.

mwtm statreps

Full Syntax

mwtm statreps [**aaa | noaaa**] [**acct | noacct**] [**allmi**] [**alllte**] [**apn | noapn**] [**chassisinventory | nochassisinventory**] [**clean**] [**cleancustom** [*tag*]] [**cpu | nocpu**] [**csg | nocsg**] [**csvnames** [**mwtm | 3gpp**]] [**csvtype** [**allnodes | pernodecomb | pernodeuniq**]] [**custage** [*number-of-days*]] [**dailyage** [*number-of-days*]] [**dailycsvage** [*number-of-days*]] [**diskcheck | nodiskcheck**] [**disable | enable**] [**epc | noepc**] [**export | noexport**] [**gtp | nogtp**] [**gttacct | nogttacct**] [**gttrates| nogttrates**] [**ha | noha**] [**hourlyage** [*number-of-days*]] [**hourlycsvage** [*number-of-days*]] [**interface | nointerface**][**extinterface | noextinterface**] [**invage** [*number-of-days*]] [**iplinks | noiplinks**] [**iplocalpool | noiplocalpool**] [**link | nolink**] [**maxcsvrows** [*rows*]] [**mem | nomem]** [**mlr | nomlr**] [**monthlyage** [*number_of_days*]] [**monthlycsvage** [*number_of_days*]] [**msu | nomsu**] [**nametype** [**dnsname | customname | sysname**]][**nullcaps | nonullcaps**] [**pdsn | nopdsn**] [**pwe3 | nopwe3**] [**qos | noqos**][**q752 | noq752**] [**rano | norano**] [**sctp | nosctp**] [**servratio** [*factor*]] [**status**] [**slb | noslb**] [**timemode** [**12 | 24**] [**timer**] [**utilratio** [*factor*]] [**xua | noxua**] [**15minage** [*number_of_days*]] [**15mincsvage** [*number_of_days*]][**all** [**getallne | nogetallne**]]

Optionally, you can specify a hostname or IP address to enable or disable the specified report for a specific device. For example the following command enables CPU reports for the device172.16.1.1:

```
mwtm statreps cpu 172.16.1.1
```

If you specify a command in which the hostname or IP address is not applicable, the host parameter is ignored and does not cause an error.

Command Description

You must log in as the root user or superuser to use these commands.

- **all**—Specifies MWTM to generate all type of element inventory reports.
  - **getallne**—Generate element inventory report.
  - **nogetallne**—Do not generate element inventory reports.
- **aaa**—Specifies whether MWTM should generate AAA reports.
  - **aaa**—Generate AAA reports.
  - **noaaa**—Do not generate AAA reports.
- **acct**—*ITP only.* Specifies whether the MWTM should generate MTP3 and XUA accounting reports. MTP3 accounting describes MTP3 layer traffic in support of linksets; XUA accounting describes MTP3 layer traffic in support of application servers.

  - **acct**—Generate MTP3 and XUA accounting reports. You must enable MTP3 accounting on the links for the MWTM to generate MTP3 accounting reports.
  - **noacct**—Do not generate MTP3 or XUA accounting reports. This is the default setting.

Note This command does not trigger the immediate collection of statistics. By default, MWTM collects MTP3 and XUA accounting statistics nightly. It might take up to 2 days before the first reports are generated.

See MTP3 Accounting Reports, page 13-214 for more information on MTP3 accounting reports. See AS Accounting Reports, page 13-212, for more information on XUA accounting reports.

- **allmi**—Generates all mobile internet reports.
- **alllte**—Generates all LTE reports.
- **apn**—Specifies whether MWTM should generate APN reports:
  - **apn—**Generate APN reports.
  - **noapn**—Do not generate APN reports.
- **chassisinventory—**Specifies whether MWTM should generate chassis inventory reports.
  - **chassisinventory**—Generate chassis inventory reports.
  - **nochassisinventory**—Do not generate chassis inventory reports.
- **clean**—Removes all data from MWTM network statistics reports, restoring the reports to an unchanged state. You must log in as the root user or superuser to use this command.
- **cleancustom**—*ITP only.* Removes all data from one or more MWTM custom statistics reports, restoring the reports to an unchanged state. To clean:
  - All custom reports, enter **mwtm statreps cleancustom**.
  - A single custom report, enter **mwtm statreps cleancustom** *tag*, where *tag* is the ID tag of the custom report that you want to clean.

  See Locating Stored Reports, page 13-284 for more information.
- **cpu**—Generate CPU statistics reports.
  - **cpu**—Generate CPU statistics reports.
  - **nocpu**—Do not generate CPU statistics reports. This is the default setting.
- **csg**—*CSG only.* Specifies whether the MWTM should generate CSG subscriber reports:
  - **csg**—Generate CSG subscriber statistics reports. You must enable CSG accounting for the MWTM to generate CSG accounting statistics.
  - **nocsg**—Do not generate CSG subscriber statistics reports. This is the default setting.
- **csvnames**—Specifies the CSV filename format.
  - **mwtm**—Creates files in the default MWTM file naming format that has been supported in previous versions of MWTM.
  - **3gpp**—Creates files in the standard 3GPP file naming style as specified in 3GPP standard 32432-900.

Note To view the 3gpp reports, you need to restart the server using mwtm restart command.

- **csvtype**—Specifies the CSV file type format.
  - **allnodes**—Puts all rows for all nodes in one csv.zip file for each report and each polling period such as 15min, hourly, daily. This is the default and only supported behavior when csvnames=mwtm.
  - **pernodeuniq**—Puts all rows for each node in a separate csv.zip file under a separate directory for each node name for each report and each polling period. Only exception to this is the APN Aggregate reports which contain data that spans multiple nodes by default.
  - **pernodecomb**—Generates csv.zip files similar to csvtype=pernodeuniq, but instead of creating a unique file for each node, report, and polling period, it generates a constantly updating series of combined report files as fast as the report engine can process.
- **custage**—*ITP only.* Specifies the maximum number of days the MWTM should archive custom reports. If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 10 days.

  This command has the same function as the **mwtm repcustage** command. See Locating Stored Reports, page 13-284 for more information.
- **dailyage**—Specifies the maximum number of days to archive the daily network statistics reports. If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 90 days.
- **dailycsvage**—Specifies the maximum number of days to archive the daily CSV reports.
- **diskcheck**—Specifies whether the MWTM should verify that a disk has at least 10 MB of space remaining before generating network statistics reports:
  - **diskcheck**—Verify the disk space. This is the default setting.
  - **nodiskcheck**—Do not verify the disk space.

  If your system does not return the necessary amount of free space, in a correct format that the MWTM can parse, use this command to disable checking to allow reporting to continue.
- **enable**—Specifies to generate network statistics and accounting reports:
  - **enable**—Generate network statistics and accounting reports. This is the default setting.
  - **disable**—Do not generate network statistics and accounting reports.

  You must enter this command to generate network statistics and accounting reports before entering the **mwtm accstats**, **mwtm gttstats**, **mwtm linkstats**, **mwtm mlrstats**, and **mwtm xuastats** commands.

  See Chapter 13, “Managing Reports” for more information on network statistics and accounting reports.
- **epc**—Generate EPC reports.
  - **epc**—Generate EPC reports.
  - **noepc**—Do not generate EPC reports.
- **export**—*ITP only.* Specifies whether the MWTM should generate network statistics and accounting reports in export format:
  - **export**—Generate network statistics reports in export format. This is the default setting.
  - **noexport**—Do not generate network statistics reports in export format.

Network statistics reports in export format are *.zip* files that contain comma-separated value (CSV) text files that you can download and unzip. See Enabling Automatic Reports Using the CLI, page 13-2 for more information.

- **gtp—**Specifies whether MWTM should generate GTP reports.
  - **gtp**—Generate GTP reports.
  - **nogtp**—Do not generate GTP reports. This is the default setting.
- **gttacct**—*ITP only.* Specifies whether the MWTM should generate GTT accounting statistics reports:
  - **gttacct**—Generate GTT accounting statistics reports. You must enable GTT accounting for the MWTM to generate GTT accounting statistics.
  - **nogttacct**—Do not generate GTT accounting statistics reports. This is the default setting.

Note This command does not trigger immediate collection of statistics. By default, MWTM collects GTT accounting statistics nightly. It might take up to 2 days before the first reports are generated.

See GTT Accounting Reports, page 13-213 for more information on GTT accounting statistics reports.

- **gttrates—***ITP only.* Generate GTT rates reports.
  - **gttrates**—Generate GTT rates reports.
  - **nogttrates**—Do not generate GTT rates reports. This is the default setting.
- **ha**—*HA only.* Generate HA reports.
  - **ha**—Generate HA reports.
  - **noha**—Do not generate HA reports. This is the default setting.
- **hourlyage**—Specifies the maximum number of days to archive the hourly network statistics reports. If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 31 days.
- **hourlycsvage**—Specifies the maximum number of days to archive the hourly CSV reports.
- **interface**—Specifies whether the MWTM should generate Interface reports:
  - **interface**—Generate Interface reports.
  - **nointerface**—Do not generate Interface reports.
  - **extinterface**—Generate External Interface statistics reports.
  - **noextinterface**—Do not generate External Interface statistics reports.
- **invage**—Specifies the maximum number of days to archive the inventory reports.
- **iplinks**—*ITP only.* Specifies whether the MWTM should include links that use the Stream Control Transmission Protocol (SCTP) IP transport protocol in network statistics reports:
  - **iplinks**—Include SCTPIP links. This is the default setting.
  - **noiplinks**—Do not include SCTPIP links.
- **iplocalpool**— Specifies whether the MWTM should generate IP local pool reports:
  - **iplocalpool**—Generate IP local pool reports.

  - **noiplocalpool**—Do not generate IP local pool reports.

- **link**—*ITP only.* Specifies whether the MWTM should generate link and linkset statistics summary reports:
  - **link**—Generate link and linkset statistics summary reports.
  - **nolink**—Do not generate link and linkset statistics summary reports. This is the default setting.

Note This command does not trigger immediate collection of statistics. By default, MWTM collects link and linkset statistics hourly. It might take up to 2 hours before the first reports are generated. See PDSN Reports, page 13-159 and Linkset Reports, page 13-80 for more information on link and linkset statistics summary reports.

- **maxcsvrows**—*ITP only.* Specifies the maximum number of rows that the MWTM includes in export CSV files. *Rows* indicates the maximum number of rows to include.

Note If you want to limit export CSV files to a size that Microsoft Excel can handle, set the value to 65535.

This command only applies to these files:

  - *MWTMLinksetStats.RollingSevenDayAllHours.csv.zip*
  - *MWTMLinkStats.RollingSevenDayAllHours.csv.zip*
  - *MWTMAccStats.DailyDetail.<yyyy-mm-dd>.csv.zip*

- **mem**—Generates memory statistics reports.
  - **mem**—Generate memory statistics reports.
  - **nomem**—Do not generate memory statistics reports. This is the default setting.
- **mlr**—*ITP only.* Specifies whether the MWTM should generate MLR accounting reports:
  - **mlr**—Generate MLR reports. You must also enable MLR reporting for the MWTM to generate MLR reports.
  - **nomlr**—Do not generate MLR reports. This is the default setting.

Note This command does not trigger immediate collection of statistics. By default, MWTM collects MLR accounting statistics nightly. It might take up to 2 days before the first reports are generated.

See MLR Reports, page 13-90 for more information on MLR reports.

- **monthlyage**—Specifies the number of days to archive the monthly report data. If you do not specify a value for the number of days, you are prompted to enter a number.
- **monthlycsvage**—Specifies the maximum number of days to archive the monthly CSV reports.
- **msu**—*ITP only.* Specifies whether the MWTM should generate MSU rates reports:
  - **msu**—Generate MSU rates reports. You must also enable reporting for the MWTM to generate MSU rates reports.
  - **nomsu**—Do not generate MSU rates reports. This is the default setting.

See MSU Rates Reports, page 13-95 for more information on MSU rates reports.

- **nametype**—Specifies the Node name type for exported CSV files.
- **nullcaps**—*ITP only.* Specifies whether the MWTM should include SCTP links that do not have planned send and receive capacities in network statistics reports:
  - **nullcaps**—Include SCTP links that do not have planned send and receive capacities. This is the default setting.
  - **nonullcaps**—Do not include SCTP links that do not have planned send and receive capacities.
- **pdsn**—*PDSN only.* Specifies to generate PDSN reports.
  - **pdsn**—Generate PDSN reports.
  - **nopdsn**—Do not generate PDSN reports.
- **pwe3**—*RANO only.* Specifies to generate PWE3 reports.
  - **pwe3**—Generate PWE3 reports.
  - **nopwe3**—Do not generate PWE3 reports.
- **qos**— Specifies whether the MWTM should generate QOS reports:
  - **qos**—Generate QOS reports.
  - **noqos**—Do not generate QOS reports.
- **q752**—*ITP only.* Specifies whether the MWTM should generate Q.752 daily statistics reports:
  - **q752**—Generate Q.752 statistics reports.
  - **noq752**—Do not generate Q.752 statistics reports. This is the default setting.

Note This command does not trigger immediate collection of statistics. By default, MWTM collects Q.752 statistics nightly. It might take up to 2 days before the first reports are generated.

- **rano**—*RANO only.* Specifies whether the MWTM should generate RANO reports:
  - **rano**—Generate RANO reports.
  - **norano**—Do not generate RANO reports. This is the default setting.
- **sctp**—*ITP only.* Generates SCTP reports.
  - **sctp**—Generate SCTP reports.
  - **nosctp**—Do not generate SCTP reports. This is the default setting.
- **servratio**—*ITP only.* Displays a red ball in the In-Service cell in a network statistics report, if this condition is met:

  Current In-Service < *factor* *** Long-Term In-Service**

  The default value for *factor* is **0.95**. Therefore, when the percentage of time that a link is in service (for an hour) falls below 95% of the long-term in-service percentage for that link, a red ball appears in the In-Service cell.
- **status**—Displays the current status of all MWTM network statistics report parameters. You use the other **mwtm statreps** commands, such as **mwtm statreps** [**disable | enable**] and **mwtm statreps** [**diskcheck | nodiskcheck**] to set these parameters.

  You can also use the follow syntax to query the statistics reports of individual nodes:

  ```
  mwtm statreps status [ip address]
  ```
- **slb**—Specifies whether the MWTM should generate SLB reports:

  - **slb**—Generate SLB reports.
  - **noslb**—Do not generate SLB reports. This is the default setting.
- **timemode**—Sets the time mode for dates in network statistics reports:
  - **12**—Use 12-hour clock, with AM and PM. 1:00 in the afternoon is 1:00 PM.
  - **24**—Use 24-hour clock, also called military time. 1:00 in the afternoon is 13:00. This is the default setting.
- **timer**—Displays the timer file for MWTM network statistics reports. The timer file is useful for identifying how much time the MWTM spends gathering report data and generating reports.
- **utilratio**—*ITP only.* Displays a red ball in the Send or Receive cell in a network statistics report, if this condition is met:

  Current > *factor* * Long-Term

  The default value for *factor* is **1.50**. Therefore, if the link for a particular hour is more than 150% of the long-term average for that link, the red ball appears in the Send or Receive cell.
- **xua**—*ITP only.* Specifies whether the MWTM should generate statistics reports for application servers and application server processes:
  - **xua**—Generate statistics reports for application servers and application server processes.
  - **noxua**—Do not generate statistics reports for application servers and application server processes. This is the default setting.

Note This command does not trigger immediate collection of statistics. By default, MWTM collects XUA statistics hourly. It might take up to 2 hours before the first reports are generated.

See AS Reports, page 13-45 and ASP Reports, page 13-52 for more information on statistics reports for application servers and application server processes.

- **15minage**—Specifies the maximum number of days to archive the15 minute statistics reports.
- **15mincsvage**—Specifies the maximum number of days to archive the15 minute CSV reports.

mwtm statreps 15minage

Server Only

Full Syntax

mwtm statreps 15minage [*number-of-days*]

Command Description

Maximum number of days the MWTM should archive 15-minute network statistics reports.

If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default aging value is 3 days.

You must log in as the root user or superuser to use this command.

Related Topic

Locating Stored Reports, page 13-284

mwtm statreps monthlyage

Server Only

Full Syntax

mwtm statreps monthlyage [*number-of-days*]

Command Description

Maximum number of days the MWTM should archive monthly network statistics reports.

If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 1,825 days.

You must log in as the root user or superuser to use this command.

Related Topic

Locating Stored Reports, page 13-284

mwtm status

Server Only

Command Description

Displays the status of all MWTM servers on the local host.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm stop

Server Only

Command Description

Stops all MWTM servers on the local host.

You must log in as the root user or superuser to use this command.

mwtm stopclients

Server and Solaris or Linux Clients Only

Command Description

Stops all MWTM clients, including all GTT clients and Event Editors, on the local host.

You must log in as the root user (not as a superuser) to use this command.

mwtm stop jsp

Server Only

Command Description

Stops the MWTM JSP Server on the local host.

You must log in as the root user or superuser to use this command.

mwtm stop pm

Server Only

Command Description

Stops the MWTM Application Server and all managed processes on the local host.

You must log in as the root user or superuser to use this command.

mwtm stop web

Server Only

Command Description

Stops the MWTM web server on the local host.

You must log in as the root user or superuser to use this command.

mwtm superuser

Server Only

Full Syntax

mwtm superuser [*username*]

Command Description

Allows the specified user to perform most functions that otherwise require the user to log in as the root user. (The root user can still perform those functions, too.) The specified user account must exist in the local */etc/passwd* file. You cannot specify a user that is defined in a distributed Network Information Services (NIS) system.

Note As a superuser, you can adversely affect your operating environment if you lack a sufficient understanding of the commands that you use. If you are a relatively inexperienced UNIX user, Cisco recommends that you limit your activities as a superuser to the tasks in this document.

For a complete list of the MWTM commands that a superuser cannot use, as well as other superuser considerations, see Specifying a Super User (Server Only), page 2-19.

You must log in as the root user (not as a superuser) to use this command.

mwtm syncusers

Server Only

Command Description

If you enable MWTM User-Based Access and you set **mwtm authtype** to **solaris**, synchronizes local MWTM passwords with Solaris.

You must log in as the root user (not as a superuser) to use this command.

Related Topic

Manually Synchronizing Local MWTM Passwords (Server Only), page 2-16

mwtm tac

Server Only

Full Syntax

mwtm tac [**short**]

Command Description

Collects important troubleshooting information for the Cisco Technical Assistance Center and writes the information to the */opt/CSCOsgm/tmp/cisco_mwtm_tshoot.log* file.

- **short**—Collects the basic information required for diagnosis of the problem.

You must log in as the root user or superuser to use this command.

Related Topic

Appendix D, “Troubleshooting the MWTM and the Network”

mwtm termproxy

Server Only

Full Syntax

mwtm termproxy [**disable** | **enable** | **status**]

Command Description

Manages a terminal proxy that resides on a server and forwards terminal requests from clients to nodes that are accessible only from that server. You use a terminal proxy to enable remote clients on desktop networks to connect to nodes that otherwise would be unreachable. You can use these options with this command:

- **disable**—Disables MWTM proxy support. This is the default setting.
- **enable**—Enables the MWTM to use a proxy and prompts you to restart the MWTM server. When you restart the server, the MWTM automatically starts the proxy process.
- **status**—Indicates whether MWTM proxy support is currently enabled or disabled.

You must log in as the root user or superuser to use this command.

Related Topic

Enabling the Terminal Server Proxy Service, page 5-11

mwtm trapaccess

Server Only

Full Syntax

mwtm trapaccess [**add** [*ip-addr*] | **clear** | **edit** | **list** | **rem** [*ip-addr*] | **sample**]

Command Description

You use this command to create and manage a list of IP addresses that can send traps to the MWTM server.

The list of allowed IP addresses resides in the *trapaccess.conf* file. By default, when you first install the MWTM, the *trapaccess.conf* file does not exist and the MWTM allows all IP addresses to send traps to the MWTM server. To create the *trapaccess.conf* file and work with the list of allowed client IP addresses, specify one of these keywords:

- **add**—Add the specified IP address to the *trapaccess.conf* file. If the file does not already exist, this command creates the file containing the first entry.
- **clear**—Remove all IP addresses from the *trapaccess.conf* file and allow traps from any MWTM client IP address.
- **edit**—Open and edit the *trapaccess.conf* file directly. If the *trapaccess.conf* file does not already exist, this command creates an empty file.
- **list**—List all IP addresses currently in the *trapaccess.conf* file. If no IP addresses appear (that is, the list is empty), the system allows traps from any MWTM IP address.
- **rem**—Removes the specified IP address from the *trapaccess.conf* file.
- **sample**—Prints out a sample *trapaccess.conf* file.

Any changes that you make take effect when you restart the MWTM server.

For more information about using this command, see Limiting Traps by IP Address, page 5-8.

You must log in as the root user or superuser to use this command.

mwtm trapratelimit abate

Server Only

Full Syntax

mwtm trapratelimit abate [**offset**]

Command Description

This option configures the trap abate offset.

By default, a node generating 2,000 or more traps (major limiting count) in the last 30 minutes (limiting interval) is considered to generate too many traps.

MWTM raises a TrapRateStatus major alarm and stops trap processing for this node. If the node no longer experiences a trap storm in the next cycle (limiting interval), MWTM will automatically reset the ProcessTrap flag and begin processing traps again.

The abate offset is the offset value from the trap major limit count. The abate threshold limit is the limiting count minus the offset value. By default, the offset value is 200. For example, if a node generates 2,000 traps (major limiting count) minus 200 traps (the default offset value), which equals 1,800 or more traps, it is considered to be faulty and MWTM stops trap processing for this node.

You must log in as the root user or superuser to use this command.

mwtm trapratelimit major

Server Only

Full Syntax

mwtm trapratelimit major [**count**]

Command Decription

This option configures the trap major limiting count or the major threshold limit.

By default, a node generating 2,000 or more traps (major limiting count) in the last 30 minutes (limiting interval) is considered to generate too many traps.

MWTM raises a TrapRateStatus major alarm and stops trap processing for this node. If the node no longer experiences a trap storm in the next cycle (limiting interval), MWTM will automatically reset the ProcessTrap flag and begin processing traps again.

You must log in as the root user or superuser to use this command.

mwtm trapratelimit interval

Server Only

Full Syntax

mwtm trapratelimit interval [**min**]

Command Decription

This option configures the interval at which nodes are checked for a trap storm.

By default, a node generating 2,000 or more traps (major limiting count) in the last 30 minutes (limiting interval) is considered to generate too many traps.

MWTM raises a TrapRateStatus major alarm and stops trap processing for this node. If the node no longer experiences a trap storm in the next cycle (limiting interval), MWTM will automatically reset the ProcessTrap flag and begin processing traps again.

You must log in as the root user or superuser to use this command.

mwtm trapratelimit minor

Server Only

Full Syntax

mwtm trapratelimit minor [**count**]

Command Description

This option configures the trap minor limiting count or the minor threshold limit.

By default, if a node generates 1,000 or more traps (minor limiting count) in the last 30 minutes (limiting interval) MWTM raises a TrapRateStatus minor alarm. MWTM will continue to process traps from the node.

If the node no longer experiences a trap storm in the next cycle (limiting interval), MWTM will automatically clear the minor alarm. If on the other hand if the node continues to receive 2,000 or more traps (major limiting count) MWTM raises TrapRateStatus major alarm and stop trap processing for this node.

You must log in as the root user or superuser to use this command.

mwtm trapsetup

Server Only

Full Syntax

mwtm trapsetup [**disable**]

Command Description

Stops the MWTM server, configures the MWTM to receive SNMP traps (or prevents the MWTM from receiving traps), then restarts the MWTM server.

When you select an SNMP trap port number for the MWTM server, ensure that your ITPs use the same SNMP trap port number. See the description of the **snmp-server host** command in the "ITP Requirements" section of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for more information.

To prevent the MWTM from receiving traps, enter the **mwtm trapsetup disable** command. The MWTM restarts the MWTM server.

You must log in as the root user (not as a superuser) to use this command.

Related Topic

- Chapter 2, "Configuring Security"
- Enabling SNMP Traps, page 5-7

mwtm trapstatus

Server Only

Command Description

Displays the current trap reception configuration for the MWTM, including:

- Whether you enabled or disabled receiving traps.
- On which UDP port the MWTM trap receiver listens.

Related Topic

Enabling SNMP Traps, page 5-7

mwtm tshootlog

Server Only

Full Syntax

mwtm tshootlog {**all** | **trace** | **action** | **list** | **none**}

Command Description

The MWTM can record all output from troubleshooting commands into a log file. To:

- To enable both troubleshooting action and trace logging, specify **all**.
- To record all troubleshooting output to a log file,, specify **trace**.
- To enable troubleshooting action logging, specify **action**.
- To list the status of action and trace logging, specify **list**.
- To disable both action and trace logging, specify **none**.

The default path for the troubleshooting trace loging is */opt/CSCOsgm/logs/troubleshooting*. The default path for the troubleshooting action log file is */opt/CSCOsgm/logs/sgmTroubleshootingLog.txt*. If you installed the MWTM in a directory other than */opt*, then the troubleshooting log file resides in that directory.

Related Topic

Appendix D, “Troubleshooting the MWTM and the Network”

mwtm uninstall

Server and Solaris or Linux Clients Only

Command Description

Uninstalls the MWTM.

You must log in as the root user (not as a superuser) to use this command.

mwtm unknownage

Server Only

Full Syntax

mwtm unknownage [*number-of-days*]

Command Description

Sets the maximum number of days to retain **Unknown** objects before deleting them from the MWTM database.

If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 7 days. Setting this value to 0 days means that, after one hour, the system deletes **Unknown**.

You must log in as the root user or superuser to use this command.

mwtm updateuser

Server Only

Full Syntax

mwtm updateuser [*username*]

Command Description

If you enable MWTM User-Based Access, changes the authentication level for the specified user. Valid levels are:

- **1**—Basic User.
- **2**—Power User.
- **3**—Network Operator.
- **4**—Network Administrator.
- **5**—System Administrator.

If you set **mwtm authtype** to **local**, you also use this command to change the user's password. When setting the password, follow the rules and considerations in Creating Secure Passwords, page 2-7.

See Enabling and Changing Users and Passwords (Server Only), page 2-13 for more information on authentication levels and the use of this command.

You must log in as the root user or superuser to use this command.

Note If you have enabled Solaris authentication, you must log in as the root user, not a superuser, to use this command (see Configuring User Access, page 2-1).

mwtm useraccess

Server Only

Full Syntax

mwtm useraccess [**disable** | **enable**]

Command Description

Enables or disables MWTM User-Based Access. User-Based Access provides multilevel password-protected access to MWTM features. Each user can have a unique username and password. You can also assign each user to one of five levels of access, which control the list of MWTM features accessible by that user.

Note You must enable MWTM User-Based Access to use the associated MWTM security commands (see Configuring User Access, page 2-1).

The mwtm useraccess command goes through the following stages, checking the status of:

1. mwtm useraccess—Enabled or disabled.
2. mwtm authtype—If you have not already set the mwtm authentication type, you must do so now.
3. mwtm adduser—If you have already assigned users, the MWTM asks if you want to use the same user database, or create a new one. If you have not assigned users, you must do so now.

You must log in as the root user or superuser to use this command.

Related Topic

Configuring User Access, page 2-1

mwtm userpass

Server Only

Full Syntax

mwtm userpass [*username*]

Command Description

If you enable MWTM User-Based Access and **mwtm authtype** is set to **local**, changes the specified user's MWTM security authentication password.

If the MWTM or a superuser automatically disables the user's authentication, this command re-enables the user's authentication with a new password.

If **mwtm authtype** is set to **solaris**, you cannot use this command; instead, you must manage passwords on the external authentication servers.

You must log in as the root user to use this command.

Related Topic

Enabling and Changing Users and Passwords (Server Only), page 2-13

mwtm version

Server and Solaris or Linux Clients Only

Command Description

Displays version information for MWTM servers and clients on the local host.

Related Topic

Chapter 11, "Accessing Data from the Web Interface"

mwtm viewlog

Server Only

Command Description

Uses PAGER to display the contents of the system message log. To:

- Save the current contents of the log, clear the log, and restart the server, enter **mwtm viewlog clear**.
- Display the contents of the log in reverse order, with the most recent messages at the beginning of the log, enter **mwtm msglog -r**.

This command has the same function as the **mwtm msglog** command.

You must log in as the root user or superuser to use this command.

mwtm wall

Server Only

Full Syntax

mwtm wall *message_string*

Command Description

Sends a message to all clients that are connected to the server. For example:

./mwtm wall Server going down at 9:00 pm tonight.

sends this message:

Server going down at 9:00 pm tonight.

The MWTM ignores quotation marks ("") in *message_string*. To include quotation marks (""), use the escape character (\) in combination with quotation marks (""). For example:

./mwtm wall Example of the \"mwtm wall\" command.

sends this message:

Example of the "mwtm wall" command.

You must log in as the root user or superuser to use this command.

mwtm webaccesslog

Server Only

Full Syntax

mwtm webaccesslog [**clear** | **-r**]

Command Description

Uses PAGER to display the MWTM system web access log file for the server to which you connect and which is currently running the MWTM server. The system web access log lists all MWTM system web access messages that it logged for the MWTM server. This method provides an audit trail of all access to the MWTM server via the web interface. To:

- Clear the log and restart the server, enter **mwtm webaccesslog clear**.
- Display the contents of the log in reverse order, with the most recent web access messages at the beginning of the log, enter **mwtm webaccesslog -r**.

You must log in as the root user or superuser to use this command.

mwtm weberrorlog

Server Only

Full Syntax

mwtm weberrorlog [**clear** | **-r**]

Command Description

Uses PAGER to display the MWTM web server error log file for the server to which you connect, and which is currently running the MWTM server. The web server error log lists all MWTM web error messages that it logged for the MWTM web server. To:

- Clear the log and restart the server, enter **mwtm weberrorlog clear**.
- Display the contents of the log in reverse order, with the most recent web error messages at the beginning of the log, enter **mwtm weberrorlog -r**.

You must log in as the root user or superuser to use this command.

mwtm weblogupdate

Server Only

Full Syntax

mwtm weblogupdate [*interval* | **disable**]

Command Description

Controls how often, in seconds, the MWTM updates certain web output.

When you enter this command, the MWTM displays the current interval. You can then change that value or leave it. The valid range is 1 second to an unlimited number of seconds. The default value is 300 seconds (5 minutes).

To disable the update interval, enter the **mwtm weblogupdate disable** command. This option reduces the CPU usage on the server and client.

You must log in as the root user or superuser to use this command.

mwtm webnames

Server Only

Full Syntax

mwtm webnames [**display** | **real**]

Command Description

Specifies whether the MWTM should show real node names or display names in web pages:

- **real**—Displays the real DNS names of nodes in web pages, as discovered by the MWTM.
- **display**—Shows display names in web pages. Display names are new names that you specify for nodes. This is the default setting. For more information about display names, see Editing Properties, page 8-49.

You must log in as the root user or superuser to use this command.

mwtm webport

Server Only

Full Syntax

mwtm webport [*port-number*]

Command Description

Sets a new port number for the web server, where *port-number* is the new, numeric port number. The MWTM verifies that the new port number is not already in use.

The new port number must contain only numbers. If you enter a port number that contains nonnumeric characters, such as **mwtm13**, the MWTM displays an error message and returns to the command prompt without changing the port number.

You must log in as the root user (not as a superuser) to use this command.

mwtm webutil

Server Only

Full Syntax

mwtm webutil [**percent** | **erlangs**]

Command Description

Specifies whether the MWTM should display send and receive for linksets and links as percentages or in Erlangs (E), in web pages:

- **percent**—The MWTM displays as a percentage (%). This is the default setting.
- **erlangs**—The MWTM displays in Erlangs (E).

You must log in as the root user or superuser to use this command.

Related Topic

- Chapter 11, "Accessing Data from the Web Interface"
- Chapter 13, "Managing Reports"
- Locating Stored Reports, page 13-284

mwtm who

Server Only

Command Description

Displays a list of all client usernames and processes connected to the server.

mwtm xtermpath

Server or Solaris or Linux Clients Only

Command Description

Specifies the path to the **xterm** application to use for xterm sessions on the MWTM client, as well as any special parameters to pass to the xterm application. The default path is */usr/openwin/bin/xterm*.

If one of the special parameters that you pass to the **xterm** application is a title, the title can contain hyphens (-) and underscores (_), but no spaces.

You must log in as the root user (not as a superuser) to use this command.

ITP-Only Commands

ITP-only commands include:

mwtm accstats

Server Only

Full Syntax

mwtm accstats [*nodes* [*linksets* [*filter*]] [*idtag*]] [*sortopts*] [**quiet**]

Command Description

Generates MWTM accounting statistics reports. To:

- Include or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.
  - A single node or signaling point, specify a single node name, or node name and signaling-point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name; for example:

    ```
    mwtm-75-59a.cisco.com
    ```

    To specify a node name and signaling point:

    ```
    mwtm-75-59a.cisco.com;net0
    ```

  - Linksets, specify a filename with a list of linksets:

    ```
    mwtm-75-96a.cisco.com;net0:7291p_to_7591a0
    ```

  - A filter, specify a filename with a list of filters in the format *dpc:opc*:

    ```
    1.2.0:1.17.0
    ```

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This is also the default setting for this command; you only need to specify **default** if you also want to specify an *idtag*, *sortopts*, or **quiet**.
  - A group of nodes or signaling points other than the one specified in the *nodes.include* file, create a file that contains the list of nodes and signaling points to include and specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm accstats** command.

- Specify the sort order for the reports, specify one of these keywords for the *sortopts* argument:
  - **-sdp**—Sort based on the destination point code (DPC) of the node, in ascending order.
  - **-sno**—Sort based on the node name, in ascending order.
  - **-sop**—Sort based on the originating point code (OPC) of the node, in ascending order.
  - **-srb**—Sort based on the number of bytes received, in descending order.
  - **-srm**—Sort based on the number of MTP3 message signal units (MSUs) received, in descending order.
  - **-ssb**—Sort based on the number of bytes sent, in descending order.
  - **-ssi**—Sort numerically based on service indicator (SI), in ascending order.
  - **-ssm**—Sort based on the number of MTP3 MSUs sent, in descending order.
- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you view by using the MWTM web interface.

The first time you use the **mwtm accstats** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you need only to enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

Related Topic

Customizing ITP Reports, page 13-285

mwtm archivedir

Server Only

Full Syntax

mwtm archivedir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. The system prompts you whether to continue.

Sets the Version Control System (VCS) repository directory, the directory in which the MWTM stores archived files.

The default VCS repository directory resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the directory is */opt/CSCOsgm/vcs-repository*.
- A different directory, then the directory resides in that directory.

Use this command if you want to use a different directory; for example, a Network File System location on another server.

- This command copies all files in the current directory to the new directory. If you do not log in as the superuser and do not own the new directory, you might not be able to copy the files. In that case, you must specify a directory that you own or you must log in as the root user. Do not set the new directory to:
  - Any of these: */usr*, */var*, */opt*, or */tmp*.
  - The same directory in which you are storing message log files (**mwtm msglogdir**), report files (**mwtm repdir**), route table files (**mwtm routedir**), GTT files (**mwtm gttdir**), or address table files (**mwtm atbldir**).

You must log in as the root user or superuser to use this command.

Note If you are setting up a new repository directory on a Network File System location on another (remote) server, ensure that the server allows read-write access to the user account that you use to run the MWTM and run this command as a superuser.

mwtm atblclient

Solaris or Linux Clients Only

Full Syntax

mwtm atblclient [*hostname*]

Command Description

Starts an MWTM Address Table Editor client on the specified host. If you do not specify a hostname, starts an MWTM Address Table Editor client on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

For more information about the MWTM Address Table Editor, see Chapter 16, "Editing ITP MLR Address Table Files."

If you log in to a remote workstation through Telnet, you must set the DISPLAY variable to your local display or you cannot use this command. If the system does not automatically set the DISPLAY variable, you must set it manually (see Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3).

mwtm atbldir

Server Only

Full Syntax

mwtm atbldir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. The system then prompts you whether to continue.

Sets the address-table staging directory, the directory in which the MWTM stores address table files. For more information about address table files, see Chapter 16, "Editing ITP MLR Address Table Files."

The default address table staging directory resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the directory is */opt/CSCOsgm/atbl*.
- A different directory, then the directory resides in that directory.

Use this command if you want to use a different directory to stage address tables, such as */tftpboot*, or such as a Network File System location on another server, used as the TFTP server for server configuration files for ITPs in the network.

This command copies all files in the current directory to the new directory. If you are not logged in as the superuser and do not own the new directory, the MWTM provides this prompt:

```
Can't create directory!! Address Table Staging Directory not changed!!

   Directory could be located on a remote NFS server.
   Manually create directory and try again.
   Set permissions using chmod 777.
```

You must specify a directory that you own, or you must log in as the root user. Do not set the new directory to:

- Any of these: */usr*, */var*, */opt*, or */tmp*.
- The same directory in which you are storing message log files (**mwtm msglogdir**), report files (**mwtm repdir**), route table files (**mwtm routedir**), or GTT files (**mwtm gttdir**).

When you enter this command, the MWTM also prompts you to enable TFTP file transfer for the address table staging directory and prompts you for the TFTP path for the directory, **tftp://***hostname***/***path*, where:

- *hostname* is the name or IP address of the host on which the address-table staging directory resides.

  If you enter a DNS name (such as **mwm-jumbo**) instead of an IP address (such as **172.18.12.10**), then the ITP must be able to resolve the DNS name; otherwise, when you try to deploy a file, the MWTM issues an appropriate error message and does not deploy the file.

  To enable the ITP to resolve DNS names, enter the **ip domain-lookup** command on the ITP. For more information about this command, see the *Cisco IOS IP Command Reference, Volume 1 of 4: Addressing and Services*, Release 12.3 or later.

- *path* is the path to the address table staging directory.

After you change the directory or enable TFTP file transfer for the directory, the MWTM asks if you want to restart the MWTM server. The new directory and TFTP setting take effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

Note If you are setting up a new address table staging directory on a Network File System location on another (remote) server, ensure that the server allows read-write access to the user account through which the MWTM is running and run this command as a superuser.

mwtm autosyncconfig

Server Only

Full Syntax

mwtm autosyncconfig [**enable** | **disable** | **status**]

Command Description

Manages **auto sync** configuration settings to automatically save the IOS configuration changes.

mwtm checkgtt

Server Only

Full Syntax

mwtm checkgtt [**-l** *logfilename*] *filename signalingpointname*

Command Description

Checks the semantics and syntax of the specified GTT file on the specified signaling point. To write detailed syntax- and semantics-checking results to a file, specify **-l** and the name of the file.

You must log in as the root user or superuser to use this command.

mwtm checkmlr

Server Only

Full Syntax

mwtm checkmlr [**-l** *logfilename*] *filename signalingpointname*

Command Description

Checks the semantics and syntax of the specified MLR address table on the specified signaling point. To write detailed syntax- and semantics-checking results to a file, specify **-l** and the name of the file.

You must log in as the root user or superuser to use this command.

mwtm checkroute

Server Only

Full Syntax

mwtm checkroute [**-l** *logfilename*] *filename signalingpointname*

Command Description

Checks the semantics and syntax of the specified route table file on the specified signaling point. To write detailed syntax- and semantics-checking results to a file, specify **-l** and the name of the file.

You must log in as the root user or superuser to use this command.

mwtm countas

Server Only

Command Description

Displays a count of application servers in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countasp

Server Only

Command Description

Displays a count of application server processes in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countaspa

Server Only

Command Description

Displays a count of application server process applications in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countlinks

Server Only

Command Description

Displays a count of links in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countlinksets

Server Only

Command Description

Displays a count of linksets in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countsgmp

Server Only

Command Description

Displays a count of signaling gateway-mated pairs in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm countsps

Server Only

Command Description

Displays a count of signaling points in the current MWTM database.

You must log in as the root user or superuser to use this command.

mwtm deletearchive

Server Only

Full Syntax

mwtm deletearchive {**-s** *signaling-point-name*} {**-t** *type*} [**-a** *address-table-name*]

Command Description

Deletes a file from the archive.

- To delete an archived file, specify **-s** and the name of the signaling point, and specify **-t** and the type, which can be one of these:
  - **gtt**
  - **route**
  - **mlr**

Note If you specify the *type* as **mlr**, you must also specify **-a** and the name of the address table.

You must log in as the root user or superuser to use this command.

mwtm deployarchive

Server Only

Full Syntax

mwtm deployarchive {**-s** *signaling point name of source configuration*} {**-t** *type*} [**-a** *address table name*] [**-r** *revision number of file*] [**-c** *archive comment for deploy*]

Command Description

Allows you to deploy an archived file to a specified signaling point. To:

- Deploy an archived file, specify **-s** and the name of the source configuration signaling point and specify **-t** and the type, which can be one of these:
  - **gtt**
  - **route**
  - **mlr**

Note If you specify the *type* as **mlr**, you must also specify **-a** and the name of the address table.

- Deploy a specific revision number of the archive file, specify **-r** and the revision number. If the revision is not specified, the current revision is deployed.
- Provide archive comments during deployment, specify **-c** and add your comments.

Once you have entered the command, you will receive a prompt to enter the destination signaling-point name.

You must log in as the root user or superuser to use this command.

mwtm deploycomments

Server Only

Full Syntax

mwtm deploycomments {**require** | **optional** | **status**}

Command Description

Allows you to require or make optional user comments during deployment. To:

- Prompt the user for comments during file archiving by using the wizard, specify **require**.
- Skip the prompt for comments during file archiving by using the wizard, specify **optional**. You can still specify comments by using CLI commands, such as **mwtm pushgtt**, **mwtm pushmlr**, and **mwtm pushroute**.
- Show the current settings on the command line, specify **status**.

You must log in as the root user or superuser to use this command.

mwtm evreps

Server Only

Full Syntax

mwtm evreps [**nomtp** | **mtp**]

Command Description

Specifies whether MWTM should generate MTP3 event reports.

- **mtp**—Generate MTP3 event reports.
- **nomtp**—Do not generate MTP3 event reports.

mwtm evreps clean

Server Only

Command Description

Removes all data from MWTM network event reports, restoring the reports to an unchanged state.

You must log in as the root user or superuser to use this command.

mwtm evreps cleancustom

Server Only

Full Syntax

mwtm evreps cleancustom [*tag*]

Command Description

Removes all data from one or more MWTM custom event reports, restoring the reports to an unchanged state. To clean:

- All custom reports, enter **mwtm evreps cleancustom**.
- A single custom report, enter **mwtm evreps cleancustom** *tag*, where *tag* is the ID tag of the custom report that you want to clean.

You must log in as the root user or superuser to use this command.

mwtm evreps diskcheck

Full Syntax

mwtm evreps [**diskcheck** | **nodiskcheck**]

Command Description

Specifies whether the MWTM should verify that a disk has at least 10 MB of space remaining before generating network event reports:

- **diskcheck**—Verify the disk space. This is the default setting.
- **nodiskcheck**—Do not verify the disk space.

If your system does not return the necessary amount of free space in a correct format that the MWTM can parse, use this command to disable checking and to allow reporting to continue.

See Chapter 13, "Managing Reports" for more information on the output of this command.

You must log in as the root user or superuser to use this command.

mwtm evreps enable

Server Only

Full Syntax

mwtm evreps [**disable** | **enable**]

Command Description

Enables the MWTM to generate event reports:

- **enable**—Generate network event reports. This is the default setting.
- **disable**—Do not generate network event reports.

The **mwtm evreps** command enables or disables the MWTM event reporting feature. To enable a specific type of event reporting, you must also enable that report type.

Note In this release, the only event reports that the MWTM can generate are MTP3 events (see mwtm evreps mtp, page B-108). To enable the MWTM event reporting feature, enter **mwtm evreps enable**. Then, to enable MTP3 event reporting, enter **mwtm evreps mtp**. To manually generate an MTP report from the command line, see mwtm mtpevents, page B-118.

You must log in as the root user or superuser to use this command.

Related Topic

Chapter 13, "Managing Reports"

mwtm evreps hourlyage

Server Only

Full Syntax

mwtm evreps hourlyage [*number-of-days*]

Command Description

Maximum number of days the MWTM should archive hourly network event reports.

If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 31 days.

You must log in as the root user or superuser to use this command.

mwtm evreps mtp

Server Only

Full Syntax

mwtm evreps [**mtp** | **nomtp**]

Command Description

Specifies whether the MWTM should generate MTP3 event reports:

- **mtp**—Generate MTP3 event reports.
- **nomtp**—Do not generate MTP3 event reports. This is the default setting.

Note The default setting for MTP3 event reporting is disabled. To enable MTP3 event reporting, first enter **mwtm evreps enable** (see mwtm evreps enable, page B-107). Then enter **mwtm evreps mtp**.

You must log in as the root user or superuser to use this command.

Related Topic

Chapter 13, "Managing Reports"

mwtm evreps status

Server Only

Command Description

Displays the current status of all MWTM network event report parameters. You set these parameters by using the other **mwtm evreps** commands, such as:

- **mwtm evreps** [**disable | enable**]
- **mwtm evreps** [**diskcheck | nodiskcheck**]

You must log in as the root user or superuser to use this command.

mwtm evreps timer

Server Only

Command Description

Displays the timer file for MWTM network event reports. The timer file is useful for identifying how much time the MWTM spends gathering report data and generating reports.

You must log in as the root user or superuser to use this command.

mwtm gttacct

Server Only

Full Syntax

mwtm gttacct [*nodes* [*linksets* [*filter*]] [*idtag*]] [*sortopts*] [**quiet**]

Command Description

Generates MWTM GTT accounting reports. To:

- Include or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.

    A single node or signaling point, specify a single node name, or node name and signaling-point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name, and each line must end with a colon (**:**).

    For example:

    ```
    mwtm-75-59a.cisco.com:
    ```

    To specify a node name and signaling point, enter:

    ```
    mwtm-75-59a.cisco.com;net0:
    ```

  - Linksets, specify a filename with a list of linksets:

    ```
    mwtm-75-96a.cisco.com;net0:7291p_to_7591a0
    ```

  - A filter, specify a filename with a list of filters in the format:

    selname:gta:pc

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This setting is also the default for this command; you only need to specify **default** if you also want to specify an *idtag*, *sortopts*, or **quiet**.
  - A group of nodes or signaling points other than the one that the *nodes.include* file specifies, create a file that contains the list of nodes and signaling points to include, and specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify a *node*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm gttacct** command.

- Specify the sort order for the reports, specify one of these keywords for the *sortopts* argument:
  - **-sgt**—Sort based on the GTA, in descending order.
  - **-sno**—Sort based on the node name, in ascending order.
  - **-spc**—Sort based on the point code, in ascending order.
  - **-ssn**—Sort based on the selector name, in ascending order.
  - **-sto**—Sort based on the total number of octets translated by GTT, in descending order.
  - **-stp**—Sort based on the total number of packets translated by GTT, in descending order. This is the default setting.
- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm gttacct** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you only need to enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

mwtm gttclient

Solaris or Linux Clients Only

Full Syntax

mwtm gttclient [*hostname*]

Command Description

Starts an MWTM GTT client on the specified host. If no hostname is specified, starts an MWTM GTT client on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

For more information about the MWTM GTT client, see Chapter 15, “Editing an ITP Global Title Translation Table.”

If you access a remote workstation through Telnet, you must set the DISPLAY variable to your local display or you cannot use this command. If the DISPLAY variable is not set automatically, you must set it manually (see Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3).

mwtm gttdir

Server Only

Full Syntax

mwtm gttdir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. The system prompts you whether to continue.

Sets the GTT staging directory, the directory in which the MWTM stores GTT files and enables Trivial File Transfer Protocol (TFTP) file transfer for the directory. See Chapter 15, "Editing an ITP Global Title Translation Table" for information about GTT files.

The default GTT staging directory resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the directory is */opt/CSCOsgm/gtt*.
- A different directory, then the directory resides in that directory.

Use this command if you want to use a different GTT staging directory, such as */tftpboot* or the Network File System location on another server, which is used as the TFTP server for server configuration files for ITPs in the network.

This command copies all files in the current directory to the new directory. If you are not logged in as the superuser and do not own the new directory, the MWTM provides this prompt:

```
Can't create directory!! GTT Directory not changed!!

   Directory could be located on a remote NFS server.
   Manually create directory and try again.
   Set permissions using chmod 777.
```

You must specify a directory that you own, or you must log in as the root user. Do not set the new directory to any of these: */usr*, */var*, */opt*, or */tmp*.

Do not set the new directory to the same directory in which you are storing:

- Message log files (**mwtm msglogdir**)
- Report files (**mwtm repdir**)
- Route table files (**mwtm routedir**)
- Address table files (**mwtm atbldir**)

When you enter this command, the MWTM also prompts you to enable TFTP file transfer for the GTT staging directory and prompts you for the TFTP path for the directory, **tftp://***hostname***/***path*, where:

- *hostname* is the name or IP address of the host on which the GTT staging directory resides.

  If you enter a DNS name (such as **mwm-jumbo**) instead of an IP address (such as **172.18.12.10**), then the ITP must be able to resolve the DNS name; otherwise, when you try to deploy a file, the MWTM issues an appropriate error message and does not deploy the file.

  To enable the ITP to resolve DNS names, enter the **ip domain-lookup** command on the ITP. For more information about this command, see the *Cisco IOS IP Command Reference, Volume 1 of 4: Addressing and Services*, Release 12.3 or later.

- *path* is the path to the GTT staging directory.

After you change the directory or enable TFTP file transfer for the directory, the MWTM asks if you want to restart the MWTM server. The new directory and TFTP setting take effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

Note If you are setting up a new GTT staging directory on a Network File System location on another (remote) server, ensure that the server allows read-write access to the user account through which the MWTM is running and run this command as a superuser.

mwtm gttstats

Server Only

Full Syntax

mwtm gttstats [*nodes* [*linksets* [*filter*]] [*idtag*]] [*sortopts*] [**quiet**]

Command Description

Generates MWTM GTT accounting statistics reports. To:

- Include or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.

    A single node or signaling point, specify a single node name, or node name and signaling-point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name, and each line must end with a colon (**:**).

    For example:

    ```
    mwtm-75-59a.cisco.com:
    ```

    To specify a node name and signaling point, enter:

    ```
    mwtm-75-59a.cisco.com;net0:
    ```

  - Linksets, specify a filename with a list of linksets:

    ```
    mwtm-75-96a.cisco.com;net0:7291p_to_7591a0
    ```

  - A filter, specify a filename with a list of filters in the format:

    selname:gta:pc

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This setting is also the default for this command; you only need to specify **default** if you also want to specify an *idtag*, *sortopts*, or **quiet**.
  - A group of nodes or signaling points other than the one that the *nodes.include* file specifies, create a file that contains the list of nodes and signaling points to include, and specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify a *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm gttstats** command.

- Specify the sort order for the reports, specify one of these keywords for the *sortopts* argument:
  - **-sgt**—Sort based on the GTA, in descending order.
  - **-sno**—Sort based on the node name, in ascending order.
  - **-spc**—Sort based on the point code, in ascending order.
  - **-ssn**—Sort based on the selector name, in ascending order.
  - **-sto**—Sort based on the total number of octets translated by GTT, in descending order.
  - **-stp**—Sort based on the total number of packets translated by GTT, in descending order. This is the default setting.
- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm gttstats** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you only need to enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

Related Topic

Customizing ITP Reports, page 13-285

mwtm linkstats

Server Only

Full Syntax

mwtm linkstats [*nodes* [*linksets*] [*idtag*]] [*sortopts*] [**quiet**]

Command Description

Generates MWTM link and linkset statistics summary reports. To include:

- Or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.
  - A single node or signaling point, specify a single node name, or node name and signaling-point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name, and each line must end with a colon (**:**).

    For example:

    ```
    mwtm-75-59a.cisco.com:
    ```

    A node name and signaling point:

```
mwtm-75-59a.cisco.com;net0:
```

  - Linksets, specify a filename with a list of linksets:

```
mwtm-75-96a.cisco.com;net0:7291p_to_7591a0
```

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This setting is also the default for this command; you only need to specify **default** if you also want to specify an *idtag*, *sortopts*, or **quiet**.
  - A group of nodes or signaling points other than the one specified in the *nodes.include* file, create a file that contains the list of nodes and signaling points to include; and, specify the full path and name of the file as the *nodes* argument.

  If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm linkstats** command.

- Specify the sort order for the reports, specify one of these keywords for the *sortopts* argument:
  - **-sco**—Sort based on the average Congestion for each link (**Avg Cong %**), in descending order.
  - **-sis**—Sort based on in-service percentage for each link (**InSrv**), in descending order.
  - **-sls**—Sort based on the linkset name, in ascending order.
  - **-srm**—Sort based on the total number of MTP3 MSUs that each link (**Recv MSUs**) receives, in descending order.
  - **-sru**—Sort based on the average Receive for each link (**Avg Receive Util** or **Avg Receive Erls**), in descending order.
  - **-ssm**—Sort based on the total number of MTP3 MSUs that each link (**Send MSUs**) sends, in descending order.
  - **-ssu**—Sort based on the average Send for each link (**Avg Send Util** or **Avg Send Erls**), in descending order. This is the default setting.
- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm linkstats** command to generate a report, you must enter the command at least three times. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful link and linkset statistics.
- Third entry continues to calculate statistics, calculates long-term averages; and, if the collected data appears valid, begins generating the report.

Thereafter, you only need to enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

Related Topic

PDSN Reports, page 13-159

Linkset Reports, page 13-80

mwtm listarchive

Server Only

Full Syntax

mwtm listarchive {**-n** *node name* | **-s** *signaling point name*} {**-t** *type*} [**-a** *address table name*]

Command Description

Displays a list of all the files in the Version Control System (VCS) archive or just those of a particular type for a specified node or signaling point. To show a list of files in the VCS of a particular:

- Node, specify **-n** and the node name.
- Signaling point, specify **-s** and the name of the signaling point.
- Type, specify **-t** and the type, which can be one of these:
  - **gtt**
  - **route**
  - **mlr**

Note If you specify the *type* as **mlr**, you must also specify **-a** and the name of the address table.

You must log in as the root user or superuser to use this command.

mwtm listgtt

Server Only

Full Syntax

mwtm listgtt [*directory*]

Command Description

Lists all current GTT files in the specified directory (*directory* must be a subdirectory of the GTT staging directory). If no directory is specified, lists all current GTT files in the GTT staging directory.

You must log in as the root user or superuser to use this command.

mwtm listhistory

Server Only

Full Syntax

mwtm listhistory {**-s** *signaling point name*} {**-t** *type*} [**-a** *address table name*]

Command Description

Displays the revision history for a specified archive file. To show the revision history for a particular:

- Signaling point, specify **-s** and the name of the signaling point.

- Type of file, specify **-t** and the type, which can be one of these:
  - **gtt**
  - **route**
  - **mlr**

Note If you specify the *type* as **mlr**, you must also specify **-a** and the name of the address table.

You must log in as the root user or superuser to use this command.

mwtm listmlr

Server Only

Full Syntax

mwtm listmlr [*directory*]

Command Description

Lists all current MLR address files in the address table staging directory (for details on setting the address table staging directory, see mwtm atbldir, page B-101.) If a subdirectory is specified, lists all current MLR address files in the specified subdirectory (*directory* must be a subdirectory of the address table staging directory).

You must log in as the root user or superuser to use this command.

mwtm listroute

Server Only

Full Syntax

mwtm listroute [*directory*]

Command Description

Lists all current route table files in the specified directory (*directory* must be a subdirectory of the DPC Route staging directory). If no directory is specified, lists all current route table files in the DPC Route staging directory.

You must log in as the root user or superuser to use this command.

mwtm mlrstats

Server Only

Full Syntax

mwtm mlrstats [*nodes* [*idtag*]] [*sortopts*] [**quiet**]

Command Description

Generates MWTM MLR processed, aborts, continues, result invokes, rule matches, subtriggers, and triggers reports. To:

- Include or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.
  - A single node or signaling point, specify a single node name, or node name and signaling point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name.

    For example:

    ```
    mwtm-75-59a.cisco.com
    ```

    To specify a node name and signaling point:

    ```
    mwtm-75-59a.cisco.com;net0
    ```

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This setting is also the default for this command; you only need to specify **default** if you also want to specify an *idtag*, *sortopts*, or **quiet**.
  - A group of nodes or signaling points other than the one specified in the *nodes.include* file, create a file that contains the list of nodes and signaling points to include and specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm mlrstats** command.

- Specify the sort order for the reports, specify one of these keywords for the *sortopts* argument:
  - **-sab**—Sort based on the number of MSUs not processed by MLR (**Aborts**), in descending order.
  - **-sal**—Sort based on the number of MSUs of type GSM-MAP AlertSc that MLR (**MAP Alerts**) processed, in descending order.
  - **-sco**—Sort based on the number of MSUs passed back to SCCP that MLR (**Continue**) processed, in descending order.
  - **-smo**—Sort based on the number of MSUs of type GSM-MAP SMS-MO that MLR (**MAP SMS-MOs**) processed, in descending order.
  - **-smt**—Sort based on the number of MSUs of type GSM-MAP SMS-MT that MLR (**MAP SMS-MTs**) processed, in descending order.
  - **-sno**—Sort based on the node name, in ascending order.
  - **-snt**—Sort based on the number of MSUs of type ANSI-41 SMSNotify that MLR (**ANSI-41 SMS-Notifys**) processed, in descending order.
  - **-spp**—Sort based on the number of MSUs of type ANSI-41 SMD-PP that MLR (**ANSI-41 SMD-PPs**) processed, in descending order.
  - **-sre**—Sort based on the number of MSUs of type ANSI-41 SMSRequest that MLR (**ANSI-41 SMD-Reqs**) processed, in descending order.

  - **-sri**—Sort based on the number of MSUs of type GSM-MAP SRI-SM that MLR (**MAP SRI-SMs**) processed, in descending order.
  - **-sro**—Sort based on the number of packets that MLR (**Routed**) routed, in descending order.
- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

  If you do not specify the **quiet** keyword (that is, if you view the output on your terminal), the MWTM displays only instance-level statistics (as listed in the description of the *sortopts* argument). To see the full set of trigger-level statistics, you must use the MWTM web interface (see MLR Reports, page 13-90).

The first time you use the **mwtm mlrstats** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you only need to enter this command once to generate the report.

See MLR Reports, page 13-90 for more information on MLR reports.

You must log in as the root user or superuser to use this command.

mwtm msustats

Server Only

Full Syntax

mwtm msustats

Command Description

Displays ITP MSU statistics reports.

You must log in as the root user or superuser to use this command.

mwtm mtpevents

Server Only

Full Syntax

mwtm mtpevents [*nodes* [*idtag*]] [**quiet**]

Command Description

Generates MWTM MTP3 event reports. To:

- Include or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.

– A single node or signaling point, specify a single node name, or node name and signaling-point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name.

  For example:

  ```
  mwtm-75-59a.cisco.com
  ```

  To specify a node name and signaling point:

  ```
  mwtm-75-59a.cisco.com;net0
  ```

– Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This setting is also the default for this command; you only need to specify **default** if you also want to specify an *idtag* or **quiet**.

– A group of nodes or signaling points other than the one that the *nodes.include* file specified, create a file that contains the list of nodes and signaling points to include; and, specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm mtpevents** command.

- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm mtpevents** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you need only enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

Related Topic

Customizing ITP Reports, page 13-285

mwtm pcformat

Server Only

Full Syntax

mwtm pcformat {**edit** | **list** | **master** | **restore**}

Command Description

You use this command to set the point code format for this MWTM server and for all associated MWTM clients to use. You need to set the point code format usually only once, after installation.

You also use this command to configure the MWTM to recognize a single-instance ITP connecting to multiple instances on a multiple-instance ITP. In effect, the MWTM views the multiple networks as a single all-encompassing network.

The point code format configuration is contained in the *PointCodeFormat.xml* file. To work with the file, specify one of these keywords:

- **edit**—Opens the *PointCodeFormat.xml* file for editing.
- **list**—Displays the current contents of the *PointCodeFormat.xml* file.
- **master**—Restores the *PointCodeFormat.xml* file to the default settings.
- **restore**—Restores the *PointCodeFormat.xml* file to the last saved copy.

Any changes that you make take effect when you restart the MWTM server.

The MWTM preserves customized point code formats when you upgrade to a new version or release of the MWTM.

See Setting the ITP Point Code Format, page 5-4 and Connecting a Single-Instance ITP to a Multiple-Instance ITP, page 5-6 for more information about using this command.

You must log in as the root user or superuser to use this command.

mwtm pclist

Server Only

Command Description

Lists all point codes that all nodes that the MWTM detects are currently using.

You must log in as the root user or superuser to use this command.

mwtm pushgtt

Server Only

Full Syntax

mwtm pushgtt [**-l** *logfilename*] [**-u** *username*] [**-p** *password*] [**-n** *enableusername*] [**-e** *enablepassword*] [**-s** *storagedevicename*] [**-c** *archive comments*] [**--overwrite**|**--no-overwrite**] [**--activate**|**--no-activate**] *filename signalingpointname*

Command Description

Uploads the specified GTT file to the specified ITP signaling point.

Use these keywords and arguments with this command. If you do not specify a required keyword or argument, the MWTM prompts you to specify it.

- **-l** *logfilename*—Writes detailed syntax and semantics checking results, as well as a detailed Telnet log, to the specified file.
- **-u** *username*—Log in username, if required by the ITP.
- **-p** *password*—Log in password, if required by the ITP.
- **-n** *enableusername*—Enable username, if required by the ITP.

- **-e** *enablepassword*—Enable password, if required by the ITP.
- **-s** *storagedevicename*—If the ITP has more than one storage device, uploads the file to the specified device, such as **disk1**, **flash**, or **slot0**.
- **-c** *archive comments*—Allows you to provide optional archive comments.
- **--overwrite**—If the specified file already exists on the specified ITP signaling point, overwrites the file.
- **--no-overwrite**—If the specified file already exists on the specified ITP signaling point, does not overwrite the file.
- **--activate**—Uploads the file and activates it (replaces the currently running file with the uploaded file).
- **--no-activate**—Uploads the file without activating it (does not replace the currently running file).

You must log in as the root user or superuser to use this command.

mwtm pushmlr

Server Only

Full Syntax

mwtm pushmlr [**-l** *logfilename*] [**-u** *username*] [**-p** *password*] [**-n** *enableusername*] [**-e** *enablepassword*] [**-s** *storagedevicename*] [**-c** *archive comments*] [**--overwrite**|**--no-overwrite**] [**--activate**|**--no-activate**] *filename signalingpointname*

Command Description

Uploads the specified address table file to the specified ITP signaling point.

Use these keywords and arguments with this command. If you do not specify a required keyword or argument, the MWTM prompts you to specify it.

- **-l** *logfilename*—Writes detailed syntax and semantics checking results, as well as a detailed Telnet log, to the specified file.
- **-u** *username*—Log in username, if the ITP requires.
- **-p** *password*—Log in password, if the ITP requires.
- **-n** *enableusername*—Enable username, if the ITP requires.
- **-e** *enablepassword*—Enable password, if the ITP requires.
- **-s** *storagedevicename*—If the ITP has more than one storage device, uploads the file to the specified device, such as **disk1**, **flash**, or **slot0**.
- **-c** *archive comments*—Allows you to provide optional archive comments.
- **--overwrite**—If the specified file already exists on the specified ITP signaling point, overwrites the file.
- **--no-overwrite**—If the specified file already exists on the specified ITP signaling point, does not overwrite the file.
- **--activate**—Uploads the file and activates it (replaces the currently running file with the uploaded file).
- **--no-activate**—Uploads the file without activating it (does not replace the currently running file).

You must log in as the root user or superuser to use this command.

mwtm pushroute

Server Only

Full Syntax

mwtm pushroute [**-l** *logfilename*] [**-u** *username*] [**-p** *password*] [**-n** *enableusername*] [**-e** *enablepassword*] [**-s** *storagedevicename*] [**-c** *archive comments*] [**--overwrite**|**--no-overwrite**] [**--activate**|**--no-activate**] *filename signalingpointname*

Command Description

Uploads the specified route table file to the specified ITP signaling point.

Use these keywords and arguments with this command. If you do not specify a required keyword or argument, the MWTM prompts you to specify it.

- **-l** *logfilename*—Writes detailed syntax and semantics checking results, as well as a detailed Telnet log, to the specified file.
- **-u** *username*—Log in username, if the ITP requires.
- **-p** *password*—Log in password, if the ITP requires.
- **-n** *enableusername*—Enable username, if the ITP requires.
- **-e** *enablepassword*—Enable password, if the ITP requires.
- **-s** *storagedevicename*—If the ITP has more than one storage device, uploads the file to the specified device, such as **disk1**, **flash**, or **slot0**.
- **-c** *archive comments*—Allows you to provide optional archive comments.
- **--overwrite**—If the specified file already exists on the specified ITP signaling point, overwrites the file.
- **--no-overwrite**—If the specified file already exists on the specified ITP signaling point, does not overwrite the file.
- **--activate**—Uploads the file and activates it (replaces the currently running file with the uploaded file).
- **--no-activate**—Uploads the file without activating it (does not replace the currently running file).

You must log in as the root user or superuser to use this command.

mwtm q752stats

Server Only

Full Syntax

mwtm q752stats [*nodes* [*linksets*] [*idtag*]] [**quiet**]

Command Description

Manually generates MWTM Q.752 statistics reports. To include:

- Or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.

– A single node or signaling point, specify a single node name, or node name and signaling point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name.

  For example:

  ```
  mwtm-75-59a.cisco.com
  ```

  To specify a node name and signaling point:

  ```
  mwtm-75-59a.cisco.com;net0
  ```

– Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This is also the default setting for this command; you only need to specify **default** if you also want to specify an *idtag* or **quiet**.

– A group of nodes or signaling points other than the one specified in the *nodes.include* file, create a file that contains the list of nodes and signaling points to include and specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm q752stats** command.

- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm q752stats** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you only need to enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

Related Topic

Customizing ITP Reports, page 13-285

mwtm repcustage

Server Only

Full Syntax

mwtm repcustage [*number-of-days*]

Command Description

Maximum number of days the MWTM should archive custom reports.

If you enter this command without the *number-of-days* argument, the MWTM displays the current maximum number of days. You can then change that value or leave it. The valid range is 1 day to an unlimited number of days. The default value is 10 days.

You must log in as the root user or superuser to use this command.

Related Topic

Locating Stored Reports, page 13-284

mwtm routedir

Server Only

Full Syntax

mwtm routedir [*directory*]

Command Description

Note You must stop the MWTM server before performing this command. The system prompts you whether to continue.

Sets the DPC Route staging directory, the directory in which the MWTM stores ITP route table files, and enables Trivial File Transfer Protocol (TFTP) file transfer for the directory. See Chapter 14, "Editing an ITP Route Table File" for information about ITP route table files.

The default DPC Route staging directory resides in the MWTM installation directory. If you installed the MWTM in:

- The default directory, */opt*, then the directory is */opt/CSCOsgm/routes*.
- A different directory, then the directory resides in that directory.

Use this command if you want to use a different DPC Route staging directory, such as */tftpboot* or a Network File System location on another server that is used as the Trivial File Transfer Protocol (TFTP) server for server configuration files for ITPs in the network.

This command copies all files in the current directory to the new directory. If you are not logged in as the superuser and do not own the new directory, the MWTM provides this prompt:

```
Can't create directory!! DPC Route Staging Directory not changed!!

   Directory could be located on a remote NFS server.
   Manually create directory and try again.
   Set permissions using chmod 777.
```

You must specify a directory that you own, or you must log in as the root user. Do not set the new directory to any of these: */usr*, */var*, */opt*, or */tmp*.

Do not set the new directory to the same directory in which the GTT files (**mwtm gttdir**), message log files (**mwtm msglogdir**), report files (**mwtm repdir**), or address table files (**mwtm atbldir**) reside.

When you enter this command, the MWTM also prompts you to enable TFTP file transfer for the DPC Route staging directory and for the TFTP path for the directory, **tftp://***hostname***/***path*, where:

- *hostname* is the name or IP address of the host on which the DPC Route staging directory resides.

If you enter a DNS name (such as **mwm-jumbo**) instead of an IP address (such as **172.18.12.10**), then the ITP must be able to resolve the DNS name; otherwise, when you try to deploy a file, the MWTM issues an appropriate error message and does not deploy the file.

To enable the ITP to resolve DNS names, enter the **ip domain-lookup** command on the ITP. For more information about this command, see the *Cisco IOS IP Command Reference, Volume 1 of 4: Addressing and Services*, Release 12.3 or later.

- *path* is the path to the DPC Route staging directory.

After you change the directory or enable TFTP file transfer for the directory, the MWTM asks if you want to restart the MWTM server. The new directory and TFTP setting take effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

Note If you are setting up a new DPC Route staging directory on a Network File System location on another (remote) server, ensure that the server allows read-write access to the user account through which the MWTM runs and run this command as a superuser.

mwtm routetabledefs

Server Only

Full Syntax

mwtm routetabledefs [**true** | **false**]

Command Description

Specifies whether the MWTM should automatically populate the Route Table dialog box with default values:

- **true**—Automatically populate the Route Table dialog box with default values. This is the default setting.
- **false**—Do not automatically populate the Route Table dialog box with default values; that is, force the user to enter values in the dialog box.

When you enter this command, the new setting takes effect when you restart the MWTM server.

You must log in as the root user or superuser to use this command.

mwtm start atblclient

Server and all Clients

Full Syntax

mwtm start atblclient [*hostname*]

Command Description

Starts an MWTM Address Table Editor client on the specified host. If no hostname is specified, starts an MWTM Address Table Editor client on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

If you access a remote workstation through Telnet, you must set the DISPLAY variable to your local display or you cannot use this command. If the DISPLAY variable is not set automatically, you must set it manually (see Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3).

This command has the same function as the **mwtm atblclient** command.

mwtm start gttclient

Server and all Clients

Full Syntax

mwtm start gttclient [*hostname*]

Command Description

Starts an MWTM GTT client on the specified host. If no hostname is specified, starts an MWTM GTT client on the default host, as specified during installation. See Connecting to a New Server, page 4-40 for information about determining the default host.

If you access a remote workstation through Telnet, you must set the DISPLAY variable to your local display or you cannot use this command. If the DISPLAY variable is not set automatically, you must set it manually (see Setting the DISPLAY Variable for Solaris or Linux Clients, page 3-3).

This command has the same function as the **mwtm gttclient** command.

mwtm xuastats

Server Only

Full Syntax

mwtm xuastats [*nodes* [*idtag*]] [*sortopts*] [**quiet**]

Command Description

Generates MWTM accounting statistics reports for application servers and application server processes. To:

- Include or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.
  - A single node or signaling point, specify a single node name, or node name and signaling-point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name, and each line must end with a colon (**:**).

    For example:

    ```
    mwtm-75-59a.cisco.com:
    ```

    To specify a node name and signaling point:

    ```
    mwtm-75-59a.cisco.com;net0:
    ```

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This is also the default setting for this command; you only need to specify **default** if you also want to specify an *idtag*, *sortopts*, or **quiet**.
  - A group of nodes or signaling points other than the one specified in the *nodes.include* file, create a file that contains the list of nodes and signaling points to include and specify the full path and name of the file as the *nodes* argument.

Note For more details on including and excluding objects, see NoteThe MWTM processes the include files first, then the exclude files., page 13-287.

If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm xuastats** command.

- Specify the sort order for an application server report, specify one of these keywords for the *sortopts* argument:
  - **-sfm**—Sort based on the Packets From MTP3 column, in descending order. This is the default setting.
  - **-sta**—Sort based on the Packets To ASPs column, in descending order.
- Specify the sort order for an application server process report, specify one of these keywords for the *sortopts* argument:
  - **-sfa**—Sort based on the Packets From ASPs column, in descending order. This is the default setting.
  - **-sfm**—Sort based on the Packets From MTP3 column, in descending order.
  - **-sre**—Sort based on the Receive Errors column, in descending order.
  - **-sse**—Sort based on the Send Errors column, in descending order.
  - **-sta**—Sort based on the Packets To ASPs column, in descending order.
  - **-stm**—Sort based on the Packets To MTP3 column, in descending order.
- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm xuastats** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you need only enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

Related Topic

AS Reports, page 13-45

mSEF-Only Commands

mSEF-only commands include:

mwtm chassisinventory

Server Only

Full Syntax

mwtm chassisinventory [**report** | **csv**]

Command Description

Displays current 7600 chassis and SAMI Inventory reports.

Report—Displays current 7600 chassis and SAMI Inventory reports.

CSV—Displays current 7600 chassis and SAMI Inventory reports in CSV format.

You must log in as the root user or superuser to use this command.

mwtm ggsnstats

Server Only

Full Syntax

mwtm ggsnstats [*nodes* [*idtag*]] [**quiet**]

Command Description

Manually generates MWTM GGSN statistics reports. To include:

- Or exclude specific objects in the reports, use the *nodes* argument. To include:
  - All nodes, specify **all**.
  - A single node or signaling point, specify a single node name, or node name and signaling point name, as the *nodes* argument. The node name must exactly match the node name that the MWTM discovered, including the domain name.

    For example:

    ```
    mwtm-75-59a.cisco.com
    ```

    To specify a node name and signaling point:

    ```
    mwtm-75-59a.cisco.com;net0
    ```

  - Or exclude objects based on the contents of the user-defined *nodes.include*, *linksets.include*, *nodes.exclude*, and *linksets.exclude* files, create the files, then specify **default**. This is also the default setting for this command; you only need to specify **default** if you also want to specify an *idtag* or **quiet**.

– A group of nodes or signaling points other than the one specified in the *nodes.include* file, create a file that contains the list of nodes and signaling points to include and specify the full path and name of the file as the *nodes* argument.

Note The MWTM processes the include files first, then the exclude files.

If you specify *nodes*, you can also specify an *idtag* to identify the reports. The *idtag* can be any meaningful character string, but it cannot contain any spaces. The default value for *idtag* is the process ID of the **mwtm ggsnstats** command.

- Disable automatic output to the terminal when running this command in a script, specify the **quiet** keyword. The MWTM generates the report in export format, which you can view by using the MWTM web interface.

The first time you use the **mwtm ggsnstats** command to generate a report, you must enter the command at least twice. The:

- First entry gets the first set of raw data.
- Second entry begins calculating useful accounting statistics and, if the collected data appears valid, begins generating the report.

Thereafter, you only need to enter this command once to generate the report.

You must log in as the root user or superuser to use this command.

mwtm msefsubscount

Server Only

Full Syntax

mwtm msefsubscount [**bwg | csg2 | ggsn | ha | pdngw | pdsn | sgw**] [**hourly | daily | monthly | all**]

Command Description

Collects mSEF subscriber count from the database.

Generates a zip file with separate and consolidated logs for each mSEF device type (BWG, CSG2, GGSN, HA, PDNGW, PDSN, and SGW).

The data can be collected for specific interval (hourly, daily, or monthly) or all.

You must log in as the root user or superuser to use this command.

APPENDIX C

FAQs

This appendix contains:

General FAQs

These categories of frequently asked questions are general questions about the Cisco Mobile Wireless Transport Manager (MWTM):

Installation Questions

This section addresses the following installation questions:

How do I install the MWTM client?

You can install the MWTM client either from the DVD distributed with the MWTM, or by using a web browser to download the MWTM client from an MWTM server. See the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5* for full details.

After a failed uninstall of the Windows client, I am prompted to uninstall again, but the procedure does not work. Why?

If for some reason the Windows MWTM client uninstall procedure fails before the client is completely uninstalled, the MWTM prompts you to uninstall the client again. However, this might not be possible using the standard **Add/Remove Programs** icon in the Windows Control Panel, or from the Windows Start menu.

If you cannot uninstall the MWTM client using the standard procedure, use this procedure:

Step 1 Delete the MWTM client installation directory and its contents. If you installed the MWTM client in the default directory, *C:\Program Files*, then the installation directory is *C:\Program Files\Cisco Systems\MWTM Client*. If you installed the MWTM client in a different directory, then the installation directory resides in that directory.

Step 2 Delete the MWTM Client entries from the Windows Start menu and desktop.

Why do I see strange character strings when I install the MWTM?

Some UNIX systems use the LANG variable to indicate the locale. The setting of the LANG environment variable can cause syntax errors in the MWTM setup scripts, which can result in messages that contain strange character strings such as **?y?d@O**. To correct this problem, unset the LANG environment variable in the workstation from which you are installing the MWTM, using one of these commands:

- If you are running sh, enter the **unset LANG** command.
- If you are running csh, enter the **unsetenv LANG** command.

Then install the MWTM again.

Server Questions

This section addresses the following server questions:

What workstation and network devices do I need to run the MWTM?

The MWTM comprises two distinct pieces of functionality.

- The MWTM server application runs on Solaris/Linux only.
- The MWTM client application, including the user interface, runs on Solaris/Linux and Windows XP Professional. For Solaris/Linux, the MWTM client can run on the same system as the MWTM server, or on a different system.

Note The Linux client is unsupported.

For further hardware and software requirements, see the "Preparing to Install the MWTM" chapter of the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.

Why can't my remote workstation access the MWTM on my local workstation?

Keep in mind that performance is always better if you access the MWTM by installing the MWTM client on the remote workstation.

However, if you want to enable a remote Solaris/Linux workstation to access the MWTM on a local workstation, enter the **xhost +** *remote_workstation* UNIX command on your local workstation, where *remote_workstation* is the remote device you are enabling to access your local workstation.

To enable a remote Windows workstation to access the MWTM on a local workstation, you can use an X-Window system emulator such as eXceed or Reflection X, but be aware that there might be display problems. For example, the window borders might disappear, or the keyboard focus might be missing.

The **X Performance Enhancer (AntiAliasing Off)** check box in the Preferences window specifies whether antialiasing is turned on in the topology map. Antialiasing, which is turned on by default, improves the appearance of the icons and connections in the map.

You can improve the performance of the MWTM client on a remote workstation by turning off antialiasing in the topology map. For more information, see Turning Off Antialiasing, page 10-23.

I moved the server on which I had installed the MWTM and now I can't start the MWTM client or server. Why?

If you change the IP address of the server on which you installed the MWTM, or if you move the server to a new network, you must reboot the server to prevent MWTM connection problems.

To reboot the server, use this procedure:

Step 1 Log in as the root user, as described in Becoming the Root User (Server Only), page 3-2.

Step 2 Enter:

```
cd /opt/CSCOsgm/bin
./mwtm reboot
```

If you change the server's Solaris/Linux hostname, you must reset the default hostname on the MWTM server and client, using this procedure:

Step 3 Log in as the root user, as described in Becoming the Root User (Server Only), page 3-2.

Step 4 Enter:

```
cd /opt/CSCOsgm/bin
./mwtm evilstop
```

The MWTM stops all MWTM servers on the local host.

Step 5 Enter:

```
./mwtm servername hostname
```

where *hostname* is the new default hostname. Ensure that the new name is valid and is defined in your */etc/hosts* file.

The MWTM resets the default hostname for the MWTM server and client and automatically restarts the MWTM server.

Step 6 Any remote clients connecting to this new host should also change their default server name. From Windows, choose **Start > Programs > Cisco MWTM Client > Modify Default MWTM Server Name**.

Why did I receive a "cannot connect to server" message?

When you launch the MWTM client, the GTT Editor, Address Table Editor, or the Event Editor, or when you connect to a new server (whether manually or automatically as the result of a server failure), you might receive this message:

```
This client is not allowed to connect to the server or the server is listening on a port
the client does not know about or cannot reach. Click the help button for a more detailed
explanation.
```

If you receive this message, one of these situations has occurred:

- An MWTM administrator has prevented your MWTM client from connecting to the MWTM server, using the **mwtm ipaccess** command.

  To resolve this problem, contact the MWTM administrator and ask to have your client's IP address added to the *ipaccess.conf* file (see Limiting MWTM Client Access to the MWTM Server (Server Only), page 2-29).

- The MWTM server has more than one IP address, but the MWTM server's default hostname is set to an IP address that your MWTM client cannot access.

  To resolve this problem in Solaris/Linux, use the **mwtm servername** command to reset the MWTM server's default hostname to an IP address that your client can access and restart the server (see mwtm servername, page B-62).

  To resolve this problem in Windows, choose **Start > Programs > Cisco MWTM Client > Modify Default MWTM Server Name**, then you can enter the **mwtm servername** command.

Note Using the **mwtm servername** command to reset the MWTM server's default hostname does not affect communication between the MWTM server and the nodes.

- A firewall is installed between the MWTM server and your MWTM client that only allows traffic to pass through to the MWTM server's port numbers 1774 (the MWTM web server port) and 44742 (the MWTM Naming server port), but communication between the MWTM servers and clients requires additional ports.

  To resolve this problem, set up the firewall correctly (see Firewall Communication, page H-5).

Will the MWTM server processes restart automatically after a system reboot?

Yes. When you install the MWTM server, the MWTM modifies your system startup scripts to ensure that the MWTM server processes start up again after a system reboot. To accomplish this, the MWTM adds these lines to your system startup scripts:

```
/etc/init.d/sgm
/etc/rc0.d/K99sgm
/etc/rc1.d/K99sgm
/etc/rc2.d/K99sgm
/etc/rc3.d/K99sgm
/etc/rc3.d/S99sgm
```

These lines ensure that the MWTM shutdown and startup scripts run in the correct order for each system initiation state.

Note that for Linux only, these lines are modified as well:

```
/etc/rc5.d/S99sgm
/etc/rc6.d/K99sgm
```

Why doesn't my MWTM server start after installing SSL?

If you have not installed the SSL key and certificate, the MWTM server will not start. For exact details on this process, see Enabling SSL Support on the MWTM Server, page 2-21.

GUI Questions

This section addresses the following GUI questions:

Some of my MWTM windows are showing up with small, unusable text entry fields. How can I correct this?

Depending on your system, as well as other factors, the MWTM windows can sometimes display so small that text is illegible, and columns and text entry fields are very narrow and unusable. If this happens, resize the window and widen the individual columns until the information is again legible and the columns and text entry fields are usable.

To make a column wider or narrower, click the column divider in the heading and move the divider to the right or left while holding down the right mouse button.

Sometimes my MWTM display seems to lock up. Why?

In the MWTM, events might cause message popups to remain in the background of your display, preventing you from interacting with other windows. If you suspect that your display has locked up, perform these tasks:

- Ensure that you are running the MWTM on a supported operating system. For more information about supported operating systems, see "Preparing to Install the MWTM" in the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.
- Minimize windows and look for an MWTM message popup in the background.

Browser Questions

This section addresses the following browser questions:

Sometimes when browsing the MWTM web interface, a popup appears with this message: Unresponsive Script. Why does this happen and how can I prevent it from reoccurring?

This problem occurs when using the Firefox browser version 1.5. It is not an MWTM bug. You can prevent the popup from occurring with this workaround:

Step 1 In the address bar of a Firefox browser window, enter **about:config**

Step 2 In the filter bar, enter **dom.max_script_run_time**.

You should now see a setting appear in the window below the filter bar. The setting's name should match what you entered previously (dom.max_script_run_time) and most likely shows a default value of 5.

Step 3 Double-click this setting. Firefox will prompt you for a new value. Enter **10**.

If changing this setting still causes the Unresponsive Script popup to appear, repeat these steps but increase the number that you enter in this step.

The MWTM web pages appear empty (without content). Why does this happen and how can I prevent it from reoccurring?

Your Internet Explorer browser settings in the MWTM client are disabling active scripting. To modify this, in Internet Explorer, change the browser settings as follows:

Step 1 Choose **Tools > Internet Options**.

Step 2 Select the Security tab.

Step 3 Click the **Custom Level** button.

Step 4 Search for Active Scripting in the Scripting section.

Step 5 Click the **Enable** radio button to enable Active Scripting.

Step 6 Search for Logon in the User Authentication section.

Step 7 Click the **Automatic Logon with current username and password** radio button.

What is the difference between the Java and Web client?

The following table compares MWTM features for Java and Web Client:

Feature	Java Client	Web Client
Topology	Available	Not Available
Custom views	Performed	Not Available
Network Discovery	Available	Available
ITP Route table, GTT, and Address file configuration	Performed	Not Available
Real-time statistical graphs	Performed	Not Available
Device credentials and SNMP settings configuration	Available	Available
Historical statistical reports	Not Available	Performed
Provisioning, including batch provisioning	Not Available	Performed
Group management	Not Available	Performed
mSEF management and subscriber search	Not Available	Available

Topology Questions

This section addresses the following topology questions:

- How does “zoom in on an area” work in a topology map?, page C-7
- Can I add my own icons to the topology map?, page C-7

How does “zoom in on an area” work in a topology map?

With this feature, you can zoom in on a chosen area of the topology map in the topology window. To do so, click the **Zoom in on an area** button, or choose **Topology Tools > Zoom > Area** from the MWTM main menu, then click in the topology map and drag a rectangle around the area you want to zoom in on. The MWTM expands the chosen area to fill the topology map.

Can I add my own icons to the topology map?

No. To ensure that icons on the topology map can be resized cleanly, they are drawn as special vector-based images. Raster images, such as GIF files, do not resize cleanly.

Events and Alarms Questions

This section addresses the following events and alarms questions:

- If I select the Clear Event Icon menu option, does that delete the event from the MWTM database?, page C-8
- Can I add my own sounds to the Event Sound Filter?, page C-8
- Why are the age of my alarms always 0 minutes?, page C-8
- Why are objects in the Physical folder ignored?, page C-8

- How do I enable CPU usage threshold alarms?, page C-9

If I select the Clear Event Icon menu option, does that delete the event from the MWTM database?

No. When you select the **Clear Event Icon** menu option for an object, the MWTM does not delete the actual event from its database. The MWTM only deletes the event icon (an orange triangle) from its displays for the object, and only for the MWTM client on which you are currently working.

Can I add my own sounds to the Event Sound Filter?

Yes. You can add sound files to an MWTM client. The MWTM clients can play these sound file formats: AIFC, AIFF, AU, SND, and WAV.

Note WAV files encoded using MPEG Layer-3 are not supported.

The MWTM client sound files are stored in the MWTM client's *sounds* directory:

- If you installed the MWTM client for Solaris/Linux in the default directory, */opt*, then the sound file directory is */opt/CSCOsgmClient/sounds*.
- If you installed the MWTM client for Windows in the default directory, */Program Files*, then the sound file directory is *C:\Program Files\Cisco Systems\MWTM Client\sounds*.
- If you installed the MWTM in a different directory, then the sound file directory resides in that directory.

If for some reason the MWTM cannot play a specified sound file, the MWTM plays a default beep. For example, the MWTM cannot play a sound file if one of these conditions exists:

- The file has been moved or deleted from the *sounds* directory.
- The *sounds* directory has been deleted or cannot be found.
- Some other application is using all of the sound resources.
- No sound card is present.

Why are the age of my alarms always 0 minutes?

If the server clock is ahead of the client clock, the value will be 0 until the client clock catches up to the server clock. To get accurate values, use a time service such as Network Time Protocol (NTP) or similar, which keeps server and client clocks in sync.

Why are objects in the Physical folder ignored?

Interfaces that are not configured for ITP, IPRAN, mSEF, or management connections could be set as administratively up on the node; however, since these interfaces are not connected and/or not configured, they appear to be operationally down, even though this status does not affect the behavior of the network (for example, unconnected E1 ports on cards in an ONS chassis). To make sure that these interfaces do not contribute to the overall status of the parent node, the Physical folder status is ignored.

Objects that appear in the Physical folder but also outside of the Physical folder are *not* ignored, and their status does contribute to the status of the parent node.

To change the default behavior, you can set all physical folders to unignored using the mwtm ignorephysicalfolders command.

If you want to monitor the status of objects that are ignored in the Physical folder:

Step 1 In the MWTM client navigation tree, expand the node that contains the Physical folder you want to unignore. Right-click and choose **Physical > Unignore**.

Step 2 In the Status Contributors tab for the Physical folder, in the Ignored column, check the boxes for the objects you want to keep ignoring. Only the objects with unchecked boxes will not be ignored.

How do I enable CPU usage threshold alarms?

MWTM does not currently poll the device for CPU threshold alarms. MWTM recognizes the cpmCPURisingThreshold and cpmCPUFallingThreshold traps defined in the CISCO-PROCESS-MIB and creates events for them in the Event History table. You can modify the MWTM event configuration to raise and clear an alarm when these traps are received. Using the Event Editor, enable the raise alarm check box of both the CPURisingThreshold and CPUFallingThreshold events. Select File -> Deploy to make your changes active.

To enable the cpmCPURisingThreshold and cpmCPUFallingThreshold traps on the device, execute the following commands. It is recommended that the rising and falling intervals be 900 seconds or greater to ensure that the traps convey reliable information.

```
snmp-server enable traps cpu threshold

process cpu threshold type <total|process|interrupt> rising <rising threshold> interval
<rising interval> falling <falling threshold> interval <falling interval>
```

If needed, also consult the IOS command reference for your platform.

Polling Questions

This section addresses the following polling questions:

- How often does the MWTM poll nodes?, page C-9
- How do I change the default status polling interval?, page C-9

How often does the MWTM poll nodes?

By default, the MWTM polls the nodes in the network every 15 minutes. However, you can initiate a poll for one or more nodes at any time by selecting the nodes in the Discovery tab in the Discovery dialog box and pressing **Poll**.

You can also change the default poll interval for one or more nodes in the SNMP Configuration dialog box. You must be logged in as the root user or as a superuser to access this dialog box.

Finally, the Node Details window polls the visible node and its adjacent node every 15 seconds, but you can change that poll interval, too.

How do I change the default status polling interval?

The MWTM polls the MWR node for status information (for example, interface up or down) every 15 minutes. The size of this poll depends on the number and type of interfaces that are enabled on the MWR.

To change the default polling interval of 15 minutes, open the SNMP Configuration dialog box by selecting **Network > SNMP Configuration** from the MWTM main window. You can use this dialog box to change the default polling interval to any number of minutes from 5 to 1440.

Note The status information in the GUI is only as good as the most recent poll.

MIB Questions

What are the names of the MIBs used by the MWTM?

You can find the complete list of MIBs that the MWTM configures and queries in Appendix F, "MIB Reference."

You can obtain the latest versions of these MIBs from one of these locations:

- The Zip file *mibs.zip*, located at the top of the MWTM DVD Image, contains these MIBs.
- You can download these MIBs from the Cisco website:

  http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml
- The MIBs are also accessible from the MWTM web interface by clicking **Administrative** in the navigation tree, then clicking **MWTM supported SNMP MIBs**.

Miscellaneous Questions

This section addresses the following miscellaneous questions:

Does the MWTM require any other NMS applications?

The MWTM is functionally a standalone product and does not require any other products. However, you can integrate the MWTM with other products to provide added value.

For example, you can integrate the MWTM with CiscoWorks, which provides access to the full suite of CiscoWorks products, including the Device Center, the CiscoView Element Manager, Resource Manager Essentials (RME), the Internetwork Performance Monitor (IPM), and the Access Control List Manager. See Integrating the MWTM with CiscoWorks, page 4-36 for more information.

You can also forward the MWTM events to other hosts, in the form of SNMP traps. This enables the MWTM to integrate with high-level event- and alarm-monitoring systems such as the Cisco Info Center (CIC) and Macrames's Netcool suite of products. These systems can provide a single high-level view of all alarm monitoring in your network, making it easier to detect and resolve problems (see Forwarding Events as Traps to Other Hosts, page 9-37).

Can I run the MWTM on my Windows PC?

You can run the MWTM client on Windows XP Professional on your PC. However, the MWTM server must run on a Solaris/Linux system.

What is a superuser?

A superuser is an MWTM user who has been enabled to perform most of the MWTM functions that otherwise require the user to be logged in as the root user.

For a complete description of the functions that a superuser can and cannot perform, as well as instructions for enabling a superuser, see Specifying a Super User (Server Only), page 2-19.

Does the MWTM Java RMI use TCP or UDP?

The two-way RMI communication in the MWTM that occurs between Java-based GUI clients and Java-based server processes uses TCP sockets.

What does a status of Deleted, Uninhibited, or NoShutdown mean?

A status of Deleted, Uninhibited, or NoShutdown indicates a possible problem with the MWTM. If you see one of these status settings, contact Cisco TAC or your Cisco Account Team.

Why don't the contents of the syslog tab match the log files of my syslog server?

The MWTM client shows current syslog information available from a node, which reflects what content the node has stored in its internal memory. It is possible to configure your node to send its syslog messages to a host that stores these messages in files (usually under */var/adm*). The MWTM does not access these persisted log messages, even if the host on which your MWTM server is running is logging syslog messages from your node. To access these persisted log messages, use CiscoWorks, or other software with syslog viewing capabilities.

When I start my MWTM client, I get a login window. However, I did not specify a user password during installation. How do I fix this?

When you install the MWTM and if you select all the default settings, user security is enabled (default option) which causes the MWTM login window to appear when you start the MWTM client. However, if you did not provide a user password during the installation, you must disable user security before you can log into the MWTM client or add user passwords to the MWTM.

To *disable* user security:

Step 1 Log in as the root user on the MWTM server.

Step 2 Run the following command:

```
/opt/CSCOsgm/bin/mwtm useraccess disable
```

Output similar to the following appears:

```
[root@mwtm-server bin]# /opt/CSCOsgm/bin/mwtm useraccess disable

User Based Access Protection is Disabled.
MWTM server must be restarted for changes to take effect.
Use the following command to restart the server:

 mwtm restart

Clear browser cache and restart browser after changing MWTM Security!!
[root@mwtm-server bin]#
```

Step 3 Make sure you restart the MWTM server (using the **mwtm restart** command) to activate the new security settings.

To *enable* user security:

Step 1 Log in as the root user on the MWTM server.

Step 2 Run the following command:

/opt/CSCOsgm/bin/mwtm useraccess enable

Step 3 Run the following command:

/opt/CSCOsgm/bin/mwtm adduser <username>

Output similar to the following appears:

```
[root@mwtm-server bin]# /opt/CSCOsgm/bin/mwtm useraccess enable

User Based Access Protection is Enabled.
Use the "mwtm adduser" command to add users.
Log in with usernames and passwords for access to MWTM Features.
MWTM server must be restarted for changes to take effect.
Use the following command to restart the server:

     mwtm restart

Clear browser cache and restart browser after changing MWTM Security!!

[root@mwtm-server bin]# /opt/CSCOsgm/bin/mwtm adduser newuser
Adding user newuser
New password:
Re-enter new password:
Adding password for user newuser

Should user be forced to change this password at the next login? [n] n

Access Level
============================

1 - Basic User
2 - Power User
3 - Network Operator
4 - Network Administrator
5 - System Administrator

Enter access level for user newuser: 5
User newuser added with level 5 access.

User Based Access Protection is Enabled.

Clear browser cache and restart browser after changing MWTM Security.

[root@mwtm-server bin]#
```

Step 4 Make sure you restart the MWTM server (using the **mwtm restart** command) to activate the new security settings.

I'm field testing MWTM in my lab and I see confusing results when discovering new network configurations. What's going on?

The MWTM keeps information about older objects in its database even after they have been deleted. This is considered a logically deleted state. MWTM retains this information to try and maintain any user customized data associated with an object (for instance, a customized name) in case the object is rediscovered at some point in the future. Logically deleted data is physically deleted after seven days if it is not reused by then. You can use the mwtm purgedb command to immediately remove this logically deleted data from the MWTM database.

Unfortunately, this benefit might have a side effect. In certain cases, rediscovery of a deleted object may cause the MWTM to use obsolete information in the database, rather than the new information. Ultimately, some configuration changes are not detected, and the viewable data from the client application is incorrect.

There are 2 alternatives to address this behavior in a lab environment:

1. Change the default setting of 7 days to 0 in the Server.properties file (using the DELETE_AGING_TIMEOUT variable).
2. Issue the **mwtm purgedb** command to immediately remove this logically deleted data from the MWTM database (for details, see mwtm purgedb, page B-55).

Why can't I discover primary and standby devices at the same time?

In MWTM, nodes are identified by their management IP address, from which MWTM initiates SNMP polling of a device. In various redundancy scenarios, different devices respond to requests on the same IP address. When this happens, MWTM is unable to differentiate between the multiple devices and considers them the same device.

For example, if two routers share the same physical link via a Y-cable where only one of the devices can use the IP address at a time (even though there are actually two devices), MWTM discovers and displays a single device only.

If a redundancy mechanism is instantiated where two devices share the same virtual IP address but only one device responds to any given request, MWTM discovers and displays a single device only.

How do I increase the swap size in Solaris?

To create a new swap file on Solaris:

Step 1 Use mkfile to create a file suitable for a local swap area.

For example, to create a 1GB swap file, enter the following command:

```
/usr/sbin/mkfile 1024m /opt/swapfile
```

where */opt/swapfile* is the name of the file to be used as swap space. Units for the size can be kilobytes (k), blocks (b), or megabytes (m). Choose carefully the disk location to create the swap file. Choose a disk partition with plenty of free disk space.

Step 2 Tell the system to start using the file as swap by entering the following command:

```
/usr/sbin/swap -a /opt/swapfile
```

Step 3 Run swap -l to verify that the swap file has been activated.

```
/usr/sbin/swap -l
```

Step 4 Add the following line to /etc/vfstab to assure the new swapfile is maintained across system reboots:

```
/opt/swapfile   -   -   swap   -   no   -
```

How do I increase the swap size in Linux?

To create a new swap file on Linux:

Step 1 Use dd to create a file suitable for a local swap area.

For example, to create a 1GB swap file, enter the following command:

```
/bin/dd if=/dev/zero of=/opt/swapfile bs=1M count=1024
```

where */opt/swapfile* is the name of the file to be used as swap space. This specifies a blocksize of 1Mb and 1024 of them for 1Gb total. Choose carefully the disk location to create the swap file. Choose a disk partition with plenty of free disk space.

Step 2 Tell the system to start using the file as swap and activate it:

```
/sbin/mkswap /opt/swapfile
/sbin/swapon /opt/swapfile
```

Step 3 Run swap -l to verify that the swap file has been activated.

```
/sbin/swapon -s
```

Step 4 Add the following line to /etc/fstab to assure the new swapfile is maintained across system reboots:

```
/opt/swapfile swap swap defaults 0 0
```

How to disable DNS lookups on the MWTM server host?

MWTM data processing occurs by looking up a node by its DNS name that is executed by the CLI command.

Note Enabling /Disabling DNS lookup requires server restart. By **Enabling** DNS Lookup, MWTM will search and display the DNS names of the devices discovered.During new installation of MWTM, the DNS Lookup status is enabled and its value changes during the execution of DNS lookup CLI.

Log in as root user and execute the following CLI command to enable/disable the status of DNS lookup for your nodes:

Step 1 Use - status option to check the status of the DNS Lookup.

```
/usr/gnu/bin/run mwtm dnslookup status
```

where *status option* gives the current status of the DNS Lookup.

Step 2 Use - enable option to enable the status of the DNS Lookup:

```
/usr/gnu/bin/run mwtm dnslookup enable
```

where *enable option* enables the DNS Lookup.

Step 3 Use - disable option to disable the status of the DNS Lookup:

```
/usr/gnu/bin/run mwtm dnslookup disable
```

where *disable option* disables the DNS Lookup.

Note By **Disabling** DNS Lookup, MWTM will not search for the DNS names of devices discovered. Instead, the discovered nodes are displayed by their IP addresses in the DNS tree.

ITP Specific FAQs

This section addresses frequently asked questions related to ITP operations:

Can ITPs send traps to the MWTM and to another process on the same node?

Yes. You can configure your ITPs to send SNMP traps to more than one process on a single node. Each process receives traps on a different port number. However, to do so, you must configure a different community string for each process.

For example, your ITP configurations could include these lines:

```
snmp-server host 1.2.3.4 public udp-port 162
snmp-server host 1.2.3.4 otherCommunity udp-port 44750
```

where:

- The first line configures the HP OpenView trap receiver, with community string **public** and UDP port number **162**.
- The second line configures the MWTM trap receiver, with community string **otherCommunity** and UDP port number **44750**.

You would then configure the MWTM to receive traps on port number 44740. For information about how to configure the MWTM port number, see Enabling SNMP Traps, page 5-7.

Why did the MWTM not discover all of my ITP nodes?

After you discover the network, examine the Discovered Nodes table to verify that the MWTM discovered all of the nodes in the network. If you suspect that the MWTM did not discover all of the nodes, verify these conditions:

- Verify that the MWTM server can ping the nodes.
- Verify that the nodes are running ITP IOS images that are compatible with the MWTM server.
- Verify that the SNMP is enabled on the nodes.

- Verify that the MWTM is configured with the correct SNMP community name (see Launching the Discovery Dialog, page 3-6).
- Verify that the missing nodes are connected to the seed nodes by SCTP connections, not just serial connections.
- Verify that you chose **Entire Network** when you ran Discovery. If you suspect that you did not, run Discovery again with **Entire Network** chosen.

How can the Received for some of my links be 105%?

For serial and HSL links on Cisco 7507 and 7513 series routers, in the Received and Send real-time data charts for links and linksets, the visible data can vary by up to 5% from the actual —the MWTM might even display data above 100%. This variance results from the synchronization of Layer 2 counters between the Versatile Interface Processor (VIP) CPU and the Route Switch Processor (RSP) CPU on 7500 series routers. This variance does not occur for links on Cisco 2600, 7200, or 7300 series routers.

What does the asterisk (*) mean next to an SLC number?

In the MWTM, each link is identified by its signaling link code ID (SLC). An asterisk indicates that a link is not configured, or that a poll could not get data for the link.

The placement of the asterisk, to the left or right of the SLC, indicates whether the missing link is associated with the chosen linkset or with its adjacent linkset. For example, **SLC (*)3** means that no link is associated with the chosen linkset for SLC 3, and **SLC 3(*)** means that no link is associated with the adjacent linkset for SLC 3.

When I try to deploy routes, GTT files, or address table files from the MWTM, why does TFTP fail or time out?

There are three primary causes for TFTP failure or timeout errors:

- You might not have enabled TFTP on your server, which will cause a timeout error (see Setting Up TFTP on Your Server (ITP Only), page 5-11).
- You might have specified your tftp root directory (by default, /tftpboot) in the tftp path, which is not necessary and will cause TFTP to fail. For details on specifying the correct path, see these sections:

  mwtm atbldir, page B-101

  mwtm gttdir, page B-111

  mwtm routedir, page B-124
- If the staging directory (created using the previous commands) does not have write permissions for the MWTM server processes, the TFTP will fail.

Why don't my linkset and link totals match?

When you run the **mwtm export** command for a link or linkset, you might notice the output totals do not match the totals in the MWTM client. This discrepancy occurs because the **mwtm export** command counts each side of the linkset or link as a individual linkset or link, whereas the MWTM client (assuming it knows both sides) counts both sides as one linkset or link pair. Therefore, the **mwtm export** command might have more linksets and links than the MWTM client shows.

How do I enable accounting collection in the MWTM?

Enabling accounting collection in the MWTM is described next. First, you must enable accounting on each ITP node using IOS commands. Then you can enable accounting in the MWTM.

Note Enable accounting on each ITP node using IOS commands. Accounting can be enabled on the ITP globally or per linkset. For detailed information on IOS modes and commands, see the Cisco IOS software documentation.

To enable accounting globally for all linksets on an ITP node:

Step 1 Go into IOS global configuration (**configure terminal**) mode.

Step 2 Enter these commands and arguments:

```
node name(config)#cs7 accounting global-gtt
node name(config)#cs7 accounting global-mtp3
node name(config)#cs7 accounting global-unrouteable
```

Note These IOS arguments are the recommended defaults for the MWTM.

To enable accounting per linkset on an ITP node:

Step 1 Go into IOS global configuration (**configure terminal**) mode.

Step 2 Enter these commands and arguments:

```
node name(config)#cs7 instance number linkset name
node name(config)#accounting
node name(config)#gtt-accounting
node name(config)#unrouteable-accounting
```

Note These arguments are the recommended defaults for the MWTM. The instance number argument is not required if you have only one instance.

The MWTM accounting reports are disabled by default. Enable them:

Step 1 Enter these commands:

```
node name#/opt/CSCOsgm/bin/sgm statreps acct
node name#/opt/CSCOsgm/bin/sgm statreps gtt
```

Data is collected daily, and is not affected by polling interval preferences in the Java or web clients.

Note These arguments are the recommended defaults for the MWTM. However, other arguments are available. For a full list of **mwtm statreps** commands, see Appendix B, "Command Reference."

Step 2 Polling intervals for historical reports are controlled by the root user's crontab file. To display the current values for crontab, and to verify that accounting reports are enabled, run this command:

```
node name#crontab -l
```

The list should include statreps acct and statreps gtt.

How do I generate custom ITP reports quarter hourly instead of hourly or daily?

You can manually generate custom reports using the MWTM command line interface (CLI).

Note Custom reports are *custom* because you can specify that they run at custom time intervals. The content of custom reports is the same as the regularly scheduled reports.

These commands apply to generating custom reports:

- mwtm accstats quiet
- mwtm gttstats quiet
- mwtm linkstats quiet
- mwtm mlrstats quiet
- mwtm q752stats quiet
- mwtm xuastats quiet

The quiet option disables output to the console.

The output of these commands is placed in this directory:

/opt/CSCOsgm/reports/custom

Note For details on these commands, see Appendix B, "Command Reference."

Use the UNIX cron facility to schedule the CLI commands to be run every quarter hour:

Step 1 Log in as the root user, as described in Becoming the Root User (Server Only), page 3-2.

Step 2 Enter this command to edit the crontab:

```
crontab -e
```

Step 3 For example, if you wanted to have the link and XUA statistic reports run every quarter hour instead of hourly or daily:

a. Comment out these lines:

```
5 * * *  /opt/CSCOsgm/bin/sgmCron.sh xuastats
56  * * * *  /opt/CSCOsgm/bin/sgmCron.sh linkstats
```

b. Add a line similar to these for each report command:

```
00,15,30,45 * * * *  /opt/CSCOsgm/bin/mwtm linkstats quiet
00,15,30,45 * * * *  /opt/CSCOsgm/bin/mwtm xuastats quiet
```

You can find these reports in this directory:

/opt/CSCOsgm/reports/custom

There will be 15 minute timestamps on each report file.

Step 4 To view these reports on the web, open the MWTM web interface (see Accessing the MWTM Web Interface, page 11-2) then choose **File Archive > Reports > Custom**.

Note You can keep both the standard hourly reports and the 15 minute reports by leaving both types in the crontab instead of commenting out the lines in the previous steps. This will generate a heavier load on the system for a few minutes at the top of the hour when both are running at the same time.

Why do I have limited functionality on certain tabs?

You might notice limited functionality on the following ITP tabs:

- MSU Rates
- MLR Details
- Non-Stop Operation

These tabs are available on certain nodes, and also require specific IOS images:

Tab	Node Availability	IOS Required Images
MSU Rates	All	• 12.2 (18) IXB or later • 12.2 (25) SW7 or later • 12.4 (11) SW or later
MLR Details	All	• 12.2(18)IXA or later • 12.2(21)SW1 or later • 12.4(11)SW or later
Non-Stop Operation	Cisco 7500 and Cisco 7600 nodes only	• 12.2 (18) IXA or later • 12.2(21)SW or later • 12.2 (4)MB13a or later

IP-RAN Specific FAQs

This section addresses frequently asked questions related to IP-RAN operations:

What is the difference between in-band and out-of-band management?

Nodes located at the cell site are usually accessible only over the same path used to transport voice traffic. Collecting management information over this path is called in-band management and has an impact on backhaul. The MWTM can reduce the amount and frequency of collecting management information when information is collected in-band.

Nodes located at the aggregation site are managed using different paths than those used by voice traffic. Collecting management information in this configuration is called out-of-band management and has no impact on backhaul.

The following table compares MWTM features for in-band and out-of-band management:

Feature	In-band Management for MWR	Out-of-band Management for MWR
Historical reports	Not available[1]	Generated
Trap polling	Traps do not trigger polling	Traps do trigger polling
Regular polling[2]	Performed	Performed
Real-time polling	Available[3]	Performed

1. However, you can always collect historical reports from the aggregation node site (that is, the RAN SVC module in the ONS). The receiving traffic on the RAN SVC shorthaul and backhaul matches transmitting traffic from the MWR shorthaul and backhaul.
2. Polls are performed every 15 minutes. To change this rate, see the SNMP and Credentials Dialog Box (for details, see SNMP Settings Table, page 5-15).
3. To perform real-time polling in-band, you must configure it in the Preferences window (for details, see Startup/Exit Settings, page 4-3).

- These cell-site node configuration statements provide the MWTM with information required to optimize data collection:

```
conf t
 ipran-mib location cellSite
 ipran-mib snmp-access inBand
```

- If you have a cell-site node that is managed out-of-band, or you have sufficient bandwidth for in-band managed traffic, you can configure the cell-site node as follows:

```
conf t
 ipran-mib location cellSite
 ipran-mib snmp-access outOfBand
```

- These aggregation-site node configuration statements provide the MWTM with information required to optimize data collection:

```
conf t
 ipran-mib location aggSite
 ipran-mib snmp-access outOfBand
```

This example shows the range of options that are available for the **ipran-mib** command:

```
ems1941ka#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ems1941ka(config)#ipran-mib ?
  backhaul-notify-interval  Interval for backhaul
  location                  Location of device
```

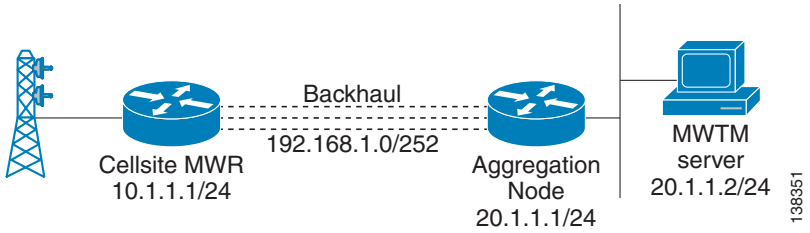
```
  snmp-access               Specify type snmp connectivity
  threshold-acceptable      Acceptable  threshold
  threshold-overloaded      Overloaded  threshold
  threshold-warning         Warning  threshold

ems1941ka(config)#ipran-mib location ?
  aggSite    Located at BSC or RNC site
  cellSite   Located at BTS or Node B site
  undefined  Undefined location

ems1941ka(config)#ipran-mib snmp-access ?
  inBand     In Band SNMP connectivity
  outOfBand  Out of Band SNMP connectivity
  undefined  Undefined connectivity
```

How does the MWTM server communicate to the IP-RAN node at the remote cell site?

The MWTM server must communicate to the cell-site node using IP routing. If the cell-site node is reachable only through the backhaul interface, add a static route on the MWTM server to point to the cell-site node. Use the IP address of the local (aggregation site) IP-RAN node as the next-hop address.

These examples of static routing for Solaris and Linux platforms are based on the diagram in Figure C-1.

Figure C-1 Example of Static Routing



To create a static route on a Solaris MWTM server, use this procedure:

Step 1 Log in as the root user, as described in Becoming the Root User (Server Only), page 3-2.

Step 2 Enter this command:

```
/usr/sbin/route add host 10.1.1.1 20.1.1.1
```

To create a static route on a Linux MWTM server, use this procedure:

Step 1 Log in as the root user, as described in Becoming the Root User (Server Only), page 3-2.

Step 2 Enter this command:

```
route add -host 10.1.1.1 gw 20.1.1.1
```

When viewing capacity planning information in the RAN Backhaul report, the peak timestamps are sometimes outside the chosen range. For example, 2005-12-01 appears in the report window, but I see Nov 30, 2005 11:58:37 PM in the Peak Timestamp information. Why is the peak timestamp outside the chosen range?

Summaries do not end on fifteen-minute boundaries such as 12:00:00, 12:15:00, 12:30:00, because the node processes system time from its own start time, not from the current hour and minute. Therefore, when the timestamps are normalized to the MWTM server time, the end timestamp might appear as 12:03:15, 12:18:15, or 12:33:15.

When you run a capacity planning report, the MWTM retrieves records for the fifteen-minute period that has an end timestamp in the start and stop range that you specify. Using the previous timestamps as examples, if a user runs a report for the 12:00-to-13:00 time range, the 12:03:15 record is retrieved. That record is a fifteen-minute summary of the period between 11:48:16 and 12:03:15. If the Peak Timestamp for this record occurred at 11:55:44, the user would observe this value in the capacity planning report.

A user might observe Peak Timestamps that occur up to fifteen minutes before the start timestamp specified in the capacity planning report query. This is the expected behavior.

Does the MWTM support the use of Hot Standby Router Protocol (HSRP) for a pair of redundant nodes?

The MWTM supports HSRP for the Cisco Mobile Wireless Router (MWR) 1941-DC-A operating in an active-standby configuration. The MWTM supports these scenarios:

- An MWR fails at the cell site, and you install a new MWR to replace it. The MWTM applies the same IP address and configuration to the new MWR, but shows a different serial number. The MWTM detects that the new MWR is at the same cell site as the old MWR, and reuses the historical statistics for this node.
- You deploy two MWRs as a redundant pair by using the Y-cable configuration described in the *Cisco MWR 1941-DC-A Mobile Wireless Edge Router Software Configuration Guide*. When a failover occurs, the MWTM detects that the newly active node is at the same cell site as the standby node. The MWTM reuses the historical statistics for this node.
- The MWTM shows a failover alarm or a series of events associated with the failover between the active and standby nodes in a redundant pair of MWRs.

Note The MWTM GUI shows only the active MWR in an active-standby pair.

Because the IOS configurations are not synchronized between MWR nodes, make sure the IOS configs are identical (except HSRP settings) on both nodes.

How do I sync up the time/date display on my IP-RAN performance and error data with the time/date on the MWR?

For the performance and error data to match the time/date on the MWRs, all equipment (Cisco and MWTM server) must be configured with the same Network Time Protocol (NTP) server.

To configure NTP on the Cisco node:

Step 1 Log in to the node.

Step 2 Go into config mode.

Step 3 Enter:

```
ntp server <ip-address-of-ntp-server>
```

Step 4 Exit the config mode.

Step 5 Save the configuration.

To configure NTP on a Solaris-based MWTM server:

Step 1 Log in as the root user.

Step 2 Edit the */etc/ntp.conf* file by adding this line:

```
server <ip-address-of-ntp-server>
```

Step 3 Restart the NTP software using this command:

```
/etc/init.d/ntpd restart
```

Step 4 Run the date command and ensure the clock has been set properly.

If the date is still incorrect, follow these instructions:

a. Stop the NTP software using the following command:

```
/etc/init.d/ntpd stop
```

b. Manually sync the date using the following command:

```
/usr/sbin/ntpdate <ip-address-of-ntp-server>
```

c. Start the NTP software using the following command:

```
/etc/init.d/ntp start
```

Note To enable the NTP software, the packages SUNWntpr and SUNWntpu are required. As the root user, run the command: **pkginfo | grep SUNWntp**. You can download missing packages from Sunfreeware.com.

To configure NTP on a Linux-based server:

Step 1 Log in as the root user

Step 2 Edit the *ntp.conf* file (usually located in */etc*, */etc/inet*, or */etc/ntp/ntpservers*) by adding the following line:

```
server <ip-address-of-ntp-server>
```

Step 3 Restart the NTP software using this command:

```
/etc/init.d/ntpd restart
```

Step 4 Run the date command and ensure the clock has been set properly.

If the date is still incorrect, follow these instructions:

a. Stop the NTP software using the following command:

```
/etc/init.d/ntpd stop
```

b. Manually sync the date using the following command:

```
/usr/sbin/ntpdate <ip-address-of-ntp-server>
```

c. Start the NTP software using the following command:

```
/etc/init.d/ntp start
```

Note The NTP package is required to enable the NTP software. To determine if the NTP package has been installed, run the command **rpm -qa | grep -i ntp** as the root user. Missing packages can be downloaded from RPMFind.net.

Why are my MWR nodes yellow when I discover them?

When the MWTM discovers or polls a node, a list of all interfaces and their corresponding status are reported back to the MWTM server. If the MWTM determines that one or more interfaces are operationally down, the MWR node is marked with a yellow status symbol unless the interface has an administrative status of Down (coming from the IOS shutdown directive). To determine the status of an interface, the MWTM uses the following logic matrix:

Interface Admin Status	Interface Operational Status	Reported Interface Status	MWTM Ignored Status
Up	Up	Up	Not ignored
Up	Down	Down	Not ignored
Down	Down	Down	Ignored
Down	Up	Down	Ignored

Note As shown in the above matrix, MWTM automatically ignores any interface with an administrative status of Down.

Why does my backhaul graph show greater than 100% for transmit traffic?

When the backhaul for transmit traffic exceeds 100%, the likely cause is oversubscription of the shorthaul links that constitute the backhaul. The backhaul is the amount of traffic that the system attempted to send, not the amount that was actually sent. If it is greater than 100%, you should see queue drops or other errors during the same time period. A backhaul of greater than 100% is possible for a heavily loaded link with some occasional oversubscription.

How to create SAToP and CESoPSN Interfaces?

There is no separate interface type for SAToP. For TDM over PWE3, MWTM supports provisioning of both SAToP and CESoPSN by selecting the TDM group as unframed vs framed with time slots where as, the user is choosing between SAToP vs CESoPSN.

The SAToP and CESoPSN Interfaces can be created as follows:

Step 1 Open the MWTM application.

Step 2 Select the IP-RAN device.

Step 3 Select an unused T1 or E1 interface in the left pane.

Step 4 Click the **Details** tab.

Step 5 Click **Provision**.

The provisioning screen is displayed.

Step 6 Select Type as CEMGroup from the drop-down list.

Step 7 Click **New**.

The Basic panel is displayed.

Step 8 Enter the CEM Group Number.

Step 9 Select the type of Controller from the drop-down list.

Step 10 Check the Unframed check box to create SAToP and uncheck the check box to create CESoPSN Interface.

Begin time slot and End time slot text fields are disabled if you check the Unframed check box and the text fields are enabled if you uncheck Unframed check box.

The remaining text fields displayed in the Basic panel are optional.

Step 11 Click **Next**.

The Feature panel is displayed.

Step 12 Click the **Feature** button to add new features.

Step 13 Click **Next**.

The Summary panel is displayed.

Step 14 Click **Submit**.

mSEF Internet Specific FAQs

This section addresses frequently asked questions related to mSEF operations:

What is SAMI card? What are SAMI processors? What is single IP architecture versus IP address for individual processors? For each architecture, how they are shown in MWTM? How is the Cisco 7600 chassis shown in MWTM?

The Cisco SAMI, is a high-performance Cisco software application module that occupies one slot in the Cisco 7600 series router platform. With a network processor and six PowerPCs (PPCs), the Cisco SAMI offers a parallel architecture for Cisco software applications such as the Cisco Content Services Gateway - 2nd Generation (CSG2), the Cisco Gateway GPRS Support Node (GGSN), the Cisco Mobile Wireless Home Agent (HA), the Cisco Broadband Wireless Gateway (BWG), and the Cisco IP Transfer Point (ITP).

In early releases of the mSEF technologies, each of the six PPCs ran an individual, separately addressable IOS image. As such, in MWTM a single SAMI card appeared as six separate Node objects. In later releases, the individual PPCs are combined into one IOS image and as such a single SAMI card appears as a single Node object. In ITP, the SAMI card serves as a line processor and does not appear as a Node in MWTM. The following table shows the technologies supported by MWTM in which the SAMI is used and how they appear in MWTM.

Technology	Number of Nodes in MWTM
ITP	Not applicable
CSG2	1
GGSN R8	6
GGSN R9	6
HA R4.0	6
HA R5.0	1
BWG R1	6
BWG R2	6
SGW R1	1
PDNGW R1	1
PDSN R5.1	1

The 7600 routers that house the mSEF-related SAMI cards are manageable in MWTM; and if they are discovered, they appear in MWTM as a Node object with the MWTM feature type of *mSEF*. A Cisco 7600 router that houses SAMI cards functioning as an ITP appears in MWTM as a Node object with the MWTM feature type of *ITP*.

What is a managed node? For network scalability planning, how do I count managed nodes in MWTM versus the number of SAMI cards?

In MWTM a managed Node is defined as a network element that has a unique management IP address and responds to an SNMP poll. In some cases, each processor on a SAMI card responds individually to SNMP requests and has a unique management IP address. (Refer to the prior FAQ section for information on which technologies instantiate multiple IOS images on a SAMI card.) For scalability planning purposes, use the following table to estimate the number of managed nodes:

Technology	Number of Nodes in MWTM
7600-ITP	1
7600-mSEF	1

Technology	Number of Nodes in MWTM
SAMI-CSG2	1
SAMI-GGSN R8	6
SAMI-GGSN R9	6
SAMI-HA R4.0	6
SAMI-HA R5.0	1
SAMI-BWG R1	6
SAMI-BWG R2	6
SAMI-SGW R1	1
SAMI-PDNGW R1	1
SAMI-PDSN R5.1	1

Why does the HA subscriber count show the count by processor and not per SAMI card?

The MWTM Subscriber report attempts to report the number of subscribers per SAMI card. The SAMI card can, in certain instances, host multiple IOS images with separately addressable management IP addresses. Typically, each IOS image on a SAMI card, when polled for a serial number, returns the serial number of the SAMI card. In the case of SAMI cards running HA R4.0, which present six IOS images, a null serial number is returned. MWTM cannot correlate the individual IOS images to a given SAMI card, and, therefore, cannot aggregate the subscriber counts.

When I enable CiscoWorks integration, why do some devices have the options to Launch CiscoView and Device Center, while other screens have the Device Center option only and not CiscoView?

CiscoView is for the chassis level only, and the **Launch CiscoView** option is available for 7600 chassis supervisor cards. CiscoView is not supported for SAMI cards.

Why the provision button is not displayed for discovered mSEF devices?

Assuming the credentials are correct for the discovered devices, there may be some additional basic configurations that need to be done on the devices before MWTM can recognize the device as belonging to a particular feature. Below are some procedures to debug the reason for some of the mSEF device type:

For BWG:

Step 1 Click the node and view the Details tab.

Step 2 If the Feature for the device is displayed as Generic, then include the following config-line on the device.

```
node name(config)#service wimax agw
```

This enables MWTM to recognize the device as BWG, the feature now gets displayed as BWG and the **Provision** button comes up.

For HA:

Step 1 Click on the node and view the Details tab.

Step 2 If the Feature for the device is displayed as Generic, then include the following config on the device.

```
node name(config)#router mobile
node name(config)#ip mobile home-agent
```

This enables MWTM to recognize the device as a Home Agent. The feature now gets displayed as HA and the **Provision** button comes up.

For GGSN:

Step 1 Click on the node and view the Details tab.

Step 2 If the Feature for the device is displayed as GGSN, then include the following config-line on the device.

```
node name(config)#service gprs ggsn
```

This config-line brings up the **Provision** button.

Other mSEF devices do not require basic config-lines, so **Provision** button is displayed automatically.

Why and how to display the HA IP mobile statistics based on CLIDs or in NAI format?

The CLID (Calling station Identifier) format is a subset of the NAI (Network Access Identifier) format. While the basic NAI format is 'user@domain', the format for the CLID is 'user'. In case of NAI the ‘user’ part can be a phone number or name, while in case of CLID the ‘user’ is a phone number (series of digits) only.

Currently MWTM supports NAI format in troubleshooting (**show ip mobile binding nai**).

To switch to CLID's format comment the following lines in */opt/CSCOsgm/etc/SystemDefinedInputData.ts*

The following will match NAI:

REGEX(NAI,^(([a-zA-Z0-9_\-\=\?\#\$\&*\+/\^\!\%\'\{\}\|\~\.]|(\\:)|(\\;)|(\\,)|(\\\[)|(\\\])|(\\<)|(\\>)|(\\")|(\\@)|(\\\\)|(\\\()|(\\\)))*([a-zA-Z0-9_\-\=\?\#\$\&*\+/\^\!\%\'\{\}\|\~]|(\\:)|(\\;)|(\\,)|(\\\[)|(\\\])|(\\<)|(\\>)|(\\")|(\\@)|(\\\\)|(\\\()|(\\\)))*((@(([a-zA-Z0-9\-]+\.)+)(([a-zA-Z0-9\-])*([a-zA-Z0-9])))?)$)

Comment the line above and uncomment the REGEX below to switch between NAI and CLID specific editing.

The following will match CLID:

REGEX(NAI,[0-9]+)

#

APPENDIX D

Troubleshooting the MWTM and the Network

This appendix provides this information for troubleshooting basic Cisco Mobile Wireless Transport Manager (MWTM) network problems.

This appendix contains:

Clearing a Locked-Up MWTM Display

In the MWTM, events might cause message popups to remain in the background of your display, preventing you from interacting with other windows. If you suspect that your display has locked up, perform these tasks:

- Ensure that you are running the MWTM on a supported operating system. For details on supported operating systems, see Chapter 1, “Preparing to Install the MWTM” in the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.1.5*.
- Minimize windows and look for an MWTM message popup in the background.

Investigating Data Problems

If you suspect that there are problems with the data that the MWTM is displaying, perform these tasks:

- Enter equivalent **show** commands on the router. Is the data the same as that visible by the MWTM?
- Send SNMP queries to the nodes. Do all queries complete?

The results of these tasks can help you distinguish between a router problem and an MWTM problem.

Understanding MWTM Client Start Error Messages

If you encounter one of these errors upon starting the MWTM client, follow the subsequent procedures:

- DataModelMediatorService: Could not find service in RMI registry or the RMI Registry may be down.
- DemandPollerManagerService: Could not find service in RMI registry or the RMI registry may be down. Check the MWTM server and ensure that it is running.

Data Model Mediator Service Error

If you have received this message: "DataModelMediatorService: Could not find service in RMI registry or the RMI Registry may be down" either you have specified an incorrect port number when installing the MWTM, or the server or RMI registry is unavailable.

To correct this problem:

Step 1 Verify that you specified a correct port number.

Step 2 Enter the **mwtm status** command on the server to determine the status of all MWTM servers on the local host.

Step 3 Enter the **mwtm restart** command to restart any servers that are not running.

Demand Poller Manager Service Error

If you have received this message: "DemandPollerManagerService: Could not find service in RMI registry or the RMI registry may be down. Check the MWTM server and ensure that it is running" one or more of the MWTM server processes may not have started.

To diagnose and correct this problem:

Step 1 Enter the **mwtm status** command on the server to determine the status of all MWTM processes.

Check the output to see if the *sgmDataServer* and *sgmTrapReceiver* processes are in the "Not Running" state as shown in the following example:

```
MWTM Web     Server  IS  Running.
Version Control System IS Initialized....
MWTM App   Server  IS  Running.
    -- MWTM Database      Server  IS  Running.
    -- MWTM Naming        Server  IS  Running.
    -- MWTM MessageLog    Server  IS  Running.
    -- MWTM DataServer    Server  NOT Running.
    -- MWTM Provision     Server  IS  Running.
    -- MWTM TrapReceiver  Server  NOT Running.
    -- MWTM TerminalProxy Server  IS  Running.
    -- MWTM JSP           Server  IS  Running.
    -- MWTM Launch        Server  IS  Running.
```

Step 2 If the processes are not all in the "Is Running" state, search log file */opt/CSCOsgm/logs/messageLog.txt* for this error message:

```
A java.IO.EOFException was encountered against the persisted.server.data file.
```

Step 3 Enter the **mwtm cleandb** command on the server, which will restore the *persisted.server.data* file to a valid state. The output should now show all processes running as shown in the following example:

```
MWTM Web     Server  IS  Running.
Version Control System IS Initialized....
MWTM App   Server  IS  Running.
    -- MWTM Database      Server  IS  Running.
    -- MWTM Naming        Server  IS  Running.
    -- MWTM MessageLog    Server  IS  Running.
    -- MWTM DataServer    Server  IS  Running.
    -- MWTM Provision     Server  IS  Running.
    -- MWTM TrapReceiver  Server  IS  Running.
    -- MWTM TerminalProxy Server  IS  Running.
    -- MWTM JSP           Server  IS  Running.
    -- MWTM Launch        Server  IS  Running.
```

Step 4 Start the MWTM client, then re-discover the network (for details, see Discovering Your Network, page 3-4.)

Checking MWTM Server Start Processes

When you run the **mwtm start** command, normal output appears:

```
MWTM App   Server  IS  Started.
    -- MWTM Database      Server  IS  Started.
    -- MWTM Naming        Server  IS  Started.
    -- MWTM MessageLog    Server  IS  Started.
    -- MWTM DataServer    Server  IS  Started.
    -- MWTM Provision     Server  IS  Started.
    -- MWTM TrapReceiver  Server  IS  Started.
    -- MWTM TerminalProxy Server  IS  Started.
    -- MWTM JSP           Server  IS  Started.
Starting MWTM Web     Server on Port 1774...
    -- MWTM Web     Server  Started.
Version Control System IS Initialized....
```

If the sgmDataServer and sgmTrapReceiver process do not appear in the Ready state, see Demand Poller Manager Service Error, page D-2 for details on fixing this issue.

Viewing MWTM Data on the Web

The MWTM provides an enormous amount of web-based troubleshooting information. From the MWTM web interface, you can access many web pages containing MWTM data, including server status, network status, installation logs, message logs, product documentation, and other important troubleshooting information about the MWTM. For full details, see Chapter 11, “Accessing Data from the Web Interface.”

Troubleshooting IOS Commands on the Web

Note If you have implemented MWTM User-Based Access, this option is available to users with authentication level Network Operator (level 3) and higher.

You can perform troubleshooting on a node or an object in the node's hierarchy by:

1. Selecting an object in a view in the navigation tree
2. Clicking the Troubleshooting tab in the right pane

Note The Troubleshooting tab is not available for all objects in the navigation tree.

Tip To save the output of all executed commands to a log file, see mwtm tshootlog, page B-90.

Before you can run commands and view output, credentials must be properly configured. You can configure credentials using the CLI command (see mwtm addcreds, page B-6) or through the MWTM client (see Configuring Login Credentials, page 5-19). If credentials are not configured, the message "No credentials available. Add credentials and reload the page" appears in the output pane.

The right pane for the Troubleshooting table shows these fields and toolbar buttons for the chosen object:

Field or Toolbar Button	Description
Object Name (in heading)	Name as discovered by the MWTM.
Server Name (in heading)	Name of the MWTM server associated with the node.
Category	Related commands are grouped together in categories. Some categories are provided by default and cannot be modified. Additional categories are user-defined.
Command	List of commands or tasks associated with the chosen category. A chosen command can be executed using the **Execute Command** button.
Suffix	Filters the output of troubleshooting commands. For example: • include—Includes the lines matching the specified regular expression. • exclude—Excludes the lines matching the specified regular expression. • begin—Starts the printout at the line matching a regular expression. • section—Outputs only the matching sections of the printout. **Note** The suffixes allowed here are those supported by the IOS version.
 Execute Command	Executes the chosen command only.

Field or Toolbar Button	Description
 Execute Category	Executes all commands in the chosen category.
 Cancel Execution	Stops any execution process.
 Clear Output	Clears all output from the screen.
Output Pane	Pane at bottom where command output appears.

Related Topics

- Configuring Login Credentials, page 5-19
- Viewing Troubleshoot, page 7-39
- mwtm addcreds, page B-6
- mwtm tshootlog, page B-90

Viewing Detailed Troubleshooting Instructions for Events

The MWTM provides extensive type-specific help and troubleshooting instructions for events. To see help and troubleshooting instructions for an event, right-click the event and select **Help for Event**.

You can also provide your own enterprise-specific instructions to operators in the event help. For more information, see Changing the Way the MWTM Processes Events, page 9-24.

Diagnosing a Typical Network Problem

This section contains this content:

- Diagnosing a Typical ITP Network Problem, page D-6
- Diagnosing a Typical RAN-O Network Problem, page D-8

When you use the MWTM to diagnose a problem in a network, follow these basic steps:

Step 1 Monitor the network using the MWTM main window and the topology window. For example, an object in the topology map that changes color from green to yellow or red indicates a problem in the network.

Step 2 Use MWTM windows, especially the Details window, to begin investigating the problem.

Step 3 As you identify the source of the problem, examine the messages logged by the MWTM for more detailed information about the sequence of events that led to the problem.

Step 4 Connect (by using Telnet or SSH) to the problematic node, if necessary.

Diagnosing a Typical ITP Network Problem

This real-life example provides detailed information about using the MWTM to diagnose a problem in an ITP network:

Step 1 A network operator (we'll call him Joe) is using the MWTM to monitor an ITP network. Joe has customized his view, limiting it to only those nodes for which he is responsible.

(For more information about customizing views, see Chapter 6, "Managing Views.")

Step 2 In the topology map, Joe notices a signaling point that has changed color from green to yellow. Yellow indicates a status of Warning, which means that one or more links or linksets associated with that signaling point is in Unknown or Warning status and is not flagged as Ignored.

(For more information about signaling point status, see Viewing Details, page 7-7.)

Step 3 Joe single-clicks the signaling point in the topology map.

The MWTM highlights the signaling point in the topology map, and in the topology ASP/SP/view table, in the left pane of the topology window. With the signaling point highlighted, Joe can easily see that the name of the signaling point is sgm-7500j.

The MWTM also shows all associated linksets in the topology ASPA/linkset table.

Joe double-clicks the signaling point's name in the topology ASP/SP/view table.

The MWTM redraws the topology map, centered on sgm-7500j, making it easier for Joe to see the relevant portion of the map.

(For more information about the topology window and how to use it, see Chapter 10, "Viewing Network Topology.")

Step 4 Joe notices that one of sgm-7500j's diamonds is red, indicating that the associated linkset is either Unavailable or Unknown. Joe single-clicks the red diamond.

The MWTM highlights the linkset in the topology map and in the topology ASPA/linkset table. The table entry indicates that the linkset is Unavailable.

(For more information about linkset status, see Viewing Details, page 7-7.)

Step 5 Joe right-clicks the linkset in the topology map and selects **View > Details** in the right-click menu.

The MWTM opens the Details window, showing detailed information for the linkset.

In the Details window, detailed information for the chosen linkset appears in the left column and for the adjacent linkset in the right column

Immediately, Joe sees that the left column is populated with MWTM data, but the right column is not. The problem is in the adjacent signaling point-to-primary signaling point linkset.

(For more information about linkset details, see Chapter 7, "Understanding Detailed Object Functions.")

Step 6 Joe clicks on Linkset under Summary Lists to display the list of links associated with the linkset, identified by their signaling link code IDs (SLCs). In this case, only one link is listed, SLC 0, and it is red, meaning it has failed and no traffic is flowing on the link.

Joe selects SLC 0, and the MWTM shows detailed information for the link in the left column. Normally the MWTM also shows detailed information for links associated with the adjacent linkset in the right column, but in this case, that column is blank.

(For more information about linkset status, see Viewing Details, page 7-7.)

Step 7 Joe decides to investigate the adjacent signaling point, so he double-clicks the adjacent signaling point in the topology map.

The resulting display shows that the adjacent signaling point, sgm-2600a, is Unmanaged.

(For more information about signaling point details, see Chapter 7, "Understanding Detailed Object Functions.")

Step 8 Joe closes the Details window and returns to the topology window. He tries to find sgm-2600a in the topology map, but the map is too complex. So Joe lets the MWTM find the signaling point or application server process for him:

a. He selects **Edit > Find** in the MWTM main menu. The Find dialog box appears.

b. He enters sgm-2600a in the Search string field and makes sure the Name, check box is checked.

c. He clicks **OK** to launch the search. Almost immediately, the MWTM finds the signaling point or application server process and the Choose dialog box appears, listing all found objects.

d. Joe selects sgm-2600a, and the MWTM automatically highlights sgm-2600a in the topology ASP/SP/view table and in the topology map, and redraws the map centered on sgm-2600a.

(For more information about finding objects in the topology map, see Chapter 10, "Viewing Network Topology.")

Step 9 Joe wants to see recent events for sgm-2600a, so he clicks the signaling point in the topology map and selects **View > Events** in the MWTM main menu. The Recent Events tab appears for the chosen object, in this case showing recent events for sgm-2600a.

(For more information about viewing events, see Chapter 9, "Managing Alarms and Events.")

Step 10 Joe decides to see if the MWTM can manage the signaling point. He right-clicks sgm-2600a in the topology map and selects Manage in the right-click menu.

The MWTM changes the status of the signaling point from Unmanaged (red) to Warning (yellow), which means the signaling point is active, but one or more associated linksets or links has a status of Failed, Unavailable, Unknown, or Warning and is not flagged as Ignored.

(For more information, see Unmanaging and Managing Nodes or ITP Signaling Points, page 8-58.)

Step 11 Joe wants to see status change messages for sgm-2600a, so he right-clicks the signaling point again and selects **Event History > Status Change Messages** in the right-click menu. The MWTM shows recent status change messages for the signaling point in a web browser.

Joe sees that many of the links and linksets associated with sgm-2600a have a status of Unknown.

(For more information about displaying messages on the web, see Chapter 11, "Accessing Data from the Web Interface.")

Step 12 At this point, Joe must determine why so many of the links and linksets are Unknown. He must verify that the MWTM server can ping the node (see Enabling the Terminal Server Proxy Service, page 5-11), and that the MWTM is configured with the correct SNMP community name for the node (see Launching the Discovery Dialog, page 3-6).

(For a list of some other actions Joe can take, see Verifying Discovery, page 3-14.)

Step 13 Finally, Joe can use another product, such as CiscoView, to further investigate the problem.

(For more information about integrating the MWTM with CiscoView and other products, see Integrating the MWTM with Other Products, page 4-36.)

Diagnosing a Typical RAN-O Network Problem

This real-life example provides detailed information about using the MWTM to diagnose a problem in a RAN-O network:

Step 1 A network operator (we'll call him Joe) is using the MWTM to monitor a RAN-O network. Joe has customized his view, limiting it to only those nodes for which he is responsible.

(For more information about customizing views, see Chapter 6, "Managing Views.")

Step 2 In the topology map, Joe notices a node that has changed color from green to yellow. Yellow indicates a status of Warning, which means that one or more interfaces associated with that node is in Unknown or Warning status and is not flagged as Ignored.

(For more information about node status, see the "Viewing Details" section on page 7-7.)

Step 3 Joe single-clicks the node in the topology map.

The MWTM highlights the node in the topology map and in the topology view table in the left pane of the topology window. With the node highlighted, Joe can easily see that the name of the node is MWR-1941a.

The MWTM also shows all associated interfaces in the topology Connections table.

Joe clicks the node's name and the zoom button in the topology view table.

The MWTM redraws the topology map, centered on MWR-1941a, making it easier for Joe to see the relevant portion of the map.

(For more information about the topology window and how to use it, see Chapter 10, "Viewing Network Topology.")

Step 4 Joe notices that one of MWR-1941a's diamonds is red, indicating that the associated interface is either Unavailable or Unknown. Joe single-clicks the red diamond.

The MWTM highlights the connection in the topology map and in the topology Connections table. The table entry indicates that the connection is Unavailable.

Step 5 Joe right-clicks the connection in the topology map and selects **View > Configuration Details** in the right-click menu.

The MWTM opens the Details window (in the main MWTM window), showing detailed information for the connection. In the Details window, detailed information for the chosen connection appears in the Configuration Data section.

Immediately, Joe sees that the Operational Status is Down but notices that the Operational Status for E1 1/0 is Up.

Step 6 Joe selects the Recent Events tab and notices that a Critical Alarm for E1 1/0 was recently added.

Joe logs into the MWR-1941a node (right-click on node name and choose **Node Connect**) and runs the **show controller E1 1/0** command. He learns that the node recently loss physical connectivity.

Step 7 Joe goes to the router and discovers that the cable is physically damaged. He replaces the cable and returns to the MWTM server.

Step 8 Joe views the MWTM main window and observes that the MWTM has already polled the node and changed the state color from yellow to green.

Step 9 Joe looks at the MWTM topology window again and verifies the interface status has changed from yellow to green.

APPENDIX E

Status Definitions

This appendix defines the default status settings for all Cisco Mobile Wireless Transport Manager (MWTM) network objects and lists the values of each of the icons.

Table E-1 Definition of Status Icons

Icon	GUI Element	Possible Values
	Node status	Active—Node is fully functional.
	View status	Active—All objects in the chosen view are currently Active and fully functional
	Folder status	Active—All objects in the chosen folder are currently Active and fully functional.
	Admin status	Up—Administratively up.
	Operational status	Up—Interface is up.
	Interface status	Active—Interface is Active.
	Application Server status (*ITP only*)	Active—The application server is available and application traffic is Active. At least one application server process serving this application server is Active.
	Application Server Process Associations status (*ITP only*)	Active—The remote peer at the application server process association is available and application traffic is Active.
	Links status (*ITP only*)	Active—The link is currently fully functional.
	Linksets status (*ITP only*)	Active—The linkset is currently fully functional.
	Signaling Gateway Mated Pairs status (*ITP only*)	Active—The signaling gateway-mated pair is available and application traffic is active.
	Signaling Point status *ITP only*)	Active—The signaling point is currently fully functional.
	GSM Abis Connect status (*RAN-O only*)	Connected—The node is monitoring local and remote alarm status.
	UMTS Iub Connect status (*RAN-O only*)	Open—Connection is open and available for traffic.
	UMTS Iub Alarm status (*RAN-O only*)	No alarm—No alarm is present.
	UMTS Iub Redundancy status (*RAN-O only*)	Active—Active owner of interface Standby—Standby owner of interface.
	UMTS Iub Interface status (*RAN-O only*)	Active—The interface is currently fully functional.
	Card definition status	Active—The card is currently fully functional.
	RAN-O status	Active—The RAN backhaul is currently fully functional.
	PWE3 Virtual Circuit	Active— The virtual circuit is active.
	Inbound Operational Status (*IPRAN only*)	Up —Virtual circuit operationally active.
	Outbound Operational Status (*IPRAN only*)	Up —Virtual circuit operationally active.
	APN status *(mSEF only)*	Active—The APN is currently fully functional.

Table E-1 Definition of Status Icons (continued)

	Node status	Discovering—The node is being discovered and Simple Network Management Protocol (SNMP) queries have been sent to the node. Polling—The node is being polled.
	Node status	Unknown—The node failed to respond to an SNMP request. The MWTM sets all associated signaling points, linksets, and links to *Unknown*.
	Admin status	Unknown—Unknown administrative status.
	Operational status	Unknown—Unknown operational status. Down—Interface is down. Dormant—Interface is dormant. Not present—An interface component is missing. Lower Layer Down—An interface is down because of a lower-layer interface.
	Interface status	Down—The interface is not available. Unknown—The MWTM cannot determine the current status of the interface.
	Application Server status (*ITP only*)	Down —The application server is not available. All application server processes that serve this application server are Down. This is the initial status for application servers. Inactive—The application server is available, but no application traffic is active (that is, at least one application server process is Inactive, and no application server process is Active). Pending—The last remaining Active application server process serving this application server has become Inactive or Down. The next status for this application server will be Active, Inactive, or Down, depending on the recovery timer, and whether an application server process can become Active. Unknown—The MWTM cannot determine the current status of the application server.
	Application Server Process status (*ITP only*)	Unknown—The MWTM cannot determine the current status of the application server process.
	Application Server Process Associations status (*ITP only*)	Blocked—The application server process association cannot receive normal data traffic, but it can send and receive control messages. Down—The remote peer at the application server process association is not available, or the related SCTP association is down. This is the initial status for application server process associations. Inactive—The remote peer at the application server process association is available, and the related SCTP association is up, but application traffic has stopped. The application server process association should not receive any data or SNMP messages for the application server. Pending—The last remaining Active application server process serving this application server process association has become Inactive or Down. The next status for this application server process association will be Active, Inactive, or Down, depending on the recovery timer, and whether an application server process can become Active. Unknown—The MWTM cannot determine the current status of the application server process association.

Table E-1 Definition of Status Icons (continued)

	Links status (*ITP only*)	Blocked—Traffic on this link is disabled by protocol. Failed—An error is preventing traffic from flowing on this link, or the associated linkset has been set to Shutdown status. A link can be Failed from an MTP3 perspective, but control messages might still be sent or received on the link, resulting in changing packet/second and bit/second rates. The rates might also be different at each end of the link, depending on the reason for the failure and the timing related to each endpoint. Unknown—Either the node associated with this link has failed to respond to an SNMP request, or the MWTM found that the link no longer exists.
	Linksets status (*ITP only*)	Unavailable—An error is preventing traffic from flowing on this linkset. Unknown—Either the node associated with this linkset has failed to respond to an SNMP request, or the MWTM found that the linkset no longer exists.
	Signaling Gateway Mated Pairs status (*ITP only*)	Down—The signaling gateway-mated pair is not available. Inactive—The signaling gateway-mated pair is available, but application traffic has stopped. Unknown—The MWTM cannot determine the current status of the signaling gateway-mated pair.
	Signaling Point status (*ITP only*)	Unknown—The MWTM cannot determine the current status of the signaling point.
	GSM Abis Connect status (*RAN-O only*)	Disconnected—The system ignores the local alarm status. The local transmitter on the short-haul is disabled. Capability messages are transmitted to the remote describing the provisioning. The system stays disconnected until the remote capabilities are known and the peer state transitions to connected.
	UMTS Iub Connect status (*RAN-O only*)	Starting—The shorthaul interface is administratively active, but the backhaul interface is down. Stopped—Unable to connect to peer in specified time interval. Additional attempts will be tried based on peer request or restart timers.
	UMTS Iub Alarm status (*RAN-O only*)	Local Alarm—Indicates local interface problem. The interface has not received synchronization from the GSM node. The node stops transmitting backhaul samples. Alarm State Unavailable—Indicates the alarm state is not available. This state only applies to the remote and occurs when the peer connection is inactive.
	Card definition status (*RAN-O only*)	Not Present—Preconfigured but not inserted in the ONS chassis Failed—Not functional Unknown—Failed SNMP
	RAN-O status (*RAN-O only*)	Failed—None of the shorthaul or IP backhaul interfaces are active. Unknown—The MWTM cannot determine the current status of the RAN backhaul.
	PWE3 Virtual Circuit status	Down—The virtual circuit is down. Unknown—MWTM cannot determine the current status of the interface.
	APN status *(mSEF only)*	Unknown—The node failed to respond to an SNMP request.

Table E-1 Definition of Status Icons (continued)

	Node status	Warning—The node is active, but one or more associated objects are in Failed, Unavailable, Unknown, or Warning status and are not Ignored.
	Folder status	Warning—At least one object is not Active.
	Interface status	Warning—The interface status is Active, but some underlying facility is not fully functional.
	Application Server status (*ITP only*)	Warning—The application server is Active, but one of these conditions exists: • At least one application server process association for this application server is not fully functional. • A signaling gateway-mated pair has been defined for this signaling point, but no application server exists on the mate. • The mate's application server is not Active.
	Application Server Process Associations status (*ITP only*)	Warning—The application server process association is Active, but some underlying facility is not fully functional.
	Links status (*ITP only*)	Warning—The link is active and traffic is flowing, but one or more of these situations has occurred: • The link is congested. • The link has exceeded the defined Receive % or Send %. • One or more of the local or remote IP addresses defined for SCTP is not active.
	Linksets status (*ITP only*)	Warning—The linkset is Active, but one or more links in the linkset is congested or is in Failed, Unknown, or Warning status, and is not Ignored. At least one link is available and can carry traffic.
	Signaling Gateway Mated Pairs status (*ITP only*)	Warning—The signaling gateway-muted pair is Active, but some underlying facility is not fully functional.
	Signaling Point status (*ITP only*)	Warning—The signaling point is Active, but one or more associated links or linksets is in Failed, Unavailable, Unknown, or Warning status, and is not flagged as Ignored.
	GSM Abis Connect status (*RAN-O only*)	Send Connect—One or more attempts have been made to connect to remote peer. Receive Connect—The local peer has received a connect request from the remote peer. Connect Rejected—Connection was rejected. ACK Connect—The initial connect request was sent and acknowledged by remote peer. The local peer is now waiting for a connect request from the remote peer. Check Connect—The local peer has reason to believe its remote peer has failed. Additional tests are being processed to verify peer's state.
	UMTS Iub Connect status (*RAN-O only*)	Initialized—The connection is starting initialization. Stopping—Connection shut down by peer's Term-Request. Will transition to stopped state. Connect Sent—Connection request sent to peer. ACK Received—Connection request sent and acknowledgement has been received from peer. Now waiting for peer's connection request. ACK Sent—Connection request received and acknowledgement has been sent to peer Connection request sent and waiting for peer's acknowledgement.

Table E-1 Definition of Status Icons (continued)

	UMTS Iub Alarm status (*RAN-O only*)	Received Alarm—Indicates receive problem in the local node. The remote node stops transmitting backhaul data and indicates a blue alarm.
	UMTS Iub Interface status (*RAN-O only*)	Warning—The interface is Active, but some underlying object is not fully functional.
	Card definition status (*RAN-O only*)	Warning—Not in configured protection state.
	RAN-O status (*RAN-O only*)	Warning—At least one of the shorthaul interfaces or IP backhaul interfaces is not Active.
	PWE3 Virtual Circuit	Warning—At least one of the components of the virtual circuit is not active.
	APN status *(mSEF only)*	Warning—An APN instance associated with a top-level APN is not active.
	Node status	Unmanaged—One of these situations exists: • The node is known indirectly by the MWTM. In other words, the MWTM knows the node exists but there is no known SNMP stack on the node for the MWTM to query. • An MWTM user has set the node to Unmanaged status, to prevent the MWTM from polling the node. (ITP only) If the associated signaling points are referenced via linksets to other signaling points, the MWTM automatically sets all associated signaling points to Unmanaged, and deletes all associated linksets and links, as well as all linksets and links that reference the node as an adjacent node. (ITP only) If the associated signaling points are not referenced to other signaling points, the MWTM automatically deletes the signaling points, all associated linksets and links, and all linksets and links that reference the node as an adjacent node. Waiting—The node is in the Discovery queue but is not currently being discovered.
	View status	Unmanaged—All objects in the chosen view are currently Unmanaged.
	Application Server Process status (*ITP only*)	Unmanaged—The MWTM cannot determine the status of the application server process because there is no known SNMP stack on the node that hosts this application server process for the MWTM to query.
	Signaling Point status (*ITP only*)	Unmanaged—The MWTM cannot discover the signaling point. It is not an ITP node.

Table E-1 Definition of Status Icons (continued)

	Admin status	Shutdown—Status is Down. Testing—Object is in Test mode.
	Operational status	Testing—Object is in Test mode.
	Application Server status (*ITP only*)	Shutdown—An administrator has forced the application server to an unavailable state.
	Application Server Process Associations status (*ITP only*)	Shutdown—An administrator has forced the application server process association to an unavailable state.
	Links status (*ITP only*)	InhibitLoc—A local ITP administrator has set the link to prevent traffic from flowing. InhibitRem—A remote ITP administrator has set the link to prevent traffic from flowing. Shutdown—An ITP administrator has set the link to prevent traffic from flowing.
	Linksets status (*ITP only*)	Shutdown—An ITP administrator has set the linkset to prevent traffic from flowing. When a linkset is set to Shutdown, all its associated links are set to Failed by Cisco IOS.
	PWE3 Virtual Circuit	Shutdown—The virtual circuit is administratively closed.
	Signaling Gateway Mated Pairs status (*ITP only*)	Shutdown—An administrator has forced the signaling gateway-mated pair to an unavailable state.
	UMTS Iub Connect status (*RAN-O only*)	Closed—The backhaul interface is active, but the shorthaul is administratively closed. Closing—Connection closed by administration request.
	UMTS Iub Alarm status (*RAN-O only*)	Remote Alarm—Indicates a problem at the remote end. The alarm generated by the remote interface in the E1/T1 data stream is sent and no other action is required.

APPENDIX F

MIB Reference

This appendix contains:

BWG Specific MIBs

The Cisco Mobile Wireless Transport Manager (MWTM) queries these BWG specific Management Information Bases (MIBs), listed in alphabetical order:

MIB	Description
CISCO-ASN-GATEWAY-MIB.my	Manages Cisco's Broadband Wireless Gateway (BWG).
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.

MIB	Description
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.

Common MIBs

The MWTM queries these general MIBs, listed in alphabetical order:

MIB	Description
ATM-MIB.my	Module for ATM and AAL5-related objects for managing ATM interfaces, ATM virtual links, ATM cross-connects, AAL5 entities, and AAL5 connections.
ATM-TC-MIB.my	Provides Textual Conventions and OBJECT-IDENTITY Objects to be used by ATM systems.
BRIDGE-MIB.my	Manages devices that support IEEE 802.1D.
CISCO-AAA-SERVER-MIB.my	Provides configuration and statistics reflecting the state of authentication, authorization, and accounting (AAA) server operation in the node and AAA communications with external servers.
CISCO-ACCESS-ENVMON-MIB.my	Describes the additional status of the Environmental Monitor on those Cisco Access devices which support one.
CISCO-CEF-MIB.my	Manages CISCO Express Forwarding (CEF).
CISCO-CEF-TC.my	Defines Textual Conventions for Cisco Express Forwarding (CEF).
CISCO-CLASS-BASED-QOS-MIB.my	Class-Based QoS Configuration and Statistics MIB. This MIB provides read access to Quality of Service (QoS) configuration and statistics information for Cisco platforms that support the Modular Quality of Service Command-line Interface (Modular QoS CLI).

MIB	Description
CISCO-CONFIG-MAN-MIB.my	Provides configuration management, primarily by tracking changes and saving the running configuration. This MIB represents a model of configuration data that exists in various locations: • running—In use by the running system • terminal—Logical or attached hardware • local—Saved locally in NVRAM or flash • remote—Saved to a server on the network
CISCO-EMBEDDED-EVENT-MGR-MIB.my	Describes and stores the events generated by the Cisco Embedded Event Manager.
CISCO-ENHANCED-MEMPOOL-MIB.my	Monitors the memory pools of all physical entities on a managed system.
CISCO-ENTITY-ALARM-MIB.my	Defines the managed objects that support the monitoring of alarms generated by physical entities contained by the system, including chassis, slots, modules, ports, power supplies, and fans.
CISCO-ENTITY-EXT-MIB.my	Extension of the ENTITY-MIB specified in RFC2737. Contains Cisco-defined extensions to the entityPhysicalTable to represent information related to entities of class module(entPhysicalClass = 'module') which have a Processor.
CISCO-ENTITY-FRU-CONTROL CAPABILITY.my	Provides additional capabilities for various platforms that are needed by the *CISCO-ENTITY-FRU-CONTROL-MIB*.
CISCO-ENTITY-FRU-CONTROL-MIB.my	Monitors and configures the operational status of Field Replaceable Units (FRUs) of the system listed in the Entity-MIB (RFC 2037) entPhysicalTable. FRUs include assemblies such as power supplies, fans, processor modules, interface modules, and so forth.
CISCO-ENTITY-SENSOR-MIB.my	Monitors the values of sensors in the Entity-MIB (RFC 2037) entPhysicalTable.
CISCO-ENTITY-VENDORTYPE-OID-MIB.my	Defines the object identifiers that are assigned to various components on Cisco products, which are used by the entPhysicalTable of the ENTITY-MIB to uniquely identify the type of each physical entry.
CISCO-ENVMON-MIB.my	Provides environmental monitoring information on Cisco ITPs.
CISCO-EPM-NOTIFICATION-MIB.my	Defines the trap structure that carries the identity and status information of the managed object. The MWTM can send internal events as traps defined in this MIB to third-party network management system (NMS) applications for further processing.
CISCO-ETHER-CFM-MIB.my	Defines the managed objects and notifications for Ethernet Connectivity Fault Management (CFM).
CISCO-FLASH-MIB.my	Provides management of Cisco Flash Devices.
CISCO-FRAME-RELAY-MIB.my	Cisco Frame Relay MIB file. This MIB provides Frame Relay specific information.
CISCO-GENERAL-TRAPS-MIB.my	Provides TCP connection details (reload and connection close).
CISCO-HSRP-EXT-MIB.my	Provides an extension to the *CISCO-HSRP-MIB* which defines Cisco's proprietary Hot Standby Routing Protocol (HSRP). The extensions cover assigning of secondary HSRP IP addresses and modifying an HSRP group's priority by tracking the operational status of interfaces.

MIB	Description
CISCO-HSRP-MIB.my	Provides a means to monitor and configure the Cisco IOS proprietary Hot Standby Router Protocol (HSRP). Cisco HSRP protocol is defined in RFC2281.
CISCO-ICSUDSU-MIB.my	Integrated CSU/DSU MIB module for T1 and switched 56 kbps interfaces.
CISCO-IF-EXTENSION-MIB.my	Extension to the *CISCO-IETF-SCTP-MIB* used to provide additional information to manage the Stream Control Transmission Protocol (RFC 2960).
CISCO-MEMORY-POOL-MIB.my	Module for monitoring memory pools.
CISCO-PROCESS-MIB.my	Shows memory and CPU on Cisco nodes. CPU gives a general idea of how busy the processor is. The numbers are a ratio of the current idle time divided by the longest idle time.
CISCO-PRODUCTS-MIB.my	Defines the object identifiers that are assigned to various hardware platforms, and hence are returned as values for sysObjectID.
CISCO-QOS-PIB-MIB.my	Cisco QoS Policy PIB for provisioning QoS policy.
CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB.my	Supports the Resilient Ethernet Protocol Feature.
CISCO-RF-MIB.my	Provides configuration control and status for the Redundancy Framework (RF) subsystem. RF provides a mechanism for logical redundancy of software functionality and is designed to support 1-to-1 redundancy on processor cards. Redundancy is concerned with the duplication of data elements and software functions to provide an alternative in case of failure.
CISCO-RTTMON-MIB.my	Defines a MIB for Round Trip Time (RTT) monitoring of a list of targets, using a variety of protocols.
CISCO-SMI.my	Defines the Structure of Management Information for the Cisco enterprise.
CISCO-STACK-MIB.my	Provides configuration and runtime status for chassis, modules, ports, and so on, on the Catalyst systems.
CISCO-SYSLOG-MIB.my	Provides a means of gathering syslog messages generated by the Cisco IOS. The MWTM can send internal events as traps defined in this MIB to third-party NMS applications for further processing.
CISCO-TC.my	Defines textual conventions used throughout Cisco enterprise MIBs.
CISCO-VTP-MIB.my	Module for entities implementing the VTP protocol and VLAN management.
ENTITY-MIB.my	Module that represents multiple logical entities supported by a single SNMP agent. This MIB is based on RFC 2737. For more information on entity MIBs, see RFC 2037 section 3.
EtherLike-MIB.my	Describes generic objects for ethernet-like network interfaces.
FDDI-SMT73-MIB.my	Contains information for FDDI (Fiber Distributed Data Interface).
HCNUM-TC.my	Contains textual conventions for high capacity data types. This module addresses an immediate need for data types not directly supported in the SMIv2. This short-term solution is meant to be deprecated when a long-term solution is deployed.

MIB	Description
IANAifType-MIB.my	Defines the IANAifType Textual Convention, and thus the enumerated values of the ifType object defined in MIB-II's ifTable.
IF-MIB.my	Describes generic objects for network interface sublayers. This MIB is an updated version of MIB-II's ifTable, and incorporates the extensions defined in RFC 1229.
IMA-MIB.my	Module that manages ATM Forum Inverse Multiplexing for ATM (IMA) interfaces.
INET-ADDRESS-MIB.my	Defines textual conventions for representing Internet addresses. An Internet address can be an IPv4 address, an IPv6 address, or a DNS domain name. This module also defines textual conventions for Internet port numbers, autonomous system numbers, and the length of an Internet address prefix.
OLD-CISCO-INTERFACES-MIB.my	Defines interfaces for the Cisco enterprise.
OLD-CISCO-SYS-MIB.my	Provides a means of gathering basic information for an IOS node.
OLD-CISCO-SYSTEM-MIB.my	Old Cisco System MIB file.
OLD-CISCO-TCP-MIB.my	Old Local TCP MIB file.
OLD-CISCO-TS-MIB.my	Cisco Terminal Service MIB file.
OSPF-MIB.my	Describes the OSPF version 2 protocol.
OSPF-TRAP-MIB.my	Describes the traps for the OSPF version 2 protocol.
P-BRIDGE-MIB.my	Manages Priority and Multicast Filtering,defined by IEEE 802.1D-1998.
PerfHist-TC-MIB.my	Provides Textual Conventions to be used by systems supporting 15 minute-based performance history counts.
Q-BRIDGE-MIB.my	Manages Virtual Bridged Local Area Networks as defined by IEEE 802.1Q-2003.
RFC1213-MIB.my	Provides basic management information on the ITP (RFC 1213).
RFC1315-MIB.my	Frame Relay MIB file.
RFC1406-MIB.my	Contains DS1 (T1/E1) line information.
RMON2-MIB.my	Module for managing remote monitoring device implementations. This MIB module augments the original *RMON MIB* as specified in RFC 1757.
RMON-MIB.my	Remote network monitoring devices, often called monitors or probes, are instruments that exist for the purpose of managing a network. This MIB defines objects for managing remote network monitoring devices.
SNMP-FRAMEWORK-MIB.my	Defines the SNMP Management Architecture.
SNMP-TARGET-MIB.my	Defines the MIB objects that provide mechanisms to remotely configure the parameters used by an SNMP entity for the generation of SNMP messages.
SNMPv2-CONF.my	Defines SNMPv2 conformance.
SNMPv2-MIB.my	Defines SNMPv2 entities.
SNMPv2-SMI.my	Defines the Structure of Management Information for SNMPv2.
SNMPv2-TC.my	Defines textual conventions for SNMPv2.
TOKEN-RING-RMON-MIB.my	Contains Token Ring monitoring information.

CSG1 Specific MIBs

The MWTM queries these CSG1 specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-CSG-MIB.my	Supports the Cisco Content Services Gateway (CSG) product. It includes five traps and four tables that enable querying CSG resource statistics.
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.

CSG2 Specific MIBs

The MWTM queries these CSG2 specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-CONTENT-SERVICES-MIB.my	Content Service is a capability to examine IP/TCP/UDP headers, payload and enable billing based on the content being provided.
CISCO-DIAMETER-BASE-PROTOCOL-MIB.my	Module for the entities implementing the Diameter Base Protocol.
CISCO-MOBILE-POLICY-CHARGING-CONTROL-MIB.my	Contains the Policy Control and Charging (PCC) configurations/statistics which are implemented on the Mobile PCC infrastructure.
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.

MIB	Description
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.

GGSN Specific MIBs

The MWTM queries these GGSN specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-DIAMETER-BASE-PROTOCOL-MIB.my	Module for the entities implementing the Diameter Base Protocol.
CISCO-GGSN-EXT-MIB.my	Extends extends the CISCO-GGSN-MIB and manages the Gateway GPRS Support Node (GGSN) devices. A GGSN device provides interworking with external packet-data network of a particular GPRS service provider. It provides a combination of IP routing and GPRS specific functionality to support mobile users.
CISCO-GGSN-MIB.my	Manages the Gateway GPRS Support Node (GGSN) devices.
CISCO-GGSN-QOS-MIB.my	Manages the Quality of Service parameters of GGSN in a GPRS system.
CISCO-GGSN-SERVICE-AWARE-MIB.my	Manages the service-aware feature of Gateway GPRS Support Node (GGSN). This MIB is an enhancement of the *CISCO-GGSN-MIB*.
CISCO-GPRS-ACC-PT-MIB.my	Supports access point configuration for GGSN in a GPRS system. GPRS [1] is a GSM network providing mobile wireless data communication services.
CISCO-GPRS-CHARGING-MIB.my	Manages the charging related function on the GGSN node of a GPRS system.
CISCO-GTP-MIB.my	Manages the GPRS Tunnelling Protocol (GTP) on GGSN and SGSN.
CISCO-IP-LOCAL-POOL-MIB.my	Defines the configuration and monitoring capabilities relating to local IP pools.
CISCO-PSD-CLIENT-MIB.my	Manages the client side functionality of the Persistent Storage Device (PSD).
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.

MIB	Description
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.

HA Specific MIBs

The MWTM queries these HA specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-IP-LOCAL-POOL-MIB.my	Defines the configuration and monitoring capabilities relating to local IP pools.
CISCO-MOBILE-IP-MIB.my	Extension to the *IETF MIB* module defined in RFC-2006 for managing Mobile IP implementations.
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.
RFC2006-MIB.my	Module for the Mobile IP.

ITP Specific MIBs

The MWTM queries these ITP specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-BITS-CLOCK-MIB.my	Provides information on Building Integrated Timing Supply (BITS) clocking sources and operation modes. The MWTM can generate notifications to indicate when clocking sources change roles or become unavailable.
CISCO-IETF-SCTP-EXT-MIB.my	Extension to *CISCO-IETF-SCTP-MIB* that provides additional information to manage SCTP (RFC 2960).
CISCO-IETF-SCTP-MIB.my	The MIB module for managing SCTP protocol (RFC 2960).
CISCO-ITP-ACL-MIB.my	Manages access lists that control messages sent over SS7 networks using ITP.
CISCO-ITP-ACT-MIB.my	Provides information specified in ITU Q752 Monitoring and Measurements for SS7 networks. This information is used to manage messages sent over SS7 networks using ITP. This MIB has been deprecated and replaced by the *CISCO-ITP-GACT-MIB*.
CISCO-ITP-DSMR-MIB.my	Provides information about Distributed Short Message Routing for Short Message Service Center. This MIB will provide information used to control and measure SS7 messages signaling units in a SS7 Network. Message Signaling Units are routed based on information found in the SCCP, TCAP, MAP, and MAP-user layers.
CISCO-ITP-DSMR-SMPP-MIBmy	Provides information about Distributed Short Message Routing delivery using Short Message Peer-to-Peer protocol.
CISCO-ITP-DSMR-UCP-MIB.my	Provides information about Distributed Short Message Routing delivery using Universal Computer Protocol.
CISCO-ITP-GACT-MIB.my	Provides information specified in ITU Q752 Monitoring and Measurements for SS7 networks. This information is used to manage messages sent over SS7 networks using ITP. This MIB replaces the *CISCO-ITP-ACT-MIB* and supports multiple instances of a signaling point in the same configuration.
CISCO-ITP-GRT-MIB.my	Manages information required to route messages sent over SS7 networks using ITP. This MIB replaces the *CISCO-ITP-RT-MIB* and supports multiple instances of a signaling point in the same configuration.
CISCO-ITP-GSCCP-MIB.my	Provides information specified in ITU Q752 Monitoring and Measurements for SS7 networks. This information is used to manage Signaling Connection Control Part (SCCP) messages sent over SS7 networks using ITP. This MIB replaces the *CISCO-ITP-SCCP-MIB* and supports multiple instances of a signaling point in the same configuration.
CISCO-ITP-GSP-MIB.my	Manages signaling points and associated messages sent over SS7 networks using ITP. This MIB replaces the *CISCO-ITP-SP-MIB* and supports multiple instances of a signaling point in the same configuration.
CISCO-ITP-GSP2-MIB.my	Provides information specified in ITU Q752 Monitoring and Measurements for SS7 networks. This information is used to manage messages sent over SS7 networks using ITP. This MIB replaces the *CISCO-ITP-SP2-MIB* and supports multiple instances of a signaling point in the same configuration.
CISCO-ITP-MLR-MIB.my	Provides information about Multi-Layer Routing (MLR). This information is used to control and measure SS7 message signaling units (MSUs) in an SS7 network.

MIB	Description
CISCO-ITP-MONITOR-MIB.my	Provides information about monitoring SS7 links. This information is used to manage the state of software used to collect all packets transported and received over an SS7 link.
CISCO-ITP-MSU-RATES-MIB.my	Provides information used to manage the number of MTP3 MSUs transmitted and received per processor. Many of the higher level protocols require several MSUs per transaction. Traffic capacity planning is based on MSUs, not transactions. This MIB provides information to determine current traffic.
CISCO-ITP-RT-MIB.my	Manages the route tables used to control messages sent over SS7 networks using ITP. This MIB has been deprecated and replaced by the *CISCO-ITP-GRT-MIB*.
CISCO-ITP-SCCP-MIB.my	Manages SCCP messages sent over SS7 networks using ITP, and provides information specified in ITU Q752 Monitoring and Measurements for SS7 networks. This MIB has been deprecated and replaced by the *CISCO-ITP-GSCCP-MIB*.
CISCO-ITP-SP-MIB.my	Manages signaling points and associated linksets and links in SS7 networks using ITP.
CISCO-ITP-SP2-MIB.my	Provides Quality of Service (QoS) information related to the configuration of an SS7 network. Also provides MTP3 event history information. This MIB has been deprecated and replaced by the *CISCO-ITP-GSP2-MIB*.
CISCO-ITP-TC-MIB.my	Defines textual conventions used to manage nodes related to the SS7 network. The ITU documents that describe this technology are the ITU Q series, including: • ITU Q.700: Introduction to CCITT SS7 • ITU Q.701: Functional description of the message transfer part (MTP) of SS7.
CISCO-ITP-XUA-MIB.my	Manages MTP3 User Adaptation (M3UA) and SCCP User Adaptation (SUA) for ITP.
NetNumber-MIB.my	Common Object Definitions for the NetNumber enterprise MIBs.
TITAN-MIB.my	Module for the NetNumber TITAN.

IPRAN Specific MIBs

The MWTM queries these IPRAN specific MIBs, listed in alphabetical order:

MIB	Description
CERENT-454-MIB.mib	Defines the alarms and events for the Cisco ONS 15454. The MWTM processes each ONS event by creating an MWTM event with a severity that maps to the severity of the ONS event.
CERENT-ENVMON-MIB.mib	Provides environmental status information.
CERENT-FC-MIB.mib	Defines the managed objects for performance monitoring of supported Fibre Channel interfaces.
CERENT-GLOBAL-REGISTRY.mib	Provides the global registrations for all other CERENT MIB modules.
CERENT-MSDWDM-MIB.mib	Defines the managed objects for physical layer related interface configurations and objects for the protocol specific error counters for dense wavelength division multiplexing (DWDM) optical switches.
CERENT-OPTICAL-MONITOR-MIB.mib	Defines objects to monitor optical characteristics and set corresponding thresholds on the optical interfaces in a network element.
CERENT-TC.mib	Provides the global Textual Conventions for all other CERENT MIB modules.
CISCO-IETF-PW-MIB.my	Contains managed object definitions for Pseudo Wire operation.
CISCO-IETF-PW-TC-MIB.my	Used to identify the VC (together with some other fields) in the signaling session. Zero if the VC is set-up manually.
CISCO-IP-RAN-BACKHAUL-MIB.my	Provides information on the optimization of IP-RAN traffic between the cell site and the aggregation node site. It handles both GSM Abis and UMTS Iub traffic.
MPLS-VPN-MIB.my	Contains managed object definitions for the Multiprotocol Label Switching (MPLS)/Border Gateway Protocol (BGP) Virtual Private Networks (VPNs).
CISCO-BGP4-MIB.my	An extension to the IETF BGP4 MIB module defined in RFC 1657.
BGP4-MIB.my	The MIB module for BGP-4.

PCRF Specific MIBs

The MWTM queries the following MIB:

MIB	Description
FusionWorks.mib	Describes the system management information available from the SNMP agent in the FusionWorks SystemManager.

PDNGW Specific MIBs

The MWTM queries these specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-DIAMETER-BASE-PROTOCOL-MIB.my	The MIB module for entities implementing the Diameter Base Protocol. Initial Cisco'ized version of the IETF draft draft-zorn-dime-diameter-base-protocol-mib-00.txt.
CISCO-EPC-GATEWAY-MIB	Manages the EPC 3GPP release 8 features and configuration for PGW and SGW.
CISCO-EPC-GATEWAY-QOS-MIB.my	Manages the Quality of Service parameters of PGW and SGW in LTE SAE Architecture.
CISCO-GGSN-EXT-MIB.my	Manages the Gateway GPRS Support Node (GGSN) devices. This MIB is an extension of the CISCO-GGSN-MIB.
CISCO-GGSN-MIB.my	Manages the Gateway GPRS Support Node (GGSN) devices.
CISCO-GGSN-SERVICE-AWARE-MIB.my	Manages the service-aware feature of Gateway GPRS Support Node (GGSN).
CISCO-GPRS-ACC-PT-MIB.my	Supports access point configuration for GGSN in a GPRS system.
CISCO-GPRS-CHARGING-MIB.my	Manages the charging related function on the GGSN node of a GPRS system.
CISCO-GTP-MIB.my	Manages the GPRS Tunnelling Protocol (GTP) on GGSN and SGSN.
CISCO-GTPV2-MIB.my	Manages the GTP path with GTPv2 statistics and system based aggregated statistics for the GGSN evolved gateway.
CISCO-IP-LOCAL-POOL-MIB.my	Defines the configuration and monitoring capabilities relating to local IP pools.
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.

PDSN Specific MIBs

The MWTM queries these specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-CDMA-AHDLC-MIB.my	Provides details concerning Asynchronous High-level Data Link Control (AHDLC) engine state, performance, configuration and notification.
CISCO-CDMA-PDSN-EXT-MIB.my	Supports the Code Division Multiple Access (CDMA) Packet Data Serving Node (PDSN) feature. This MIB is an extension to the CISCO-CDMA-PDSN-MIB. A CDMA2000 network supports wireless data communication through 3G CDMA radio access technology and 3G A10/A11 interface. PDSN acts as a foreign agent that establishes, maintains, and terminates the link layer to a mobile station.
CISCO-CDMA-PDSN-MIB.my	Supports the CDMA PDSN (Packet Data Serving Node) feature. A CDMA2000 network supports wireless data communication through 3G CDMA radio access technology and 3G A10/A11 interface. PDSN acts as a foreign agent that establishes, maintains, and terminates the link layer to a mobile station.
CISCO-MOBILE-IP-MIB.my	Extension to the *IETF MIB* module defined in RFC-2006 for managing Mobile IP implementations.
CISCO-RADIUS-MIB.my	Radius Configuration MIB. This MIB module is for monitoring and configuring authentication and logging services using RADIUS (Remote Authentication Dial In User Service) related objects.
CISCO-VPDN-MGMT-EXT-MIB.my	VPDN management MIB extension Module. This MIB is a supplement to CISCO-VPDN-MGMT-MIB.my.
CISCO-VPDN-MGMT-MIB.my	MIB module for VPDN.
RFC2006-MIB.my	Module for the Mobile IP.

SGW Specific MIBs

The MWTM queries these specific MIBs, listed in alphabetical order:

MIB	Description
CISCO-DIAMETER-BASE-PROTOCOL-MIB.my	The MIB module for entities implementing the Diameter Base Protocol. Initial Cisco'ized version of the IETF draft draft-zorn-dime-diameter-base-protocol-mib-00.txt.
CISCO-EPC-GATEWAY-MIB	Manages the EPC 3GPP release 8 features and configuration for PGW and SGW.
CISCO-EPC-GATEWAY-QOS-MIB.my	Manages the Quality of Service parameters of PGW and SGW in LTE SAE Architecture.
CISCO-GGSN-EXT-MIB.my	Manages the Gateway GPRS Support Node (GGSN) devices. This MIB is an extension of the CISCO-GGSN-MIB.
CISCO-GGSN-MIB.my	Manages the Gateway GPRS Support Node (GGSN) devices.
CISCO-GGSN-SERVICE-AWARE-MIB.my	Manages the service-aware feature of Gateway GPRS Support Node (GGSN).
CISCO-GPRS-ACC-PT-MIB.my	Supports access point configuration for GGSN in a GPRS system.

MIB	Description
CISCO-GPRS-CHARGING-MIB.my	Manages the charging related function on the GGSN node of a GPRS system.
CISCO-GTP-MIB.my	Manages the GPRS Tunnelling Protocol (GTP) on GGSN and SGSN.
CISCO-GTPV2-MIB.my	Manages the GTP path with GTPv2 statistics and system based aggregated statistics for the GGSN evolved gateway.
CISCO-IP-LOCAL-POOL-MIB.my	Defines the configuration and monitoring capabilities relating to local IP pools.
CISCO-SLB-DFP-MIB.my	Reports the congestion status of the real server. This MIB generates notifications when the congestion state is detected on the real server.
CISCO-SLB-EXT-MIB.my	Supports Server Load Balancing Manager(s). This MIB extends the SLB management functionality in the CISCO-SLB-MIB. The Cisco Content Switching Module (CSM) product is the first SLB product to support this MIB.
CISCO-SLB-MIB.my	Supports Server Load Balancing Manager(s), such as the Cisco IOS SLB product. This MIB includes instrumentation for the manager-side implementation of the Dynamic Feedback Protocol (DFP). A DFP uses the DFP protocol to communicate with DFP agents in order to obtain information about Servers. This MIB includes the objects required for implementing the load balancer management side of the Server/Application State Protocol (SASP). The load balancer is responsible for registering Members with a SASP-Agent. A Member is an entity that is defined on the load balancer to service Internet traffic. The responsibility of the Agent is to monitor the Members, and report a recommended weight to the load balancer. The weight is then used in load balancing decisions.

You can obtain the latest versions of these MIBs from one of these locations:

- The zip file *mibs.zip*, located at the top of the MWTM DVD Image, contains these MIBs.
- You can download these MIBs from the Cisco website:

  http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

APPENDIX G

Trap Reference

This appendix contains:

General Traps

The Cisco Mobile Wireless Transport Manager (MWTM) supports these general traps/notifications, which apply to:

- IP Transfer Point (ITP) networks
- IP Radio Access Network (IPRAN) networks
- Mobile Services Exchange Framework (mSEF) networks, which include:
  - Content Services Gateway (CSG)
  - Gateway GPRS Support Node (GGSN)
  - Home Agent (HA)
  - Broadband Wireless Gateway (BWG)
  - Packet Data Serving Node (PDSN)

Note Some traps are platform/IOS specific.

Trap Name	Description
authenticationFailure	An authenticationFailure trap signifies that the IP address is accessing this node using the wrong community string.
caemTemperatureNotification	A caemTemperatureNotification is sent if the over temperature condition is detected in the managed system. This is a replacement for the ciscoEnvMonTemperatureNotification trap because the information ciscoEnvMonTemperatureStatusValue required by the trap is not available in the managed system.

Trap Name	Description
caemVoltageNotification	A caemVoltageNotification is sent if the over voltage condition is detected and ciscoEnvMonVoltageState is not set to notPresent in the managed system. This is a replacement for the ciscoEnvMonVoltageNotification trap because the information ciscoEnvMonVoltageStatusValue required by the trap is not available in the managed system.
casServerStateChange	An AAA server state change notification is generated whenever an AAA server connection state changes value. An AAA server state can be either *up* or *dead*.
ccmCLIRunningConfigChanged	Indicates that the running configuration of the managed system has changed from the CLI. If the managed system supports a separate configuration mode (where the configuration commands are entered under a configuration session which affects the running configuration of the system), then this notification is sent when the configuration mode is exited. During this configuration session there can be one or more running configuration changes.
ceAlarmAsserted	The agent generates this trap when a physical entity asserts an alarm.
ceAlarmCleared	The agent generates this trap when a physical entity clears a previously asserted alarm.
cefInconsistencyDetection	A cefInconsistencyDetection notification is generated when CEF consistency checkers detects an inconsistent prefix in one of the CEF forwarding databases. Note that the generation of cefInconsistencyDetection notifications is throttled by the agent, as specified by the 'cefNotifThrottlingInterval' object.
cefPeerFIBStateChange	A cefPeerFIBStateChange notification is generated if change in cefPeerFIBOperState is detected for the peer entity.
cefPeerStateChange	A cefPeerStateChange notification is generated if change in cefPeerOperState is detected for the peer entity.
cefResourceFailure	A cefResourceFailure notification is generated when CEF resource failure on the managed entity is detected. The reason for this failure is indicated by cefResourcefFailureReason.
cefcFRUInserted	Indicates that a FRU was inserted. The varbind for this notification indicates the entPhysicalIndex of the inserted FRU, and the entPhysicalIndex of the FRU container.
cefcFRURemoved	Indicates that a FRU was removed. The varbind for this notification indicates the entPhysicalIndex of the removed FRU, and the entPhysicalIndex of the FRU container.
cefcModuleStatusChange	This notification is generated when the value of cefcModuleOperStatus changes.It can be utilized by an NMS to update the status of the module it is managing.
cefcPowerStatusChange	Indicates that the power status of a FRU has changed. The varbind for this notification indicates the entPhysicalIndex of the FRU, and the new operational-status of the FRU.
cempMemBufferNotify	Whenever the cempMemBufferPeak object is updated in the buffer pool, a cempMemBufferNotify notification is sent. The sending of these notifications can be enabled/disabled via the cempMemBufferNotifyEnabled object.

Trap Name	Description
cEventMgrPolicyEvent	This notification is configured to be sent from within an Embedded Event Manager policy after an Embedded Event Manager event ceemHistoryEventType has occurred. If one or more of the objects ceemHistoryPolicyIntData1, ceemHistoryPolicyIntData2, and ceemHistoryPolicyStrData are not instantiated, the varbind for the object(s) not instantiated contains the value noSuchInstance.
cEventMgrServerEvent	This notification is sent by the Embedded Event Manager server after it has run a policy associated with the event ceemHistoryEventType that was received.
chassisAlarmOff	Signifies that the agent entity has detected that the chassisTempAlarm, chassisMinorAlarm, or chassisMajorAlarm object in this MIB has transitioned to the off(1) state. The generation of this trap can be controlled by the sysEnableChassisTraps object in this MIB
chassisAlarmOn	Signifies that the agent entity has detected that the chassisTempAlarm, chassisMinorAlarm, or chassisMajorAlarm object in this MIB has transitioned to the on(2) state. The generation of this trap can be controlled by the sysEnableChassisTraps object in this MIB.
cHsrpStateChange	A cHsrpStateChange notification is sent when a cHsrpGrpStandbyState transitions to either active or standby state, or leaves active or standby state. There will be only one notification issued when the state change is from standby to active and vice versa.
cisco_authenticationFailure	Signifies that the IP address is accessing this node using the wrong community string.
cisco_coldStart	Signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration might be altered.
cisco_linkDown	Signifies a failure in one of the communication links represented in the node's configuration has occurred.
cisco_linkUp	Signifies that one of the communication links represented in a node’s configuration has come up.
cisco_warmStart	Signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration is unaltered.
ciscoConfigManEvent	Notification of a configuration management event as recorded in ccmHistoryEventTable.
ciscoEnvMonFanNotification	A ciscoEnvMonFanNotification trap is generated if any one of the fans in the fan array (where extant) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.
ciscoEnvMonFanStatusChangeNotif	A *ciscoEnvMonFanStatusChangeNotif is sent if there is change in the state of a device being monitored by ciscoEnvMonFanState.*
ciscoEnvMonRedundantSupply Notification	A ciscoEnvMonRedundantSupplyNotification trap is generated if the redundant power supply (where extant) fails. Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.

Trap Name	Description
ciscoEnvMonShutdownNotification	A ciscoEnvMonShutdownNotification trap is generated if the environmental monitor detects a testpoint reaching a critical state and is about to initiate a shutdown. This notification contains no objects so that it can be encoded and sent in the shortest amount of time possible. Even so, management applications should not rely on receiving such a notification as it might not be sent before the shutdown completes.
ciscoEnvMonSuppStatusChangeNotif	A ciscoEnvMonSupplyStatChangeNotif is sent if there is change in the state of a device being monitored by ciscoEnvMonSupplyState.
ciscoEnvMonTemperatureNotification	A ciscoEnvMonTemperatureNotification trap is generated if the temperature measured at a given testpoint is outside the normal range for the testpoint (that is, is at the warning, critical, or shutdown stage). Since such a Notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.
ciscoEnvMonTempStatusChangeNotif	A ciscoEnvMonTempStatusChangeNotif is sent if there is change in the state of a device being monitored by ciscoEnvMonTemperatureState.
ciscoEnvMonVoltageNotification	A ciscoEnvMonVoltageNotification trap is generated if the voltage measured at a given testpoint is outside the normal range for the testpoint (that is, is at the warning, critical, or shutdown stage). Since such a notification is usually generated before the shutdown state is reached, it can convey more data and has a better chance of being sent than does the ciscoEnvMonShutdownNotification.
ciscoEnvMonVoltStatusChangeNotif	A ciscoEnvMonVoltStatusChangeNotif is sent if there is change in the state of a device being monitored by ciscoEnvMonVoltageState.
ciscoFlashCopyCompletionTrap	A ciscoFlashCopyCompletionTrap is sent at the completion of a flash copy operation if such a trap was requested when the operation was initiated.
ciscoFlashDeviceChangeTrap	A ciscoFlashDeviceChangeTrap is sent whenever a removable Flash device is inserted or removed.
ciscoFlashDeviceInsertedNotif	A ciscoFlashDeviceInsertedNotif notification is sent whenever a removable Flash device is inserted.
ciscoFlashDeviceInsertedNotifRev1	A ciscoFlashDeviceInsertedNotif notification is sent whenever a removable Flash device is inserted ciscoFlashDeviceInsertedNotifRev1 deprecates ciscoFlashDeviceInsertedNotif since it uses ciscoFlashDeviceName as a varbind which is deprecated.
ciscoFlashDeviceRemovedNotif	A ciscoFlashDeviceRemovedNotif notification is sent whenever a removable Flash device is removed.
ciscoFlashDeviceRemovedNotifRev1	A ciscoFlashDeviceRemovedNotif notification is sent whenever a removable Flash device is removed. ciscoFlashDeviceRemovedNotifRev1 deprecates ciscoFlashDeviceRemovedNotif since it uses ciscoFlashDeviceName as a varbind, which is deprecated.
ciscoFlashMiscOpCompletionTrap	A ciscoFlashMiscOpCompletionTrap is sent at the completion of a miscellaneous flash operation (enumerated in ciscoFlashMiscOpCommand) if such a trap was requested when the operation was initiated.
ciscoFlashPartitioningCompletionTrap	A ciscoFlashPartitioningCompletionTrap is sent at the completion of a partitioning operation if such a trap was requested when the operation was initiated.
ciscoICsuDsuT1LoopStatus Notification	Indicates a change in T1 Loop Status.

Trap Name	Description
ciscoRFProgressionNotif	A ciscoRFProgressionNotif trap is sent by the active redundant unit whenever its RF state changes or the RF state of the peer unit changes.
ciscoRFSwactNotif	A ciscoRFSwactNotif trap is sent by the newly active redundant unit whenever a switch of activity (SWACT) occurs. In the case where a SWACT event might be indistinguishable from a reset event, a network management station should use this notification to differentiate the activity.
clogMessageGenerated	When a syslog message is generated by the node a clogMessageGenerated notification is sent. The sending of these notifications can be enabled/disabled via the clogNotificationsEnabled object.
coldStart	Signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration might be altered.
cpmCPUFallingThreshold	A cpmCPUFallingThreshold trap is generated when CPU is below the falling threshold.
cpmCPURisingThreshold	A cpmCPURisingThreshold trap is generated when CPU is above the rising threshold.
entConfigChange	An entConfigChange notification is generated when the value of entLastChangeTime changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls. An agent should not generate more than one entConfigChange notification-event in a given time interval (five seconds is the suggested default). A notification-event is the transmission of a single trap or inform PDU to a list of notification destinations. If additional configuration changes occur in the throttling period, then notification-events for these changes should be suppressed by the agent until the current throttling period expires. At the end of a throttling period, one notification-event should be generated if any configuration changes occurred since the start of the throttling period. In such a case, another throttling period is started right away. An NMS should periodically check the value of entLastChangeTime to detect any missed entConfigChange notification-events (for example, because of throttling or transmission loss).
entSensorThresholdNotification	The sensor value crossed the threshold listed in entSensorThresholdTable. This notification is generated once each time the sensor value crosses the threshold.
fallingAlarm	The SNMP trap that is generated when an alarm entry crosses its falling threshold and generates an event that is configured for sending SNMP traps.
linkDown	Signifies a failure in one of the communication links represented in the node's configuration has occurred.
linkUp	Signifies that one of the communication links represented in a node's configuration has come up.
moduleDown	Signifies that the agent entity has detected that the moduleStatus object in this MIB has transitioned out of the ok(2) state for one of its modules. The generation of this trap can be controlled by the sysEnableModuleTraps object in this MIB
moduleUp	Signifies that the agent entity has detected that the moduleStatus object in this MIB has transitioned to the ok(2) state for one of its modules. The generation of this trap can be controlled by the sysEnableModuleTraps object in this MIB.

Trap Name	Description
reload	A reload trap signifies that the sending protocol entity is reinitializing itself such that the agent's configuration or the protocol entity implementation may be altered.
risingAlarm	The SNMP trap that is generated when an alarm entry crosses its rising threshold and generates an event that is configured for sending SNMP traps.
rttMonConnectionChangeNotification	This notification is only valid when the RttMonRttType is *echo* or *pathEcho*. An rttMonConnectionChangeNotification indicates that a connection to a target (not to a hop along the path to a target) has either failed on establishment or been lost and when reestablished. This causes rttMonCtrlOperConnectionLostOccurred to change value. If history is not being collected, the instance values for the rttMonHistoryCollectionAddress object will not be valid. When RttMonRttType is not *echo* or *pathEcho*, the rttMonHistoryCollectionAddress object will be null.
rttMonLpdDiscoveryNotification	Indicates that the LSP Path Discovery to the target PE has failed, and it also indicates the clearing of such condition. This causes rttMonLpdGrpStatsLPDFailOccurred to change value. When the rttMonLpdGrpStatsLPDFailOccurred is *false*, the instance value for rttMonLpdGrpStatsLPDFailCause is not valid.
rttMonLpdGrpStatusNotification	Indicates that the LPD Group status rttMonLpdGrpStatsGroupStatus has changed, indicating some connectivity change to the target PE. This causes rttMonLpdGrpStatsGroupStatus to change value.
rttMonNotification	Indicates the occurrence of a threshold violation, and it indicates the previous violation has subsided for a subsequent operation. When the RttMonRttType is *pathEcho*, this notification will only be sent when the threshold violation occurs during an operation to the target and not to a hop along the path to the target. This also applies to the subsiding of a threshold condition. If history is not being collected, the instance values for the rttMonHistoryCollectionAddress object will not be valid. When RttMonRttType is not *echo* or *pathEcho*, the rttMonHistoryCollectionAddress object will be null. rttMonReactVar defines the type of reaction that is configured for the probe (for example, jitterAvg). Trap definitions for the probes are in the rttMonReactTable, and each probe can have more than one trap definition for various types (for example, jitterAvg). So the object rttMonReactVar indicates the type (for example, packetLossSD) for which threshold violation traps have been generated. The object rttMonEchoAdminLSPSelector will be valid only for the probes based on *mplsLspPingAppl* RttMonProtocol. For all other probes it will be null.
rttMonThresholdNotification	Indicates the occurrence of a threshold violation for a RTT operation, and it indicates the previous violation has subsided for a subsequent RTT operation. This causes rttMonCtrlOperOverThresholdOccurred to change value. When the RttMonRttType is *pathEcho*, this notification will only be sent when the threshold violation occurs during an operation to the target and not to a hop along the path to the target. This also applies to the subsiding of a threshold condition. If history is not being collected, the instance values for the rttMonHistoryCollectionAddress object will not be valid. When RttMonRttType is not *echo* or *pathEcho* the rttMonHistoryCollectionAddress object will be null.

Trap Name	Description
rttMonTimeoutNotification	Indicates the occurrence of a timeout for a RTT operation, and it indicates the clearing of such a condition by a subsequent RTT operation. This causes rttMonCtrlOperTimeoutOccurred to change value. When the RttMonRttType is *pathEcho*, this notification will only be sent when the timeout occurs during an operation to the target and not to a hop along the path to the target. This also applies to the clearing of the timeout. If history is not being collected, the instance values for the rttMonHistoryCollectionAddress object will not be valid. When RttMonRttType is not *echo* or *pathEcho*, the rttMonHistoryCollectionAddress object will be null.
rttMonVerifyErrorNotification	Indicates the occurrence of a data corruption in an RTT operation.
tcpConnectionClose	A tty trap signifies that a TCP connection, previously established with the sending protocol entity for the purposes of a tty session, has been terminated.
warmStart	Signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration is unaltered.

ITP Specific Traps

The MWTM supports these ITP specific traps, listed in alphabetical order:

Trap Name	Description
ciscoBitsClockFreerun	This trap is for Building Integrated Timing Supply (BITS) clocking sources. It is used to generate notifications to indicate when clocking source is unavailable. The internal clock will operate in *freerun* mode using appropriate local oscillator. Therefore, it does not provide synchronous clocking. This is the least stable of all operating modes.
ciscoBitsClockHoldover	This trap is for Building Integrated Timing Supply (BITS) clocking sources. It is used to generate notifications to indicate when clocking source is unavailable and the internal clock will operate in holdover mode. The network clock module has stored information about the incoming clock signal, it can faithfully reproduce the lost signal while in holdover mode until a switchover to another clock source occurs.
ciscoBitsClockSource	This trap is for Building Integrated Timing Supply (BITS) clocking sources. It is used to generate notifications to indicate when clocking sources change.
ciscoGrtDestStateChangeRev1	A ciscoGrtDestStateChangeRev1 trap is generated whenever one or more destination changes states within the cgrtDestNotifWindowTimeRev1 duration. Latest state information at the end of cgrtDestNotifWindowTimeRev1 is provided. It may be necessary to suppress the sending of notification when a large number destinations change state, due the failure of some common resource. The number of notifications can be controlled by specifying values for cgrtDestNotifWindowTimeRev1 and cgrtDestNotifMaxPerWindowRev1 objects. When the number of destination state changes exceed the specified value, the notification will provide a count of notifications that got suppressed for the remainder of the window.

Trap Name	Description
ciscoGrtDestStateChange	A ciscoGrtDestStateChange trap is generated whenever one or more destination changes states. This notification contains a list of destination state changes in the cgrtDestNotifChanges object. State changes are accumulated until the cgrtDestNotifChanges is full or the maximum delay time is reached. The delay time is specified by the cgrtDestNotifDelayTime object. It might be necessary to suppress the sending of notification when a large number destinations change state, due to the failure of some common resource. The number of notifications can be controlled by specifying values for cgrtDestNotifWindowTime and cgrtDestNotifMaxPerWindow objects. When the number of destination state changes exceed the specified value the last notification will indicate that notifications are suppressed for the remainder of the window. This notification deprecates ciscoGrtDestStateChange.
ciscoGrtMgmtStateChange	A ciscoGrtMgmtStateChange trap is generated whenever one or more management routes change state. This notification contains a list of management route state changes in the cgrtMgmtNotifChanges object. State changes are accumulated until the cgrtMgmtNotifChanges is full or the maximum delay time is reached. The delay time is specified by the cgrtMgmtNotifDelayTime object. It might be necessary to suppress the sending of notification when a large number of routes change state, due to the failure of some common resource. The number of notifications can be controlled by specifying values for cgrtMgmtNotifWindowTime and cgrtMgmtNotifMaxPerWindow objects. When the number of route state changes exceed the specified value the last notification will indicate that notifications are suppressed for the remainder of the window.
ciscoGrtMgmtStateChangeRev1	This notification is generated whenever one or more management routes change states within the cgrtMgmtNotifWindowTimeRev1 duration. Latest state information at the end of cgrtMgmtNotifWindowTimeRev1 is provided. It may be necessary to suppress the sending of notification when a large number of routes change state, due the failure of some common resource. The number of notifications can be controlled by specifying values for cgrtMgmtNotifWindowTimeRev1 and cgrtMgmtNotifMaxPerWindowRev1 objects. When the number of route state changes exceed the specified value, the last notification will provide a count of notifications that got suppressed for the remainder of the window. This notification deprecates ciscoGrtMgmtStateChange.
ciscoGrtNoRouteMSUDiscards	This notification is generated whenever one or more MSU discards happen due to route data error for a specific signaling point instance in the configured cgrtNoRouteMSUsNotifWindowTime. For cases when there is a non-zero number of MSUs discarded, this notification will be sent at the end of the cgrtNoRouteMSUsNotifWindowTime interval, with cgrtIntervalNoRouteMSUs indicating the total count of MSUs discarded for that specific signaling point instance during the entire cgrtNoRouteMSUsNotifWindowTime interval Q752/5.5.
ciscoGrtRouteTableLoad	A ciscoGrtRouteTableLoad trap is generated whenever a load operation is started or completed. Route table configurations can be loaded by CLI requests. In addition, route tables can loaded using configuration statements. This allows route tables to be reloaded whenever a node restarts.

Trap Name	Description
ciscoGsccpGttErrors	This notification is generated whenever any global title error is encountered in last interval specified by the cgsccpGttErrorPeriod and the cgsccpInstErrorIndicator will be set to true. The notification will also be generated when errors have abated. The notification is generated after the number of recovery intervals as specified by the cgsccpGttErrorRecoveryCount object has passed without any global title errors.
ciscoGsccpGttLoadTable	A ciscoGsccpGttLoadTable trap is generated whenever a load operation is started or completes.
ciscoGsccpGttMapStateChange	A ciscoGsccpGttMapStateChange is generated when a mated application subsystem changes to a new state. The value of cgsccpGttMapSsStatus indicates the new state for the subsystem.
ciscoGsccpLocalSsStateChange	The notification generated when a local application subsystem changes to a new state. The subsystem number and the latest subsystem state will be provided in this notification.
ciscoGsccpRmtCongestion	This notification is generated initially when congestion is experienced in the remote SCCP component for the first time in last interval specified by the cgsccpGttErrorPeriod. The notification is generated after the number of recovery intervals as specified by the cgsccpGttErrorRecoveryCount object has passed without any congestion errors and total number of local congestion observed for different congestion levels at the end of the interval along with the latest known congestion status for that remote signalling point will be provided.
ciscoGsccpSOGReceived	This notification is generated initially when a Subsystem Out-of-Service Grant is sent in response to a Subsystem Out-of-Service Request message. The affected PC and affected SSN are provided with this notification.
ciscoGsccpSegReassUnsup	This notification is generated initially when a SCCP message is dropped due to a segmentation or reassembly unsupported or failure errors in last interval specified by the cgsccpGttErrorPeriod and the cgsccpInstErrorIndicator will be set to true. The notification will also be generated after the number of recovery intervals as specified by the cgsccpGttErrorRecoveryCount object has passed without any segmentation or reassembly unsupported errors.
ciscoGspCongestionChange	A ciscoGspCongestionChange trap is generated when a link changes to a new congestion level as specified by the cgspLinkCongestionState object.
ciscoGspIsolation	This notification indicates the instance specified by cgspInstDisplayName and cgspInstDescription has become isolated. All linkset used to connect MTP3 node (instance) are unavailable. Isolation is ended when any linkset supported by this instance reaches the active state.
ciscoGspLinkRcvdUtilChange	A ciscoGspLinkRcvdUtilChange trap is generated when the cgspLinkUtilStateRcvd changes states.
ciscoGspLinkSentUtilChange	A ciscoGspLinkSentUtilChange trap is generated when the cgspLinkUtilStateSent changes states.
ciscoGspLinksetStateChange	A ciscoGspLinksetStateChange trap is generated when a linkset changes to a new state. The value of cItpSpLinksetState indicates the new state.
ciscoGspLinkStateChange	A ciscoGspLinkStateChange trap is generated when a link changes to a new state. The value of cItpSpLinkState indicates the new state.
ciscoGspRxCongestionChange	The notification generated when a link changes to a new congestion level as specified by cgspLinkRxCongestionstate object for Received side congestion.

Trap Name	Description
ciscoGspUPUReceived	The notification is generated when a UPU MSU is received from a remote signaling point, for a specific instance and user part for the first time in the configured cgspUPUNotifWindowTime. For cases when there is a non-zero number of UPU MSUs received, this notification will be sent at the end of the cgspUPUNotifWindowTime interval, with cgspIntervalUPUs indicating the total count of UPU MSUs received for that specific instance and user part during the entire cgspUPUNotifWindowTime interval Q752/5.6.
ciscoGspUPUTransmitted	The notification is generated when a UPU MSU is transmitted to a remote signaling point, for a specific instance and user part for the first time in the configured cgspUPUNotifWindowTime. For cases when there is a non-zero number of UPU MSUs received, this notification will be sent at the end of the cgspUPUNotifWindowTime interval, with cgspIntervalUPUs indicating the total count of UPU MSUs transmitted for that specific instance and user part during the entire cgspUPUNotifWindowTime interval Q752/5.7.
ciscoItpMsuRateState	This notification is generated once for the interval specified by the cimrMsuRateNotifyInterval object when the cimrMsuTrafficRateState object has the following state transitions: • acceptable to warning • acceptable to overloaded • warning to overloaded At the end of the interval specified by the cimrMsuRateNotifyInterval object another notification will be generated if the current state is different from state sent in last notification even if the state transition is not one of the previously mentioned transitions. When the cimrMsuRateNotifyInterval is set to zero all state changes will generate notifications.
ciscoItpXuaAspAssocStateChange	The ciscoItpXuaAspAssocStateChange trap is generated when the association used to connect to the ASP changes state.
ciscoItpXuaAspCongChange	A ciscoItpXuaAspCongChange trap is generated when an ASP changes to a congestion level as specified by the cItpXuaAspCongLevel object.
ciscoItpXuaAspDestAddrStateChange	The ciscoItpXuaAspDestAddrStateChange to trap is generated when a destination IP address used by ASP changes state.
ciscoItpXuaAspStateChange	A ciscoItpXuaAspStateChange trap is generated when an ASP changes to a new state. The value of cItpXuaAspAsState indicates the new state for the ASP that is serving the AS specified by cItpXuaAsDisplayName.
ciscoItpXuaAsStateChange	A ciscoItpXuaAsStateChange trap is generated when an AS changes to a new state. The value of cItpXuaAsState indicates the new state for the AS.
ciscoItpXuaSgmAssocStateChange	The ciscoItpXuaSgmAssocStateChange trap is generated when the association used to connect to the SG Mate changes state.
ciscoItpXuaSgmCongChange	A ciscoItpXuaSgmCongChange trap is generated when an SGMP changes to a congestion level as specified by the cItpXuaSgmCongLevel object.
ciscoItpXuaSgmDestAddrStateChange	The ciscoItpXuaSgmDestAddrStateChange trap is generated when a destination IP address used by SG Mate changes state.
ciscoItpXuaSgmStateChange	A ciscoItpXuaSgmStateChange trap is generated when an SG Mate changes to a new state. The value of cItpXuaSgmState indicates the new state for the SG Mate.

Trap Name	Description
ciscoMlrTableLoad	A ciscoMlrTableLoad trap is generated when a load operation is started or completed. Route table configurations can be loaded by CLI requests. In addition, route tables can loaded using configuration statements, which allows route tables to be reloaded whenever a node restarts.
cItpRouteStateChange	A cItpRouteStateChange trap is generated whenever one or more route destination status changes states and includes the count of all route state changes. This notification contains a list of route state changes in the cItpRtNotifInfoStateChanges object. State changes are accumulated until the cItpRtNotifInfoStateChanges is full or the maximum delay time is reached. The delay time is specified by the cItpRtChangeNotifDelayTime object. It might be necessary to suppress the sending of notification when a large number route change state, due the failure of some common resource. The number of notifications can be controlled by specifying values for cItpRtChangeNotifWindowTime and cItpRtChangeNotifMaxPerWindow objects. When the number of route state changes exceed the specified value the last notification will indicate that notifications are suppressed for the remainder of the window.
cItpSccpGttMapStateChange	A cItpSccpGttMapStateChange trap is generated when a mated application subsystem changes to a new state. The value of cItpSccpGttMapSsStatus indicates the new state for the subsystem.
cSctpExtDestAddressStateChange	A cSctpExtDestAddressStateChange trap is generated when the state transition of cSctpAssocRemAddressStatus has occurred.
ciscoItpXuaAsRmtThStateChange	The ciscoItpXuaAsRmtThStateChange trap is generated when the Rate Limit Threshold level for a xua changes to a new state. This trap is generated when the rate limit onset threshold is reached. The value of cItpXuaAsRmtThState indicates the new state.
ciscoItpXuaAsRmtHtStateChange	The ciscoItpXuaAsRmtHtStateChange trap is generated when the Rate Limit hit levelfor a xua changes to a new state. This trap is generated when the rate limit is hit and packet actually drop due to rate limit. The value of cItpXuaAsRmtHtState indicates the new state.
ciscoGspLinksetRmtThStateChange	The ciscoGspLinksetRmtThStateChange trap is generated when the Rate Limit Threshold level for a linkset changes to a new state. This trap is generated when the rate limit onset threshold is reached. The value of cgspLinksetRmtThState indicates the new state.
ciscoGspLinksetRmtHtStateChange	The ciscoGspLinksetRmtHtStateChange trap is generated when the Rate Limit hit level for a linkset changes to a new state. This trap is generated when the rate limit is hit and packet actually drop due to rate limit. The value of cgspLinksetRmtHtState indicates the new state.

IPRAN Specific Traps

OSPF Specific Traps

The MWTM supports these OSPF specific traps, listed in alphabetical order:

Trap Name	Description
ospfInterfaceAuthenticationFailure	An ospfInterfaceAuthenticationFailure trap signifies that a packet has been received on a non-virtual interface from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type.
ospfInterfaceConfigError	An ospfInterfaceConfigError trap signifies that a packet has been received on a non-virtual interface from a router whose configuration parameters conflict with this router's configuration parameters. Note that the event optionMismatch should cause a trap only if it prevents an adjacency from forming.
ospfBadPacketReceived	An ospfInterfaceBadPacketReceived trap signifies that an OSPF packet has been received on a non-virtual interface that cannot be parsed.
ospfInterfaceState	An ospfInterfaceState trap signifies that there has been a change in the state of a non-virtual OSPF interface. This trap should be generated when the interface state regresses (e.g., goes from Dr to Down) or progresses to a terminal state (i.e., Point-to-Point, DR Other, Dr, or Backup).
ospfLinkStateDbOverflow	An ospfLinkStateDbOverflow trap signifies that the number of LSAs in the router's link state database has exceeded ninety percent of ospfExtLsdbLimit.
ospfMaxAgeLsa	An ospfMaxAgeLsa trap signifies that one of the LSAs in the router's link state database has aged to MaxAge.
ospfNeighborRestartHelperState	An ospfNeighborRestartHelperStatus trap signifies that there has been a change in the graceful restart helper state for the neighbor. This trap should be generated when the neighbor restart helper status transitions for a neighbor.
ospfNeighborState	An ospfNeighborState trap signifies that there has been a change in the state of a non-virtual OSPF neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., 2-Way or Full). When an neighbor transitions from or to Full on non-broadcast multi-access and broadcast networks, the trap should be generated by the designated router. A designated router transitionined to Down will be noted by ospfIfStateChange.
ospfNssaTranslatorState	An ospfNssaTranslatorStatus trap indicates that there has been a change in the router's ability to translate OSPF type-7 LSAs into OSPF type-5 LSAs. This trap should be generated when the translator status transitions from or to any defined status on a per-area basis.
ospfOriginateLsa	An ospfOriginateLsa trap signifies that a new LSA has been originated by this router. This trap should not be invoked for simple refreshes of LSAs (which happens every 30 minutes), but instead will only be invoked when an LSA is (re)originated due to a topology change. Additionally, this trap does not include LSAs that are being flushed because they have reached MaxAge.
ospfRestartState	An ospfRestartStatus trap signifies that there has been a change in the graceful restart state for the router. This trap should be generated when the router restart status changes.

Trap Name	Description
ospfRetransmit	An ospfRetransmit trap signifies than an OSPF packet has been retransmitted on a non-virtual interface. All packets that may be retransmitted are associated with an LSDB entry. The LS type, LS ID, and Router ID are used to identify the LSDB entry.
ospfVirtualInterfaceAuthenticationFailure	An ospfVirtualInterfaceAuthenticationFailure trap signifies that a packet has been received on a virtual interface from a router whose authentication key or authentication type conflicts with this router's authentication key or authentication type.
ospfVirtualInterfaceConfigError	An ospfVirtualInterfaceConfigError trap signifies that a packet has been received on a virtual interface from a router whose configuration parameters conflict with this router's configuration parameters. Note that the event optionMismatch should cause a trap only if it prevents an adjacency from forming.
ospfVirtualBadPacketReceived	An ospfVirtualInterfaceBadPacketReceived trap signifies that an OSPF packet has been received on a virtual interface that cannot be parsed.
ospfVirtualInterfaceState	This ospfVirtualInterfaceState trap should be generated when the interface state regresses (e.g., goes from Point-to-Point to Down) or progresses to a terminal state (i.e., Point-to-Point).
ospfVirtualRetransmit	An ospVirtualRetransmit trap signifies than an OSPF packet has been retransmitted on a non-virtual interface. All packets that may be retransmitted are associated with an LSDB entry. The LS type, LS ID, and Router ID are used to identify the LSDB entry.
ospfVirtualNeighborRestartHelperState	An ospfVirtualNeighborRestartHelperStatus trap signifies that there has been a change in the graceful restart helper state for the virtual neighbor. This trap should be generated when the virtual neighbor restart helper status transitions for a virtual neighbor.
ospfVirtualNeighborState	An ospfVirtualNeighborState trap signifies that there has been a change in the state of an OSPF virtual neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., Full).

RAN-O Specific Traps

The MWTM supports these RAN-O specific traps, listed in alphabetical order:

Trap Name	Description
cerent454Events	The CERENT-454-MIB defines the events and alarms that are raised by the ONS 15454. The MWTM processes each ONS event by creating an MWTM event with a severity that maps to the severity of the ONS event.
ciscoIpRanBackHaulGsmAlarm	A ciscoIpRanBackHaulGsmAlarm trap is generated when the values of these objects change: connect state, local alarm state, remote alarm state, and redundancy state.
ciscoIpRanBackHaulUmtsAlarm	A ciscoIpRanBackHaulUmtsAlarm trap is generated when the values of these objects change: connect state, received local state, received remote state, transmit local state, transmit remote state, and redundancy state.

IP-RAN Specific Traps

Trap Name	Description
ciscoIpMRouteMissingHeartBeats	A ciscoIpMRouteMissingHeartBeat is sent if a multicast router with this feature enabled failed to receive configured number of heartbeat packets from heartbeat sources within a configured time interval.
ciscoMvpnMvrfChange	A ciscoMvpnMvrfChange notification signifies a change about a MVRF in the device. The change event can be creation of the MVRF, deletion of the MVRF or an update on the default or data MDT configuration of the MVRF. The change event is indicated by ciscoMvpnGenOperStatusChange embedded in the notification. The user can then query ciscoMvpnGenericTable, ciscoMvpnMdtDefaultTable and/or ciscoMvpnMdtDataTable to get the details of the change as necessary.
ciscoPimInterfaceDown	A ciscoPimInterfaceDown notification signifies the loss of a PIM interface. This notification should be generated whenever an entry is about to be deleted from the PimInterfaceTable. pimInterfaceStatus identifies the interface which was involved in the generation of this notification.
ciscoPimInterfaceUp	A ciscoPimInterfaceUp notification signifies the restoration of a PIM interface. This notification should be generated whenever pimInterfaceStatus transitions into the 'active' state. pimInterfaceStatus identifies the interface which was involved in the generation of this notification.
ciscoPimInvalidJoinPrune	A ciscoPimInvalidJoinPrune notification signifies the receipt of an invalid join/prune message. This notification is generated whenever the cpimInvalidJoinPruneMsgsRcvd counter is incremented. cpimLastErrorOrigin, cpimLastErrorGroup, and cpimLastErrorRP should signify the source address, group address and the RP address in the invalid join/prune packet.
ciscoPimInvalidRegister	A ciscoPimInvalidRegister notification signifies that an invalid Register message was received by this device. This notification is generated whenever the cpimInvalidRegisterMsgsRcvd counter is incremented. cpimLastErrorOrigin, cpimLastErrorGroup, and cpimLastErrorRP should signify the source address, group address and the RP address in the invalid register packet.
ciscoPimRPMappingChange	A ciscoPimRPMappingChange notification signifies a change in the RP Mapping on the device in question. A change in RP Mapping could be because of addition of new entries to the RP Mapping cache, deletion of existing entries, or a modification to an existing mapping. The type of change is indicated by cpimRPMappingChangeType. pimRPSetHoldTime is used to identify the row in the pimRPSetTable that is responsible for the generation of this notification. In case of modification to existing entries, a notification should be generated once before the modification (with cpimRPMappingChangeType set to modifiedOldMapping) and once after modification (with cpimRPMappingChangeType set to modifiedNewMapping).

Trap Name	Description
crepLinkStatus	This notification is sent when a REP interface has entered or left REP link operational status. The link is considered operational when 'crepIfOperStatus' is 'twoWay'. 'crepIfOperStatus' would be 'none' if the crepInterfaceConfigEntry entry has been removed.
crepPortRoleChange	This notification is sent when the role of a Port changes that are indicated by 'crepIfPortRole'.
crepPreemptionStatus	This notification indicates the status of the preemption triggered on REP primary edge.
pimNeighborLoss	A pimNeighborLoss trap signifies the loss of an adjacency with a neighbor. This trap should be generated when the neighbor timer expires, and the router has no other neighbors on the same interface with a lower IP address than itself.

PWE3 Specific Traps

The MWTM supports these PWE3 specific traps, listed in alphabetical order:

Trap Name	Description
cpwVcDown	The cpwVcDown trap is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the down(2) state from some other state. The included values of cpwVcOperStatus MUST all be set equal to this down(2) state. The two instances of cpwVcOperStatus in this notification indicate the range of indexes that are affected. Note that all the indexes of the two ends of the range can be derived from the instance identifiers of these two objects. For cases where a contiguous range of cross-connects have transitioned into the down(2) state at roughly the same time, the device SHOULD issue a single notification for each range of contiguous indexes in an effort to minimize the emission of a large number of notifications. If a notification has to be issued for just a single cross-connect entry, then the instance identifier (and values) of the two cpwVcOperStatus objects MUST be identical.
cpwVcUp	This notification is generated when the cpwVcOperStatus object for one or more contiguous entries in cpwVcTable are about to enter the up(1) state from some other state. The included values of cpwVcOperStatus MUST both be set equal to this new state (that is, up(1)). The two instances of cpwVcOperStatus in this notification indicate the range of indexes that are affected. Note that all the indexes of the two ends of the range can be derived from the instance identifiers of these two objects. For cases where a contiguous range of cross-connects have transitioned into the up(1) state at roughly the same time, the device SHOULD issue a single notification for each range of contiguous indexes in an effort to minimize the emission of a large number of notifications. If a notification has to be issued for just a single cross-connect entry, then the instance identifier (and values) of the two cpwVcOperStatus objects MUST be the identical.

mSEF Specific Traps

The MWTM supports these mSEF specific traps, listed in alphabetical order:

Generic mSEF Traps

The MWTM supports these generic mSEF traps, listed in alphabetical order:

Trap Name	Description
ciscoSlbRealState Change	The notification generated when a real server changes to a new state. The value of slbRealServerState indicates the new state.
ciscoSlbVirtualState Change	The notification generated when a virtual server changes to a new state. The value of slbVirtualServerState indicates the new state.
cslbxFtStateChange	The notification generated when the Fault Tolerance process changes to a new state. The value of cslbxFtState indicates the new state.

CSG1 Traps

The MWTM supports these CSG1 traps, listed in alphabetical order:

Trap Name	Description
ciscoCsgAgentLostRecordEvent	This notification is issued when csgAgentNotifsEnabled is set to true, and the CSG must discard accounting records that should be sent to the billing mediation agent. Initially, csgAgentLostRecords is set to 0. When a record is discarded, csgAgentLostRecords is incremented, a period timer is started, and this notification is issued. The NMS and the agent save this value. The agent continues to increment csgAgentLostRecords each time a record is lost. When the period timer expires, the agent compares the current value of csgAgentLostRecords with the previous (saved) value. If the values are equal this notification is issued again, signaling to the NMS that the condition has been cleared. Otherwise, the timer is restarted to monitor the next period. When a record is lost and no period timer is active, this notification is issued and the above procedure is repeated.
ciscoCsgAgentStateChange	This notification is issued when csgAgentNotifsEnabled is set to 'true', and the billing mediation agent changes state. There is one exception: No notification is issued for state changes involving *echowait* because this would cause an excessive number of notifications.
ciscoCsgQuotaMgrLostRecordEvent	This notification is issued when csgQuotaNotifsEnabled is set to true, and the CSG must discard request records to be sent to the quota manager. The processing is the same as described in the description for ciscoCsgAgentLostRecordEvent.
ciscoCsgQuotaMgrStateChange	This notification is issued when csgQuotaNotifsEnabled is set to true, and the quota manager changes state. There is one exception: No notification is issued for state changes involving *echowait* because this would cause an excessive number of notifications.
ciscoCsgUserDbStateChange	This notification is issued when csgDatabaseNotifsEnabled is set to true, and the user database changes state.

CSG2 Traps

The MWTM supports these CSG2 traps, listed in alphabetical order:

Trap Name	Description
ciscoContentServicesBMALost RecordEvent	This notification is issued when ccsBMAStateChangeNotifEnabled is set to true, and accounting records, which should be sent to the billing mediation agent, must be discarded. Initially, ccsBMALostRecords is set to 0. When a record is discarded, ccsBMALostRecords is incremented, a period timer is started, and this notification is issued. The NMS and the agent save this value. The agent continues to increment ccsBMALostRecords each time a record is lost. When the period timer expires, the agent compares the current value of ccsBMALostRecords with the previous (saved) value. If the values are equal this notification is issued again, signaling to the NMS that the condition has been cleared. Otherwise, the timer is restarted to monitor the next period. When a record is lost and no period timer is active, this notification is issued and the above procedure is repeated.
ciscoContentServicesBMAState Change	This notification is issued when ccsBMAStateChangeNotifEnable is set to true, and the billing mediation agent changes state. There is one exception: No notification is issued for state changes involving *echowait* because this would cause an excessive number of notifications.
ciscoContentServicesQuotaMgrLost RecordEvent	This notification is issued when ccsQuotaMgrStateChangeNotifEnable is set to true, and request records to be sent to the quota manager must be discarded. The processing is the same as described in the description for ccsQuotaMgrLostRecordEvent.
ciscoContentServicesQuotaMgr StateChange	This notification is issued when ccsQuotaMgrStateChangeNotifEnabled is set to true, and the quota manager changes state. There is one exception: No notification is issued for state changes involving *echowait* because this would cause an excessive number of notifications.
ciscoContentServicesUserDbState Change	This notification is issued when ccsUserDbStateChangeNotifEnabled is set to true, and the user database changes state.
ciscoContentServicesUserThreshold Exceeded	This notification is issued when ccsUserThresholdExceededNotifEnabled is set to 'true', and when actual users limit exceeds threshold which is set by ccsgsUserThreshold.
ciscoDiaBaseProtPeerConnectionDo wnNotif	An ciscoDiaBaseProtPeerConnectionDownNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionDownNotif is true(1) • cdbpPeerStatsState changes to closed(1). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtPeerConnectionUp Notif	A ciscoDiaBaseProtPeerConnectionUpNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionUpNotif is true(1) • The value of cdbpPeerStatsState changes to either rOpen(6)or iOpen(7). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.

Trap Name	Description
ciscoDiaBaseProtPermanentFailure Notif	A ciscoDiaBaseProtPermanentFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePermanentFailureNotif is true(1) • The value of cdbpPeerStatsPermanentFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtProtocolErrorNotif	A ciscoDiaBaseProtProtocolErrorNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableProtocolErrorNotif is true(1) • The value of cdbpPeerStatsProtocolErrors changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtTransientFailure Notif	An ciscoDiaBaseProtTransientFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableTransientFailureNotif is true(1) • The value of cdbpPeerStatsTransientFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoMobilePolicyChargingControl PreloadError	This notification is issued when cmpccPreloadErrorNotifEnabled is set to true, and an error occurs in preloading as indicated by the value of cmpccppsErrorState: • Indicates PCRF has sent an incomplete Policy object. • Indicates a mandatory AVP in the preloading message is missing. • Indicates PCEF is not able to install/modify/remove a policy preloading object. • Indicates PCRF sent the preloading objects in wrong order. • Indicates PCRF tried to preload an object, which is already statically configured in PCEF. 255 indicates no error has occurred so far.
cIscsiInstSessionFailure	Sent when an active session is failed by either the initiator or the target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiIntrLoginFailure	Sent when a login is failed by a initiator. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiTgtLoginFailure	Sent when a login is failed by a target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cmpccPreloadRollbackFailed	This notification is generated when rollback of an object fails, which indicates that object could be out of sync. The cmpccppsRollbackFailedReason present in the varbind list, indicates the reason that triggers the sending for 'cmpccPreloadRollbackFailed' notification. The entPhysicalName identifies the entity that implements the PCEF functionality of the Gx interface.
cPsdClientDiskFullNotif	This notification is generated when the PSD server's disk become full. If the disk of a writable PSD server becomes full, the client shall not be able to write any CDR into the server. It shall then behave as a retrieve only PSD server.

Trap Name	Description
cPsdClientDownNotif	A notification of this type is generated when the PSD server goes DOWN. If the PSD client was in write/retrieving state, then that operation shall be stopped.
cPsdClientUpNotif	A notification of this type is generated when the PSD server comes UP. A GTP' (GTP enhanced for charging) path will be created fulfilling all the specific requirements of the PSD interface.

GGSN Traps

The MWTM supports these GGSN traps, listed in alphabetical order:

Trap Name	Description
cGgsnAccessPointNameNotif	This notification indicates the occurrence of an APN (Access Point Name) related alarm.
cGgsnGlobalErrorNotif	This notification indicates the occurrence of a GGSN related alarm.
cGgsnInServiceNotif	A notification of this type is generated when GGSN is placed in inService mode, which is specified by cGgsnServiceModeStatus.
cGgsnMaintenanceNotif	A notification of this type is generated when GGSN is placed in maintenance mode which is specified by cGgsnServiceModeStatus.
cGgsnMemThreshold ClearedNotif	A notification of this type is generated when GGSN retains the memory and falls below threshold value specified by cGgsnMemoryThreshold.
cGgsnMemThreshold ReachedNotif	A notification of this type is generated when GGSN reaches the memory threshold value specified by cGgsnMemoryThreshold.
cGgsnNotification	This notification indicates the occurrence of a GGSN related alarm. If and when additional useful information is available for specific types of alarms, then that information may be appended to the end of the notification in additional varbinds.
cGgsnPacketData ProtocolNotif	This notification indicates the occurrence of a user related alarm.
cGgsnPdfStateDownNotif	A notification of this type is generated when PDF (Policy Decision Function) connection goes DOWN.
cGgsnPdfStateUpNotif	A notification of this type is generated when PDF connection comes UP.
cGgsnSACsgStateDownNotif	This notification is generated when CSG state goes down.
cGgsnSACsgStateUpNotif	This notification is generated when CSG state goes up.
cGgsnSADccaAuth RejectedNotif	This notification is generated when credit-control server failed in authorization of end user. The PDP (Packet Data Protocol) context is deleted and category is blacklisted.
cGgsnSADccaCredit LimReachedNotif	This notification is generated when the credit limit is reached. The credit-control server denies the service request since the end user's account could not cover the requested service. Client shall behave exactly as with cGgsnSADccaEndUsrServDeniedNotif.
cGgsnSADccaEndUsr ServDeniedNotif	This notification is generated when the credit-control server denies the service request due to service restrictions. On reception of this notification on category level, the CLCI-C shall discard all future user traffic for that category on that PDP context and not attempt to ask for more quotas during the same PDP context.

Trap Name	Description
cGgsnSADccaRatingFailed	This notification is generated when the credit-control server cannot rate the service request, due to insufficient rating input, incorrect AVP combination or due to an AVP (Attribute Value Pair) or an AVP value that is not recognized or supported in the rating.
cGgsnSADccaUser UnknownNotif	This notification is generated when the specified end user is unknown in the credit-control server. Such permanent failures cause the client to enter the Idle state. The client shall reject or terminate the PDP context depending on whether the result code was received in a CCA (Credit Control Answer) (Initial) or CCA (Update).
cgprsAccPtCfgNotif	A notification of this type is generated when an entry is generated in the cgprsAccPtCfgNotifHistTable and cgprsAccPtCfgNotifEnable is set to true.
cgprsAccPtInServiceNotif	A notification of this type is generated when APN is placed in *in-service* mode which is specified by cgprsAccPtOperationMode.
cgprsAccPtMaintenance Notif	A notification of this type is generated when APN is placed in maintenance mode which is specified by cgprsAccPtOperationMode.
cgprsAccPtSecDestViolNotif	A notification of this type is generated when security violation as specified by cgprsAccPtVerifyUpStrTpduDstAddr occurs on an APN.
cgprsAccPtSecSrcViolNotif	A notification of this type is generated when security violation as specified by cgprsAccPtVerifyUpStrTpduSrcAddr occurs on an APN.
cgprsCgAlarmNotif	A cgprsCgAlarmNotif signifies that a GPRS (General Packet Radio Service) related alarm is detected in the managed system. This alarm is sent after an entry has been added to cgprsCgAlarmHistTable.
cgprsCgGatewaySwitch overNotif	A notification of this type is generated when the charging gateway is switched, the new charging gateway is identified by cgprsCgActiveChgGatewayAddress and the old charging gateway is identified by cgprsCgOldChgGatewayAddress. The switchover will happen according to the value set in cgprsCgGroupSwitchOverTime and the selection of the new CG will be according to the value set in cgprsCgSwitchOverPriority.
cgprsCgInServiceModeNotif	A notification of this type is generated when the GGSN charging function is in normal mode. This can be identified by cgprsCgServiceMode object.
cgprsCgInServiceModeNotif	A notification of this type is generated when the GGSN charging function is in normal mode. This can be identified by cgprsCgServiceMode object.
cgprsCgMaintenance ModeNotif	A notification of this type is generated when the GGSN charging function is in maintenance mode. This can be identified by cgprsCgServiceMode object.
cGtpPathFailedNotification	This notification is sent when one of this GSN's peers failed to respond to the GTP (GPRS Tunneling Protocol) Echo Request message for the waiting interval.
cilpPercentAddrUsedHiNotif	A notification indicating that the percentage of used addresses of an IP local pool is equal to or exceeds the threshold value indicated by cIpLocalPoolPercentAddrThldHi.
cilpPercentAddrUsedLoNotif	A notification indicating that the percentage of used addresses of an IP local pool went below the threshold value indicated by cIpLocalPoolPercentAddrThldLo.
ciscoDiaBaseProtPeerConnect ionDownNotif	A ciscoDiaBaseProtPeerConnectionDownNotif notification is sent when both the following conditions are true: The value of ciscoDiaBaseProtEnablePeerConnectionDownNotif is true(1) cdbpPeerStatsState changes to closed(1). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.

Trap Name	Description
ciscoDiaBaseProtPeerConnectionUpNotif	A ciscoDiaBaseProtPeerConnectionUpNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionUpNotif is true(1) • The value of cdbpPeerStatsState changes to either rOpen(6)or iOpen(7). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtPermanentFailureNotif	A ciscoDiaBaseProtPermanentFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePermanentFailureNotif is true(1) • The value of cdbpPeerStatsPermanentFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtProtocolErrorNotif	A ciscoDiaBaseProtProtocolErrorNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableProtocolErrorNotif is true(1) • The value of cdbpPeerStatsProtocolErrors changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtTransientFailureNotif	A ciscoDiaBaseProtTransientFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableTransientFailureNotif is true(1) • The value of cdbpPeerStatsTransientFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoIpLocalPoolInUseAddrNotif	A notification indicating that number of used addresses of an IP local pool exceeded the threshold value indicated by cIpLocalPoolStatInUseAddrThldHi.
cIscsiInstSessionFailure	Sent when an active session is failed by either the initiator or the target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiIntrLoginFailure	Sent when a login is failed by a initiator. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiTgtLoginFailure	Sent when a login is failed by a target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cPsdClientDiskFullNotif	A notification of this type is generated when the PSD (Persistent Storage Device) server's disk become full. If the disk of writable PSD server becomes full, the client shall not be able to write any CDR into the server. It shall then behave as a retrieve only PSD server.
cPsdClientDownNotif	A notification of this type is generated when the PSD server goes DOWN. If the PSD client was in write/retrieving state, then that operation shall be be stopped.
cPsdClientUpNotif	A notification of this type is generated when the PSD server comes UP. A GTP' (GTP enhanced for charging) path will be created fulfilling all the specific requirements of the PSD interface.

BWG Traps

The MWTM supports these BWG traps, listed in alphabetical order:

Trap Name	Description
ciscoAgwMaxBaseStation ExceededAbateNotif	A notification of this type is generated when the number of base stations goes below the percent of the maximum number of base stations as specified by the object cagwMaxBaseStationExceededNotifThreshold.
ciscoAgwMaxBaseStation ExceededOnsetNotif	A notification of this type is generated when the number of base stations exceeded the percent of the maximum number of base stations as specified by the object cagwMaxBaseStationExceededNotifThreshold.
ciscoAgwMaxSubscribers ExceededAbateNotif	A notification of this type is generated when the number of subscribers goes below the percent of the maximum number of base stations as specified by the object cagwMaxSubscribersExceededNotifThreshold.
ciscoAgwMaxSubscribers ExceededOnsetNotif	A notification of this type is generated when the number of subscribers exceeded the percent of the maximum number of base stations as specified by the object cagwMaxSubscribersExceededNotifThreshold.
ciscoAgwServiceDown Notif	A notification of this type is generated when the BWG is not in service.
ciscoAgwServiceUpNotif	A notification of this type is generated when the BWG is in service.

HA Traps

The MWTM supports these HA traps, listed in alphabetical order:

Trap Name	Description
cilpPercentAddrUsedHi Notif	A notification indicating that the percentage of used addresses of an IP local pool is equal to or exceeds the threshold value indicated by cIpLocalPoolPercentAddrThldHi.
cilpPercentAddrUsedLo Notif	A notification indicating that the percentage of used addresses of an IP local pool went below the threshold value indicated by cIpLocalPoolPercentAddrThldLo.
ciscoIpLocalPoolInUseAddrNotif	A notification indicating that number of used addresses of an IP local pool exceeded the threshold value indicated by cIpLocalPoolStatInUseAddrThldHi.
cmiHaMaxBindingsNotif	The HA total registrations reached maximum bindings. This notification is sent when the registration request from MN is rejected by the HA.
cmiHaMnRegReqFailed	The Mobile Node (MN) registration request failed notification. This notification is sent when the registration request from MN is rejected by the HA.
crRadiusServerRetransHiNotif	This notification indicates that the current number of server retransmissions are greater than or equal to crRadiusServerRetransThldHi. Once sent, this notification will be disarmed until the number of retransmissions falls below the value configured through crRadiusServerRetransThldNorm.
crRadiusServerRetransNormNotif	This notification indicates that the current number of server retransmissions are less than or equal to crRadiusServerRetransThldNorm. Once sent, this notification will be disarmed until the number of retransmissions exceed the value configured through crRadiusServerRetransThldHi.

Trap Name	Description
crRadiusServerRTTHiNotif	This notification indicates that the current server round-trip time is greater than or equal to crRadiusServerRTTThldHi. Once sent, this notification is disarmed until the round-trip time falls below the value configured through crRadiusServerRTTThldNorm.
crRadiusServerRTTNormNotif	This notification indicates that the current server round-trip time is less than or equal to crRadiusServerRTTThldNorm. Once sent, this notification is disarmed until the round-trip time exceeds the value configured through crRadiusServerRTTThldHi.
cslbcSlbDfpCongestionAbate	The server generates this notification when value of cslbcInstanceDfpValue object rises above the threshold indicated by the cslbcDfpCongestionAbateThreshold object.
cslbcSlbDfpCongestionOnset	The server generates this notification when value of cslbcInstanceDfpValue object drops below the threshold indicated by the cslbcDfpCongestionOnsetThreshold object.
mipAuthFailure	Indicates that the Mobile IP entity has an authentication failure when it validates the mobile Registration Request or Reply.

PDNGW Traps

The MWTM supports these PDNGW traps, listed in alphabetical order:

Trap Name	Description
cGgsnAccessPointNameNotif	This notification indicates the occurrence of a APN related alarm.
cGgsnGlobalErrorNotif	This notification indicates the occurrence of a GGSN related alarm.
cGgsnInServiceNotif	A notification of this type is generated when GGSN is placed in inService mode which is specified by cGgsnServiceModeStatus.
cGgsnMaintenanceNotif	A notification of this type is generated when GGSN is placed in maintenance mode which is specified by cGgsnServiceModeStatus.
cGgsnMemThresholdClearedNotif	A notification of this type is generated when GGSN retains the memory and falls below threshold value specified by cGgsnMemoryThreshold.
cGgsnMemThresholdReachedNotif	A notification of this type is generated when GGSN reaches the memory threshold value specified by cGgsnMemoryThreshold.
cGgsnPacketDataProtocolNotif	This notification indicates the occurrence of a User related alarm.
cGgsnSACsgStateDownNotif	This notification is generated when CSG state goes down.
cGgsnSACsgStateUpNotif	This notification is generated when CSG state goes up.
cGgsnSADccaAuthRejectedNotif	This notification is generated when credit-control server failed in authorization of end user. The PDP context is deleted and category is blacklisted.
cGgsnSADccaCreditLimReachedNotif	This notification is generated when the credit limit is reached. The credit-control server denies the service request since the end user's account could not cover the requested service. Client shall behave exactly as with cGgsnSADccaEndUsrServDeniedNotif.
cGgsnSADccaEndUsrServDeniedNif	This notification is generated when the credit- control server denies the service request due to service restrictions. On reception of this notif on category level, the CLCI-C shall discard all future user traffic for that category on that PDP context and not attempt to ask for more quotas during the same PDP context.
cGgsnSADccaRatingFailed	This notification is generated when the credit-control server cannot rate the service request, due to insufficient rating input, incorrect AVP combination or due to an AVP or an AVP value that is not recognized or supported in the rating.

Trap Name	Description
cGgsnSADccaUserUnknownNotif	This notification is generated when the specified end user is unknown in the credit-control server. Such permanent failures cause the client to enter the Idle state. The client shall reject or terminate the PDP context depending on whether the result code was received in a CCA (Initial) or CCA (Update).
cGtpPathFailedNotification	This notification is sent when one of this GSN's peers failed to respond to the GTP 'Echo Request' message for the waiting interval.
cIscsiInstSessionFailure	Sent when an active session is failed by either the initiator or the target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiIntrLoginFailure	Sent when a login is failed by a initiator. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiTgtLoginFailure	Sent when a login is failed by a target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cegCongestionClearedNotif	The gateway sends this notification, when the gateway congestion level goes below cegLowCongestionThreshold value. This gives an indication that the gateway has recovered from congestion and it can accept all calls.
cegCongestionHighThresholdNotif	The gateway sends this notification when the gateway congestion level goes above cegHighCongestionThreshold value. This gives an indication that the gateway is running at high congestion and at this state it would reject all new calls.
cegCongestionLowThresholdNotif	The gateway sends this notification when the gateway congestion level goes above cegLowCongestionThreshold value. This gives an indication that the gateway has returned back from the high congestion mark to the low congestion mark and at this state it can accept only the high priority calls and those with a lower priority would be rejected.
cegqR8CacMaxPdpExceededNotif	This notification is sent when the number of pdps on the gateway has reached the user-configured maximum (or threshold).
cegqR8CacUpgBRateBearerRejNotif	This notification is sent when bearers are Rejected/Downgraded by CAC due to requesting for higher bit rate than user-configured maximum for a certain QCI class.
cegqR8QciBWMaxReachedNotif	This notification is sent when the bandwidth allocated for a certain QCI class has been fully utilized and no further bearer can be admitted for this QCI class. The notification is sent when the bandwidth pool utilization reaches the value in the object cegqR8BWPoolQciAbsVal.
cgprsAccPtCfgNotif	A notification of this type is generated when an entry is generated in thecgprsAccPtCfgNotifHistTable and cgprsAccPtCfgNotifEnable is set to true.
cgprsAccPtInServiceNotif	A notification of this type is generated when APN is placed in in-service mode which is specified by cgprsAccPtOperationMode.
cgprsAccPtMaintenanceNotif	A notification of this type is generated when APN is placed in maintenance mode which is specified by cgprsAccPtOperationMode.
cgprsAccPtSecDestViolNotif	A notification of this type is generated when security violation as specified by cgprsAccPtVerifyUpStrTpduDstAddr occurs on an APN.
cgprsAccPtSecSrcViolNotif	A notification of this type is generated when security violation as specified by cgprsAccPtVerifyUpStrTpduSrcAddr occurs on an APN.

Trap Name	Description
cgprsCgAlarmNotif	A cgprsCgAlarmNotif signifies that a GPRS related alarm is detected in the managed system. This alarm is sent after an entry has been added to cgprsCgAlarmHistTable.
cgprsCgGatewaySwitchoverNotif	A notification of this type is generated when the charging gateway is switched, the new charging gateway is identified by cgprsCgActiveChgGatewayAddress and the old charging gateway is identified by cgprsCgOldChgGatewayAddress. The switchover will happen according to the value set in cgprsCgGroupSwitchOverTime and the selection of the new CG will be according to the value set in cgprsCgSwitchOverPriority.
cgprsCgInServiceModeNotif	A notification of this type is generated when the GGSN charging function is in normal mode. This can be identified by cgprsCgServiceMode object.
cgprsCgMaintenanceModeNotif	A notification of this type is generated when the GGSN charging function is in maintenance mode. This can be identified by cgprsCgServiceMode object.
cilpPercentAddrUsedHiNotif	A notification indicating that the percentage of used addresses of an IP local pool is equal to or exceeds the threshold value indicated by cIpLocalPoolPercentAddrThldHi.
cilpPercentAddrUsedLoNotif	A notification indicating that the percentage of used addresses of an IP local pool went below the threshold value indicated by cIpLocalPoolPercentAddrThldLo.
ciscoDiaBaseProtPeerConnectionDownNotif	A ciscoDiaBaseProtPeerConnectionDownNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionDownNotif is true(1) • cdbpPeerStatsState changes to closed(1). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtPeerConnectionUpNotif	A ciscoDiaBaseProtPeerConnectionUpNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionUpNotif is true(1) • The value of cdbpPeerStatsState changes to either rOpen(6)or iOpen(7). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtPermanentFailureNotif	A ciscoDiaBaseProtPermanentFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePermanentFailureNotif is true(1) • The value of cdbpPeerStatsPermanentFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtProtocolErrorNotif	A ciscoDiaBaseProtProtocolErrorNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableProtocolErrorNotif is true(1) • The value of cdbpPeerStatsProtocolErrors changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtTransientFailureNotif	A ciscoDiaBaseProtTransientFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableTransientFailureNotif is true(1) • The value of cdbpPeerStatsTransientFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoIpLocalPoolInUseAddrNotif	A notification indicating that number of used addresses of an IP local pool exceeded the threshold value indicated by cIpLocalPoolStatInUseAddrThldHi.

SGW Traps

The MWTM supports these SGW traps, listed in alphabetical order:

Trap Name	Description
cGgsnAccessPointNameNotif	This notification indicates the occurrence of a APN related alarm.
cGgsnGlobalErrorNotif	This notification indicates the occurrence of a GGSN related alarm.
cGgsnInServiceNotif	A notification of this type is generated when GGSN is placed in inService mode which is specified by cGgsnServiceModeStatus.
cGgsnMaintenanceNotif	A notification of this type is generated when GGSN is placed in maintenance mode which is specified by cGgsnServiceModeStatus.
cGgsnMemThresholdClearedNotif	A notification of this type is generated when GGSN retains the memory and falls below threshold value specified by cGgsnMemoryThreshold.
cGgsnMemThresholdReachedNotif	A notification of this type is generated when GGSN reaches the memory threshold value specified by cGgsnMemoryThreshold.
cGgsnPacketDataProtocolNotif	This notification indicates the occurrence of a User related alarm.
cGgsnSACsgStateDownNotif	This notification is generated when CSG state goes down.
cGgsnSACsgStateUpNotif	This notification is generated when CSG state goes up.
cGgsnSADccaAuthRejectedNotif	This notification is generated when credit-control server failed in authorization of end user. The PDP context is deleted and category is blacklisted.
cGgsnSADccaCreditLimReachedNotif	This notification is generated when the credit limit is reached. The credit-control server denies the service request since the end user's account could not cover the requested service. Client shall behave exactly as with cGgsnSADccaEndUsrServDeniedNotif.
cGgsnSADccaEndUsrServDeniedNif	This notification is generated when the credit- control server denies the service request due to service restrictions. On reception of this notif on category level, the CLCI-C shall discard all future user traffic for that category on that PDP context and not attempt to ask for more quotas during the same PDP context.
cGgsnSADccaRatingFailed	This notification is generated when the credit-control server cannot rate the service request, due to insufficient rating input, incorrect AVP combination or due to an AVP or an AVP value that is not recognized or supported in the rating.
cGgsnSADccaUserUnknownNotif	This notification is generated when the specified end user is unknown in the credit-control server. Such permanent failures cause the client to enter the Idle state. The client shall reject or terminate the PDP context depending on whether the result code was received in a CCA (Initial) or CCA (Update).
cGtpPathFailedNotification	This notification is sent when one of this GSN's peers failed to respond to the GTP 'Echo Request' message for the waiting interval.
cIscsiInstSessionFailure	Sent when an active session is failed by either the initiator or the target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cIscsiIntrLoginFailure	Sent when a login is failed by a initiator. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.

Trap Name	Description
cIscsiTgtLoginFailure	Sent when a login is failed by a target. The implementation of this trap should not send more than three notifications of this type in any 10 second time span.
cegCongestionClearedNotif	The gateway sends this notification, when the gateway congestion level goes below cegLowCongestionThreshold value. This gives an indication that the gateway has recovered from congestion and it can accept all calls.
cegCongestionHighThresholdNotif	The gateway sends this notification when the gateway congestion level goes above cegHighCongestionThreshold value. This gives an indication that the gateway is running at high congestion and at this state it would reject all new calls.
cegCongestionLowThresholdNotif	The gateway sends this notification when the gateway congestion level goes above cegLowCongestionThreshold value. This gives an indication that the gateway has returned back from the high congestion mark to the low congestion mark and at this state it can accept only the high priority calls and those with a lower priority would be rejected.
cegqR8CacMaxPdpExceededNotif	This notification is sent when the number of pdps on the gateway has reached the user-configured maximum (or threshold).
cegqR8CacUpgBRateBearerRejNotif	This notification is sent when bearers are Rejected/Downgraded by CAC due to requesting for higher bit rate than user-configured maximum for a certain QCI class.
cegqR8QciBWMaxReachedNotif	This notification is sent when the bandwidth allocated for a certain QCI class has been fully utilized and no further bearer can be admitted for this QCI class. The notification is sent when the bandwidth pool utilization reaches the value in the object cegqR8BWPoolQciAbsVal.
cgprsAccPtCfgNotif	A notification of this type is generated when an entry is generated in thecgprsAccPtCfgNotifHistTable and cgprsAccPtCfgNotifEnable is set to true.
cgprsAccPtInServiceNotif	A notification of this type is generated when APN is placed in in-service mode which is specified by cgprsAccPtOperationMode.
cgprsAccPtMaintenanceNotif	A notification of this type is generated when APN is placed in maintenance mode which is specified by cgprsAccPtOperationMode.
cgprsAccPtSecDestViolNotif	A notification of this type is generated when security violation as specified by cgprsAccPtVerifyUpStrTpduDstAddr occurs on an APN.
cgprsAccPtSecSrcViolNotif	A notification of this type is generated when security violation as specified by cgprsAccPtVerifyUpStrTpduSrcAddr occurs on an APN.
cgprsCgAlarmNotif	A cgprsCgAlarmNotif signifies that a GPRS related alarm is detected in the managed system. This alarm is sent after an entry has been added to cgprsCgAlarmHistTable.
cgprsCgGatewaySwitchoverNotif	A notification of this type is generated when the charging gateway is switched, the new charging gateway is identified by cgprsCgActiveChgGatewayAddress and the old charging gateway is identified by cgprsCgOldChgGatewayAddress. The switchover will happen according to the value set in cgprsCgGroupSwitchOverTime and the selection of the new CG will be according to the value set in cgprsCgSwitchOverPriority.
cgprsCgInServiceModeNotif	A notification of this type is generated when the GGSN charging function is in normal mode. This can be identified by cgprsCgServiceMode object.
cgprsCgMaintenanceModeNotif	A notification of this type is generated when the GGSN charging function is in maintenance mode. This can be identified by cgprsCgServiceMode object.

Trap Name	Description
cilpPercentAddrUsedHiNotif	A notification indicating that the percentage of used addresses of an IP local pool is equal to or exceeds the threshold value indicated by cIpLocalPoolPercentAddrThldHi.
cilpPercentAddrUsedLoNotif	A notification indicating that the percentage of used addresses of an IP local pool went below the threshold value indicated by cIpLocalPoolPercentAddrThldLo.
ciscoDiaBaseProtPeerConnectionDownNotif	A ciscoDiaBaseProtPeerConnectionDownNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionDownNotif is true(1) • cdbpPeerStatsState changes to closed(1). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtPeerConnectionUpNotif	A ciscoDiaBaseProtPeerConnectionUpNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePeerConnectionUpNotif is true(1) • The value of cdbpPeerStatsState changes to either rOpen(6)or iOpen(7). It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtPermanentFailureNotif	A ciscoDiaBaseProtPermanentFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnablePermanentFailureNotif is true(1) • The value of cdbpPeerStatsPermanentFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtProtocolErrorNotif	A ciscoDiaBaseProtProtocolErrorNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableProtocolErrorNotif is true(1) • The value of cdbpPeerStatsProtocolErrors changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoDiaBaseProtTransientFailureNotif	A ciscoDiaBaseProtTransientFailureNotif notification is sent when both the following conditions are true: • The value of ciscoDiaBaseProtEnableTransientFailureNotif is true(1) • The value of cdbpPeerStatsTransientFailures changes. It can be utilized by an NMS to trigger logical/physical entity table maintenance polls.
ciscoIpLocalPoolInUseAddrNotif	A notification indicating that number of used addresses of an IP local pool exceeded the threshold value indicated by cIpLocalPoolStatInUseAddrThldHi.

PCRF Traps

The MWTM supports these PCRF traps, listed in alphabetical order:

Trap Name	Description
alarmNotification	This is a notification of an alarm generated within the FusionWorks system.
applicationStateNotification	This notification is issued when an application changes state.
clearNotification	This is a clear notification for an alarm generated within the FusionWorks system.
componentStateNotification	This notification is issued when a component changes state.

Trap Name	Description
groupStateNotification	This notification is issued when a component group changes state.
objectStateNotification	This notification is issued when an object changes state.

PDSN Traps

The MWTM supports these PDSN traps, listed in alphabetical order:

Trap Name	Description
cCdmaAhdlcEngineDownNotif	This notification indicates an AHDLC engine is 'down' due to some fault through the desired state of the engine is 'up'.
cCdmaClusterCtrlStatusChange	Cluster member PDSN detects controller PDSN status change.
cCdmaClusterCtrlStatusChange2	Cluster member PDSN detects controller PDSN status change.
cCdmaClusterMemberStatusChange	Cluster controller detects member PDSN status change.
cCdmaClusterMemberStatusChange2	Cluster controller detects member PDSN status change.
cCdmaClusterSessionHighReached	This notification indicates a cluster session high threshold has been reached by PDSN cluster controller.
cCdmaClusterSessionLowReached	This notification indicates a cluster session low threshold has been reached by PDSN cluster controller. Service affected level: Major/Warning
cCdmaPcfMaxAllowedNotif	This notification indicates PDSN has reached the maximum number of allowed PCF. In this state request from new PCF will be rejected. Service affected level: critical
cCdmaPdsnStatusChange	This notification indicates status change of PDSN.
cCdmaSessionFormatErrorNotif	This notification indicates PDSN received invalid arguments from PCF leading to session termination. The agent should not generate more than 1 trap of this type per second to minimize the level of management traffic on the network
cCdmaSessionHighReached	This notification indicates a session high threshold has been has been reached.
cCdmaSessionLowReached	This notification indicates a session low threshold has been has been reached.
cCdmaSessionLowReached2	This notification indicates a session low threshold has been has been reached.
cCdmaSessionMaxAllowedNotif	This notification indicates PDSN has reached the maximum number of sessions the system can handle.In this state new session request will be rejected. Service affected level: critical

Trap Name	Description
cCdmaSessionRegReqFailedNotif	This notification indicates a Registration Request received has failed which may be due to one of the following reasons: • Insufficient resource • Administrative prohibition • MN authentication failure • Registration id mismatch • Bad request • Unknown HA address • T bit not set or unsupported VID The agent should not generate more than 1 trap of same type per second to minimize the level of management traffic on the network. Service affected level: minor
ciscoCdmaExtLoadHighReachedNotif	A notification of this type is generated by PDSN to indicated that PDSN has exceeds the maximum load configured. Maximum load on PDSN is based on the any one of following parameters bandwidth, cputhreshold, procmemthreshold and iomemthreshold. The notification reason object indicates the parameter that has exceeds the configured load.
ciscoCdmaExtLoadLowReachedNotif	his notification indicates PDSN has reached the ninety percent of the configured load after generating the ccpCdmaExtLoadHighReachedNotif notification. In this state new session request will be accepted.
cvpdnNotifSession	Conveys an event regarding the L2X session with the indicated session ID and Xconnect VCID.

APPENDIX H

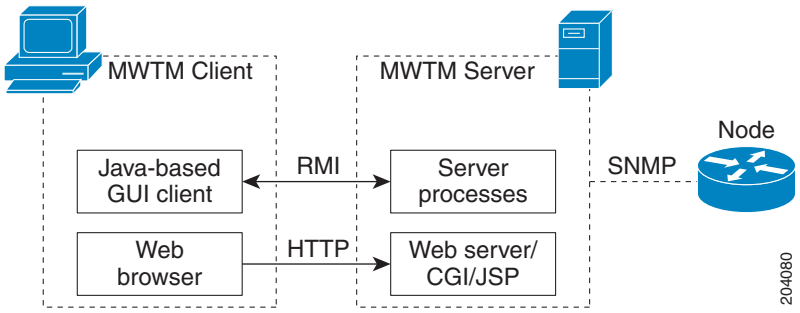
Configuring MWTM to Run with Various Networking Options

In addition to running on standard IP-connected networks, the Cisco Mobile Wireless Transport Manager (MWTM) has the flexibility to adapt to a variety of different networking environments, including Virtual Private Network (VPN), Network Address Translation (NAT), firewall, port-forwarding, and Secure Sockets Layer (SSL). The MWTM software can run in each of these environments individually, or in any combination of networking environments.

This appendix describes communication between the MWTM client and the MWTM server. Figure H-1 includes the following:

- Two-way Remote Method Invocation (RMI) communication between a Java-based GUI client and Java-based server processes. The client can send requests to and receive responses from the server, and the server can send unsolicited notifications to the client. For example, if the server detects that an ITP's state has changed, it sends a notification to all MWTM clients to update their topology windows.
- One-way HTTP communication between a web browser and an MWTM-embedded web server, using the request/response model.

Figure H-1 MWTM Communication



Note This appendix does not address communication between the MWTM server and the ITP, which uses the SNMP protocol for network management.

This appendix contains:

How Does RMI Work?

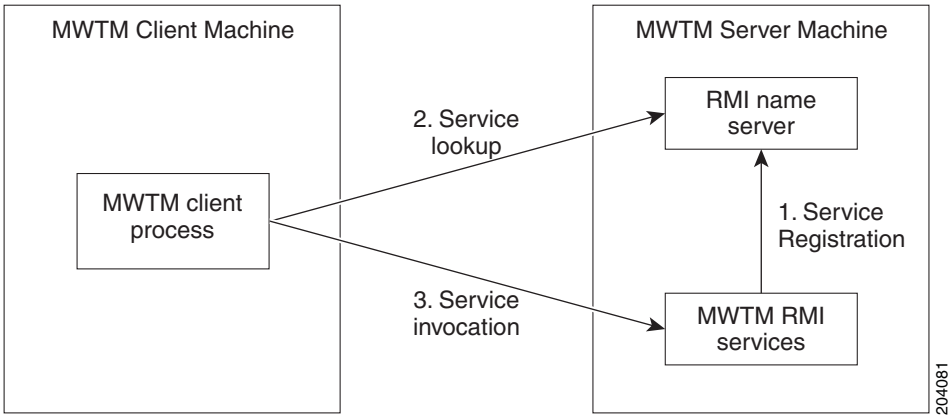
RMI is a Java-based technology that allows a Java application to communicate with another Java application (usually residing on different hosts) using remote method invocation. RMI marshals and unmarshals method parameters and return values using Java object serialization. It uses TCP connections as the default communication mechanism.

Understanding how RMI works can assist your understanding of the different scenarios presented in this appendix.

The types of RMI components that exist between the MWTM client and server communication are:

- **RMI name server**—Runs on the MWTM server
- **MWTM RMI services**—Runs on the MWTM server
- **MWTM client process**—Runs on the MWTM client

Figure H-2 RMI Components



When the MWTM server starts, the MWTM RMI services register with the RMI name server. These registered RMI services have one single published IP address.

When the MWTM client starts, it first establishes a TCP connection to the RMI name server and performs a service lookup. The RMI name server returns the published IP address for the MWTM RMI services. The MWTM client then establishes another TCP connection to the published IP address of the MWTM RMI services for client and server communication.

This appendix describes how to configure the MWTM software to adjust the communication process outlined previously, in order to make the MWTM work with NAT, Port-Forwarding, and/or a Dual-Interface MWTM server.

VPN Communication

Note VPN configuration is transparent to the user; no manual configuration is needed.

MWTM client/server communication can run transparently through a VPN tunnel, which is a secure IP layer, without any user intervention. You can use VPN to connect to a corporate network, then start the MWTM client to connect through the VPN tunnel to an MWTM server in the corporate network.

When the client host establishes a VPN tunnel, the operating system (or system library) sees this as another virtual IP interface. The VPN tunnel does not affect HTTP communication between the web browser and server, it only affects RMI communication between the MWTM client and server processes.

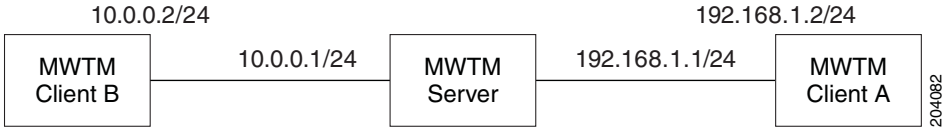
For HTTP communication, the virtual IP address is transparent to the upper layer. The operating system automatically chooses the correct IP address to send out the request packet. For RMI communication, the MWTM client must register with the MWTM server using the correct IP address, so that the server can invoke RMI callbacks and send unsolicited notifications to the client.

The MWTM software solves this problem by automatically detecting the local IP interface so that the MWTM server can send unsolicited notification to the correct IP address.

Figure H-3 shows a sample VPN network with these characteristics:

- The MWTM client with IP address 192.168.0.1 is connected to the MWTM server network through a VPN tunnel.
- The MWTM client host has obtained VPN IP address 10.1.1.2, which is a virtual IP interface.

Figure H-3 VPN Communication



When connecting to the MWTM server, the MWTM client automatically recognizes its VPN IP address, 10.1.1.2, and uses that address to register with the MWTM server to receive RMI callbacks.

NAT Communication

MWTM client/server communication can run through one or more static NAT-connected networks.

Note The MWTM software does not support dynamic NAT or dynamic NAT pool overloading.

In a static NAT network, the MWTM client and server reside on different sides of the NAT network, with no routes between the client network and the server network. The NAT device statically maps the client IP address to a NAT address in the server network, and the server IP address to a NAT address in the client network.

The NAT device translates packets between the MWTM client and server by replacing IP address headers when packets pass through. From the client's point of view, the server appears to be at a NAT IP address in the client network, and vice versa. For most protocols, this technique is sufficient to enable the client and server to communicate.

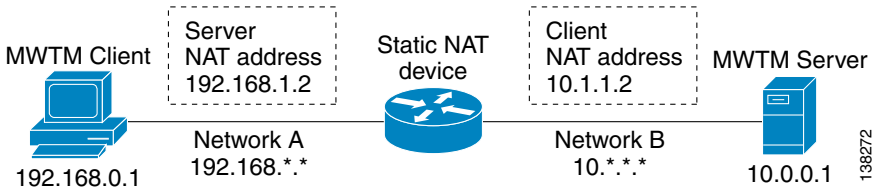
However, for the RMI protocol, this is not sufficient. The RMI protocol requires the client and server to keep remote object references by remote stubs. These remote stubs contain the remote objects' IP addresses, and are passed between the client and server using Java serialization. The NAT device only converts the IP addresses in the IP packet header, but the remote stub object is in the packet content. Therefore, the NAT device cannot recognize the IP address inside the packet, and fails to route it correctly.

The MWTM software solves this problem by creating a specialized NAT-aware socket factory. The user must perform some manual configuration to enable the MWTM to “know” the network NAT configuration.

Figure H-4 shows a sample static NAT network with these characteristics:

- A static NAT device connects Network A (192.168.*.*) to Network B (10.*.*.*), with no routes between Network A and Network B.
- The NAT device maps the MWTM client IP address 192.168.0.1 in Network A to 10.1.1.2 in Network B.
- The NAT device maps the MWTM server IP address 10.0.0.1 in Network B to 192.168.1.2 in Network A.

Figure H-4 Static NAT Communication



To configure the MWTM software in this static NAT network, you must change the MWTM client's *RMIOverNAT.properties* file.

- In Solaris/Linux, if you installed the MWTM software in the default directory, */opt*, then the location of the file is */opt/CSCOsgmClient/properties/RMIOverNAT.properties*.
- In Windows, if you installed the MWTM software in the default directory, *C:\Program Files*, then the location of the file is *C:\Program Files\SGMClient\properties\RMIOverNAT.properties*.
- If you installed the MWTM software in a different directory, then the file resides in that directory.

For the example shown in Figure H-4, you must add this line to the file:

10.0.0.1 = 192.168.1.2

This line maps the MWTM server's real IP address, 10.0.0.1 in Network B, to its NAT address, 192.168.1.2, in Network A, which is the server's IP address as seen by the client.

Note The MWTM server automatically detects the MWTM client's NAT address. No manual configuration on the part of the user is needed at the server side.

When the MWTM server starts, it starts MWTM services that register with the RMI server and publish themselves with the IP address specified in the SERVER_NAME property of *System.properties* file on the MWTM server. In the given example, the published IP address is 10.0.0.1.

The MWTM client starts and connects to 192.168.1.2 (specified as the MWTM client's default server address). The NAT device translates the MWTM client's request to the RMI server at 10.0.0.1.

The MWTM client then asks where the MWTM services are located. The RMI server replies that these MWTM services reside at 10.0.0.1. Without the *RMIOverNAT.properties* file on the MWTM client, the client will try to connect to 10.0.0.1, which would fail.

If we have configured the *RMIOverNAT.properties* file on the MWTM client as in the example, the MWTM client will still connect to 192.168.1.2 for name lookup, and the name server will return that MWTM services are running on 10.0.0.1. The MWTM client then looks in the *RMIOverNAT.properties* file, and discovers that the translated address for 10.0.0.1 is 192.168.1.2. With this configuration, the MWTM client will try to connect to 192.168.1.2 for RMI services (instead of 10.0.0.1). As the result, the connection will be established successfully.

Firewall Communication

To enable MWTM client/server communication through a firewall, you need to set up the firewall so that it allows MWTM communication packets to pass through freely.

This section contains:

Configuring Port Numbers and Parameters

Note The MWTM client and server communicate using TCP sockets. All port numbers in this section are TCP ports.

The port number used by the MWTM software is configured in the *System.properties* file:

- If you installed the MWTM software in the default directory, */opt*, then the location of the file is */opt/CSCOsgm/properties/System.properties*.
- If you installed the MWTM software in a different directory, then the file resides in that directory.

Set these parameters on the *server* side of the file:

RMIREGISTRY_PORT = 44742

DATASERVER_PORT = 0

LOGINSERVER_PORT = 0

WEB_PORT = 1774

where:

- RMIREGISTRY_PORT is the port on which the RMI naming server listens. You must specify a port number; **0** is not allowed.
- DATASERVER_PORT is the port on which the Data Service listens. If you specify **0**, the MWTM software uses a random available port, 1024 and above. The MWTM maintains the chosen port until the next server restart.
- LOGINSERVER_PORT is the port on which the Log in Service listens. If you specify **0**, the MWTM software uses a random available port, 1024 and above. The MWTM maintains the chosen port until the next server restart.
- WEB_PORT is the port on which the MWTM web server listens. You must specify a port number; **0** is not allowed. To change the WEB_PORT number, use the **mwtm webport** command (see mwtm webport, page B-95).

Note If any of these port numbers change, you must restart the MWTM server before the changes take effect.

Set these parameters in the MWTM *client's System.properties* file:

RMIREGISTRY_PORT = 44742

CLIENT_PORT = 0

where:

- RMIREGISTRY_PORT is the port on which the server-side RMI naming server listens. This port number must match the one specified for the RMIREGISTRY_PORT on the server side.
- CLIENT_PORT is the port on which the MWTM client listens for RMI callbacks (unsolicited notifications):
  - If you specify CLIENT_PORT = 0, the MWTM software uses any available port, 1024 and above.
  - If you specify CLIENT_PORT with a single value other than 0, such as CLIENT_PORT = 33459, the MWTM software uses that port, and you can run only one MWTM client process at a time.
  - If you specify CLIENT_PORT with a range of values other than 0, such as CLIENT_PORT = 33459-33479, the MWTM software can use any of the ports in the range, including the beginning and ending ports, and you can run more than one MWTM client process at a time.

Note If any of these port numbers change, you must restart the MWTM client before the changes take effect.

The MWTM client's *System.properties* file resides in the *properties* directory:

- In Solaris/Linux, if you installed the MWTM software in the default directory, */opt*, then the location of the file is */opt/CSCOsgmClient/properties/System.properties*.

- In Windows, if you installed the MWTM software in the default directory, *C:\Program Files*, then the location of the file is *C:\Program Files\SGMClient\properties\System.properties*.
- If you installed the MWTM software in a different directory, then the file resides in that directory.

Configuring Firewalls

Step 1 Identify the TCP port numbers to use between the MWTM server and client applications.

The MWTM software uses four TCP port numbers on the server side and two TCP port numbers on the client side to communicate between the MWTM server and client(s). These ports include the RMI Registry Port, the Data Server Port, the Login Server Port, the Client Port, and the HTTP Web Server port.

These ports are used for two way TCP connections between the MWTM server and client as follows:

1. For a client initiating a connection to the server, the initiating port on the client side is dynamic, and the target port on the server can be fixed by the DATASERVER_PORT and LOGINSERVER_PORT properties on the server.
2. For the server initiating a connection to the client (this is used for status change notifications), the initiating port on the server side is dynamic, and the target port on the client can be fixed by the CLIENT_PORT property on the client side.

You configure these port numbers in a plain-text file named *System.properties* located on the MWTM server and client. When configuring the MWTM software in a firewall deployment, you should use these port numbers:

- **RMI Registry Port**—44742
- **Data Server Port**—44751
- **Login Server Port**—44752
- **Client Port**—56173
- **HTTP Web Server Port**—1774

Step 2 Modify the *System.properties* file on the MWTM server. The *System.properties* file resides on the MWTM server under the */opt/CSCOsgm/properties* directory.

Note If the you installed the MWTM software in a location other than the default (*/opt/CSCOsgm*), substitute the correct directory name to locate the properties directory.

Caution Before editing, always make a backup of the file. This ensures a valid file exists in case an error is made during the editing process.

Using a text editor, edit this file and specify the appropriate port number where indicated subsequently:

Port Name	Keyword	Value
RMI Registry Port	RMIREGISTRY_PORT	44742
Data Server Port	DATASERVER_PORT	44751

Port Name	Keyword	Value
Login Server Port	LOGINSERVER_PORT	44752
HTTP Web Server Port	WEB_PORT	1774

Step 3 Modify the *System.properties* file on the MWTM client. The *System.properties* file resides on the MWTM client machine under:

- /opt/CSCOsgm/properties directory for Solaris clients
- *C:\Program Files\MWTMClient\properties* for Windows clients

Note If the you installed the MWTM software in a location other than the default (*/opt/CSCOsgmClient*), substitute the correct directory name to locate the properties directory.

Caution Before editing, always make a backup of the file. This ensures a valid file exists in case an error is made during the editing process.

Using a text editor, edit this file and specify the appropriate port number where indicated subsequently:

Port Name	Keyword	Value
RMI Registry Port	RMIREGISTRY_PORT	44742
Client Port	CLIENT_PORT	56173

Step 4 Modify the node configuration files with the chosen port numbers.

On Cisco nodes, you can use extended access lists to allow the chosen TCP port numbers to pass between the appropriate interface(s). Assuming a single node separates the MWTM client and server, you can use the following extended access list:

Note The *established* entries are necessary, as they allow data to flow between the server and client that initiated the session. Without this keyword, clients will not have access to the MWTM server.

```
# MWTM Client Interface
interface FastEthernet 1/1
  ip address 192.168.1.100 255.255.255.0
  ip access-group client-to-server in

# MWTM Server Interface
interface FastEthernet 2/1
  ip address 192.168.2.100 255.255.255.0
  ip access-group server-to-client in

# Access list from client to server
ip access-list extended client-to-server
  10 permit tcp any any established
  20 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 44742
  30 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 44751
  40 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 44752
  50 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 1774
```

```
# Access list from server to client
ip access list extended server-to-client
  10 permit tcp any established
  20 permit tcp host 192.168.2.2 192.168.1.0 0.0.0.255 eq 56173
```

Step 5 Restart the MWTM server to use the newly chosen TCP port numbers.

As the root user, on the MWTM server, type:

```
#/opt/CSCOsgm/bin
#./mwtm restart
```

The server processes restart using the newly chosen port numbers.

Sample Firewall Configuration

This sample shows how to configure your firewall from the server side, client side, and Cisco node side.

Figure H-5 shows a sample firewall network with these parameters set in the *System.properties* file:

- On the MWTM server side:

  RMIREGISTRY_PORT = 44742

  DATASERVER_PORT = 44751

  LOGINSERVER_PORT = 44752

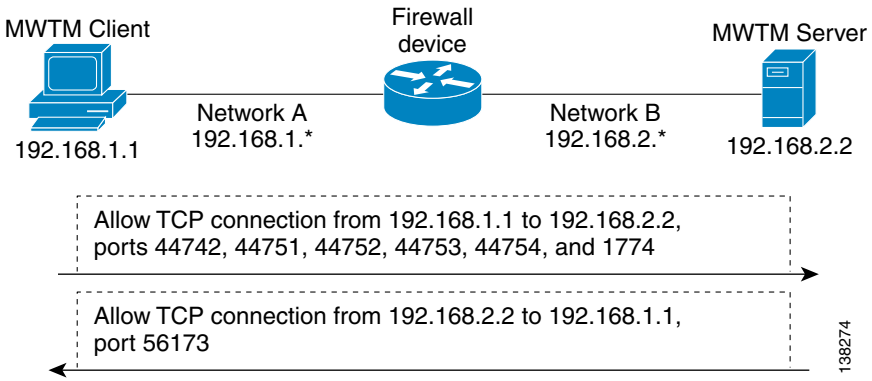
  WEB_PORT = 1774

- On the MWTM client side:

  RMIREGISTRY_PORT = 44742

  CLIENT_PORT = 56173

Figure H-5 Firewall Communication



This example illustrates a typical firewall configuration for Cisco nodes using access lists. This examples has two extended access lists:

- **ip access-list extended client-to-server**—This access list is applied on the input interface from the client to the server (FE 1/1).
- **ip access-list extended server-to-client**—This access list is applied on the input interface from the server to the client (FE 2/1).

```
!
ip access-list extended client-to-server
    10 permit tcp any any established
    20 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 44742
    30 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 44751
    40 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 44752
    50 permit tcp 192.168.1.0 0.0.0.255 host 192.168.2.2 eq 1774
!   60 …
!
ip access list extended server-to-client
    10 permit tcp any any established
    20 permit tcp host 192.168.2.2 192.168.1.0 0.0.0.255 eq 56173
!   30 …
!
interface FastEthernet 1/1
    ip address 192.168.1.100 255.255.255.0
    ip access-group client-to-server in
!   …
!
interface FastEthernet 2/1
    ip address 192.168.2.100 255.255.255.0
    ip access-group server-to-client in
!   …
!
```

Note Both of these access lists allow established TCP connections (*10 permit tcp any any established, see previous*). When the MWTM client or server establishes a TCP connection to the other end, it uses a fixed destination port. However, the source port from the initiating party is random. The established keyword allows a returning TCP packet to go back to the random initiating source port.

Port-Forwarding Communication

To enable the MWTM software to operate in a TCP port-forwarding environment, perform these configuration tasks:

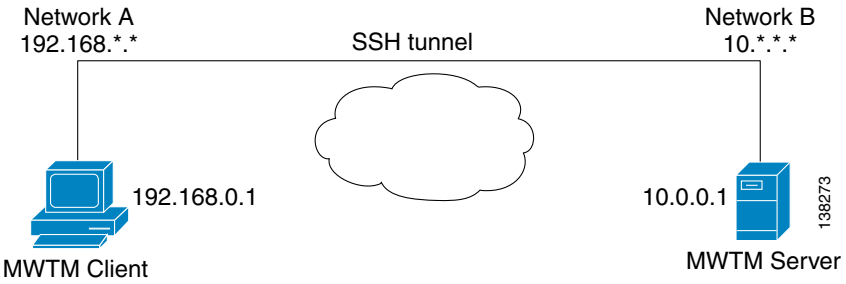
Step 1 Configure the server hostname and port number mapping in the MWTM client's *RMIOverNAT.properties* file, as described in NAT Communication, page H-4.

Step 2 Configure the port numbers used by the MWTM client and server in the *System.properties* file, as described in Firewall Communication, page H-5.

Step 3 Configure the port-forwarding tunnel to forward each side's TCP connection to the other side.

Figure H-6 shows a sample network that uses Secure Shell (SSH) port-forwarding. Other port-forwarding configurations might use a single host with dual interfaces at the client's and server's networks. While other port-forwarding configurations might differ from this example, the general rules to configure the MWTM software to operate in a port-forwarding environment are the same.

Figure H-6 Port-Forwarding Communication



The port-forwarding network shown in Figure H-6 has these parameters set:

- In the *System.properties* file, on the MWTM server side:

  RMIREGISTRY_PORT = 44742

  DATASERVER_PORT = 44751

  LOGINSERVER_PORT = 44752

  WEB_PORT = 1774

- In the *System.properties* file, on the MWTM client side:

  RMIREGISTRY_PORT = 44742

  CLIENT_PORT = 56173

- In the MWTM client's *RMIOverNAT.properties* file:

  10.0.0.1/44742 = 127.0.0.1/25742

  10.0.0.1/44751 = 127.0.0.1/25751

  10.0.0.1/44752 = 127.0.0.1/25752

  10.0.0.1/1774 = 127.0.0.1/8080

- In the port-forwarding network:

  Local port 25751 => remote host 127.0.0.1, port 44742

  Local port 25751 => remote host 127.0.0.1, port 44751

  Local port 25752 => remote host 127.0.0.1, port 44752

  Local port 8080 => remote host 127.0.0.1, port 1774

  Remote port 56173 => local host 127.0.0.1, port 56173

Note For port-forwarding setup, the backward-forwarding port numbers must match each other. In the previous example, both are 56173. The forward-forwarding port numbers do not need to match each other.

If you want to run more than one MWTM client process at the same time on the same node, you must specify CLIENT_PORT with a range of values other than 0, such as CLIENT_PORT = 33459-33479, in the MWTM client's *RMIOverNAT.properties* file. See Firewall Communication, page H-5 for more information about specifying the CLIENT_PORT parameter. You must also set up the backward-forwarding port numbers to use a range of values.

When the MWTM server starts, underlying network services register with the RMI server and publish themselves with the IP address specified in the SERVER_NAME property of the *System.properties* file on the MWTM server. In the given example, the published IP address is 10.0.0.1.

The MWTM client starts and connects to the localhost/127.0.0.1 (specified as the MWTM client's default server address). The SSH port-forwarding tunnel forwards the MWTM client's request to the RMI server at the MWTM server's localhost/127.0.0.1.

The MWTM client then asks where the MWTM services are located, and the RMI server replies that these MWTM services reside at 10.0.0.1. Without the *RMIOverNAT.properties* file on the MWTM client, the client would try to connect to 10.0.0.1, which would fail because of a network routing problem.

If we have configured the *RMIOverNAT.properties* file on the MWTM client as in the example, the MWTM client will still connect to the localhost/127.0.0.1 for name lookup, and the name server would return that MWTM services are running on 10.0.0.1. The MWTM client then looks in the *RMIOverNAT.properties* file, and discovers that the translated address for 10.0.0.1 is 127.0.0.1. With this configuration, the MWTM client will try to connect to 127.0.01 for RMI services (instead of 10.0.0.1). As a result, the connection will establish successfully.

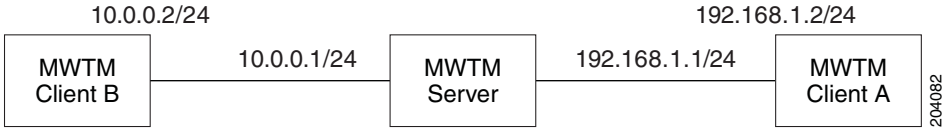
Configuring MWTM to Work With a Dual-Interface Machine Connected to Separate Networks

The MWTM client and server communication is based on Java RMI protocol. A limitation of RMI is its inability to publish itself with more than one specific IP address. This means that the RMI service can only register to one single interface on a dual interface machine. You can deploy the MWTM server on a dual interface machine in various scenarios:

- In some scenarios, all MWTM clients run on one side of the MWTM server interface, with no MWTM clients on the other side of the interface (for example, the other MWTM server interface is exclusively used for network management/SNMP traffic). In this scenario, ensure that the MWTM server published address is the interface connected to the MWTM clients. To change the published address of the MWTM server, see mwtm servername, page B-62.
- In some other scenarios, the two MWTM server interfaces are connected to the same network, or the two interfaces are connected to two different networks, but these networks are routed between each other. Typically, the intention is to use two physical interfaces to provide redundancy on the MWTM server. When providing physical interface redundancy, you should use Cisco Server Load Balancing technology. For details on configuring the MWTM software with this scenario, see Configuring MWTM with IOS Server Load Balancing, page H-16.

This section describes a third scenario: how to configure the MWTM software to work with a dual-interface machine that is connected to two separate networks. Both networks have MWTM clients that need to connect to the MWTM server. Figure H-7 is a diagram of a sample network where a single MWTM server is connected to two separate networks. Two MWTM clients, A and B, are on these two separate networks and need to communicate with the MWTM server.

Figure H-7 Sample Network



In this network configuration, the two networks (192.168.1.0/24 and 10.0.0.0/24) are not routed between each other. If the two networks were routed between each other (for example, if MWTM client B at 10.0.0.2 could reach the MWTM server at 192.168.1.1), you would configure the MWTM server with the 192.168.1.1 address, which would enable MWTM client A and MWTM client B to connect to the MWTM server.

The following sections give an example of how to configure the MWTM software to work with MWTM clients on both networks.

MWTM Server Configuration

The MWTM server can publish only one single IP address on the MWTM server machine. To configure this published address, use the **mwtm servername** command (see mwtm servername, page B-62).

For example, a system administrator configures the MWTM server to use the 192.168.1.1 address, by running the command **mwtm servername 192.168.1.1** on the MWTM server machine. The MWTM server will restart for the change to take effect. The command changes the *System.properties* file on the MWTM server to contain following line:

```
SERVER_NAME = 192.168.1.1
```

MWTM Client A Configuration

No special configurations are required on MWTM client A. Because this client is on the same network as the MWTM server binding interface, MWTM client A can communicate freely with the MWTM server.

You do need to ensure that during installation, MWTM client A has set up the MWTM server IP address as 192.168.1.1.

If the initial installation has incorrect information, you can change the MWTM server IP address to 192.168.1.1 using the **mwtm servername** command, or you can use the Change Default MWTM Server option on the MWTM client menu. For detailed information, see mwtm servername, page B-62, or Changing the Default MWTM Server Name, page 3-26.

MWTM Client B Configuration

When the MWTM server starts up on a dual-interface machine, it starts the RMI server and binds it to all the interfaces.

The MWTM server then starts all MWTM services and binds them to all the interfaces. These MWTM services then register with the RMI server and publish themselves with the IP address specified in the SERVER_NAME property of the *System.properties* file on the MWTM server. In the given example, the published IP address is 192.168.1.1.

MWTM client B starts up, connecting to 10.0.0.1 (specified as the MWTM client B default server address). MWTM client B connects to the RMI server at 10.0.0.1.

MWTM client B then asks where the MWTM services are located. The RMI server replies that these MWTM services reside at 192.168.1.1. Without the *RMIOverNAT.properties* file on the MWTM client B, the client would try to connect to 192.168.1.1, which would fail.

If we have configured the *RMIOverNAT.properties* file on MWTM client B as in the example, MWTM client B will still connect to 10.0.0.1 for name lookup, and the name server will return that MWTM services are running on 192.168.1.1. The MWTM client then looks in the *RMIOverNAT.properties* file, and discovers that the translated address for 192.168.1.1 is 10.0.0.1. With this configuration, MWTM client B will try to connect to 10.0.0.1 (instead of 192.168.1.1) for RMI services. As the result, the connection will establish successfully.

Configuring MWTM client B involves two things:

- First, ensure that MWTM client B has setup the MWTM server IP address as 10.0.0.1 during installation.

  If the initial installation has incorrect information, you can also change the MWTM server IP address to 10.0.0.1 using the **mwtm servername 10.0.0.1** command, or using the Change Default MWTM Server option on the MWTM client menu.

- Next, you must edit the *RMIOverNAT.properties* file on the MWTM client machine. On a Windows client, the default location of this file is *C:\ProgramFiles\SGMClient\properties\RMIOverNAT.properties*. On a Solaris client, the default location of this file is */opt/CSCOmwcClient/properties/RMIOverNAT.properties*.

  Add this line in the *RMIOverNAT.properties* file:

  ```
  192.168.1.1 = 10.0.0.1
  ```

After you have completed these steps, MWTM client B will be able to connect to the MWTM server even if the MWTM server published address 192.168.1.1 is unreachable from MWTM client B. MWTM client B will convert 192.168.1.1 to a reachable IP address 10.0.0.1 for client to server TCP connection.

Additional Network Configurations

Numerous other network configurations are not directly addressed here. The MWTM client and server can work with most of these networks, as long as the MWTM client and server can establish an SSH connection.

A few examples of alternative network configurations are:

- Dynamic NAT, where the MWTM client and server are on two different sides of the dynamic NAT network.
- A situation where the MWTM client is in a trusted network and the MWTM server is in a public network, but the firewall does not allow a direct TCP connection made from the MWTM server to the MWTM client.
- A situation where the MWTM server is in a trusted network and the MWTM client is in a public network, but the firewall does not allow a direct TCP connection made from MWTM client to MWTM server.

To allow the MWTM client and server communication in these network environments, you can establish a SSH connection between the MWTM client and the MWTM server using SSH port-forwarding (for details, see Port-Forwarding Communication, page H-10).

SSL Communication

If SSL is implemented and enabled in your MWTM system, the MWTM software uses secure socket communication for both RMI and HTTP communication between the MWTM client and server.

The MWTM software supports standard-based SSL encryption algorithms, including RSA, DSA public key algorithms, and 40-bit or 128-bit encryption. The MWTM software can generate an X.509 certificate and a certificate signing request (CSR), which is interoperable with most certificate authorities (CAs).

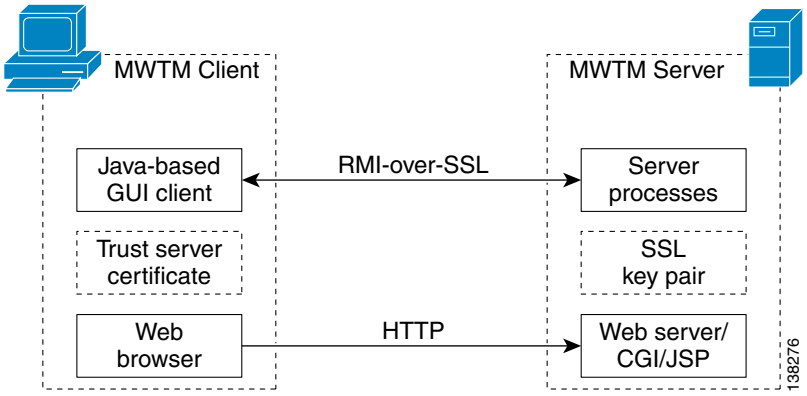
Both the MWTM web server and the MWTM server processes share the same SSL key/certificate pair. In addition, the MWTM client and the web browser can examine the server's certificate.

For more information, including descriptions of the MWTM commands and procedures used to implement, enable, manage, and monitor SSL support, see Implementing SSL Support in the MWTM, page 2-21.

Figure H-8 shows a sample MWTM-over-SSL network with these characteristics:

- A user-generated SSL key pair on the MWTM server.
- The server's certificate is trusted on the MWTM client.
- Communication between the client and server is RMI-over-SSL and HTTPS. Both protocols are encrypted and secure.

Figure H-8 SSL Communication



Configuring MWTM with IOS Server Load Balancing

If a network failure causes the MWTM software to fail, you can no longer monitor your network. You can solve this potential problem by configuring a backup MWTM server, as detailed in Configuring a Backup MWTM Server, page 5-9. However, this solution requires a connection to the backup MWTM server, which might not mirror exactly the primary MWTM server.

A better solution is to use IOS Server Load Balancing (IOS SLB), which provides transparent failover of the MWTM client connection.

Use this procedure to configure the MWTM software with IOS SLB:

Step 1 Ensure that you have this required hardware and software:

- Solaris/Linux server with at least two network interface cards (NICs)
- Cisco 7204VXR or 7206VXR series node
- IOS SLB release 12.1(11b)E or later
- MWTM release 6.1 or later

Step 2 Configure the Solaris/Linux server with at least two active NICs.

Step 3 Configure a routing protocol on the Solaris/Linux server, such that if one network interface fails, the other interfaces can still contact the monitored networks and the MWTM client:

- Run **in.routed** on the Solaris/Linux server, with two RIP-based nodes on two separate networks providing routing tables for the server. See the **in.routed** man page for more information on this configuration.
- Use the GateD routing software developed by NextHop Technologies.

Step 4 Configure the Cisco 7204VXR or 7206VXR series router, with the Solaris/Linux server network interfaces configured as real servers in the server farm. Refer to the IOS SLB feature module for more information on configuring the IOS SLB node.

Step 5 Configure a virtual interface, lo0:1 with the Internet address that matches the virtual IP address configured on the IOS SLB node:

ifconfig lo0:1 addif *ip-address*

Step 6 Install the MWTM software.

Step 7 Edit the */opt/CSCOsgm/properties/System.properties* file, and replace the SERVER NAME variable with the DNS entry that matches the virtual IP address configured on the IOS SLB node. Save your changes and restart the MWTM server.

Step 8 Configure your MWTM clients to match the same DNS entry.

Your configuration is complete.

Remember that:

- Failover of the MWTM client is transparent to the user. No additional changes are needed at that end.
- A failure of either interface, or of the surrounding networks, might cause the MWTM client to hang for a short period, depending on the convergence of the routing protocol used by the MWTM server. For example, with RIP, the MWTM client might hang for up to two minutes while RIP converges after a network failure. Faster protocols might result in shorter MWTM client hang times.

APPENDIX I

MWTM Ports

The Cisco Mobile Wireless Transport Manager (MWTM) uses the following default ports to provide services:

Port Name or Number	Port Type	Description
1774	tcp	Apache web server
1775	tcp	TOMCAT Java Server Pages (JSP) server
44742	tcp	Java Remote Method Invocation (RMI) naming service
dynamic port 1	tcp	Java RMI service for Login Service. A network or system administrator can specify a fixed port using the LOGINSERVER_PORT parameter in the *System.properties* file. **Note** If you installed the MWTM in the default directory, */opt*, then the location of the *System.properties* file is */opt/CSCOsgm/properties/System.properties*. If you installed the MWTM in a different directory, then the *System.properties* file resides in that directory.
dynamic port 2	tcp	Java RMI service for the MWTM Data Server. A network or system administrator can specify a fixed port using the DATASERVER_PORT parameter in the *System.properties* file. **Note** If you installed the MWTM in the default directory, */opt*, then the location of the *System.properties* file is */opt/CSCOsgm/properties/System.properties*. If you installed the MWTM in a different directory, then the *System.properties* file resides in that directory.
162	udp	Simple Network Management Protocol (SNMP) trap listener
dynamic ports 1-25	udp	SNMP request senders. These ports are used by the SNMP stack for sending SNMP requests. A maximum of 25 can be opened in the MWTM. You can customize the number of ports by changing the SNMP_SOCKET_NUMBER parameter in the *Server.properties* file. **Note** If you installed the MWTM in the default directory, */opt*, then the location of the *Server.properties* file is */opt/CSCOsgm/properties/Server.properties*. If you installed the MWTM in a different directory, then the *Server.properties* file resides in that directory.

GLOSSARY

This glossary contains Cisco Mobile Wireless Transport Manager (MWTM) specific terms. For an online listing of other internetworking terms and acronyms, see this URL:

http://docwiki.cisco.com/wiki/Category:Internetworking_Terms_and_Acronyms_(ITA)

A

access list — A list kept by routers to control access to or from the router for a number of services (for example, to prevent packets with a certain IP address from leaving a particular interface on the router).

accounting — Collection of SS7 accounting statistics.

adjacent node — In the MWTM, for a given pair of connected nodes, the node that the MWTM discovered second. See primary node.

adjacent point code — Point code of the adjacent ITP signaling point for the linkset. Contrast with local point code.

aggregation site — A Base Station Controller (BSC) or Radio Network Controller (RNC) site where traffic is collected for multiple cell sites. See cell site.

alarm — An alarm is a sequence of events, each representing a specific occurrence in the alarm lifecycle. The lifecycle of an alarm can include any number of related events that are triggered by changes in severity, updates to services, and so on. See event.

alias point code — See capability point code.

ANSI — American National Standards Institute.

API — Application Programming Interface. A source code interface that a computer system or program library provides to support requests for services by a computer program.

APN — Access Point Name.

application server — Logical entity serving a specific routing key. The application server implements a set of one or more unique application server processes, of which one or more is normally actively processing traffic. See application server process, application server process association, routing key, signaling gateway-mated pair.

application server process — IP-based instance of an application server, such as Call Agents, HLRs, SMSCs, and so on. An application server process can implement more than one application server. See application server, application server process association, routing key, signaling gateway-mated pair.

application server process association — ITP's virtual view of an application server process. The application server process association is defined on, and resides on, the ITP. See application server, application server process, routing key, signaling gateway-mated pair.

arrowhead In topology maps, indicator for an application server process association connection. See topology map.

auto save Setting that enables the MWTM to save changes automatically when you exit the MWTM.

auto start Setting that enables the MWTM to start a process automatically when the Process Manager is started. See Data Server, Message Log Server, Process Manager, Trap Receiver.

B

base station controller See BSC.

base transceiver station See BTS.

browser GUI-based hypertext client application, such as Internet Explorer or Mozilla, used to access hypertext documents and other services located on innumerable remote servers throughout the World Wide Web (WWW) and Internet.

BSC Base Station Controller. Equipment that manages radio resources in a GSM network.

BTS Base Transceiver Station. The equipment in a GSM network that is used to transmit radio frequencies over the air waves.

C

capability point code Point code shared by more than one signaling point, each of which is also assigned a "real" point code. Also called alias point code.

CDMA Code Division Multiple Access.

cell site A Base Transceiver Station (BTS) or Node B site, usually located at the remote site with limited connectivity. See aggregation site.

circle In topology maps, indicator for a link that is part of a virtual linkset, associated with the closest node. See topology.

circle layout Topology map layout in which objects are arranged in a circle, connected by links. Contrast with spring layout. See topology map.

Cisco IOS software Cisco Internetwork Operating System software. Cisco system software that provides common functionality, scalability, and security for many Cisco products. The Cisco IOS software allows centralized, integrated, and automated installation and management of internetworks, while ensuring support for a wide variety of protocols, media, services, and platforms.

CLI Command line interface. An interface that allows the user to interact with the Cisco IOS software operating system by entering commands and optional arguments.

client Node or software program that requests services from a server. The MWTM user interface is an example of a client. See also server.

client view User-customized subset of the DEFAULT view. See also DEFAULT view, view, subview.

CLLI code COMMON LANGUAGE Location Identification Code for a node. A CLLI code is a standardized 11-character identifier that uniquely identifies the geographic location of the node.

COA Change of Authorization.

command line interface See CLI.

community name See community string.

community string Text string that acts as a password and is used to authenticate messages sent between a management station and a node containing an SNMP agent. The community string is sent in every packet between the manager and the agent. Also called community name, read community.

congestion Condition in which a link has too many packets waiting to be sent. This condition could be caused by the failure of an element in the network. Possible levels are None, Low, High, and Very High, which correspond roughly to equivalent ANSI, China standard, ITU, NTT, and TTC congestion levels.

console log Log containing unexpected error and warning messages from the MWTM server, such as those that might occur if the MWTM server cannot start.

cost Measure of the suitability of a route to a destination, relative to other routes. Costs range from 1 (lowest cost and highest priority) through 9 (highest cost and lowest priority).

credentials Login credentials that are stored in an encrypted file on the server, eliminating the need for users to login before running commands. The MWTM enables a system administrator to configure the login credentials using the Node SNMP and Credentials Editor dialog box.

cross-instance GTT file Global Title Translation file that supports the Multiple Instance and Instance Translation ITP features. Cross-instance GTT files contain application groups that reference point codes in other GTT files. See Instance Translation, Multiple Instance.

CSV Comma-separated values. A widely-used file format for storing tabular data.

current view View that is currently in use on an MWTM client. The view can be the DEFAULT view or a customized view. Also called current view. See client view, DEFAULT view.

D

Data Server Multi-threaded process that handles most of the work done by the MWTM, including discovery, polling, and scheduling. See also Message Log Server, Process Manager, Trap Receiver.

DEFAULT view View into which the MWTM places all discovered objects when discovering the network. The DEFAULT view is stored on the MWTM server and shared by all MWTM clients, but it cannot be modified by the clients. See current view, view.

demand polling User-initiated poll of selected nodes. Contrast with status polling.

destination linkset In ITP route tables, linkset associated with the destination point code. Also called the output linkset. See linkset, destination point code, route table.

destination point code In ITP route tables, point code of the adjacent signaling point, the destination for packets on the selected signaling point. See destination linkset, point code, route table.

device See node.

device type In MWTM, the type of a discovered device, either a Cisco device or a BTS, BSC, or legacy SS7 device. Also called system object ID. See legacy device.

diamond In topology maps, indicator for a connection that is part of a configured interface, associated with the closest node. See topology.

discovered Object that has been discovered by the MWTM. Also called *known*. Contrast with unknown.

Discovery Process by which the MWTM discovers objects in your network. See also nonrecursive Discovery, recursive Discovery.

display name User-specified name for a node. Contrast with DNS name. See also node name.

domain name The style of identifier—a sequence of case-insensitive ASCII labels separated by dots ("bbn.com.")—defined for subtrees in the Internet Domain Name System [R1034] and used in other Internet identifiers, such as host names, mailbox names, and URLs.

Domain Name System See DNS.

double triangle In topology maps, indicator for a connection that has multiple interfaces, such as two linksets between the same two signaling points. See topology map.

DNS Domain Name System. System used on the Internet for translating names of network nodes into addresses.

DNS name Initial name of a node, as discovered by the MWTM. Contrast with display name. See also node name.

DPC See destination point code.

E

Erlang (E) The international (dimensionless) unit of the average traffic intensity (occupancy) of a facility during a period of time, normally, a busy hour. The number of Erlangs is the ratio of the time during which a facility is occupied (continuously or cumulatively) to the time this facility is available for occupancy. Another definition is the ratio of the average call arrival rate into the system, to the average call duration. One Erlang is equivalent to 36 ccs (completed call seconds), which is another traffic intensity unit.

event An event is a singular occurrence in time. Events are derived from incoming traps and notifications, and from detected status changes.

The MWTM can detect events that are triggered by SNMP traps or notifications, status changes, and user actions. See trap, alarm.

event forwarding See trap forwarding.

exclude Removing a network object from a view, while retaining the object in the MWTM database.

F

Field Replaceable Units — See FRU.

FRU — Assemblies such as power supplies, fans, processor modules, interface modules, and so forth.

G

GGSN — Gateway GPRS Support Node. A gateway that provides mobile cell phone users access to a public data network or specified private IP networks.

GPRS — General Packet Radio Service. A 2.5G mobile communications technology that enables mobile wireless service providers to offer their mobile subscribers packet-based data services over GSM networks.

GSM — ITU standard for defining the Global System for Mobile communications, a digital cellular telephone standard.

Global System for Mobile communications — See GSM.

graphical element — Graphical representation of an object or view in the topology map. See topology map.

graphical user interface — See GUI.

GTP — GPRS Tunneling Protocol. A protocol that enables the connection between the SGSN and the GGSN.

GTT — Global Title Translation. The process by which the SCCP translates a global title into the point code and subsystem number of the destination service switching point where the higher-layer protocol processing occurs.

GUI — Graphical user interface. User environment that uses pictorial as well as textual representations of the input and output of applications and the hierarchical or other data structure in which information is stored. Conventions such as buttons, icons, and windows are typical, and many actions are performed using a pointing device (such as a mouse). Microsoft Windows and the Apple Macintosh are prominent examples of platforms utilizing a GUI.

H

host — Computer system on a network. Similar to the term node except that host usually implies a computer system, whereas node generally applies to any network system, including access servers and ITP, IPRAN, or mSEF devices. See also node.

host address — See host number.

host number — Part of an IP address that designates which node on the subnetwork is being addressed. Also called a host address.

HSL High-speed link. An HSL link is one that uses use the SS7-over-ATM (Asynchronous Transfer Mode) high-speed protocol.

HTML Hypertext Markup Language. Simple hypertext document formatting language that uses tags to indicate how a given part of a document should be interpreted by a viewing application, such as a web browser. See also hypertext and browser.

hypertext Electronically-stored text that allows direct access to other texts by way of encoded links. Hypertext documents can be created using HTML, and often integrate images, sound, and other media that are commonly viewed using a browser. See also HTML and browser.

Hypertext Markup Language See HTML.

I

ignore Exclude an object when aggregating and displaying MWTM status information. See also unignore.

IMSI International Mobile Subscriber Identity. A unique 15-digit code that identifies an individual user on a GSM network.

installation log Log containing messages and other information recorded during installation.

Instance Translation ITP feature in support of the Multiple Instance feature that enables the conversion of packets between instances of any variant. Each instance is a separate domain with a defined variant, network indicator, ITP point code, optional capability point code, and optional secondary point code. Each instance also has its own routing table and GTT file. See cross-instance GTT file, Multiple Instance.

interface Connection between two systems or devices. In the MWTM, an interface is a connection on an ITP, IPRAN, or mSEF node.

internal ID Unique identifier assigned by the MWTM, for its own internal use, to every event, link, linkset, and node.

Internet Protocol See IP.

IP Internet Protocol. Network layer protocol in the TCP/IP stack offering a connectionless internetwork service. IP provides features for addressing, type-of-service specification, fragmentation and reassembly, and security. Documented in RFC 791.

IP address 32-bit address assigned to hosts using TCP/IP. An IP address belongs to one of five classes (A, B, C, D, or E) and is written as 4 octets separated by periods (dotted decimal format). Each address consists of a network number, an optional subnetwork number, and a host number. The network and subnetwork numbers together are used for routing, while the host number is used to address an individual host within the network or subnetwork. A subnet mask is used to extract network and subnetwork information from the IP address. CIDR provides a new way of representing IP addresses and subnet masks. See also IP.

IP backhaul A trunk that transports optimized voice and data traffic between a remote cell-site, RAN-O node and an aggregation RAN-O node at a central site.

IPC Inter Processor Communication.

ITP Part of Cisco's hardware and software SS7-over-IP (SS7oIP) solution. ITP provides a reliable, cost-effective medium for migrating Signaling System 7 (SS7), the telecommunications network signaling technology, to the mobile wireless industry IP environment. ITP off-loads SS7 Short Messaging Service (SMS) traffic onto the IP network, replacing the mobile service provider's signaling network with a redundant IP cloud.

ITU International Telecommunication Union.

K

known See discovered.

L

LAN Local Area Network.

legacy device In the MWTM, an SS7 device that is not a Cisco ITP or a Cisco RAN-O node. Legacy devices include MSCs, SCPs, SSPs, STPs, BSCs, and BTSs. See MSC, SCP, SS7, SSP, STP, BTS, BSC.

link In ITP, the connection between nodes. See ITP, linkset, node.

link type In the MWTM, the type of a discovered ITP link, either SCTP IP or serial. See HSL, SCTP, serial, virtual link.

linkset In ITP, a grouped set of links. In the MWTM, a representation of two linksets associated with two nodes, one for each side of a logical connection. See ITP, link, node.

linkset pair In the MWTM, a single linkset with input from the perspective of both of its endpoints. See also linkset.

linkset type In the MWTM, the type of a discovered linkset, either SCTP IP, serial, HSL, mixed, or other. Other means no links have been defined for the linkset. See HSL, mixed linkset, SCTP, serial, virtual linkset.

local authentication Type of MWTM security authentication that allows the creation of user accounts and passwords local to the MWTM system. When using this method, usernames, passwords, and access levels are managed using MWTM commands. Contrast with Solaris authentication.

For more information on Solaris authentication, see the "Implementing Secure User Access (Server Only)" section on page 2.

local IP address IP address used by the MWTM client to connect to the MWTM server.

local point code Point code of the primary signaling point for a linkset. Contrast with adjacent point code.

local VPN IP address IP address used by the MWTM client to connect to the MWTM server via VPN. See local IP address, VPN.

M

M3UA MTP3 User Adaptation layer. A protocol for supporting the transport of any SS7 MTP3 user signaling over the IP network. M3UA provides a seamless operation of the MTP3 user peers in the SS7 and IP domains. See MTP3.

managed object Node, application server, application server process, application server process association, link, linkset, node, signaling gateway-mated pair, or signaling point that is being managed by the MWTM.

Management Information Base See MIB.

MAP Mobile Application Part. An SS7 protocol that allows for the implementation of mobile network signaling infrastructure. See SS7.

mask Bit combination used in the MWTM to indicate the significant bits of the point code.

For ANSI and China standard networks using the default 24-bit point code format, the default mask is **255.255.255**.

For ITU networks using the default 14-bit point code format, the default mask is **7.255.7**.

For NTT and TTC networks using the default 16-bit point code format, the default mask is **31.15.127**.

Message Log Server Multi-threaded process that logs messages from the Data Server, Process Manager, and MWTM client. See also Data Server, Process Manager, Trap Receiver.

MIB Management Information Base. Database of network management information that is used and maintained by a network management protocol such as SNMP. The value of a MIB object can be changed or retrieved using SNMP commands, usually through a GUI network management system. MIB objects are organized in a tree structure that includes public (standard) and private (proprietary) branches.

mixed linkset Linkset in which the links are of two or more types. (This configuration is not recommended.)

MLR Multi-Layer SMS Routing. Scheme that enables intelligent routing of Short Message Service (SMS) mobile originated (MO) messages based on the application or service from which they originated or to which they are destined. The MLR feature can make SMS message routing decisions based on information found in the TCAP, MAP, and MAP-user layers; MAP operation codes MAP-MT-FORWARD-SM and SEND-ROUTING-INFO-FOR-SM; and ANSI TCAP and IS-41 MAP operations.

mobile switching center See MSC.

MSC Mobile switching center. Provides telephony switching services and controls calls between telephone and data systems.

MSU Message Signal Unit. MSUs provide MTP protocol fields and are the workhorses of the SS7 network. All signaling associated with call setup and teardown, database query and response, and SS7 management requires the use of MSUs. See MTP3.

MTP3 Message Transfer Part, level 3. An SS7 protocol that routes SS7 signaling messages to public network nodes by means of destination point codes, which allow messages to be addressed to specific signaling points. See SS7.

Multi-Layer SMS Routing See MLR.

Multiple Instance ITP feature that makes it possible to connect an ITP to different networks at one time, each with specific variant and network indicator values. The ITP treats each combination of variant and network indicator as a separate "instance" or signaling point with its own local point code and routing table on the ITP. Each instance is part of the SS7 network and shares the same variant and network indicator. In order for instances in the same network to be properly managed they must be assigned the same network name. See cross-instance GTT file, Instance Translation.

N

name server Server connected to a network that resolves network names into network addresses.

NAT Network Address Translation. Internet standard that enables a LAN to use one set of IP addresses for internal traffic and a second set of addresses for external traffic.

Network Address Translation See NAT.

network indicator See NI.

network management system See NMS.

network view See view.

Network Time Protocol See NTP.

new node Node that the MWTM has newly discovered, and that has not yet been added to the current view.

NI Network indicator. Information within the service information octet of the MSU that permits discrimination between national and international messages. See MSU.

NMS Network management system. System responsible for managing at least part of a network. An NMS is generally a reasonably powerful and well-equipped computer such as an engineering workstation. NMSes communicate with agents to help keep track of network statistics and resources.

node Endpoint of a network connection or a junction common to two or more lines in a network. Nodes can be processors, controllers, or workstations. Nodes, which vary in routing and other functional capabilities, can be interconnected by links, and serve as control points in the network.

In ITP, a node is a Cisco ITP or a legacy SS7 device (SSP, SCP, or STP).

In RAN-O networks, a node is a Cisco Mobile Wireless Router (MWR), Optical Networking System (ONS), RAN service module, or a legacy RAN device (BTS or BSC).

See legacy device.

Node B Physical unit for radio transmission/reception with cells in the UTRAN.

node name Name of a node. This is either the DNS name of the node, or a user-specified name. See display name, DNS name.

nonrecursive Discovery Discovery of seed nodes only. The MWTM discovers all seed nodes and attempts to manage them, then marks all nodes that are adjacent to those seed nodes as Unmanaged. Contrast with recursive Discovery.

Non-Stop Operation See NSO.

note User-defined descriptive string attached to an object.

NSO Non-Stop Operation. Implementation of redundant data elements and software functionality, enabling networks to approach 99.999% availability. See also RF.

NTP Network Time Protocol. Timing protocol that maintains a common time among Internet hosts in a network.

O

object Node, application server, application server process, application server process association, link, linkset, node, signaling gateway-mated pair, or signaling point that has been discovered by the MWTM.

output linkset See destination linkset.

P

PDP Packet Data Protocol. Network protocol used by external packet data networks that communicate with a GPRS network. IP is an example of a PDP supported by GPRS. Refers to a set of information (such as a charging ID) that describes a mobile wireless service call or session, which is used by mobile stations and GGSNs in a GPRS network to identify the session.

PCRF Policy and Charging Rules Function.

PDNGW Packet Data Node Gateway.

PDSN Packet Data Serving Node.

PDU Protocol Data Unit. OSI term for packet.

ping Packet internet groper. ICMP echo message and its reply. Often used in IP networks to test the reachability of a network device.

point code A unique address code that identifies a service provider within a signaling network. Also called primary point code. See capability point code, destination point code, local point code, secondary point code.

polling Access method in which a primary network device inquires, in an orderly fashion, whether secondaries have data to transmit. The inquiry occurs in the form of a message to each secondary that gives the secondary the right to transmit.

poll interval Time between polls.

poll response Time taken by a node to respond to MWTM poll requests.

port In IP terminology, an upper-layer process that receives information from lower layers. Ports are numbered, and each numbered port is associated with a specific process. For example, SMTP is associated with port 25. A port number is also called a well-known address.

preferences Settings that enable a user to change the way the MWTM presents information.

primary node In the MWTM, for a given pair of connected signaling points or nodes, the signaling point or node that the MWTM discovered first. See adjacent node.

primary point code See point code.

primary SNMP address IP address used by SNMP to poll the node. (There might be other IP addresses on the node that are not the primary SNMP address.) Contrast with secondary IP address.

process Internal component of the MWTM. See Data Server, Message Log Server, Process Manager, Trap Receiver.

Process Manager Multi-threaded process that handles the management of registered MWTM processes. See also Data Server, Message Log Server, Trap Receiver.

Q

QoS Quality of service. Measure of performance for a transmission system that reflects its transmission quality and service availability.

Quality of Service See QoS.

R

Radio Network Controller See RNC.

RAN Radio Access Network.

RAN backhaul The end-to-end RAN connections between the BTS or Node B at the cell site and the BSC or RNC. See also virtual RAN backhaul, IP backhaul.

RAN shorthaul An interface that transports GSM or UMTS voice and data traffic between the BTS or Node-B and the RAN-O node at the cell site. At the aggregation site, RAN shorthauls exist between the RAN-O node and the BSC or RNC.

RAN-O RAN optimization. Standard-based, end-to-end, IP connectivity for GSM and UMTS RAN transport. The Cisco solution puts RAN voice and data frames into IP packets at the cell-site, and transports them seamlessly over an optimized backhaul network. At the central site, the RAN frames are extracted from IP packets, and the GSM or UMTS data streams are rebuilt.

read community See community string.

recursive Discovery Discovery of the entire network. The MWTM discovers all seed nodes and attempts to manage them; then attempts to discover and manage all ITP nodes that are adjacent to those seed nodes (unless the nodes are connected by serial links only); then attempts to discover and manage all ITP nodes that are adjacent to *those* nodes; and so on, until the MWTM has discovered the entire network.

Contrast with nonrecursive Discovery.

Redundancy Framework See RF.

RF Redundancy Framework. Mechanism for logical redundancy of software functionality, designed to support 1:1 redundancy on processor cards. See also NSO.

RNC Radio Network Controller. Network element that controls one or more Node B transceiver stations in the UTRAN.

route Path through an internetwork.

route set Set of routes with the same destination point code.

route table Table used in ITP to locate a destination linkset for a packet whose destination point code does not match the ITP's local point code.

routing key Set of SS7 parameters that uniquely define the range of signaling traffic to be handled by a particular application server or application server route table. Thus, the routing key identifies an application server or an application server route table. See application server, application server process, application server process association, signaling gateway-mated pair

S

SCCP Signaling Connection Control Part. A routing protocol in SS7 protocol suite in layer 4 that provides end-to-end routing for TCAP messages. SCCP also provides the means by which an STP can perform global title translation, a procedure by which the destination signaling point and subsystem number is determined from digits present in the signaling message. See also TCAP.

SCP Service control point. An element of an SS7-based Intelligent Network that performs various service functions, such as number translation, call setup and teardown, and so on.

SCTP Stream Control Transmission Protocol. An end-to-end, connection-oriented protocol that transports data in independent sequenced streams.

SGW Serving Gateway.

secondary IP address Alternate or backup IP address used by a node. Contrast with primary SNMP address.

secondary point code Alternate or backup point code used by a signaling point. See point code.

seed file List of seed nodes. See seed node.

seed node Node used by the MWTM to discover the other objects in your network.

serial Method of data transmission in which the bits of a data character are transmitted sequentially over a single channel.

server Node or software program that provides services to clients. See client.

service control point See SCP.

service switching point See SSP.

SGMP See signaling gateway-mated pair.

SGSN Serving GPRS Support Node. Node that connects the radio access network to the GPRS or UMTS core and tunnels user sessions to the GGSN.

signaling gateway-mated pair Pair of signaling gateways that exchange necessary state information using the Signaling Gateway-Mated Protocol (SGMP). See application server, application server process, application server process association, routing key, signaling gateway-mated pair.

Signaling Gateway-Mated Protocol Protocol that enables two Cisco ITP M3UA/SUA signaling gateways to act as a mated pair and exchange necessary state information. See signaling gateway-mated pair.

signaling point See SP.

signal transfer point See STP.

Signaling System 7 See SS7.

Simple Network Management Protocol See SNMP.

SMPP Short Message Peer-to-Peer Protocol. A messaging protocol meant to simplify integration of data applications with wireless mobile networks such as GSM.

SNMP Simple Network Management Protocol. Network management protocol used almost exclusively in TCP/IP networks. SNMP provides a means to monitor and control network devices, and to manage configurations, statistics collection, performance, and security.

SOAP Simple Object Access Protocol. A protocol for exchanging XML-based messages over computer networks. See XML.

Solaris authentication Type of MWTM security authentication that uses standard Solaris-based user accounts and passwords, as specified in the */etc/nsswitch.conf* file. You can provide authentication with the local */etc/passwd* file or from a distributed Network Information Services (NIS) system. Contrast with local authentication.

For more information on Solaris authentication, see the "Implementing Secure User Access (Server Only)" section on page 2.

SP Signaling point. An SCP, SSP, or STP, or an ITP instance. See SCP, SSP, or STP.

spring layout Topology map layout in which objects are arranged in a spring layout. Objects with the most links are drawn closer to the center of the map, while objects with fewer links are drawn farther away. Contrast with circle layout. See topology map.

SS7 Signaling System 7. Standard CCS system used with BISDN and ISDN. Developed by Bellcore.

SSL Secure Sockets Layer. A protocol for transmitting private documents via the Internet.

SSP Service switching point. Element of an SS7-based Intelligent Network that performs call origination, termination, or tandem switching.

status Current condition, such as Active or Unknown, of a network object.

status polling Regularly scheduled polling of nodes performed by the MWTM. Contrast with demand polling.

STP Signal transfer point. Element of an SS7-based Intelligent Network that performs routing of the SS7 signaling.

SUA SCCP User Adaptation. A client/server protocol that provides a gateway to the legacy SS7 network for IP-based applications that interface at the SCCP layer. See also SCCP.

Stream Control Transmission Protocol See SCTP.

subview A view within a customized view. You can create subviews on an MWTM client, with each subview devoted to a different part of the network. You can then load a subview to manage a different part of the network, or switch to the DEFAULT view to see the entire network. See also DEFAULT view.

superuser User specified in the MWTM to be able to perform most functions that otherwise require the user to be logged in as the root user.

For more information, see the "Specifying a Super User (Server Only)" section on page 19.

system object ID See device type.

T

TCP Transmission Control Protocol. Connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack. See also TCP/IP.

TCAP Transaction Capabilities Application Part. An SS7 protocol that enables the deployment of advanced intelligent network services by supporting non-circuit related information exchange between signaling points using the SCCP connectionless service. See also SCCP.

TCP/IP Transmission Control Protocol/Internet Protocol. Common name for the suite of protocols developed by the U.S. DoD in the 1970s to support the construction of worldwide internetworks. TCP and IP are the two best-known protocols in the suite. See also IP and TCP.

TFTP Trivial File Transfer Protocol. A protocol that is used to transfer small files between hosts of a network. See also host.

thread name Task name.

timeout Event that occurs when one network device expects to hear from another network device within a specified period of time, but does not. The resulting timeout usually results in a retransmission of information or the dissolving of the session between the two devices.

tooltip Popups that display information about objects and table entries.

topology See topology map.

topology map Graphical representation by the MWTM of the network. Also called topology.

Transmission Control Protocol See TCP.

Transmission Control Protocol/Internet Protocol See TCP/IP.

trap Unsolicited message sent by an SNMP agent to an NMS, console, or terminal to indicate the occurrence of a significant event, such as a specifically defined condition or a threshold that has been reached.

trap forwarding Forwarding MWTM events to other hosts, in the form of SNMP traps. This enables the MWTM to integrate with high-level event- and alarm-monitoring systems such as the Cisco Info Center (CIC) and Micromuse's Netcool suite of products. These systems can provide a single high-level view of all alarm monitoring in your network, making it easier to detect and resolve problems.

Trap Receiver Multi-threaded process that receives SNMP traps for the MWTM. See also Data Server, Message Log Server, Process Manager.

Trivial File Transfer Protocol See TFTP.

U

UDP User Datagram Protocol. Connectionless transport layer protocol in the TCP/IP protocol stack. UDP is a simple protocol that exchanges datagrams without acknowledgments or guaranteed delivery, requiring that error processing and retransmission be handled by other protocols. UDP is defined in RFC 768.

UMTS Universal Mobile Telecommunications System. Third generation wireless standard for supporting data transfer rates of 144 kbs (vehicular), 384 kbs (pedestrian), or up to 2 Mbs in buildings.

UMTS Terrestrial RAN See UTRAN.

unignore Stop ignoring the selected object at the next polling cycle. See also ignore.

unknown Device type for which the MWTM is unable to determine the device type. If a node, the node failed to respond to an SNMP request. If a linkset or link, either the associated node failed to respond to an SNMP request, or the MWTM found that the linkset or link no longer exists. Contrast with discovered.

Universal Mobile Telecommunications System See UMTS.

unmanaged Node status in which the node is known indirectly by the MWTM (the MWTM knows the device exists but no known SNMP stack exists on the device for the MWTM to query), or a user has set the node to this status to prevent the MWTM from polling the node.

User-Based Access MWTM security scheme that provides multi-level password-protected access to MWTM features. Each user can have a unique username and password. Each user can also be assigned to one of five levels of access, which control the list of MWTM features accessible by that user.

For more information, see the "Configuring User Access" section in Chapter 2, "Configuring Security."

User Datagram Protocol See UDP.

Amount of an object's send or receive capacity that is being used, expressed as a percentage or in Erlangs.

UTRAN UMTS Terrestrial RAN. Radio access network for UMTS networks.

V

variant A method of identifying SS7 point codes. Example point code variants are:

ITU: 3-8-3 format is common, made up of 14 bits

ANSI: 8-8-8 format is common, made up of 24 bits

view View that is currently in use on an MWTM client. The current view can be the DEFAULT view or a customized view. A customized view can have one or more subviews. See client view, current view, DEFAULT view.

virtual RAN backhaul A grouping of RAN backhauls. A virtual RAN backhaul is useful if you have configured several RAN backhauls for the same interface. To view the for that interface, create a virtual RAN backhaul that contains all the real backhauls that you have configured for the interface. See RAN backhaul.

virtual link Link that connects signaling point instances running on the same device. The MWTM does not poll virtual links, nor does it display real-time data or accounting statistics for virtual links.

virtual linkset Linkset in which the links are virtual links, which connect signaling point instances running on the same device. The MWTM does not poll virtual linksets, nor does it display real-time data or accounting statistics for virtual linksets.

Note Prior to IOS release 12.2(23)SW1, virtual linksets on multi-instance routers were created manually by the user. Within and after that release, virtual linksets are created automatically.

Virtual Private Network See VPN.

VPDN Virtual Private Dialup Network.

VPN Virtual Private Network. Enables IP traffic to travel securely over a public TCP/IP network by encrypting all traffic from one network to another. A VPN uses “tunneling” to encrypt all information at the IP level.

VRF Virtual Routing and Forwarding.

W

World Wide Web See WWW.

WWW World Wide Web. Large network of Internet servers providing hypertext and other services to terminals running client applications such as a browser. See also *browser*.

X

XML Extended Markup Language. A general-purpose markup language for to facilitating the sharing of data across different information systems connected through the Internet. See SOAP.

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