CHAPTER 1

Overview

This chapter describes the Cisco Mobile Wireless Transport Manager (MWTM) software that manages IP Transfer Point (ITP) and Radio Access Network Optimization (RAN-O) networks. It includes:

What is the MWTM?

The MWTM is a network management software product that network administrators use to discover, manage, and troubleshoot networks that include Cisco ITP and Cisco RAN-O nodes. The MWTM provides:

Server and Network Features

The MWTM:

- Uses client/server architecture. See What is Client/Server Architecture?, page 1-8 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 more than 1,000 cell sites, or 150 Cisco ITP nodes and 20 clients connected to the server.
- 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 RAN-O network and displays each network element, neighboring equipment, and physical and logical connections in a network topology drawing that you can customize.
- 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 except the topology map, real-time data charts, and event management (and, for ITP networks, route table and GTT file configuration).

Event Monitoring Features

The MWTM:

- Displays a real-time event list that supports acknowledgement, annotation, customized filtering, and field viewing that conform to ITU-T Q.733 standards.
- Receives native traps from nodes in the Cisco RAN-O and Cisco ITP solutions and uses SNMP polling to identify the status of each managed RAN-O node and the status of links, linksets, and ITP platforms. 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 utilization 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
- 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 (ITP Only)

The MWTM:

- 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.
- 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.
- 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.

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 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 the MWTM *personality* to show menus, options, and tools that are only for ITP networks or only for RAN-O networks, or, if required, for both network types. You customize the personality preference during installation. You can change the personality 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, and 4.1. Supports cross-instance GTT files. Provides command-line verification of route tables and GTT tables.

Integration Features

The MWTM can integrate with:

- The entire suite of CiscoWorks LMS 2.6 products, including:
  - Resource Manager Essentials, which provides network management for Cisco ITP and RAN-O nodes.
  - CiscoView Element Manager, which provides dynamic status, monitoring, and configuration information for a broad range of Cisco internetworking products.

  You can launch the CiscoView Element Manager and the CiscoWorks Device Center directly from the 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.
- Processes northbound Cisco ITP and RAN-O events, inventory, and provisioning XML/SOAP APIs, allowing 3rd-party OSSs to programmatically manage:

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

What is ITP?

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 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:

- Cisco MWR 1941-DC-A 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.

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_configuration_guide_chapter09186a00804d45e1.html
- *Cisco ONS 15454 RAN Service Module Software Configuration Guide*:
  http://www.cisco.com/en/US/products/hw/optical/ps2006/products_configuration_guide_book09186a0080787fc2.html

How Do I Identify My Network Type?

The MWTM typically manages ITP or RAN-O networks, but it can also manage both network types simultaneously. 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 in the title bar. For example, if the MWTM is managing both network types, the title bar displays *(ITP RAN-O)*.

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 ITP and RAN-O networks, you can uniquely identify node types by the DNS hostnames 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, RAN-O nodes can employ a unique host naming scheme (for example, rano-34). In addition, you can separate the ITP and RAN-O node types into different management subviews with, for example, one subview for ITP and another subview for RAN-O nodes. For more information about creating views and subviews, refer to Chapter 7, "Managing Views."

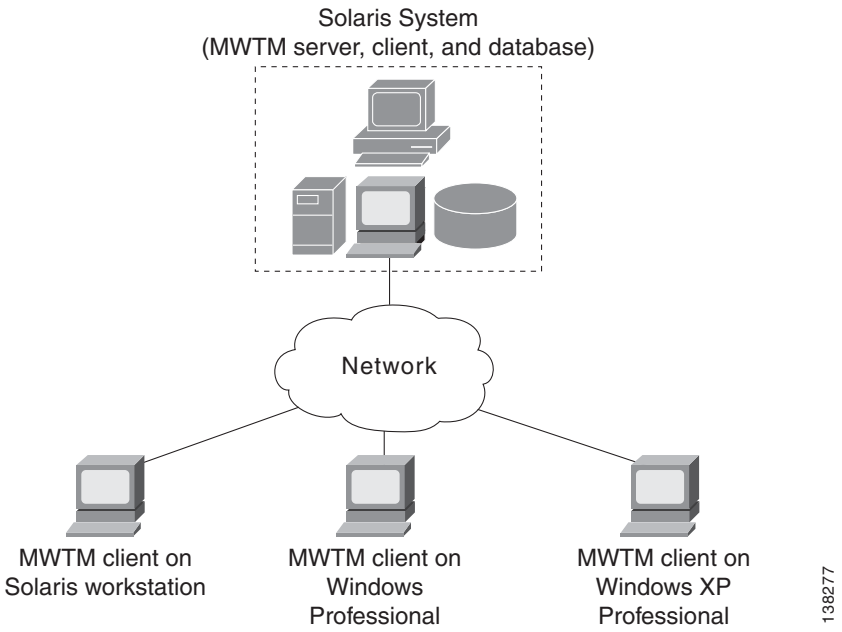
What is Client/Server Architecture?

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 20 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 or Linux. The MWTM client is available on Solaris and Windows XP Professional.

Figure 1-1 The 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, refer to the *Installation Guide for the Cisco Mobile Wireless Transport Manager 6.0*.