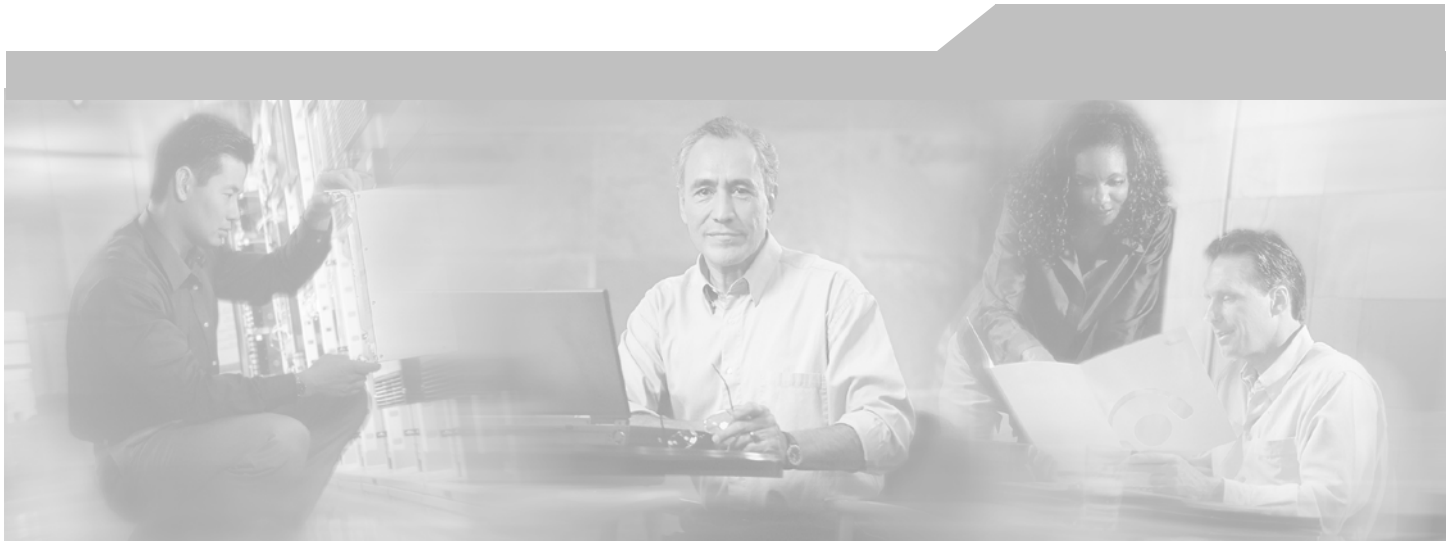

Cisco Active Network Abstraction Administrator's Guide, 3.5

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Important Notice

Cisco ANA 3.5 is a carrier-class, multi-vendor network and service management platform which builds a real-time virtual model of the network, serving as a live information base for value-added tools and applications for integration into an existing OSS environment.

Cisco ANA 3.5 is a limited release by Cisco Systems of the existing features and functions of the Sheer DNA 4.0.1 software.

As this is a limited release, the naming of the product in the software and the user documentation remains as Sheer DNA.

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- Obtain assistance with security incidents that involve Cisco products.
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http://www.cisco.com/go/psirt

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http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

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Emergencies — security-alert@cisco.com

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Nonemergencies — psirt@cisco.com

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1 877 228-7302

1 408 525-6532

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Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

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For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

- Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
- EMEA: +32 2 704 55 55
- USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

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To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

- Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.
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http://ciscoiq.texterity.com/ciscoiq/sample/

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About This Guide

This Administrator's Guide describes the structure and features of the Sheer™ Dynamic Network Abstraction (DNA) system. Sheer DNA Manage is the GUI client application designed to simplify and facilitate Sheer DNA administration. Sheer DNA Manage enables the System Administrator to configure and control the DNA system. Sheer DNA Manage interacts with the Sheer DNA Registry ("Golden Source") to query and modify configuration information. This guide is intended for use by trained System Administrators.

It includes the following chapters:

Chapter 1, Introducing Sheer DNA, page 1, describes the Sheer™ DNA platform and architecture. In addition, it provides a brief explanation of the terms used throughout this guide.

Chapter 2, Getting Started with Sheer DNA Manage, page 13, describes the Sheer DNA Manage working environment and how to open and operate the Sheer DNA Manage application.

Chapter 3, Deploying Sheer DNA, page 57, describes the steps that must be performed to deploy the Sheer DNA.

Chapter 4, General DNA Manage Tables, page 61, describes how to perform general Sheer DNA Manage functions when working with tables.

Chapter 5, Managing Sheer DNA Units, page 69, describes how to manage Sheer DNA Units. This includes adding and removing Sheer DNA Units.

Chapter 6, Managing AVMs and VNEs, page 79, describes how to define and manage AVMs and VNEs.

Chapter 7, Managing Global Settings, page 107, describes how to define and manage the Sheer DNA Manage global settings, including client licenses, DNA database segments, customizing a message of the day (service disclaimer), polling groups, and protection groups.

Chapter 8, Managing Links, page 127, describes how to add and remove a topological link between two ports of two Network Elements in the network.

Chapter 9, Managing Workflows, page 133, briefly describes the *Workflow Engine* branch in the Sheer DNA Manage application.

Chapter 10, Managing Sheer DNA Security, page 135, describes how Sheer DNA implements a three-dimensional security engine combining a role-based security mechanism with scopes that are granted to users. In addition, it describes managing users in the Sheer DNA platform, including, defining users and passwords.

Appendix A, Utility Scripts, page 155, describes the Sheer DNA utility scripts including how to restart the Sheer DNA Platform.

Appendix B, Golden Source Registry, page 157, provides details of the Golden Source Registry.

Appendix C, Ports Used by Sheer DNA, page 159, provides a list of the ports used by the various Sheer DNA Server and Client applications.

Appendix D, Drools Rules Engine, page 161, introduces and describes Drools.

Note: Changes to the Registry should only be carried out with the support of Cisco Professional Services.

Table of Contents

1 Introducing Sheer DNA

About this chapter:

This chapter describes the Sheer™ Dynamic Network Abstraction (DNA) platform and architecture. In addition, it provides a brief explanation of the terms used throughout this guide. The Sheer DNA Manage maintenance application is part of an overall Sheer solution; therefore, in order to better understand the Sheer DNA Manage environment, a brief overview of Sheer DNA is required.

The Sheer Solution, page 1, provides an overview of the Sheer DNA, its platform architecture and functional blocks.

Sheer DNA Components, page 4, describes the Sheer DNA system's key components.

Sheer DNA Manage Control Functionality, page 6, describes how Sheer DNA Manage serves as a tool to manage the Sheer DNA, which enables the addition, removal and modification of Sheer DNA information.

Additional Concepts and Terms, page 7, explains any additional terms used within the Sheer DNA Manage application and this guide.

Terminology and Conventions, page 11, describes the conventions used in the Sheer DNA Administrator's Guide. In addition, it provides a guide to related documentation.

1.1 The Sheer Solution

Sheer Dynamic Network Abstraction (DNA) is a carrier class network management platform, designed to serve as an active mediation layer between the operation and the network layers. Sheer DNA provides a rich set of GUI easy to use applications as well as well-defined, APIs for Operation Support Systems, enabling carriers and service providers to efficiently respond to the constant market demand for new, reliable and more sophisticated services, while hiding the complexity of large, multi-vendor, multi-technology networks.

Sheer DNA provides solutions for diverse network environments and applications. It offers an integrated network and service auto-discovery for network modeling, intelligent fault analysis and a highly flexible network configuration and activation engine. This enables fully correlated management of global scale networks supporting millions of subscribers and customers.

Sheer DNA is a network management solution that provides a fully integrated service-oriented solution offering:

- Multi-vendor, hybrid device support
- Multi-Technology (IP, VPN, MPLS, Ethernet, ATM, DSL)
- Multi-function (Network discovery, Fault, Activation and Configuration)
- Vertical integration with multiple OSS/BSS applications

Based on a patented innovative architecture of Distributed Autonomous VNEs, Sheer DNA was designed from day one to enable integrated management, for hybrid network environments, while being extremely scalable in supporting network growth and evolution.

The Sheer DNA introduces key functional highlights such as:

- **Network (Horizontal) Integration:** supporting NEs from multiple vendors, across multiple technologies, forming a unified, end-to-end synthesis of the network
- **Network and Service Discovery, Real-time Inventory and Topology:** discovery of network inventory, services and multi-layer connectivity to form an accurate, up-to-date network information model
- **Network Fault Intelligence:** using the auto-discovered network model for fault correlation and root cause analysis
- **Service Impact:** the service impact analysis of various network faults showing affected VPNs and sites
- **Activation and Configuration:** a flexible, high-performance activation engine that supports virtually any device configuration required
- **Service Verification:** real-time verification of configuration health and consistency
- **Service Path Analysis:** dynamic isolation and tracing of service paths, end-to-end across technologies and network layers
- **GUI Client Applications:** a powerful set of user applications for Assurance, Fulfillment and Performance management

- **OSS/BSS (Vertical) Integration:** open, flexible northbound adaptation framework to OSS/BSS applications, in a wide variety of APIs, protocols and information models
- **Scalability:** a fully distributed solution implementing parallel processing that inherits the scaling properties of the network by creating a virtual model of it. Adding more Autonomous VNEs and/or more DNA Units easily supports network growth.

The **Sheer™ DNA** platform architectural diagram and functional blocks are displayed below.

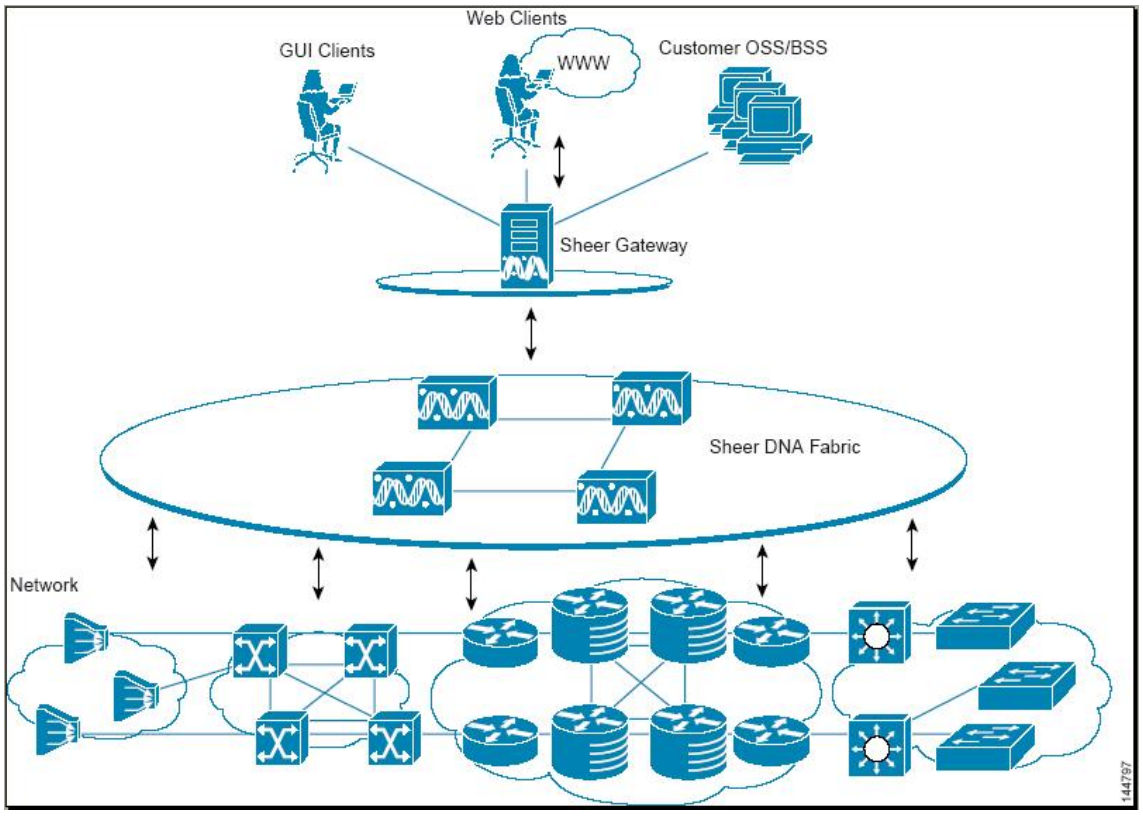


Figure 1: Sheer DNA Architecture

1.2 Sheer DNA Components

The Sheer DNA system is comprised of several key components, as described in the sections that follow.

1.2.1 Autonomous VNE

The Autonomous VNEs (Virtual Network Elements) are software entities that run as a completely autonomous process within the Sheer DNA Units. Each VNE is assigned to manage a single Network Element (NE) instance using whatever southbound management interfaces the NE implements (e.g. SNMP or Telnet). The Autonomous VNEs are the entities that maintain a live model of each NE and of the entire network.

As the VNE loads, it starts investigating the NE and automatically builds a live model of the NE, including its physical and logical inventory, its configuration and its status. Following the device investigation, the VNEs begin to negotiate with peering VNEs, which represent the peering NEs determining the connectivity and topology at different layers. This model of the network topology, device state and device inventory is constantly being updated by the VNEs, which track every change that occurs in the NE or in the network.

Messaging between VNEs is used for running different end-to-end flows, in order to provide information for root cause and impact analysis, service path tracing and more.

1.2.2 The Sheer DNA Servers

Sheer DNA uses two distinct server types, each performing different activities:

- Sheer DNA Gateway
- Sheer DNA Unit

Sheer DNA Gateway

The *Sheer DNA Gateway* serves as the gateway through which all clients, including any OSS/BSS applications as well as the Sheer DNA clients can access the system. The gateway is an extended Sheer DNA Unit. It enforces access control and security for all connections and manages client sessions. In addition it functions as a repository for storing configuration, network and system events and alarms.

Another important function of the Sheer DNA Gateway is to map network resources to the business context. This enables Sheer DNA to contain information that is not directly contained in the network (such as VPNs and Subscribers) and display it to northbound applications.

Sheer DNA Unit

The main purpose of the Sheer DNA Units is to host the Autonomous VNEs. The Sheer DNA Units are interconnected to form a fabric of VNEs that can inter-communicate with other VNEs regardless of which unit they are running on. Each Sheer DNA Unit can host thousands of Autonomous VNE processes (depending on the server system size). The Sheer DNA Units also allow for optimal VNE distribution, ensuring geographic proximity between the VNE and its managed NE.

The clustered N+m high availability mechanism within the Sheer DNA Fabric is designed to handle the failure of a Sheer DNA Unit. Sheer DNA Unit availability is established in the Gateway, running a *Protection Manager* process, which continuously monitors all the Sheer DNA Units in the network. Once the *Protection Manager* detects a Sheer DNA Unit that is malfunctioning, it automatically signals one of the m servers in its cluster to load the configuration of the faulty unit (from the system Registry), taking over all its managed Network Elements. The switchover to the redundant standby Sheer DNA Unit does not result in any loss of information in the system, as all of the information is auto-discovered from the network, and no persistent storage synchronization is required. When a Sheer DNA Unit is configured it can be designated as being an active or standby unit.

For more information about high availability, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

1.2.3 Sheer DNA Clients

Sheer provides a comprehensive suite of GUI applications to manage the network using the Sheer DNA platform.

- **Sheer NetworkVision:** The main GUI application of Sheer DNA, used to visualize every management function supported by the system. For more information, refer to the *Cisco Active Network Abstraction NetworkVision User's Guide*.
- **Sheer EventVision:** A tool for viewing all historical events detected by the Sheer DNA system. For more information, refer to the *Cisco Active Network Abstraction EventVision User's Guide*.

- **Sheer DNA Manage:** A system administration and configuration tool for managing the entire Sheer DNA platform, as described below.
- **Sheer Registry Editor:** A tool used for viewing and configuring the Sheer Registry.

The Sheer DNA Clients support automatic client updates from the Sheer DNA Gateway using Web Start. When connecting with a Sheer DNA Gateway application, the system verifies that the client version is the latest available and if an upgrade is required, the system automatically updates the Sheer Clients from the Sheer DNA Gateway.

1.3 Sheer DNA Manage Control Functionality

Sheer DNA includes extensive system administration functions for simple system control. Sheer DNA Manage is the GUI tool used for performing various system administration activities. It provides an interface to perform the following:

- **Sheer DNA Units:** Adding and removing Units.
- **Autonomous Virtual Machines (AVMs) and Virtual Network Elements (VNEs):** Adding and removing AVMs and VNEs for the different Sheer DNA Units. Starting and stopping VNEs, and setting polling information per VNE.
- **Global Settings:**
  - **Clients Licenses:** Installing and managing Sheer DNA Client licenses
  - **DB Segments:** Viewing the storage allocated for all of the database segments
  - **Messages of the Day:** Generating a message of the day (service disclaimer)
  - **Polling Groups:** Customizing protection groups
  - **Protection Groups:** Setting up scopes of devices and system users
- **Topology:** Managing static and persistent topology links.
- **Workflow Engine:** Enables the administrator to manage workflow templates and running workflows in runtime.
- **Scopes:** Enables the administrator to group a collection of managed Network Elements together in order to enable the user to view and/or manage the Network Elements based on the user's role.
- **Users:** Enables the administrator to define and manage user accounts.

1.4 Additional Concepts and Terms

The sections below include additional concepts and terms used in the Sheer DNA Manage application and throughout this guide.

AVM

The Sheer DNA Units are divided into AVMs (Autonomous Virtual Machines). These AVMs are Java processes that provide the necessary distribution support platform for executing and monitoring multiple VNEs. AVMs and VNEs should reside on a Sheer DNA Unit (as a common configuration) but they can also reside on a Sheer DNA Gateway.

There are some types of AVMs that run on the server which do not run VNEs. These AVMs have reserved ID numbers, namely, AVM 0-100 and these cannot be used. In addition, there are other reserved AVM ID numbers. The following AVMs have special roles assigned to them, namely:

- AVM 0 (the switch AVM)
- AVM 11 (the Gateway)
- AVM 66 (the workflows AVM)
- AVM 99 (the management AVM)
- AVM 100 (the trap management AVM)

Device/Network Element

A network component existing in the network, for example, the devices displayed in Sheer DNA and in Sheer NetworkVision.

Element Management

The base configuration for the creation of the managed element. Sheer DNA Manage enables the user to create VNEs, for example, by entering the IP address, SNMP and polling rate information and so on. This is called **Element Management**.

License

Sheer DNA Client applications and BQL connectivity is based on installed license files. Sheer DNA Manage enables the administrator to control and monitor the number of Sheer DNA Client and BQL connections over a limited or unlimited period of time based on the client licenses installed. Two types of licenses are supported, namely, fixed (the number of installed users are identified by user names or IP addresses or both) or floating (the number of installed users operating concurrently).

Managed Element

After Sheer DNA Manage installs and runs the process, samples the device and collects the data a VNE (**Managed Element)** is created. The VNE includes logical inventory (tables, for example, forwarding tables) and physical inventory (for example, modules and ports), and this **Managed Element** can be accessed using Sheer NetworkVision.

Network Element Components

Component(s) of a Network Element (NE), such as port(s), blade(s), context(s) and so on.

Permission

The user's ability to perform certain tasks. There are two types of permissions, namely, default and NE related.

- **Default:** The default permission only applies to the activities that are related to GUI functionality, not the activities related to Network Elements. For example, a user with the default permission Viewer can view maps and the Device List. For more information, refer to page 136.
- **Network Element:** The NE related permission enables the administrator to group a collection of managed Network Elements together (in Sheer DNA Manage) in order to enable the user to view and/or manage the NEs based on the user's role or permission. After the user is allocated a scope (list of Network Elements) and a role, the user can then perform various activities on the Network Elements, for example, manage alarms in Sheer NetworkVision. For more information, refer to page 135.

Polling Group

A polling group is defined as a group of polling rates that can be specified for a device. For more information, refer to page 114.

Protection Group

A Protection Group is a cluster to which Units and Standby Units are related. In case of Unit failover then the Redundant Unit will be taken from the same Protection Group.

Redundant Unit

The Sheer DNA Unit comes with built-in redundancy for maximum up time and automatic switching. A threshold configurable watchdog constantly monitors the Sheer DNA Units and Sheer DNA Gateway and can make an automatic or manual (operator approved) switch over when there is no response from the monitored entity. The system is always up-to-date via real time investigation of the network. The redundancy mechanism ensures synchronization of the active and backup Sheer DNA units. Once activated, the standby Sheer DNA node is immediately synchronized with the network.

Roles

Sheer DNA implements a security engine that combines a role-based security mechanism that is applied on scopes of Network Elements granted per user. The system supports user accounts creation, multiple Network Element scope definition and a set of five pre-defined roles for security and access control to allow different system functions:

- **Administrator:** Manage the system configuration and security.
- **Configurator:** Activate services, and configure the network.
- **Operator Plus:** Able to fully control alarm life cycle and create maps.
- **Operator:** Configure business tags and perform most day-to-day operations.
- **Viewer:** Read only access to the network and to non-privileged system functions.

Roles can be granted per scope or at an application level (default permission), namely, all the activities that are related to GUI functionality, not the activities related to devices. The default permission includes:

- Application login.
- Manage alarms in Sheer NetworkVision.
- Manage maps: Creating, deleting, and opening.
- Map manipulation: Arrange map, including, aggregations, adding NEs, NEs placement in map, map background and so on.
- Business tag management.

Scopes

A scope is a named collection of managed Network Elements that have been grouped together in order to allow a user to view and/or manage the Network Elements provided a given role. Grouping can be based on geographical location, Network Element type (such as DSLAM, router, SW, etc.), Network Element category (such as access, core, etc.) or any other division according to the network administrator's requirements.

Using NetworkVision, a user that has been assigned a scope can view and/or manage the NEs within this scope according to the role assigned to the user as per the scope. The user cannot view any information regarding NEs that are outside the user's scope, including basic properties, inventory, and alarms.

Static Link

A static link is a physical link that is not automatically discovered by the system. The user manually creates the static link between Network Elements by selecting the two end ports from the NE's physical inventory.

Transport Link

A transport link is a logical link used for communication between the units and for transferring information.

Users

In order for a user to work with Sheer DNA the following requirements must be met:

- The user must have a valid license installed.
- The user must have a defined Sheer DNA user account.
- The user must have an assigned permission.

For more information about users, refer to *Chapter 10, Managing Sheer DNA Security*.

Workflow

A workflow consists of several tasks grouped together and arranged in a flowchart. All workflows are stored on the Sheer DNA Gateway. After a workflow is deployed, it is accessible using *Sheer DNA Manage* in order to view properties and status. Deployed workflow templates can be invoked via the Sheer DNA API using BQL. In addition, the user can view a history of the invoked workflows using Sheer EventVision. For more information, refer to this guide and the *Cisco Active Network Abstraction Workflow User's Guide*.

1.5 Terminology and Conventions

This Sheer DNA Administrator's Guide uses the following conventions:

Convention	Description
^ or Ctrl	The ^ and Ctrl symbols represent the Control key. For example, the key combination ^D or Ctrl-D means hold down the Control key while pressing the D key. Keys are indicated in capital letters but are not case sensitive.

Command syntax descriptions use the following conventions:

Convention	Description
boldface	Boldface text indicates commands and keywords that the user enters literally as shown.
italics	Italic text indicates arguments for which the user supplies values.
[x]	Square brackets enclose an optional element (keyword or argument).
|	A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x | y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x | y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.

Nested sets of square brackets or braces indicate optional or required choices within optional or required elements. For example:

Convention	Description
[x {y | z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
`screen`	Examples of information displayed on the screen are set in Courier New font.
`Boldface screen`	Examples of text that the user must enter are set in Courier New bold font.
`< >`	Angle brackets enclose text that is not printed to the screen, such as passwords.
`[ ]`	Square brackets enclose default responses to system prompts.
`{ }`	Curly brackets group mandatory parameters together where there are options.

Related Documentation

For more detailed information, refer to the following publications:

- *Cisco Active Network Abstraction NetworkVision User's Guide*
- *Cisco Active Network Abstraction EventVision User's Guide*
- *Cisco Active Network Abstraction Servers Installation Guide*
- *Cisco Active Network Abstraction Client Installation Guide*
- *Cisco Active Network Abstraction High Availability User's Guide*
- *Cisco Active Network Abstraction Error Messages*
- *Cisco Active Network Abstraction Workflow User's Guide*

2 Getting Started with Sheer DNA Manage

About this chapter:

This chapter describes the Sheer DNA Manage working environment and how to access Sheer DNA Manage tools and commands. It also provides instructions for launching and overviews operating the Sheer DNA Manage application-using menu and toolbar options.

The *Sheer DNA Manage* window provides access to all of Sheer DNA Manage's functionality.

Starting Sheer DNA Manage, below, describes how to open the *Sheer DNA Manage* window.

The Sheer DNA Manage Window, page 15, briefly describes the *Sheer DNA Manage* window, including the *Tree* pane and *Workspace*.

Sheer DNA Manage Window, Menus and Toolbar, page 19, provides a detailed description of the Sheer DNA information displayed in the *Sheer DNA Manage* window, the menus, and toolbars.

Logging Out, page 56, describes how to log out of Sheer DNA Manage.

2.1 Starting Sheer DNA Manage

Sheer DNA Manage is password protected to ensure security, and is only available to users with Administrator privileges. Before you start working with Sheer DNA Manage, make sure you know the user name, password and the Sheer DNA Gateway IP address or host name that you require.

Note: If a user does not login to the Sheer DNA Manage, NetworkVision or EventVision applications during a specified period of time (the default is one month) the user's account will be locked automatically. The default period can be changed in the Sheer DNA Registry. The period of time is measured from the time the user last logged out of any of the Sheer DNA Client applications. For information about unlocking a user, refer to page 147.

To start Sheer DNA Manage

1. From the *Start* menu, select the **Programs** folder, then **Sheer DNA/Sheer DNA Manage**. The *Sheer DNA Manage - Login* dialog box is displayed.

Note: It is recommended that the administrator change the user name and login password after logging in for the first time.

The last four Sheer DNA Gateways to which the user logged in successfully are displayed in the **Host** dropdown list. The list is displayed in chronological order with the most recent Sheer DNA Gateway displayed at the top of the list.

2. Enter the required Sheer DNA Gateway's information in the **Host** field, as an IP address or host name,

   or

   Select a Sheer DNA Gateway from the **Host** dropdown list.

Note: The Sheer DNA Gateway IP address or host name that was used when you last logged in is automatically displayed at the top of the **Host** dropdown list.

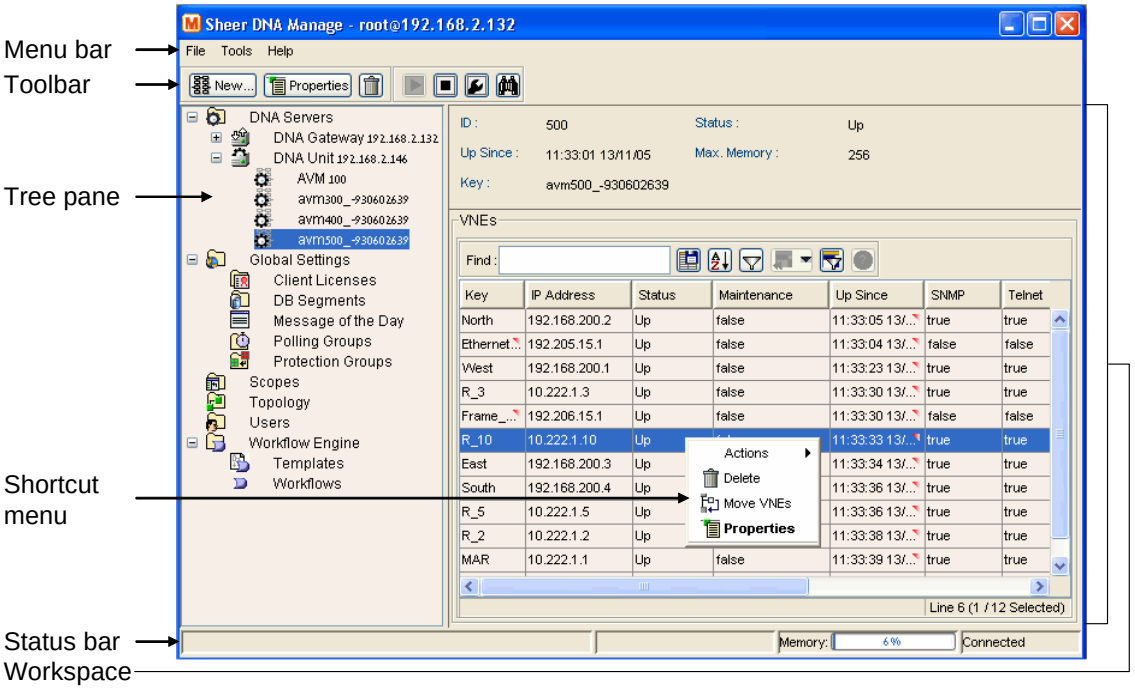
Note: Make sure that you use the leading IP address (the IP on which the Sheer DNA Gateway was configured) when logging in to the system.

3. Click **OK**. The *Sheer DNA Manage* window is displayed. The user name and host information is displayed in the *Sheer DNA Manage* window heading.

Note: Some of the *Workspaces* in the *Sheer DNA Manage* window may appear empty when the application is opened for the first time.

2.2 The Sheer DNA Manage Window

The *Sheer DNA Manage* window is displayed below.



The *Sheer DNA Manage* window is divided into areas or panes, as follows:

- The *Tree* pane, as described on page 15.
- The *Workspace*, as described on page 18.
- The *Status Bar*, displays the memory usage of the application process and connection status.

Dragging the borders of the *Sheer DNA Manage* window adjusts the size of each area. The two areas are correlated; this means that selecting an option in the *Tree* pane affects the information displayed in the *Workspace*.

2.2.1 Sheer DNA Manage Tree Pane

The *Tree* pane displays a tree-and-branch representation of the Sheer DNA Manage folders. The branches can be expanded and collapsed in order to display and hide information as needed. An example of the *Tree* pane is displayed above.

Sheer DNA Manage enables the user to manage and maintain information in the Sheer DNA using the following branches in the *Sheer DNA Manage* window:

- **DNA Servers:** Enables the administrator to manage information relating to the Sheer DNA Gateway, and Sheer DNA Units, including the AVMs and the VNEs in the Sheer DNA. This includes viewing a list of Sheer DNA Units, adding, editing and removing AVMs and VNEs, viewing VNE and AVM properties, starting and stopping AVMs and VNEs, and moving VNEs to maintenance mode. The *DNA Servers* branch includes the *DNA Gateway* and *AVM* sub-branches. For more information about the *DNA Servers* branch, refer to page 20.
- **Global Settings:** The *Global Settings* branch includes the *Client Licenses*, *DB segments*, *Message of the Day*, *Polling Groups* and *Protection Groups* sub-branches. The *Global Settings* branch enables the administrator to:
  - Install and manage Sheer DNA Client licenses.
  - Enables the administrator to view a table describing the storage allocated for all the database segments. For more information about the *DB Segments* branch, refer to page 37.
  - Manage the service disclaimer (message of the day). For more information about the *Service Disclaimer Message of the Day*, refer to page 113.
  - Manage the polling groups to be used by a group of devices. The administrator can define a few polling groups, and the devices will then be polled according to the polling group. Every polling group has a different set of polling intervals. For more information about the *Polling Groups* branch, refer to page 114.
  - Manage and change the default setup of the Sheer DNA Units by customizing protection groups (clusters) and then assigning Sheer DNA Units to these protection groups. For more information about the *Protection Groups* branch, refer to page 121.

  For more information about the *Global Settings* branch, refer to page 33.
- **Scopes:** Enables the administrator to group a collection of managed Network Elements together in order to enable the user to view and/or manage the Network Elements based on the user's role. For more information about the *Scopes* branch, refer to page 44.
- **Topology:** Enables the administrator to manage topology-related parameters, namely, the static links between the devices. For more information about the *Topology* branch, refer to page 47.

- **Users:** Enables the administrator to define and manage user accounts. For more information about the *Users* branch, refer to page 49.
- **Workflow Engine:** Enables the administrator to manage workflow templates and running workflows in runtime. For more information about the *Workflow Engine* branch, refer to page 52.

Clicking on a branch in the *Tree* pane enables the user to view information relating to the selected branch in the *Workspace*. Right-clicking on a branch in the *Tree* pane, opens a shortcut menu enabling the user to perform various functions.

The following icons are displayed in the *Sheer DNA Manage* window:

Icon	Description
	DNA Servers branch
	Sheer DNA Gateway
	Sheer DNA Units
	Sheer DNA Redundant Unit
	AVMs (VNE)
	Global Settings branch
	DB Segments
	Client Licenses
	Message of the Day
	Polling Groups
	Protection Groups
	Scopes
	Topology
	Users
	Workflow Engine
	Templates
	Workflows

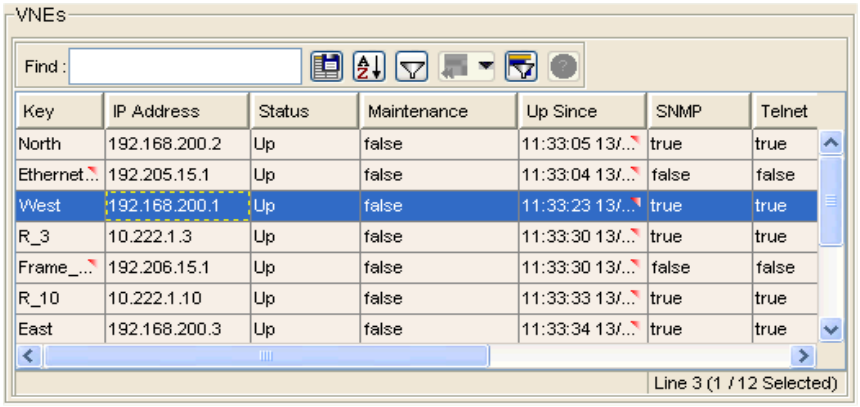
Note: The menus and toolbar displayed in the *Sheer DNA Manage* window are context sensitive; the options vary depending on your selection in the *Tree* pane and the *Workspace*.

2.2.2 Sheer DNA Manage Window Workspace

The *Workspace* is displayed on the right side of the *Sheer DNA Manage* window and enables the user to view Sheer DNA Manage information according to the branch selected in the *Tree* pane. The information displayed varies according to the branch selected in the *Tree* pane.

Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys when a table is displayed in the *Workspace*.

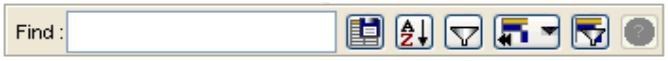
The **Selection** field displayed at the bottom of the *Workspace* displays the number of selected rows and the total number of rows in the table, for example, 6/6 Selected (refer to page 17).



In addition, it displays the location of the selected row(s) in the table, for example, Line 2.

Table Toolbar

Whenever a table forms part of the *Workspace*, the same toolbar is displayed, no matter which branch is selected in the *Tree* pane.



The table toolbar contains the following tools:

Export to CSV: Enables the user to save the current Sheer DNA Manage working environment as a file in the Sheer DNA. For more information, refer to page 68.

Sort Table Values: Enables you to sort the information displayed in the table, for example, according to status or IP address.

Filter: Enables the user to define a filter on the information displayed in the table of the *Workspace* using the *Filter* dialog box. For more information, refer to page 63.

Note: When a filter is applied the **Set Selection Filter** button and the **Rewind All** option under the **Previous Selection Filter** buttons is activated.

Set Selection Filter: Applies filters to the selected line or lines.

Note: When the user selects one or multiple lines in a table, the **Previous Selection Filter** button is activated.

Previous Selection Filter: Enables the user to undo the last applied filter selection.

Rewind All option**:** Enables the user to undo all previous applied filter selections, and returns all the originally displayed data to the table displayed in the *Workspace*.

Opens the online Sheer DNA Manage Help.

For operating instructions on selecting lines and applying filters, refer to the sections *Filtering Information* and *Setting Selection Filters* in *Chapter 4, General DNA Manage Tables*.

The **Find** field enables the user to search for information relating to the branch selected in the *Tree* pane. For more information about searching for information, refer to page 63.

2.3 Sheer DNA Manage Window, Menus and Toolbar

This section provides a detailed description of the Sheer DNA information displayed in the *Sheer DNA Manage* window depending on the branch selected, the menus, and toolbars.

For specific information about each branch, refer to:

- **DNA Servers**, page 20.
- **DNA Server Entities,** including the DNA Gateway and DNA Units, page 24.
- **AVMs**, page 29.
- **Global Settings**, page 33.
- **Scopes**, page 44.
- **Topology**, page 47.

- **Users**, page 49.
- **Workflow Engine**, page 52.

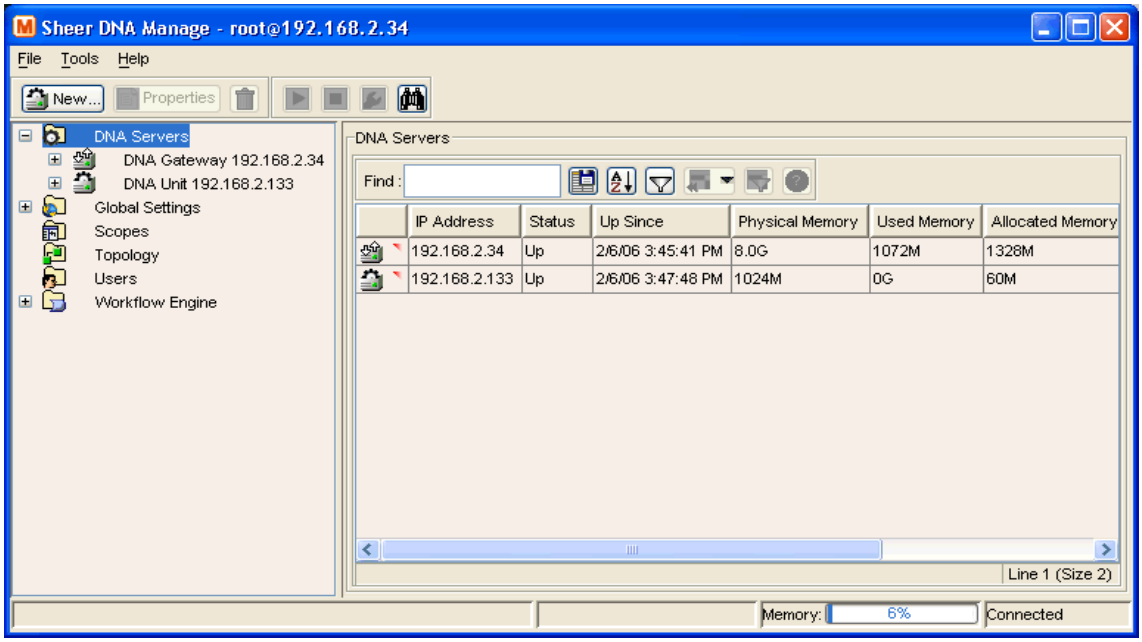
2.3.1 DNA Servers Branch

Sheer DNA Manage maintains a list of all of the DNA Servers defined in the system. The *DNA Servers* branch enables the user to add and remove DNA Unit Servers.

The user can expand this branch to view a list of the Sheer DNA Units, Sheer DNA Gateway and AVMs. Each Sheer DNA Gateway, Sheer DNA Unit and AVM has its own sub-branch. The *DNA Servers* branch (and associated sub-branches) enables the user to manage information relating to the AVMs and VNEs contained in the Sheer DNA Units.

Note: AVMs and VNEs should reside on a Sheer DNA Unit (as a common configuration) but they can also reside on a Sheer DNA Gateway.

The *DNA Servers* branch is displayed below.



The *DNA Servers* branch contains the following sub-branches:

- **DNA Gateway** and **DNA Unit**, namely, DNA Server Entities, refer to page 24.
- **AVMs**, refer to page 29.

For more information about DNA Server menu and toolbar options:

- Menu options, refer to page 21.
- Toolbar options, refer to page 23.

The *Workspace* area of the *DNA Servers* branch enables the user to view a list of all of the Sheer DNA Gateways and Sheer DNA Units and their status. Clicking on a column heading in the table in the *Workspace* sorts the Sheer DNA Units in ascending or descending order according to the selected column.

Note: Any changes that are made to the *DNA Servers* branch are saved automatically and registered immediately in the Sheer DNA.

The following columns are displayed in the table in the *Workspace*:

- **IP Address:** The IP address of the Sheer DNA Units, and Sheer DNA Gateways as defined in Sheer DNA Manage.
- **Status:** The status of the Sheer DNA Unit, as follows:
  - **Up:** The Sheer DNA Unit is up.
  - **Down:** The Sheer DNA Unit is down.
  - **Unreachable:** The Sheer DNA Unit cannot be reached.
- **Up Since:** The date and time when the DNA Unit was last loaded.
- **Physical Memory:** The physical memory of the Sheer DNA Unit.
- **Used Memory:** The memory being used by the Sheer DNA Unit.
- **Allocated Memory:** The amount of memory allocated to the Sheer DNA Unit. Allocated memory is the sum of all of the memory settings for all of the AVMs.
- **Protection Group:** The protection group to which the Sheer DNA Unit has been allocated.
- **AVM HA:** The Sheer DNA Unit is enabled for high availability (**true**) or disabled (**false**). By default this option is enabled for high availability.

For more information about the *DNA Servers* branch, refer to *Chapter 5, Managing Sheer DNA Units*.

Menus

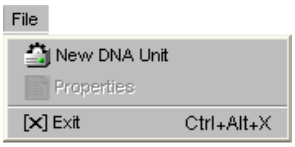
This section provides a description of each option available in the menus when the *DNA Servers* branch is selected. The following menus are available:

- *File* menu, as described in the next section.
- *Tools* menu, as described on page 22.

- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 23.
- *Workspace* shortcut menu, as described on page 23.

File Menu – DNA Servers Branch

The *File* menu is displayed below.



New DNA Unit

Creates a new DNA Unit.

Exit

Exits Sheer DNA Manage. For more information, refer to page 56.

Tools Menu – DNA Servers Branch

The *Tools* menu is displayed below.

Change User Password

Enables the user to change the password used, when logging in to the Sheer DNA Client application suite. The change will take effect the next time that the user logs in to the application. The *Tools* menu option is the same throughout the application.

Help Menu

The *Help* menu is displayed below.

The Help menu enables the user to display application information, for example, the version number. The *Help* menu options are the same throughout the application.

Tree Pane Menu – DNA Servers Branch

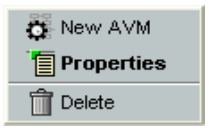
When the user right-clicks on the *DNA Servers* branch the following menu is displayed:

New DNA Unit

The user can add a new Sheer DNA Unit to the Sheer DNA Servers.

Workspace Shortcut Menu – DNA Servers Branch

When the user right-clicks on a Sheer DNA Unit or DNA Gateway in the table in the *Workspace* the following menu is displayed:



New AVM

Adds an AVM to the selected Sheer DNA Unit. For more information, refer to page 80.

Properties

Displays the properties of the selected Sheer DNA Unit in a *Properties* dialog box. For more information, refer to page 73.

Switch

This option is available when high availability is enabled and is only available for Sheer DNA Units. Manually switch to the standby Sheer DNA Unit. For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

Delete

Deletes the selected Sheer DNA Unit. For more information, refer to page 75.

DNA Manage Toolbar – DNA Servers Branch

The *DNA Servers* branch contains the following tools (available tool bar options):

Adds a new Sheer DNA Unit to the Sheer DNA Server.

Search for a Sheer DNA Unit/AVM/VNE amongst all the Sheer DNA Servers.

When a Sheer DNA Unit is selected in the table of the *Workspace* the following tools are displayed in the toolbar:

Creates a new AVM in the selected Sheer DNA Unit or Gateway.

Displays the properties of the selected Sheer DNA Unit.

Deletes the selected Sheer DNA Unit.

Search for a Sheer DNA Unit/AVM/VNE amongst all the Sheer DNA Servers.

For more information about the *DNA Servers* branch, refer to *Chapter 5, Managing Sheer DNA Units*.

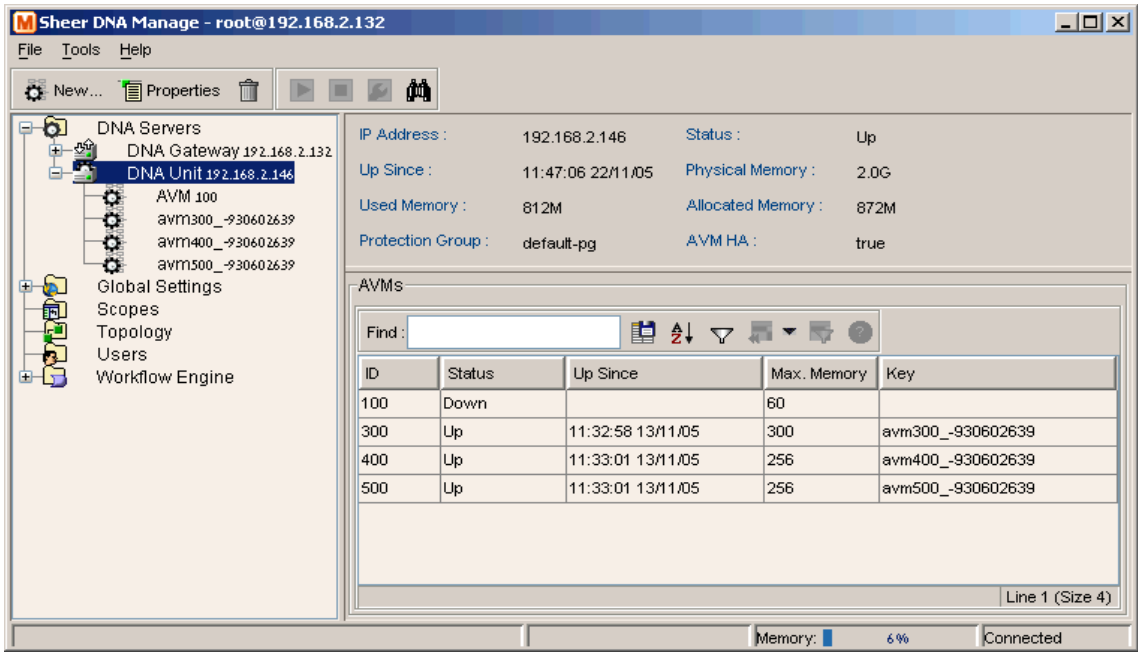
2.3.2 DNA Server Entities Branch

The *DNA Server Entities* sub-branch includes the **DNA Gateway** and **DNA Unit** sub-branches. All the options described here refer to both sub-branches.

The *DNA Server Entities* sub-branch enables the user to manage information relating to the AVMs and VNEs on a selected Sheer DNA Unit. These include:

- Adding, editing and removing an AVM
- Switching manually to the standby Sheer DNA Unit
- Viewing AVM properties
- Moving AVMs
- Starting and stopping AVMs and VNEs
- Adding VNEs

An example of the *Sheer DNA Manage* window when a *DNA Servers Entity* sub-branch is selected is displayed below.



Each row in the table in the *Workspace* enables the user to view the status of an AVM. The AVMs can be sorted in ascending or descending order by clicking on the column heading in the table.

Note: Any changes that are made to the *DNA Servers Entity* sub-branch are saved automatically and registered immediately in the Sheer DNA.

The following columns are displayed in the *Workspace* table for the AVMs that are listed or running under the server entity:

- **ID:** The name of the AVM as defined in Sheer DNA and unique to the AVM, for example, AVM 18.
- **Status:** The status of the AVM, as follows:
  - **Starting Up:** When an AVM is started.
  - **Up:** The AVM is up.
  - **Shutting Down** When an AVM is stopped.
  - **Down:** The AVM is down.
  - **Unreachable:** The AVM cannot be reached.
- **Up Since:** The date and time that the Sheer DNA Unit was last started.
- **Max Memory:** The maximum allocated memory size as defined when the AVM was created in Sheer DNA Manage. The default value is 256 MB.

- **Key:** The key of the AVM, which is unique to the system. By default the key is displayed as "AVM + ID + timestamp".

For more information about DNA Server specific menu and toolbar options:

- Menu options, refer to page 26.
- Toolbar options, refer to page 28.

DNA Server Entities Menus

This section provides a description of each option available in the menus when the *DNA Server* sub-branch is selected. The following menus are available:

- *File* menu, as described on page 26.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 27.
- *Workspace* menu, as described on page 27.

File Menu – DNA Servers Entities Branch

The *File* menu is displayed below.

New AVM

Adds an AVM to the selected Sheer DNA Unit. For more information, refer to page 80.

Properties

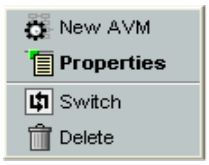
Displays the *DNA Unit Properties* dialog box. This dialog box lists the properties of the selected Sheer DNA Unit and indicates its status. For more information, refer to page 73.

Exit

Exits Sheer DNA Manage.

Tree Pane Shortcut Menu – DNA Server Entities Branch

When the user right-clicks on the *DNA Server Entities* sub-branch in the *Tree* pane the following shortcut menu is displayed:



New AVM

Adds an AVM to the selected Sheer DNA Unit.

Properties

Displays the properties of the selected Sheer DNA Unit.

Switch

This option is available when high availability is enabled and is only available for Sheer DNA Units. Manually switch to the standby Sheer DNA Unit. For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

Delete

Deletes the selected Sheer DNA Unit.

Workspace Shortcut Menu – DNA Servers Entity Branch

When the user right-clicks an AVM in the *Tree* pane or in the table in the *Workspace* the following menu is displayed:

New VNE

Adds a New VNE to the chosen AVM.

Note: A new VNE cannot be added to the reserved AVMs 0-100.

Actions

Enables the user to start or stop an AVM.

Delete

Deletes an AVM.

Move AVM

Move an entire AVM between DNA Units.

Properties

Displays the properties of the selected AVM and its status in the *General* tab of a dialog box.

DNA Manage Toolbar – DNA Server Entities Branch

When the *DNA Server Entities* sub-branch is selected in the *Tree* pane the following tools are displayed in the toolbar:

Creates a new AVM in the selected Sheer DNA Unit or Gateway.

Displays the Sheer DNA Server properties and status.


Deletes the selected Sheer DNA Unit.


Search for a Sheer DNA Unit/AVM/VNE amongst all the Sheer DNA Servers.

When an AVM is selected in the table in the *Workspace* the following tools are displayed in the toolbar:

Creates a new VNE in the selected AVM.

Displays the AVM properties and status. For more information, refer to page 82.


Deletes the selected AVM.


Starts the selected AVM. For more information, refer to page 85.


Stops the selected AVM. For more information, refer to page 85.


Search for a Sheer DNA Unit/AVM/VNE amongst all the Sheer DNA Servers.

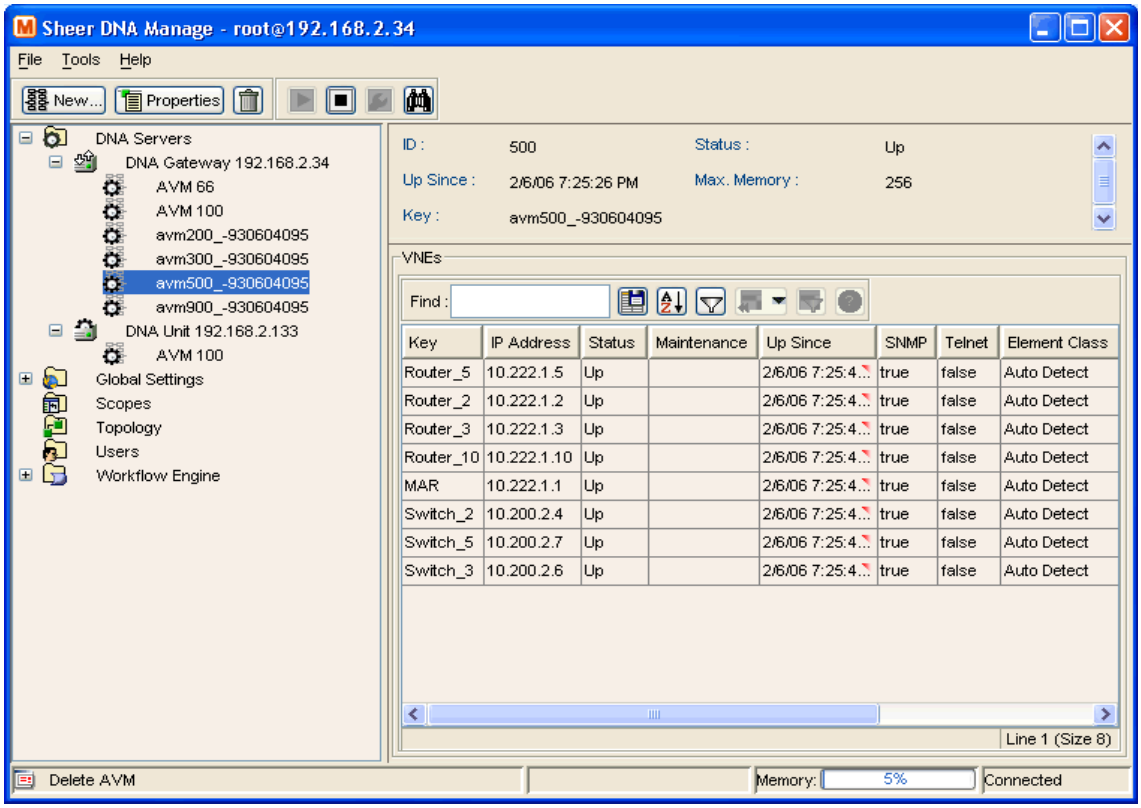
For more information on the *DNA Servers Entity* sub-branch, refer to *Chapter 6, Managing AVMs and VNEs.*

2.3.3 AVM Branch

The *AVM* sub-branch enables the user to manage information relating to the VNEs in a selected AVM. This includes:

- Adding, editing and removing a VNE
- Viewing VNE or AVM properties
- Deleting an AVM
- Moving AVMs and/or VNEs
- Starting and stopping VNEs or AVMs
- Moving VNEs to maintenance mode

An example of the *Sheer DNA Manage* window when the *AVM* sub-branch is selected is displayed below.



When the user selects the *AVM* sub-branch the workspace displays the properties of the AVM and a table with the list of VNEs.

Note: No VNEs are displayed when a special AVM (for example, AVM 66) that belongs to the Gateway is selected.

The following columns are displayed in the *Workspace* table:

- **Key:** The unique key of the VNE.
- **IP Address:** The IP address of the device as defined in Sheer DNA Manage.
- **Status:** The status of the VNE, as follows:
  - **Starting Up:** When a VNE is started.
  - **Up:** The VNE is up.
  - **Shutting Down** When a VNE is stopped.
  - **Down:** The VNE is down.
  - **Unreachable:** Sheer DNA failed to access the VNE.
- **Maintenance:** Indicates whether the VNE is or is not in maintenance mode, namely, true or false.
- **Up Since:** The date and time that the VNE was last started.
- **SNMP:** Indicates whether this option is enabled or disabled on the VNE, namely, true or false.
- **Telnet:** Indicates whether this option is enabled or disabled on the VNE, namely, true or false.
- **Element Class:** Detects the VNE category, namely, Auto Detect, Generic SNMP, Cloud or ICMP.
- **Element Type:** The device type (manufacturer name), for example, Cisco 7204.
- **Polling Group:** The name of the customized polling group or it is blank if it is an instance.

For more information about VNEs, refer to *Chapter 6, Managing AVMs and VNEs* the section on *VNEs Overview*.

For more information about AVM menu and toolbar options:

- Menu options, refer to page 30.
- Toolbar options, refer to page 33.

AVM Menus

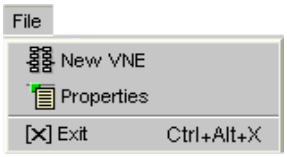
This section provides a description of each option available in the menus when the *AVM* sub-branch is selected. The following menus are available:

- *File* menu, as described below.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.

- *Tree Pane* shortcut menu, as described on page 31.
- *Workspace* shortcut menu, as described on page 32.

File Menu – AVM Branch

The *File* menu is displayed below.



New VNE

Adds a VNE to the selected AVM.

Note: A new VNE cannot be added to the reserved AVMs 0-100.

Properties

Displays the properties of the selected AVM and its status.

Exit

Exits Sheer DNA Manage.

Tree Pane Shortcut Menu – AVM Branch

When the user right-clicks on the *AVM* sub-branch in the *Tree* pane the following menu is displayed:

New VNE

Creates a VNE for the selected AVM. For more information, refer to page 80

Note: A new VNE cannot be added to the reserved AVMs 0-100.

Actions

Starts or stops an AVM. For more information, refer to page 85.

Delete

Deletes an AVM from the Sheer DNA Server.

Note: Reserved AVMs 0-100 cannot be deleted.

Move AVM

Move an entire AVM between DNA Units. For more information, refer to page 86.

Note: Reserved AVMs 0-100 cannot be moved.

Properties

Displays the properties of the selected AVM.

Workspace Shortcut Menu – AVM Branch

When the user right-clicks on a selected VNE in the table the following shortcut menu (and sub-menu, when required) options are displayed:

Actions

Enables the user to start, stop or delete a VNE. In addition, the VNE can be moved to maintenance mode.

Delete

Deletes the selected VNE from an AVM.

Move VNEs

Move a single VNE between AVMs.

Properties

Displays the properties of the selected VNE.

DNA Manage Toolbar – AVM Branch

When the *AVM* sub-branch is selected in the *Tree* pane the following tools are displayed in the toolbar:

Creates a new VNE in the selected AVM.

Displays the properties of the selected AVM.


Deletes the selected AVM.


Starts the selected AVM.


Stops the selected AVM.


Search for a Sheer DNA Unit/AVM/VNE amongst all the Sheer DNA Servers.

When a VNE is selected in the table in the *Workspace* the following tools are displayed in the toolbar:

Creates a new VNE in the selected AVM.

Displays the properties of the selected VNE.


Deletes the selected VNE from an AVM.


Starts the selected VNE.


Moves the selected VNE to maintenance mode.


Stops the selected VNE.


Search for a Sheer DNA Unit/AVM/VNE amongst all the Sheer DNA Servers.

For more information on the *AVM* sub-branch, refer to *Chapter 6, Managing AVMs and VNEs.*

2.3.4 Global Settings Branch

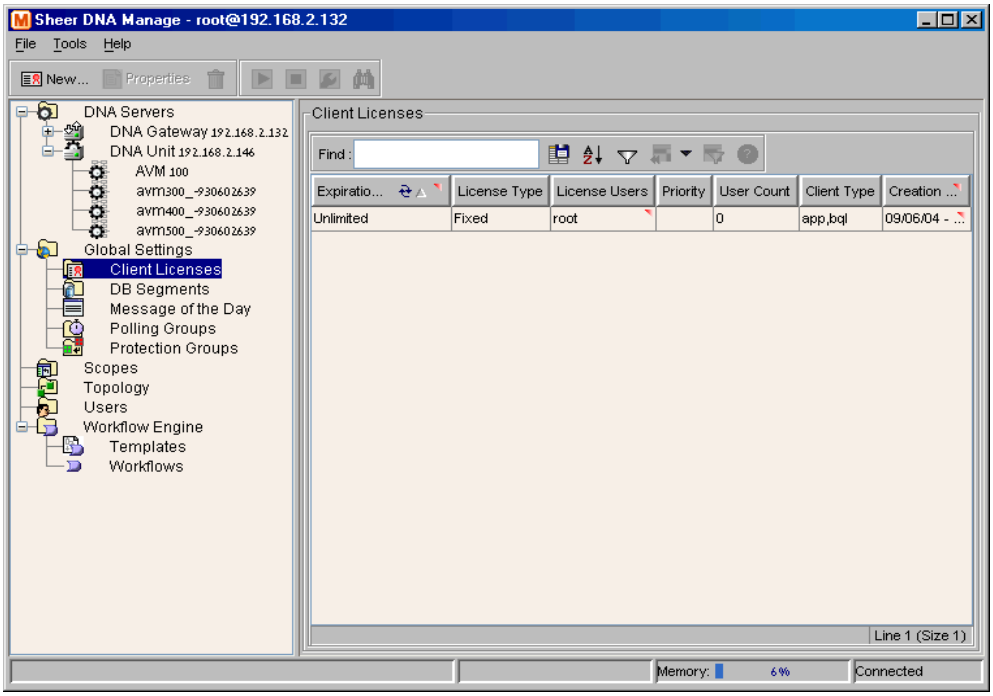
The *Global Settings* branch maintains system-wide settings, for example, polling and protection groups. Any changes that are made to the settings affect the configuration throughout the entire system.

The *Global Settings* branch includes the following sub-branches:

- **Client Licenses**, refer to page 34
- **DB Segments**, refer to page 37
- **Message of the Day**, refer to page 38
- **Polling Groups**, refer to page 39
- **Protection Groups**, refer to page 41

Client Licenses

The *Client Licenses* sub-branch enables control and monitoring of the number of Sheer DNA Client connections over a limited or unlimited period of time as defined in terms of the client license. The *Sheer DNA Manage* window with the *Client Licenses* sub-branch selected is displayed below.



The following columns are displayed in the *Workspace* table when the *Client Licenses* sub-branch is selected:

- **Expiration Date:** Date of the expiration of the license. The license can be for a limited or unlimited period of time.
- **License Type:** The license type, namely:
  - **Fixed:** The number of installed users are identified by user names or IP addresses or both. For example, 5 users with the user names a, b, c, d and e.

    or
  - **Floating:** The number of installed users operating concurrently (unspecified). For example, 5 users.
- **License Users:** The user names and/or IP addresses of the users.
- **Priority:** Available in a future version.
- **User Count:** The number of users allowed to operate the Sheer DNA Client applications, as defined in terms of the license. The exact number of users is displayed if the number is limited or 0 indicates an unlimited number of users.

- **Creation Date:** The date when the license was implemented.
- **Client Type:** The applications to which the user is authorized to connect, namely, BQL and/or Sheer DNA Client applications.

For more information about:

- Menus options, refer to page 35.
- Toolbar options, refer to page 36.

Client Licenses Menus

This section provides a description of each option available in the menus when the *Client Licenses* sub-branch is selected. The following menus are available:

- *File* menu, as described below.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 36.
- *Workspace* shortcut menu, as described on page 36.

File Menu – Client Licenses Branch

The *File* menu is displayed below.

New License

Install a new license.

Properties

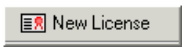
Displays the properties of the selected license.

Exit

Exits Sheer DNA Manage.

Tree Pane Menu – Client Licenses Branch

Right clicking on the *Client Licenses* sub-branch displays the following menu:

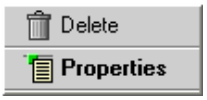


New License

Install a new license.

Workspace Shortcut Menu – Client Licenses Branch

When the user right-clicks in the table in the *Workspace* the following shortcut menu is displayed:



Delete

Deletes the selected license.

Properties

Displays the properties of the selected license.

Toolbar – Client Licenses Branch

When the *Client Licenses* sub-branch is selected in the *Tree* pane the toolbar contains the following tools:

Install a new license.

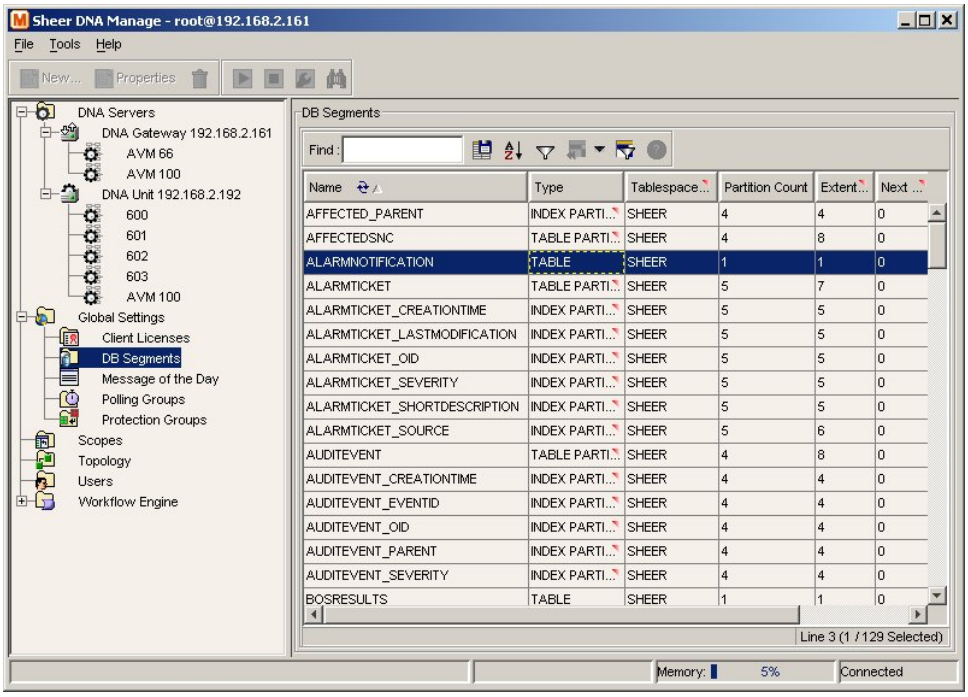
Displays the properties of the selected license.

Deletes the selected license.

For more information about client licenses, refer to page 107.

DB Segments Branch

The *DB segments* branch in Sheer DNA Manage displays a table describing the storage allocated for all database segments. An example of the *Sheer DNA Manage* window when the *DB Segments* branch is selected is displayed below.

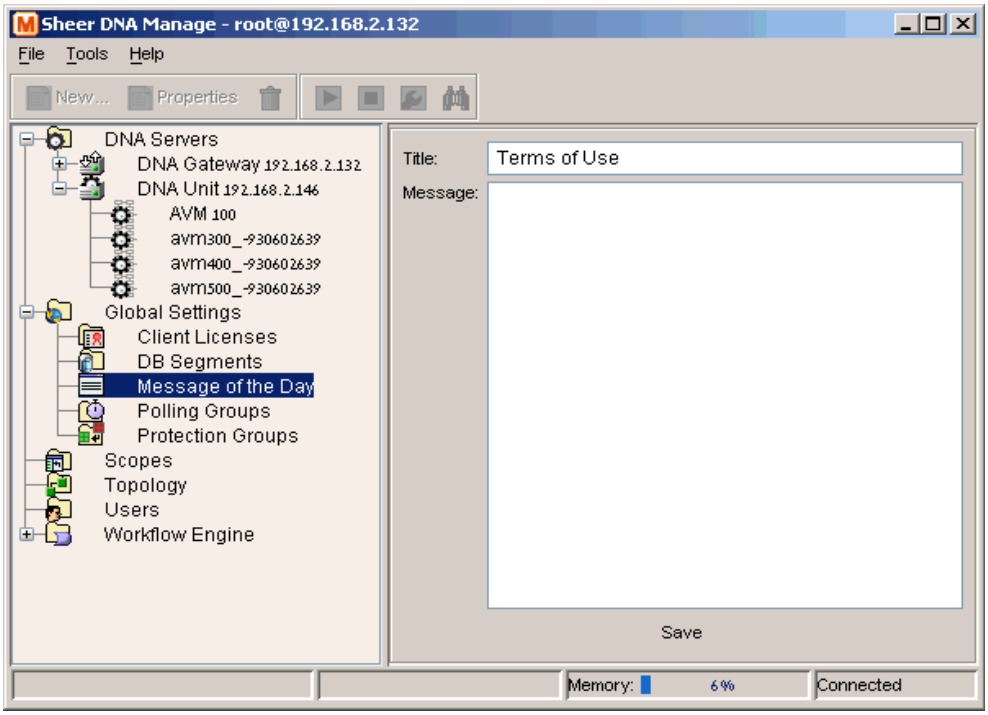


The following columns are displayed in the *Workspace* table when the *DB Segments* branch is selected:

- **Name:** Name of the segment.
- **Type:** Type of segment, namely, INDEX PARTITION, TABLE PARTITION, TABLE, CLUSTER, INDEX, ROLLBACK, DEFERRED ROLLBACK, TEMPORARY, CACHE, LOBSEGMENT and LOBINDEX
- **Tablespace Name:** Name of the table space containing the segment.
- **Partition Count:** Number of partitions.
- **Extent Count:** Number of extents allocated to the segment where the data is stored.
- **Next Extent Size:** Size in bytes of the next extent to be allocated to the segment.
- **Bytes:** Size in bytes, of the segment.

Service Disclaimer Message of the Day

The *Message of the Day* sub-branch enables the user to define a message (service disclaimer) that will be displayed when a user logs in to the Sheer Client applications. An example of the *Sheer DNA Manage* window when the *Message of the Day* sub-branch is selected is displayed below.



The following areas are displayed in the *Workspace*:

- **Title:** The title of the message, which is displayed as the title of the dialog box. By default the title "Terms of Use" is displayed.
- **Message:** A free text message for the user. The message supports HTML format.

  Note: The **Abort** and **Continue** buttons are displayed in the message dialog box by default, so the message must relate to these actions. The user must accept (Continue) the service disclaimer otherwise the user will be unable to login.

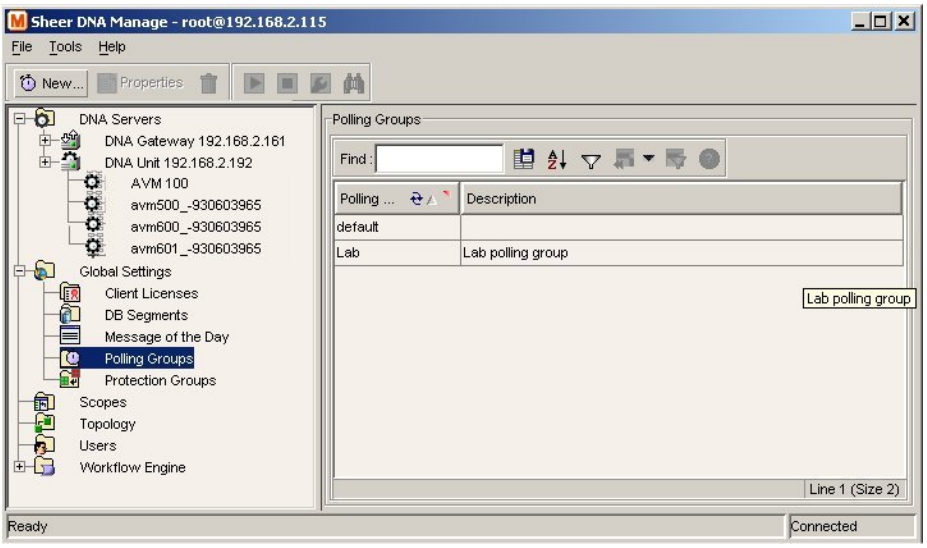
The following button is displayed in the *Workspace*:

- **Save:** Saves the message so that it is displayed when the user logs in to a Sheer Client application.

For more information about the *Message of the Day* branch, refer to page 113.

Polling Groups

The *Polling Groups* sub-branch enables the user to manage polling groups, by categorizing a group of devices to be polled according to pre-set intervals. The *Polling Groups* sub-branch is displayed below.



The following columns are displayed in the *Workspace* table when the *Polling Groups* sub-branch is selected:

- **Polling Group:** The polling group name defined by the user
- **Description:** A description of the polling group.

Note: Any changes that are made to the *Polling Groups* sub-branch are saved automatically and registered immediately in the Sheer DNA.

For more information about:

- Menu options, refer to page 39.
- Toolbar options, refer to page 41.

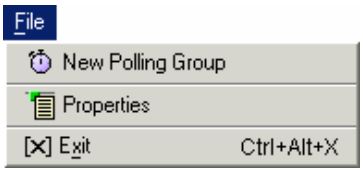
Polling Group Menus

This section provides a description of each option available in the menus when the *Polling Groups* sub-branch is selected. The following menus are available:

- *File* menu, as described on page 40.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 40.
- *Workspace* shortcut menu, as described on page 40.

File Menu – Polling Groups Branch

The *File* menu is displayed below.



New Polling Group

Creates a new polling group.

Properties

Displays the properties of the selected polling group.

Exit

Exits Sheer DNA Manage.

Tree Pane Menu – Polling Groups Branch

Right-clicking on the *Polling Groups* sub-branch displays the following menu:

New Polling Group

Creates a new polling group.

Workspace Shortcut Menu – Polling Groups Branch

When the user right-clicks in the table in the *Workspace* the following shortcut menu, is displayed:

Properties

Displays the properties of the selected polling group.

Delete

Deletes the selected polling group.

Toolbar – Polling Groups Branch

When the *Polling Groups* sub-branch is selected in the *Tree* pane the toolbar contains the following tools:

Creates a new polling group.

Displays the properties of the selected polling group.


Deletes the selected polling group.

When a polling group is selected in the table in the *Workspace*, clicking **Properties** in the toolbar displays the properties of the polling group in a *Properties* dialog box.

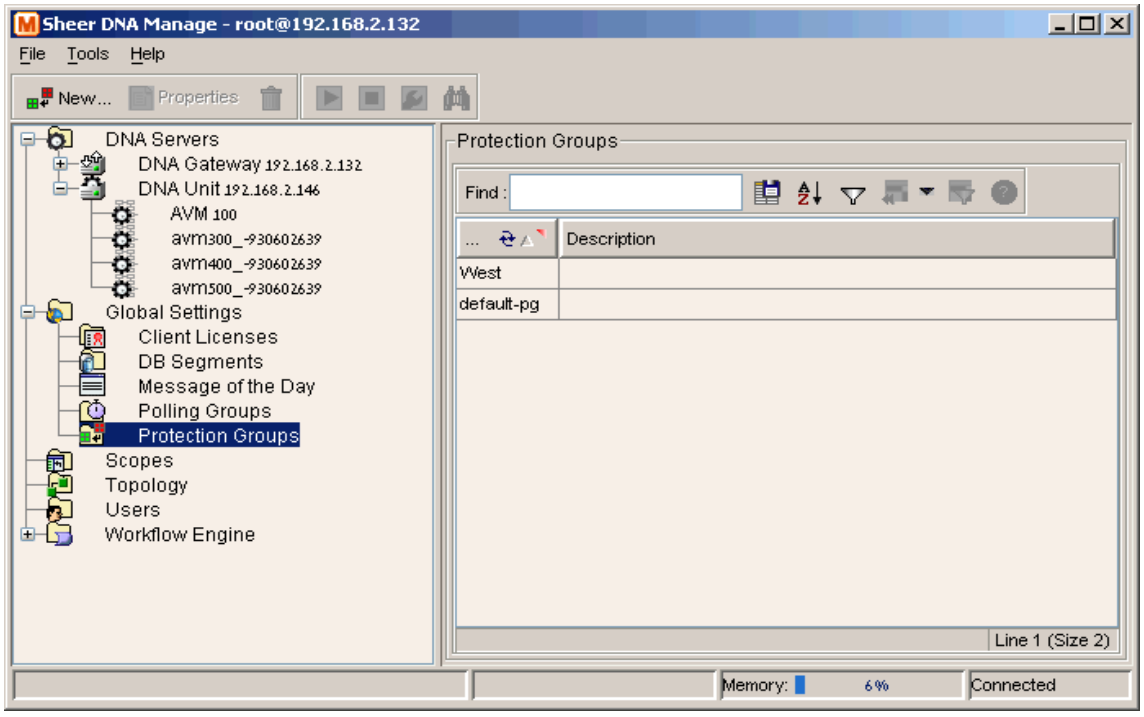
For more information about polling groups, refer to page 114.

Protection Groups

By default all the Sheer DNA Units in the Sheer DNA Fabric belong to one big cluster. The *Protection Groups* sub-branch enables the administrator to change the default setup of the Sheer DNA Units by customizing protection groups (clusters) and then assigning Sheer DNA Units to these protection groups.

For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide.*

The *Sheer DNA Manage* window with the *Protection Groups* sub-branch selected is displayed below.



The following columns are displayed in the *Workspace* table when the *Protection Groups* sub-branch is selected:

- **Name:** The protection group name defined by the administrator.
- **Description:** A description of the protection group.

For more information about:

- Menu options, refer to page 43.
- Toolbar options, refer to page 44.

Protection Group Menus

This section provides a description of each option available in the menus when the *Protection Groups* sub-branch is selected. The following menus are available:

- *File* menu, as described on page 43.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 43.
- *Workspace* shortcut menu, as described on page 43.

File Menu – Protection Groups Branch

The *File* menu is displayed below.

New Protection Group

Creates a new protection group.

Properties

Displays the properties of the selected protection group.

Exit

Exits Sheer DNA Manage.

Tree Pane Menu – Protection Groups Branch

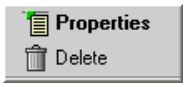
Right clicking on the *Protection Groups* sub-branch displays the following shortcut menu:

New Protection Group

Creates a new protection group.

Workspace Shortcut Menu – Protection Group Branch

When the user right-clicks in the table in the *Workspace* the following shortcut menu is displayed:



Delete

Deletes the selected protection group.

Properties

Displays the properties of the selected protection group in a *Properties* dialog box.

Toolbar – Protection Groups Branch

When the *Protection Groups* sub-branch is selected in the *Tree* pane the toolbar contains the following tools:

Creates a new protection group.

Displays the properties of the selected protection group.

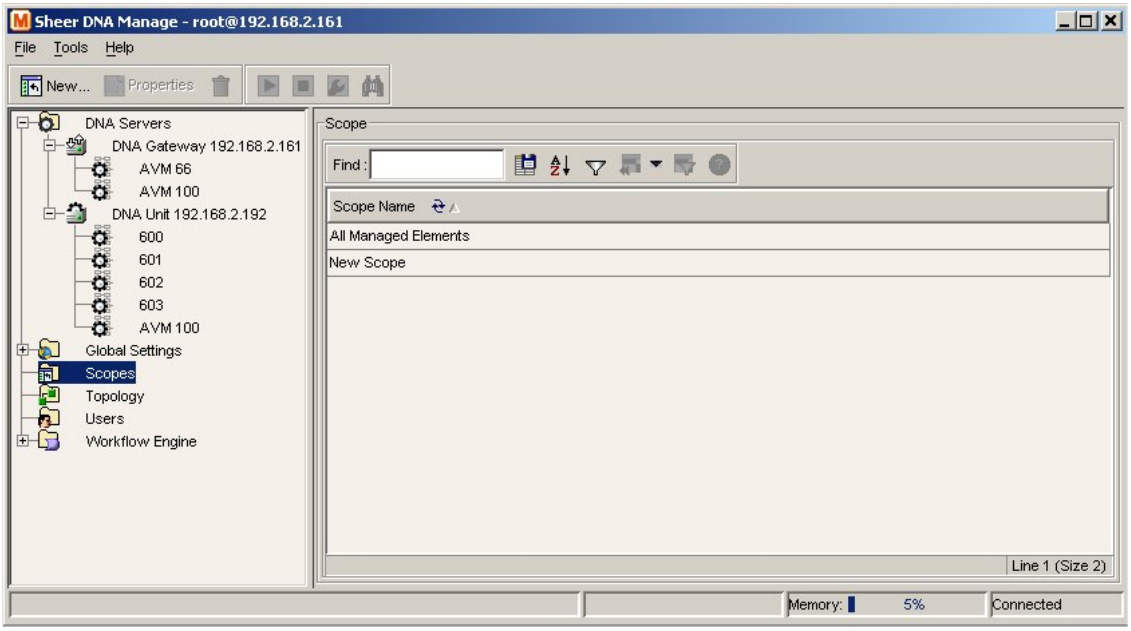
Deletes the selected protection group.

For more information about protection groups, refer to the *Cisco Active Network Abstraction High Availability User's Guide.*

2.3.5 Scopes Branch

The *Scopes* branch enables the administrator to group a collection of managed Network Elements together in order to enable the user to view and/or manage the Network Elements based on the role granted to the user for the scope. For more information on the *Scopes* branch, refer to *Chapter 9, Managing DNA Security.*

The *Scopes* branch is displayed below.



Each row in the table in the *Workspace* displays the name of a scope as defined in Sheer DNA Manage.

For more information about:

- Menu options, refer to following section.
- Toolbar, refer to page 46.

Note: The menus and toolbar displayed in the *Sheer DNA Manage* window are context sensitive; the options vary depending on your selection in the *Tree* pane and *Workspace*.

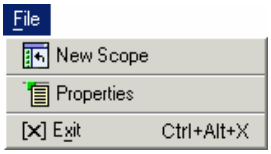
Scopes Menus

This section provides a description of each option available in the menus when the *Scopes* branch is selected. The following menus are available:

- *File* menu, as described in the following section.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 45.
- *Workspace* shortcut menu, as described on page 46.

File Menu – Scopes Branch

The *File* menu for the *Scopes* branch is displayed below.



New Scope

Creates a new scope.

Properties

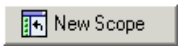
Displays the properties of the selected scope.

Exit

Exits Sheer DNA Manage. For more information, refer to page 56.

Tree Pane Shortcut Menu – Scopes Branch

When the user right-clicks on the *Scopes* branch in the *Tree* pane the following menu is displayed:



New Scope

Creates a new scope.

Workspace Shortcut Menu – Scopes Branch

When the user right-clicks in the table in the *Workspace* the following shortcut menu is displayed:

Delete

Deletes the selected scope.

Properties

Displays the properties of the selected scope.

Note: The user cannot delete or edit the **All Managed Elements** scope in the table in the *Workspace*. For more information, refer to the *Scopes* section on page 140.

Toolbar – Scopes Branch

When the *Scopes* branch is selected in the *Tree* pane the toolbar contains the following tools:

Creates a new scope. For more information, refer to page 140.

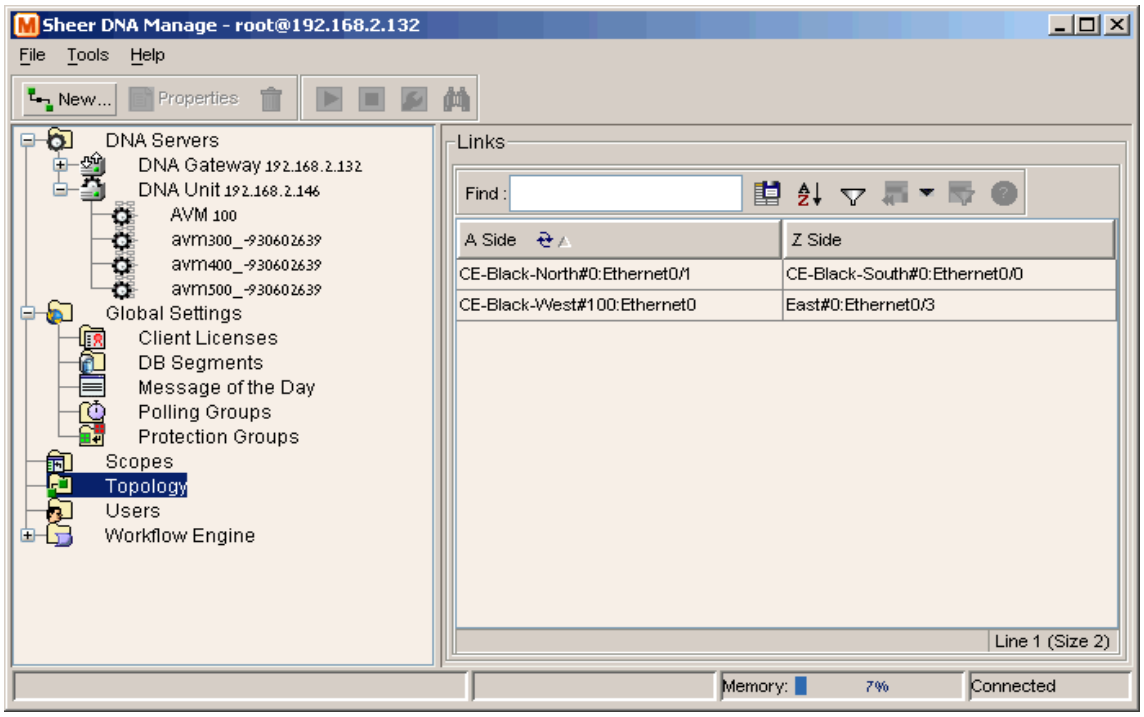
Displays the properties of the selected scope.


Deletes the selected scope.

When a scope is selected in the table in the *Workspace*, clicking **Properties** in the toolbar displays the properties of the selected scope in a *Properties* dialog box.

2.3.6 Topology Branch

The *Topology* branch enables the user to define static links between the Network Elements in order to supplement or override existing auto-discovered topology. The *Sheer DNA Manage* window with the *Topology* branch selected is displayed below.



The *Topology* branch displays all of the static links defined in the system including the A Side and Z Side of the link.

For more information about:

- Menu options, refer to page 47.
- Toolbar options, refer to page 49.

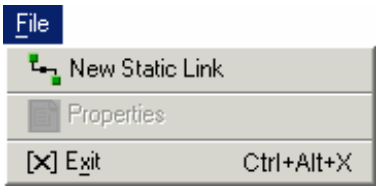
Topology Menus

This section provides a description of each option available in the menus when the *Topology* branch is selected. The following menus are available:

- *File* menu, as described in the following section.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 48.
- *Workspace* shortcut menu, as described on page 48.

File Menu – Topology Branch

The *File* menu is displayed below.



New Static Link

Creates a new static link.

Properties

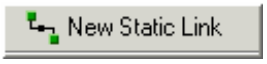
This option is unavailable.

Exit

Exits Sheer DNA Manage. For more information, refer to page 56.

Tree Pane Shortcut Menu – Topology Branch

When the user right-clicks on the *Topology* branch in the *Tree* pane the following menu is displayed:



New Static Link

Creates a new static link.

Workspace Shortcut Menu – Topology Branch

When the user right-clicks in the table in the *Workspace* the following menu is displayed:

Delete

Deletes the selected static link.

Toolbar – Topology Branch

The *Topology* branch contains the following tools:

Opens the *New Link* dialog box enabling the user to create a link between two devices. For more information, refer to page 127.

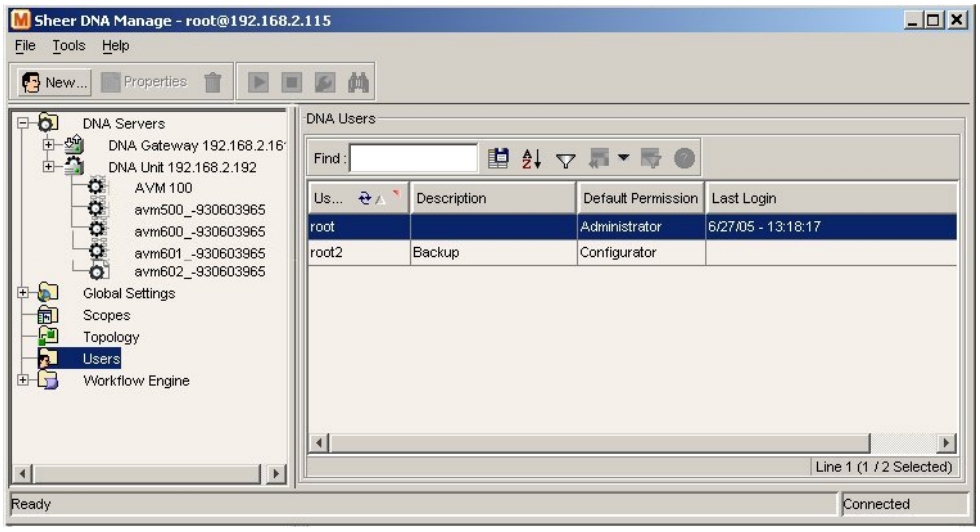
Deletes the selected static link.

For more information about the *Topology* branch, refer to *Chapter 8, Managing Links*.

2.3.7 Users Branch

The *Users* branch enables the administrator to define and manage user accounts. For more information about the *Users* branch, refer to *Chapter 10, Managing Sheer DNA Security*.

The *Sheer DNA Manage* window with the *Users* branch selected is displayed below.



Each row in the table in the *Workspace* displays the user name and a description of the user.

The following columns are displayed in the *Workspace* table:

- **User Name:** The user name (unique) defined for the current client station.
- **Description:** A description of the user.
- **Default Permission:** The default permission of the user, namely, Viewer to Administrator. For example, a user with the default permission Viewer can view maps and the Device List.

Note: The default permission only applies at an application level, namely, all the activities that are related to GUI functionality, not the activities related to devices. For more information, refer to *Chapter 10, Managing Sheer DNA Security*.

- **Last Login:** The date and time that the user last logged in.

For more information about:

- Menu options, refer to the following section.
- Toolbar options, refer to page 51.

Note: The menus and toolbar displayed in the *Sheer DNA Manage* window are context sensitive; the options vary depending on your selection in the *Tree* pane and *Workspace*.

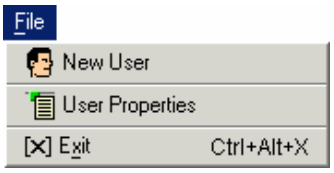
Users Menus

This section provides a description of each option available in the menus when the *Users* branch is selected. The following menus are available:

- *File* menu, as described in the following section.
- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 51.
- *Workspace* shortcut menu, as described on page 51.

File Menu – Users Branch

The *File* menu is displayed below.



New User

Creates a new user for the current client station.

Properties

Displays the properties of the selected user.

Exit

Exits Sheer DNA Manage. For more information, refer to page 56.

Tree Pane Menu – Users Branch

When the user right-clicks on the *Users* branch in the *Tree* pane the following menu is displayed:

New User

Creates a new user for the current client station.

Workspace Shortcut Menu – Users Branch

When the user right-clicks in the table in the *Workspace* the following menu is displayed:

Change Password

Displays the *Set Password* dialog box that enables the administrator to edit a user's password.

Delete

Deletes the selected user name from the system.

Note: The user name **root** cannot be deleted.

Properties

Displays the properties of the selected user.

Toolbar – Users Branch

The *Users* branch contains the following tools:

Opens the *New User* dialog box enabling the user to define a new user for the current client station.

Displays the properties of the selected user.

Deletes the selected user name from the system.

2.3.8 Workflow Engine Branch

The *Workflow Engine* branch enables the user to manage workflow templates and running workflows in runtime. The *Workflow Engine* branch includes the following sub-branches:

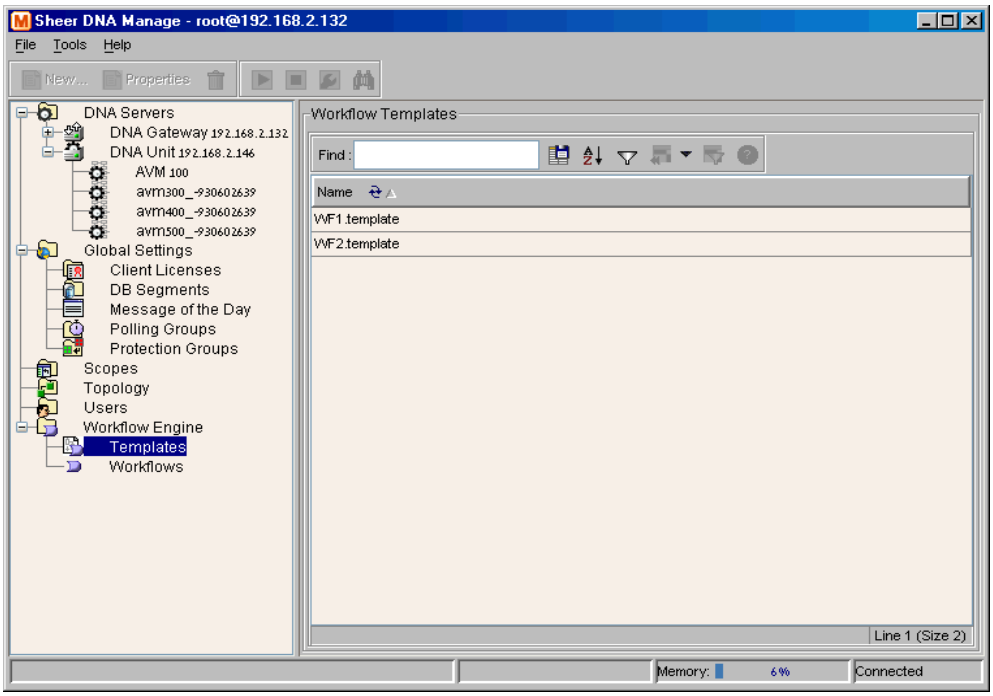
- **Templates:** Displays a list of the deployed workflow templates and enables the user to view the properties of the workflow template. For more information, refer to the section below.
- **Workflows:** Displays a list of the running or completed workflows and enables the user to view and alter their current status. For more information, refer to page 54.

Templates

The *Templates* sub-branch enables the user to:

- View a list of the deployed workflow templates
- View the properties (attributes) of a workflow template
- Delete a workflow template

The *Sheer DNA Manage* window with the *Templates* sub-branch selected is displayed below.



The table displays the names of the workflow templates (in the *Workspace*), as defined using the Sheer Workflow Editor.

For more information about:

- Menu options, refer to the following section.
- Toolbar options, refer to page 54.

Templates Menus

This section provides a description of each option available in the menus when the *Templates* sub-branch is selected. The following menus are available:

- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described the following section.
- *Workspace* shortcut menu, as described on page 53.

Tree Pane Shortcut Menu – Templates Branch

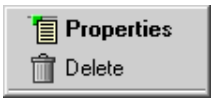
Right clicking on the *Templates* sub-branch displays the following shortcut menu:

Properties

Displays a list of the workflow templates available on the Sheer DNA Gateway.

Workspace Shortcut Menu – Templates Branch

When the user right-clicks in the table in the *Workspace* the following shortcut menu is displayed:



Properties

Displays the properties (attributes) of the selected workflow template.

Delete

Deletes the selected workflow template.

Toolbar – Templates Branch

When the *Templates* sub-branch is selected in the *Tree* pane the toolbar contains the following tools:

 Deletes the selected workflow template.

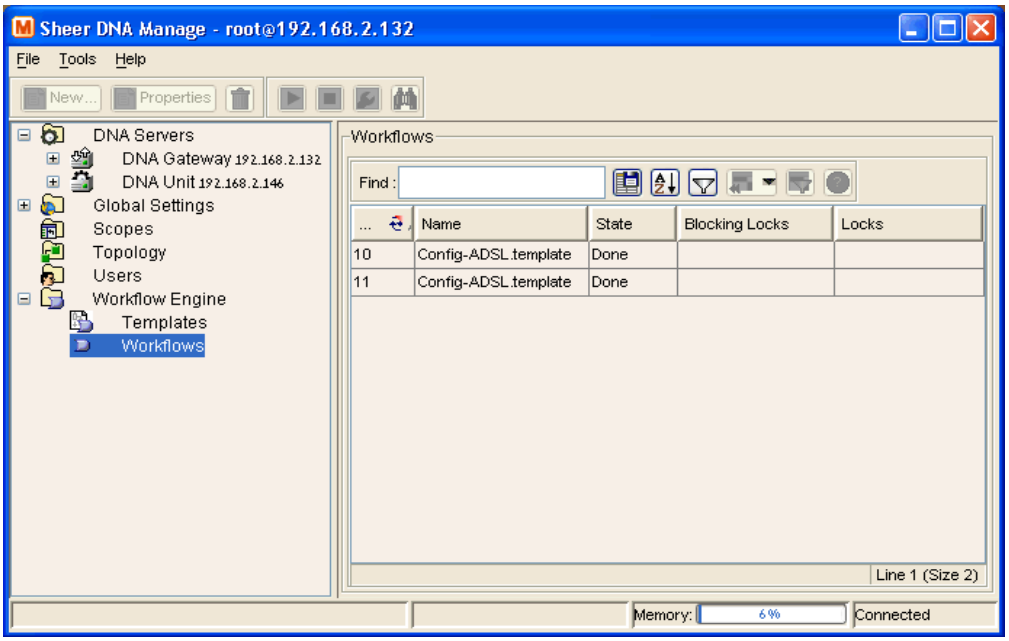
For more information about workflows, refer to the *Cisco Active Network Abstraction Workflow User's Guide*.

Workflows

The *Workflows* sub-branch enables the user to:

- View the list of running or completed workflows and the status of each
- View the output of a workflow
- Abort a workflow that is being processed or that has been completed, and initiate rollback
- Delete a workflow
- View the properties of a workflow

The *Sheer DNA Manage* window with the *Workflows* sub-branch selected is displayed below.



The following columns are displayed in the *Workspace* table when the *Workflows* sub-branch is selected:

- **ID:** A unique sequential number given to the workflow.

- **Name:** The name of the workflow, as defined using the Sheer Workflow Editor.
- **State:** The current status of the workflow, namely, **Ready**, **Running**, **Done**, or **Aborted**.

For more information about:

- Menu options, refer to the following section.
- Toolbar options, refer to page 56.

Workflows Menus

This section provides a description of each option available in the menus when the *Workflows* sub-branch is selected. The following menus are available:

- *Tools* menu, as described on page 22.
- *Help* menu, as described on page 22.
- *Tree Pane* shortcut menu, as described on page 55.
- *Workspace* shortcut menu, as described on page 55.

Tree Pane Menu – Workflows Branch

Right clicking on the *Workflows* sub-branch displays the following shortcut menu:

Properties

Displays a list of the scripts and their current status.

Workspace Shortcut Menu – Workflows Branch

When the user right-clicks in the table in the *Workspace* the following shortcut menu is displayed:

Show Output

View the output of the workflow.

Abort/Rollback

Aborts the workflow and performs rollback if the workflow is running, or if the workflow has already been completed it performs rollback.

Delete

Deletes the workflow from the database.

Note: A workflow can only be deleted from the database when it is **Done** or **Aborted**. It cannot be deleted while the process is still running.

Properties

Displays the properties (attributes) of the selected workflow, including its status.

Toolbar – Workflows Branch

When the *Workflows* sub-branch is selected in the *Tree* pane the toolbar contains the following tools:

Deletes the workflow from the database.

For more information about workflows, refer to the *Cisco Active Network Abstraction Workflow User's Guide*.

2.4 Logging Out

When the user has finished working with Sheer DNA Manage the user can log out of the application. Any changes that were made are automatically saved when logging out.

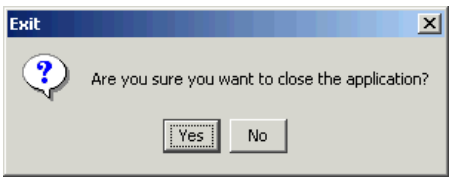
To log out of Sheer DNA Manage

1. From the *File* menu, select **Exit**,

   or

   Click  to close the *Sheer DNA Manage* window.

   The following message is displayed:

2. Click **Yes**. The *Sheer DNA Manage* window is closed.

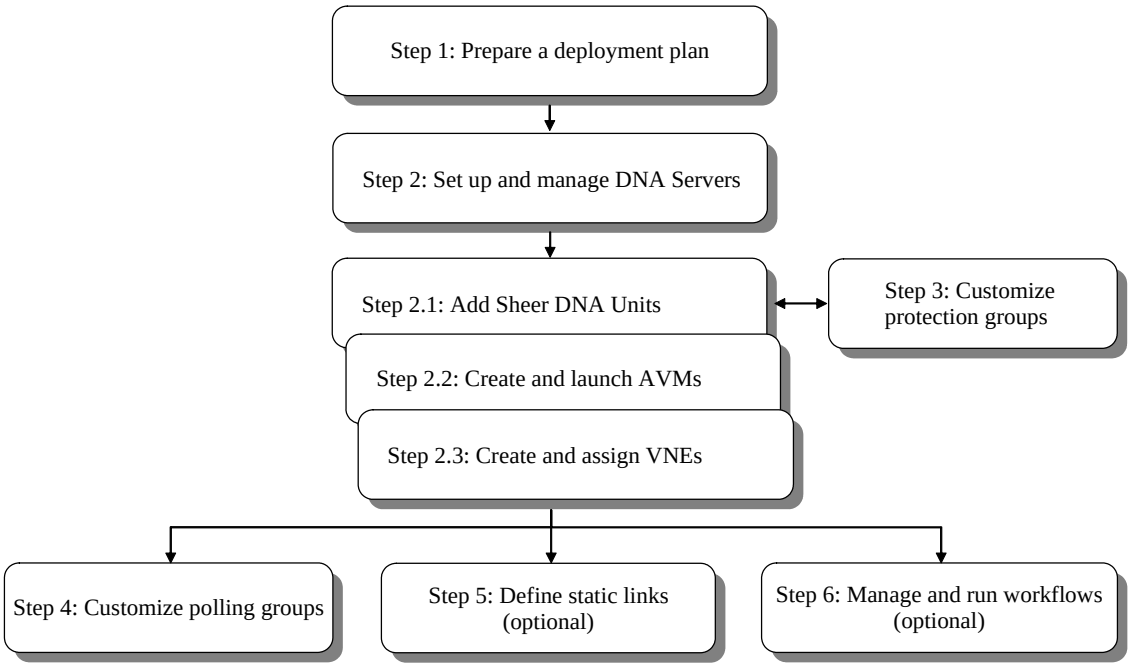
3 Deploying Sheer DNA

About this chapter:

This chapter describes the steps that must be performed to deploy Sheer DNA and provides cross-references to the relevant sections in this Administrator's Guide.

3.1 System Setup Flow

The flow below describes the steps required to deploy Sheer DNA using Sheer DNA Manage and the order in which they must be performed.



Step 1: Prepare a deployment plan: The user must decide the following:

- How many Sheer DNA Unit servers are going to be deployed and allocate AVMs (Autonomous Virtual Machines) to each server.
- How many and what types of Network Elements will be managed by each AVM.

- How many protection groups there are going to be and how Sheer DNA Units are going to be grouped together in protection groups (clusters), based on the following considerations:
  - Device type
  - Geographical location
  - Importance of device
  - Number of devices

Note: The planning of **Protection Groups** in the deployment plan is only applicable when high availability is enabled. For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

- How many standby Sheer DNA Units are going to be deployed.
- How Sheer DNA Units, standby Sheer DNA Units and protection groups are going to be deployed and allocated.
- How many network scopes are required and according to what policy.
- How many users will be defined.

Step 2: Set up and manage DNA Servers: This includes the following:

- **Step 2.1: Add Sheer DNA Units:** Enables the administrator to add a Sheer DNA Unit. Transport links are created automatically between the Sheer DNA Unit and its associated Sheer DNA Gateway in a star topology or between two Sheer DNA Units. For more information, refer to the section *Adding New Sheer DNA Units* on page 71.

  In addition, the administrator can configure Sheer DNA Units for high availability and assign the Sheer DNA Units to protection groups. The standby Sheer DNA Units can be configured and assigned to protection groups (optional). For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.
- **Step 2.2: Create and launch AVMs:** Enables the administrator to add AVMs to managed Network Elements. For more information, refer to the section *Creating AVMs* on page 80.
- **Step 2.3: Create and assign VNEs:** Enables the administrator to create a Virtual Network Element (VNE) that corresponds to a Network Element. For more information, refer to the section *Defining VNEs* on page 89.

Note: Additional Units, AVMs, VNEs, Scopes and Users can be added or edited at any time.

Step 3: Customize protection groups: Enables the administrator to change the default setup of Sheer DNA Units by customizing protection groups (clusters) and then assigning Sheer DNA Units to these groups. For more information, refer to *Cisco Active Network Abstraction High Availability User's Guide.*

Important Note: You must assign a DNA Unit and/or Redundant Unit to a specific Protection Group.

Step 4: Customize polling groups: Enables the administrator to customize new polling groups and rates. For more information, refer to the section *Customizing a Polling Group* on page 116.

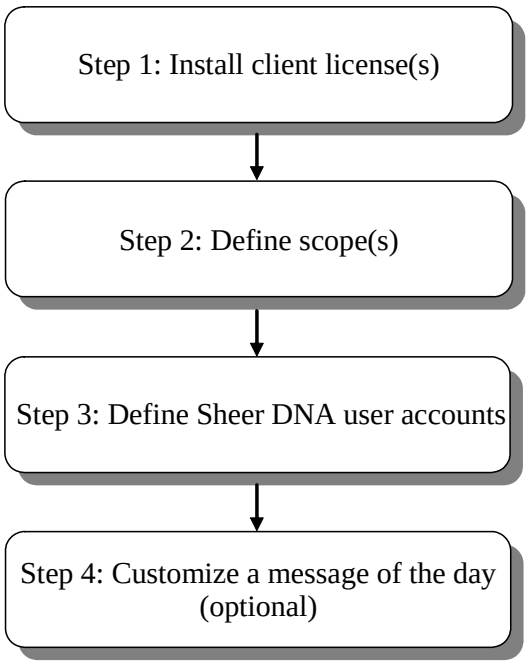
Note: This step can be performed at any time after Step 1.

Step 5: Define static links: Enables the administrator to add a static link between two ports of two Network Elements in the network (optional). For more information, refer to the section *Creating a Static Link* on page 127.

Step 6: Manage and run workflows: Enables the administrator to manage workflow templates and running workflows in runtime using the *Workflow Engine* branch (optional). For more information, refer to *Chapter 9, Managing Workflows.*

3.2 User and View Setup Flow

The flow below describes the steps required to setup Sheer DNA users and the view using Sheer DNA Manage and the order in which they should be performed.



Step 1: Install client license(s): Enables the administrator to install and uninstall the client license provided by Sheer. For more information, refer to the section *Managing Client Licenses* on page 107.

Step 2: Define scope(s): Enables the administrator to define and manage scopes. For more information, refer to the section *Creating Scopes* on page 140.

Step 3: Define Sheer DNA user accounts: Enables the administrator to define and manage Sheer DNA user accounts. For more information, refer to section *Creating New Sheer DNA User Accounts* on page 143.

Step 4: Customize a message of the day: Enables the administrator to define a message (service disclaimer) that will be displayed when the user logs in to the Sheer Client applications. For more information, refer to section *Customizing a Message of the Day* on page 113.

For a detailed description about how Sheer DNA implements a role-based security mechanism with scopes (groups of Network Elements) that are granted to users and managing users in the Sheer DNA platform, refer to *Chapter 10, Managing Sheer DNA Security*.

4 General DNA Manage Tables

About this chapter:

This chapter describes how to perform general Sheer DNA Manage functions when working with tables:

Working with DNA Manage Tables, page 61, describes how to work with Sheer DNA Manage tables, including finding information, opening filters and exporting table information.

Finding Text in a Table, page 63, describes how to sort a table by defining specific criterion.

Filtering Information, page 63, describes how to define a filter for the data displayed in the *Workspace*. In addition, it describes how to select lines and set specific selection filters.

Setting Selection Filters, page 65, describes how to choose a line or specific set of lines, and display them in the table.

Sorting a Table, page 67, describes how to sort tables by defining specific criteria.

Exporting the Table to a File, page 68, describes how to export all the currently displayed data from the *Workspace* to a CSV file.

All these functions are performed using the Sheer DNA Manage table toolbar above the displayed table.

4.1 Working with DNA Manage Tables

Various tables are used throughout the application to display different types of information. Sheer DNA Manage enables the user to perform the following functions using the toolbar displayed above the table in the *Workspace*:

- Find text in a table.
- Define a filter in a table.
- Clear a defined filter from a table.
- Choose lines and set a selection filter in a table
- Undo the previous selection filter in a table
- Undo all selection filters
- Sort the table according to a column

- Export table information.
- Finding specific information in DNA Manage tables

You can also find specific DNA Manage information, such as DNA Units, AVM/VNE details using the  toolbar button and entering criteria into the *Find* dialog box. For more information, refer to section *Finding a Unit/AVM/VNE* on page 76.

For more information about the Table toolbar, refer to page 18.

The user can open the *Filter* dialog box by clicking the  button and sorting criteria by table field, operator, and text.

The user can also (multiple) select specific lines and display them in the table using the  button, and undo the last applied filter, or rewind all filters using the  buttons.

Sheer DNA Manage enables the user to sort a table in one or more of the following ways:

- According to a column by clicking on the required column heading. The  icon is displayed next to the selected column heading.
- In ascending or descending order by clicking on the column heading.
- By clicking the  button in the toolbar of the table and specifying the criterion by which the table will be sorted. For more information about sorting a table using the  button, refer to page 67.

A triangle is displayed next to the column heading to indicate the column according to which the table is sorted.

Clicking on a red triangle displayed in a cell expands the cell to display all of the information in the cell.

4.2 Finding Text in a Table

Sheer DNA Manage enables the user to search for information in the *Workspace* by entering the search criteria, for example, by entering a partial user name.

Note: The tools displayed in the table are a generic component of Sheer DNA applications.

To find text in a table

1. In the table toolbar, in the **Find** field enter the search criteria.
2. Press **Enter**. The row matching the search criteria is highlighted in the table.

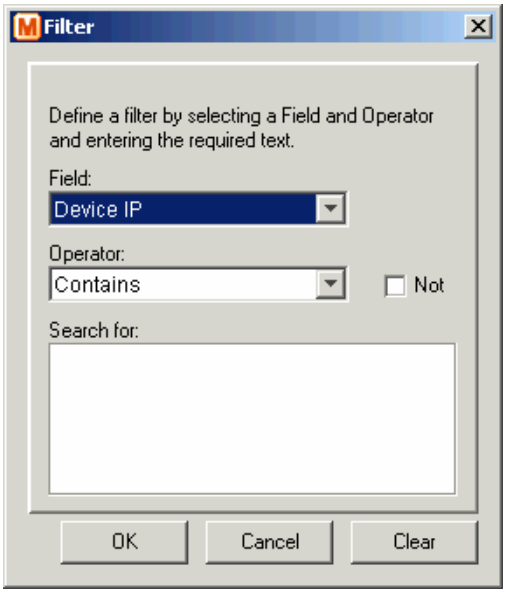
   Note: Click **F3** to continue searching the table.

4.3 Filtering Information

Sheer DNA Manage enables the user to define a filter for the data displayed in the *Workspace* according to a selected column. For example, in the *Users* branch information can be filtered according to user name.

To define a filter

1. In the table toolbar, click **Filter**  . An example of the *Filter* dialog box with defined field and operator criteria displayed.



The following dropdown lists are displayed in the *Filter* dialog box:

- **Field:** Displays a dropdown list of all the columns displayed in the current table.
- **Operator:** Displays a dropdown list of the values included in the filter operation.

The following checkbox is displayed in the *Filter* dialog box:

- **Not:** Select this checkbox to filter the negative of the value in the **Operator** field. For example, if the **Not** checkbox was selected in the *Filter* dialog box, the filter operator would be the equivalent of "does not contain".

The following free text area is displayed in the *Filter* dialog box:

- **Search for:** Enter the required filter value.

2. Select an option from the **Field** and **Operator** dropdown lists.
3. Enter the required filter values in the **Search for** field.
4. Click **OK**. The information is displayed in the *Workspace* using the defined filter.

Note: The **Filter** button toggles to  indicate that a filter has been applied.

The filter can be cleared in order to display all the data in the table again.

To clear a filter

1. In the toolbar, click **Filter**  . The *Filter* dialog box is displayed.
2. Click **Clear**. The *Workspace* displays all of the data.

Important Note: Use the **Clear** filter option to clear ALL of the filter settings (refer to the note in the *Setting Selection Filters* section on page 65).

4.4 Setting Selection Filters

The user can choose a line or specific set of lines, and display them in the table (all un-selected lines are hidden). The user may make continuous multiple line selections, setting the table content after each selection, using the Set Selection Filter button.

The user can undo the last line selections (one step back), one at a time, using the Previous Selection Filter button, or undo (rewind) all multiple line selections, using the Rewind All dropdown menu option.

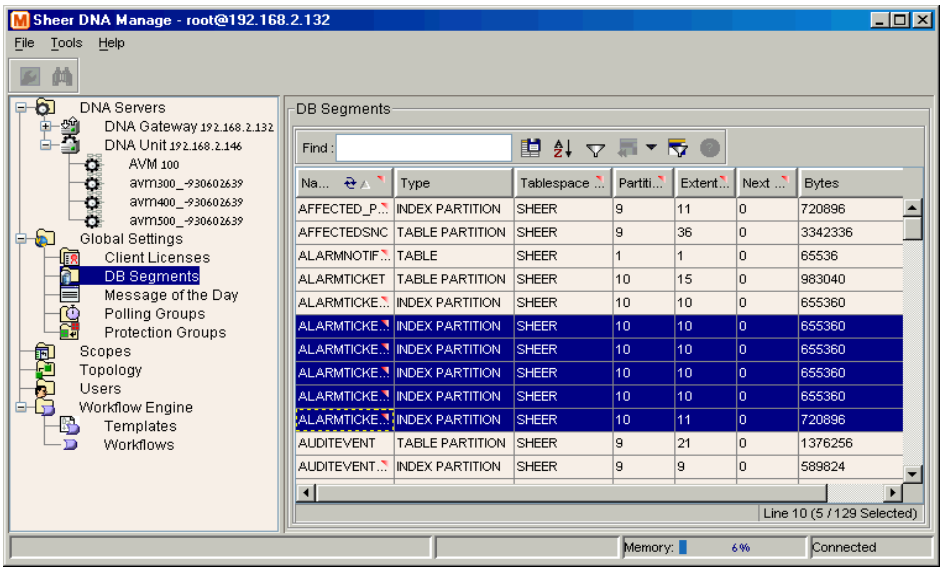
This powerful Sheer DNA filtering mechanism enables the user sort though several hundred lines and pinpoint the appropriate line(s) that contain the required information.

For example, to filter and display seven lines in a 129 line Database Segment table:

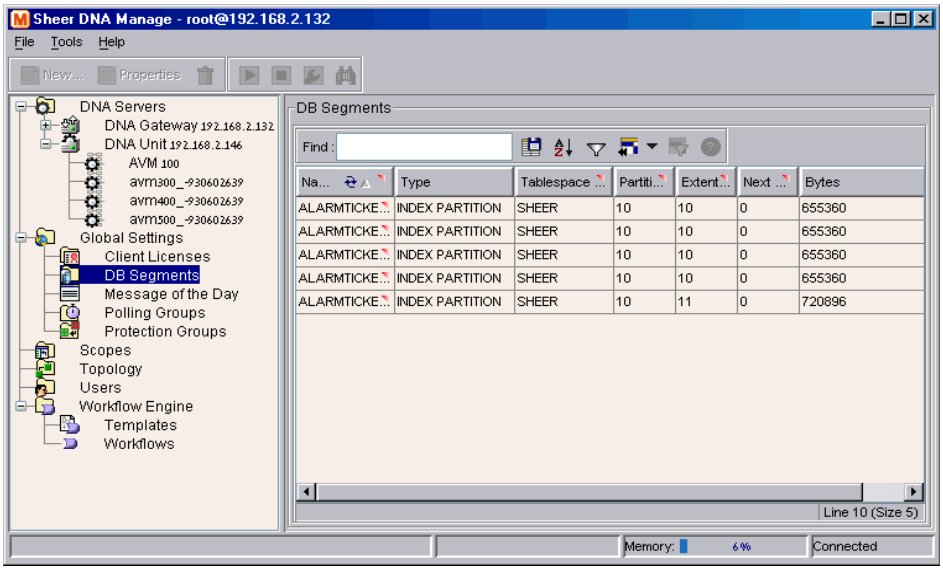
- Select the appropriate lines in the table using standard Windows mouse and/or keystroke operations
- Apply the filter to the selected line(s) using the button.

To choose multiple lines and apply the set selection filter

1. Select the line(s) in a DNA Manage table using the mouse and standard Microsoft® Windows selection keys. The **Set Selection Filter** button is activated.



2. Click the button. Only the selected line(s) remain in the table.

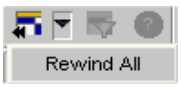


To undo the previous filter selection

1. Select one or several lines and filter them out using the appropriate table toolbar buttons.
2. To undo the last filtering out selection, select the **Previous Selection Filter** button. The table will display all lines that appeared before your last filter selection.

To undo all previous selected filter out options

1. Select, filter out and sort lines as required in the table using the appropriate table toolbar buttons, such as **Previous Selection Filter** button.
2. Click the **Previous Selection** button. The **Rewind All** dropdown menu option is displayed:



3. Select **Rewind All**. All the lines in the table are displayed.

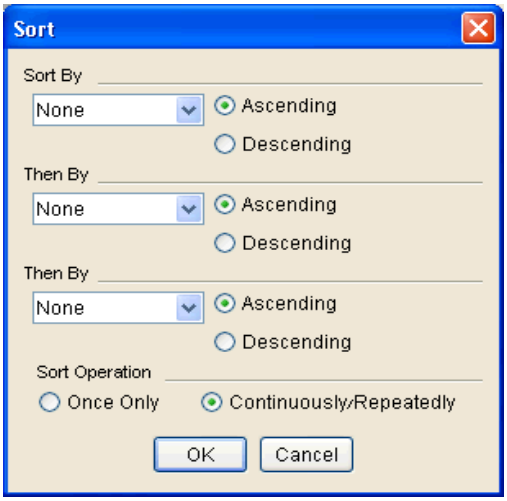
Important Note: To clear all manually selected and defined filter options, use the **Clear** command button in the *Filter* dialog box (refer to page 64 for operating instruction to clear filters).

4.5 Sorting a Table

The tables displayed in Sheer DNA Manage can be sorted by defining specific criterion on a one-time only basis or continuously.

To sort a table

1. In the toolbar, click  . The *Sort* dialog box is displayed.



   The following dropdown lists are displayed in the **Sort By** area:

   - **Sort By:** A dropdown list of all of the columns displayed in the currently displayed table. The table is sorted firstly according to the selection made here. Select ascending or descending order.
   - **Then By:** Dropdown lists of all of the columns displayed in the table. The table is sorted secondly and then lastly according to the selections made here. Select ascending or descending order.

   The following radio buttons are displayed in the **Sort Operation** area:

   - **Once Only:** Sorts the information displayed in the table according to the specified criterion once only. When this option is selected a triangle is displayed in the table heading for the selected column.
   - **Continuously/Repeatedly:** Sorts the information displayed in the table according to the specified criterion continuously. When this option is selected the icon is displayed next to the selected column heading.

2. Select an option from the **Sort By** dropdown list and **Ascending** or **Descending** order.

3. Select an option from the **Then By** dropdown lists and **Ascending** or **Descending** order (optional).

4. Select **Once Only** or **Continuously/Repeatedly**.
5. Click **OK**. The table information is sorted according to the filter defined.

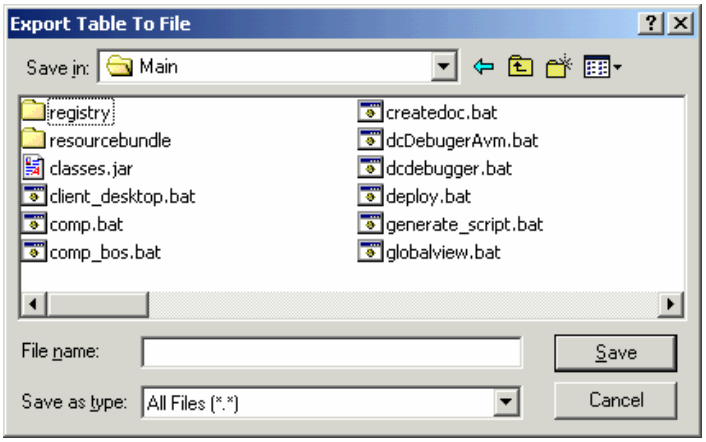
4.6 Exporting the Table to a File

Sheer DNA Manage enables the user to export all the currently displayed data from the *Workspace* to a CSV file. Either the selected rows are exported or when nothing is selected the entire table is exported. The data can then be imported and viewed at a later stage.

Note: This tool occurs throughout the application with the same functionality.

To export the table to a file

1. In the table toolbar, click the **Export to CSV** button. The *Export Table To File* dialog box is displayed.



2. Browse to the directory where you want to save the table.
3. In the **File name** field, enter a name for the table.
4. Click **Save**. The table or selected row(s) is saved in the selected directory.

5 Managing Sheer DNA Units

About this chapter:

This chapter describes how to manage Sheer DNA Units. This includes adding and removing Sheer DNA Units, and viewing Sheer DNA Unit properties.

What is a DNA Unit?, page 70, provides a description of a DNA Unit.

Adding New Sheer DNA Units, page 71, describes how to add a new Sheer DNA Unit to the Sheer DNA fabric.

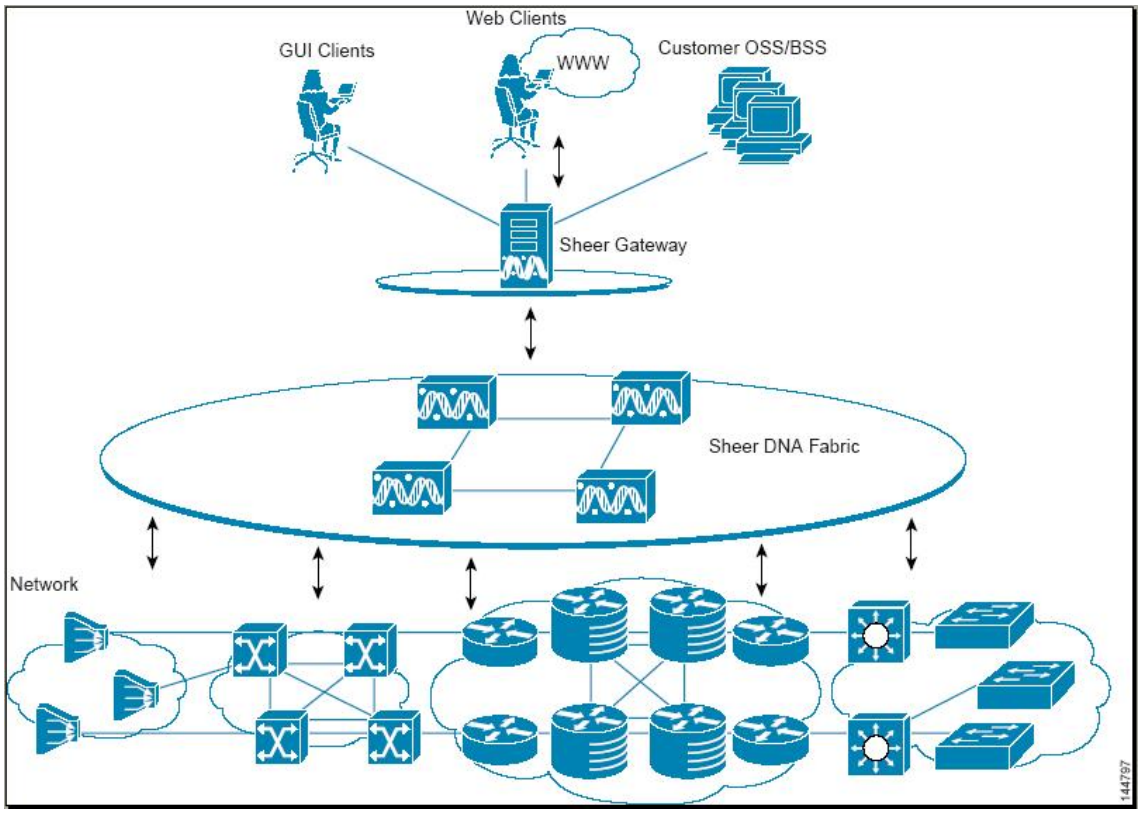
Editing Sheer DNA Unit Properties, page 73, describes how to view the properties of a Sheer DNA Unit.

Removing a Sheer DNA Unit, page 75, describes how to remove a Sheer DNA Unit.

Finding a Unit/AVM/VNE, page 76, describes how to locate Sheer DNA Units, AVMs and VNEs among all Sheer DNA Servers.

5.1 What is a DNA Unit?

The main purpose of the Sheer DNA Units is to host the Autonomous VNEs. The Sheer DNA Units are interconnected to form a fabric of VNEs that can inter-communicate with other VNEs regardless of which unit they are running on. Each Sheer DNA Unit can host thousands of Autonomous VNE processes (depending on the server system size).



For more information about adding Sheer DNA Units, refer to the section *Adding New Sheer DNA Units* on page 71.

The Sheer DNA Units also allow for optimal VNE distribution, ensuring geographic proximity between the VNE and its managed NE.

The clustered N+m **High Availability** mechanism within the Sheer DNA Fabric is designed to handle the failure of a Sheer DNA Unit. Sheer DNA Unit availability is established in the Gateway, running a *Protection Manager* process, which continuously monitors all the Sheer DNA Units in the network. Once the *Protection Manager* detects a Sheer DNA Unit that is malfunctioning, it automatically signals one of the m servers in its cluster to load the configuration of the faulty unit (from the system Registry), taking over all its managed Network Elements. The switchover to the redundant standby Sheer DNA Unit does not result in any loss of information in the system, as all of the information is auto-discovered from the network, and no persistent storage synchronization is required. When a Sheer DNA Unit is configured it can be designated as being an active or standby unit.

Note: The Sheer DNA system is usually configured with Sheer's High Availability mechanism enabled.

For more information about high availability, standby units, and defining a redundant unit, refer to the *Cisco Active Network Abstraction High Availability User's Guide.*

5.2 Adding New Sheer DNA Units

Sheer DNA Manage enables the user to add a Sheer DNA Unit to the Sheer DNA Fabric. Sheer DNA Manage automatically registers the Sheer DNA Unit in the registry and creates a transport uplink between the Sheer DNA Unit and the Sheer DNA Gateway. The Sheer DNA Units are linked to the Sheer DNA Gateway in a star topology.

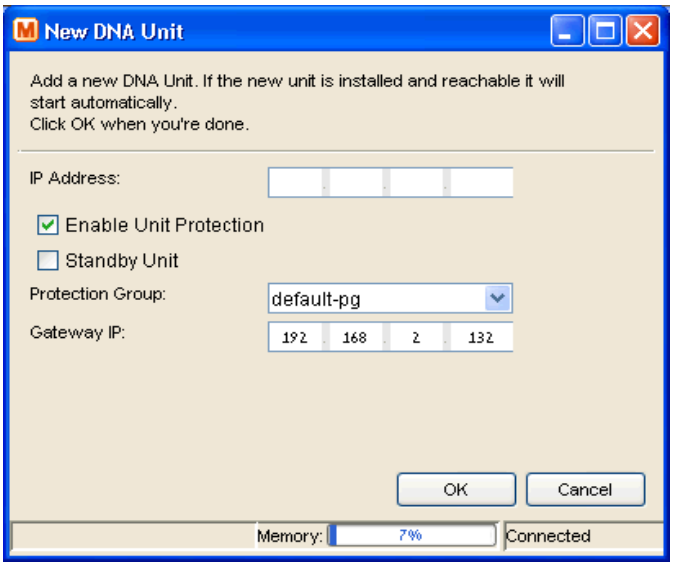
In addition, the administrator can enable or disable high availability for a Sheer DNA Unit. These settings enable the administrator to define to which protection group a Sheer DNA Unit is assigned and whether it is enabled for high availability.(For more information on high availability, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.)

Note: By default all Sheer DNA Units in the Sheer DNA Fabric belong to one big cluster, namely, the **default-pg** protection group.

To add a new DNA Unit

1. Select the *DNA Servers* branch in the *DNA Manage* window *Tree* pane. The *DNA Servers* branch is displayed.

2. Right-click on the *DNA Servers* branch to display the shortcut menu and select **New DNA Unit** or in the toolbar click **New Unit** or from the *File* menu select **New DNA U**nit. The *New DNA Unit* dialog box is displayed.



The following field is displayed in the *New DNA Unit* dialog box:

- **IP Address:** The unique IP address of the Sheer DNA Unit.

  Note: If a Sheer DNA Unit is already configured with the same IP address an error message is displayed.

The following checkboxes are displayed in the *New DNA Unit* dialog box:

- **Enable Unit Protection:** Define whether a Sheer DNA Unit is enabled (checkbox is selected) for high availability. This option is selected by default.

  Note: It is highly recommended that the user does not disable this option. When you define the DNA Unit as the "new" Standby Unit, this option is automatically disabled. For more information about configuring standby Sheer DNA Units, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

- **Standby Unit:** Define whether a Sheer DNA Unit is defined (checkbox is selected) as a standby unit.
- The **Protection Group** dropdown list displays the currently defined list of customized protection groups

3. Enter the IP Address of the new Sheer DNA Unit in the **IP Address** field.
4. Select the required protection group from the **Protection Group** dropdown list.
5. Click **OK**. The new Sheer DNA Unit is displayed in the *Tree* pane and the *Workspace* of the *Sheer DNA Manage* window.

If the new Sheer DNA Unit is installed and reachable it will start automatically. The Sheer DNA Unit is registered with the Sheer DNA Gateway. Specifically, the command creates the configuration registry for the new Sheer DNA Unit in the Golden Source. For more information about the *Golden Source Registry*, refer to page 157.

In addition, Sheer DNA Manage automatically creates the transport uplinks between the Sheer DNA Unit and the Sheer DNA Gateway.

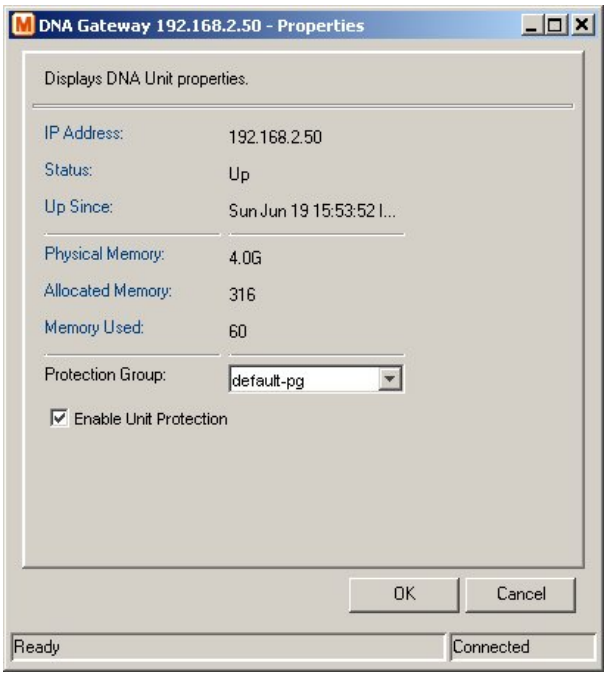
5.3 Editing Sheer DNA Unit Properties

The user can view the properties of a Sheer DNA Server, for example, physical and allocated memory.

To edit a Sheer DNA Unit's properties

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window *Tree* pane. The *DNA Servers* branch is displayed.
2. Select the Sheer DNA Unit or Sheer DNA Gateway in the *Workspace* or expand the *DNA Servers* branch and select the required Sheer DNA Unit or Sheer DNA Gateway in the *Tree* pane.

3. Right-click on the required Sheer DNA Unit or DNA Gateway branch to display the shortcut menu and select **Properties**, or in the toolbar click **Properties** or from the *File* menu, select **Properties**. The *DNA Unit Properties* dialog box is displayed.



The following fields are displayed in the *DNA Unit Properties* dialog box:

- **IP Address:** The IP Address of the Sheer DNA Unit or Sheer DNA Gateway.
- **Status:** The status of the Sheer DNA Unit or Gateway, namely, Up or Down.
- **Up Since**: The date and time that the Sheer DNA Unit or Sheer DNA Gateway was started.
- **Physical Memory:** The physical memory of the Sheer DNA Unit or Sheer DNA Gateway.
- **Allocated Memory:** The amount of memory allocated to the Sheer DNA Unit or Sheer DNA Gateway. Allocated memory is the sum of all of the memory settings for all of the AVMs.
- **Used Memory**: The maximum memory used by the Sheer DNA Unit or Sheer DNA Gateway. (Used memory is the sum total of the memory used by all the AVMs that are Up.)

The **Protection Group** dropdown list displays the currently defined list of customized protection groups.

4. You can change the assigned DNA Unit protection group, as required, by selecting an option from the dropdown list.

   The **Enable Unit Protection** checkbox defines whether a Sheer DNA Unit is enabled (the checkbox is selected) for high availability. This option is selected by default when high availability is enabled.

   Note: If and when you change (disable/enable) the **Enable Unit Protection** option (high availability), changes will only become effective after a delay of about 15 minutes.

5. Click **OK**. The *DNA Unit Properties* dialog box is closed.

5.4 Removing a Sheer DNA Unit

The user can remove a Sheer DNA Unit.

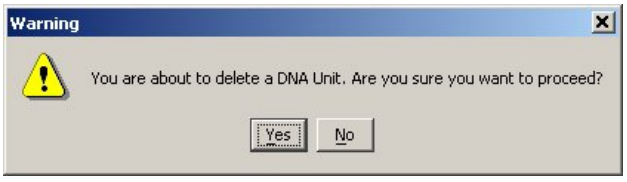
Note: The user must first delete all of the VNEs and non-reserved AVMs before deleting a Sheer DNA Unit. The reserved AVMs cannot be deleted. For more information about reserved AVMs, refer to page 80.

Note: The Sheer DNA Gateway cannot be deleted.

Note: The Sheer DNA Unit cannot be deleted if it is the Sheer DNA Gateway to which the user is connected.

To remove a Sheer DNA Unit

1. In the *Sheer DNA Manage* window *Tree* pane, select the *DNA Servers* branch. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the Sheer DNA Unit you want to remove in the *Tree* pane or *Workspace*.
3. Right-click on the Sheer DNA Unit that you want to remove to display the shortcut menu, and select **Delete**. A warning message is displayed.



4. Click **Yes** to proceed or **No** to cancel the operation. A confirmation message is displayed.
5. Click **OK**. The Sheer DNA Unit is deleted and is no longer displayed in the *Tree* pane and *Workspace*.

5.5 Finding a Unit/AVM/VNE

A single search in Sheer DNA Manage can locate Sheer DNA Units, AVMs and VNEs among all Sheer DNA Servers according to specifically defined search criteria.

To find a Unit/AVM/VNE

1. In the *Sheer DNA Manage* window *Tree* pane, select the *DNA Servers* branch or any sub-branch. The selected branch or sub-branch is displayed.
2. In the toolbar, click **Find**. The *Find* dialog box is displayed.

The **Find** field enables the user to enter specific search criteria in order to find the required DNA Unit/AVM/VNE. For example, the user can search for an AVM using the ID number or search for a Unit using an IP address.

The **Types** dropdown list enables the user to specify whether the user is searching for a Unit/AVM/VNE by selecting an option from the list. When an option is selected from the list, then the **Property** area is enabled, displaying the properties for the selected option. For example, if AVM is selected from the **Types** dropdown list, then the AVM's properties are displayed in the **Property** area and the user can select a specific property according to which the user wants to conduct the search.

The **Up** and **Down** radio buttons enable the user to search up and down (you can also use the F3 key).

The following buttons are displayed in the *Find* dialog box:

- **Find:** Searches for the DNA Unit/AVM/VNE from the selected point in the *Tree* pane, either up or down.
- **Cancel:** Cancels the search and clears the *Find* dialog box.

3. Enter the search criteria in the **Find** field.
4. From the **Types** dropdown list select DNA Unit/AVM/VNE (optional).
5. From the **Property** area select a specific property (optional).
6. Select a direction, namely, **Up** or **Down**.
7. Click **Find**. The DNA Unit/AVM/VNE matching the search criteria is highlighted in Sheer DNA Manage.

Note: Click **F3** to view the next DNA Unit/AVM/VNE matching the search criteria.

6 Managing AVMs and VNEs

About this chapter:

This chapter describes defining and managing AVMs and VNEs.

Creating AVMs, page 80, describes how to define an AVM for a Sheer DNA Unit Server.

AVM Status, page 82, describes the status of AVMs when they are created and loaded.

Viewing and Editing an AVM's Properties, page 83, describes how to view and edit an AVM's properties.

Deleting an AVM, page 84, describes how to delete AVMs.

Starting and Stopping AVMs, page 85, describes how to stop and start AVMs, and the respective changes in AVM status.

Moving AVMs, page 86, describes how to manage AVM before you move them, and their status after a move.

VNEs Overview, page 87, provides an overview of assigning VNE IP addresses, the VNE relationship to an AVM, and how to add a VNE to an AVM.

Defining VNEs, page 89 describes how to open the *New VNE* dialog box and provides a description of property options you may define in each tab.

Viewing and Editing a VNE's Properties, page 101, describes how to view and edit the properties of a VNE.

Deleting a VNE, page 103, describes how to delete a VNE from an AVM.

Changing the VNE's State, page 104, describes how to start or stop a VNE or move a VNE to maintenance mode.

Moving Multiple and Single VNEs, page 105, describes how to move VNEs between AVMs.

6.1 Creating AVMs

Sheer DNA Manage enables the user to define AVMs for DNA Unit Servers. Every AVM (Autonomous Virtual Machine) in the Sheer DNA Fabric is by default managed by the watchdog protocol. Sheer DNA Manage enables the administrator to define AVMs for Sheer DNA Units and enable or disable the watchdog protocol on the AVM.

In order to define an AVM:

- The Sheer DNA Unit must be installed.
- The Sheer DNA Unit must be connected to the transport network.
- The default AVMs, namely, AVM 0 (the switch AVM), AVM 99 (the management AVM) and AVM 100 (the trap management AVM) must be running.

  Note: For more information on the status of AVMs, for example, status **Up** when the AVM is running, refer to the *AVM Status* section on page 82.

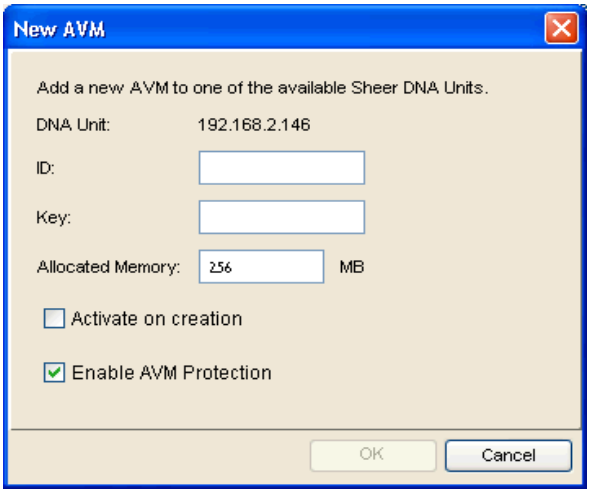
- The new AVM must have a unique ID within the Sheer DNA Unit.

  Note: There are certain AVM ID numbers that are reserved, namely, AVM 0-100 and these cannot be used. In addition, there may be other reserved AVM ID numbers. The user will be unable to enter a reserved number.

To create an AVM

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *DNA Servers Entity* sub-branch.

3. Right-click on the required Sheer DNA Unit to display the menu and select **New AVM** or in the toolbar click **New AVM** or from the *File* menu select **New AVM**. The *New AVM* dialog box is displayed.



The following fields are displayed in the *New AVM* dialog box:

- **DNA Unit:** The IP address of the selected Sheer DNA Unit.

  Note: The Sheer DNA Unit does not have to be **Up** to create a new AVM.

- **ID:** The name of the AVM as defined in Sheer DNA Manage, and unique to the Sheer DNA Unit, for example, AVM 18.

  Note: The AVM numbers 0-100 are reserved and cannot be used. The user will be unable to enter a reserved number. A message is displayed in the *New AVM* dialog box advising the user that the number is reserved.

- **Key:** The key is a string that uniquely identifies an AVM in the system (across all DNA Units) thus enabling a transparent failover scenario in the system. If the user does not enter a key the default key is used, namely, “ID + timestamp”.
- **Allocated Memory:** The maximum memory allocated to the AVM.

The following checkboxes are displayed in the *New AVM* dialog box:

- **Activate on creation:** Select this option to load the AVM into the bootstrap of the Sheer DNA Unit. This changes the administrative status of the AVM to **Up** and ensures that the AVM is loaded on subsequent restarts of the Sheer DNA Unit. By default this option is unchecked and the newly created AVM has an administrative status of **Down**.

- **Enable AVM Protection:** By default this option is selected enabling the watchdog protocol on the AVM when high availability is enabled. For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

Note: It is highly recommended that the user does not disable this option if high availability is enabled.

Note: If this option is selected or unchecked when the AVM is up then you will need to restart the AVM in order for this change to take affect.

4. Define the properties of the AVM.
5. Click **OK**. The new AVM is added to the selected Sheer DNA Unit, is displayed in the *Workspace*, and is activated.

Creating the new AVM results in Sheer DNA providing the registry information of the new AVM in the specified Sheer DNA Unit, and the AVM can now host VNEs. For more information, refer to the section *Defining VNEs* on page 89.

6.2 AVM Status

The status of AVMs (and VNEs) is affected by Admin and Oper mode. Admin mode is the administrative instructions that are sent to the AVM. Oper mode is the actual status of the AVM, for example, Up. For more information about Admin and Oper modes, refer to page 83.

When moving an AVM (file), its status, for example, Up or Down, has a bearing on whether the file is reloaded (Up) or not (Down). For more information about moving AVMs, refer to page 86. For more information about starting and stopping AVMs, refer to page 85.

An AVM can have only one of the following statuses at a time:

- **Up:** The file (process) is reachable and was loaded and started. When a **Start** (command) option is issued, and no problems are encountered, such as an overloaded server, the AVM is running (has been loaded and started), and its status is **Up**.
- **Down:** The file (process) is reachable and was stopped. When a **Stop** (command) option is issued, Sheer DNA issues instructions to shutdown all of the processes. When all of the processes have been stopped, the status of the AVM is **Down**.
- **Starting Up:** When a **Start** or upload (command) option is issued, and for example, the Server cannot execute it due to the fact that it is busy or overloaded, the status of the AVM is **Starting Up**.

- **Shutting Down:** When a **Stop** (command) option is issued, and while the command is being executed (some processes may still be running), the status of the AVM is **Shutting Down**.

6.2.1 Admin and Oper Mode AVM Status

The table below describes the status of an AVM depending on the Admin and Oper modes, as displayed in the **Status** column of the AVMs table. The Admin mode is the administrative instructions that are sent to the VNE. The Oper mode is the actual status of the VNE, for example, Up.

Status	Admin Mode	Oper Mode
Up	Up	Up
Shutting Down	Down	Up
Down	Down	Down
Starting Up	Up	Down

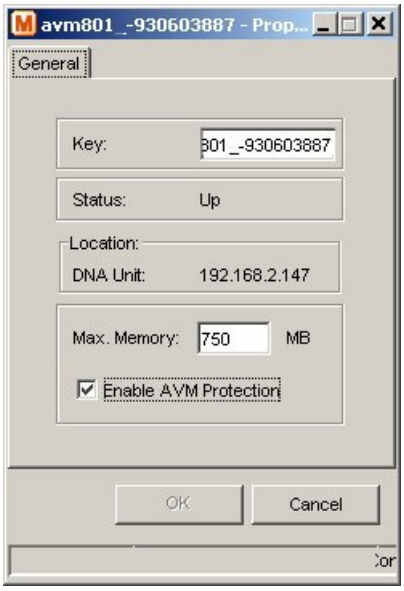
6.3 Viewing and Editing an AVM's Properties

Sheer DNA Manage enables the user to view and edit the properties of an AVM, for example, the key and the allocated memory.

To view and edit an AVM's properties

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch in the *Tree* pane.
3. Right-click to display the shortcut menu and select **Properties**, or from *File* menu, select **Properties** or in the toolbar click **Properties**.

The *AVM Properties* dialog box is displayed with the details of the selected AVM, including, the IP address/key of the Sheer DNA Unit.



The following field is displayed in the *AVM Properties* dialog box:

- **Status:** The status of the AVM, namely, Up, Down or Unreachable. For more information, refer to the section *AVM Status* on page 82.

4. Edit the details of the AVM, as required.

Note: For more information on the other fields displayed in the *AVM Properties* dialog box, refer to page 81.

5. Click **OK**. The AVM's new properties are displayed in the *Workspace*.

6.4 Deleting an AVM

The user can remove an AVM. If the AVM is running it will be stopped before removal. This procedure deletes the registry information of the AVM in the specified Sheer DNA Unit. If there are VNEs running in the AVM then an error message will be displayed and the user will be unable to delete the AVM.

Important Note: You must remove all of the VNEs before removing their hosting AVM.

For more information, refer to *Deleting a VNE* on page 103.

Note: Reserved AVMs 0-100 cannot be deleted.

To delete an AVM

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch in the *Tree* pane.
3. Right-click to display the menu and select **Delete**. A warning message is displayed.
4. Click **Yes**. A confirmation message is displayed.
5. Click **OK**. The selected AVM is deleted from the selected Sheer DNA Unit.

Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

6.5 Starting and Stopping AVMs

Sheer DNA Manage enables the user to start or stop an AVM.

Note: Stopping the AVM process stops all of the VNEs in the AVM. You should be aware that any change in status of the AVMs, may take some time to be applied. For example, during execution of the **Stop** command it may take several minutes before the status changes from **Shutting Down** to **Down**.

To start or stop an AVM

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch.
3. Right-click to display the shortcut menu and select **Actions | Start** or **Actions | Stop** or in the toolbar click  or  .

   The AVM is started or stopped and the appropriate status is displayed as follows:

   - When an AVM is started a **Starting Up** status is displayed in the *Workspace*.
   - When the AVM is started an **Up** status is displayed in the *Workspace*.
   - When the AVM is stopped a **Shutting Down** status is displayed in the *Workspace*.

- When the AVM is stopped the **Down** state is displayed in the *Workspace*.

Note: When the AVM status is displayed as **Down**, the status remains **Down** and no-reload will take place.

6.6 Moving AVMs

Sheer DNA Manage enables the administrator to move an entire AVM between Sheer DNA Units.

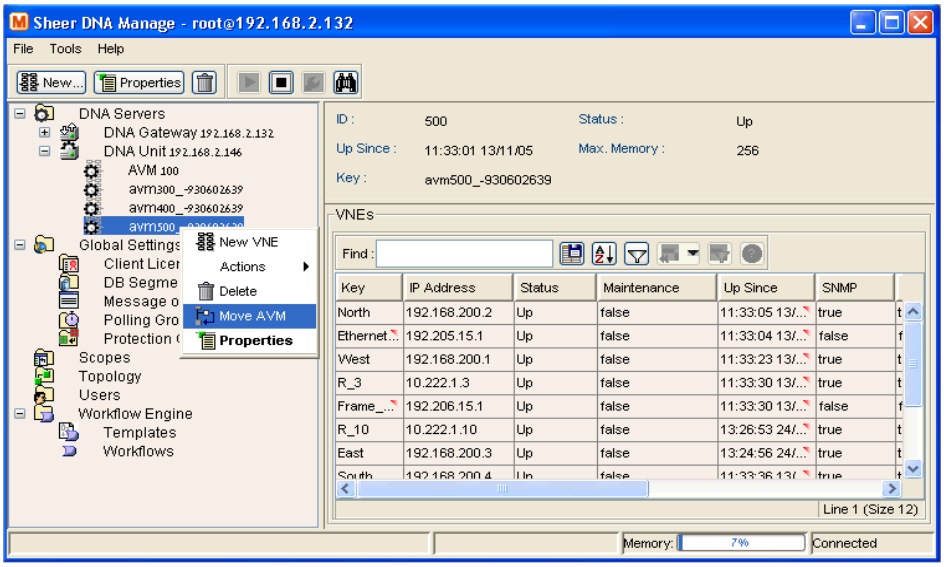
Note: Reserved AVMs 0-100 cannot be moved.

Sheer DNA Manage automatically checks the status of the AVM/VNE before it is moved. This information is maintained in the memory.

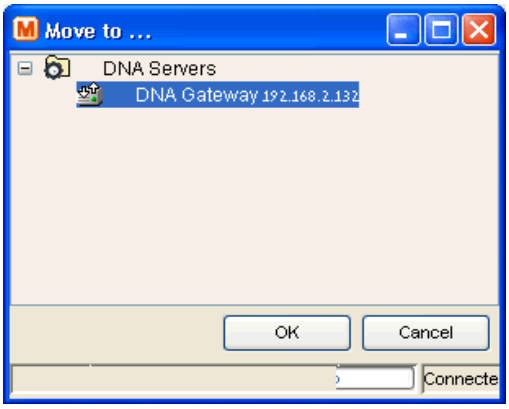
If the AVM is **Up** it is stopped and then it is moved to the target Sheer DNA Unit. After the move is completed, the AVM is reloaded according to its status prior to the move, namely, the status of the AVM as it was before the move is maintained. For example, if it was **Up** before the move it will remain **Up**, if it was **Down** it will remain **Down**.

To move an AVM

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch.



3. Right-click to display the menu and select **Move AVM**. The *Move to* dialog box is displayed.



   The *Move to* dialog box displays a tree-and-branch representation of the selected Sheer DNA Server and its Units, excluding the Sheer DNA Unit in which the AVM is currently located. The highest level of the tree displays the Sheer DNA Server. The branches can be expanded and collapsed in order to display and hide information.

4. Browse to and select the Sheer DNA Unit (branch) where you want to move the AVM(s).

5. Click **OK**. The AVM(s) is moved and now appears beneath the selected Sheer DNA Unit.

For information about moving VNEs, refer to page 105.

6.7 VNEs Overview

A Virtual Network Element (VNE) is designated by its leading IP address and corresponds to a single Network Element (NE). Typically a Network Element has only one IP address that is used for management. For such devices the leading IP address is the single IP address configured for this device.

In cases where a NE has multiple IP addresses, the operator must choose one of these IP addresses to be used as a leading IP address. The leading IP address serves as an identifier of the VNE that corresponds to the NE and is displayed wherever the IP address of the Network Element is required.

Note: Two VNEs cannot monitor the same Network Element.

Sheer DNA Manage enables the user to create VNEs (replicas of devices), for example, by entering the IP address, SNMP and polling rate information and so on. This is called **Element Management**.

After Sheer DNA Manage installs and runs the process, samples the device and collects the data a VNE (**Managed Element)** is created. The VNE includes tables and physical inventory, and this **Managed Element** can be accessed using Sheer NetworkVision.

6.7.1 VNE Status

The status of VNEs is affected by Admin and Oper mode. Admin mode is the administrative instructions that are sent to the VNE. Oper mode is the actual status of the VNE, for example, Up. For more information about Admin and Oper modes, refer to page 89.

When moving a VNE, its status, for example, Up or Down, has a bearing on whether the VNE is reloaded (Up) or not (Down). For more information about moving VNEs, refer to page 105. For more information about starting and stopping VNEs, refer to page 104.

A VNE can have only one of the following statuses at a time:

- **Up:** The VNE (process) is reachable and was loaded and started. When a **Start** (command) option is issued, and no problems are encountered, such as an overloaded server, the VNE is running (has been loaded and started), and its status is **Up**.
- **Down:** The VNE (process) is reachable and was stopped. When a **Stop** (command) option is issued, Sheer DNA issues instructions to shutdown all of the processes. When all of the processes have been stopped, the status of the VNE is **Down**.
- **Unreachable:** The VNE cannot be managed by Sheer DNA and its status is defined as Unreachable. When an option (command) is issued that cannot be executed by Sheer DNA, the status of the VNE is **Unreachable**.
- **Starting Up:** When a **Start** or upload (command) option is issued, and for example, the Server cannot execute it due to the fact that it is busy or overloaded, the status of the VNE is **Starting Up**.
- **Shutting Down:** When a **Stop** (command) option is issued, and while the command is being executed (some processes may still be running), the status of the VNE is **Shutting Down**.

In addition to the statuses described, the VNE can be placed in maintenance mode, for example, a VNE's status can be **Up** and in maintenance mode. NEs often undergo maintenance operations and planned outages. The Sheer DNA platform supports such maintenance operations without affecting the overall functionality of the active network.

While in maintenance mode (temporary state) a VNE:

- Does not change state on its own, unless the user explicitly (manually) switches the VNE back to active state.
- Never polls the device.
- Does not report any alarms, including device reachability.
- Maintains any existing links.
- Does not fail on verification requests.

For more information about maintenance mode, refer to page 104.

6.7.2 Admin and Oper Mode VNE Status

The table below describes the status of a VNE depending on the Admin and Oper modes, as displayed in the **Status** column of the VNEs table. The Admin mode is the administrative instructions that are sent to the VNE. The Oper mode is the actual status of the VNE, for example, Up.

Status	Admin Mode	Oper Mode
Up	Up	Up
Shutting Down	Down	Up
Down	Down	Down
Starting Up	Up	Down
Unreachable	Up	Unreachable

For example, if the user starts the VNE, the Admin status is **Up** but the Oper status is **Down** and has not started yet (because the Server is busy), the status is **Starting Up**. If the VNE is **Up** and running and the user stops the VNE, the Admin status is **Down** but the process is not terminated immediately, the status is **Shutting Down**.

6.8 Defining VNEs

The user adds and defines a new VNE for the system using Sheer DNA Manage; this VNE corresponds to a Network Element (NE) and should only be added to the system once. As the VNE loads, Sheer DNA starts investigating the NE and automatically builds a live model of it, including its physical and logical inventory, its configuration, and its status.

When adding a new VNE, Sheer DNA creates the registry information of the new VNE in the Sheer DNA Unit. The newly created VNE has an administrative status of Down and uses the default community strings and polling rates. The VNE inherits these properties from the configuration record that corresponds to the device type.

A VNE must be loaded into the bootstrap of the Sheer DNA Unit before it starts monitoring its underlying NE. This changes the administrative status of the VNE to Up, and ensures that the VNE is loaded on subsequent restarts of the Sheer DNA Unit. Loading the VNE also starts the VNE immediately. For more information on the status of VNEs, refer to page 88.

Before adding a new VNE using DNA Manage, the user must first determine to which Sheer DNA Unit and AVM, the new VNE should be added.

The user can define and manage SNMP, Telnet/SHH, ICMP, and polling information for the appropriate VNEs in the *New VNE* dialog box.

Note: A new VNE cannot be added to the reserved AVMs 0-100.

The user can create VNEs that perform reachability testing only through ICMP. This can be done by creating the VNE and selecting the type **ICMP** and then defining the details in the **ICMP** tab. For more information about the ICMP tab, refer to page 98.

For information on defining VNE properties in the respective VNE tabs, refer to the following sub-sections:

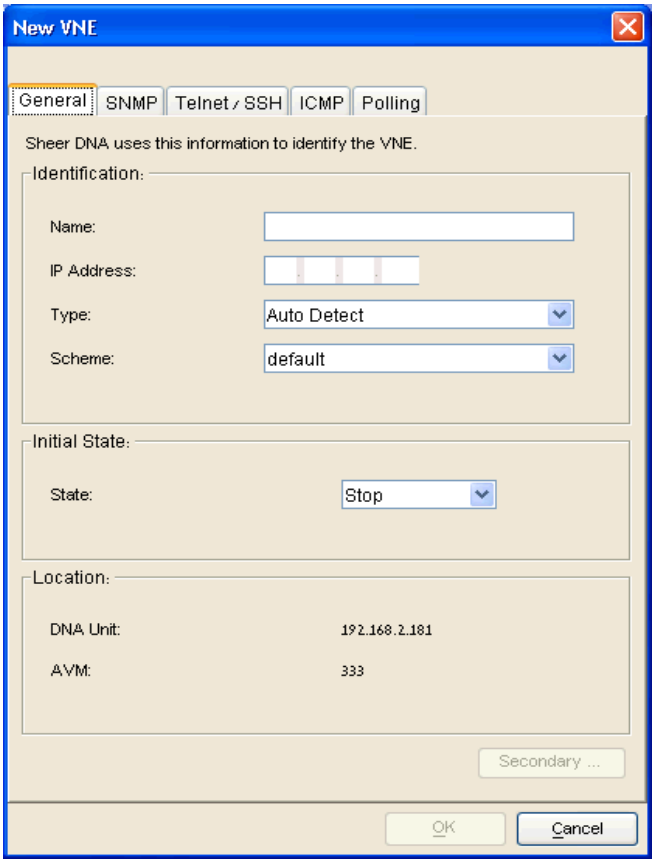
- General properties on page 92
- SNMP properties on page 94
- Telnet/SSH properties on page 96
- ICMP properties on page 98
- Polling properties on page 99

For details on viewing and editing VNE properties, refer to the section *Viewing and Editing a VNE's Properties* on page 101.

To define the properties of a new VNE

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Servers* branch is displayed.
2. Expand the *DNA Unit* branch and select the required *AVM* sub-branch in the *Tree* pane.

3. Right-click in the *Tree* pane to display the shortcut menu and select **New VNE**, or from *File* menu select **New VNE** or in the toolbar, click **New VNE**. The *New VNE* dialog box is displayed.



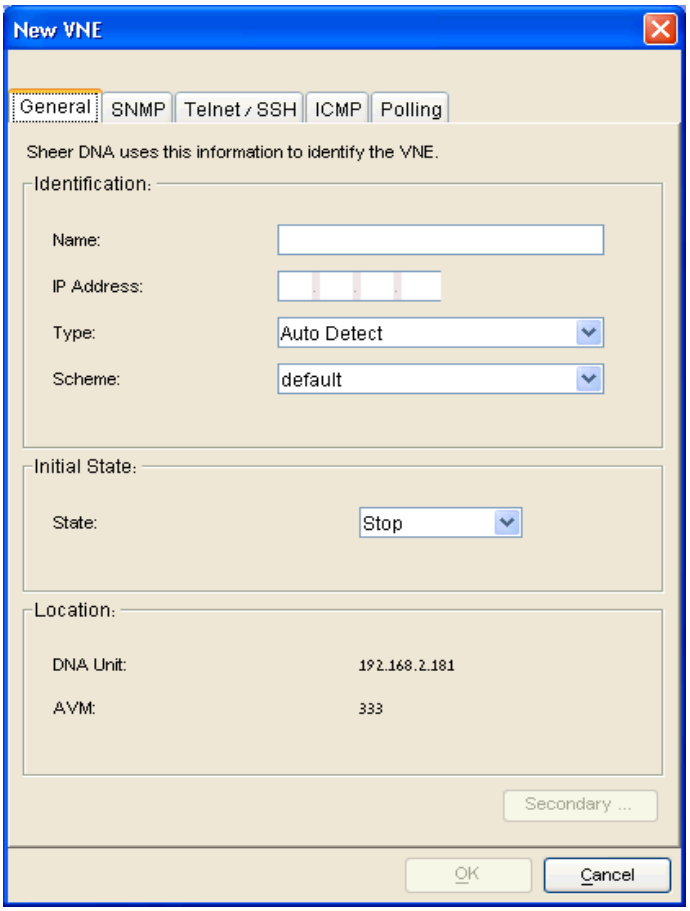
The *New VNE* dialog box contains the following tabs:

- **General** tab, page 92, enables the user to manage VNE information in the connected Sheer DNA (Mandatory Name and IP fields).
- **SNMP** tab, page 94, enables the user to support polling and accessing devices using SNMPv1, SNMPv2c and SNMPv3.
- **Telnet / SSH** tab, page 96, enables the user to choose Telnet or SSH for device access and configure the login sequence.
- **ICMP** tab, page 98, enable the user to verify that devices are reachable by sending repetitive ICMP request packets, and testing reachability by defining the polling rate.
- **Polling** tab, page 99, enables the user to associate a VNE in the Sheer DNA with a polling group or define an instance.

Important Note: The **OK** button in the *New VNE* dialog box is enabled only when the user has typed in the VNE name and IP address in the *General* tab (**Mandatory Fields**).

6.8.1 General Tab

The **General** tab enables the user to manage VNE information in the connected Sheer DNA.



The following VNE identification fields are displayed in the **Identification** area:

- **VNE Name:** The name of the VNE that is used as a unique key throughout the system (Sheer NetworkVision, DNA Manage, EventVision).

  Note: This name is also used for VNE manipulation commands.

- **IP Address:** The IP address of the device.
- **Type:** Select the VNE Type from the dropdown list:
  - **Auto Detect:** Automatically detects the device type and loads the relevant VNE.

    Note: SNMP cannot be disabled if the **AutoDetect** option is selected (refer to the *SNMP Tab* section for more information).

  - **Generic SNMP**: Loads a generic VNE.

- **Cloud:** Loads an unmanaged network segment. Specific cloud configuration is provided on a per project basis.
- **ICMP:** The VNE uses this ICMP-based reachability test to validate communication with the managed device by continuously sending ICMP packets.

  Note: When this option is selected the **ICMP** tab is enabled (the **SNMP**, **Telnet / SSH** and **Polling** tabs are disabled).

- **Scheme:** Defines the VNE modeling components investigated during the discovery process. This enables the administrator to define different behavior for some devices, for example, for some devices poll only with SNMP and for other devices also poll with Telnet. Soft properties and activation scripts are also attached to a specific scheme. By default, the VNE inherits the VNE Scheme from the **Default** scheme. Select the VNE Scheme from the dropdown list. Where more than one scheme exists in the network, the VNE loads the selected scheme.

The following VNE state fields are displayed in the **Initial State** area:

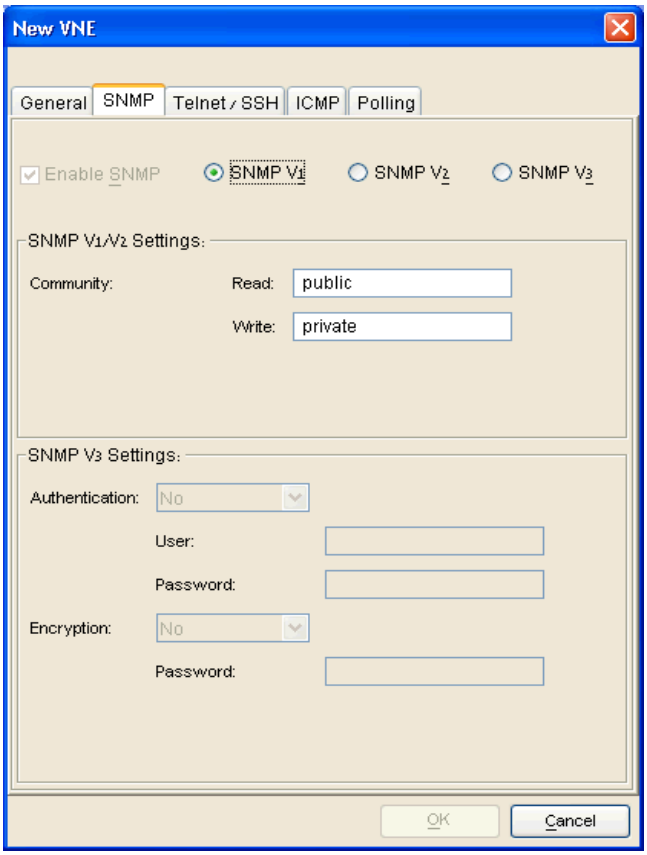
- **State:** The initial state of the VNE, namely, Start, Stop or Maintenance. By default, this option is set to **Stop**.
  - **Stop:** The VNE is not loaded.
  - **Start:** The VNE is loaded and starts collecting data.
  - **Maintenance:** The VNE is started and moved to maintenance mode, this means that no alarms will be sent. For more information, refer to page 88.

The following fields are displayed in the **Location** area of the **General** tab:

- **DNA Unit:** The IP address of the Sheer DNA Unit that hosts the VNE's AVM.
- **AVM:** The AVM on the Sheer DNA Unit that hosts the VNE.

6.8.2 SNMP Tab

The **SNMP** tab enables the user to support polling and accessing devices using SNMPv1, SNMPv2 and SNMPv3. Selecting the **SNMP** tab displays the following dialog box:



The following checkbox and radio buttons are displayed in the **SNMP** tab of the *New VNE* dialog box:

- **Enable SNMP:** Check this option to enable the SNMP communication protocol so that the user can work with it.

  Note: A VNE can be **SNMP** enabled or disabled at any time, however, when the **Auto Detect** option is selected in the **General** tab, it cannot be disabled. (For more information, refer to the **General** tab section on page 92).

- **SNMP V1:** Select SNMP version 1.
- **SNMP V2:** Select SNMP version 2.
- **SNMP V3:** Select SNMP version 3.

  Note: The **SNMP V3 Settings** area is only enabled when **SNMP Version 3** is selected.

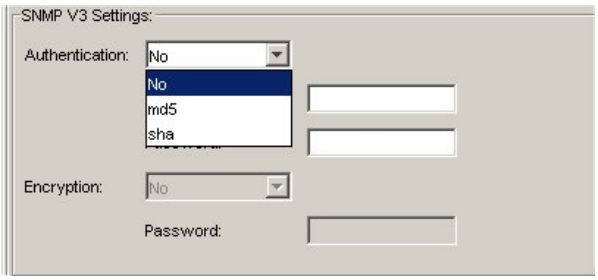
The following fields are displayed in the **SNMP V1/V2 Settings** area:

- **Read:** The SNMP Read Community status, namely, Public or Private, as defined by the user.
- **Write:** The SNMP Write Community status, namely, Public or Private, as defined by the user.

Note: The **SNMP V3 Settings** area is only enabled when **SNMP V3** is selected.

The following fields are displayed in the **SNMP V3 Settings** area:

- **Authentication:** Select one of the following:
  - **No:** No authentication is required.
  - **md5**
  - **sha**



If MD5 or SHA is selected, enter the required information in the following fields:

- User
- Password

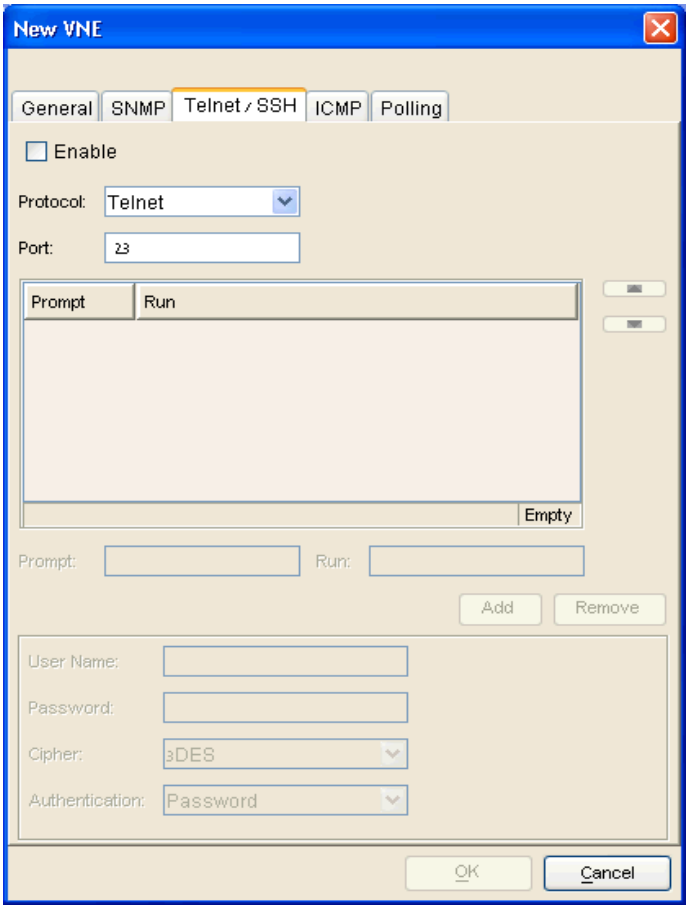
- **Encryption:** Select one of the following:
  - **No**: No encryption is required.
  - **DES**

If **DES** is selected, enter the required information in the following field:

- Password

6.8.3 Telnet / SSH Tab

The **Telnet / SSH** tab enables the user to define the Telnet command sequence and support SSH for device access (reachability) and investigation. Selecting the **Telnet / SSH** tab displays the following tabbed dialog box:



The following checkbox is displayed in the **Telnet / SSH** tab of the *New VNE* dialog box:

- **Enable:** Check this option to enable the Telnet/SSH1 communication protocol to be used by the VNE to investigate the reachability of the device by activating the **Prompt** and **Run** fields, and the **Add**/**Remove** command buttons.

  Note: A VNE can be **Telnet / SSH** enabled or disabled at any time.

The following fields are displayed in the **Telnet / SSH** tab of the *New VNE* dialog box:

- **Protocol:** A dropdown list of the available protocols, namely:
  - **Telnet:** By default this option is set to **Telnet**. When **Telnet** is selected the **Port** field automatically displays **23**.

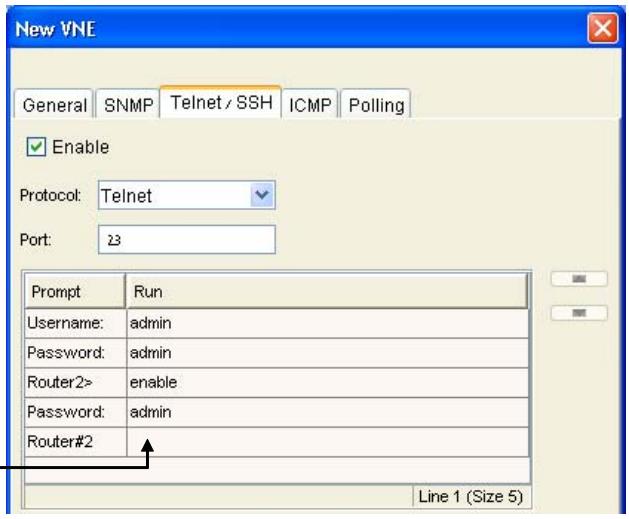
  - **SSH1:** When **SSH1** is selected the **Port** field automatically displays **22**. In addition, the SSH information fields are enabled in the tabbed dialog box.
- **Port:** When **Telnet** is selected this field automatically displays **23**. When **SSH1** is selected this field automatically displays **22**. The user can edit the port number displayed.
- **Prompt:** The expected Telnet/SSH string. This information is displayed in the table (in the relevant column) after clicking **Add**.
- **Run:** The Telnet/SSH string to be sent to the device when the expected prompt is detected. This information is displayed in the table (in the relevant column) after clicking **Add**.

The following buttons are displayed in the **Telnet / SSH** tab of the *New VNE* dialog box:

- **Add:** Adds the **Prompt** and the **Run** fields to the list in the table.
- **Remove:** Removes the selected row from the list in the table.

Use the **Up** and **Down** arrows to change the order of the commands in the list.

Note: The Telnet sequence (the order of the commands) must end with a line that includes only the prompt field.



The Telnet sequence ends with a line that includes the prompt field only

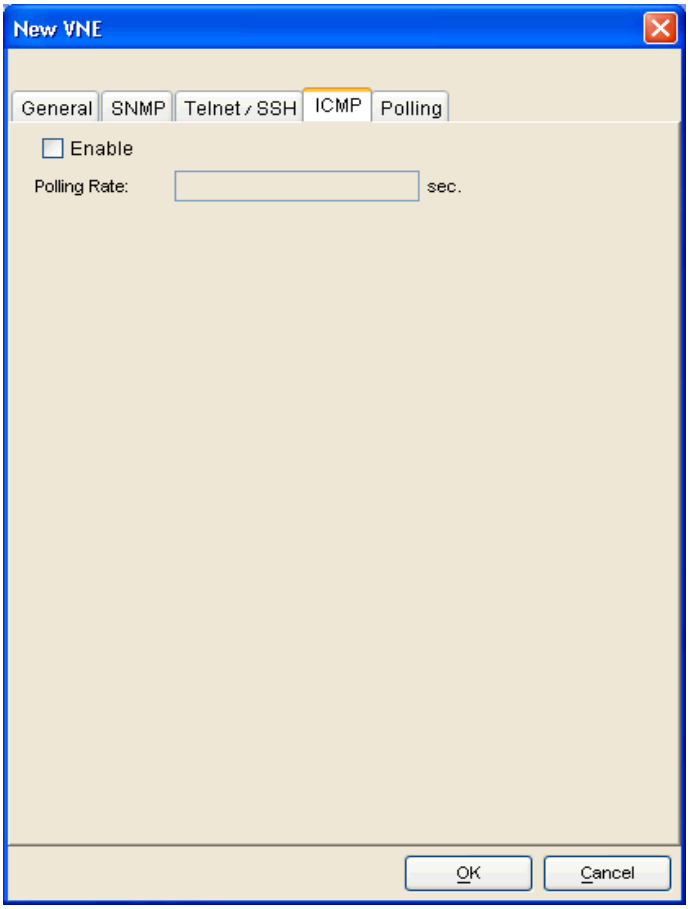
If the SSH1 protocol is selected, enter the required information/properties in the following fields:

- **User Name**
- **Password**

- **Cipher:** Sheer DNA supports polling devices using the SSH protocol, which defines a set of ciphers, namely, encryption algorithms, that may be used to encrypt data. This field provides a dropdown list of the available cipher options, namely, 3**DES** (default), **DES** and **Blowfish**.
- **Authentication:** Displays the option **Password**.

6.8.4 ICMP Tab

The **ICMP** tab enables repetitive sending of packets to a device to verify that the device is reachable. The user can define the polling rate (in seconds) for the VNE. Selecting the **ICMP** tab displays the **ICMP** tab in the *New VNE* dialog box.



The following checkbox is displayed in the **ICMP** tab of the *New VNE* dialog box:

- **Enable:** Check this option to enable the use of the ICMP communication protocol to verify that the device is reachable.

Note: The **ICMP** enable option can be enabled or disabled at any time. If this option is enabled, the user must type in a polling rate (in seconds).

6.8.5 Polling Tab

When customizing polling rates, special consideration should be given to the following:

- Fast polling rates (30 sec) provide high data accuracy
  - Fast change tracking (VC table, profile changes) and accurate flows

    vs.
  - Constant polling generating high NE CPU utilization, high network traffic, polling overlaps, and starvation for scheduled polling
- Slow polling rates (30 min) will affect data accuracy
  - Slow change tracking, stuck flows, invalid information

    vs.
  - Low NE and network utilization, complete polling cycles

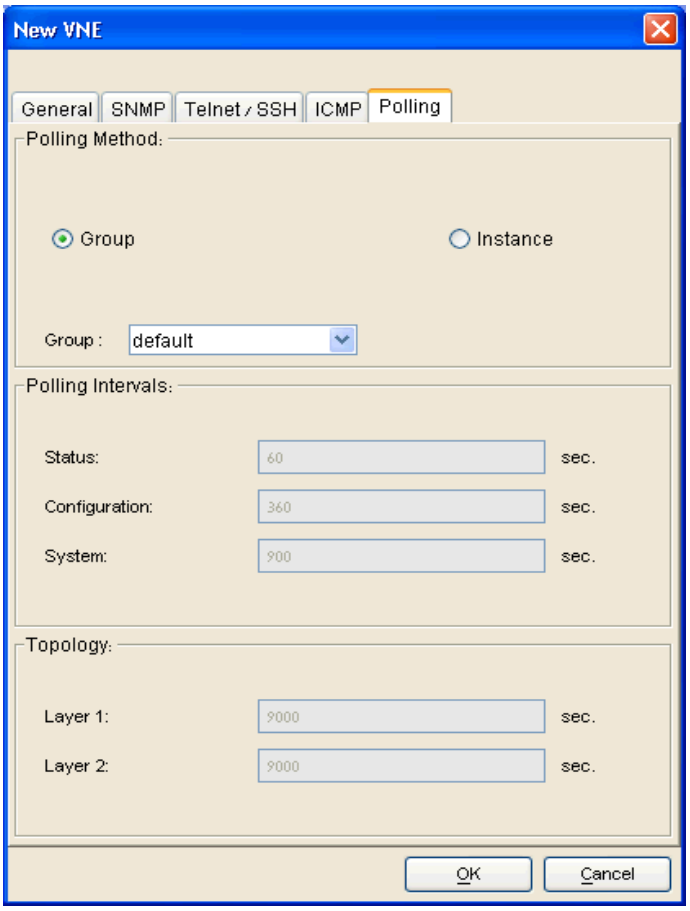
Warning: Changing polling rates may result in excess traffic and Network Element crashes.

The **Polling** tab enables the administrator to:

- Associate a VNE with a previously created polling group.
- Customize polling intervals for a VNE. Different polling intervals can be defined, namely:
  - **Status:** Typically, would be the most frequently polled information reflecting the current operational state of the element and its components.
  - **Configuration:** Reflects more dynamic element configuration such as forwarding, routing and switching tables.
  - **System:** Reflects element configuration that is less dynamic in nature.
  - **Topology:** Reflects topology connections at different layers.

In addition, a polling interval can be configured for a class of devices, for example, for all Cisco routers.

Selecting the **Polling** tab displays the following dialog box:



The following radio buttons are displayed in the **Polling Method** area:

- **Group:** The VNE inherits the polling rates from the polling group selected in the dropdown list. By default, the VNE inherits the polling rates from the **Default** polling group.

  For more information about creating customized polling groups, refer to *Chapter 7, Managing Global Settings*.

  Note: The **Polling Intervals** and **Topology** areas are disabled when **Group** is selected.

- **Instance:** Enables the user to change the polling rates of any one of the built-in polling intervals currently displayed in the dialog box tab.

  Note: A polling rate that is not changed inherits its settings from the group specified in the **Group** dropdown list.

  Note: The **Polling Intervals** and **Topology** areas are enabled when **Instance** is selected.

The following polling interval fields are displayed in the **Polling Intervals** area:

- **Status:** Sets the polling rate for status-related information, such as device status (up/down), port status, admin status and so on. The information is related to the operational and administrative status of the Network Element. The default setting is 60 seconds.
- **Configuration:** Sets the polling rate for configuration-related information, such as VC tables, scrambling and so on. The default setting is 360 seconds.
- **System:** Sets the polling rate for system-related information, such as device name, device location and so on. The default setting is 900 seconds.

The following fields are displayed in the **Topology** area:

- **Layer 1:** Sets the polling rate of the topology process as an interval for the Layer 1 counter. This is an ongoing process. The default setting is 9000 seconds.
- **Layer 2:** Sets the polling rate of the topology process as an interval for the Layer 2 counter. This process is available on demand. The default setting is 9000 seconds.

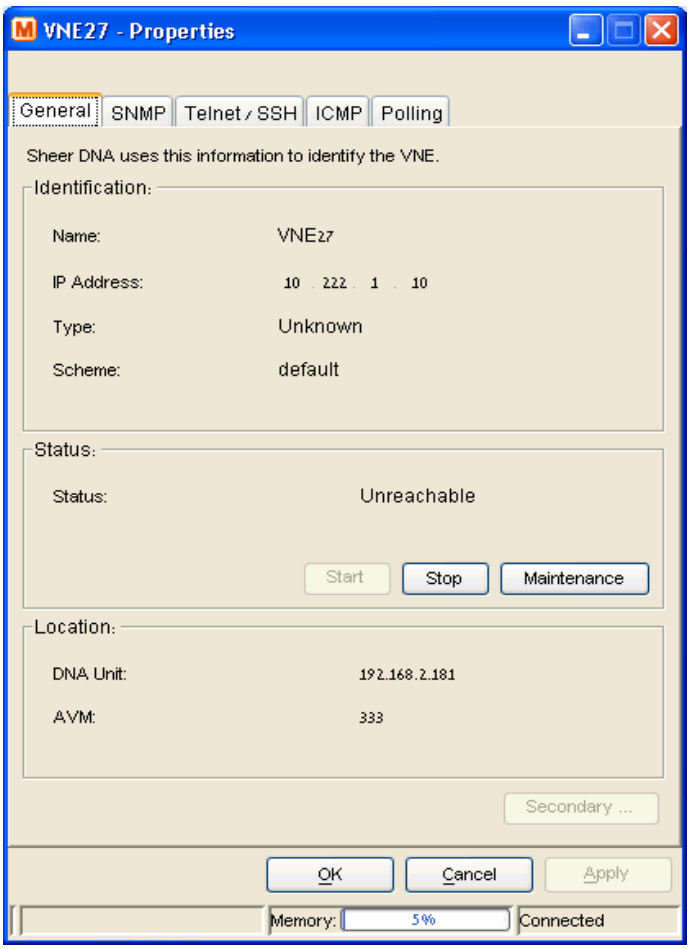
6.9 Viewing and Editing a VNE's Properties

Sheer DNA Manage enables the user to view and edit the properties of a VNE in a Sheer DNA Unit, for example, the status and Telnet settings. For more information about VNEs, refer to page 89.

To edit a VNE's properties

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* tabbed dialog box. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch in the *Tree* pane.

3. Right-click on the required VNE in the *VNEs Properties* table in the *Workspace* to display the shortcut menu, and select **Properties** or from *File* menu, select **Properties** or in the toolbar click **Properties**. The *VNE Properties* dialog box is displayed with the details of the selected VNE.



For more details about the fields displayed in the *VNE Properties* dialog box, refer to page 91. In addition to the fields displayed when adding a new VNE, the following fields and buttons are displayed:

- **VNE Status:** The operational status, namely, Up, Down, Shutting Down, Starting Up, or Unreachable. For more information on the status of VNEs, refer to page 88.
  - **Start:** Click this button to start the VNE if it is has been stopped or is in maintenance mode. For more information, refer to page
  - **Stop:** Click this button to stop the VNE if it is running or is in maintenance mode.

- **Maintenance:** Click this button to move the VNE to maintenance mode, so that no alarms will be sent. If this is done when the VNE has been stopped this has no meaning for the VNE.

- **DNA Unit**: The current Sheer DNA Unit that hosts the VNE.
- **AVM:** The current AVM number, which changes according to the Sheer DNA Unit selected to show one of the available AVMs on that Sheer DNA Unit.

4. Edit the details of the VNE, as required.
5. Click **Apply**.
6. Click **OK**. The VNE's properties are edited accordingly.

6.10 Deleting a VNE

Sheer DNA Manage enables the user to delete a VNE(s) from a Sheer DNA Unit and AVM. This process stops the VNE if it is running and deletes all VNE references from the system and Golden Source. This includes the registry information of the VNE in the specified Sheer DNA Unit. A VNE that has been removed no longer appears in any future system reports.

Since all VNE information is deleted, adding the VNE again requires the user to reinsert all the VNE information.

Note: A VNE that has static links configured cannot be deleted without first removing all of the static links configured for the VNE. Dynamic links are automatically removed.

To delete a VNE

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch in the *Tree* pane.
3. Right-click on the required VNE in the VNEs *Properties* table in the *Workspace* to display the shortcut menu, and select **Delete**. A warning message is displayed.
4. Click **Yes**. A confirmation message is displayed.
5. Click **OK**. The selected VNE is deleted from the AVM and is not displayed in the VNEs *Properties* table.

   Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

6.11 Changing the VNE's State

Sheer DNA Manage enables the user to start or stop a VNE or move a VNE to maintenance mode. Starting the VNE adds the VNE to the server bootstrap. Stopping the VNE removes the VNE from the server bootstrap.

During normal operation, NEs often undergo maintenance operations and planned outages (software upgrades, hardware modifications, cold reboots and so on). The Sheer DNA platform supports such maintenance operations without affecting the overall functionality of the active network. Neighboring VNEs do not generate alarms that are related to links to or from the maintained VNE.

While in maintenance state (temporary state) a VNE:

- Does not change state on its own, unless the user explicitly (manually) switches the VNE back to active state.
- Never polls the device.
- Does not report any alarms, including device reachability.
- Maintains any existing links.
- Does not fail on verification requests.

The VNE blocks all provisioning flows that run through the VNE. A device in maintenance state can be disconnected and/or restarted, and this does not result in link down alarms. Upon restart, the VNE receives only persistent information, and returns to its latest known configuration, the topology links are renewed automatically.

A VNE in maintenance state appears in Sheer NetworkVision displaying this icon: 

To change the VNE's state

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch in the *Tree* pane.
3. Select the required VNE in the in the VNEs *Properties* table in the *Workspace*.

4. Right-click to display the shortcut menu and select one of the following:
   - **Actions** | **Start** or in the toolbar click  .
   - **Actions** | **Stop** or in the toolbar click  .
   - **Actions** | **Maintenance** or in the toolbar click  .
5. The state of the VNE changes based on your selection:
   - If the VNE is started a confirmation message is displayed. Click **OK**. An **Up** status will eventually be displayed in the *VNEs Properties* table in the *Workspace*. In the interim, you may see a **Starting Up** status, when, for example, the Server is overloaded, or the VNE is still being loaded.
   - If the VNE is stopped a confirmation message is displayed. Click **OK**. A **Down** status will eventually be displayed in the *VNEs Properties* table in the *Workspace*. In the interim, you may see a **Shutting Down** status while various processes are closing down.
   - If the VNE is moved to maintenance mode a confirmation message is displayed. Click **OK**. A **Maintenance** status is displayed in the *VNEs Properties* table in the *Workspace*.

6.12 Moving Multiple and Single VNEs

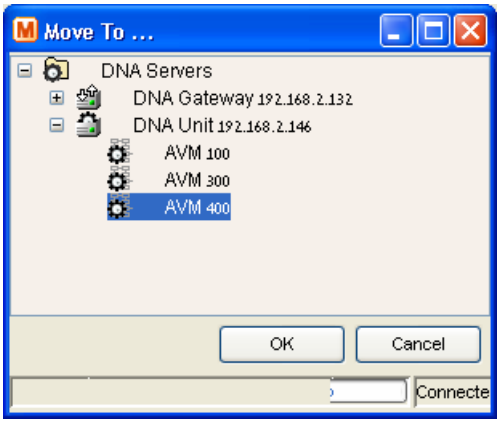
Sheer DNA Manage enables the administrator to move single and/or multiple VNEs between AVMs. The VNEs that are moved are unloaded. The status of the VNEs is maintained after they are reloaded.

Note: Use standard Microsoft Windows mouse and keyboard techniques for multiple selections in the appropriate Properties table displayed in the *Workspace*.

To move a single VNE or multiple VNEs

1. Select the *DNA Servers* branch in the *Sheer DNA Manage* window. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *AVM* sub-branch in the *Tree* pane. The VNEs are displayed in the *Workspace*.
3. Select a VNE or select multiple VNEs using the mouse and/or keyboard, then right-click on the required VNE(s) in the *Tree* pane to display the shortcut menu.

4. Select **Move VNEs** from the shortcut menu. The *Move To* dialog box is displayed:



The *Move To* dialog box displays a tree-and-branch representation of the selected Sheer DNA Server, its Units and AVMs, excluding the AVM in which the VNE is currently located. The highest level of the tree displays the Sheer DNA Server. The branches can be expanded and collapsed in order to display and hide information.

5. In the *Move To* dialog box, browse to and select the AVM (branch) where you want to move the VNE(s).

6. Click **OK**. The VNE is moved to its new location, and now appears beneath the selected AVM (branch) in the *VNEs Properties* table in the *Workspace*.

Note: The user can view the "moved" VNE by selecting the appropriate AVM in the *Tree* pane of the *Sheer DNA Manage* window (such as AVM 500-930000) and view the "moved" VNE in the *VNEs Properties* table displayed in the *Workspace*.

Note: The VNE(s) that is moved is automatically unloaded and reloaded, and its status is maintained.

7 Managing Global Settings

About this chapter:

This chapter describes how to define and manage the Sheer DNA Manage global settings, including, client licenses, polling groups, protection groups and customizing a message of the day (service disclaimer).

Managing Client Licenses, page 107, describes how to install and uninstall a client license. In addition, it describes viewing client license properties.

Viewing DB Segments, page 112, describes how to view the database segments table.

Customizing a Message of the Day, page 113, describes how to customize a message of the day (service disclaimer).

Managing Polling Groups, page 114, describes how to customize and modify polling groups using Sheer DNA Manage. In addition, it describes how to view polling group properties.

Managing Protection Groups, page 121, briefly describes changing the default setup of Sheer DNA Units by customizing protection groups (clusters) and then assigning Sheer DNA Units to these groups.

For more information about the *Global Settings* branch, refer to page 33.

Note: The *Global Settings* branch can be expanded to view the required sub-branch in the *Tree* pane.

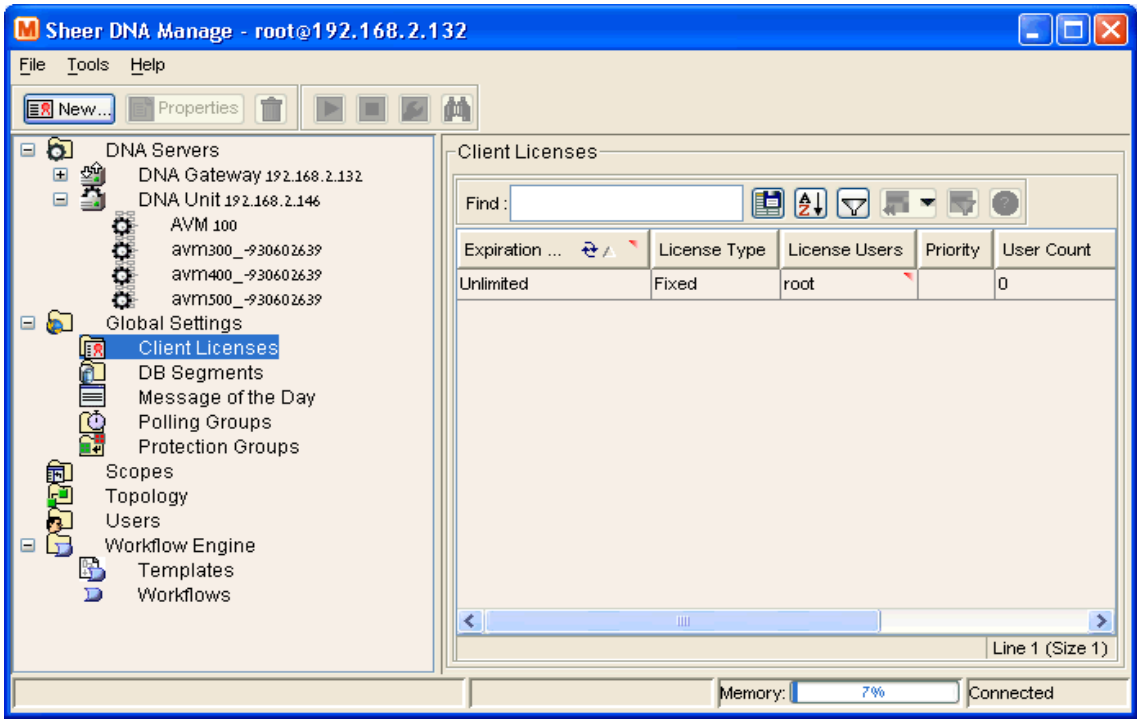
7.1 Managing Client Licenses

Sheer DNA Client applications and BQL connectivity is based on installed license files. Sheer DNA Manage enables the administrator to control and monitor the number of Sheer DNA Client and BQL connections over a limited or unlimited period of time based on the client licenses installed. Two types of licenses are supported, namely, fixed (the number of installed users are identified by user names or IP addresses or both) or floating (the number of installed users operating concurrently).

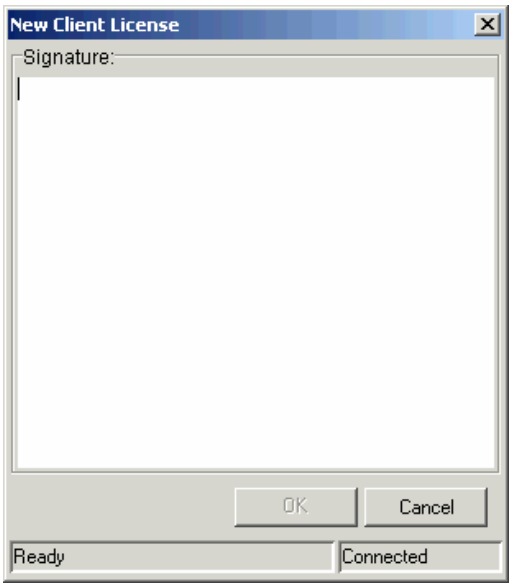
For more information on the *Client Licenses* sub-branch, refer to page 34.

To install a license

1. Select the *Client Licenses* sub-branch in the *Sheer DNA Manage* window's *Tree* pane. The *Client Licenses* table is displayed.



2. Right-click the *Client Licenses* sub-branch to display the shortcut menu and select **New License**, or from the *File* menu select **New License** or in the toolbar click **New License**. The *New Client License* dialog box is displayed.



3. Copy the key from the file provided to you by Sheer Networks.

4. Paste the information in the *New Client License* dialog box.
5. Click **OK**. The new license information is displayed in the *Workspace*.

The administrator can uninstall the client license, for example, if it has expired.

Note: The default license cannot be deleted.

To uninstall a license

1. Select the *Client Licenses* sub-branch in the *Sheer DNA Manage* window's *Tree* pane. The *Client Licenses* sub-branch is displayed (refer to page 108).
2. Select the license that you want to uninstall in the *Workspace* pane.
3. Right-click the license line in the table to display the shortcut menu and select **Delete**, or click **Delete** in the toolbar. The license is uninstalled and is no longer displayed in the *Workspace* of the *Sheer DNA Manage* window.

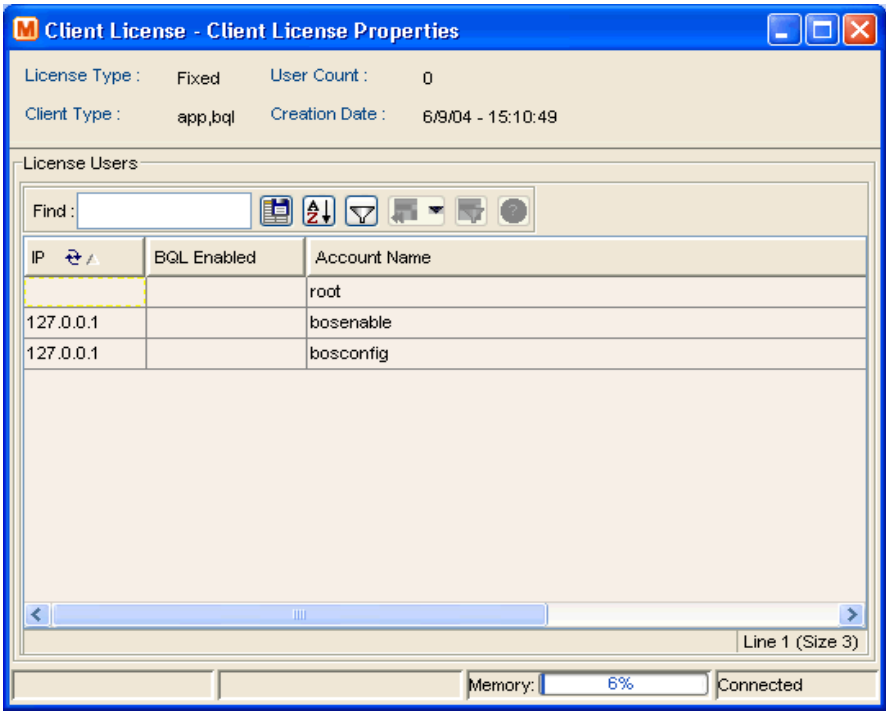
7.1.1 Viewing Client License Properties

Sheer DNA Manage enables the user to view the properties of a license, for example, the IP address and account name.

To view client license properties

1. Select the *Client Licenses* sub-branch in the *Sheer DNA Manage* window's *Tree* pane. The *Client Licenses* table is displayed.
2. Select the required license in the table.

3. Right-click to display the shortcut menu and select **Properties**, or from the *File* menu select **Properties** or in the toolbar click **Properties**. The *Client License Properties* dialog box is displayed.



The following fields are displayed at the top of the *Client License Properties* dialog box:

- **License Type:** The license type, namely:
  - **Fixed:** The number of installed users are identified by user names or IP addresses or both. For example, 5 users with the user names a, b, c, d and e.

    or

  - **Floating:** The number of installed users operating concurrently (unspecified). For example, 5 users.
- **Client Type:** The applications to which the user is authorized to connect, namely, BQL and/or Sheer DNA Client applications.
- **User Count:** The number of users allowed to operate the Sheer DNA Client applications, as defined in terms of the license. The exact number of users is displayed if the number is limited or 0 indicates an unlimited number of users.
- **Creation Date:** The date when the license was implemented.

When the properties of the license are displayed in the *Workspace* table then the properties of the allocated users are displayed as follows:

- **IP:** Where the license is location based, (namely, limited to a specific seat), this is the IP address from which logins will be allowed for this license.
- **BQL Enabled:** Indicates whether the license includes BQL connections or just the Client applications.
- **Account Name:** The username used to login.

4. Click  to close the *Client License Properties* dialog box.

7.2 Viewing DB Segments

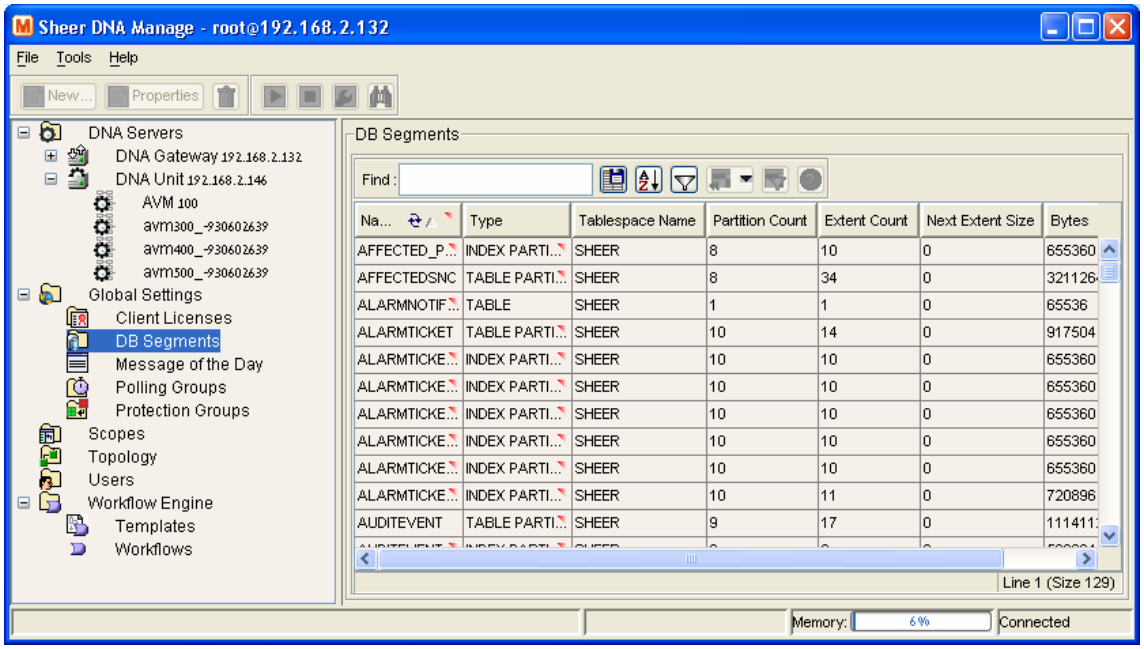
Sheer DNA Manage enables the administrator to view and monitor the following:

- Database segments' storage allocation information
- Database disk usage
- Database growth

The information is automatically checked by the system.

To view the DB Segments

- Select the *DB Segments* branch in the *Sheer DNA Manage* window's *Tree* pane. The DB Segments are displayed in the *Workspace*.



For more information about the columns displayed in the DB Segments table, refer to page 37.

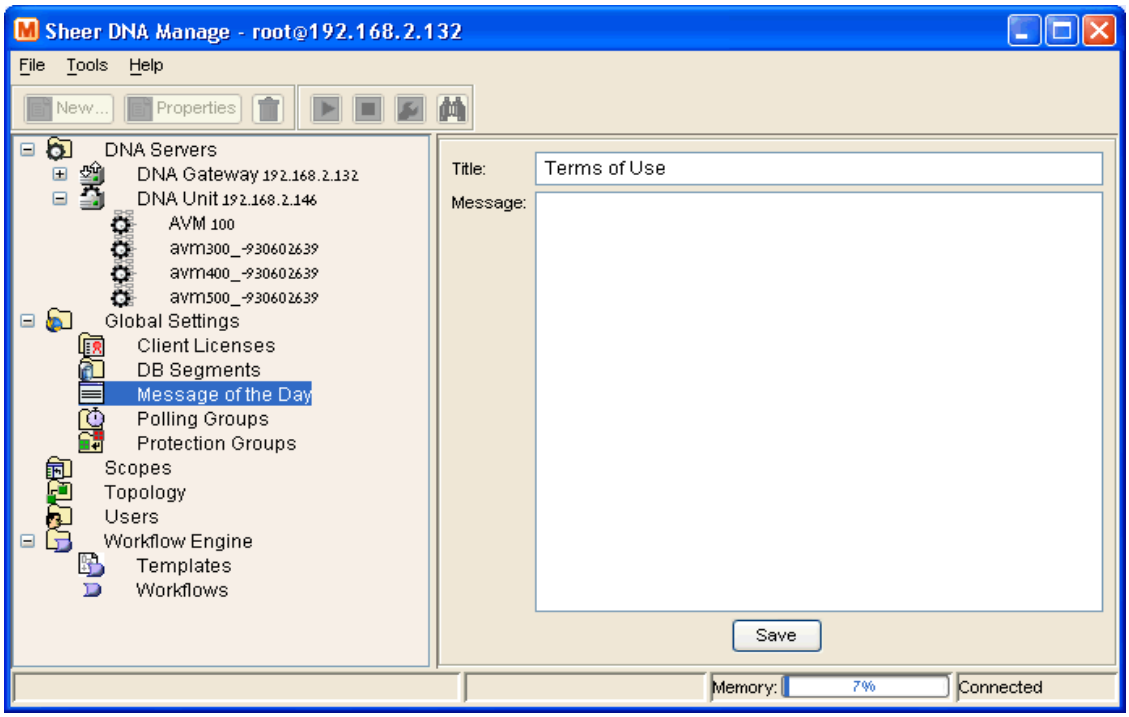
7.3 Customizing a Message of the Day

Sheer DNA Manage enables the user to define a message (service disclaimer) that is displayed when the user logs in to any Sheer Client application (optional). The user must accept the message before logging in. If the user does not accept the message the user will be unable to login. The message supports HTML format.

The message can be changed, as required; however, only one message is applied at any given point in time.

To customize a message of the day

1. Select the *Message of the Day* branch in the *Sheer DNA Manage* window's *Tree* pane. The Title and Message fields are displayed in the *Workspace*.



2. Enter a **Title** for the message.
3. Enter a **Message**.

> **Note: Abort** and **Continue** buttons are displayed in the message dialog box by default, so the message must be related to these actions. For example, "Do you accept the terms of use in the Product License Agreement? Click **Continue** to proceed or click **Abort** to cancel."

4. Click **Save**. A confirmation message is displayed.
5. Click **OK**. The message is displayed when the user logs in to any Sheer Client application.

To remove a message of the day

1. Select the *Message of the Day* sub-branch in the *Sheer DNA Manage* window's *Tree* pane.
2. In the *Workspace*, select the text in the **Message** area and press **Delete** on your keyboard.
3. Click **Save**. A confirmation message is displayed.
4. Click **OK**. The message is no longer displayed when the user logs in to the Sheer Client applications.

7.4 Managing Polling Groups

This section includes the following:

Polling Groups Overview, below, provides general information about polling groups.

Customizing a Polling Group, page 116, describes how to customize new polling groups using Sheer DNA Manage.

Modifying a Polling Group, page 118, describes how to modify existing polling groups using Sheer DNA Manage and view polling group properties.

Deleting a Polling Group, page 119, describes how to delete polling groups.

Adaptive Polling, page 119, describes adaptive polling for VNEs.

7.4.1 Polling Groups Overview

The Sheer DNA Unit servers poll the NEs to discover and display accurate and up-to-date information of the network. The system periodically triggers polling at set intervals. The polling rates can be customized or optimized by the administrator.

Sheer DNA provides the ability to fine-tune the frequency in which information is retrieved from the managed elements in order to enable a high degree of control and flexibility over the amount of network traffic used by the various VNEs. Different polling intervals can be set for gathering the information for:

- **Status**. Sets the polling rate for status-related information, such as device status (up/down), port status, admin status and so on. The information is related to the operational and administrative status of the NE.
- **Configuration**. Sets the polling rate for configuration-related information, such as VC tables, scrambling and so on.

- **System**. Sets the polling rate for system-related information, such as device name, device location and so on.
- **Topology Layer 1 Counters**. Sets the polling rate of the topology process as an interval for the Layer 1 counter. This is an ongoing process.
- **Topology Layer 2 Counters**. Sets the polling rate of the topology process as an interval for the Layer 2 counter. This process is available on demand.

Note: All polling rates are expressed in seconds.

In addition to the defined polling intervals, the VNEs implement adaptive polling ensuring that the element is not overloaded. Checking the device CPU, may defer specific polls in order to avoid an additional load on the managed element. For more information about adaptive polling, refer to page 119.

The user can define polling profiles by setting customized polling intervals, which can be applied to managed elements. The VNE then polls the network element according to the preset values. This ensures polling of devices for different information consistently and in accordance with technical and business requirements.

Core devices can be assigned to a polling group (namely, all devices use the same polling profile) that specifies a higher frequency for status but a lower frequency for configuration-related information while edge or access devices can be polled more frequently for system and configuration-related information. Managed Network Service operators for example, can use polling groups to reflect their agreement with customers so that premium customer devices are polled more frequently than normal devices.

Sheer DNA includes the pre-configured polling group “default” for the administrator’s convenience, which cannot be deleted. The default polling group includes the following settings:

- Status polling rate is 60 seconds.
- Configuration polling rate is 360 seconds.
- System polling rate is 900 seconds.
- Layer 1 polling rate is 9000 seconds.
- Layer 2 polling rate is 9000 seconds.

7.4.2 Customizing a Polling Group

Sheer DNA Manage enables the user to create and customize new polling groups. The new polling groups that are created can then be used when defining a VNE. For more information, refer to the section *Defining VNEs* on page 89.

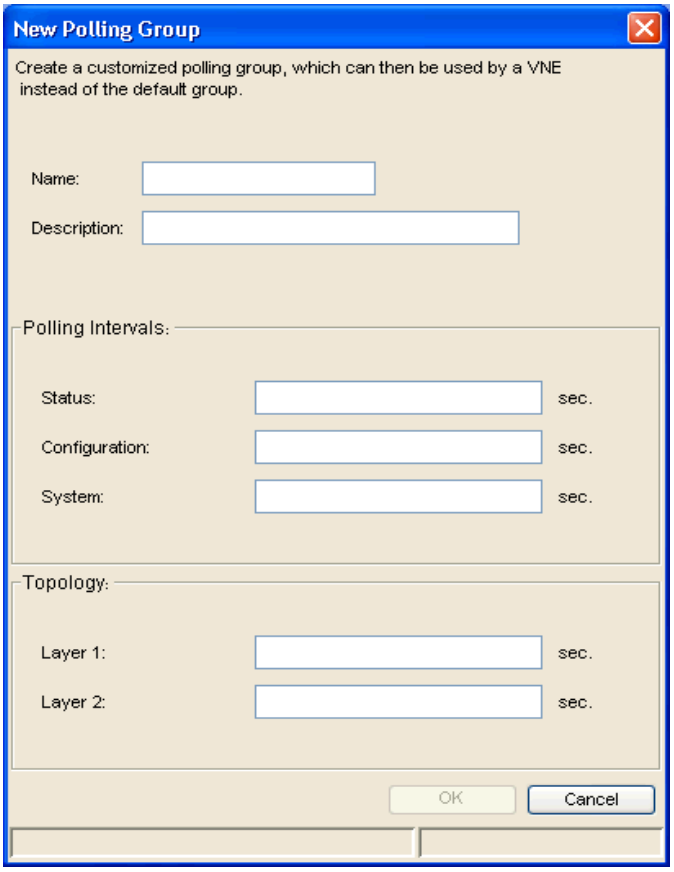
Warning: Changing the polling rates may result in excess traffic and Network Element crashes.

To create and customize a polling group

1. Select the *Global Settings* branch in the *Sheer DNA Manage* window's *Tree* pane. The *Global Settings* branch is displayed.
2. Expand the *Global Settings* branch and select the required sub-branch in the *Tree* pane.
3. Select the *Polling Groups* sub-branch in the *Sheer DNA Manage* window's *Tree* pane. The *Polling Groups* table is displayed in the *Workspace*.

4. Right-click to display the shortcut menu and select **New Polling Group** or from the *File* menu select **New Polling Group** or in the toolbar click **New**.

   The *New Polling Group* dialog box is displayed.



   The following fields are displayed at the top of the *New Polling Group* dialog box:

   - **Name:** The polling group name defined by the user.
   - **Description:** A description of the polling group.

5. Type the name and description of the polling group in the appropriate fields.

   The following fields are displayed in the **Polling Intervals** area:

   - **Status:** Sets the polling rate for status-related information, such as device status (up/down), port status, admin status and so on. The information is related to the operational and administrative status of the Network Element.
   - **Configuration:** Sets the polling rate for configuration-related information, such as VC tables, scrambling and so on.

- **System:** Sets the polling rate for system-related information, such as device name, device location and so on.

The following fields are displayed in the **Topology** area:

- **Layer 1:** Sets the polling rate of the topology process as an interval for the Layer 1 counter. This is an ongoing process.
- **Layer 2:** Sets the polling rate of the topology process as an interval for the Layer 2 counter. This is process is available on demand.

6. Define the new polling groups' properties.
7. Click **OK**. The new polling group is displayed in the *Workspace*.

   The new polling group can be used when defining a new VNE. For more information, refer to the section *Defining VNEs* on page 89.

7.4.3 Modifying a Polling Group

Sheer DNA Manage enables the user to modify a polling group and view polling group properties.

To modify a polling group

1. Select the *Polling Groups* sub-branch in the *Sheer DNA Manage* window's *Tree* pane. The *Polling Groups* table is displayed in the *Workspace*.
2. Right-click the required polling group in the *Workspace* to display the shortcut menu, and select **Properties** or, from the *File* menu select **Properties** or in the toolbar click **Properties**. The *Update Polling Group* dialog box is displayed.

   For more information on the fields displayed in the *Update Polling Group* dialog box, refer to page 117.
3. Edit the properties of the polling group as required.

   Note: If any VNE is using this polling group then a warning message is displayed.

4. Click **Apply**.
5. Click **OK.** The polling group's settings are modified accordingly.

   Note: Modifying the polling group settings affects all of the VNEs and devices using the selected polling group.

7.4.4 Deleting a Polling Group

Sheer DNA Manage enables the user to delete polling groups.

To delete a polling group

1. Select the *Global Settings* branch in the *Sheer DNA Manage* window's *Tree* pane and choose the *Polling Groups* sub-branch. The Polling Groups are displayed in *Polling Groups* table in the *Workspace*.
2. Right-click on the required polling group in the *Polling Group* table in the *Workspace* to display the shortcut menu, and select **Delete**. A warning message is displayed.
3. Click **Yes**. A confirmation message is displayed.
4. Click **OK**. The polling group is deleted from the *Polling Group* table.

Note: You cannot delete a Polling Group being used by another VNE.

7.4.5 Adaptive Polling

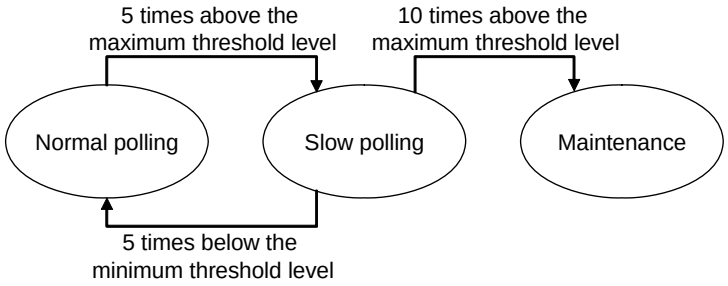
VNEs implement adaptive polling ensuring that the element is not overloaded in addition to defined polling intervals. Checking the device CPU usage, may defer specific polls in order to avoid an additional load on the managed element.

When a VNE exceeds the maximum CPU usage threshold value an alarm is sent and the VNE is automatically transferred to a slow polling interval, namely, the VNE is polled less regularly.

When the CPU usage threshold values for the VNE fall below the clear threshold value then an alarm is sent and the VNE returns to normal polling.

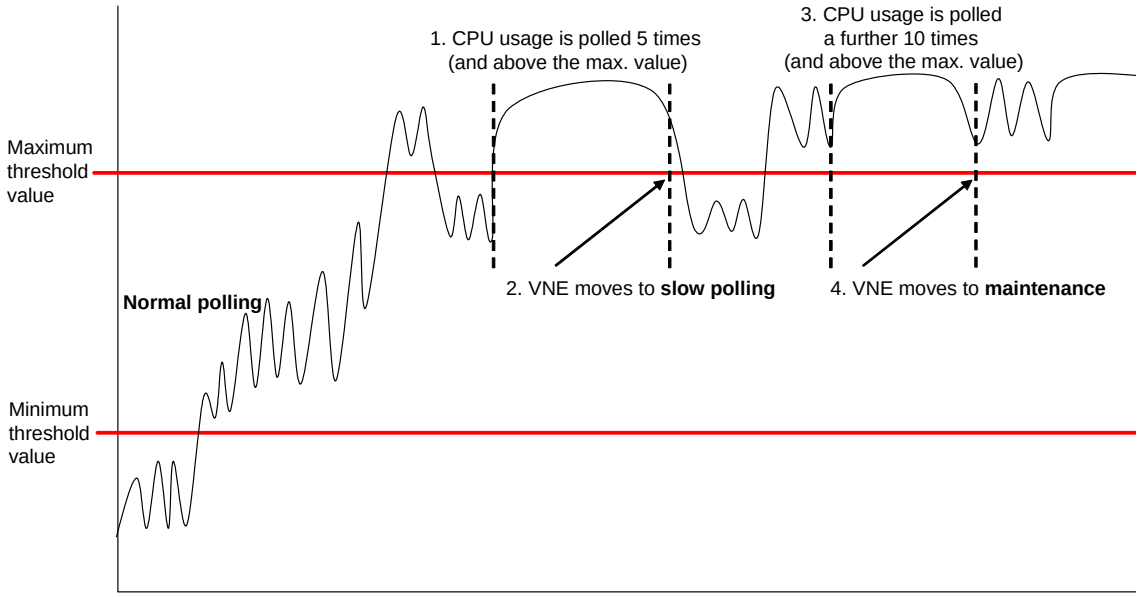
The values for any VNE can be customized through the system registry, for example, the minimum and maximum CPU usage threshold values. When the defined values are reached an alarm is sent. A clear value can also be defined so that when the CPU usage threshold value drops below the maximum value or rises above the minimum value a message is sent clearing the original alarm. These values are defined in the Registry.

In addition, the maximum and minimum tolerance levels can be customized through the system registry. When a VNE is using normal polling and CPU usage is high, Sheer DNA waits for the maximum CPU usage threshold value (upper tolerance level) to be exceeded five times (default) and only then does the VNE move to slow polling, as shown in the diagram below.



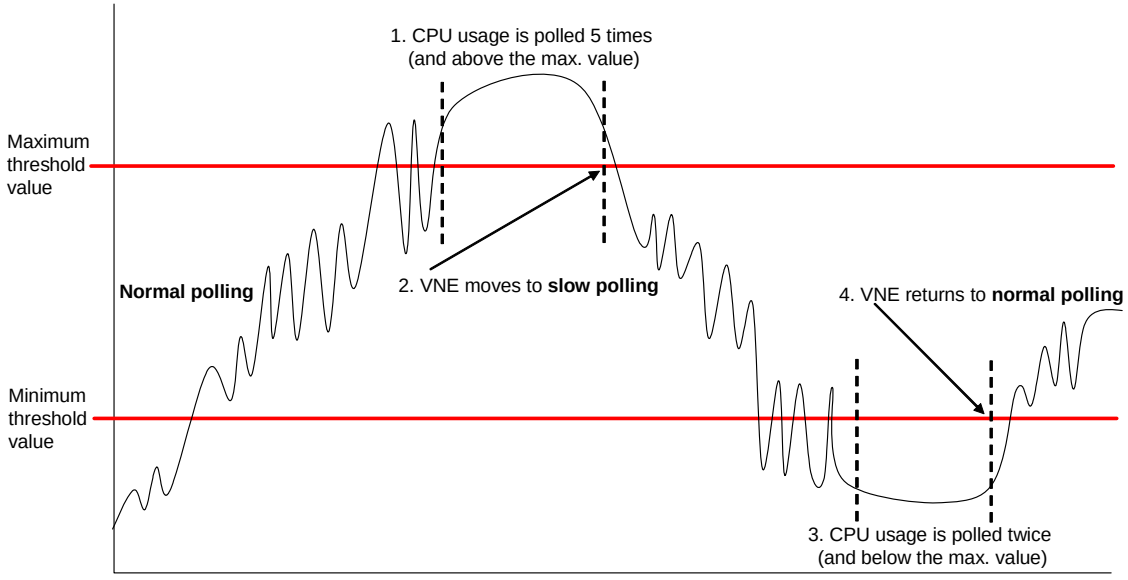
If the VNE is using slow polling after it has been checked five times, then the VNE is checked a further 10 times (default) to see whether the CPU usage is still high. If this is the case, the VNE is moved to maintenance mode. Once the VNE is in maintenance mode the user must manually set the VNE back to normal polling, (it does not automatically return to regular polling). Once the VNE is in maintenance mode the device is not polled and no alarms are reported.

In the example below CPU usage is polled 5 times and it is above the maximum value, so the VNE moves to slow polling. The CPU usage is the polled a further 10 times and it is above the maximum value, so the VNE moves to maintenance mode.



When the VNE is using slow polling and CPU usage drops to a regular level (or below the minimum value), Sheer DNA waits for the VNE to drop below the maximum CPU usage threshold value twice (default) and only then does the VNE return to normal polling.

In the example below CPU usage is polled 5 times and it is above the maximum value, so the VNE moves to slow polling. The CPU usage then drops to a regular level (or below the minimum value). The CPU usage is the polled again twice and it is below the maximum value, so the VNE returns to normal polling.



If CPU usage is high and a slow polling interval is used and the AVM goes down and is then restarted the AVM remembers its previous polling interval and when the AVM is restarted the AVM will make use of the same polling interval that it was using before it went down.

7.5 Managing Protection Groups

By default all the Sheer DNA Units in the Sheer DNA Fabric belong to one big cluster, namely, the **default-pg** protection group. The administrator can change the default setup of the Sheer DNA Units by customizing protection groups (clusters) and then assigning Sheer DNA Units to these groups.

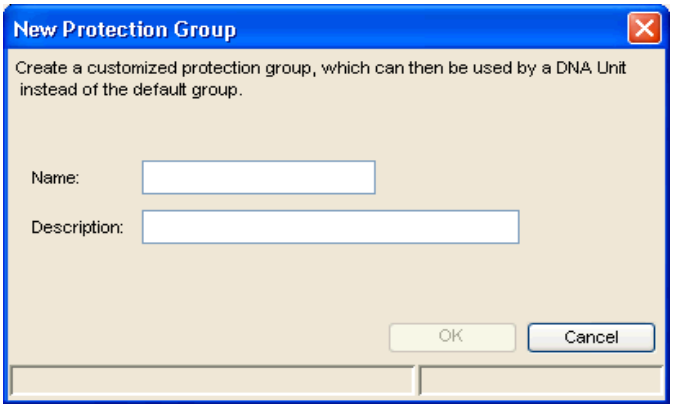
For more information, refer to the *Cisco Active Network Abstraction High Availability User's Guide*.

Sheer DNA Manage enables the user to create new protection groups. The new protection groups that are created can then be used when defining a Sheer DNA Unit. For more information, refer to page 71.

To create a protection group

1. Select the *Global Settings* branch in the *Sheer DNA Manage* window's *Tree* pane. The *Global Settings* branch is displayed.
2. Expand the *Global Settings* branch and select the required sub-branch in the *Tree* pane.
3. Select the *Protection Groups* sub-branch in the *Sheer DNA Manage* window's *Tree* pane. The *Protection Groups* table is displayed in the *Workspace*.
4. Right-click the *Protection Groups* sub-branch, and select **New Protection Group** from the shortcut menu, or from the *File* menu select **New Protection Group** or in the toolbar, click **New**.

   The *New Protection Group* dialog box is displayed.



   The following fields are displayed at the top of the *New Protection Group* dialog box:

   - **Name:** The polling group name defined by the user.
   - **Description:** A description of the polling group.

5. Type the name and description of the polling group in the appropriate fields and click **OK**. The *Workspace* displays details of the new Protection Group and all of the currently defined protection groups in the *Protection Groups* table.

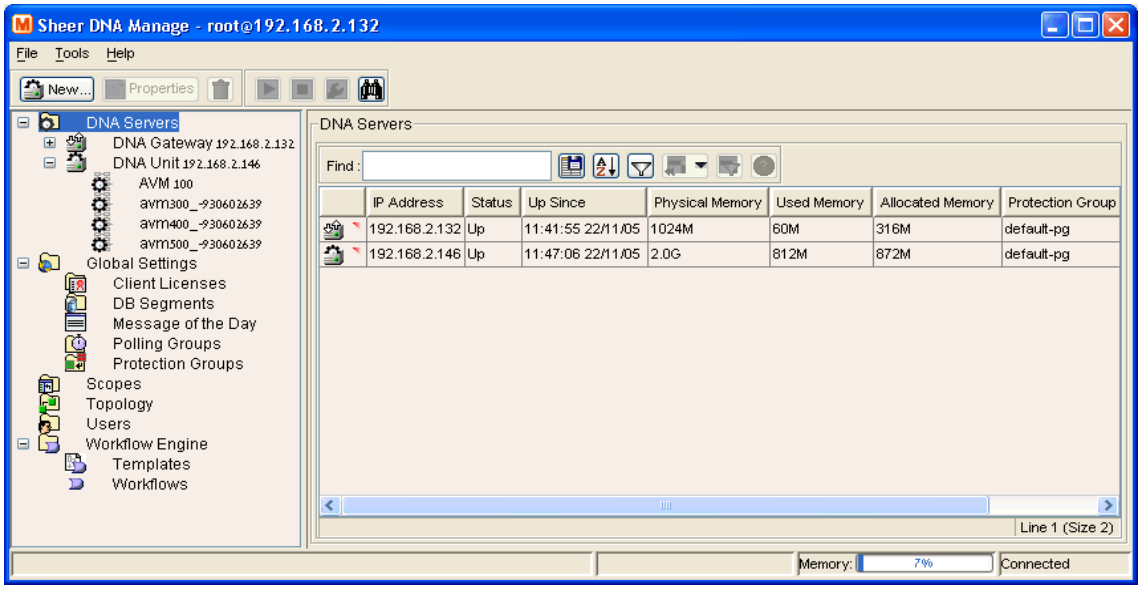
Note: The **default-pg** protection group displayed in the *Workspace* is the default protection group (cluster), to which, by default, all the Sheer DNA Units in the Sheer DNA Fabric belong.

7.5.1 Checking Assignment of Protection Groups to DNA Units

The administrator can view the protection groups to which the Sheer DNA Units are currently assigned. In so doing, the administrator can, at a glance, check that the configuration or assignment matches the initial deployment plan.

To check the Sheer DNA Units-protection groups assignments

- Select the *DNA Servers* branch in the *Sheer DNA Manage* window's *Tree* pane. The properties of the *DNA Servers* branch are displayed in the *Workspace*, including the details of the protection group to which each Sheer DNA Unit and standby Sheer DNA Unit currently belongs.



7.5.2 Changing Protection Groups for DNA Units

The administrator can easily and quickly change the protection group to which a Sheer DNA Unit has been assigned.

To change the protection group setting of a Sheer DNA Unit

1. Select the *DNA Servers* branch in the *DNA Manage* window's *Tree* pane. The *DNA Servers* branch is displayed.
2. Expand the *DNA Servers* branch and select the required *DNA Unit* sub-branch.

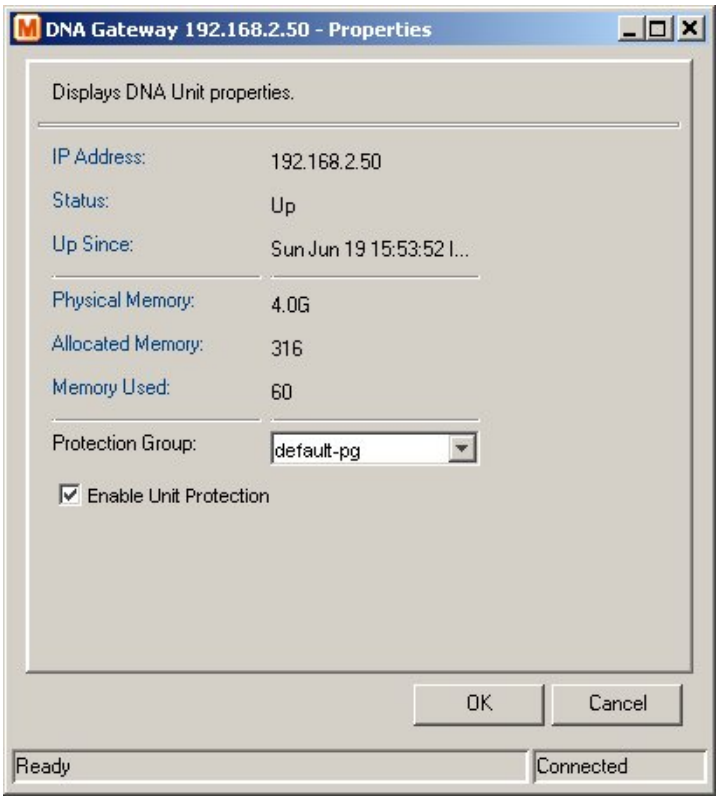
3. Right-click on the required Sheer DNA Unit to display the shortcut menu and select **Properties**,

   or

   In the toolbar click 

   or

   From the *File* menu select **Properties**. The *DNA Unit Properties* dialog box is displayed.



   The **Protection Group** dropdown list displays the currently customized protection groups. For more information about defining a new protection group, refer to the section *Managing Protection Groups* on page 121.

   The **Enable Unit Protection** checkbox enables the administrator to define whether a Sheer DNA Unit is enabled (checkbox is selected) for high availability.

   Note: It is recommended that the user does not disable this option.

4. Select the protection group from the **Protection Group** dropdown list to which you want to assign the Sheer DNA Unit.

5. Click **OK** to save the updated protection group settings for the selected Sheer DNA Unit. The Sheer DNA Manage window is displayed.

7.5.3 Viewing and Editing Protection Group Properties

The administrator can view the properties of a protection group, for example, the description. In addition, the administrator can edit the description of the protection group.

To view and edit a protection group's properties

1. Select the *Global Settings* branch in the *DNA Manage* window's *Tree* pane. The *Global Settings* branch is displayed.
2. Expand the *Global Settings* branch and select the *Protection Groups* sub-branch.
3. Select the required protection group in the *DNA Manage* window's *Workspace*.
4. Right-click to display the shortcut menu and select **Properties**,

   or

   In the toolbar click 

   ,

   or

   From the *File* menu select **Properties**.

   The *Properties* dialog box is displayed.

5. View the properties of the protection group and/or edit the description.
6. Click **OK**. The *Sheer DNA Manage* window is displayed.

7.5.4 Deleting a Protection Group

Sheer DNA Manage enables the user to delete protection groups.

Note: Check that you are deleting the correct protection group, as there may be a DNA Unit using the protection group.

To delete a protection

1. Select the *Global Settings* branch in the *DNA Manage* window's *Tree pane*. The *Global Settings* branch is displayed.
2. Expand the *Global Settings* branch and select the *Protection Groups* sub-branch.
3. Select the required protection group in the *DNA Manage* window's *Workspace*.
4. Right-click to display the shortcut menu and select **Delete**,

   or

   In the toolbar click  .

   The protection group is deleted.

8 Managing Links

About this chapter:

This chapter describes how to add and remove a static link between two ports of two Network Elements in the network. These static links will override any existing auto-discovered topology in the system. A static link is identical in all respects to a link that was auto-discovered.

Static links can be viewed using the *Topology* branch and in the device topology static key in the relevant Golden Source AVM .xml file.

Creating a Static Link, page 127, describes how to add a static link between two ports of two Network Elements in the network.

Removing a Static Link, page 131, describes how to delete a dynamic or static link or all of the links between devices.

8.1 Creating a Static Link

Sheer DNA Manage enables the user to create a static link between devices by selecting the two end ports from the device's physical inventory. To create a static topological link the user needs to supply the exact location of the two end ports (at both ends of the link). The physical hierarchy in which the port is located defines the location of a port, as follows:

Device →[shelf] → module → [submodule] → port

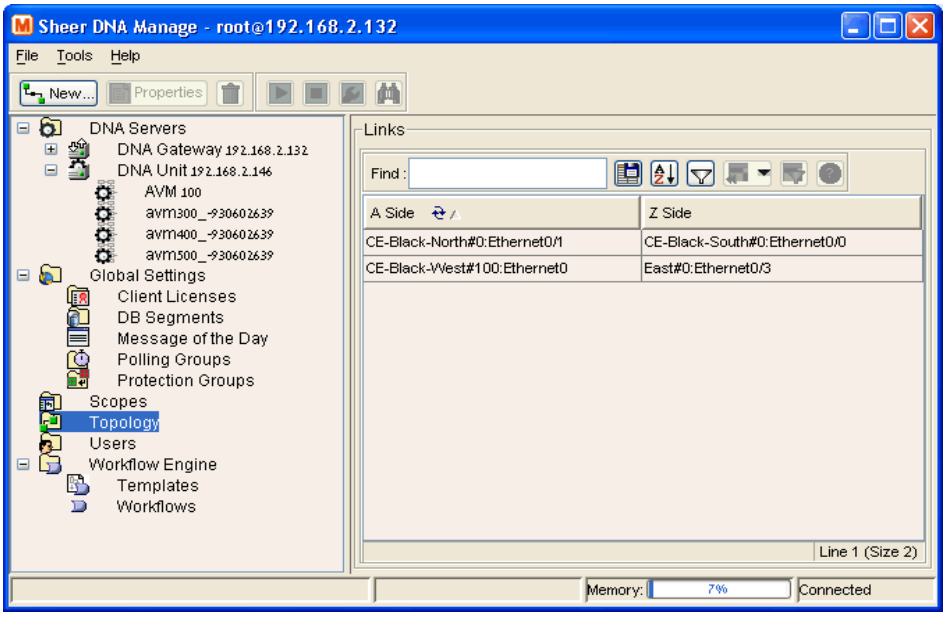
Note: The link is bi-directional and therefore only needs to be added once.

The new link is validated after the two ports are selected, but before the link is added. Validation checks the following:

- The similarity of the connector port types (for example, RJ45 on both sides)
- Layer 2 technology type (for example, ATM OC-3 on both sides)
- The physical layer
- The operation status of both ports
- If one of the ports is part of another link

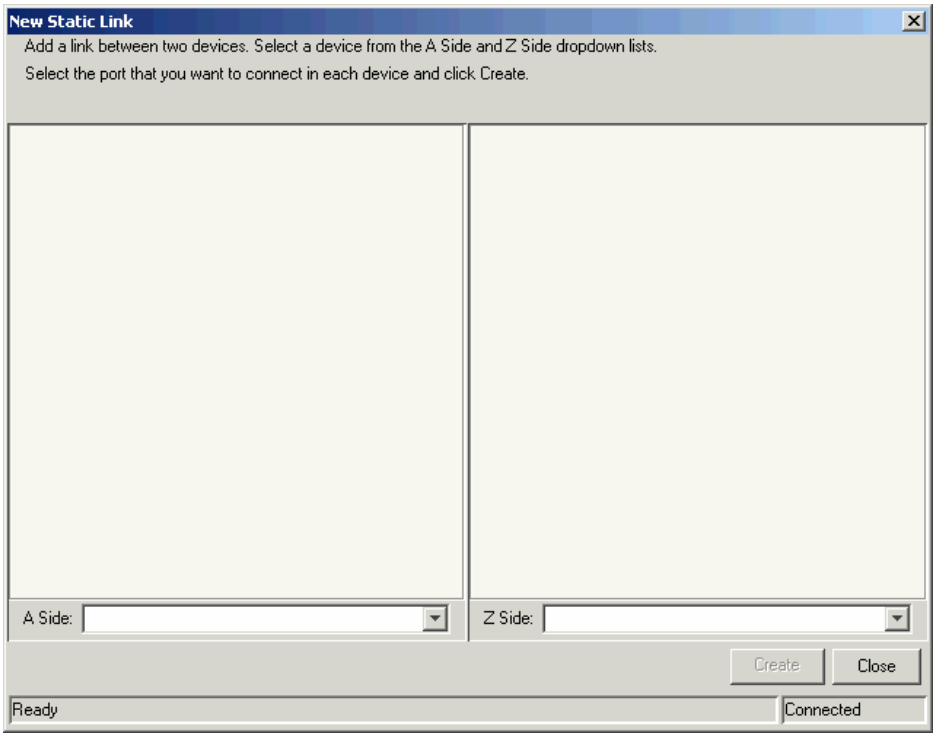
To create a new static link

1. Select the *Topology* branch in the *Sheer DNA Manage* window. The *Topology* branch is displayed.



Note: Any changes made in the *Topology* branch are saved automatically and are registered immediately in the Sheer DNA.

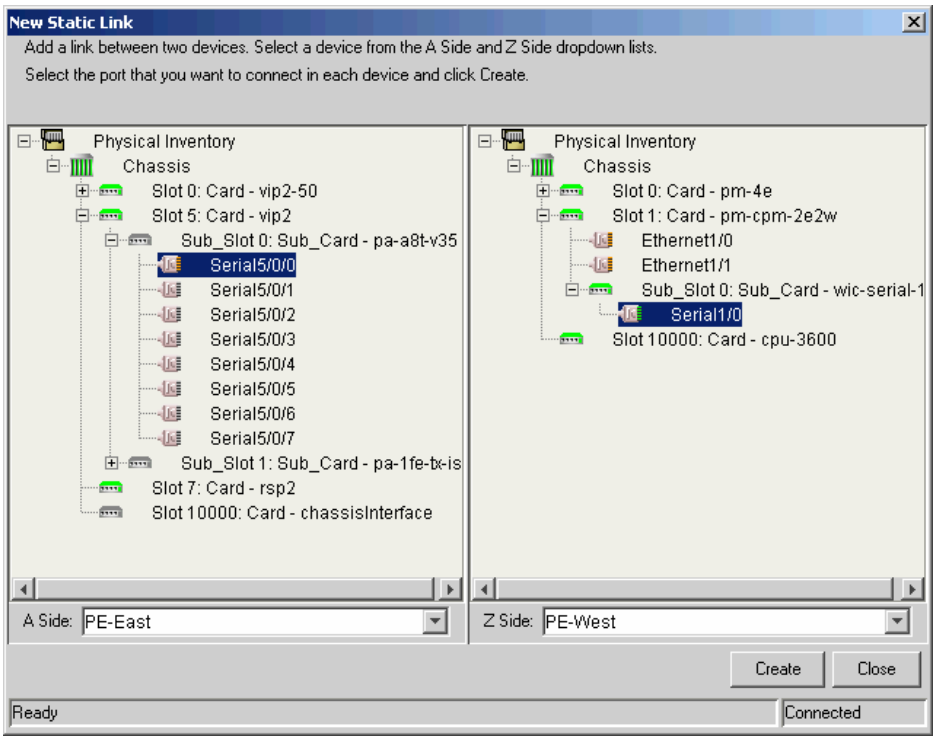
2. Right-click to display the menu and select **New Static Link** or from *File* menu select **New Static Link** or in the toolbar click **New Static Link**. The *New Static Link* dialog box is displayed.



The **A Side** and **Z Side** dropdown lists enable the user to select the devices and required port on which they want to create the static link. When a device is selected from the dropdown list the physical inventory of the device is displayed in the related area of the dialog box.

3. From the **A Side** and **Z Side** dropdown lists select a device. The physical inventory of each device is displayed in the related area of the dialog box.

4. Expand the tree and select the **A Side** and **Z Side** port of each device.



For more information about the icons and severity displayed in this dialog box, refer to the *Cisco Active Network Abstraction NetworkVision User's Guide*.

5. Click **Create**. The link is validated and a confirmation message is displayed.

Note: The **Create** button is only enabled when A Side and Z Side ports are selected.

Note: A warning message is displayed if:

- One of the validation checks fails
- The operation status of one port is Up and the other port is Down
- The ports selected are not of the same type
- The Layer 2 technology type is not the same
- If one of the ports is part of another link

Click **No** to cancel the connection.

6. Click **Close**. The *New Static Link* dialog box is closed and the newly created link between the two devices is displayed in the *Workspace*.

Note: The new link is created with the rule A Side < Z Side lexicographically. For example, if the user selected A Side = PE-West and Z Side = PE-East. The link that is created and displayed in the table, will be A Side = PE-East and Z Side = PE-West.

8.2 Removing a Static Link

A dynamic or static link between the devices can also be deleted from a Sheer DNA. A dynamic link is one that is detected by Sheer DNA and connected automatically. A static link is one that is manually entered by the user.

To remove a link

1. Select the *Topology* branch in the *Sheer DNA Manage* window. The *Topology* branch is displayed.
2. Select the required link in the *Workspace*.

Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

3. Right-click to display the menu and select **Delete** or in the toolbar click  . The selected link is deleted and is no longer displayed in the *Workspace*.

9 Managing Workflows

About this chapter:

This chapter briefly describes the *Workflow Engine* branch in the Sheer DNA Manage application.

About the Sheer Workflow Editor, below, provides an overview of the Sheer Workflow Editor.

Workflow Engine Branch, page 134, briefly describes the *Workflow Engine* sub-branches, namely, *Templates* and *Workflows*.

For more information about the *Workflow Engine* branch menus and toolbar, refer to page 52.

9.1 About the Sheer Workflow Editor

The Sheer Workflow Editor enables the creation and execution of logical flows of atomic tasks (activation commands), including, complex rollback scenarios. This logic enables the user to define relationships between tasks, including sequences, branches, failure procedures, scheduling, and access to Sheer Commands as well as Sheer's Information Model. The Workflow Editor can interface with an external system such as an order management system in order to create a full solution for service provisioning, which is user-customizable and user-extendable.

The Sheer Workflow Editor is a GUI-oriented process management tool that acts as a powerful visual design and execution tracing tool for defining and deploying activation workflows (a workflow consists of several tasks grouped together and arranged in a hierarchy). Workflow management is supported in runtime and includes a runtime GUI control console. The easy-to-use GUI is flexible enough to enable complex flows to be created with a minimum of effort. For information about launching and working with the Sheer Workflow Editor, refer to the *Cisco Active Network Abstraction Workflow User's Guide*.

All workflows are stored on the Sheer DNA Gateway. The Workflow Editor engine resides on the Sheer DNA Gateway,
using AVM 66.

Note: In order to use workflows **AVM 66** must be up and the relevant license must be installed.

After a workflow is deployed, it is accessible via Sheer DNA Manage for viewing properties and status. Deployed workflows can be invoked via the Sheer DNA API using BQL.

9.2 Workflow Engine Branch

The *Workflow Engine* branch in Sheer DNA Manage enables the user to manage the workflow templates and running workflows in runtime.

Note: The *Workflow Engine* branch is only enabled upon installation of the relevant license.

The *Workflow Engine* branch includes the following sub-branches:

- **Templates:** Displays a list of the deployed workflow templates and enables the user to view the properties of the workflow template.
- **Workflows:** Displays a list of the running or completed workflows and enables the user to view and alter their current status.

For more information about the *Workflow Engine* branch functionality, refer to the *Cisco Active Network Abstraction Workflow User's Guide*.

10 Managing Sheer DNA Security

About this chapter:

This chapter describes how Sheer DNA implements a two-dimensional security engine combining a role-based security mechanism with scopes (groups of Network Elements) that are granted to users. In addition, it describes managing users in the Sheer DNA platform, including, defining users and passwords.

Security Overview, page 135, describes the security related concepts and terms used in the Sheer DNA Manage application and throughout this guide.

Customizing Security Flow, page 139, describes the steps required to customize security.

Creating Scopes, page 140, describes how to group a collection of managed Network Elements together in Sheer DNA Manage. In addition, it describes how to edit the Network Elements included in a scope, view the scope's properties and how to delete a scope.

Creating New Sheer DNA User Accounts, page 143, describes how to create permitted users for the current client station.

Granting or Editing a User's Rights, page 146, describes how to manage general user account information and the list of scopes assigned to the user as well as the security access roles per scope and assign maps to a user.

Deleting a Sheer DNA User Account, page 152, describes how to delete a Sheer DNA user account from the list of users.

Changing a User's Password, page 152, describes how the administrator can redefine the user's password. In addition, it describes how the current user can change the user password.

10.1 Security Overview

This section describes the security related concepts and terms used in the Sheer DNA Manage application and throughout this guide.

10.1.1 Scopes

Sheer DNA Manage enables the administrator to group a collection of managed Network Elements together in order to enable the user to view and/or manage the NEs based on the user's role or permission.

After the user is allocated a scope (list of Network Elements) and a role, the user can then perform various activities on the Network Elements included in the scope, as follows:

- Activate services.
- Manage alarms in Sheer NetworkVision.
- Manipulate graphical Network Elements in the map.
- View Network Element, inventory, and link properties.
- Add Network Elements to the map view.
- Manipulate business tags per Network Element.
- Manage advanced options, for example, show counters, show utilization, and refresh.

By default Sheer DNA includes a pre-configured scope for the administrator's convenience, which cannot be edited or deleted, namely, **All Managed Elements**. This default scope includes all of the managed Network Elements. A user granted the All Managed Elements scope can view and manage all the Network Elements all the time according to the user's role assigned to the scope.

10.1.2 Default Permissions

The Role or default permission only applies to the activities that are related to GUI functionality, not the activities related to Network Elements, including:

- Application login.
- Manage alarms in Sheer NetworkVision.
- Manage maps: Creating, deleting, and opening.
- Map manipulation: Arrange map, including, aggregations, adding NEs, NEs placement in map, map background and so on.
- Business tag management.

10.1.3 Security Access Roles

Sheer DNA provides five pre-defined security access roles that can be granted to a user in order to enable system functions:

- **Administrator:** Manage the system configuration, and security. Sheer DNA Manage supports multiple administrators.
- **Configurator:** Activate services, and configure the network.
- **Operator Plus:** Manage the alarm life cycle.

- **Operator:** Configure business tags and manage most day-to-day operations.
- **Viewer:** View only access to the network and to non-privileged system functions.

Note: Roles can be granted per scope or at an application level (namely, all the activities that are related to GUI functionality, not the activities related to devices). Users can have different roles for different scopes. Role functionality is incremental.

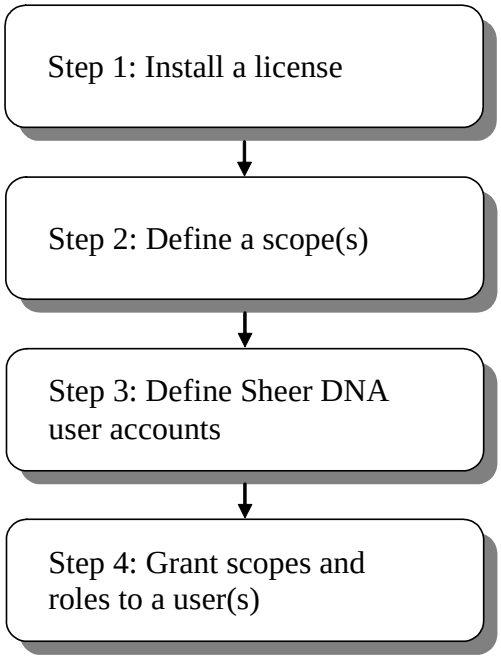
The table below illustrates the functionality per role according to the default permission and Scope based functionality:

Role	Default Permission Based Functionality	Scope Based Functionality
Administrator 	Platform management: • Manage DNA Servers, AVMs, transport and VNEs • Global setting: Managing polling groups, protection groups, client licenses and service disclaimers • View DB segments • Create/delete scopes • Manage user accounts • Manage static topology links • Manage VNEs from Sheer DNA Manage or Sheer NetworkVision Map management: • Open, edit, delete all user maps	
Configurator 	Map management: • Create maps Advanced tools: • Ping and Telnet a NE directly from the client • Enable/disable port alarms • Sheer DNA Command Builder	Activation services: • Allow activation commands per managed NE

Role	Default Permission Based Functionality	Scope Based Functionality
OperatorPlus 	Map management: • Create new maps and add NEs • Edit/delete/rename maps • Save maps Map manipulation: • Create/break aggregations • Change map layout • Set background image • Create business links	Alarm management: • Acknowledge, remove, and clear alarms that belong to the NEs within a user's scope that have the OperatorPlus role Map manipulation: • Create business tags for NEs Display network information: • Display path tool traffic, rates, drops or any dynamic data
Operator 	Map manipulation: • Create/delete business tags Application: • Open EventVision	Display network information: • Refresh port information from NE
Viewer 	Application: • Login to NetworkVision, EventVision • Change user password • View the Device List • View map • View link properties • Use table filter • Export from any table	Display network and business tag information: • View alarm list, alarm properties, and find alarms • Find and view attachments • View NE properties and inventory • Calculate and view affected parties • Open port utilization graph

10.2 Customizing Security Flow

The flow below describes the steps required to customize security using Sheer DNA Manage and the order in which they must be performed.



Step 1: Install a license: Enables the administrator to control and monitor the number of Sheer DNA Client and BQL connections over a limited or unlimited period of time based on the client licenses installed. For more information, refer to *Section 7.1, Managing Client Licenses*.

Step 2: Define a scope: Enables the administrator to group a collection of managed Network Elements together in order to enable the user to view and/or manage the Network Elements based on the user's role. For more information, refer to *Section 10.3, Creating Scopes*.

Step 3: Define Sheer DNA user accounts: Enables the administrator to define and manage user accounts. For more information, refer to *Section 10.4, Creating New Sheer DNA User* Accounts.

Step 4: Grant scopes and roles to a user: Enables the administrator to manage general user account information and the list of scopes assigned to the user as well as the security access roles per scope. For more information, refer to *Section 10.5, Granting or Editing a User's Rights.*

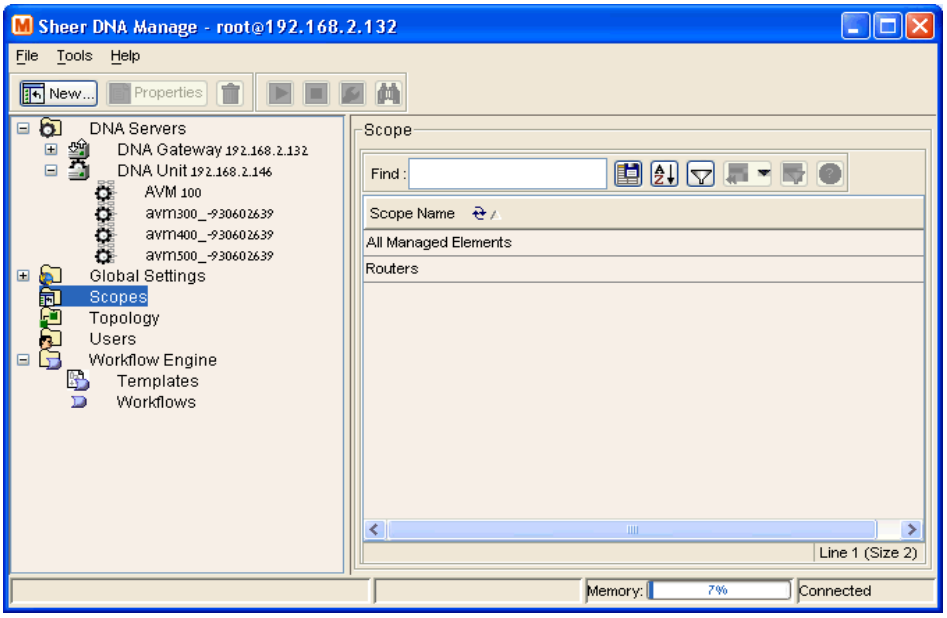
10.3 Creating Scopes

Sheer DNA Manage enables the administrator to group a collection of managed Network Elements together in order to enable the user to view and/or manage the Network Elements based on the user's role or permission.

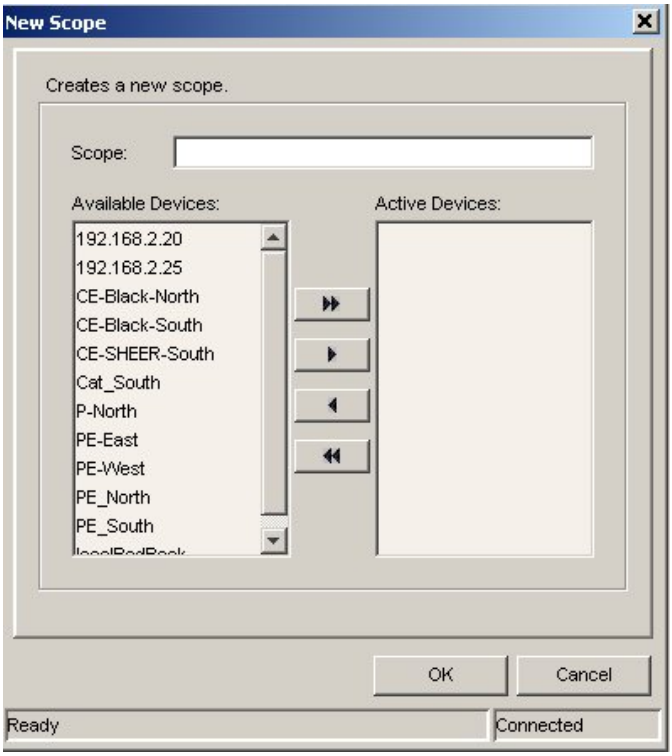
Once a scope is created it can be assigned to a user. Multiple scopes can be assigned to a single user and a single scope can be assigned to multiple users. When the scope is assigned to a user, the administrator is required to provide the user with security access roles as well, namely, to define the user's role within the assigned scope. For more information, refer to page 146.

To create a scope

1. Select the *Scopes* branch in the *Sheer DNA Manage* window. The *Scopes* branch is displayed.



2. Right-click to display the menu and select **New Scope** or from *File* menu select **New Scope** or in the toolbar click **New Scope**. The *New Scope* dialog box is displayed.



The following fields are displayed in the *New Scope* dialog box:

- **Scope:** The name of the scope (unique).
- **Available Devices:** A list of all of the available devices.
- **Active Devices:** A list of all of the active devices defined for the scope.

The following buttons are displayed in the *New Scope* dialog box:

 Adds all available devices to the **Active Devices** list.

 Adds the active device to the **Active Devices** list.

 Removes an active device from the scope.

 Removes all active devices from the scope.

3. Enter a name for the scope in the **Scope** field.
4. Select a device/s from the list of **Available Devices** and click  to add the device/s to the list of **Active Devices** in the scope.

Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

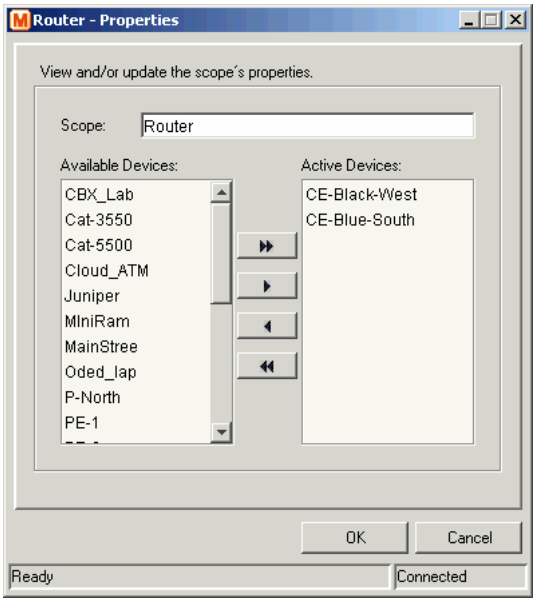
5. Click **OK**. The scope is saved and is displayed in the *Workspace*.

10.3.1 Editing a Scope and Viewing a Scope Properties

Sheer DNA Manage enables the administrator to edit the details of a scope and to view the scope's properties.

To edit a scope or view scope properties

1. Select the *Scopes* branch in the *Sheer DNA Manage* window's *Tree* pane. The *Scopes* table is displayed in the *Workspace*.
2. Select the scope that you want to edit or view in the *Workspace*.
3. Right-click the required scope to display the shortcut menu, and select **Properties**, or from *File* menu select **Properties** or in the toolbar, click **Properties**. The *Properties* dialog box is displayed.



For more information about the *Properties* dialog box, refer to page 141.

4. Edit and/or view the properties as required.
5. Click **OK**. The *Properties* dialog box is closed.

10.3.2 Deleting Scopes

A device scope (lists of devices or Network Element groups) can also be deleted.

Note: When a scope is deleted, it is deleted from all users who have the assigned scope.

To delete a scope

1. Select the *Scopes* branch in the *Sheer DNA Manage* window's *Tree* pane. The *Scopes* table is displayed in the *Workspace*.
2. Select the scope that you want to delete in the *Workspace*.

   Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

3. Right-click the required scope to display the shortcut menu, and select **Delete**. The scope is deleted and is not displayed in the *Workspace*.

10.4 Creating New Sheer DNA User Accounts

The *Users* branch enables the administrator to define and manage user accounts. This includes, managing general user information as well as security access rights, and forced login changes, as required. The administrator can also monitor the user's last login time.

Note: Creating a new user using the *New User* dialog box, is only part of the "creating-user" process. Granting user security rights to operate Sheer DNA applications are defined in the *User Properties* dialog box. For more information, refer to *Section 10.5, Granting or Editing a User's Rights*.

The new user is created with a set of pre-defined system defaults, as follows:

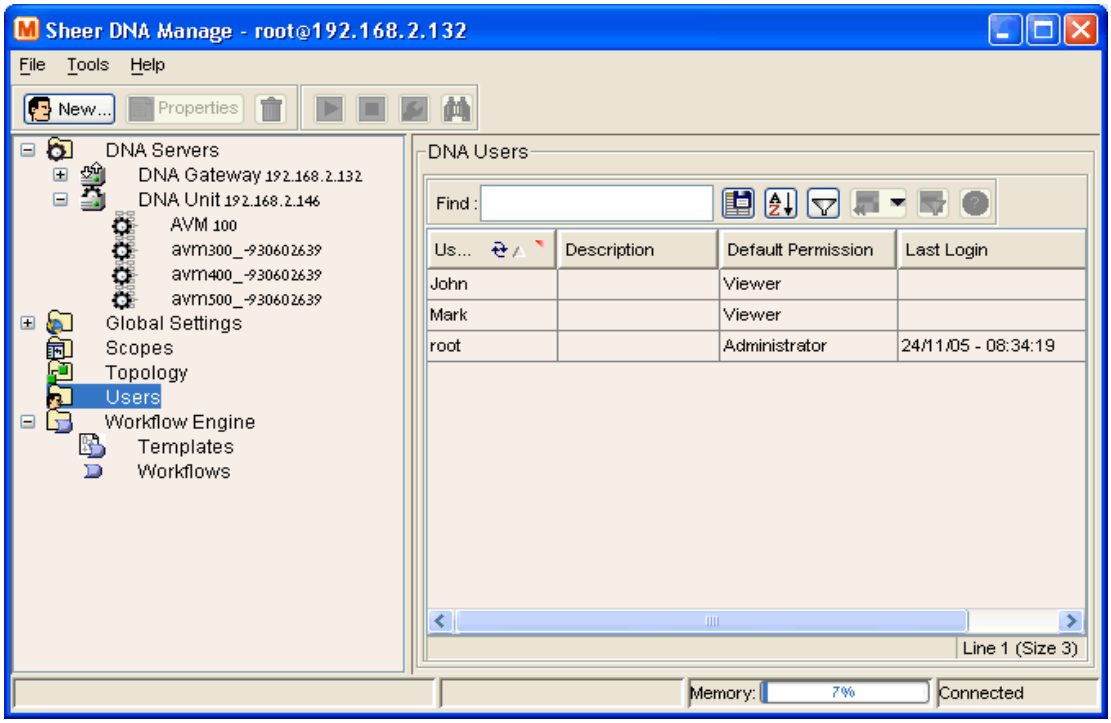
- No scopes are assigned to the user
- The number of connections is unlimited
- The password must be changed every 30 days

Note: Sheer NetworkVision has the following pre-configured password defaults:

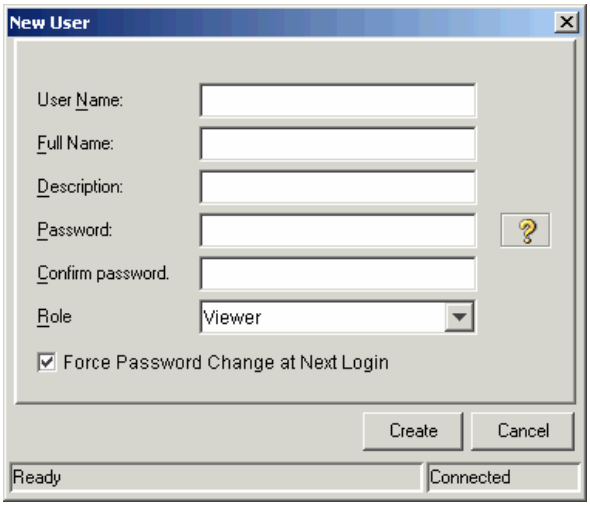
- The maximum length of the user name and full name is 20 characters.
- The minimum length of the user password is 8 characters.
- The maximum length of the password is 20 characters.
- The minimum number of digits that must be included in the user password is 1.
- The user name cannot contain any special characters like * # ? and so on.
- The password cannot contain the User Name or vice versa.

To define a user account

1. Select the *Users* branch in the *Sheer DNA Manage* window. The *Users* branch is displayed.



2. Right-click to display the menu and select **New User** or from *File* menu select **New User** or in the toolbar click **New User**. The *New User* dialog box is displayed.



Note: Clicking [?] displays the current password rules.

The following fields are displayed in the *New User* dialog box:

- **User Name:** The new user's name used for logging in (mandatory).

  Note: The user name is unique and a maximum of 20 characters may be used. Special characters may not be used.

- **Full Name:** The full name of the user (optional).

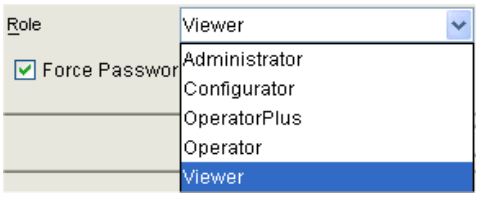
  Note: A maximum of 20 characters may be used, but no special characters may be used.

- **Description:** A free text description of the user (optional).
- **Password:** Enter the new password (mandatory).

  Note: A minimum of 8 characters must be used, including, at least 1 digit. The maximum length of the user password is 20 characters.

- **Confirm Password:** Enter the new password again to confirm the new password (mandatory).

The **Role** dropdown list enables the administrator to define the security access role (permission) for the new user.



Note: The permission only applies to activities or actions that are not related to a NE (Network Element). For more information on the functionality that a user can perform, refer to the section *Security Access Roles* on page 136.

When a new user is defined as an **Administrator** this user can perform all administrative actions, including opening all maps, working with all scopes and managing the system using Sheer DNA Manage. All of this is performed with the highest privileges. Sheer DNA Manage supports multiple administrators. Access rights do not need to be defined for an administrative user. For more information, refer to page 136.

The **Force Password Change at Next Login** checkbox is selected by default and forces the user to change the user password at next login.

The following button is displayed in the *New User* dialog box:

- **Create:** Adds the new user to the list of Sheer DNA Client users and the new user name is displayed in the *Workspace*.

3. Enter a unique **User Name** (mandatory).
4. Enter a **Full Name** and **Description** (optional).
5. Enter a **Password** (mandatory).
6. Enter the password again in the **Confirm Password** field (mandatory).
7. Select a security access role for the new user from the **Role** dropdown list.
8. Click **Create**. The new user name and default security access role are displayed in the *Workspace*.

10.5 Granting or Editing a User's Rights

Once the administrator has defined the scopes and the new user accounts, Sheer DNA Manage enables the administrator to manage or edit general user account information and the list of scopes assigned to the user, the security access roles per scope, and assign maps to a user.

Note: A user may have different security access roles for different scopes, and maps.

In addition, the administrator can view the properties of a user.

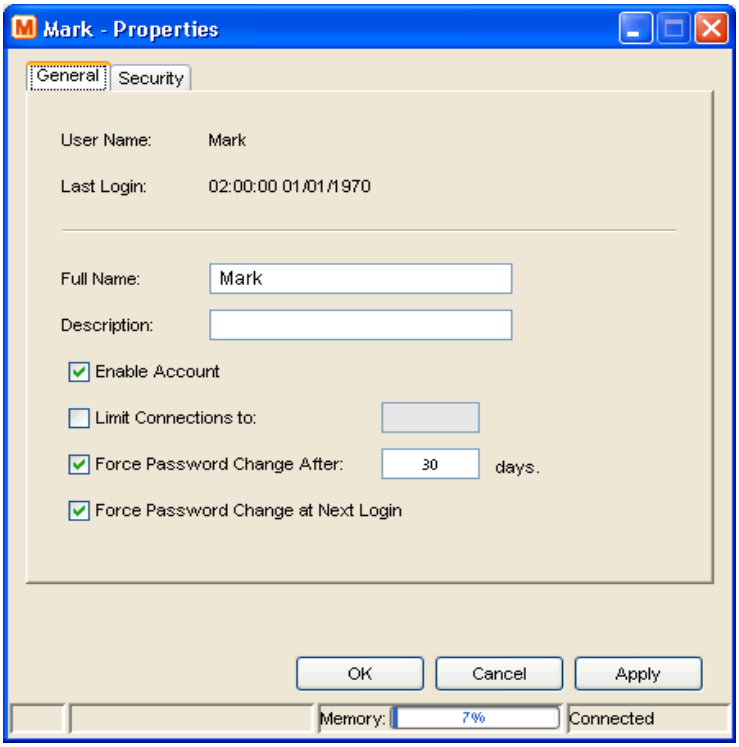
10.5.1 General User's Rights

Sheer DNA Manage enables the administrator to manage or edit general user account information. In addition, the administrator can view the properties of a user.

To grant or edit a user's rights

1. Select the *Users* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Users* table is displayed in the *Workspace*.
2. Right-click the required user to display the shortcut menu.

3. From the shortcut menu, select **Properties**. The *Properties* dialog box is displayed with the *General* tab selected by default.



The **General** tab contains general user account information and the following fields are displayed:

- **User Name:** The current user's name. The user name cannot be modified.
- **Last Login**: The date and time that the user last logged in.
- **Full Name:** The full user name.
- **Description:** A description of the user.

The following checkboxes are displayed in the **General** tab of the *Properties* dialog box:

- **Enable Account:** Select this option to enable the user account or uncheck to disable the user account. The user account is automatically locked when the number of logins defined is exceeded (the **Limit Connections to** option is selected). An administrator can manually lock or unlock a user's account at any time. A user whose account is locked cannot login to the system.

- **Limit Connections to:** The number of instances of the Sheer DNA Client applications that the user can access at any one time. For example, if the number of connections is limited to 10, the user can have 5 instances of Sheer DNA Manage and 5 instances of Sheer NetworkVision open at the same time. If the user then tries to open an instance of Sheer EventVision the user will be unable to do so.
- **Force Password Change After:** The number of days after which a user is forced to change their password.
- **Force Password Change at Next Login:** Select this option to force the user to change the user password at next login. The administrator can define this option at any time.

4. Edit the general properties as required.

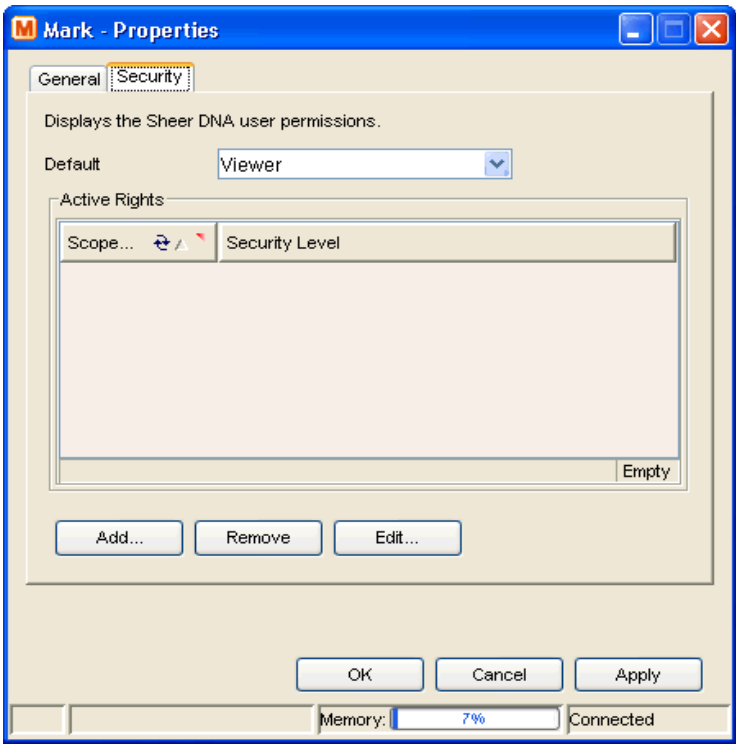
10.5.2 User's Security Rights

To define a User's default security rights, you use the *Security* tab in the *User Properties* dialog box.

To edit a user's default security rights

1. Select the *Users* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Users* table is displayed in the *Workspace*.
2. Right-click the required user to display the shortcut menu, and select **Properties**. The *User Properties* dialog box is displayed.

3. Select the **Security** tab. The following tab is displayed.



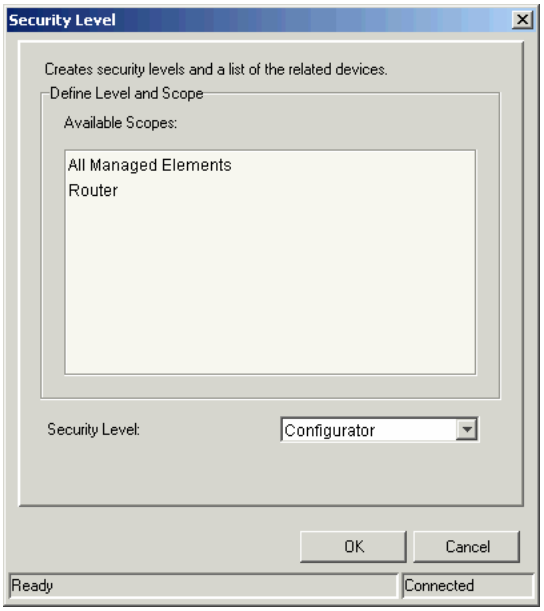
The **Security** tab controls the user's capability to view and manage the application, and Network Elements by granting the user scopes and security access roles. By default a new user is assigned a Viewer security access role. The following columns are displayed in the table in the **Security** tab of the *Properties* dialog box:

- **Scope Name:** The name of the scope.
- **Security Level:** The security access role defined for the scope. For more information about security access roles, refer to page 136.

The following buttons are displayed in the *Properties* dialog box when the **Security** tab is selected:

- **Add:** Adds the new scope.
- **Remove:** Deletes the selected scope from the user's active rights.
- **Edit:** Edits the selected permission of the user.

4. Click **Add** to add the scope to the **Active Rights** of the user. The *Security Level* dialog box is displayed.



The following area is displayed in the *Security Level* dialog box:

- **Available Scopes:** Lists all of the predefined and unassigned scopes.

The following dropdown list is displayed in the *Security Level* dialog box:

- **Security Level**: Displays the security access roles for the defined scopes. For more information about security access roles, refer to page 136.

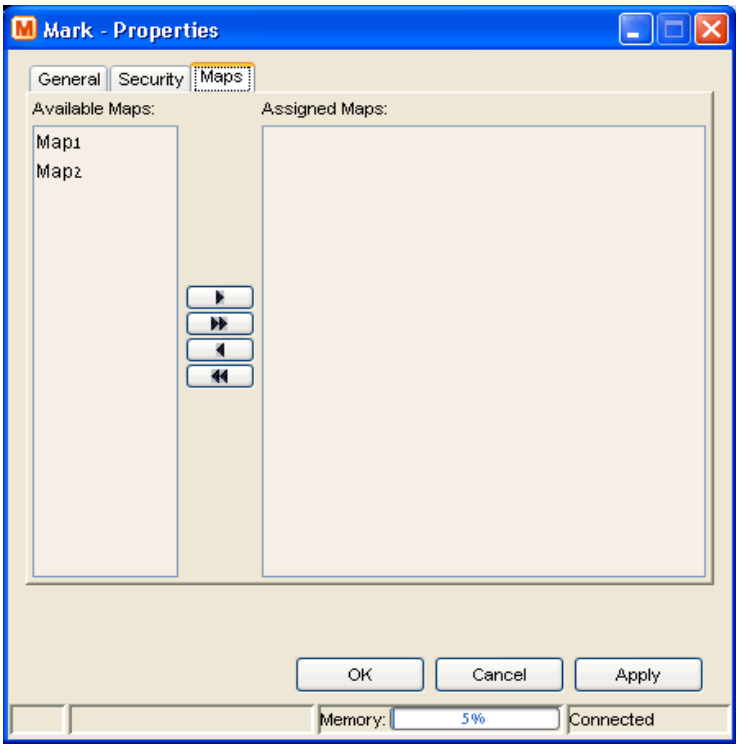
5. Select a scope from the **Available Scopes** list.
6. Select the required security access role from the **Security Level** dropdown list.
7. Click **OK**. The scope is added to the list of **Active Rights** in the **Security** tab of the *User Properties* dialog box.
8. Click **Apply**/**OK**. The *Properties* dialog box is closed.

10.5.3 Map User Permissions

Sheer DNA Manage enables the administrator to assign a map(s) to the user. When the user logs in to Sheer NetworkVision, the user can only open and manage the map(s) assigned to the user by the administrator.

To assign maps to a user

1. Select the *Users* branch in the *Sheer DNA Manage* window's *Tree* pane. The *DNA Users* table is displayed in the *Workspace*.
2. Right-click the required user to display the shortcut menu, and select **Properties**. The *User Properties* dialog box is displayed, as shown on page 149.
3. Select the **Maps** tab. The **Maps** tab is displayed.



The **Maps** tab is divided into two parts:

- The left hand side displays a list of all of the available maps in the database that have not been assigned to the user.
- The right hand side displays all the maps that have been assigned to the user, and which the user can open and manage in Sheer NetworkVision.

The following buttons are displayed between the available maps and assigned maps lists in the **Map** tab:

 Moves the selected map to the **Assigned Maps** list.

 Move the entire available map list to the **Assigned Maps** list.

 Removes a selected map from the assigned map list to the **Available Map** list.

 Removes the entire assigned map list to the **Available Map** list.

4. Select a map/s from the list of **Available Maps** and click  to add the map to the list of **Assigned Maps** to the user.

Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

5. Select and move maps between the two lists, as required, using the appropriate buttons.
6. Click **OK** to confirm the user's assigned map(s).

10.6 Deleting a Sheer DNA User Account

An administrator can also delete a Sheer DNA user account.

To delete a user account

1. Select the *Users* branch in the *Sheer DNA Manage* window's *Tree* pane. The *Users* table is displayed in the *Workspace*.
2. Select the user that you want to delete in the *Workspace*.

Note: Multiple rows can be selected using the standard Microsoft® Windows selection keys.

3. Right-click the required user to display the shortcut menu and select **Delete**. The selected user is deleted and is not displayed in the *Workspace*.

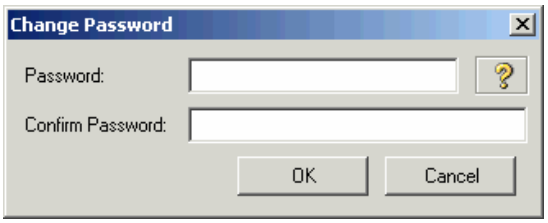
10.7 Changing a User's Password

Sheer DNA Manage enables the administrator to change the user's password at any time. When this happens the user is usually forced to change the password at the next login.

In addition, the current user can also initiate a change of password, where the user will be required to enter the old password in order to validate the new password.

To change a user's password (administrator)

1. Select the *Users* branch in the *Sheer DNA Manage* window's *Tree* pane. The *Users* table is displayed in the *Workspace*.
2. Select the user in the *Workspace* whose password you want to change.
3. Right-click the required user to display the shortcut menu and select **Change Password**. The *Change Password* dialog box is displayed.



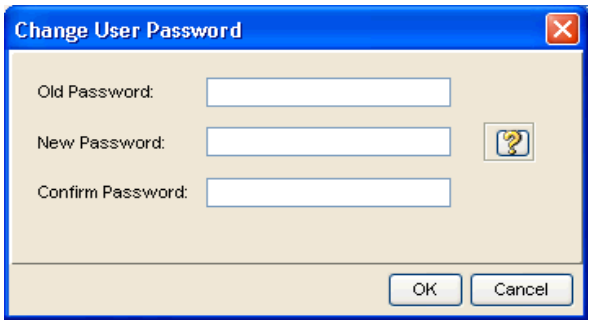
Note: Clicking  displays the password rules.

4. Enter the new password in the **Password** and **Confirm Password** fields.
5. Click **OK**. A confirmation message is displayed.
6. Click **OK**. The *Change Password* dialog box is closed.

Sheer DNA Manage enables the current user to also initiate a change of password.

To change the current user's password

1. From the *Tools* menu select **Change User Password**. The *Change User Password* dialog box is displayed.



Note: Clicking  displays the password rules.

2. Enter the old password in the **Old Password** field.

3. Enter the new password in the **New Password** and **Confirm** P**assword** fields.
4. Click **OK**. A confirmation message is displayed.
5. Click **OK**. The *Change User Password* dialog box is closed.

A Utility Scripts

About this appendix:

This appendix describes the Sheer DNA utility scripts.

Restarting Sheer DNA Gateway, below, describes how to restart the Sheer DNA Gateway from the Unix command line.

Restarting a Sheer DNA Unit, page 155, describes how to restart a Sheer DNA Unit from the Unix command line.

Executing a Command on all Sheer DNA Units, page 156, describes the script used to execute a given command on all of the Sheer DNA Units.

A.1 Restarting Sheer DNA Gateway

The user can restart the Sheer DNA Gateway from the Unix command line.

To restart the Sheer DNA Gateway

1. Open a Telnet session to the Sheer DNA Gateway machine and login to the machine.
2. Execute the script:

```
~sheer/Main/mvm.csh
```

Note: When the Sheer DNA Gateway is restarted, all of the clients are reconnected.

Note: The Server status can be verified using Sheer DNA Manage.

A.2 Restarting a Sheer DNA Unit

Restarting a Sheer DNA Unit machine kills all of the AVM processes on the machine and restarts them.

Given that the system saves part of its information within the process memory, restarting a Sheer DNA Unit will cause some of the information to disappear. It will, therefore, take as long as the longest full polling cycle for the system to recover all of the information that was stored in the process memory prior to the restart. Data that was saved in persistent storage before restarting will be available immediately.

Restarting a machine may cause some of the VNEs running on the machine to be reported as unreachable. This is due to handshake protocols with the Sheer DNA Unit that will fail due to the unavailability of the VNEs.

Restarting a machine will abort all active queries, flows and transactions that are currently being executed within the VNEs that run on the restarted Sheer DNA Unit.

To restart a Sheer DNA Unit

1. Open a Telnet session to the Sheer DNA Unit machine and login to the machine.
2. Execute the script:

```
~sheer/Main/mvm.csh
```

A.3 Executing a Command on all Sheer DNA Units

The script rall.csh is a utility used to execute a given command on all of the Sheer DNA Units (not on the Sheer DNA Gateway).

```
~sheer/Main/rall.csh <script>
```

Where **<script>** is the script name.

The script example below will restart all the Sheer DNA Units (not the Sheer DNA Gateway).

```
~sheer/Main/rall.csh mvm.csh
```

B Golden Source Registry

About this appendix:

This appendix provides details of the Golden Source Registry.

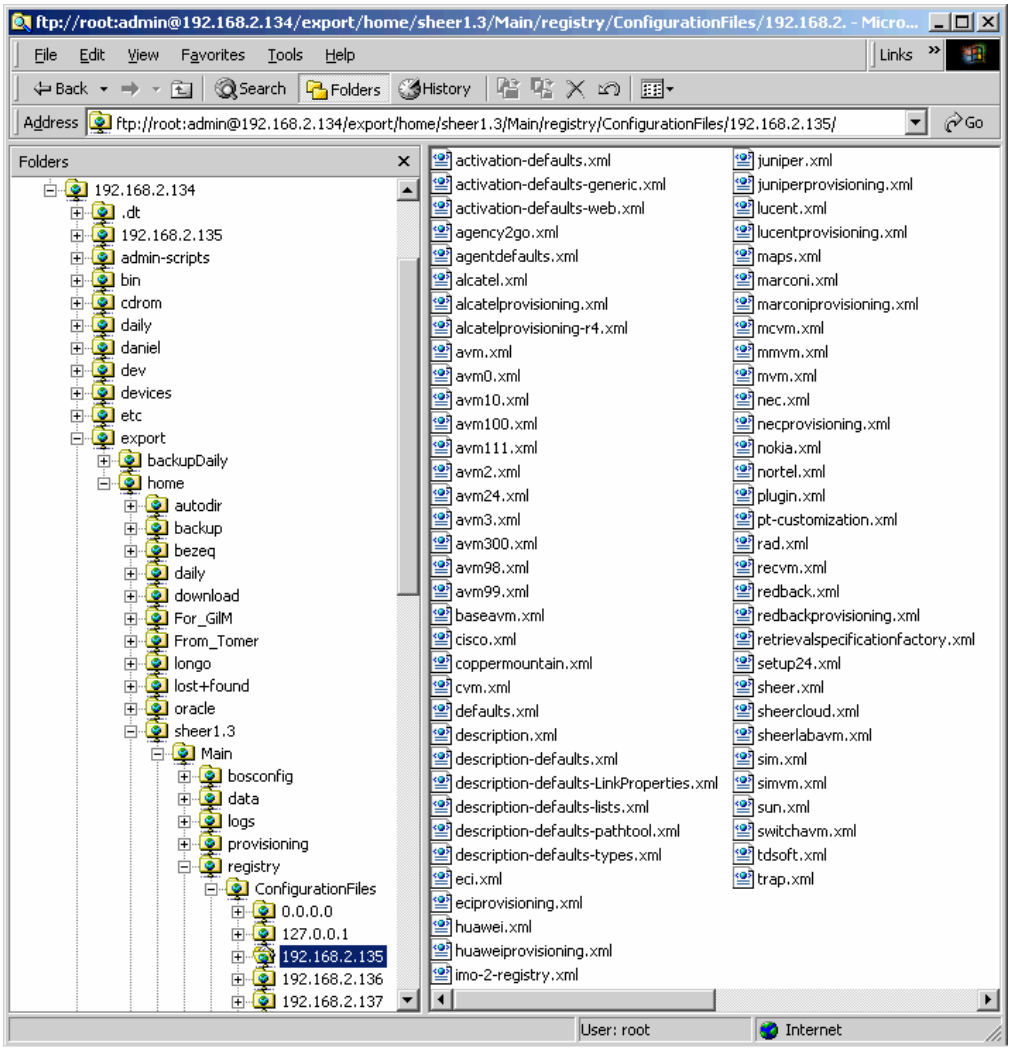
The Golden Source registry is the master registry responsible for maintaining, distributing, and updating registry configuration files to all of the Sheer DNA Units and the Sheer DNA Gateway server. The master copy of the Golden source files is centrally located on the Sheer DNA Gateway server:

```
~sheer/Main/registry/ConfigurationFiles
```

- `/0.0.0.0` is the template folder used by the system.
- `/127.0.0.1` is the Sheer DNA Gateway sub-folder.
- A sub-folder for each of the Sheer DNA Units.

These sub-folders are created during the installation procedure. Each sub-folder contains the relevant registry .xml files. These files can either be edited manually using Telnet and an editor or using the Sheer Registry Tool.

The screen below displays the registry files for each Sheer DNA server and the Golden Source hives.



The Golden Source mechanism enables consistent management of the entire system. Each Sheer DNA Unit and Sheer DNA Gateway has its own set of registry configuration files and parameters. The registry files are replicated automatically during the installation of the Sheer DNA Unit and Sheer DNA Gateway.

Each time a Sheer DNA Unit and Sheer DNA Gateway process starts it accesses the Golden Source and retrieves the updated configuration. All additions and changes to the Golden Source are automatically sent to the relevant Sheer DNA Servers. Each Sheer DNA Unit keeps a local copy of its relevant registry files. When a Sheer DNA Unit cannot connect to the Sheer DNA Gateway this local copy is used.

C Ports Used by Sheer DNA

About this appendix:

This appendix provides a list of the ports used by the various Sheer DNA Server and Client applications.

Scope	Protocol	Port
Sheer DNA Gateway Northbound		
Sheer NetworkVision	TCP	9770
Sheer NetworkVision	TCP	9771
Sheer NetworkVision - Webstart Edition	TCP	1310
Sheer EventVision	TCP	1521
SSH (for Sheer DNA Shell)	TCP	22
Telnet (for Sheer DNA Shell)	TCP	23
BQL	TCP	9002
Registry Editor	TCP	8011
Registry Editor	TCP	8099
Sheer DNA Gateway Southbound and Intra-Unit Communication		
Transport	TCP	9390
High Availability & Registry Synchronization	TCP	8099
System Administration and Scripts	TCP	512
System Administration and Scripts	TCP	513
System Administration and Scripts	TCP	514
Secure connectivity for System Administration and Scripts	TCP	1101
Time Synchronization (NTP)	UDP	123

D Drools Rules Engine

About this appendix:

This appendix introduces and describes the Drools rules engine.

Drools Rules Engine Overview, below, introduces the Drools rules engine components and terminology.

Drools and ANA Integration, page 162, explains how Drools is integrated within Cisco ANA.

Drools Definitions in ANA, page 162, describes Drools within ANA.

Upgrading Rule Files, page 163, describes the rule upgrade process.

D.1 Drools Rules Engine Overview

Drools rules engine is a general-purpose expert-system generator and combines rule-based techniques and object-oriented programming. It also provides a customizable mechanism to add decision support and data flow control functions to business applications.

Drools rules engine is based on an object-oriented paradigm and uses user-defined rules to perform pattern matching on different conditions. The rules are written in a java like syntax, and are organized into source files (known as a ***rule files***), which are plain ASCII files.

D.1.1 Drools Components and Terminology

Drools uses *objects* as marked out by *patterns* and *rules* that invoke certain *Actions*:

- Drools ***objects*** are Java objects and can be represented by instances of Java classes or XML schemas.
- A ***pattern*** is a coded expression (“program”), which manipulates one or more objects to form a pattern to make, adapt or fashion behavior according to designed logic.
- ***Working Memory*** is where Drools stores all the objects, which it is currently handling.
- ***Actions*** are operations that may change the working memory.

- A ***rule*** can perform many types of actions, such as:
  - Add or remove an object from the working memory
  - Modify an object
  - Execute a method on one of the objects
- The ***Agenda*** is where Drools stores the list of rules to be fired.

D.2 Drools and ANA Integration

The Drools rule engine enables the user to extend the ANA alarm correlation mechanism with user-defined rules and business logic.

The Drools rule engine is fully integrated within the Cisco ANA Gateway and does not require any synchronization or maintenance. It can access all ANA information and functions:

- Use up-to-date network information (topology, hierarchy, inventory) as part of its rule processing
- Create and manipulate alarms, and send commands to NEs
- Define operator-logic rules, such as:
  - *If the alarm was not attended to within 2 hours then…*
  - *If there are more than 5 open alarms on this device then…*
  - *If today is Tuesday then…*

The rules are written for Drools in xml format files, and can be modified and reloaded in runtime. There is neither a need to compile the rules, nor to restart any ANA component.

ANA maintains two Drools processing instances (Contexts), with two respective rule files:

- ***Pre-correlation*** processing context
- ***Post-correlation*** processing context

The Rule files are located under **`~sheer/Main/data`** in the ANA Gateway server.

D.3 Drools Definitions in ANA

The Drools mechanism runs in two processing contexts:

- Pre-correlation context – defined in the **`pre.drl`** rule file
- Post-correlation context – defined in the **`post.drl`** rule file.

The Drools parameters are stored in the ANA registry file **`mmvm.xml`** under the event-management key:

- Context ID - the Drools context name
- Rule file name – the name of the respective rule file.
  - the specified rule (the file name under **`mmvm.xml`**).

D.4 Upgrading Rule Files

To upgrade a rule file:

1. Make a copy of the required rule file (***pre.drl*** or ***post.drl***), and edit it.
2. Copy the updated file (under a temporary name) to the ANA Gateway (directory **`~sheer/Main/data`**).

   Note: In case the rule file is edited on a PC, make sure that the text format is compliant to the UNIX version that runs on the Cisco ANA Gateway. If necessary, use a utility such as ***DOS2UNIX*** for conversion.

3. Check the validity of the new file, by running the ***checkrules.cmd*** utility (developed by Cisco to validate the rules syntax), as follows:
   `checkrules.cmd <rule-file-name>`
4. Once the rule file has been validated:
   - Copy the new rule file on top of the respective existing rule file.
   - Reload rules files by running the reloadrules.cmd utility, as follows:
     `reloadrules.cmd <contex-id>`

For information about using Shell commands to manipulate Drools, refer to the *Cisco Active Network Abstraction Shell User's Guide*.

For more information about Drools, go to **www.drools.org**