



Sun Management Center 3.5 User's Guide

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Preface

The *Sun Management Center 3.5 User's Guide* provides instructions on how to use the Sun™ Management Center system management solution.

Who Should Use This Book

This book is intended for use by system administrators who have experience working with networks and understand networking terminology and technology.

Using UNIX Commands

This document does not contain information about basic UNIX® commands and procedures, such as shutting down the system, booting the system, or configuring devices.

See one or more of the following sources for this information:

- *Solaris Handbook for Sun Peripherals*
- Online documentation for the Solaris™ software environment (available from <http://docs.sun.com>)
- Other software documentation that you received with your system

How This Book Is Organized

This book contains the following information:

Chapter 1 provides an overview of the Sun Management Center 3.5 product and defines essential concepts.

Chapter 2 explains how to use administrative domains.

Chapter 3 describes how to create individual managed objects for the Sun Management Center topology database.

Chapter 4 explains how to automatically identify managed objects and add them to the topology database.

Chapter 5 introduces the Java™ user interface.

Chapter 6 describes the details window.

Chapter 7 explains how to view information about your managed network.

Chapter 8 describes how to monitor specific data properties.

Chapter 9 explains how to view information about data properties in a graphical format.

Chapter 10 describes how to monitor and change data property attributes.

Chapter 11 explains how to work with modules.

Chapter 12 describes how to create and respond to alarms.

Chapter 13 describes how to work with groups of managed objects rather than individual ones.

Chapter 14 describes how to work with dataviews.

Chapter 15 introduces the web-based user interface.

Chapter 16 describes how to create and respond to alarms using the web-based user interface.

Chapter 17 describes how to monitor data property attributes in the web-based user interface.

Chapter 18 explains how to setup and administer security for this product.

Chapter 19 explains how to import and export topology information.

Chapter 20 identifies the capabilities of the command-line interface.

Appendix A contains additional information and troubleshooting procedures that do not clearly fit elsewhere.

Appendix B explains how routing affects network management.

Appendix C describes information about standard modules.

Appendix D identifies standard alarm rules.

Glossary is a list of words and phrases found in this book and their definitions.

Product Information

Information about this product is available at the Sun Management Center web site at <http://www.sun.com/sunmanagementcenter/>.

The Sun Management Center 3.5 product includes open source software. To view license terms, attribution, and copyright statements for the open source software, see the copyright file located at the following default path:
`/cdrom0/image/Webserver/Solaris_9/SUNWtcatr/install/copyright.`

Accessing Sun Documentation Online

The docs.sun.comSM Web site enables you to access Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject. The URL is <http://docs.sun.com>.

Typographic Conventions

The following table describes the typographic changes used in this book.

TABLE P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> you have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	<code>machine_name%</code> su Password:
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	To delete a file, type rm <i>filename</i> .
<i>AaBbCc123</i>	Book titles, new words, or terms, or words to be emphasized.	Read Chapter 6 in <i>User's Guide</i> . These are called <i>class</i> options. You must be <i>root</i> to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P-2 Shell Prompts

Shell	Prompt
C shell prompt	<code>machine_name%</code>
C shell superuser prompt	<code>machine_name#</code>
Bourne shell and Korn shell prompt	<code>\$</code>
Bourne shell and Korn shell superuser prompt	<code>#</code>

Introduction to Sun Management Center

This chapter provides an overview of the Sun™ Management Center 3.5 product, its component layers, and the relationships among the layers.

This chapter includes the following topics:

- “Sun Management Center Overview” on page 27
- “Important Changes in Sun Management Center 3.5 Software” on page 28
- “Sun Management Center Architecture” on page 29
- “Sun Management Center Concepts” on page 33
- “Sun Management Center Management and Monitoring Features” on page 36
- “Sun Management Center Software Environments” on page 40
- “Installing Sun Management Center Software” on page 41
- “Getting Started with Sun Management Center Software” on page 41
- “Additional Information” on page 42

Sun Management Center Overview

Sun Management Center software is an open, extensible system monitoring and management solution. This solution uses Simple Network Management Protocol (SNMP), the Java Remote Management Interface (RMI), and the Hypertext Transfer Protocol (HTTP). These tools enable Sun Management Center to provide integrated, comprehensive enterprise-wide management of Sun products and their subsystems, components, and peripheral devices.

Sun Management Center technology provides a solution to extend and enhance the management capability of Sun’s hardware and software solutions. This technology can be grouped into the following functional areas.

System Management

Monitors and manages the system at the hardware and operating system levels. Monitored hardware includes boards, tapes, power supplies, and disks.

Operating System Management

Monitors and manages operating system parameters that include load, resource usage, disk space, and network statistics.

Application and Business System Management

Provides enabling technology to monitor business applications such as trading systems, accounting systems, inventory systems, and control systems.

Scalability

Provides an open, scalable, and flexible solution to configure and manage multiple management administrative domains. These domains consist of many systems and span across an enterprise. Administrators can configure the software in a centralized or distributed fashion so that the product supports multiple users.

Important Changes in Sun Management Center 3.5 Software

Version 3.5 of the Sun Management Center product includes the following significant changes:

- You can install Sun Management Center software and add-on products through a graphical user interface (GUI). For information about installing the software, see “Sun Management Center 3.5 Installation and Setup” in *Sun Management Center 3.5 Installation and Configuration Guide*.
- You can set up Sun Management Center software either as part of the GUI-based installation process or through a separate GUI. For information about setting up the software, see “Sun Management Center 3.5 Installation and Setup” in *Sun Management Center 3.5 Installation and Configuration Guide*.
- You can install and upgrade multiple agents through a standard mechanism. See “Creating Agent-Update Images” in *Sun Management Center 3.5 Installation and Configuration Guide* for more details.
- You can run the server and agent software on a machine that has multiple IP addresses. For more information, see “Configuring Server and Agent on Multi-IP Machines” in *Sun Management Center 3.5 Installation and Configuration Guide*.
- Security enhancements include support for firewalls and NAT configurations. For more information, see *Sun Management Center 3.5 Installation and Configuration Guide*.
- The group operations feature has been replaced with the Manage Jobs feature. For information about this feature, see Chapter 13.
- The Premier Management Applications (PMA) product has been integrated into the base product. Functionality for managing jobs, importing and exporting topology, and dataviews is now included in the base product.

- Many bugs have been fixed in this release.

Sun Management Center Architecture

Sun Management Center software includes three component layers: console, server, and agent. The product is based on the manager and agent architecture:

- The console layer provides the user interface that you use to initiate management tasks. This layer includes a Java console, a web console, and a command-line interface (CLI).
- The server (manager) executes management applications and sends requests to agents to perform management tasks on your behalf.
- The agents that execute on the managed nodes access the management information, monitor local resources, and respond to manager requests.

The following figure illustrates the three component layers.

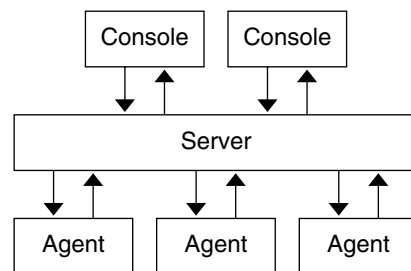


FIGURE 1-1 Sun Management Center Component Layers

The major Sun Management Center layers and their functions are described next.

Console Layer

The Sun Management Center console layer is the interface between you and the other component layers of Sun Management Center software. This layer includes a Java console, a web console, and a CLI. You can have multiple consoles, serving multiple users, for the same Sun Management Center server. The consoles provide these features:

- Visual representations of the managed objects, for example, hosts and networks
- The ability to manipulate attributes and properties that are associated with the managed objects, for example, create alarm thresholds

- The ability to initiate management tasks, for example, dynamic reconfiguration

Server Layer

The server layer accepts requests through the console and passes these requests to the appropriate agent. The server then relays the response from the agent back to the console.

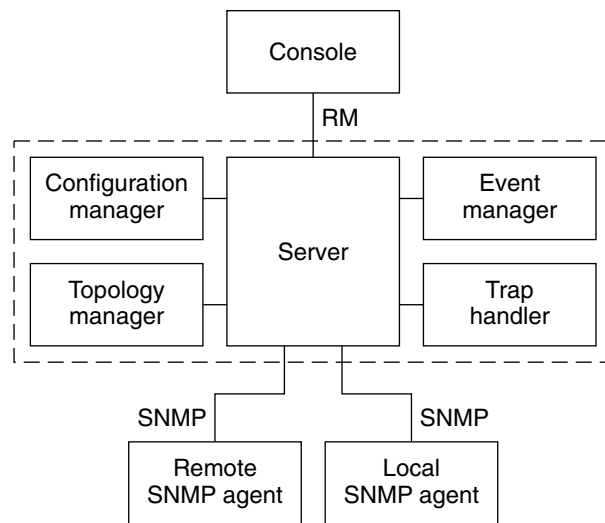
For example, if you request information on the number of users that are accessing a host, the server layer receives this request from the console. The server layer then sends the request to the agent on that host. The agent finds the answer and sends the answer back to the server, which forwards the information to the console.

Similarly, if an error condition is created on one of the hosts, the agent on that host notifies the server. The server forwards the information to the console as an alarm.

In addition, the server layer provides the console with a secure entry point to interface with the agents.

The server layer includes the following components, as illustrated in Figure 1–2:

- Sun Management Center server
- Sun Management Center web server
- Topology manager
- Trap handler
- Configuration manager
- Event manager



☐ Sun Management Center server layer.

FIGURE 1-2 Sun Management Center Server Layer

The *server component* is the core of the server layer. The server component consists of two servers: a Java server and a web server. Both the Java server and the web server are multi-threaded. These servers can handle multiple data requests from various Sun Management Center users.

The *topology manager* provides services that include managing user administrative domains and arranging managed object topology.

The *trap handler* is a centralized SNMP trap receptor that logs and forwards traps to interested components. This server layer component is responsible for receiving all alarm notifications.

The *configuration manager* provides security services to the server and the agents.

The *event manager* receives event information from the agents. These events can trigger alarms, which are forwarded to the console.

Agent Layer

The agent layer monitors, gathers information about, and manages objects on the nodes that the Sun Management Center software manages. The server layer uses SNMP to interact with the agent layer to gain access to the managed objects.

Sun Management Center agents are scalable, extensible, and SNMP-based. The agents monitor and manage objects by loading modules that focus on a specific aspect of the system, as well as application health and performance. These objects represent hardware, operating systems, and applications.

The agents use rules to determine the status of the managed objects. When the conditions that a rule specifies become true, the software automatically generates alarms and performs actions as the rule specifies.

Server Context

The server layer and agent layers together are referred to as a Sun Management Center *server context*. When you start the console, you log in to a particular server context. The managed objects whose agents send information to that server belong to the same server context.

A managed object can belong to the same server context or to a *remote server context*. A managed object in a remote server context sends information to a different server. A managed object in the same server context sends information to the server host that is connected to your console.

By default, the Sun Management Center software *manages* an object in the same server context but only *monitors* an object in a remote server context. For more precise definitions of “manage” and “monitor,” see Glossary. For more information on server contexts and security, see “Sun Management Center Remote Server Access” on page 257.

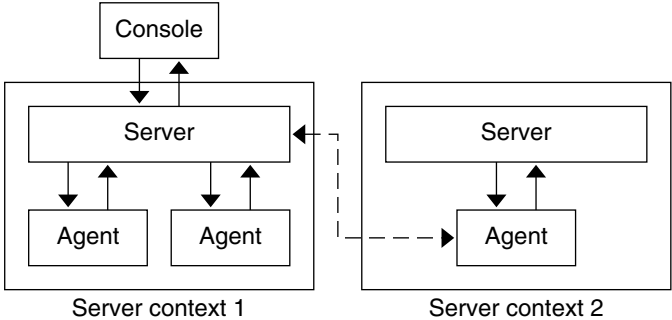


FIGURE 1-3 Console Logs Into a Server Context

Sun Management Center Concepts

The following concepts are fundamental to understanding Sun Management Center software:

- Administrative domains
- Management information base (MIB)
- Modules
- Alarms and rules

Note – In this document, “domain” refers to a Sun Management Center administrative domain. This term should not be confused with uses of the term “domain” related to other Sun products or documentation. See Chapter 2 for more information.

Administrative Domains

An *administrative domain* is a hierarchical collection of resources that you want to monitor and manage. The resources can include a complete campus, individual buildings, hosts, networks, subnets, links, and so on. Each administrative domain consists of these resources, which can be combined with other resources to form groups within a administrative domain. Each of these groups can contain additional groups of resources, providing a multilevel, hierarchical administrative domain.

You can create one or more administrative domains that are based on your business needs. For example, you might create a lab administrative domain that contains all the lab machines. Similarly, you might create an accounting administrative domain that contains all the machines that are used for accounting.

The Sun Management Center software displays the administrative domain and its members in a visual representation. Figure 1–4 shows an example.

In the following example, the host, `Payroll2`, belongs to the `Building B` group, which belongs to the `Payroll Servers 1` administrative domain.

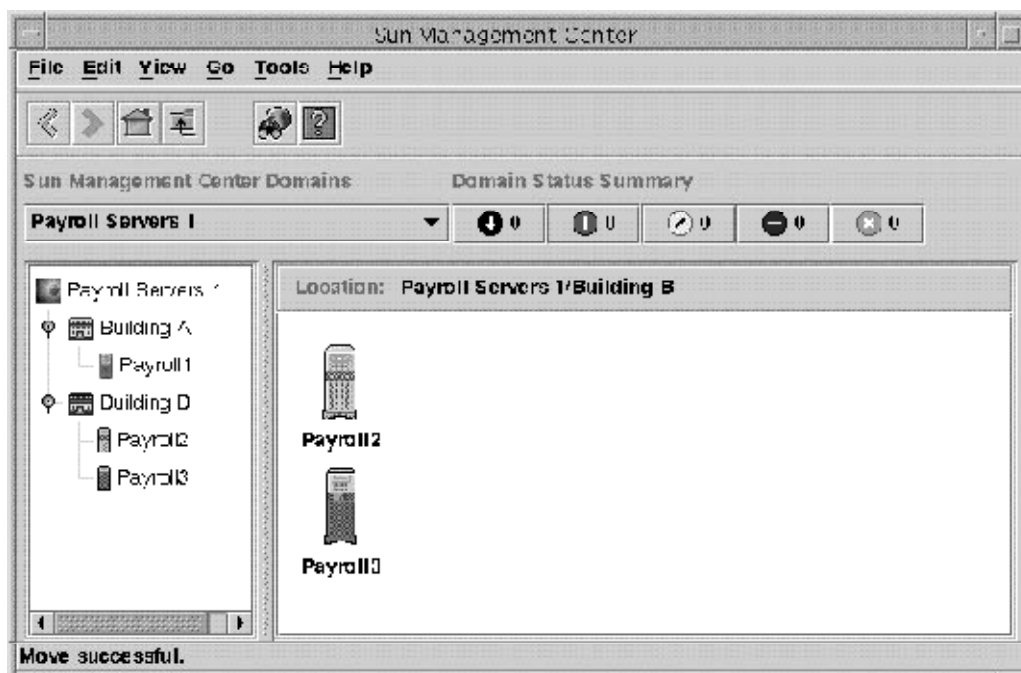


FIGURE 1-4 Java Console Window Showing an Administrative Domain and Its Members

Management Information Base (MIB)

A management information base (MIB) is a hierarchical database schema that describes the data that are available from an agent. Sun Management Center agents use the MIB to store monitored data that can be accessed remotely.

Sun Management Center Modules

Unlike most agents, the Sun Management Center agents do not implement the MIB in a monolithic code that contains a wide variety of functions in a single program. Instead, Sun Management Center software uses several components, that are called *modules*, for each agent. Each module implements its own MIB. Therefore, the Sun Management Center agent MIB is the cumulative total of all the modules and their individual MIBs, as illustrated in the following figure.

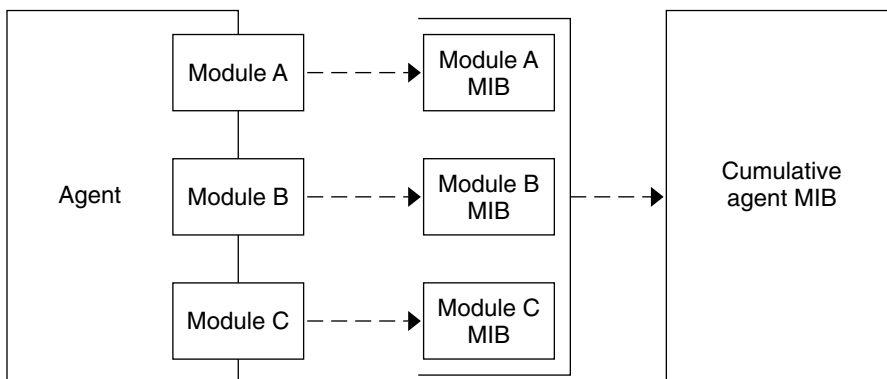


FIGURE 1-5 Sun Management Center Agent MIB

Sun Management Center modules monitor and manage the resources of systems, applications, and network devices. The modules enable you to isolate and monitor specific system components. For example, separate modules are available for monitoring the kernel, for monitoring printers, and for monitoring processes. The modules are primarily used to monitor and to notify you through alarms when error conditions occur or when performance tuning is required. For more information on alarms, see “Alarms and Rules” on page 35.

Each module consists of one or more properties that you can monitor. For example, one of the default modules that is loaded during installation is the Kernel Reader. This module monitors the kernel properties. These properties include user statistics, disk statistics, file system usage, and so on.

Note – You can add or remove modules dynamically. This feature enables you to customize the modules that are loaded on each agent (object), based on your need.

Alarms and Rules

An *alarm* is a notification of an abnormal event. Sun Management Center software enables you to monitor your system using alarms that have differing severities. The thresholds that generate these alarms are defined in the modules. The software enables you to set the thresholds that trigger simple alarms.

For example, one of the properties of the Kernel Reader module is the number of user sessions. The software enables you to set a threshold number of user sessions that, when exceeded, generates an alarm. For example, you might tell Sun Management Center software to generate a critical alarm when there are seven or more user sessions. Similarly, you might tell the software to generate a cautionary alarm when there are five or six user sessions.

The software is configured with default alarm conditions. You can set and define your own alarm thresholds for simple alarms, such as those alarms that are based on the simple `rCompare` (comparison) rule.

Complex rules also generate alarms. For example, one complex rule generates an alert alarm when a disk is more than 75 percent busy, the average queue length is over 10 entries, and the wait queue is increasing. This rule combines three conditions:

- Percentage of the disk that is busy
- Average queue length
- Wait queue

Unlike simple rules, these complex rules are predefined. You cannot modify complex rules. Consequently, you cannot set thresholds for complex alarms.

When an alarm is generated, the software notifies you through the main console window, and through an alarm action. The alarm action can include a message sent to a specified email address or activation of a script. You can also write a customized program that notifies you in other ways that an alarm condition has occurred.

For more information on alarms, see Chapter 12. For more information on rules, see Appendix D.

Sun Management Center Management and Monitoring Features

Sun Management Center software includes the following management and monitoring features:

- “Autonomous Agents” on page 37
- “User Security” on page 37
- “Discovery Feature” on page 37
- “Main Console Window” on page 38
- “Hierarchy and Topology Views” on page 38
- “Topology Import and Export Features” on page 39
- “Graph Feature” on page 39
- “Dataviews Feature” on page 39
- “Manage Jobs Feature” on page 40
- “Module Configuration Propagation (MCP) Feature” on page 40

General Support Features

The features that are described in this section provide support for managing and monitoring your environment.

Autonomous Agents

Sun Management Center agents work autonomously by actively sampling key data on host systems. These agents can be polled through SNMP `get` requests for the current status of the monitored data.

When an agent gathers data for a monitored resource, the agent checks the data against the alarm threshold set for the resource. The agent then determines whether the data values constitute an alarm condition. If the monitored data meets the alarm threshold, the agent performs the action that is associated with the alarm condition. Agents send asynchronous messages (SNMP traps) to the server, which delivers notification of the change in the status of the monitored data.

User Security

The Sun Management Center security feature authenticates user login and access control privileges for users and groups. The software enables users to set security permissions at the administrative domain, group, host, and module levels.

You can restrict access by setting different permissions. For example, you might determine that one group of users can view and modify properties on a host, while another group of users can only see the host. For more general information about Sun Management Center security, see Chapter 18.

You can access Sun Management Center security features from the Attribute Editor within the console or from the CLI. For more information about the Attribute Editor, see Chapter 10. For more information about the CLI, see Chapter 20.

Specific Management and Monitoring Features

The features that are described in this section provide specific monitoring and management functionality. These features can be accessed through the consoles. Some of these features can also be accessed through the CLI.

Discovery Feature

The Sun Management Center includes a discovery feature. This feature enables you to find automatically network resources for Sun Management Center to monitor and manager. The discovery feature allows to specify discovery criteria based on several values such as IP range, host name, loaded modules, operating system, hardware type, or some combination of these values. For more information, see Chapter 4.

Main Console Window

Sun Management Center software provides Java and web interfaces that enable you to view, monitor, and interact with the software. You can monitor multiple administrative domains, spanning different locations, through multiple console windows. For more information about the Java console, see Chapter 5. For information about the web console, see Chapter 15.

Note – The web console provides a subset of the functions that are available in the Java console. Most of this document describes the functions that are available in the Java console. Information that is specific to the web console is expressly identified.

Hierarchy and Topology Views

Sun Management Center software offers the following views:

- Hierarchy and topology views for every administrative domain
- Hierarchy and contents views for every object

The hierarchy view enables you to navigate through the administrative domain or host to find the object of interest. The topology view or contents view displays the members of the object that is selected in the hierarchy.

For an administrative domain, the hierarchy and topology views are displayed in the main console window. In addition, you can customize the administrative domain topology view by adding a background or creating a connection between objects in the administrative domain.

For an object, the hierarchy and contents views are displayed in the Details window. The Details window consists of a series of tabs. The available tabs depend on the type of object that is selected. For example, the following tabs would be displayed for a typical host object:

- Info
- Module Browser
- Alarms
- View Logs
- Applications
- Hardware

The View Logs, Applications, and Hardware tabs are described briefly in the sections that follow. For more information about the Details window, see Chapter 6.

View Logs Tab Overview

The View Logs tab enables you to view informational messages, including error messages, about your host.

Applications Tab Overview

The Applications tab enables you to view and select detailed information about processes running on the selected host or node. If you have any custom or third-party applications installed, this tab also enables you to view detailed information about processes running in the selected applications. The displays are continually updated.

Hardware Tab Overview

The physical view from the hardware tab provides you with photo-realistic front, back, and side views of the host. You can click individual components of the host to see detailed information about that component. For example, you can click a board in a server to see detailed information about that board, such as CPUs, memory, and board temperature.

Note – Physical views are available only for some hardware platforms.

Sun Management Center software also provides a logical view of the overall hardware configuration of the host. Similar to the physical view, you can click a single component to obtain detailed information about that hardware component.

Note – Logical views are available only for some hardware platforms.

Topology Import and Export Features

The topology import and export features enable you to import and export the topology database from or to an ASCII file that uses XML markup. These features provide a convenient way to migrate management domains from one Sun Management Center server to another server or to backup information for a server. For more information, see Chapter 19.

Graph Feature

Sun Management Center software enables you to create a two-dimensional graph of any monitored data property that has a numerical value. For more information, see Chapter 9.

Dataviews Feature

The Attribute Editor window is used to browse management properties from a single agent by selecting an individual management object type. Sun Management Center also provides a dataviews feature that enables you to create a customized view or

dashboard. In this customized view, you can put together a screen that shows individual properties that belong to different Sun Management Center modules that are loaded on separate Sun Management Center hosts. For more information, see Chapter 14.

Manage Jobs Feature

The Manage Jobs window enables you to create persistent jobs for topology objects. This feature provides a way to manage a collection of agents (or group) with the same ease as a single agent. Use the Manage Jobs window to define the objects to include, the specific tasks to run, and a schedule on which to run the job. For more information, see Chapter 13.

Module Configuration Propagation (MCP) Feature

MCP support enables you to make a persistent snapshot of an individual agent configuration. When you combine MCP support with the Manage Jobs feature, you can easily distribute agent configuration to multiple agents. For more information, see “To Create a Configuration Task” on page 208.

Sun Management Center Software Environments

You can deploy Sun Management Center software in two different environments:

- Production environment
- Developer environment

The *production* environment is an active environment in which you manage and monitor your hardware, including subsystems, components, and peripheral devices.

In contrast, the *developer* environment is a test, or demonstration, environment that developers can use to develop and test modules to work with the Sun Management Center software. While the developer environment might appear to be a production environment, its sole purpose is to be an environment in which developers create Sun Management Center modules. For more information on developer environments, refer to the *Sun Management Center 3.5 Developer Environment Reference Manual*.

Installing Sun Management Center Software

For information on installing Sun Management Center 3.5, see the *Sun Management Center 3.5 Installation and Configuration Guide*.

After you install Sun Management Center software, spend some time moving among the various windows and testing their functions. Once you explore and test the software, you will have a better understanding of how you can customize Sun Management Center software to aid in your system monitoring.

Getting Started with Sun Management Center Software

This section describes a suggested approach to setting up and using the Sun Management Center software. This process includes a summary of some typical tasks and the order in which you should do them. Each task is referenced to a section in the manual, which provides detailed, step-by-step directions. Your actual steps will vary according to your business needs.

The task sequence presumes that you explore and learn the software before you set up your actual monitoring environment.

1. Install Sun Management Center software. See *Sun Management Center 3.5 Installation and Configuration Guide* for more information about installing and configuring the software.
2. Identify users and privileges for using the Sun Management Center software, as described in “Using Access Control” on page 259. For general information about security, see Chapter 18.
3. Start the Sun Management Center console. The console provides a graphical interface to managing and monitoring your network. To start the Java console from a terminal window, type the following command: `/opt/SUNWsymon/sbin/es-start -c`. For more information, see Chapter 5. To access the Web console, type the appropriate URL in your Web browser. For more information, see Chapter 15.
4. Define a collection of network objects for the software to manage and monitor, as explained in “To Create Administrative Domains” on page 49.
5. Add servers, routers, and other network objects to the administrative domain in the Sun Management Center database. For information about creating objects manually to populate the domain, see Chapter 3. For information about using the

- Discovery Manager to populate the domain, see Chapter 4.
6. Familiarize yourself with the console window and navigate through the hierarchy and topology views as explained in Chapter 5 or Chapter 15.
 7. View detailed information about a managed object, as explained in Chapter 6 and Chapter 7. More information about viewing specific data properties is explained further in Chapter 8, Chapter 9, and Chapter 10.
 8. Customize the monitoring capabilities of the software by adding or removing module functions, as described in Chapter 11. For information about the modules that are available within the product, see Appendix C.
 9. Define conditions that should generate an alarm and specify actions to occur when the condition is met, as described in Chapter 12. For information about the predefined rules that relate to alarms, see Appendix D.
 10. Create management and monitoring functions that relate to a user-defined group of objects, as explained in Chapter 13.

Note – For additional information specific to your hardware, see your supplement.

Additional Information

This documentation includes a description of basic and advanced features that are available in the Sun Management Center 3.5 product. The features that are available in your environment may include additional software modules or specific hardware information.

Related Hardware Information

Sun Management Center supports multiple hardware platforms. Refer to the *Sun Management Center 3.5 Installation and Configuration Guide* for more information on the supported hardware platforms.

This book (*Sun Management Center 3.5 User's Guide*) describes the software capability that is common to all the supported hardware platforms. Platform-specific information is included in the platform-specific supplements. For example, *Sun Management Center Supplement for Sun Enterprise Midrange Servers* describes Sun Management Center functions that are specific to the following platforms:

- SPARCserver[®] 1000 and 1000E
- SPARCcenter[®] 2000 and 2000E
- Sun Enterprise[™] 6x00/5x00/4x00/3x00

This supplement is located on the Sun Management Center 3.5 CD and on the Sun Management Center web site at <http://www.sun.com/sunmanagementcenter/>.

Note – For complete information on how you can use the Sun Management Center software to manage and monitor your machines, read *both* this guide and the appropriate hardware supplements.

Add-on Products

Your Sun Management Center environment might be enhanced by the several products. See the related documentation for more information.

- *Sun Management Center 3.5 Performance Reporting Manager User's Guide*
- *Sun Management Center 3.5 Service Availability Manager User's Guide*
- *Sun Management Center 3.5 System Reliability Manager User's Guide*
- Hardware-specific documentation or platform supplements

Release Notes

For additional documentation that describes new capabilities, refer to the *Sun Management Center 3.5 Software Release Notes*, which you can find at any of the following locations:

- Sun Management Center 3.5 product CD
- docs.sun.com web site
- Sun Management Center web site at <http://www.sun.com/sunmanagementcenter/>

Using Sun Management Center Administrative Domains

A Sun Management Center administrative domain is an arbitrary collection of resources that can include a complete site, individual buildings, hosts, networks, subnets, links, and so on. The organization of an administrative domain collection is in a hierarchy.

Note – In this document, *administrative domain* refers to a Sun Management Center administrative domain. This term should not be confused with other uses of the term domain related to other Sun products or documentation.

This chapter describes the following topics:

- “Administrative Domains Concepts” on page 46
- “To Start Sun Management Center” on page 47
- “To Set the Home Administrative Domain” on page 48
- “To Create Administrative Domains” on page 49
- “Populating Administrative Domains” on page 50
- “To View Information About an Administrative Domain ” on page 50
- “To Set Security for an Administrative Domain” on page 51
- “To Delete an Administrative Domain” on page 53
- “Monitoring Remote Administrative Domains” on page 53
- “To View Information From a Remote Administrative Domain” on page 55

Administrative Domains Concepts

Sun Management Center software can monitor a multitude of hosts. To enable you to perform your monitoring tasks in an efficient manner, Sun Management Center software organizes hosts into groups. The largest, highest-level grouping is an administrative domain. An administrative domain is an arbitrary grouping of hosts, subnets, networks, buildings, and so on.

You can create one or more administrative domains, and provide a unique name for each domain. Each administrative domain consists of one or more members that are arranged in a hierarchy. For example, you might decide that an administrative domain consists of all the hosts in one building. Or, you might decide that an administrative domain consists of all the hosts in a campus.

Tip – Spend some time planning how you want to organize your hosts into different administrative domains.

Decide whether you need additional groups below the administrative domain to organize your hosts. For example, if there are several hundred hosts, placing your hosts individually in one administrative domain is impractical.

You might decide to break the administrative domain into a set of smaller groups, for example, campuses. The Headquarters administrative domain might consist of several campus locations. Each of these campus locations might be broken into smaller groups, for example, buildings. Similarly, each building might be broken into smaller groups, such as networks, subnets, and groups. Finally, each group contains individual hosts.

In this particular example, the hierarchical order, from highest level to lowest level, is as follows:

1. Administrative domain
2. Campus
3. Building
4. Network
5. Subnet
6. Group
7. Individual host

For detailed information on creating administrative domains, see “To Create Administrative Domains” on page 49.

The home domain is the administrative domain that is displayed when you log into a specific server.

Starting Sun Management Center Software

The Sun Management Center server software automatically starts upon completion of installation and when the server system reboots. You use a console to access the server.

▼ To Start Sun Management Center

1. **To start the Sun Management Center console, type the following command:**

```
% installed-root-directory/sbin/es-start -c
```

where the default installed root directory is `/opt/SUNWsymon`.

The login screen appears.

Note – You can also access some Sun Management Center features from a web browser. For more information, see Chapter 15.

2. **Type a valid user name, password, and server host name in the appropriate fields.**

The user account must be listed in the `/var/opt/SUNWsymon/cfg/esusers` file on the Sun Management Center server.

Tip – To change the server port number or the communications security level for this console session, click Options.

3. **Press the Return key, or click the Login button.**

The Set Home Domain window appears if you have not previously logged in to this server or if you have not set a home domain. The home domain is the administrative domain that is displayed when you log in to a specific server. This dialog box appears each time you start the console until you set a home domain.

During installation, a default administrative domain that is named Default Domain is created for you. The Default Domain initially consists of one object, your server host. To use the default administrative domain, select Default Domain and click the Go To button. For information about setting the home domain, see “To Set the Home Administrative Domain” on page 48.

At this time, you may want to populate your administrative domain or perform other tasks.

- To create objects in your administrative domain, see “Populating Administrative Domains” on page 50.
- To explore the main console window, see Chapter 5.
- To explore monitoring features, see Chapter 8.
- To create additional administrative domains, see “To Create Administrative Domains” on page 49.

▼ To Set the Home Administrative Domain

1. **To access the Set Home Domain window, choose Set Home Domain from the File menu in the main console window.**

Tip – The Set Home Domain window appears automatically if you have not previously logged in to this server or if you have not set a home domain.

2. **In the Set Home Domain window, select the name of the administrative domain that you want to set as your home domain.**

The selected administrative domain is highlighted.

3. **Click the Set Home button.**

You see the following message at the bottom of the Set Home Domain dialog box.

```
Setting Home Domain...Please wait
```

When the home domain has been set, the message changes.

```
Home domain successfully set.
```

Your default administrative domain is set as your home domain. Information about the home domain appears in the main console window. For more information, see “Administrative Domains Concepts” on page 46.

Tip – Click the Go To button to use an administrative domain without setting the domain as the home domain. The selected administrative domain appears in the main console window. In this case, your home domain is not set, and the Set Home Domain window appears the next time that you start the console.

4. **Click the Close button.**

The selected home domain appears in the main console window.

Creating Administrative Domains

Use the Domain Manager window to create Sun Management Center administrative domains.

▼ To Create Administrative Domains

1. **Choose Domain Manager from the File menu in the main console window.**

The Domain Manager appears.

2. **In the Domain Manager, click the Add button.**

The Create Domain dialog box appears, as shown in the following figure.

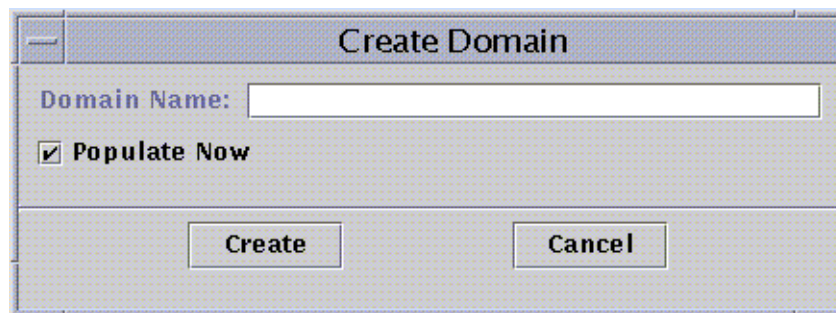


FIGURE 2-1 Create Domain Dialog Box

3. **Type the name of the new administrative domain in the Domain Name field.**
4. **If you do not want your administrative domain to be populated now, deselect the Populate Now check box.**

The default choice is for Sun Management Center software to display a dialog box that enables you to start the Discovery Manager immediately after creating an administrative domain. For more information about the Discovery Manager, see Chapter 4.

5. **To create the new administrative domain, click the Create button.**

To close the window without creating the administrative domain, click the Cancel button.

If you do not have the proper security permissions to create an administrative domain, an error message is displayed. See Chapter 18 for more information on security.

Populating Administrative Domains

Once you have created your administrative domains, you can begin to populate these administrative domains and their subordinate groups.

Note – To populate an administrative domain, you must have `esdomadm` privileges. See “Sun Management Center Groups” on page 252 for more information.

To add hosts and other resources to an administrative domain collection, use one of these methods:

- **Populate with the Discovery Manager**
The Discovery Manager is the default method for populating a newly created administrative domain. Discovery Manager searches the network for resources. The search can be time-consuming, but you can shorten the search by setting limits. See Chapter 4 for more information.
- **Populate with the Discovery Manager at scheduled intervals by using the Scheduling feature**
The scheduling feature enables you to search periodically for new managed objects on the network. You can set the search to occur hourly, daily, weekly, or monthly. See “Making and Modifying Discover Requests” on page 75 for more information.
- **Manually populate with the Create an Object menu option**
To add objects individually, use the Create an Object option. This option is useful for adding a small number of known resources. For example, if you have installed a new host, you can use Create an Object to add the host to the local administrative domain immediately. See Chapter 3 for more information.

Managing Administrative Domains

Once you have created Sun Management Center administrative domains, you can manage those domains.

▼ To View Information About an Administrative Domain

You can list administrative domains through the Domain Manager window or the Sun Management Center main console window.

1. Access the Domain Manager from the main console window in one of the following ways:

- Choose Domain Manager from the File menu.
- Click the Sun Management Center Administrative Domains pull-down menu.

The current list of administrative domains is displayed.

2. Select the administrative domain that you want to view.

The main console window displays the selected administrative domain. The Sun Management Center Administrative Domains button changes to display the name of the administrative domain that you selected.

▼ To Set Security for an Administrative Domain

The administrative domain Attribute Editor provides additional information about the selected administrative domain and about the rules that govern its behavior. Use the Attribute Editor to edit security information for the administrative domain.

Note – Each Attribute Editor displays one or more tab buttons depending on the type of selected object.

1. Access the Attribute Editor in either of the following ways:

- From the hierarchy view in the main console window, press mouse button three on the administrative domain icon. Then, choose Attribute Editor from the pop-up menu.
- From the main console window, choose Domain Manager from the File menu. Then, choose an administrative domain and click the Security button.

2. If not already selected, click the Security tab in the Attribute Editor window.

The security information appears in the Attribute Editor window, as illustrated in the following figure.



FIGURE 2-2 Attribute Editor for an Administrative Domain

3. Type the names of user and administrator groups in the appropriate fields.
See Chapter 18 for more information about users and groups.
4. To accept your changes and close the Attribute Editor window, click the OK button.

▼ To Delete an Administrative Domain



Caution – When you delete an administrative domain, you also delete all the members of that administrative domain.

1. **In the Domain Manager window, select the name of the administrative domain that you want to delete.**

Note – To delete an administrative domain, you must have the appropriate security permission. For more information on Sun Management Center security, see Chapter 18.

2. **Click the Delete button.**

The Confirm Domain Deletion dialog box is displayed.

There are two versions of the Domain Deletion dialog box. One version is for any administrative domain. The other version is for the administrative domain that you are currently viewing.

3. **To verify that you want to delete the selected administrative domain, click the Delete button.**

The Confirm Domain Deletion dialog box displays the following message.

Deleting domain...Please wait.

When the administrative domain has been successfully deleted, the dialog box is removed and the Domain Manager updates the list of administrative domains.

4. **To close the Domain Manager window, click the Close button.**

Monitoring Remote Administrative Domains

Remote administrative domains are Sun Management Center administrative domains that are created in a different Sun Management Center server context. See “Server Context” on page 32 for a description of server context.

If you are interested in an object in a different server context, you can still *monitor* the remote resource. To monitor the remote resource, reference the remote administrative domain in your local administrative domain. To *manage* the remote resource, log out of

your current Sun Management Center server context and log into the remote server context. You can manage monitored properties on a resource *only* if the agent is managed by the server to which your console is connected. By default, Sun Management Center security gives you “read-only” privileges for remote administrative domains. For more information on security, see Chapter 18.

Note – You can reference a remote administrative domain to *monitor* resources in that administrative domain. You *cannot* manage monitored properties on a remote resource.

For example, your current Sun Management Center server context may be based in the Headquarters administrative domain. A second, remote Sun Management Center server context may be based in Regional Office 1. When workers are absent from Regional Office 1, you can monitor the regional office administrative domains from Headquarters by referencing these remote administrative domains in the Headquarters server context. If an emergency occurs, administrators in Headquarters can notify a Regional Office 1 administrator immediately.

Note – Remote administrative domains enable you to monitor critical resources continuously.

Figure 2–3 illustrates how remote monitoring works. Administrative Domain A monitors objects 1 and 2, which are assigned to Domain A. Administrative Domain A remotely monitors objects 3 and 4, which are assigned to Domain B. Note that administrative Domain A cannot monitor objects 3 or 4 without going through remote administrative Domain B.

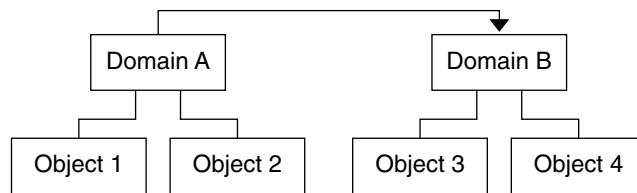


FIGURE 2–3 Remote Administrative Domain

Do not create an administrative domain that refers to itself. For example, do not create an administrative domain A that references another administrative domain B which in turn, contains a reference to administrative domain A.

If two administrative domains must monitor each other, avoid creating a circular domain reference. Instead, create a domain member, for example a group, under Domains A and B as shown in the following figure.

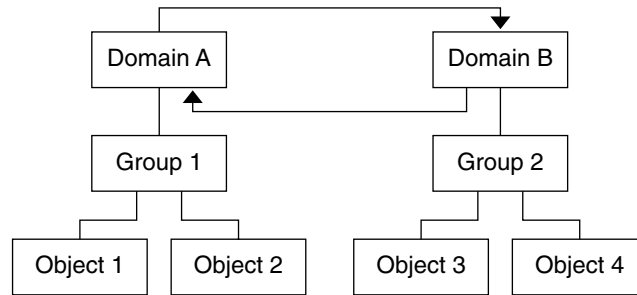


FIGURE 2-4 Setting Up Successful Cross-Monitoring for Remote Administrative Domains

Now when making a remote reference, Domain A can reference Group 2 under Domain B, while Domain B can reference Group 1 under Domain A.

▼ To View Information From a Remote Administrative Domain

1. **In the main console window, choose Remote Domain Manager from the File menu.**
The Remote Domain Manager dialog box is displayed.
2. **Type the name of the remote server in the Host field.**
3. **If applicable, type the port number for the remote Topology manager in the Port field**
By default, the Topology manager is installed on the server on port 164.
4. **Click the List Domains button.**
A list of administrative domains on the remote server is displayed.
5. **Select the administrative domain that you want to reference.**
The selected administrative domain is highlighted.
6. **Click the Reference button.**
The selected administrative domain is created as a reference administrative domain in the currently selected administrative domain in the main console window.

Manually Adding Objects to the Topology Database

This chapter describes how to manually create objects that are added to the Sun Management Center topology database. For information about using the Discovery Manager to automatically populate the topology database, see Chapter 4.

This chapter discusses the following topics:

- “Managed Objects Concepts” on page 57
- “To Create a Node ” on page 60
- “To Create a Module Object” on page 62
- “To Create a Group” on page 63
- “To Create a Composite Object” on page 64
- “To Create a Segment” on page 65
- “To Connect Objects in the Topology View” on page 66
- “To Copy an Object” on page 67
- “To Copy a Group of Objects” on page 68
- “To Modify an Object” on page 68
- “To Cut and Paste Objects” on page 70
- “To Delete Objects” on page 71

Managed Objects Concepts

Sun Management Center objects represent parts, or *nodes*, of a network. These objects include hardware and software components such as hosts (workstations and servers), printers, routers, modules, and so on. Even a segment of the network itself can be an object.

Note – For additional information, refer to your hardware supplement. The supplement contains important hardware-specific information about creating an object.

To monitor or manage an object, you create a node in the topology database to represent the object in an administrative domain or group. If the group does not yet exist, you must first create the group.

You can create one or more administrative domains that contain nodes for multiple objects, such as the workstations and other devices that are connected to the server. Once these administrative domains exist, you can monitor or manage them. For information about administrative domains, see Chapter 2.

Managed Object Categories

Sun Management Center supports the following object categories:

- **Node** – A node object generally refers to a hardware component, such as a workstation or server, printer, or router. See “To Create a Node ” on page 60.
- **Composite** – A composite object refers to a collection of related objects that you want to monitor as a single entity. A composite object can also be a *service object*. A service object is a specific type of composite object that enables you to monitor services. An example of a composite object could refer to a hardware system on which multiple instances of the Solaris operating environment are running. See “To Create a Composite Object” on page 64.
- **Group** – A group object refers to a collection of objects that fall into one of two categories: General or IP-based. General groups are based on geography, such as a building, whereas IP-based groups are based on networks or subnets. See “To Create a Group” on page 63.
- **Segment** – A segment object refers to portions of the network that link together the nodes or groups. See “To Create a Segment” on page 65.
- **Module** – A module object refers to a collection of modules for the purpose of enabling a common monitoring method. See “To Create a Module Object” on page 62.

Agents and Monitors

When you create a node, you can choose from the following types of monitoring approaches.

Sun Management Center Agent – Host

Monitor and manage a host that has an active agent that is installed and running. The status of the agent on the host can be monitored. The Details window of the

Sun Management Center agent host contains tabs such as Info, Browser, Alarms, and so forth. The Entity Polling Type in the Info tab is `ahost`.

Sun Management Center Agent – Platform

For more information, see your platform supplement.

Sun Management Center Agent - Module

Monitor and manage a module that has an active Sun Management Center agent that is installed and running. The status of the Sun Management Center module on the agent host can be monitored. The Details window contains Info, Module Browser, and Alarms tabs. The Entity Polling Type in the Info tab is `amod`.

SNMP Proxy

Monitor and manage the device through a Sun Management Center agent that is running a Sun Management Center proxy module for that device. (The proxy module must have been previously loaded into the agent. See “To Load a Module” on page 164.) Communication between the Sun Management Center Topology manager and the agent is SNMPv2 `usec`. Communication between the Sun Management Center agent and the remote device is SNMPv1 or SNMPv2, depending on the proxy module. The Proxy Monitoring module data are displayed. The Details window contains the Info and Browser tabs. The Entity Polling Type in the Info tab is `aprox`.

SNMP Ping

Monitor the device by using the SNMP `ping` command. The Sun Management Center Topology manager communicates with the device using SNMPv1. No management capabilities are provided for devices that are monitored by the SNMP `ping` command. The availability of the SNMP agent on the device can be monitored. The Details window contains only the Info tab. The Entity Polling Type in the Info tab is `snmp`.

ICMP Ping

Monitor the device by using the Internet Control Message Protocol (ICMP) `ping` command. No management capabilities are provided for devices that are monitored by the ICMP `ping` command. The accessibility of the device can be monitored. The Details window contains only the Info tab. The Entity Polling Type in the Info tab is `ping`.

Non-Monitored

Created node is for display only. The node status is not monitored. No aspects of the device are monitored. The Details window contains only the Info tab. The Entity Polling Type in the Info tab is `dummy`.

Creating Objects

The general process that you follow to create objects is similar for all categories. The specific steps differ as described.

▼ To Create a Node

You create nodes through the Create Object function on the Edit menu in the main console window.

Note – An administrative domain must exist before you can create a node. For information about how to create an administrative domain, see “To Create Administrative Domains” on page 49.

1. In the hierarchy view of the main console window, select the administrative domain in which to create the new object.

Select the lowest level group of the administrative domain where the new object should be created. For example, to create a node in a building that is in one of the campuses of a administrative domain, select the building in the administrative domain as the lowest level group.

2. In the main console window, choose Create Object from the Edit menu.

The Create Object window is displayed. By default, the Node tab is selected.

3. In the upper half of the Create Object window, set up the new node.

a. Use the Monitor Via combo box to select the software or agent to monitor the new node.

There are seven categories of agents and monitors. If an agent is not available for your selected object, SNMP Ping usually works. If you do not select an available agent or ping command, the creation fails. The following choices are available:

- Sun Management Center Agent – Host
- Sun Management Center Agent – Platform
- Sun Management Center Agent - Module
- SNMP Proxy
- SNMP Ping
- ICMP Ping
- Non-Monitored

Note – To create an agent object, the MIB-II module must be loaded. If it is not, the agent can be created only as a ping host or as an SNMP host.

For more information about these monitoring choices, see “Agents and Monitors” on page 58. For information about creating an object for your specific platform, see the appropriate platform supplement.

b. If applicable, select a type from the pull-down menu in the Type field.

The Type field displays only if SNMP Ping, ICMP Ping, or Non-monitored is selected in the Monitor Via field.

The following Type choices are available:

- Server
- Workstation
- PC
- Router
- Printer
- Concentrator

c. If applicable, scroll and select an object in the Create Object window.

For some types of monitoring, the right side of the Create Object window displays the set of icons for the object you have selected. The icons are displayed in the hierarchy and topology views in the main console window when the node is created.

d. (Optional) Create a unique name in the Node Label field.

The default label is the host name.

e. (Optional) Type a description of the node.

4. In the lower half of the Create Object window, type the requested information.

The questions in the lower half of the window vary with the agent or monitor that you selected in Step a. The Non-Monitored selection does not require further information, but most agent or monitor selections ask you to provide the following information:

- Node host name
- Node IP address

You can provide the host name, the IP address, or both. If there is a conflict between the host name and the IP address, the host name takes precedence.

Other agent or monitor selections may also ask for one or more of the following items:

- Sun Management Center agent port number (default is 161)
- Proxy host name and IP address if Monitor Via is SNMP Proxy
- Read and write SNMP communities if Monitor Via is SNMP Ping (The default read community is public; The default write community is private.)

- Module name

5. To add the new node to your topology and close the Create Object window, click the OK button.

The following message is displayed at the bottom of the Create Object window:

Creating Node... Please Wait.

- If the request is completed successfully, the main console window is updated, and the new node is displayed.
- If the creation fails, an error message is displayed at the bottom of the Create Object window. The cause of the error may be one of the following reasons:
 - You do not have permission to create this node.
 - You must start a Sun Management Center agent on the node.
 - You provided incorrect agent host or port information.

Note – When you create a node on the current Sun Management Center server context, ownership of that node defaults to your login identity. When you create a node on a remote server context, ownership of that node defaults to a general user identity. This situation is normal. The general user identity is imposed for security of transactions between Sun Management Center server contexts. For more information, see “Sun Management Center Remote Server Access” on page 257.

For information about how to change the new node, see “Changing Objects” on page 67.

▼ To Create a Module Object

To monitor several module objects on several hosts, you might create module objects for each host and put the module objects in a common location. For example, you might put the module objects in the same group or administrative domain. The procedure for creating a module object is similar to the procedure for creating a node.

1. **In the hierarchy view of the main console window, select the administrative domain in which to create the new object.**
2. **In the main console window, choose Create Object from the Edit menu.**
3. **Select the Node tab in the Create Object window.**
4. **Select Sun Management Center Agent – Module in the Monitor Via field.**
5. **(Optional) Type a node label.**
6. **(Optional) Type a description.**

7. Type a host name or IP address.

You can provide either the host name, the IP address, or both. If there is a conflict between the host name and the IP address, the host name takes precedence.

8. Verify or change the port number.

9. Click the Get Modules button to view a list of modules that are currently loaded on the host.

The module list is displayed.

If the module that you want to use is not loaded, see “To Load a Module” on page 164. If the module that you want to use is not enabled, see “To Enable a Module” on page 168.

10. Select the module to monitor.

The module list closes.

11. To add your module to the topology and close the Create Object window, click the OK button.

▼ To Create a Group

You can create two types of groups: General and IP-based. General groups are based on geography, such as campus or building. IP-based groups are based on networks or subnets.

Note – To create a group, you must have esdomadm privileges. See “Sun Management Center Groups” on page 252 for more information.

1. In the hierarchy view of the main console window, select the administrative domain in which you want the new group.

For example, to create a group in a building that is in a campus of an administrative domain, click the building icon in the administrative domain.

2. In the main console window, choose Create Object from the Edit menu.

The Create Object window is displayed.

3. In the Create Object window, click the Group tab.

4. Change the Type field, if desired (General or IP-Based).

General groups are based on geography, such as campus or building. IP-based groups are based on networks or subnets.

5. Select the object type (Building, Campus, or General).

The right side of the window is updated with an icon corresponding to the object type.

6. Create a new group Label.

7. (Optional) Type a description in the Description field.

8. For an IP-based group, specify the IP address and the subnet mask.

The creation of an IP-based group results in the creation of an empty network or subnet "container." You can populate the container as explained in Step 10.

9. To add the group to your topology view and close the Create Object window, click the OK button.

The following message is displayed at the bottom of the Create Object window:

```
Creating group... Please Wait.
```

If the request ends successfully, the main console window is updated and the group is displayed.

If the request fails, an error message is displayed at the bottom of the Create Object window. The cause of the error may be that you do not have permission to create this group.

For information about how to change the new group, see "Changing Objects" on page 67.

10. Add components to your group using one of the following methods:

- Use the Create Object window. See "To Create a Node " on page 60.
- Copy and paste objects from other groups into the new group. See "To Copy an Object" on page 67.

▼ To Create a Composite Object

A composite object is a group of related objects that you want to monitor collectively. This term refers to hardware with multiple instances of the Solaris operating environment running inside a single chassis.

1. In the hierarchy view of the main console window, select the Sun Management Center administrative domain in which to create the composite object.

Select the lowest level group of the administrative domain where the new composite object should be created.

2. In the main console window, choose Create Object from the Edit menu.

The Create Object window is displayed. By default, the Node tab is selected.

3. Click the Composite tab in the Create Object window.

The window changes to display the settings that are available for composite objects.

4. Select an object in the Create Object window.

For some types of monitoring, the right side of the Create Object window displays the set of icons for the object you have selected. The icons are displayed in the hierarchy

and topology views in the main console window when the composite object is created.

5. **Create a unique name in the Label field.**
6. **(Optional) Type a description for the composite object.**
7. **In the lower half of the Create Object window, type the requested information.**
 - Agent Hostname
 - Agent IP Address
 - Sun Management Center agent port number (the default is 161)

You can provide the host name, the IP address, or both. If there is a conflict between the host name and the IP address, the host name takes precedence.

8. **To add this composite object to your topology and close the Create Object window, click the OK button.**

The following message is displayed at the bottom of the Create Object window:

```
Creating Composite Object... Please Wait.
```

- If the request is completed successfully, the main console window is updated and the new composite object is displayed.
- If the creation fails, an error message is displayed at the bottom of the Create Object window. The cause of the error may be one of the following reasons:
 - You do not have the permission to create this object.
 - You must start a Sun Management Center agent on the object.

Note – When you create a node on the current Sun Management Center server context, ownership of that node defaults to your login identity. When you create a node on a remote server context, ownership of that node defaults to a general user identity. This situation is normal. The general user identity is imposed for security of transactions between Sun Management Center server contexts. For more information, see “Sun Management Center Remote Server Access” on page 257.

For information about how to change the new composite object, see “Changing Objects” on page 67.

▼ To Create a Segment

To complete your view of an administrative domain, you can include segments of the networks that link the nodes in the administrative domain. A segment object is a line in the hierarchy of the topology view.

1. **In the main console window, in the left window pane, select a location in the administrative domain where the new segment should be created.**

The segment is created at the selected level. For example, to create a segment in a building that is in a campus of an administrative domain, select the building in the administrative domain.

2. In the main console window, choose Create Object from the Edit menu.

The Create Object window is displayed.

3. In the Create Object window, click the Segment tab.

4. Change the Type field, if desired (Bus or Ring).

5. Select the object type.

The list of choices (Ethernet or IPX) changes with your selection in the Type field.

A panel in the Create Object window displays large and small icons that correspond to the type of object you have selected. The icons are displayed in the topology view in the main console window when the segment is created.

6. Type a new segment label.

7. (Optional) Type a description in the Description field.

8. Type the IP address for this segment.

9. Type a subnet mask for this segment.

10. To add the segment to your topology and close the Create Topology window, click the OK button.

The following message is displayed at the bottom of the Create Object window:

Creating segment... Please Wait

- If the request is completed successfully, the Create Object window closes. The main console window is updated and the view is displayed.
- If the request fails, an error message is displayed in the Create Object window.

For information about how to change the new segment, see “Changing Objects” on page 67.

▼ To Connect Objects in the Topology View

To make the view in Sun Management Center more closely resemble the real-world network, you can connect objects.

1. Select two objects in the topology view.

To select two objects, select the first object in the topology view. Hold down the Shift key and click the second object.

2. Choose Create a Connection from the Edit menu.

A link is displayed between the objects.

Changing Objects

To move an object from one location in the topology view to another location, use the Edit commands: Cut and Paste. To copy an object into other topology views and leave the original object in its current location, use Copy instead of Cut. The copy, cut, and paste functions are available in the topology view. The copy and cut functions are also available in a pop-up window by clicking mouse button three (typically the right mouse button) on the object.

Note – Sun Management Center 3.5 software does not support “drag and drop” as an operation for moving objects.

For example, you can create an administrative domain that contains some of the objects that already exist in another administrative domain. To do this, create a new administrative domain as explained in “Creating Administrative Domains” on page 49. Then, copy existing objects into the new administrative domain as described in “To Copy an Object” on page 67.

You can also copy a group, which is an object that contains other objects. In this case, the software does not create an independent, completely new group. Rather, the software creates a symbolic link to the existing group. Thus, every copy is a different “view” of the *same* group.

For more information on the main console window, see Chapter 5.

▼ To Copy an Object

This procedure is for a single object. For information about how to copy a group, see “To Copy a Group of Objects” on page 68.

1. **In the main console window, select the object to copy in the topology view.**

Tip – To select multiple objects, hold down the Shift key while using the mouse button.

2. **At the top of the main console window, choose Copy from the Edit menu, or press mouse button three on the object and choose Copy from the pop-up menu.**

The following message is displayed at the bottom of the main console window:

Copy successful

3. Open the destination group or administrative domain.

The destination group is displayed in the topology view.

4. At the top of the main console window, choose Paste from the Edit menu.

The pasted object is displayed in the destination group or administrative domain. The following message is displayed at the bottom of the main console window:

```
Paste successful
```

▼ To Copy a Group of Objects

1. In the topology view, select the objects to be copied.

To copy all objects in the topology view, choose Select All from the Edit menu in the main console window.

To copy two or more objects selectively:

a. Click the first object to select it.

b. Hold down the Shift key, and click one or more additional objects.

2. Choose Copy from the Edit menu in the main console window, or press mouse button three on one of the selected objects and choose Copy from the pop-up menu.

When the objects are copied, the following message is displayed at the bottom of the main console window:

```
Copy Successful
```

3. In the hierarchy view, select the new group or administrative domain where the group is to be placed.

4. Choose Paste Into from the Edit menu in the main console window.

Alternatively, you can press mouse button three on the destination administrative domain and choose Paste Into from the pop-up menu.



Caution – If you select Paste instead of Paste Into, the objects may be pasted into the wrong group. If this occurs, select the duplicate objects and choose Delete Object/Connection from the Edit menu.

▼ To Modify an Object

Once you have created or have copied an object, you can change the object through the Modify Object window. The changes affect only the description of the object in the Sun Management Center server database and do not modify the object itself.

1. Select the object in the main console window.

2. Choose Modify from the Edit menu in the main console window.

The Modify Object window is displayed. The appearance of the window varies, depending on whether the object is a group, node, composite object, or segment.

3. Edit the characteristics as needed.

If you are modifying a group object, the following characteristics are available:

- Type: General or IP-Based
- Object: Building, Campus, or General
- Group Label
- Description
- IP Address (for IP-Based only)
- Subnet Mask (for IP-Based only)

For a node, the following characteristics are available:

- Monitor Via
This field is described in more detail in “To Create a Node ” on page 60.
- Node Label
- Description
- Additional characteristics such as host name, IP address, or port may be listed, depending on the type of node

For a segment, the following characteristics are available :

- Type: Bus or Ring
- Object: Ethernet or IPX for bus type, or FDDI for ring type
- Segment Label
- Description
- IP Address
- Subnet Mask

For a composite object, the following characteristics are available:

- Object
- Label
- Description
- Agent host name
- Agent IP address
- Port

See your hardware supplement for more information.

4. Click the OK button to save your changes, or click the Cancel button to leave the characteristics unchanged.

▼ To Rename an Object

If you have changed an object’s name in the real world, you can easily modify the managed object name in the topology database to match.

1. **In the main console window, select the object name to change.**
2. **Choose Rename Object from the Edit menu in the main console window, or press mouse button three on the object, then select Rename from the pop-up menu.**
The Rename Object window appears. The Current Label shows the existing managed object name.
3. **Type a new name in the New Label field.**
4. **To apply the new name for this object in the topology database, click the OK button.**
To exit from the Rename Object window without changing the name, click the Cancel button.

▼ To Cut and Paste Objects

You can cut and move, or permanently delete objects from the topology view in the main console window. An object that is cut is saved temporarily in memory. Then, the cut object can be pasted immediately into one or more areas. An object that is deleted cannot be recalled. For instructions on deleting objects, see “To Delete Objects” on page 71. For more information about the main console window, see Chapter 5.

Cut and paste functions work the same for all kinds of objects: hosts, modules, and groups.

Note – Sun Management Center 3.5 software does not support “drag and drop” as an operation for moving objects.

1. **Select an existing object in the topology view.**
If you have not selected an object, the Cut and Delete functions are unavailable and appear dimmed.
2. **Choose Cut from the Edit menu in the main console window, or press mouse button three on the object and choose Cut from the pop-up menu**
A dashed line is displayed around the selected object. The object does not immediately disappear, but remains active until it is pasted into a new location. This strategy protects objects, such as processes, that should not be interrupted. The object remains visible until it has been successfully pasted.

Tip – To cancel a Cut operation, click the object again.

When the Cut operation succeeds, the following message is displayed at the bottom of the main console window:

```
Cut successful
```

3. Navigate to the destination location in the topology view.

4. Choose Paste from the Edit menu.

The object appears in the new location. The object disappears from the previous location.

▼ To Delete Objects

The Delete function removes an object completely from the topology database. To move an object to another location, see “To Copy an Object” on page 67 or “To Cut and Paste Objects” on page 70.

For more information on the main console window, see Chapter 5.

Note – To delete an administrative domain, use the Delete button in the Domain Manager window. See “To Delete an Administrative Domain” on page 53.

1. Select an existing object in the topology view.

If you have not selected an object, the Delete function is unavailable and appears dimmed.

2. Choose Delete Object/Connection from the Edit menu in the main console window.

You are prompted to confirm or cancel the deletion.

If the Delete operation succeeds, the object is removed. The following message is displayed at the bottom of the main console window:

```
Delete successful
```


Adding Objects to the Topology Database Using the Discovery Manager

You can use the Discovery Manager to populate administrative domains automatically. Automatically populating administrative domains is very useful if you have a large network. For information about how to add members manually with the Create Topology Object window, see Chapter 3.

The following topics are described in this chapter:

- “Discovery Manager Concepts” on page 73
- “To Start the Discover Objects Window” on page 76
- “To Define and Initiate a Discover Objects Request” on page 76
- “To Set Preferences for a Discover Objects Request” on page 79
- “To Limit a Discovery Process by Hardware, Software, or Object Names” on page 80
- “To Schedule a Discover Objects Request” on page 81
- “To Modify a Discover Objects Request” on page 82
- “To Start, Stop, or Delete a Discover Objects Request” on page 83
- “To View the Discover Objects Log” on page 83

Discovery Manager Concepts

The Discovery Manager can find hosts, routers, networks, and subnets as explained in “Overview of IP Addressing” on page 317. The Discovery Manager also discovers objects where a Sun Management Center agent is configured to a different server context as described in “Sun Management Center Server Context and Security” on page 258.

The Discovery Manager can also find and group topology objects. These objects can be related either to a single hardware platform or to a group of cooperating hardware platforms. This discovery and grouping feature enables convenient management of the related objects. This technique is described in the add-on supplement for those machine architectures that have this grouping requirement.

Note – For additional information, refer to your platform supplement. The supplement contains important platform-specific information about discovering objects.

You can create one or more discover requests. Each request runs as a separate process and adds the discovered objects to the administrative domain. The Discovery feature is supported only for administrative domains and not for any subordinate groups. You can add requests only for an administrative domain.

You can also schedule requests to look periodically for new hosts.

Note – Every discover request is assigned a Request ID. This ID is a unique Sun Management Center internal identifier of the request. The Request IDs might not be in sequential order. The Request ID displays in the Request Details portion of the Discover Requests Window.

About the Discover Objects Window

The Discover Objects window contains the fields that are described in the following table.

TABLE 4-1 Fields in the Discover Objects Window

Field	Description
Name	A name that you create for the request. You can have multiple requests with the same name.
Scheduled	“Yes” if the request is scheduled, “No” if not scheduled

TABLE 4-1 Fields in the Discover Objects Window (Continued)

Field	Description
Status	Reflects the current state of the discover request. The status can be one of the following states: <ul style="list-style-type: none">■ New – A new request was added but not processed.■ Queued – A request has been sent to the server but processing has not yet started.■ Running – The request is currently being processed.■ Succeeded – The request has been successfully processed.■ Failed – Processing of the request has failed.■ Stopped – The user has stopped the process.■ 0 Hosts Added – The request did not find any hosts that passed the filter limits.
Request Details	Provides summary information about the selected discover request.

The Discover Objects window contains the buttons that are listed in the following table.

TABLE 4-2 Buttons in the Discover Requests Window

Button	Action
Add	Create a new discover request through the New Discover Request window.
Modify	Change the selected discover request.
Duplicate	Create a copy of the selected discover request.
Delete	Delete the selected discover request.
Start	Start the selected discover request. The selected request must not be running and must not be scheduled to run.
Stop	Stop running the selected discover request. The selected request must be running.
Log	View a log of the results that the selected discover request generated.

Making and Modifying Discover Requests

This section describes how to initiate and change a discover request.

▼ To Start the Discover Objects Window

- **Start the Discover Objects window in one of two ways:**
 - When you create an administrative domain through the Create Domain dialog box, select the Populate Now option.
For more information on creating administrative domains, see “Creating Administrative Domains” on page 49.
 - Select the administrative domain in the Sun Management Center Administrative Domains pull-down menu, then choose Discover Objects from the Tools menu in the main console window.

The Discover Objects window appears.

▼ To Define and Initiate a Discover Objects Request

You can discover hosts by using the ping command or by using routing tables.

Before you initiate a discover request that uses routing tables, read Appendix B. The appendix explains the basic concepts of routing, network classes, and netmasks.

Note – You must have esdomadm privileges to perform any operations on a Discover Request. For more information, see Chapter 18.

1. **Open the Discover Objects window as explained in “To Start the Discover Objects Window” on page 76.**

2. **Click the Add button in the Discover Objects window.**

The New Discover Request window is displayed. The Discover tab is selected by default.

Tip – To copy an existing discover request, select the existing request and click the Duplicate button in the Discover Objects window. For information about how to edit the settings for the new discover request, see “To Modify a Discover Objects Request” on page 82.

3. **Type a new name for your discover request in the Request Name field.**

Multiple requests are listed in the Discover Objects window, which enables you to select a request and to edit the related search pattern.

4. **In the Discover Using field, select the method that should be used for discovering the network.**

The discovery methods are either Ping or Routing Table.

- If you select Ping, the discovery process uses both ICMP and SNMP ping commands. The discovery process searches for hosts, routers, and composite objects in the specified IP address range. The process then places the hosts in the appropriate networks and appropriate subnets based on the netmask.

Note – A composite object includes various groupings of hardware and software, such as StarFire™ and Sun Fire™ systems. These objects do not appear within a subnet or similar structure, but are instead visible at the root level of the domain.

- If you select Routing Table, the discovery process starts from the Sun Management Center server host . The process then goes through the specified number of hops to report subnets and hosts *n* hops away. The number of hops limits the “distance” of destination hosts from the host on which the Topology manager or Sun Management Center server is running.

Note – Routing Table discover requests assume that you run an SNMP agent at port 161. The agent can be a Sun Management Center agent, `snmpdx`, or any SNMP agent provided by your network management package. To use a different port number, see Step 9.

For more information on routing tables, see Appendix B.

5. **Type the IP address from which to begin the discovery process in the Start IP Address field.**
6. **Type the IP address at which to stop the discovery process in the End IP Address field.**

Note – You only need to do this step if you selected Ping as the discovery method.

7. **Type a netmask value in the Netmask field.**

Note – You only need to do this step if the following criteria apply:

- You selected Ping as the discovery method.
 - You need to use a netmask other than the default value (255.255.255.0).
-

8. **Type a number in the Number of Hops field.**

The term *hop* refers to the number of routers through which a packet passes before the packet reaches its destination. For example, a value of 0 (zero) would limit the discovery process to the current subnet.

Note – You only need to do this step if the following criteria apply:

- You selected Routing Table as the discovery method.
 - You want to limit the size of the discovery process.
-

9. To use a port number other than the default (161), enter a port number in the Also Check Port field.

Tip – To check only the port number that you enter, deselect Use Default Port. When you select Use Default Port and you add a number in the field, the discovery process checks *both* the default port number and the port number that you provide.

10. To start the discovery process, click the OK button

A confirmation window appears.

To customize your discover request, see the following sections:

- “To Set Preferences for a Discover Objects Request” on page 79
- “To Limit a Discovery Process by Hardware, Software, or Object Names” on page 80
- “To Schedule a Discover Objects Request” on page 81

11. To run the discover request immediately, click the Yes button.

When you start the discovery process, the following events occur:

- The discovery process finds all nodes that are running the Sun Management Center agent, including agent nodes that belong to another Sun Management Center server context. Nodes that are running Sun Management Center agents in a remote Sun Management Center server context are included. Extensive information is gathered for Sun Management Center agent nodes.
- The discovery process finds all nodes that are running an SNMP agent. Limited information is gathered for SNMP agent nodes.
- The discovery process finds all nodes that are running neither a Sun Management Center agent nor an SNMP agent. These are listed as ping hosts. Very little information is gathered for ping hosts.

12. If a Sun Management Center server or agent is incorrectly reported to be a ping host or is not discovered, rerun the discovery process with larger timeout and retry values.

Note – If a host is extremely busy, a discovery process that is gathering data for that host might time out. If a timeout occurs for a host that is a Sun Management Center agent, the host might be reported as a ping host . Alternatively, the host might not be discovered at all. If a timeout happens, you might want to increase the ping and SNMP timeout periods and re-initiate the discovery process. See “To Set Preferences for a Discover Objects Request” on page 79 for more information.

▼ To Set Preferences for a Discover Objects Request

- 1. In the New Discover Request window or the Edit Discover Request window, click the Preferences tab.**
- 2. To stop writing discover request information to a log file, deselect the Log Discover Request Progress check box.**

By default, information is written to a log that you can access from the Discover Objects window. For more information, see “To View the Discover Objects Log” on page 83.

If you disable the log feature, information about the discover request process status still appears in the main Discover Objects window.
- 3. If needed, edit the information in the Timeout field in the Ping section of the Preferences.**

This field enables you to increase the amount of time in seconds that the Discovery Manager waits for a response to a ping request. By default, the Discovery Manager waits for one second for a response before the Discovery Manager times out.
- 4. If needed, edit the information in the Retries field in the Ping section of the Preferences.**

This field enables you to increase the number of times that the Discovery Manager sends a ping request to a potential managed object. By default, the Discovery Manager pings each potential object one time.
- 5. If needed, edit the information in the Timeout field in the SNMP section of the Preferences.**

This field enables you to increase the amount of time in seconds that the Discovery Manager waits for a response to an SNMP request. By default, the Discovery Manager waits for three seconds for a response before the Discovery Manager times out.
- 6. If needed, edit the information in the Retries field in the SNMP section of the Preferences.**

This field enables you to increase the number of times that the Discovery Manager sends an SNMP request to a potential managed object. By default, the Discovery Manager sends one SNMP request to each potential object.

7. If needed, edit the information in the Community String field in the SNMP section of the preferences.

This field enables you to change the default community string for SNMP. The default value is `public`. To change this value, add one or more character strings separated by a pipe (`|`) character.

8. If needed, edit the value in the Maximum Hosts field in the General section of the preferences.

This field enables you to limit the number of objects that can be added to the topology database. The default value is 256.

9. If needed, edit the value in the Maximum Time field in the General section of the preferences.

This field enables you to limit the amount of total time that the discovery process runs. The default value is 1000000 seconds, or approximately 280 hours or slightly more than 11 days.

10. Click the OK button.

Your preferences are applied. The New Discover Request window closes. The discovery process starts.

▼ To Limit a Discovery Process by Hardware, Software, or Object Names

You can choose to include or exclude managed objects by host name, operating system, or platform type. Filtering uses the `grep` command to search for the supplied value.

1. In the New Discover Request window, click the Filters tab.

2. To filter managed objects based on the object name, select Host Name or Label.

a. Type a text string in the Host Name or Label field.

b. Click the Add button to add the text string to the filtering criteria.

c. Determine whether to include managed objects that contain this string.

To include objects that contain this string, click the Include button.

To exclude objects that contain this string, click the Exclude button.

To remove a name filter, click the text string in the list on the right, then click the Remove button.

3. To filter managed objects based on the object platforms, select Platform Types.

Platforms include both hardware objects and composite objects that contain a logical grouping of hardware and software.

- a. **In the Platform Types list on the left, select a platform type on which to filter .**
 - b. **Click the Add button to add the platform type to the filtering criteria.**
 - c. **Determine whether to include managed objects for this platform.**
 To include objects for this platform, click the Include button.
 To exclude objects for this platform, click the Exclude button.
 To remove a platform types filter, select the platform type in the list on the right, then click the Remove button.
4. **To filter managed objects based on the operating environment, select Operating Systems.**
 - a. **In the Operating Systems list on the left, select an operating environment on which to filter.**
 - b. **Click the Add button to add the operating environment to the filtering criteria.**
 - c. **Determine whether to include managed objects for this operating environment.**
 To include objects for this operating environment, click the Include button.
 To exclude objects for this operating environment, click the Exclude button.
 To remove an operating environment filter, select the operating environment in the list on the right, then click the Remove button.
 5. **To filter managed objects based on the Sun Management Center modules that reside on those objects, select Modules.**
 - a. **In the Modules list on the left, select a module on which to filter.**
 - b. **Click the Add button to add the module to the filtering criteria.**
 - c. **Determine whether to include managed objects for this module.**
 To include managed objects for this module, click the Include button.
 To exclude managed objects for this module, click the Exclude button.
 To remove a module filter, select the module in the list on the right, then click the Remove button.
 6. **Click the OK button.**
 Your filters are applied. The New Discover Request window closes. The discovery process starts.

▼ To Schedule a Discover Objects Request

1. **In the New Discover Request window, click the Schedule tab.**
2. **To define a schedule, select Schedule Discovery Request.**

- 3. To set the request to run on a day other than today, provide a date in the Start Date field.**

You can edit the information in the Start Date field manually, or you can click a date in the calendar to select the date.

- 4. Select an hour and minutes from the Start Time pop-up menus.**

Hours are based on a 24-hour clock. For example, 16:30 is the same as 4:30 PM.

- 5. Choose how often the request should run from the pop-up menu next to Repeat Interval.**

Choosing a Repeat Interval enables you to automatically update the database according to your defined schedule. For example, if your network environment changes often, you might want to run your discover request on a weekly basis to keep your database current.

- 6. To exit from the New Discover Request window, click the OK button.**

The discover request is placed in a queue according to your defined schedule

▼ To Modify a Discover Objects Request

If you have previously created a periodic discover request, you can change the parameters for that discover request through the Edit Discover Request window.

- 1. Choose Discover Objects from the Tools menu in the main console window.**

The Discover Objects window is displayed.

- 2. Select the name of the discover request that you want to modify.**

- 3. Click the Modify button.**

The Edit Discover Request window is displayed. The top bar of the window displays the ID of the request, and the Request Name field displays the name of the request.

- 4. Select the Discover, Preferences, Filters, and Scheduling tabs and change settings as needed.**

Settings are the same as the settings that you created or changed when you defined the discover request. For more information, see:

- "To Define and Initiate a Discover Objects Request" on page 76
- "To Set Preferences for a Discover Objects Request" on page 79
- "To Limit a Discovery Process by Hardware, Software, or Object Names" on page 80
- "To Schedule a Discover Objects Request" on page 81

- 5. To exit from the Edit Discover Request window and to accept any changes that you made, click the OK button.**

A dialog box appears, offering several choices for running the modified discover request.

- To start the discover request and to run the request immediately, click the Yes button.
- To schedule the discover request but not run the request immediately, click the No button.
- To cancel the running of the discover request entirely, click the Cancel button.

▼ To Start, Stop, or Delete a Discover Objects Request

If you have previously created a discover request, you can start, stop, or delete the request through the Discover Objects window.

1. **Choose Discover Objects from the Tools menu in the main console window.**
The Discover Objects window is displayed.
2. **Select the name of the discover request that you want to start, stop, or delete.**
3. **Click the Start, Stop, or Delete button.**

▼ To View the Discover Objects Log

1. **In the Discover Objects window, select the name of the discover request whose log you want to view.**
2. **Click the Log button.**
The log file appears in a read-only window.

Tip – If the log file is longer than the visible part of the window, use the side scroll bar to view the rest of the file.

3. **If the request is running, click the Refresh button to update the log file view.**
4. **To exit from the log file, click the Close button.**

Managing Objects in Sun Management Center

Note – This chapter provides an overview of the Java console. Although some tasks are described, most of the procedures used to manage and monitor your system are described elsewhere in this document.

The following topics are described in this chapter:

- “Overview of Main Console Window” on page 85
- “To Use the Menu Bar” on page 86
- “To Access a Pop-Up Menu” on page 87
- “To View a Tool Tip” on page 87
- “To Find a Managed Object” on page 88
- “To View a Different Administrative Domain” on page 88
- “Administrative Domain View” on page 89
- “To Navigate the Hierarchy View” on page 91
- “To Navigate the Topology View” on page 92
- “To Change the Topology Layout” on page 93
- “To Provide a Background Image for the Topology View” on page 93
- “To Remove the Background Image From the Topology View” on page 94
- “To Connect Objects in the Topology View” on page 94
- “To Remove a Connection Between Managed Objects” on page 95
- “Administrative Domain Status Summary ” on page 95

Overview of Main Console Window

The main console window is the primary user interface for Sun Management Center. The window provides the following features:

- Visual representations of the managed objects, for example, hosts and networks

- Ability to manipulate attributes and the properties that are associated with the managed objects, such as creating alarm threshold conditions

The features that are shown in the following figure are mentioned in this chapter.

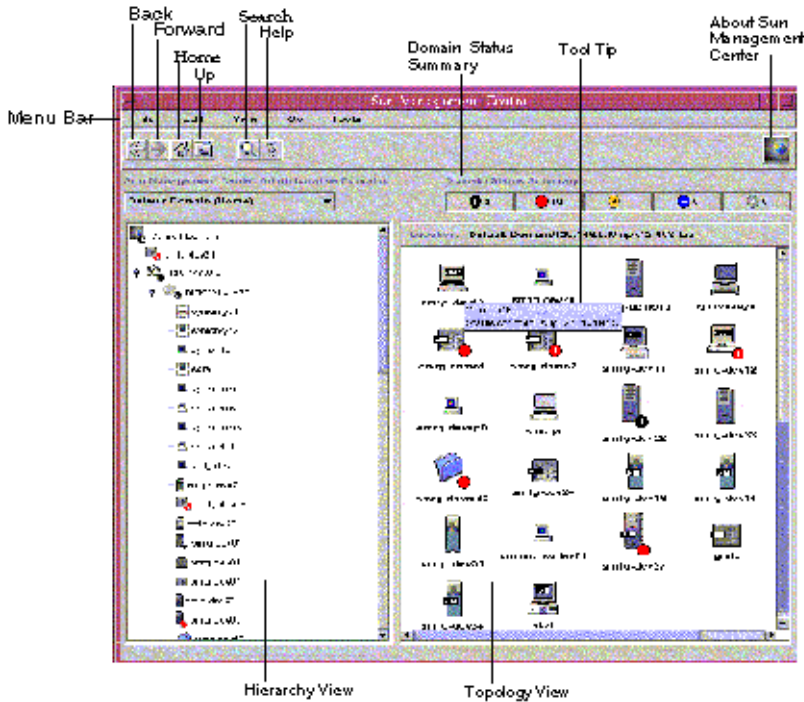


FIGURE 5-1 Main Console Window

▼ To Use the Menu Bar

The menu bar at the top of the console window provides access to common Sun Management Center features and tools. If a menu name or function appears dimmed, that option is not available for you to use. This state might mean that you need to select an appropriate managed object first.

1. **To access a menu, click the menu label.**

The menu contents appear.

Tip – Once you have displayed a menu, you can scroll or use the right and left arrow keys on your keyboard to move among the menus.

2. **To choose a menu option, click the menu option label.**

▼ To Access a Pop-Up Menu

Pop-up menus are available for all objects in the hierarchy and topology views. The contents of a menu vary according to the capability of the selected object.

1. **Click mouse button three (typically the right mouse button) on the object.**

The pop-up menu is displayed.

2. **To choose a menu item, click mouse button one (typically the left mouse button).**

The following list describes the common items in the approximate order in which the items are displayed in the pop-up menus. Some items are not displayed in all menus.

Cut	Cuts the selected object. The cut object is enclosed in a dashed box until the object is pasted into a new location. To cancel the cut operation, click the object.
Copy	Copies the selected object.
Rename	Displays the Rename Object window.
Modify	Displays the Modify Object window.
Attribute Editor	Displays the Attribute Editor. For more information, see Chapter 10.
Load Module	Displays the Load Module dialog box. For more information, see “To Load a Module” on page 164.
Details	Displays the Details window. For more information, see Chapter 6.
Alarm Action	Displays the Alarm Action window in which you can define actions to take when an alarm occurs. For more information, see Chapter 12.

▼ To View a Tool Tip

As you move the mouse cursor over various areas in the main console window, tool tips are displayed momentarily. A tool tip is a description of the selected object or a description of a property and value column of any data property table. Data property tables are described in Chapter 8. Property tables provide information about the monitored property. These tables are described in Appendix C.

- **To see a Tool Tip, place your mouse cursor over an object.**

After a brief delay, a tool tip provides a short description of that object.

▼ To Find a Managed Object

1. **From the main console window, click the Search icon or choose Search from the Go menu.**

The Search window appears.

2. **To find a specific object name, type the managed object name to find in the Object Label field.**

You can provide a complete name or a partial name.

3. **To find a managed object based on filtering criteria, click the button next to Filter Name. Then, select a filter from the Filter Name menu.**

You define a filter using the filtering mechanism in the Manage Jobs window. To access the Manage Jobs window, select Manage Jobs from the Tools menu in the main console window. For more information, see "Using Filters" on page 212.

4. **Click the Search button.**

A list of matching names is displayed in the Search Results section.

5. **To see information about a managed object, select the name from the Search Results list. Then, click the Go To button.**

The topology view of the main console window changes to show information about the selected object.

▼ To View a Different Administrative Domain

1. **In the main console window, click the Sun Management Center Administrative Domains button.**

The current list of administrative domains appears.

2. **Select the administrative domain that you want to view.**

The main console window updates to show the selected administrative domain. The Sun Management Center Administrative Domains button changes to display the name of the administrative domain that you selected.

For more information about defining and working with administrative domains, see Chapter 2.

Administrative Domain View

Once you have created an administrative domain and have populated it with objects, you can see the administrative domain and its objects in the hierarchy (tree) view and the topology (regional) view of this administrative domain.

The administrative domain view enables you to build collections of objects that support your monitoring and management tasks. You can group your host sets by buildings, subnets, or other group objects. You can view all objects in the administrative domain, or view only selected objects, such as the servers that support a specific function that interests you.

The administrative domain view shows you the objects that are contained in an administrative domain. The objects are the administrative domain, and any groups and hosts that are contained in the administrative domain.

The following figure illustrates an example of an administrative domain. In this example, Payroll Servers 1 represents an administrative domain that consists of all the host machines in the Payroll office. The host machines are found in two geographic sites: Campus A and Campus B. Campus B has one building (Building B), which contains two host machines, Payroll 1 and Payroll 2.

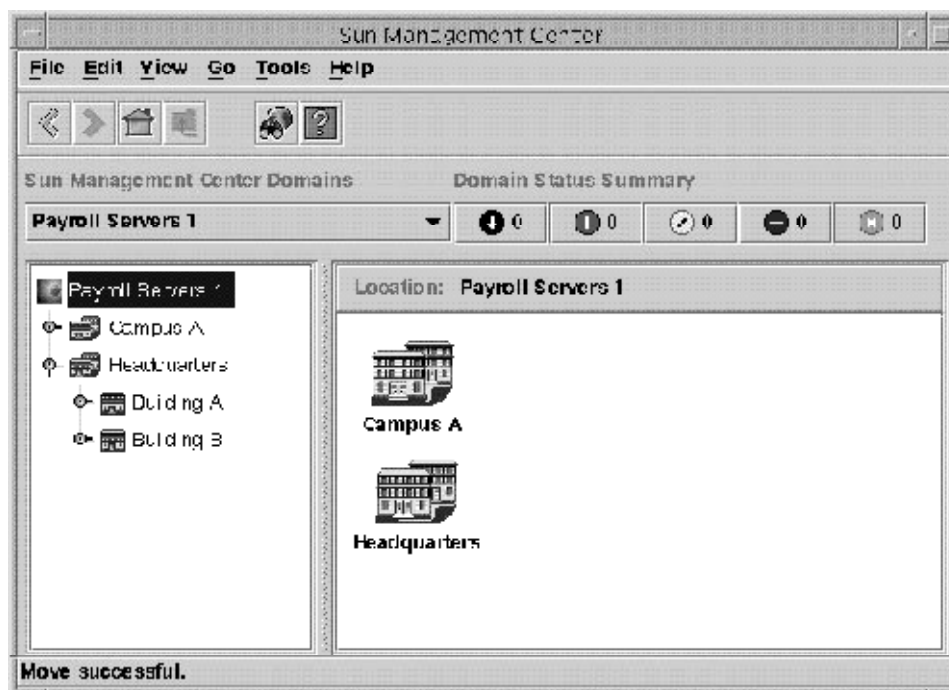


FIGURE 5-2 Sample Administrative Domain

You can choose to create a similar type of administrative domain. For example, you can group your machines by subnet, rather than by building. You should create an administrative domain and its subordinate groups in a hierarchy that best supports your monitoring activities.

For more information on administrative domains, see Chapter 2.

The main console window displays two views of an administrative domain and its members. The left side of the administrative domain view is the hierarchy view. The right side is the topology view.

- Hierarchy (tree) view

The hierarchy view displays the relationship between an administrative domain and its members. Some objects in the hierarchy view contain other objects that can be a group of objects or a single object.

In Figure 5-2, Building B is an object that is contained in the Headquarters administrative domain, but is also a group. Building B contains the network 194.150.151.52, the subnet mpk12-238-n, GROUPA, and hosts machineA and machineB.

For more information, see “Hierarchy View” on page 91.

- Topology view

The topology view displays the members of an object selected in the hierarchical tree.

For more information, see “Topology View” on page 92.

Hierarchy View

Two types of windows contain hierarchy views:

- Domain view in the main console window, as illustrated in Figure 5–1
- Browser view in the Details window, as illustrated in Figure 6–8

The administrative domain hierarchy view displays the administrative domain and its members.


The Browser hierarchy view displays the host and its modules. This view is part of the Browser Details window, which is described in Chapter 7.

Both the administrative domain hierarchy view and the Browser hierarchy view behave in the same manner. In both windows, the hierarchy view is on the left side of the window.

▼ To Navigate the Hierarchy View

1. **To view details about a host, double-click the host icon in the main console window.**

- If the selected object is a host, the Details window appears.
- If the object contains other managed objects, the topology view displays the members of the selected object.

2. **To view the contents of a managed object, click the expansion icon  to the left of the object icon.**

The icon changes to a darker color, and the subordinate objects appear in the hierarchy view.

If an object has an expansion icon next to it, the object contains additional information. You can obtain more information about the object by examining its subordinate objects.

3. **To view more information about a managed object, double-click the object icon.**

- If the managed object is a container icon, such as a domain or group object, and is not expanded, the icon changes to a darker color. The hierarchy view and the topology view expand to display the contents of the object.

- If the managed object is a container icon and is expanded, the hierarchy view and the topology view compress so that the subordinate contents are removed.
 - If the managed object is a lowest-level icon, for example, a host, the Details window appears. This window provides more information about the managed object. For more information, see Chapter 6.
4. **To access the pop-up menu for an object, press mouse button three on the object icon.**

For more information about pop-up menus, see “To Access a Pop-Up Menu” on page 87.

Topology View

The topology view displays the members of the object selected in the hierarchy view. You can customize the topology view in the following ways:

- Change the way in which an object is displayed, as described in “To Change the Topology Layout” on page 93. For example, you can view an object as a grid, a network, or a ring.
- Connect objects together, as described in “To Connect Objects in the Topology View” on page 94.
- Add a background picture or a map, as described in “To Provide a Background Image for the Topology View” on page 93.

There are two types of windows that contain topology views:

- Domain view in the main console window, as illustrated in Figure 5-1
- Browser contents view in the Details window, as illustrated in Figure 6-8

Both the administrative domain and the browser contents views behave in the same manner.

▼ To Navigate the Topology View

1. **To view details about a host, click or double-click the host icon.**
 - If the selected object is a host, the Details window appears.
 - If the object contains other managed objects, the topology view expands to display the members of the selected object.
2. **To access the pop-up menu for an object, press mouse button three on the object icon.**

For more information about pop-up menus, see “To Access a Pop-Up Menu” on page 87.

3. **To select an object, click the object icon.**

▼ To Change the Topology Layout

In the topology view, you can choose to view an object using one of several layout types. For example, you can simply view the objects as a list, or you can view the objects as a ring network.

1. **To change the topology layout, choose Topology Layouts from the View menu in the main console window.**

A selection list appears.

2. **Click the layout that you want to use.**

You can choose one of the following layout types:

- Network (default) – Shows the objects arranged in one of the following ways:
 - Across the window in the order in which the objects were discovered or added to the database
 - As arranged by the console user
- Grid – Shows the objects arranged in an organized grid in the order in which the objects were discovered or were added to the database
- List – Shows the objects in a vertical list in the order in which the objects were discovered or were added to the database
- Bus – Shows the objects linked together by a series of lines that mirror the view of a network bus
- Star – Shows the objects in a star to indicate the parent object is a star network
- Spoked Ring – Shows the objects in a ring to indicate the parent object is a ring network

The topology layout changes within a few seconds of when you select a type.

▼ To Provide a Background Image for the Topology View

You can select background images to place your managed objects in the approximate locations where the physical network components exist. This ability can be useful if you have managed objects that are located in various states or countries. Once you have set the backgrounds and placed the objects where they reside, if a problem occurs, you would be able to respond more quickly because you know where the managed object is.

1. **To choose a background for the current topology view, choose Set Topology Background from the View menu in the main console window.**

The Set Topology Background window appears.

2. **Click the name of the geographical location that you want to use.**

Tip – Use the scroll bar at the right side of the window to move up and to move down in the list.

3. **Determine how many instances of the background image to display.**
 - To apply just a single instance of the background image, make sure that Tile with this image is not selected.
 - To apply multiple instances of the background image, make sure that Tile with this image is selected.
4. **To apply your changes and close the Set Topology Background window, click Set.**

▼ To Remove the Background Image From the Topology View

1. **To remove a background for the current topology view, choose Set Topology Background from the View menu in the main console window.**

The Set Topology Background window appears.

2. **Click the Unset button.**

The Set Topology Background window closes. The topology view is redrawn without any topology background image.

▼ To Connect Objects in the Topology View

To make the topology view of your network more realistic, you can create a representation of the network connections between objects.

1. **In the topology view, click the icon for the first managed object that you want to connect.**

A selection box appears around the selected object.

2. **Press the Shift key, and click the icon for the second managed object that you want to connect.**

A selection box appears around the selected object. At this point, both objects should have selection boxes.

3. **To create the connection, choose Create Connection from the Edit menu in the main console window.**

The Create Connection window appears.

4. **In the Create Connection window, click the type of network connection to use.**

Values include the following types:

- General – Indicates either that you do not know the type of network connection or that the connection does not fit any other category
- RS-232 – Indicates an RS-232 connection
- T1 – Indicates a T1 connection
- T3 – Indicates a T3 connection

5. **Type a label for the connection.**

For example, Print Client-Print Server.

6. **(Optional) Type an additional description for the connection.**

7. **To create the connection and close the Create Connection window, click OK.**

A line appears in the topology view, connecting the objects.

▼ To Remove a Connection Between Managed Objects

1. **Click the line that indicates the connection in the topology view.**



Caution – Make sure to click the connection line carefully. If you also select an object, you might inadvertently remove that object.

2. **Choose Delete Object/Connection from the Edit menu in the main console window.**

The topology view updates.

Administrative Domain Status Summary

The administrative domain status summary displays the number of managed objects that have *unacknowledged* open alarms, by level of severity, in the selected Administrative Domain. An example is shown in Figure 5-3.

Note – If a host has multiple alarms at several different severity levels, the host is represented at only the highest severity level for that host.

For more information on the administrative domain status summary, see “To View Alarms From the Main Console Window” on page 180.



FIGURE 5-3 Domain Status Summary

Viewing Detailed Information About a Managed Object

The Sun Management Center Details window provides detailed information about a selected object. The following subjects are described in this chapter:

- “Overview of the Details Window” on page 97
- “To Start the Details Window” on page 112
- “Info Tab” on page 99
- “Module Browser Tab” on page 99
- “Alarms Tab” on page 100
- “Module Manager Tab” on page 100
- “View Logs Tab” on page 100
- “To View the System Log File Messages” on page 113
- “To Filter Your Log Request” on page 114
- “To Monitor Log Messages” on page 115
- “To Find a Log Message” on page 116
- “To View the Sun Management Center Log File Messages” on page 116
- “To Refresh Log Messages” on page 117
- “To View Other Log File Messages” on page 118
- “Applications Tab” on page 101
- “Hardware Tab” on page 104

Overview of the Details Window

The details view is a subset of the Domain view. The highest hierarchical object in a details view is the host machine or module object. For more information on module objects, see “To Create a Module Object” on page 62. Unlike the administrative domain view, the details view enables you to see modules and the various monitored properties and statistics contained in the modules.

The Details window displays several tabs. The commonly seen tabs are shown in Table 6-1.

Click a tab to view the named information.

The tabs that appear in the Details window depend on the type of selected object. For example, the Hardware tab appears only if the Config-Reader module is supported on your system. For additional information on the tabs for your specific hardware object, see your platform supplement.

TABLE 6-1 Common Details Window Tabs

Tab	Description
Info	Provides general information about the managed object including name, IP address, polling type, and so on. This information is collected at the time the object is created. Info is the default view if the managed object is being monitored through SNMP or ICMP or if the object is in a non-monitored status.
Module Browser	Enables you to navigate through the hierarchy and contents views of the hardware, operating system, local applications, and remote systems. Module Browser is the default view if the managed object is being monitored through a Sun Management Center agent. The Module Browser is described in Chapter 7.
Alarms	Displays alarm status messages and the alarm controls for the current host or node. Enables you to acknowledge or delete alarms. Alarms are described in Chapter 12.
Module Manager	Displays available modules and identifies which modules are loaded, scheduled, and enabled. Also indicates any modules that are multi-instance modules. Enables you to load, enable, disable, and unload modules.
View Logs	Displays information from log files, including error messages, for your host. Enables you to search, monitor, and examine system, Sun Management Center, and other log messages.
Applications	If Advanced System Monitoring component is installed, displays a list of applications. These applications can include the processes that are running on the host, other installed applications, and hardware information. Process information appears only if the Solaris Process Details module is loaded. Hardware information appears only if the Hardware Diagnostics Suite software is enabled. For more information about the Hardware Diagnostic Suite, view its online help.
Hardware	Displays hardware configuration information about your host for selected hardware platforms. Configuration information may include the physical and logical view of your host. This tab appears only if the hardware platform is supported by the Config-Reader module.

Info Tab

The Info tab shows the properties table for the current managed object. The properties table is the only information that is available from the Details window for objects that are monitored through SNMP or ICMP. The general properties are listed in the following table.

TABLE 6-2 General Properties in the Info Tab of the Details Window

Property	Description
Entity Desc	Label you selected when you created the node.
Entity Full Desc	Optional description that you entered when you created the node.
Hostname	Machine name ¹
IP Address	IP address ²
Netmask	Netmask associated with the host
Operating System	Operating system type and version
Entity Family	Hardware architecture
Entity Trap Destination	Host IP address of Sun Management Center server that receives this host's trap information
Entity Event Destination	Host IP address of Sun Management Center server that receives this host's events information
Entity Polling Type	Agent or SNMP
Target Hostname	Host name of the target
Target IP Address	IP address of the target
Agent Version	The version number for the agent software, or 0.0 if polling type is SNMP
Time zone	The time zone in which the managed object resides

The host name in this property table does not change if you change the host name on the host device. To update the information, either modify the host object, or delete the existing host object and re-create the object with the new name. See "To Modify an Object" on page 68.

When a Sun Management Center entity is added to the topology, the Topology Agent queries the entity for its configured IP address and port for the Trap Handler and Event Manager components. However, the information stored in the topology will be incorrect if the entity is ever reconfigured to correct a misconfiguration or to change the entity server-context. If the information that is shown here for the Trap Handler and Event Manager is compared with the expected configuration of the entity and does not match, remove the entity from the topology and re-enter it.

Module Browser Tab

The Module Browser tab displays the hierarchy and contents views for managed objects that are monitored through Sun Management Center agents. These objects represent hardware, operating system, local applications, and remote systems.

See Chapter 7 for detailed information on using the Module Browser tab.

Alarms Tab

The Alarms Details window displays the alarms for the host. For detailed information on using the Sun Management Center Alarm Manager, see Chapter 12.

Module Manager Tab

The Module Manager tab displays the loaded modules. This tab also lists those modules that are available to your system but are not currently loaded or scheduled to be loaded. You can perform the following tasks:

- Unload a module
- Load a module
- Edit module parameters
- Enable a module
- Disable a module
- Display module rules
- Schedule a module for loading at a later time

For detailed information on using the Module Manager tab, see Chapter 11.

View Logs Tab

The View Logs tab enables you to view several types of messages:

- System log messages stored in the `/var/adm` directory
- Sun Management Center error messages
- Other messages

By default, only the system log messages in `/var/adm` are displayed. File names for these system log messages start with the word `messages`.

If you select the Sun Management Center Log option on the Log File menu, a list of log file choices is displayed. An example is shown in Figure 6–11.

As shown in Figure 6–1, the View Logs window has two scrollable panes: Messages For and Monitored Messages.

- The Messages For area contains the filtered messages that you select using the Filter button. You can locate specific messages in this area by using the Find Message feature.
- The Monitored Messages area contains the messages that you select using the Monitor button. New messages in this field are highlighted.

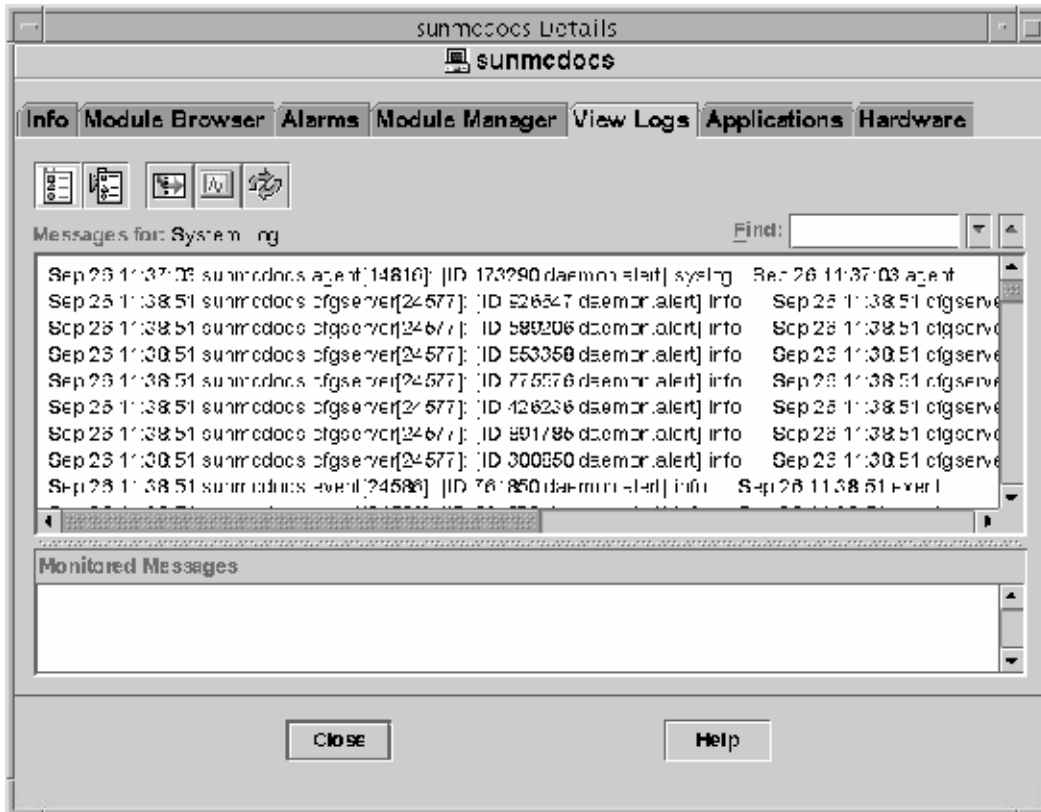


FIGURE 6-1 View Logs Screen

Note – If no messages match the Filter criteria, the following message appears at the bottom of the View Logs window.

No matches found for this log file

Applications Tab

The Applications tab enables you to view and select detailed information about processes running on the selected host or node. If you have any custom or third-party applications installed, this tab also enables you to view detailed information about processes running in the selected applications. The displays are continually updated.

View Processes

The View Processes application in Figure 6–2 enables you to view and select detailed information about processes running on the selected host or node.

The Solaris Process Details module must be loaded to use the Process Viewer. For instructions, see “To Load a Module” on page 164. If the Solaris Process Details module is not loaded when you click the Applications tab, you must do the following:

1. Close the Details window.
2. Load the Solaris Process Details module.
3. Reopen the Details window.

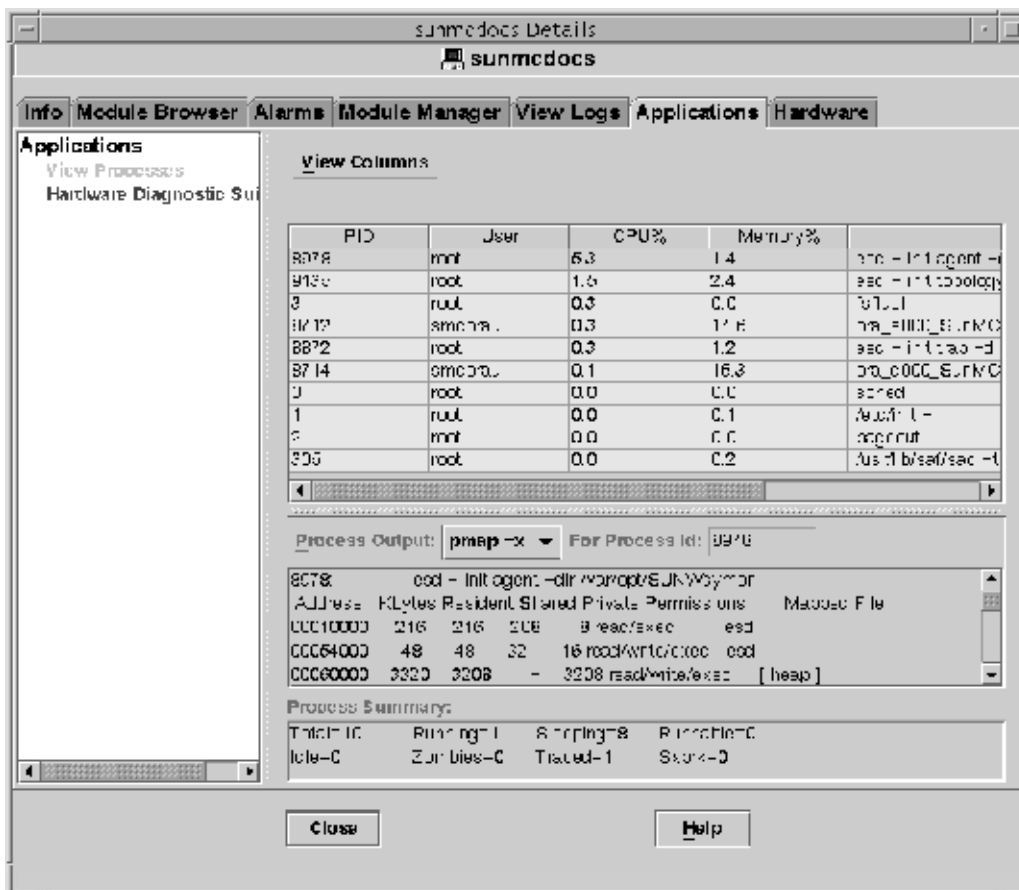


FIGURE 6–2 Process Viewer

The following table lists the properties that are available in the Process Viewer.

TABLE 6-3 Process Viewer Properties

Property	Description
PID	Process Identifier
PPID	Process ID of the parent process
UID	Effective user ID number
User	Effective user login name
EUser	Effective user ID
Group ID	Group ID of the user
EGroup	Effective group ID of the user
Session ID	Process ID of the session leader
PGroup	Process ID of the process group leader
Tty	Terminal that controls the process. A question mark (?) is printed when there is no controlling terminal.
Start time	Time that the process started, in hours, minutes, and seconds. The start time for a process that is more than 24 hours old is given in months and days.
Time	Cumulative execution time for the process
State	State of the process
Wait Channel	Address of an event for which the process is sleeping. If blank, the process is running.
Class	Scheduling class of the process
Address	Memory address of the process
Size	Size in pages in main memory for the image of the swappable process
Priority	Priority of the process
Nice	Decimal value of the system scheduling priority of the process
CPU%	Ratio of CPU time used recently to CPU time that was available in the same period, expressed as a percentage
Memory%	Ratio of the process's resident set size to the physical memory on the machine, expressed as a percentage
Command	Command name
CommandLine	Full command name and its arguments, up to a limit of 80 characters

Process Statistics Window

The Output For Process ID window displays the statistics for either `pmap`, `pstack`, `pfiles`, or `pldd` for any highlighted process in the Process View window.

<code>pmap</code>	Prints the address space map of each process
<code>pstack</code>	Prints a stack trace for each lightweight process (lwp) in each process
<code>pfiles</code>	Reports <code>fstat</code> and <code>fctl</code> information for all open files in each process
<code>pldd</code>	Prints dynamic libraries for the process

Process Summary Field

The Process Summary field lists statistics for all processes, active or inactive.

Custom or Third-Party Applications

Note – To develop custom applications, you need the Sun Management Center Developer Environment and documentation. See your Sun authorized sales representative for more information.

If you have any custom or third-party applications installed on your system, they are listed below Applications - View Processes in the left side of the Applications Details window. Select the application if you do not want to view process detail information for a host or node.

After you select an application, the selected properties for the application are displayed in the right side of the Applications Details window. The properties that are shown depend on the application that is selected.

Hardware Tab

Note – The Hardware tab does not appear if this feature is not supported on your system.

The Hardware Details window, which is shown in Figure 6–3, provides three choices for system information:

- Hardware Summary
- Physical View
- Logical View

Note – For additional information on the Hardware tab for your specific hardware object, see your platform supplement.

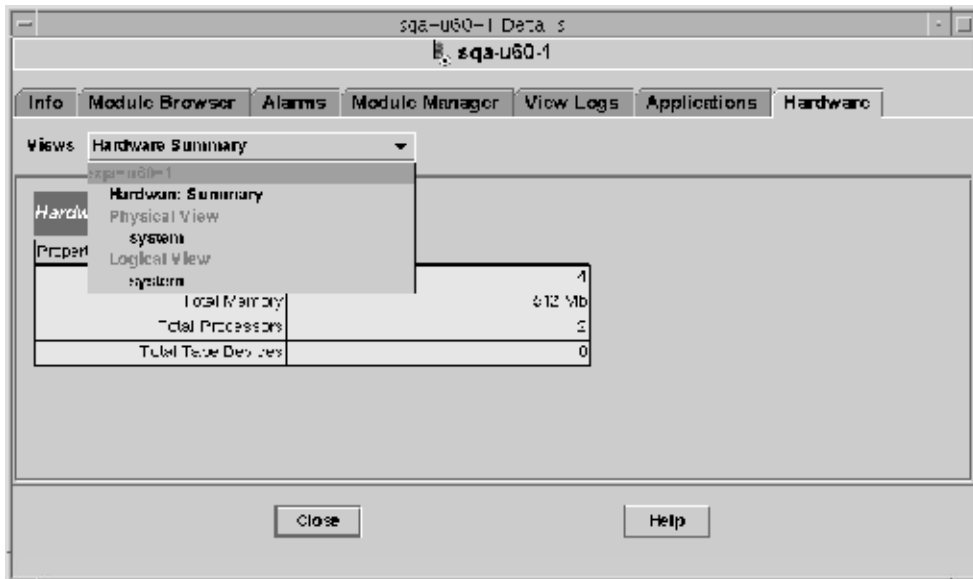


FIGURE 6-3 Hardware Details Window

The Views menu provides access to the available hardware information.

Hardware Summary

The Sun Management Center software displays a table of hardware resources of the selected host. The following list shows some typical values displayed in the Hardware Summary.

Total Disks	Total number of disks that are connected to the host
Total Memory	Total amount of memory that is connected to the host
Total Processors	Total number of processors that are connected to the host
Total Tape Devices	Total number of tape devices that are connected to the host

Your summary may appear different. The resources vary, depending on the type of object that is displayed in the detail view.

Note – The Total Disks field displays the number of internal disks *only*. This number does not include the disks that are part of enclosures.

Physical View

When you select the Physical view - system option, the software displays a photo-realistic picture of the selected host, if available. Pictures are not available for some system types.

Note – This feature is usable only if the host is monitored by a Sun Management Center agent.

As you move the mouse pointer over the picture of the system being viewed, some of the components are highlighted. The detailed component information displays in the right section of the viewing window. The path name of the component is displayed in the Component field at the bottom of the window.

If a component has an alarm, a colored line appears around the component to indicate the alarm severity. This line enables you to identify quickly the faulty component.

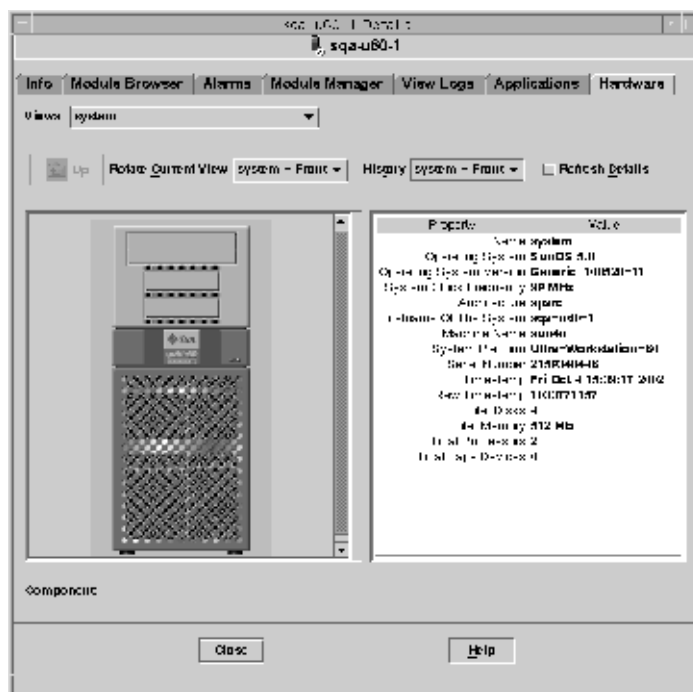


FIGURE 6-4 Hardware Configuration Physical View With Component Details (Property/Value View)

Rotate Current View Menu

For some systems, you can select alternate front, rear, and side views through the Rotate Current View pull-down menu. Pictures are not available for some system types.

For some systems, pictures of components such as CPU boards and I/O boards may also be available. As you move the mouse pointer over the system picture, the pointer changes from an arrow to a hand icon when there is an individual component picture.

Click a highlighted component to display the detailed picture of the component. When you are finished viewing component details, click Up to return to the parent system view.

Physical View When a Sun StorEdge Device is Connected

If a Sun StorEdge™ A5000, A5100, A5200, or T3 system is connected to the selected component, the Views pull-down menu lists the devices that are connected. The connected devices are listed under the system to which they are connected. The Sun StorEdge A5000-series devices are displayed on this menu as `sena (0)`, `sena (1)`, and so on.

You can select and view any of these storage devices from the Views menu.

History Menu

Use the History pull-down menu to revisit a view that you had selected previously.

Refresh Details Button

Click the Refresh Details button to update the Property/Value information in the right side of the Details window for the selected physical component. Otherwise, the information does not change from when you first opened the physical view.

Dynamic Reconfiguration Button

The Dynamic Reconfiguration button appears in the physical view and in the logical view only for certain platforms, such as E4500. Refer to your hardware supplement for more information.

Logical View

The software displays a logical view configuration of a host, if the host is monitored by a Sun Management Center agent, as illustrated in the following figure. Logical views are not available for ping hosts.

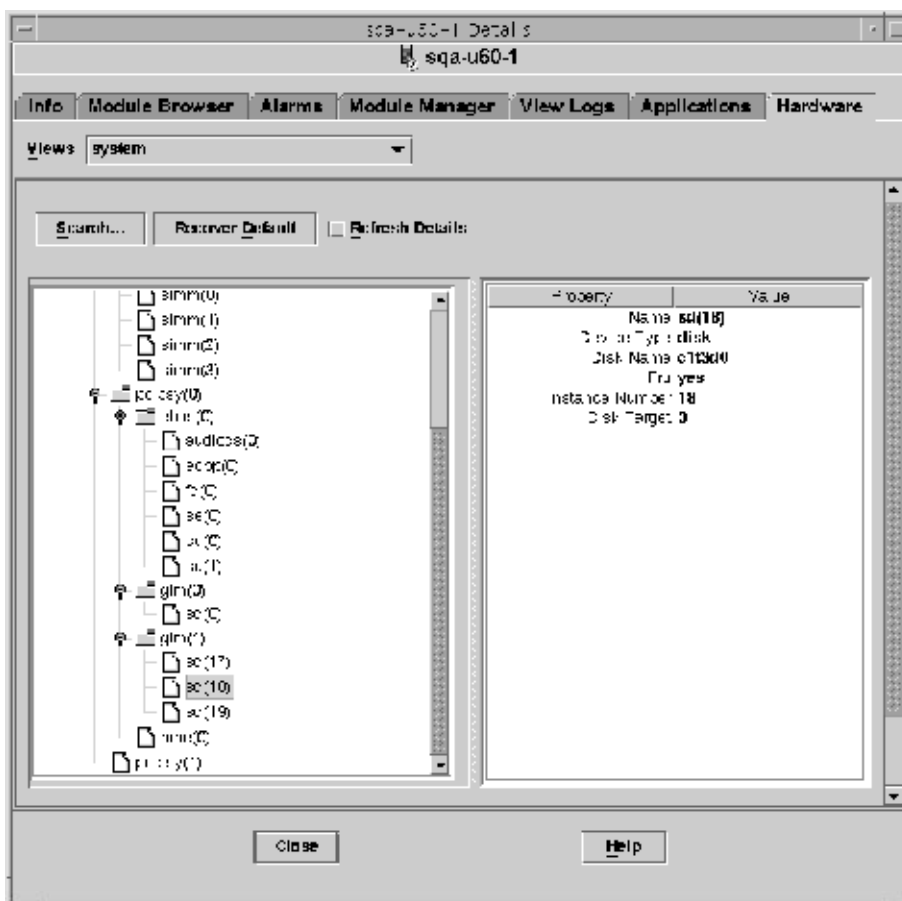


FIGURE 6-5 Hardware Configuration Logical View

Search Button

Click the Search button to display the Search window. Use the Search window to search for components in the Logical View topology on the left side of the viewing window. The located component is highlighted in the topology view. The name of the component displays in the Component field in the bottom right section of the screen.

The Search function is case-sensitive. If the search does not locate the component in your system, the following error message appears at the bottom of the Details window.

Node not found

The Search function stops at the first instance found. For example, if you enter the word board, Search always stops at board (0) . To find the next hit, click the Next button. To find a specific instance of a name, type a more complete name. For example, board (2) .

Expand All

Click the Expand All/Recover Default button to decompress and recompress all the component icons in the topology area (left side) of the window. The compressed view is shown in the following figure.

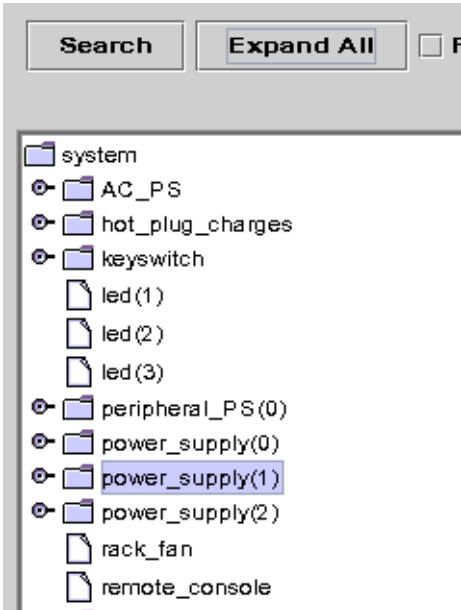


FIGURE 6-6 Compressed Topology of Components in Logical View

Press the Expand All button to display the expanded topology view, as shown in the following figure.

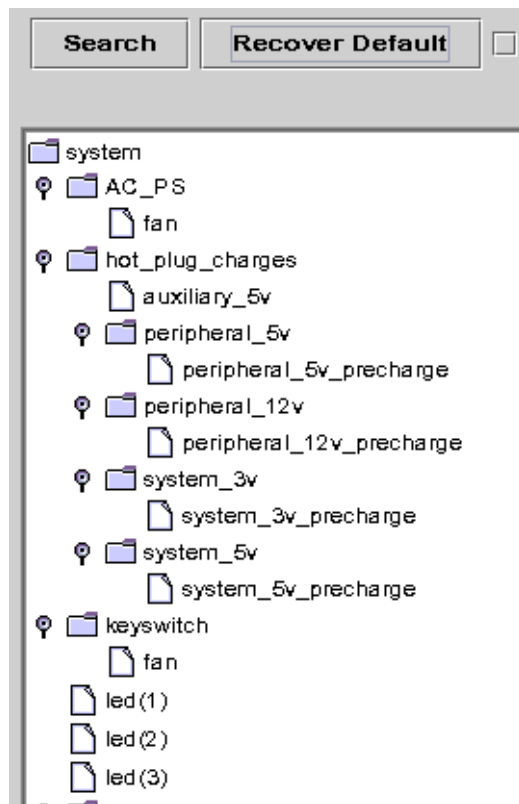


FIGURE 6-7 Expanded Topology of Components in Logical View

The button label toggles to Recover Default. When you press Recover Default, the topology recompresses all the component icons in the topology area of the window.

Refresh Details and Dynamic Reconfiguration

The Refresh Details and Dynamic Reconfiguration features in the Logical View are the same as the features described for the Physical View in “Refresh Details Button” on page 108 and “Dynamic Reconfiguration Button” on page 108.

Navigating the Details Window

Some tabs can display many levels of detail. Double-click icons in the Details window to see additional levels of information. A category can have many subcategories.

If information in a table cell is too long to display completely, hold the mouse pointer in the cell for several seconds. The complete text that is contained in that cell appears in a pop-up window.

To expand or compress the hierarchy, use the expansion icon. The hierarchy is compressed when the icon “handle” is pointing right. The hierarchy is expanded when the icon “handle” is pointing down.

▼ To Start the Details Window

1. **Start the Details window in either of the following ways:**

- Double-click an object icon in either the hierarchy view or the topology view.
- Press mouse button three on an object icon, and choose Details from the pop-up menu.

Tip – Be sure to select an object, not an administrative domain. The Details window is not available for administrative domains.

The Details window appears, as illustrated in the following figure.

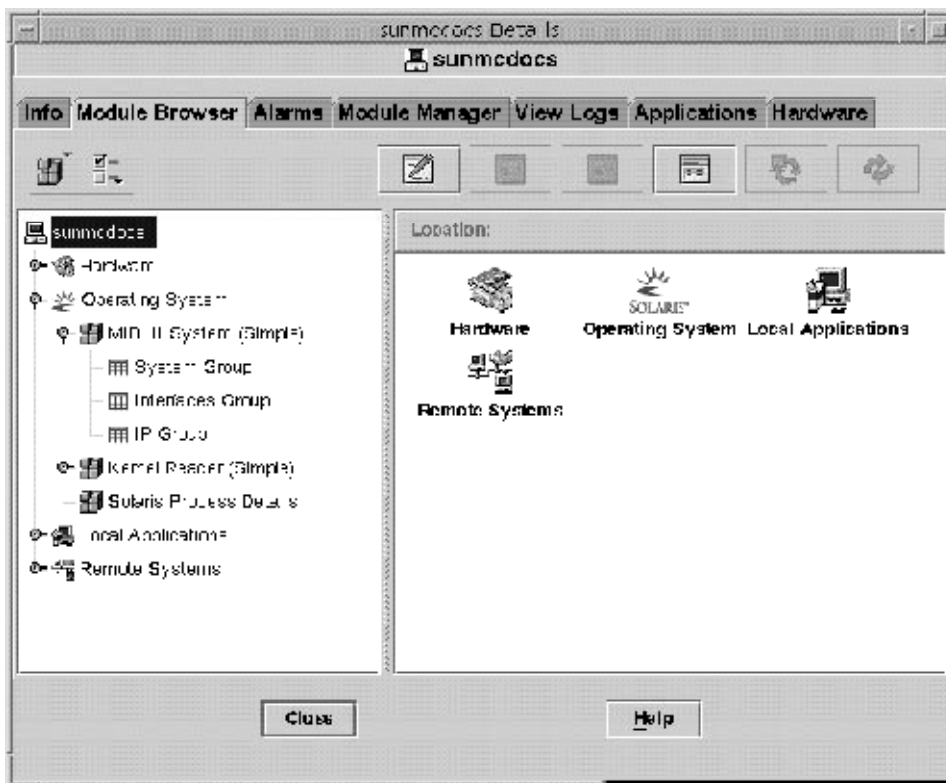


FIGURE 6-8 Details Window for a Selected Object

2. Click a tab to view detailed information for that category.

Viewing Log Files

You can view log files or portions of log files. You can also monitor log messages as the messages are added to the log files.

▼ To View the System Log File Messages

1. In the Details window, click the View Logs tab.
2. Choose System Log from the Log File menu.
3. Click the Log File field, and select Syslog.
The System Log messages are displayed.

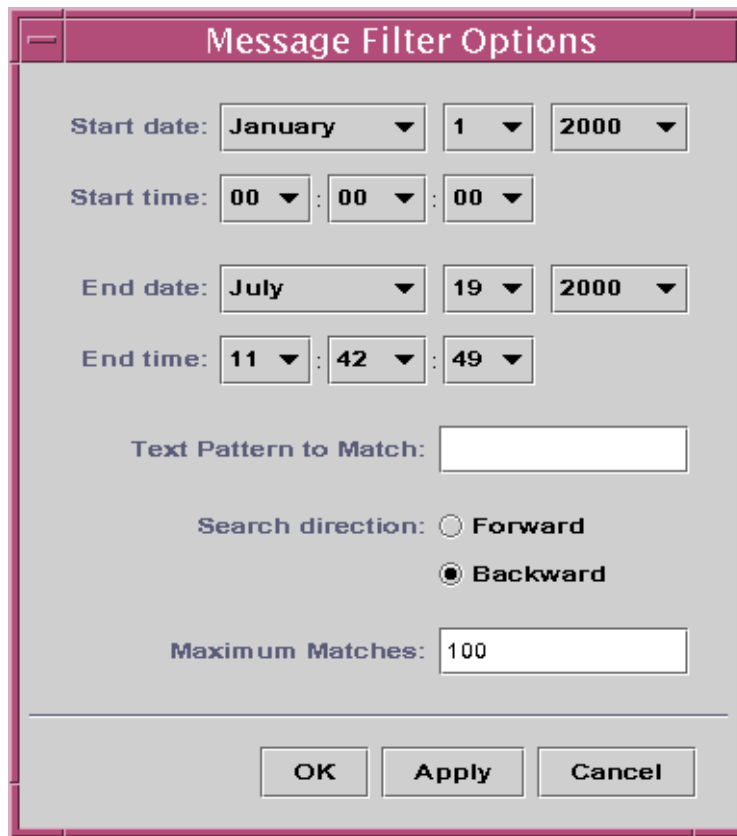
To refresh the display and view any new messages, click Reload.

▼ To Filter Your Log Request

You can apply a filter to display only those messages that match the date range and text pattern that you specify. In addition, you can limit the size of the search by specifying the maximum number of matches to report.

1. With the **View Logs** tab selected in the **Details** window, click the **Filter** button.

The Message Filter Options dialog box is displayed, as shown in the following figure.



The screenshot shows a dialog box titled "Message Filter Options". It contains the following fields and controls:

- Start date:** Three dropdown menus showing "January", "1", and "2000".
- Start time:** Three dropdown menus showing "00", "00", and "00".
- End date:** Three dropdown menus showing "July", "19", and "2000".
- End time:** Three dropdown menus showing "11", "42", and "49".
- Text Pattern to Match:** A text input field.
- Search direction:** Two radio buttons, "Forward" (unselected) and "Backward" (selected).
- Maximum Matches:** A text input field containing the value "100".
- Buttons:** "OK", "Apply", and "Cancel" buttons at the bottom.

FIGURE 6-9 Message Filter Options Dialog Box

2. Select the start date for the first log message that you want to view.
3. Select the start time for the first log message that you want to view.

4. **Select the end date for the last log message that you want to view.**
5. **Select the end time for the last log message that you want to view.**
6. **Type the text pattern to be matched in the Text Pattern to Match field.**
Use a text pattern that is unique to the type of message in which you are interested.
7. **Select Forward or Backward to specify the direction of the message search through the log file.**
To begin searching from the end of the log file, select Backward. To search from the beginning, select Forward.
8. **(Optional) Type the maximum number of log messages that should be matched in the Maximum matches to report field.**
If you enter zero (0), all matching messages are reported, up to a maximum of 100 messages.
9. **To filter and reload your log messages and close this window, click the OK button.**

▼ To Monitor Log Messages

Monitoring enables you to view new log messages as the messages occur. Each new message that arrives is highlighted.

1. **Click the Monitor button on the View Logs screen.**
The Monitor Filter Options dialog box is displayed, as shown in the following figure.

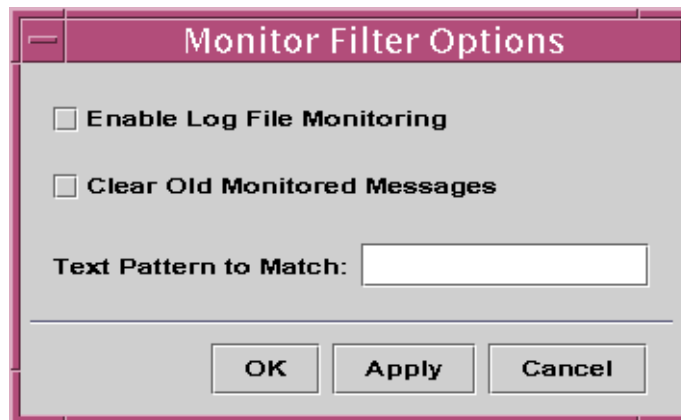


FIGURE 6-10 Monitor Filter Messages Dialog Box

2. **Select Enable Log File Monitoring to enable log file monitoring.**

3. **To display only currently monitored log messages, select Clear Old Monitored Messages.**
4. **Type the text pattern to be matched in the Text Pattern to Match field.**
You can use a UNIX regular expression. For information about regular expressions, refer to the `regex(1F)` man page.
Use a text pattern that is unique to the type of message in which you are interested.
5. **To monitor your log messages and close this window, click the OK button.**

▼ To Find a Log Message

You can search for a specific character sequence within a set of messages after the set has been loaded and displayed in the Messages For area.

1. **Click the View Logs tab in the Details window.**
2. **Type the specific character sequence that you want to find in the Find field.**

Note – Wildcard searches using an asterisk (*) character, are *not* supported in the View Logs find feature. To search for a message that contains the asterisk character, precede the character with a backslash (\), for example, *.

3. **Press Return to search the log messages for that sequence.**
The first matching message is highlighted.
4. **Click the down arrow or up arrow to continue your search and find additional occurrences of the matching sequence.**

▼ To View the Sun Management Center Log File Messages

1. **With the View Logs tab selected in the Details window, choose Sun Management Center Log from the Log File menu.**
A list of log files displays as a submenu, as shown in the following figure.

▼ To View Other Log File Messages

1. **With the View Logs tab selected in the Details window, choose Other Log from the Log File menu.**

Note – The Other Log option is available only if the Logview ACL module (Local Applications) is loaded.

2. **To filter the log information, click the Filter button. Then, provide the filter parameters in the Message Filter Options dialog box.**

The information is displayed using the filter that you selected.

Viewing Application and Process Information

You can view information about an application. You can also view information about a specific process, such as the amount of memory or CPU currently in use.

Note – The Solaris Process Details module must be loaded to view process information. For instructions, see “To Load a Module” on page 164.

▼ To View Information About a Specific Application

1. **From the Details window, click the Applications tab.**

The Applications panel appears showing a list of available applications. By default, if the Solaris Process Details module is loaded:

- The View Processes application is selected in the left side of the window.
- Process information appears in the right side of the window.

2. **To view information about another application, click on the application name in the list on the left side of the window.**

For example, you could view information about the Hardware Diagnostic Suite. The right side of the window is updated with the selected application.

▼ To Display Additional Properties in the Process Table

By default, the View Process table displays the following information:

- Process identifier (PID)

- User that is running the process
- Amount of CPU used for the process
- Amount of memory that is used for the process
- Command line for the process

To add additional information to the table, follow these steps:

1. In the Details window, click the Applications tab.

If the Solaris Process Details module is loaded, the View Process table appears.

2. Click the View Columns button above the Process table to see a list of available process properties.

A check mark appears next to columns that currently are in the table.

3. To add information about a property to the table, select the property that you want to add.

The selected property appears in a new column to the right of the existing columns in the table.

4. To add more properties to the table, repeat the preceding steps.

Tip – To view all process properties, select the All button at the bottom of the View Columns list.

▼ To Sort Columns in the Process Table

You can sort the processes (rows) by the properties (column headers) in ascending or descending order. For example, you can sort the CPU% column starting with either the smallest or the largest value first.

1. To sort columns in ascending order, click the property in the table column header.

The processes (rows) are updated in ascending order for that property.

2. To sort columns in descending order, click the property in the table column header while holding down the Shift key.

The processes (rows) are updated in descending order for that property.

▼ To Reorder Columns in the Process Table

You can rearrange the order of columns.

1. To select a column, press mouse button one on a column header.

2. To move the column, drag the column header to the desired position and release the mouse button.

Viewing Hardware Information

Note – If you load or unload the Config-Reader or Dynamic Reconfiguration modules while the Details window is open, you must close and reopen the Details window to see the results.

▼ To View a Hardware Configuration

1. **In the Details window, click the Hardware tab.**
The Hardware panel appears and displays a summary of hardware information.
2. **Select the configuration in which you are interested.**
The window is updated, and the selected feature is displayed.

▼ To Reconfigure the System

1. **Open the Details window for the selected system.**
2. **Select the Module Manager tab in the Details window, and verify that the Dynamic Reconfiguration (dr) module is loaded.**
Load the module if necessary. For information about loading modules, see “To Load a Module” on page 164.
3. **Select the Hardware tab in the Details window.**
4. **From the Views Menu, choose “system” in either the Physical View or the Logical View category.**
The view changes, and a Reconfiguration button appears at top of the display.
5. **Click the Reconfiguration button.**
 - If the Reconfiguration module is not loaded, a pop-up window displays an error message.
 - If the Reconfiguration module is loaded, the Dynamic Reconfiguration pop-up window appears.
6. **Select a board slot or memory bank.**

Dynamic Reconfiguration buttons are not available for operations that are not permitted for the selected board or memory and appear dimmed.

7. **Click the desired function button for the selected memory or board.**

TABLE 6-4 Dynamic Reconfiguration Functions

Function	Action
Configure	Adds the selected board or memory to the system configuration. Turns on power to the board, if the board was not previously in the Connected state.
Unconfigure	Removes the selected board or memory from the system configuration. Electrical power to the board is maintained.
Connect	Turns on electrical power to the board. Basic tests of the board are run, but the board is not automatically added to the system configuration. Note – The Configure function includes this function.
Disconnect	Turns off power to the board. The board is ready to remove when the yellow Service LED is lit, and the Power and Cycling LEDs are off.
Test Memory	Tests the selected memory. Note – Memory tests can be time-consuming. These tests might last an hour or longer for large-capacity DIMMs.

Browsing Information About a Managed Object

This chapter describes the following topics:

- “Overview of Module Browser Tab” on page 123
- “To Apply the Alarms Filter to All Tables” on page 128
- “To Set Security for a Host or Module” on page 129

Overview of Module Browser Tab

When you open the Details view for a host managed object, the Module Browser tab is selected. The Module Browser tab shows the hierarchy and contents view for a host. These views provide additional information about the host hardware, operating system, local applications, and remote systems.

Tip – To see alarm status information for a node, hold the mouse pointer over the object in the right side of the screen for several seconds. A tool tip shows alarm status information about the object. Tool tips are also displayed for data property table cells and are useful if information in a table cell is too long to display completely.

You can expand or compress the hierarchy view by using the expansion icon. The hierarchy is compressed when the “handle” is pointing right. The hierarchy is expanded when the “handle” is pointing down.

Sun Management Center software uses *modules* to monitor hosts. Modules are software components that monitor data pertaining to the health indicators and resources of systems, applications, and network devices. The information that the

Module Browser tab provides depends on the modules that are loaded for that host. The Sun Management Center modules belong to one of the four categories that are shown in the Module Browser tab view. For more information on modules, see Appendix C.

Note – Depending on how your system is configured, you might not have access to all of the modules described in this section.

Figure 7-1 is an example of the host view. The left side of the host view is the hierarchy (tree) view and the right side is the contents view. The host hierarchy view displays the relationship between the host and its modules. In this example, the loaded operating system modules are the MIB-II System (Simple) and the Kernel Reader (Simple) modules.

Through the Browser Details window, you can set alarm thresholds and view and graph monitored data properties for your host.

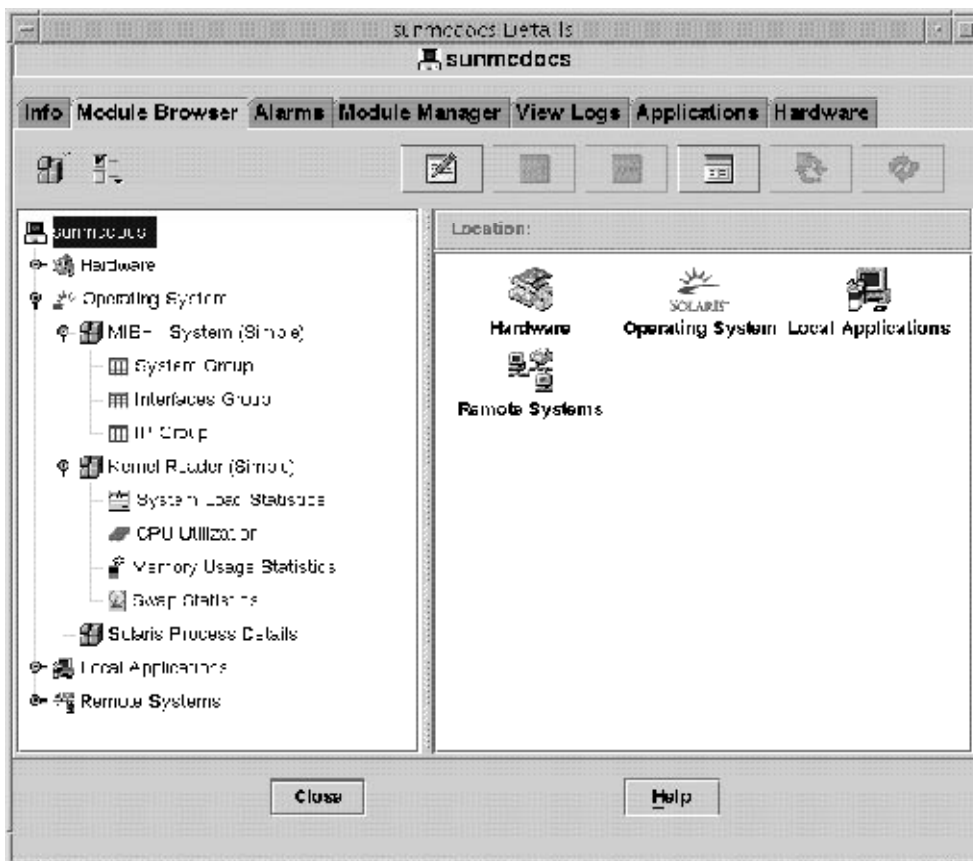


FIGURE 7-1 Browser Details Window

Hardware Monitoring

Depending on the modules that are loaded on the system, you can monitor the following information about the hardware environment of the host:

- **Config-Reader module**

The Config-Reader module monitors the host configuration. This configuration includes information and status for power supplies, key switch, fans, remote console, the system in general, and so on. There are different Config-Reader modules for different hardware platforms. If your system is supported by a Config-Reader module, that module is loaded automatically during installation. For more information on the Config-Reader module for your hardware platform, refer to your platform supplement and Appendix C.

- Sun StorEdge A5x00 system
- Sun StorEdge T3 system

For more information about specific hardware features, see the platform supplement for your system.

Operating System Monitoring

Depending on the modules that are loaded on the system, you can monitor the following information about the operating environment of the host:

- Directory Size Monitoring
- File Monitoring
- Kernel Reader (Simple)
- Kernel Reader
- MIB-II Instrumentation
- NFS File Systems
- NFS Statistics
- Simple MIB-II
- Solaris Process Details

Local Applications Monitoring

Depending on the modules that are loaded on the system, you can monitor the following information about the local applications on the host:

- Agent Statistics
- Data Logging Registry
- Dynamic Reconfiguration
- File Scanning
- Health Monitor
- Print Spooler
- Process Monitoring

Remote Systems Monitoring

Depending on the modules that are loaded on the system, you can monitor the following information about the remote systems that the host recognizes:

- MIB-II Proxy Monitoring module
- HP JetDirect module, which monitors HP printers equipped with a JetDirect card

Browser Icons

The Browser Details window includes a row of icons at the top of the panel. These icons provide access to additional functions.

Module Icon

Click the module icon to see a list of module-related functions:

- Load Module adds a module to the host. If a host is not selected, this option is unavailable and is dimmed. For more information, see “To Load a Module” on page 164.
- Edit Module enables you to change module parameters. If a module is not selected, this option is unavailable and is dimmed. For more information, see “To Modify Module Parameters” on page 171.
- Enable Module enables a module. If a module is not selected, this option is unavailable and is dimmed. For more information, see “To Enable a Module” on page 168.
- Disable Module disables a module. If a module is not selected, this option is unavailable and is dimmed. For more information, see “To Disable a Module” on page 168.
- Unload Module unloads a module from the host. If a module is not selected, this option is unavailable and is dimmed. For more information, see “To Unload a Module” on page 169.

Options Icon

Click the options icon to view a list of the following functions:

- Copy enables you to copy a module. You can paste the copied module in the topology or hierarchy view of the main console. The copy function enables you to monitor the module properties without having the Details window open. For more information, see “To Create a Module Object” on page 62.
- Copy to Dataview Clipboard enables you to copy a data property to a clipboard, and then paste into a dataview window.
- Create Dataview opens an automatically populated dataview window.
- Copy To Graph Clipboard enables you to add another data property with the same units to an existing graph. This function is used with Add From Graph Clipboard menu item in graphing window. See “To Create a Graph of Two or More Data Properties” on page 143.
- Alarms Filter Enabled enables you to apply global filters to alarms on the Details window Alarms tab. See Chapter 12 for more information.
- Add Row adds a row to a data property table. See “To Add a Row to a Data Property Table” on page 137.
- Edit Row enables you to edit information for a row in a data property table.
- Disable Row disables a row in a data property table.
- Delete Row deletes a row in a data property table.

Attributes Icon

Click the attributes icon to display the Attribute Editor for the selected object. The Attribute Editor provides additional information about the selected object and about the rules that govern its behavior. Use the Attribute Editor to edit information about the object. For more information about the Attribute Editor, see Chapter 10.

Set Property Value Icon

Click the set property value icon to add property values to a multi-instance task.

Graph Icon

Click the graph icon to create a graph of the selected monitored data property. For more information, see Chapter 9.

Probe Icon

Click the probe icon to run selected commands on the monitored data property.

Refresh Icon

Click the refresh icon to update the information in the displayed data property table.

Note – When the command is not appropriate for the selected object, the icons are unavailable and are dimmed.

Alarms Filter

You can use alarm states to filter tables. For example, you can choose to see only rows that are in a critical (red) state. These filter settings apply only to the current Module Browser tab in the current session. The settings do not persist across sessions.

The default state for the Alarms filter is that all options are selected, and Alarms Filter Enabled is set to On.

▼ To Apply the Alarms Filter to All Tables

1. **In the Details window, click the Module Browser tab.**
2. **From the Options menu, choose Alarms Filter Enabled.**

A selected check box indicates that filters apply to all tables. A blank check box indicates that filters apply only to the specific table for which the alarm filter is defined.

Host Security

In the Details window, Sun Management Center software offers security at two levels: the host and the module. You may set security at the host level only. In this case, anyone with the appropriate security can load modules, set alarm thresholds, acknowledge alarms, and so on.

You may also set security permissions at the module level. In this case, only those users with the appropriate module permissions can perform actions on the module. Module security can be used as a subset of host security.

For example, at the host level, you can set security permissions so that users A, B, and C can load modules and create alarm thresholds. User A loads the Health Monitor module and creates customized alarm thresholds. However, users B and C can change user A's work unless security permissions have also been set at the Health Monitor module level, enabling only user A to set alarm thresholds for that module.

Note – When security is set at both levels, the security permissions at the module level take precedence over the security permissions at the host level.

For more information on security, see Chapter 18.

▼ To Set Security for a Host or Module

1. **Open the Attribute Editor for a host or module in either of the following ways:**
 - Press mouse button three on the host or module and choose Attribute Editor from the pop-up menu.
 - Click the Attributes button.
2. **Click the Security tab.**
3. **Type the names of user and administrator groups in the appropriate fields.**
For more information on the security fields, see Chapter 18.
4. **To accept your security settings and close the window, click the OK button.**

Monitoring Data Properties

The Sun Management Center product enables you to monitor specific data properties for your managed objects. You can view these properties in tabular format or in graphical format. This chapter describes how to use tables to monitor data properties. The chapter includes the following information:

- “Data Property Concepts” on page 131
- “To Display a Data Property” on page 134
- “To Refresh Displayed Data” on page 135
- “To Select a Row” on page 135
- “To Select Multiple Contiguous Rows” on page 135
- “To Select Multiple Row Ranges” on page 136
- “To Monitor Directory Size” on page 136
- “To Add a Row to a Data Property Table” on page 137
- “To Add a Printer to Be Monitored” on page 138
- “To Probe a Property” on page 140

For information about how use graphs to view data properties, see Chapter 9.

Data Property Concepts

Use the Details window to view the current values for specific data properties, such as the amount of memory being used on a host. You navigate through the hierarchy (tree) view to find the appropriate data property. The lowest-level object in the host hierarchy is the monitored property. By default, information about a monitored data property is displayed in table form. For information about viewing that information in a graph, see Chapter 9.

Once the data has been displayed, you can refresh the view. In addition, you can simultaneously graph up to five data properties. These actions are described in the following sections.

Standard Table Features

Sun Management Center property tables use a standard format to display information. The format includes the following elements:

- A property table label
- Column headings
- Individual table cells organized into rows and columns

Editable and Noneditable Cells

Sun Management Center tables contain two types of cells: editable and noneditable.

- Information in an *editable* cell can be changed. This type of cell has a white background with black text.
If you edit information in the cell and you provide an invalid value, an error window appears. Click OK to close the error window. Then, re-enter an appropriate value in the table cell.
- Information in a *noneditable* cell is display-only. This type of cell has a colored background with black text. The default background color for noneditable cells is light gray.

Cell Editors

Editable cells have one of the following types of cell editors:

- Text Cell Editor
The text cell editor is invoked if the cell is a string type. Once the cell is selected, the text cursor is activated at the end of the text string. If there is no text, the cursor is aligned left in the cell. To save the information in the cell, press Return.
- Check Box Cell Editor
A check box is a component with only two choices:
 - On
 - Off
- Combo Box Cell Editor
The combo box cell editor has a drop-down menu that displays an associated list of options. The current choice appears in the combo box. As you move the cursor over the list, each option is highlighted. The option that you choose from the list replaces the current selection.

Modules That Enable You to Manipulate Rows

For selected modules, the software enables you to add, delete, enable, or disable rows for the data property tables. When these modules are initially loaded, the data property tables are empty, except the Directory Size Monitoring and Print Spooler modules. For the File Monitoring, File Scanning, and Directory Size Monitoring modules, you must add a row to monitor the data property. The following table lists the modules that allow you to add rows.

TABLE 8-1 Sun Management Center Modules to Which You Can Add Rows

Module Name	Description
Directory Size Monitoring	Enables you to define another directory for monitoring
File Monitoring	Defines the file to be monitored
File Scanning	Defines the pattern that must be matched within the monitored file
Print Spooler	Enables you to define another printer for spooler monitoring
Process Monitoring	Defines the pattern that must be matched from all the processes that are running on the agent object

For more information on the directory size monitoring and file monitoring modules, on the file scanning, print spooler, and process monitoring modules, see Appendix C.

Row Context Menu

The row context menu provides access to various row-related functions, such as enabling you to add rows to a table that allows this behavior. To activate a row context menu, press mouse button three in the appropriate row.

Table Sorting

Information in tables can be sorted by column. If a column header has a triangle that points up or down, you can change the order of the table display based on that column. Depending on the data in the column, the sort uses one of the following keys:

- Alphabetical string
- Numeric
- Date

To change between an ascending and descending sort, double-click the header of the sorted column.

Working With Large Data Property Tables

In large data property tables, you can see only one page of rows at a time. To navigate through additional pages of the table, use the icons that are displayed above the table.

The icons enable you to navigate as follows:

- Return to the first page
- Return to the previous page
- Go to the next page
- Go to the final page

In addition, a pull-down menu to the right of these icons enables you to go to a specific page.

Probing Properties

On selected module properties, the software enables you to use predetermined UNIX commands including list files, the `vmstat` command, and so on. The Probe button is available only for selected properties. Otherwise, the button is unavailable and is dimmed.

Note – The available Probe commands can sometimes be difficult to distinguish. As an example, consider the Filesystem Usage properties in the Kernel Reader module. The Find All Recent Files probe commands find *only* files that were created or modified less than 24 hours ago. The Find All Files probe commands find all files regardless of the date and time that the files were created or modified. For more information on the Filesystem Usage properties, see “File System Usage Table ” on page 355.

Working With Data Property Tables

This section describes how to display and manipulate data property tables.

▼ To Display a Data Property

Note – The following example uses the Kernel Reader module.

1. In the Browser Details window, double-click the Operating System icon in the hierarchy (tree) view.

The operating system modules are displayed in both the hierarchy and topology views.

2. **Double-click the Kernel Reader icon in the topology view, or click the expansion icon next to the Kernel Reader icon in the hierarchy view.**

The Kernel Reader statistics are displayed.

3. **Double-click the System Load Statistics icon in either the hierarchy or the topology view.**

The monitored properties are displayed in a property table.

▼ To Refresh Displayed Data

- **To refresh displayed data, use either of the following methods:**

- Press mouse button three in the data property table row and choose Refresh from the pop-up menu.
- Click the Refresh Now button.

The current table is updated with the latest information.

Note – You can also set up a refresh interval that tells the Sun Management Center software to update your monitored data at your designated time interval. For information on accomplishing this task, see “To Set a Refresh Interval” on page 157.

▼ To Select a Row

- **Click mouse button one in the first cell of the row that you want to select.**

When you select a row, the anchor cell has the focus.

The color of the cells in a row is determined by whether the cell is editable or noneditable. The maximum number of rows that can appear on one page in a table is 20.

▼ To Select Multiple Contiguous Rows

1. **Click in the first target row to highlight the entire row.**
2. **Select additional rows in one of the following ways:**
 - Drag to the last row that you want to select and release the mouse button.
 - Move your cursor to the last row that you want to select, press the Shift key and click again.

All rows between the last and first anchor points are selected.

▼ To Select Multiple Row Ranges

1. **Select the first range of a single or contiguous group of rows by completing the procedure “To Select Multiple Contiguous Rows” on page 135.**
2. **Place the cursor in a row and press the Control key.**
This step adds a new row to the selection.
3. **To extend the range of selected rows, press the Shift key.**
This step extends the range from the row that you selected with the Control key in the previous step.

Example Procedures

The following procedures provide examples of typical data property tasks.

▼ To Monitor Directory Size

The following example procedure uses the Directory Size Monitoring module. This module enables you to monitor the size and size change rate of a directory and its subdirectories. If this module is not loaded, see “To Load a Module” on page 164.

1. **In the Browser Details window, double-click the Operating System icon in the hierarchy (tree) view.**
The operating system modules are displayed in both the hierarchy and topology views.
2. **Double-click the Directory Size Monitoring icon in the topology view, or click the expansion icon next to the Directory Size Monitoring icon in the hierarchy view.**
The Directory Size Monitoring Status folder is displayed.
3. **Double-click the Directory Size Monitoring Status folder in either the hierarchy or the topology view.**
The Directory Monitoring property table is displayed.
4. **Add a row to the table in one of the following ways:**
 - Press mouse button three in a table row or column header, and choose New Row from the pop-up menu.

- Select the table. Then choose New Row from the Options icon menu.
The Row Adder window is displayed.
- 5. **Type the appropriate information in the text fields.**
 - a. **In the Instance field, type a name that uniquely identifies this instance of the Directory Size Monitoring module.**
 - b. **In the Directory field, type the complete path to the directory that you want to monitor.**
- 6. **To add the row to the table and close the Row Adder window, click the OK button.**
The added row is displayed in the topology view.

▼ To Add a Row to a Data Property Table

Note – You can use the steps in this procedure to add a row to the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring modules.

The following example procedure uses the File Monitoring module which enables you to monitor a file's size, modification date, and rate of growth. If this module is not loaded, see "To Load a Module" on page 164.

1. **In the Browser Details window, double-click the Operating System icon in the hierarchy (tree) view.**
The operating system modules are displayed in both the hierarchy and topology views.
2. **Double-click the File Monitoring icon in the topology view, or click the expansion icon next to the File Monitoring icon in the hierarchy view.**
The File Monitoring Status folder is displayed.
3. **Double-click the File Monitoring Status folder in either the hierarchy or the topology view.**
An empty property table is displayed.
4. **Add a row to the table in either of the following ways:**
 - Press mouse button three in a table row or column header, and choose New Row from the pop-up menu.
 - Select the table. Then choose New Row from the Options icon menu.
The Row Adder window is displayed.
5. **Type the appropriate information in the text fields.**

Note – This example shows the fields for the File Monitoring module. Fields differ depending on the module that you are modifying.

- Name is a unique name for this instance of the File Monitoring module.
The name should be a single word that may contain alphanumeric characters and an underscore (_).
- Description is a text description for this particular instance.
- Filename is the complete path to the file that you want to monitor.

6. To add the table row and close the Row Adder window, click the OK button.

The added row is displayed in the topology view.

▼ To Add a Printer to Be Monitored

The Print Spooler module enables you to monitor the status of the printer daemon, print queues, and other printer devices on your network. The following example procedure uses the Print Spooler module. If this module is not loaded, see “To Load a Module” on page 164.

1. In the Details window with the Module Browser tab selected, double-click the Local Applications icon in the hierarchy (tree) view.

The local applications modules are displayed in both the hierarchy and topology views.

2. Double-click the Print Spooler icon in either the hierarchy or the topology view.

Three property tables are displayed: Lpsched Status, Printer Devices Table, and Printer Queues Table.

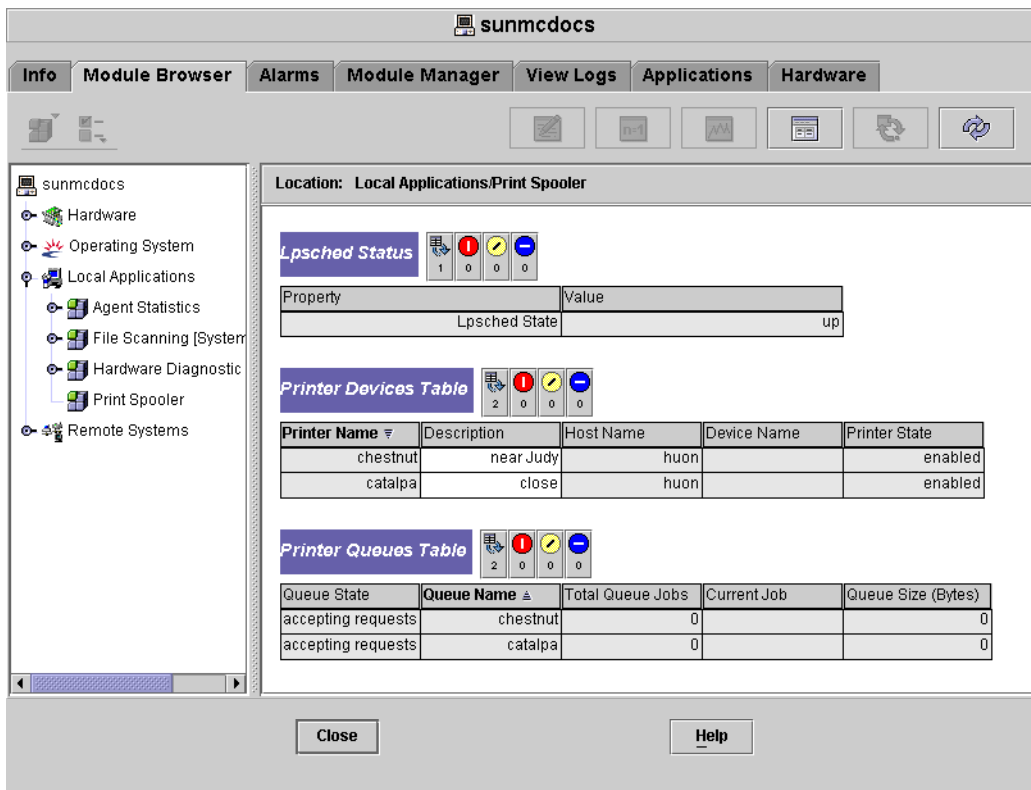


FIGURE 8-1 Print Spooler Property Tables

3. Add a printer device row to the table in either of the following ways:
 - Press mouse button three in the Printer Devices table row, and choose the New Row command from the pop-up menu.
 - Click the Printer Devices table, and choose New Row from the Options pop-up menu at the top left of the Details window.
 The Add Row window is displayed.
4. Type the name of the printer and a description for the printer in the appropriate fields.
5. To add the printer to the table and close the Add Row window, click the OK button. The added row is displayed in the topology view.

▼ To Probe a Property

This example procedure explains how to probe a property in the Directory Size Monitoring module. If you have not done so already, load this module by following the procedure “To Load a Module” on page 164.

- 1. In the Browser Details window, double-click the Operating System icon in the hierarchy (tree) view.**

The operating system modules are displayed in both the hierarchy and topology views.
- 2. Double-click the Directory Size Monitoring icon in the topology view, or click the expansion icon next to the Directory Size Monitoring icon in the hierarchy view.**

The Directory Monitoring Status folder is displayed.
- 3. Double-click the Directory Monitoring Status folder icon in either the hierarchy or the topology view.**

The monitored data properties are displayed in a property table.
- 4. List or recursively list files in either one of the following ways:**
 - Press mouse button three in the Directory Monitoring table row and choose the List Files or Recursively List Files command from the pop-up menu.
 - Click the Probe icon, select the appropriate command in the Probe Select dialog box, and click the OK button.

A window appears that displays the files.

Viewing Data Properties in a Graph

The Sun Management Center product enables you to monitor specific data properties for your managed objects. You can view these properties in tabular format or in graphical format. This chapter describes basic capabilities that Sun Management Center provides for using graphical formats to monitor data properties. The chapter includes the following information:

- “Overview of Graphs” on page 142
- “To Create a Graph of a Monitored Data Property” on page 142
- “To Create a Graph of Two or More Data Properties” on page 143
- “To Save Graphing Parameters” on page 145
- “To View an Existing Graph” on page 144
- “To Apply a Graph Template” on page 146
- “To Change Graph Type” on page 146
- “To Add or Modify Legends and Labels” on page 146
- “To Change X-Axis and Y-Axis Values” on page 147
- “To Modify the Border for the Graph or the Data Section of the Graph” on page 148
- “To Modify the Data View” on page 148
- “To Enlarge an Area of a Graph” on page 149
- “To Translate a Graph” on page 150

The Performance Reporting Management (PRM) product provides advanced graphing features, such as saving graph definitions for multiple hosts and properties, saving graphs as images, and creating graphs that are based on historical data. For more information, see *Sun Management Center 3.5 Performance Reporting Manager User’s Guide*.

For information about viewing data properties in a table, see Chapter 8.

Overview of Graphs

Use the Details window to view the current values for specific data properties, such as the amount of memory being used on a given host. You can navigate through the hierarchy (tree) view to find the appropriate managed object. The lowest-level object in the host hierarchy is the monitored property.

By default, information about a monitored data property is displayed in table form. In some instances, viewing that information in a graph can be useful. For example, to see when memory usage is highest, you might create a graph of the memory usage as a function of time.

Working with Graphs

Sun Management Center software enables you to create graphs for most monitored data properties.

▼ To Create a Graph of a Monitored Data Property

- **From the Details window, display the Graphing window in either of the following ways:**
 - Press mouse button three in any table cell that contains a data property, and choose Open Graph from the pop-up menu.
 - Select the desired data property, and click the Graph button at the top of the Details window.

The Graphing window opens. The values of the property are plotted as a function of time. The plotting is dynamic. Values continue to be plotted even if you minimize the Graphing window. Plotting stops, however, if the window is closed.

The following figure shows a typical Graphing window.

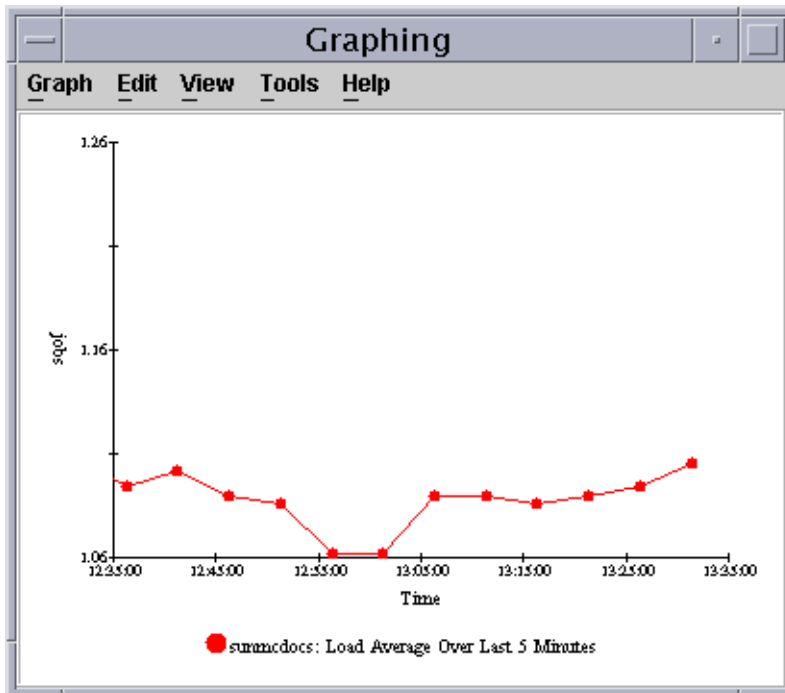


FIGURE 9-1 Graph of System Load Statistics Average Over the Last Five Minutes

▼ To Create a Graph of Two or More Data Properties

1. Click in the data property table cell.

For example, if you followed the hierarchy from Operating System to Kernel Reader (Simple) to System Load Statistics, you could select the Load Averages Over the Last 1 Minute table cell.

2. Copy the cell to the graph in one of the following ways:

- Click mouse button three in the table cell, and choose the Copy to Graph Clipboard command from the pop-up menu.
- In the Details window, choose Copy to Graph Clipboard from the Options icon menu.

Note – The Copy to Graph Clipboard command works only when the units of the data item are the same. Also, Copy to Graph Clipboard places the data on a clipboard. The data is not actually placed on the graph until you complete the following steps.

3. Go to the graphing window in which you want the additional property to be plotted.
4. Choose **Add From Graph Clipboard** from the **Graph** menu.
The second data property is added, as shown in Figure 9–2.

Note – You may graph up to five data properties at one time on a single graph.

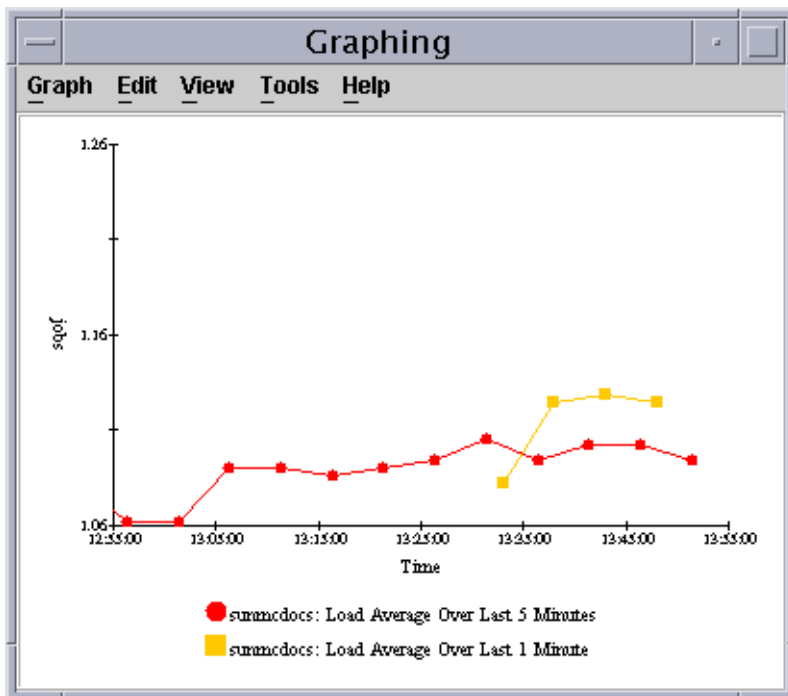


FIGURE 9–2 Load Averages Over the Last One and Five Minutes

▼ To View an Existing Graph

1. Choose **Open Saved Graph** from the **Graph** menu in the **Graphing** window.
The **Open Graph** dialog box appears.
2. Select a saved graph from the list.
3. To view the selected graph, click the **OK** button.

Note – When you save a graph request, the graph parameters are saved but not the data. Thus, when you open a graph, the graph starts plotting fresh data.

▼ To Save Graphing Parameters

The Save Graph Request As function enables you to save the host name and the data property or properties that have been graphed. Once saved, a graph of this property on this host can be pulled up quickly from inside the Graphing window. You can also access a saved graph from the Tools menu in the main console window. A newly opened graph starts plotting fresh data.

1. **To save properties for your graph, choose Save Graph Request As from the Graph menu in the Graphing window.**
2. **Type the name for this graph in the Enter Graph Name field.**
3. **Click the Save button.**

▼ To Define a Graph Template

You use graph templates to define the appearance of graphs. To create a graph template, you define the visuals for one graph and save the template for that graph. When you save the graph template, only the data properties, host information and the template gets saved. The actual graph state at the time of saving is not saved. To apply that template to new graphs so that they have the same look, see “To Apply a Graph Template” on page 146.

1. **Save the properties for a graph as explained in “To Save Graphing Parameters” on page 145.**
2. **To save the custom features that you have applied to your graph, choose Save Template from the Graph menu in the Graphing window.**

The Save Template function enables you to save any custom features that you have added to your graph. These features can include axis labeling, headers, footers, legend, and so on.

3. **Type the name for this template in the Enter Template Name field.**
4. **Click the Save button.**

▼ To Apply a Graph Template

You use graph templates to define the appearance of the graphs. Once you have defined a graph template as described in “To Define a Graph Template” on page 145, you can apply that template to multiple graphs.

1. **Choose Apply Template from the Graph menu in the Graphing window.**
The Apply Template dialog box is displayed. This dialog box enables you to apply saved custom features to the current graph.
2. **Select a saved template from the list.**
3. **To apply the template to the current graph, click the OK button.**

▼ To Change Graph Type

By default, a graph displays as a line graph. You can choose to view data in a bar chart or area graph.

1. **In the Graphing window, choose Chart Type from the Edit menu.**
2. **Select the type of graph to display.**
 - For a bar chart, select Bar.
 - For an area chart, select Area.
 - For a line chart, select Line.
3. **Click the OK button.**
The Graphing window shows the data using the selected graph type.

▼ To Add or Modify Legends and Labels

1. **In the Graphing window choose Main Titles from the Edit menu, then choose the appropriate label to modify.**
Choose from the following options:
 - To add or modify the header, choose Header.
 - To add or modify the footer, choose Footer.
 - To add or modify the data legend, choose Legend.
 - To add or modify the label for the X-Axis along the bottom of the graph, choose X-Axis Title.
 - To add or modify the label for the Y-Axis along the side of the graph, choose Y-Axis Title.Each option provides a dialog box that enables you to set similar parameters.

2. **To adjust the title text, type or modify the information in the Text field.**
3. **To change the style of the title, select the style that you want to use in the Style section.**

By default, most text is in plain style. You can also choose to have the text appear in **bold** or *italic*.
4. **To choose the font family type to apply to the title, select the font family description in the Name section.**

By default, most titles appear in a Serif font. You can also choose SansSerif or Monospaced.
5. **To choose the size of the title, select the size in the scrolling list in the Size section.**

Default sizes differ by title type. Many sizes are in the 10–14 point range. However, you can choose sizes anywhere from 6 to 26.
6. **To change the orientation of the title, select the appropriate box in the Orientation section.**

The default orientation differs by title type. For example, an X-Axis title is most likely to be oriented horizontally. You can choose any of the following orientations:

 - Horizontal – Reads left-to-right
 - Upsidedown – Reads right-to-left and flipped
 - Vertical – Left-facing, reads bottom-to-top
 - Verticalflip – Right-facing, reads top-to-bottom
7. **To provide a border around the title, choose a style from the Border Style menu.**

▼ To Change X-Axis and Y-Axis Values



Caution – When you edit axes, be careful to choose the correct values. If you choose values for Min and Max that are impossible to plot, the dialog box usually gives you an error message that describes the problem. However, if you choose values that are possible but that result in the plotted points no longer being visible, no error message appears.

1. **To modify the values to be used for the X-axis, choose Axes from the Edit menu in the Graphing window.**

The Axes Editing window appears.
2. **To disable automatic X-axis values, deselect Auto-Scaling.**

Numbers replace the word Auto in the window fields.

3. Provide appropriate values in the Minutes to display, Tick Spacing, and Grid Spacing fields.
4. To modify the values to be used for the Y-axis, from the Axes Editing window, click the Y-Axis tab.
5. To disable automatic Y-axis values, click the check box next to Auto-Scaling. Numbers replace the word Auto in the window fields.
6. Provide appropriate values in the Range Min, Max, Major Tick, Minor Tick, and Grid Spacing fields.
7. To apply your changes and close the Axes Editing window, click the OK button.

▼ To Modify the Border for the Graph or the Data Section of the Graph

1. To access the Border window, choose Border from the Edit menu in the Graphing window.
The Border window that appears has two sections:
 - Chart Area applies to a border around the entire graph.
 - Plot Area applies to a border around the data portion of the graph.
2. To modify the border on the entire graph, select a border type from the Border Type list in the Chart Area section.
There are several types of borders available.
3. To modify the border on the data portion of the graph, select a border type from the Border Type list in the Plot Area section.
There are several types of borders available.
4. To apply your border changes and close the Borders window, click the OK button.

▼ To Modify the Data View

The View menu in the Graphing window enables you to show or hide various graph components and to change the display of your data. Although the following steps are presented sequentially, you can show or hide components in any sequence you desire.

1. To enable or disable the display of live (current) data, select or deselect Live Data in the View menu in the Graphing window.
 - If live data is enabled, the graph continually updates as new data is provided.
 - If live data is disabled, the graph is static. The graph does not update with new data until you re-enable live data.

2. To show or hide the header, select or deselect **Show Header** from the **View** menu in the **Graphing** window.
3. To show or hide the footer, select or deselect **Show Footer** from the **View** menu in the **Graphing** window.
4. To show or hide the X-axis and Y-axis titles, select or deselect **Show Axis Titles** from the **View** menu in the **Graphing** window.
5. To show or hide the X-axis and Y-axis labels, select or deselect **Show Axes** from the **View** menu in the **Graphing** window.
6. To show or hide the grid lines, select or deselect **Show Grids** from the **View** menu in the **Graphing** window.
7. To show or hide the data legend, select or deselect **Show Legend** from the **View** menu in the **Graphing** window.
8. To rotate the graph, follow these steps:
 - a. Choose **Rotate Graph** from the **View** menu in the **Graphing** window.
 - b. Select the appropriate rotation value from the secondary menu.
9. To change the order of the data display, follow these steps:
 - a. Choose **Flip** from the **View** menu in the **Graphing** window.
 - b. Select either **X-Axis** or **Y-Axis** from the secondary menu

When you flip the X-axis, the Y-axis moves to the other side of the graph. The time sequence reverses. In other words, instead of the oldest data appearing on the left of the graph, the newest data appears on the left of the graph.

When you flip the Y-axis, the X-axis moves to the top of the graph. The data sequence reverses. In other words, smaller values appear at the top of the graph rather than on the bottom of the graph.
10. To reset the rotation and flip values, choose **Reset View** from the **View** menu in the **Graphing** window.

▼ To Enlarge an Area of a Graph

1. To zoom in on a specific section of a graph, choose **Zoom** from the **Tools** menu in the **Graphing** window.
2. Hold down the **Shift** key and drag mouse button one to outline the area to zoom.
3. Release the mouse button to view the enlarged area.

4. To restore the graph to its original, unzoomed view, choose **Restore** from the **Tools** menu in the **Graphing** window.

▼ To Translate a Graph

Graphs typically show the current information. You can translate information on the graph, for example, to show information from an earlier time.

1. To translate a specific section of a graph, choose **Translate** from the **Tools** menu in the **Graphing** window.
2. Hold down the **Control** key and drag mouse button one to outline the area to translate.
3. Release the mouse button to enable the translation.
4. To restore the graph to its original, untranslated view, choose **Restore** from the **Tools** menu in the **Graphing** window.

Monitoring Data Property Attributes

This chapter describes the following topics:

- “Overview of Attribute Editor” on page 151
- “Info Tab in the Attribute Editor” on page 152
- “Alarms Tab in the Attribute Editor” on page 152
- “Actions Tab in the Attribute Editor” on page 153
- “Refresh Tab in the Attribute Editor” on page 155
- “History Tab in the Attribute Editor” on page 155
- “To Open the Attribute Editor for a Specific Data Property” on page 156
- “To Open the Attribute Editor for a Data Property Column” on page 156
- “To Set a Refresh Interval” on page 157
- “To Set a History Interval” on page 157

Overview of Attribute Editor

The module data properties provide additional information about Sun Management Center modules. The Attribute Editor enables you to customize the following monitoring criteria for these properties:

- Set alarm thresholds for defined alarms
- Specify actions to take when alarm conditions occur
- Change the interval at which data updates on the screen
- Define schedules for creating log files of historical data points

The Attribute Editor has one or more tabs at the top of the window that enable you to switch between different panels. These tabs differ depending on the selected object. The following tabs are available and are described in the identified sections:

- Info – “Info Tab in the Attribute Editor” on page 152
- Alarms – “Alarms Tab in the Attribute Editor” on page 152

- Actions – “Actions Tab in the Attribute Editor” on page 153
- Refresh – “Refresh Tab in the Attribute Editor” on page 155
- History – “History Tab in the Attribute Editor” on page 155

Info Tab in the Attribute Editor

The Info panel shows additional information about the selected object. The specific information differs depending on the selected object.

Alarms Tab in the Attribute Editor

The Alarms tab enables you to set alarms thresholds only for those data properties that have associated simple alarms. Simple alarms use the `rCompare` rule, which is described in Appendix D. For information about simple alarms, see Table 10–1.

Simple alarms are based on thresholds. A monitored data property is greater than, less than, not equal to, or equal to a single threshold value. By contrast, complex alarms occur when a set of conditions becomes true. For more information about defining, acknowledging, and working with alarms in Sun Management Center, see Chapter 12.

Note – You need the appropriate security permission to set an alarm threshold. See Chapter 18 for more information.

The following table shows common simple alarm limits for monitored properties. The alarm limits are also displayed in the Parameter Description field. You may set thresholds for one or more of these alarm limits for selected data properties.

TABLE 10–1 Common Simple Alarm Limits in Sun Management Center Software

Alarm Limit	Description
Critical Threshold (>)	Critical (red) alarm occurs if a value exceeds the limit in this field.
Alert Threshold (>)	Alert (yellow) alarm occurs if a value exceeds the limit in this field.
Caution Threshold (>)	Caution (blue) alarm occurs if a value exceeds the limit in this field.
Critical Threshold (<)	Critical (red) alarm occurs if a value is below the limit in this field.

TABLE 10-1 Common Simple Alarm Limits in Sun Management Center Software
(Continued)

Alarm Limit	Description
Alert Threshold (<)	Alert (yellow) alarm occurs if a value is below the limit in this field.
Caution Threshold (<)	Caution (blue) alarm occurs if a value is below the limit in this field.
Alarm Window	Alarm occurs only during this time period. For example, if you type <code>day_of_week=fri</code> , an alarm occurs only if the alarm condition exists on a Friday. If an alarm condition exists on Tuesday, no alarm is registered.

Actions Tab in the Attribute Editor

The Actions tab appears only if you can define alarm actions for the current data property. The Actions panel enables you to instruct the software to perform a predetermined action if an alarm occurs.

Note – Acceptable actions include sending an email or executing scripts that are stored in the `/var/opt/SUNWsymon/bin` directory. These scripts execute with `root` permissions.

For example, you might define an action so that an email is sent to a system administrator whenever a critical alarm is generated for the Load Average Over the Last Five Minutes data property.

As illustrated in Figure 10-1, you can define specific actions to occur in any of the following instances:

- When a particular alarm severity (critical, alert, caution, or intermediate) occurs
- When an alarm closes
- When any change in alarm condition happens

Note – The check boxes to the right of the Action buttons enable you to specify automatic or manual execution of a specific alarm action. By default, all actions are set for automatic execution.



FIGURE 10-1 Attribute Editor Actions Panel for a Monitored Property

When you click the Actions button, the Action Dialog Selection window appears. This window enables you to create or modify the registered alarm actions. You can perform one of the following actions:

- Send an email
- Execute a script
- Clear the alarm

For more information about defining an alarm action, see “To Register an Alarm Action” on page 189.

Refresh Tab in the Attribute Editor

The Refresh panel enables you to set the refresh interval for the selected object. The refresh interval is the interval between the times when the Sun Management Center agent samples the monitored property.

Note – Only some data properties enable you to modify the refresh interval.

For information about setting the refresh interval, see “To Set a Refresh Interval” on page 157.

History Tab in the Attribute Editor

The History panel enables you to save older data for a monitored property. For example, a history of data points could be recorded every 120 seconds, as specified in the Sample Interval field. You can store this information in one of two places:

- Disk file

There are two types of disk files: circular and text. These files are located in the `/var/opt/SUNWsymon/log` directory.

- Memory cache

If you store information in the memory cache, you must also indicate how many data points should be saved in the Max Size (sample) field.

Note – You can view the history data in a graph by opening the graph for the selected monitored property. If you have selected memory cache, the graph is displayed with the historical data.

Using the Attribute Editor

The Attribute Editor provides features that support various activities. Some of these activities use other features in addition to the Attribute Editor. Information about performing simple Attribute Editor-only functions, such as defining intervals for history logs and screen refreshes, is provided here. Detailed information about alarm-related functions is provided in Chapter 12.

▼ To Open the Attribute Editor for a Specific Data Property

You can open the Attribute Editor for a specific data property value. For some data properties, you can also access the Attribute Editor for a column of values. For more information, see “To Open the Attribute Editor for a Data Property Column” on page 156.

1. **Navigate through the topology or hierarchy view until you have accessed a data property table.**
2. **Place your cursor in the value section of the table and use either of the following methods:**
 - Press mouse button three and choose Attribute Editor from the pop-up menu.
 - Click the Attributes icon.

The Attribute Editor window shows specific information about the selected data property. The displayed tabs depend on the specific data property that you selected. For information about defining alarm thresholds for the selected data property, see “Managing and Controlling Alarms” on page 185 and “Alarm Management Examples” on page 193.

▼ To Open the Attribute Editor for a Data Property Column

Choosing a data property column, rather than a specific data property value, enables you to define attributes for all values in that column. For example, consider the CPU Utilization Table. If you open the Attribute Editor for the column % CPU User Time, you could define alarm thresholds and actions for all CPUs. If you open the Attribute Editor for a specific % CPU User Time value, such as the value that applies to CPU 1, any alarm threshold or action that you defined would apply only to that specific CPU.

1. **Navigate through the topology or hierarchy view until you have accessed a data property table.**
2. **Click the column heading for the column in which you are interested.**
3. **To access the Attribute Editor, use one of the following mechanisms:**
 - Press mouse button three and choose Attribute Editor from the pop-up menu.
 - Click the Attributes icon.

The Attribute Editor window shows specific information about the selected data column. For information about defining alarm thresholds for the selected data column, see “Managing and Controlling Alarms” on page 185 and “Alarm Management Examples” on page 193.

▼ To Set a Refresh Interval

The refresh interval indicates, in seconds, how frequently an agent acquires data. The following example illustrates how to set a refresh interval for a property in the System Load Statistics module.

1. **Click the Module Browser tab in the Details window.**
2. **Click the expansion icon next to the Operating System icon in the hierarchy tree view.**
The Operating System modules are displayed.
3. **Click the expansion icon next to the Kernel Reader icon.**
The Kernel Reader properties are displayed.
4. **Double-click the System Load Statistics icon.**
The System Load Statistics properties table is displayed.
5. **Select the table cell for Load Averages Over the Last 5 Minutes.**
6. **Click the Attributes button.**
The Attribute Editor window is displayed.
7. **Click the Refresh tab button.**
The refresh panel is displayed.
8. **Type a value in seconds in the Refresh Interval field or click the Advanced button.**
For example, 300 seconds equates to five minutes.
9. **To apply the refresh interval and close the Attribute Editor window, click the OK button.**
Data for System Load Statistics are acquired every five minutes.

Note – The agent uses less CPU cycles if you provide a larger refresh interval.

▼ To Set a History Interval

1. **Open the Attribute Editor for the data property on which you want to set the history information.**
For example, follow these steps to access the Attribute Editor for Load Averages Over the Last 5 Minutes:
 - a. **Click the Module Browser tab in the Details window.**

Managing Modules

This chapter describes the following topics:

- “Sun Management Center Module Concepts” on page 159
- “To View Module Status” on page 164
- “To Load a Module” on page 164
- “To Return a Module to its Default Settings” on page 166
- “To Set a Module Schedule” on page 166
- “To Load a Scheduled Module” on page 167
- “To Enable a Module” on page 168
- “To Disable a Module” on page 168
- “To Unload a Module” on page 169
- “To Set Security Permissions for a Module” on page 169
- “To View Module Rules” on page 170
- “To Modify Module Parameters” on page 171
- “Monitoring Modules as a Group” on page 172

Sun Management Center Module Concepts

Sun Management Center modules are responsible for collecting data from specific monitored resources. These modules can be dynamically loaded, enabled, disabled, and unloaded into a Sun Management Center agent.

- When you load a module, the module icon appears in the Browser Details window. In addition, the module managed object and its data properties are defined. Data acquisition for that module begins. The data properties for the managed object are displayed in the Details window. The data display is periodically refreshed.

- When you enable a module, data acquisition restarts if the module was disabled previously. The data display for the managed object periodically refreshes in the Details window.
- When you disable a module, data acquisition stops temporarily for the managed object until the module is enabled. While a module is disabled, the data is not refreshed. Also, the data does not trigger an alarm even if you do a manual refresh. Alarms are not triggered until the module is re-enabled.
- When you unload a module, data acquisition stops for the managed object. The managed object and data properties are undefined. The module icon is removed from the Browser Details window.

Note – Some modules, such as the File Scanning Module, can be loaded more than once on a host. These modules are referred to as *multi-instance modules*. If the module is a multi-instance module, a special icon is displayed in the Details window.

Default Modules

Some or all of the following modules are loaded by default when you install the software:

- Agent Statistics
- Kernel Reader (Simple)
- Simple MIB-II
- Config-Reader (for supported hardware platforms only)
- File Scanning [System Log]

Module List

Table 11–1 lists generic modules that you can load and use. The list of modules that is displayed for your system depends on your platform type and any add-on products that you have installed. See your supplement for more information on platform-specific modules, including the Config-Reader and Dynamic Reconfiguration module. For information on the other Sun Management Center modules, see Appendix C.

TABLE 11–1 Sun Management Center Modules

Module	Module Version Number	Description
Agent Statistics	2.0	Provides information about the health of the agent installed on a host by monitoring the objects, processes, and execution of processes by the agent.
Agent Update	1.0	Enables you to use the Agent Update process to update software on agent systems.
Config-Reader	1.0	Provides the hardware configuration of the host. This module is available only if the hardware platform is supported and either the Workgroup or Desktop add-on products are installed. Both the physical view and the logical view require that this module be loaded.
Data Logging Registry	2.0	Provides information about agent data logging, such as log destination, module name, logging interval, and buffer length. Multiple copies of this module can be loaded.
Directory Size Monitoring	2.0	Enables you to isolate and monitor the size of any directory and its subdirectories on a host where a Sun Management Center agent is installed. Multiple copies of this module can be loaded, or you can add additional directories for monitoring by adding a row in the properties table.
Dynamic Reconfiguration	2.0	Enables you to perform dynamic reconfiguration operations on DR-enabled monitored hosts.
File Monitoring	2.0	Monitors selected files on a host. Monitored parameters include file size and timestamps. Multiple copies of this module can be loaded. This module requires you to add rows in the data property table. For more information, see “To Add a Row to a Data Property Table” on page 137.
File Scanning	2.0	Scans files on a host for specified patterns. Multiple copies of this module can be loaded. This module requires you to add rows in the data property table. For more information, see “To Add a Row to a Data Property Table” on page 137.
HP JetDirect	2.0	Monitors the status of HP printers that are equipped with a JetDirect card. Multiple copies of this module can be loaded.
Health Monitor	2.0	Enables you to monitor various resources usage in your host such as CPU, disk, NFS, and SNMP.

TABLE 11-1 Sun Management Center Modules (Continued)

Module	Module Version Number	Description
Kernel Reader	2.0	Provides kernel statistics, such as CPU details, system call, faults, streams, disk information, and page information.
Kernel Reader (Simple)	1.0	Provides kernel statistics, such as load statistics, swap statistics, and streams statistics. Also, provides software rules information.
Logview ACL	1.0	This module supports viewing and monitoring of the system log, Sun Management Center log, and other log files, using the Modules tab on the Details window.
MIB-II Instrumentation	1.0	Provides the system, interfaces, IP, ICMP (internet control message protocol), TCP (transmission control protocol), and UDP (user datagram protocol) MIB-II (management information base) group information of the monitored host.
MIB-II Proxy Monitoring	2.0	Provides proxy management of hosts that are running non-Sun Management Center MIB-II SNMP agents. Multiple copies of this module can be loaded.
MIB-II (Simple)	1.0	Provides the system Group, interfaces Group, IP Forwarding, IP Route Table information of the standard MIB-II (Management Information Base) group information of the monitored host. This module is a scaled-down version of the MIB-II Instrumentation module. Note – The MIB-II module identifies an agent. If this module is not loaded, the agent can be created only as a ping host or as an SNMP host.
NFS File Systems	2.0	Provides information about the NFS file systems on monitored hosts by monitoring the amount of disk space occupied by mounted or unmounted file systems and the amount of used and available space as well as the file system's remaining total capacity.
NFS Statistics	2.0	Monitors the number of NFS calls and RPC (remote procedure calls) received by the server, and monitors the status of the transaction activity on the monitored host. Multiple copies of this module can be loaded.
Print Spooler	3.0	Monitors the status of the printer daemon, the print queue, and the printer devices that are installed on the monitored host.

TABLE 11–1 Sun Management Center Modules (Continued)

Module	Module Version Number	Description
Process Monitoring	2.0	Monitors one or more processes on the host. Specifies monitored processes by matching patterns. Multiple copies of this module can be loaded. This module requires you to add rows in the data property table. For more information, see “To Add a Row to a Data Property Table” on page 137.
Solaris Process Details	2.0	Displays detailed information of Solaris processes running on a host where the Sun Management Center agent has been installed. The Process Details window requires that this module be loaded.
Storage A5x00	1.0	Enables you to monitor the state of A5000, 5100, and 5200 storage devices, and manage alarms on these devices.
Sun StorEdge T3	1.0	Enables you to monitor the state of T3 storage devices, and manage alarms on these devices.

For more information on modules, see Appendix C.

Note – The Config-Reader and Dynamic Reconfiguration modules are supported only on specific hardware platforms. For more information, refer to your platform supplement.

Depending on your system hardware, additional modules may be supported. For more information, refer to the Sun Management Center web site at <http://www.sun.com/sunmanagementcenter/>.

Working With Modules

The procedures in this section describe how to load, unload, enable, and disable modules. These procedures also explain other module-related tasks.

▼ To View Module Status

You can find out what modules are loaded or are scheduled to be loaded on a given agent or server system. In addition, you can find out what other modules are available on that system and if any of the currently loaded modules are disabled. To view the status of modules on a given system, follow these steps.

1. **Select a server or agent managed object.**
2. **Open the Details window for the selected object.**
3. **From the Details window, click the Module Manager tab.**

The modules status view appears. This view has two main sections:

- The “Modules with Load Status” section lists modules that are loaded or are scheduled to be loaded on the host. For each module, this section identifies the following information:
 - The module name, including a specific instance identifier if applicable
 - Whether the module is loaded
 - Whether the module is scheduled to be loaded
 - Whether the module is enabled
- The “Available Modules” section lists modules that can be loaded for this host. This section includes modules that are listed in the “Modules with Load Status” section when there can be more than one instance of that module on the host. For each module, this section identifies these characteristics:
 - The module name
 - Whether the module can be loaded more than once on the host (also referred to as a *multi-instance module*)

For information on how to change the status of a module, see the following sections:

- “To Load a Module” on page 164
- “To Load a Scheduled Module” on page 167
- “To Enable a Module” on page 168
- “To Disable a Module” on page 168
- “To Unload a Module” on page 169
- “To View Module Rules” on page 170
- “To Modify Module Parameters” on page 171

▼ To Load a Module

1. **To select the host machine on which the module will be loaded, click the host machine icon.**

Note – If you attempt to load a module without selecting a host, you cannot access the Load Module option in the Tools menu.

2. To open the Load Module dialog box, use one of the following mechanisms:

- Press mouse button three on the selected host icon, and select Load Module from the pop-up menu in the hierarchy view or the topology view.
- In the main console window, choose Load Module from the Tools menu.
- Open the Details window, and choose Load Module from the Module menu (the first icon at the top left of the Module Browser window).
- Open the Details window, click the Module Manager tab, select a module to load from the list of Available Modules, and click the Load button.

Note – In this case, the Module Loader window appears. Go to Step 5.

The Load Module dialog box appears.

The Load Module dialog box provides a list of Sun Management Center modules. A number next to the module name indicates the number of existing instances of that module on your host.

Note – Some modules can have multiple instances loaded on a host.

3. Select the name of the module that you want to load.

4. Click the OK button.

The Module Loader window appears. The contents of the Module Loader window depend on the selected module.

Tip – You can also double-click a module name in the Load Module dialog box to load that module.

5. If there can be more than one instance of this module, type the instance name in the Instance field.

The instance name is used within the Sun Management Center agent to identify uniquely a particular module or a row within a module. You must specify a unique name for each instance when multiple instances of the same module are loaded.

An instance name is a single word or alphanumeric string. The only special character allowed in an instance name is the underscore (_).

If you do not type information for a necessary field, the software responds with an error message and the module is not loaded.

6. (Optional) Type or change the information in the Description field.

For some modules, the Description field is the only field that you can edit.

7. Decide whether to load the module now or at a scheduled time.

- To accept the Load Parameters and load the module immediately, click OK.
- To set a time to load and enable the module, click the Schedule tab and follow the instructions in “To Set a Module Schedule” on page 166.

▼ To Return a Module to its Default Settings

You can change information for a module and later return the module to its default or original settings. For example, if you deleted some rows from the File Scanning module for the system log, you could reload that module to retrieve the deleted default rows. If you modified some alarm thresholds or defined alarm actions in a module, you could return those attributes to their default values.

1. Select the module to load.

2. If there can be more than one instance of this module, provide any required information in the Module Loader window.

Information that you provide in the Module Loader window must exactly match the original module. For example, in the case of the File Scanning module for the system log, you would need to supply the instance name `syslog`, the file name `/var/adm/messages`, and the description `System Messages`.

3. In the Module Loader window, click the Default Settings button.

The selected module will reload with all default information.

▼ To Set a Module Schedule

You can set a schedule that determines when a module should be active. For example, you might schedule a module to run between 8:00 AM and 5:00 PM every day. At all other times, the module is inactive, even if an alarm condition exists.

1. From the Module Loader window, click the Schedule tab.

2. To set the load schedule, select Scheduler next to the Module Load Schedule field.

- a. **To load this module starting on a day other than today, select a Start Date.**

You can edit the information in the Start Date field manually, or you can click on a date in the calendar to select the date.

b. Select an hour and minute for the Start Time.

Hours are based on a 24-hour clock. For example, 16:00 is the same as 4:00 PM.

c. Select an hour and minute for the End Time.

d. (Optional) To set this module to load more than once, choose how often the module should load from the Repeat Interval menu.

For example, to schedule a module to load weekly, you would select Weekly.

e. (Optional) To prevent a module from loading indefinitely at the specified interval, type a number in the Repeat Limit field.

For example, to load this module weekly for one month, you would type 4 in the Repeat Limit field.

Note – The module loads indefinitely if you do either of the following:

- You select a Repeat Interval of One Time and you do not provide an End Time.
 - You select a Repeat Interval other than One Time and you do not provide a value in the Repeat Limit field.
-

f. Click OK to set this schedule, or click Cancel to exit from the scheduler window.

3. To set the module enable schedule, select Scheduler next to the Module Enable Schedule field.

The Scheduler works the same for this feature as other schedulers throughout the product. See the preceding step for more information.

4. To load and enable the module as specified, click OK.

If you need to enter load parameters and have not done so, an error message tells you what you must do.

▼ To Load a Scheduled Module

1. In the Details window, click the Module Manager tab.

2. Select a module that is currently scheduled but not loaded from the Modules with Load Status list.

Tip – Look for a “No” in the Loaded column and a “Yes” in the Scheduled column.

3. Click the Load Now button.

The Load Now confirmation dialog box appears.

4. Determine whether to load the module at the scheduled time.

- To load the module now and at the scheduled time, click Preserve Schedule. Then click the OK button.

The module loads. The Loaded column changes to Yes and the Scheduled column remains Yes, so that the module loads again at the scheduled time.

- To load the module now, but not at the scheduled time, click Clear Schedule. Then click the OK button.

The module loads. The Loaded column changes to Yes and the Scheduled column changes to No.

▼ To Enable a Module

1. Open the Details window for the host on which the module is loaded.

2. Enable a currently loaded but not enabled module in one of the following ways:

- Click the Module Manager tab, select a module from the Modules with Load Status list, and click the Enable button.
- Press mouse button three on the module that you want to enable, and choose Enable Module from the pop-up menu.

When the module has been enabled, the following message is displayed at the bottom of the window.

Module successfully enabled.

▼ To Disable a Module

1. Open the Details window for the host on which the module is loaded and enabled.

2. Disable a currently loaded and enabled module in one of the following ways:

- Click the Module Manager tab, select a module from the Modules with Load Status list and click the Disable button.
- Press mouse button three on the module that you want to disable, and choose Disable Module from the pop-up menu.

When the module has been disabled, a small icon with an X attaches to the module icon. The following message is displayed at the bottom of the window.

Module successfully disabled.

If the disabled module is the Solaris Process Details module, the following message is displayed at the bottom of the Details window.

Solaris Process Details module disabled. Process data may not be current.



Caution – Because data is not being refreshed for a disabled module, the data does not trigger an alarm until you re-enable the module. The data does not trigger an alarm even if you manually refresh the data.

▼ To Unload a Module

1. **Open the Details window for the host on which the module is loaded.**
2. **Unload a currently loaded module in one of the following ways:**
 - Click the Module Manager tab, select the module that you want to unload from the Modules with Load Status list, and click the Unload button.
 - Press mouse button three on the module that you want to unload, and choose Unload Module from the pop-up menu.The Confirm Module Unload dialog box is displayed.
3. **To remove the module, click the Unload button in the Confirm Module Unload window.**
The module is unloaded.

▼ To Set Security Permissions for a Module

You can set security permissions for some individual modules. The security permissions for a module override the default security permissions for its parent object or host. For example, if a user has administrator privileges for a module, but only general privileges for the host, the user still retains administrator privileges for the module. For further information on privileges, see Chapter 18.

1. **Open the Details window for the host on which the module is loaded. Then, select the Module Browser tab.**
2. **Use one of these methods to access the Attribute Editor for the module on which you want to set security:**
 - Select a module in the left side of the browser. Then, click the Attribute Editor icon (the first icon above the right side of the window).
 - Select a specific data property in the right side of the window, press mouse button three and choose Attribute Editor from the pop-up menu.
3. **Click the Security tab.**

Note – The Security tab is not available if you cannot set security on the selected module.

4. Type the names of user and administrator groups in the appropriate fields.
5. To accept your security changes and close this window, click the OK button.

▼ To View Module Rules

1. In the Details window, click the Module Manager tab.
2. In the Modules with Load Status list, select the module of interest and click Rules.

The Threshold Summary of Module screen is displayed, containing the name of the selected module after the colon (:). In this example, the Kernel Reader (Simple) module is shown.

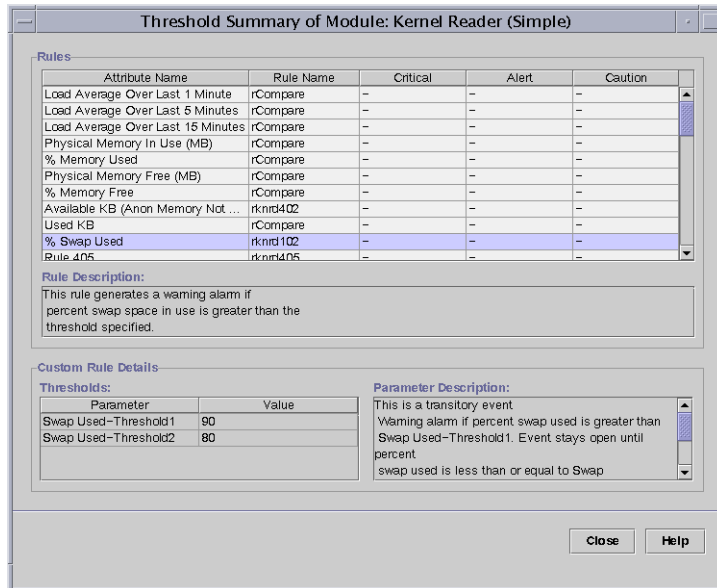


FIGURE 11-1 Threshold Summary of Module Screen

A module rules window contains the following information:

Attribute Name Identifies the data property.

Rule Name	Shows the rule name. If the rule is simple, the threshold value appears. If the rule is complex, a “-” appears. Click on the “-” to view threshold values in the Threshold list at the bottom of the window.
Critical	The most severe alarm state.
Alert	The mid-point alarm state.
Caution	The least severe alarm state.
Rule Description	Displays a rule description for the selected attribute.
Thresholds	Displays threshold values for the selected attribute.
Parameter Description	Describes the parameters that are shown in the Thresholds field.

3. After you view the information, click **Close** to return to the **Module status** screen.

▼ To Modify Module Parameters

1. Open the **Details** window for the host on which the module is loaded.
2. To change information about a module, such as its description, perform one of the following:
 - Click the **Module Manager** tab, select the module that you want to change, and click the **Edit** button.
 - Press mouse button three on the module that you want to change, and choose **Edit Module** from the pop-up menu.

The **Module Parameter Editor** appears.

3. To change the module information, type new information in the **editable** fields. For some modules, the only information that can be changed on this screen is the module description.

Tip – A **editable** field has a white background, while a **read-only** (not **editable**) field has a gray background.

4. To accept the changes that you made and close the **Module Parameter Editor** window, click the **OK** button.

Monitoring Modules as a Group

To monitor one type of module on several hosts, you can create module objects for each host and place these objects in the same group or administrative domain. To create a module object, see “To Create a Module Object” on page 62.

Managing Alarms

An *alarm* is a notification that is triggered by an abnormal event, such as exceeding a certain percentage of memory usage. The Alarm Manager software monitors your hardware and software and triggers alarms when defined conditions occur.

This chapter describes the following topics:

- “Alarm Concepts” on page 174
- “Alarms Table” on page 178
- “To View Alarms From the Main Console Window” on page 180
- “To Access an Alarm for a Specific Managed Object” on page 181
- “To Access Alarms From the Details Window” on page 181
- “To Sort the Domain Status Alarms” on page 183
- “To Sort the Alarms Table” on page 183
- “To Update the Alarms Table” on page 184
- “To Filter the Alarms Table” on page 184
- “To View a Log of Alarm Activity” on page 185
- “To Acknowledge New Alarms” on page 185
- “To Delete Alarms” on page 186
- “To Add an Alarm Note” on page 187
- “To View and Add Suggested Fixes” on page 187
- “To Select an Action” on page 191
- “To Notify Users When a Host or Agent is Down” on page 188
- “To Register an Alarm Action” on page 189
- “To Run a Registered Alarm Action” on page 190
- “To Modify Pending Alarm Actions” on page 191
- “To Define an Alarm Action Script” on page 192
- “Example: To Define and Respond to an Alarm” on page 193
- “Example: To Send an Email” on page 194

Note – The messages in the Alarms page of the Details window are always in English. These messages are not translated into other languages. However, the text in all dialog boxes and in suggested fixes is internationalized.

Alarm Concepts

The Alarm Manager software displays alarm information for managed objects. You can view object alarm information in an administrative domain in the main console window and in the Details Alarm window.

Note – The Sun Management Center agent is configured so that only one server receives alarm information from that agent.

The Sun Management Center 3.5 Alarm Manager enables you to do the following tasks:

- View alarms in pages from a database
- Manually run the currently registered action after an alarm has been triggered
- Set and change the currently registered action from a list of all installed actions
- Sort alarms
- Read the factory default suggested fix for a rule
- Create a new user-suggested fix for a rule
- Keep a running record of user notes for an alarm instance
- Acknowledge alarms when they occur
- Delete closed alarms from the database

Alarm Definitions

An alarm is a notification that is triggered by an abnormal event. Sun Management Center has two types of alarms:

- Predefined alarm conditions included in the software modules, such as notification when the CPU usage exceeds a certain percentage. These alarms are triggered by conditions outside of a preset range or by Sun Management Center rules. Default alarm conditions and rules are included in the modules. For some predefined alarms, you can change the threshold at which the alarm is triggered. In addition, you can modify the action to take when the alarm occurs and add information to the suggested fixes. For a list of Sun Management Center rules, see Appendix D.
- User-defined alarm conditions. You define what causes an alarm to occur, what action to take, and a suggested fix, if desired.

Alarm Indicators

The Alarm Manager software uses several different methods to alert you to an *unacknowledged open* alarm condition:

- Colored icons in the Domain Status Summary on the main console
- Colored icons in the hierarchy (tree) view
- Colored icons in the topology (contents) view
- Colored relevant row or relevant column in the property table (contents view)

The type and color of alarm icon identify the severity of the alarm. For example, a red alarm icon indicates that a critical condition has developed and that corrective action is required immediately. By contrast, a blue alarm icon indicates a potential or an impending service-affecting fault.

You can acknowledge, delete, and manage the object alarms by using the Alarms Details window. For more information, see “Managing and Controlling Alarms” on page 185.

Figure 12–1 shows an unacknowledged, open critical alarm in the Swap Statistics properties table Used KB row. The row is red, which indicates a critical alarm. The alarm information propagates up the hierarchy tree view, from the individual module up to the host. You would also see a red alarm icon on the following objects:

- Swap Statistics properties table
- Kernel Reader module
- Operating System
- Host

You also see a red alarm icon on the corresponding host, group (if any), or administrative domain in the main console window. The only exception would occur if an unacknowledged open black alarm of higher severity exists.

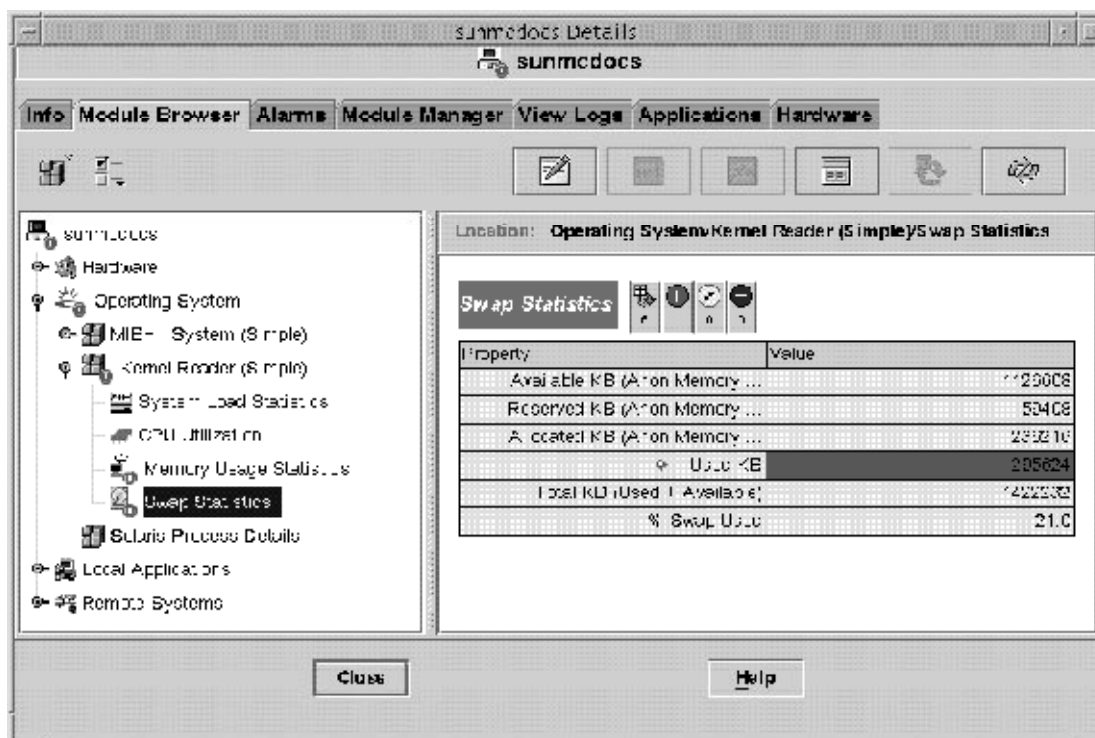



FIGURE 12-1 Swap Statistics Alarm in the Details Window





Note – Unacknowledged alarms take precedence over acknowledged alarms. If the hierarchy has two or more types of alarms, the color of the more severe unacknowledged alarm is propagated up the tree. For example, if there is a yellow unacknowledged alarm in CPU usage and a red unacknowledged alarm in Disk Statistics, only the red alarm icon propagates. However, if there is a yellow unacknowledged alarm in CPU usage and a red acknowledged alarm in Disk Statistics, only the yellow alarm icon propagates.

Alarm Severity Levels

The following alarm severities are supported:

Down Alarms A down alarm  indicates that a service-affecting condition has occurred that requires immediate corrective action. An example of this condition is the following: A required

resource that is defined by a managed object has gone out of service. A specific example of this condition is a module that has gone down.

Critical Alarms	A critical alarm  indicates that a service-affecting condition has developed that requires an urgent corrective action. An example of this condition occurs when a severe degradation in the capability of an object has occurred and you need to restore the object to full capability.
Alert Alarms	An alert alarm  indicates that a non-service-affecting condition has developed. Corrective action should be taken to prevent a more serious fault.
Caution Alarms	A caution alarm  indicates the detection of a potential or impending service-affecting fault before any significant effects have occurred. You should diagnose further if necessary and correct the problem before it becomes a serious service-affecting fault.
Off/Disabled Alarms	A disabled alarm  indicates that a resource for a managed object is disabled. For example, a module is disabled.

Indeterminate State


Objects with black star icons are objects with indeterminate states, not to be confused with alarms. A black star or “splat” icon in the main console window means that a data acquisition failure occurred in that object. The failure is not the result of a rule infraction, so no alarm is associated with the failure.

Note – When you view the data property table for an object, a pink row also indicates an indeterminate object state.

Domain Status Summary



The Domain Status Summary section of the main console window provides a brief view of managed object status. The colored icons designate the severity of the alarms.

Tip – To see a definition for a status summary icon, place your cursor over the icon.

Numbers next to the alarm icons in the Domain Status Summary indicate the managed objects for which the highest severity open, unacknowledged alarm is represented. For example, a 1 next to the alert alarm icon  (center) indicates that there is *one* managed object for which the highest severity alarm is alert.

The Domain Status Summary displays the number of managed objects in the administrative domain that have *at least one unacknowledged open* alarm of a specific severity.

Note – If multiple types of alarms exist in the host, the icon that indicates the more severe unacknowledged open alarm appears in the Domain Status Summary.

If the most severe alarm on one host is critical  and the most severe alarm on another host is alert , a 1 appears on both alarm icons.

Alarms Table

The alarms table contains a statistical summary of all alarm data for the managed object that you select.

Note – If the object is a platform, see your platform supplement for more information.

You can filter and sort this table to display only the alarms that you want to see in a preferred sequence. You filter and sort alarms from the alarms table. For additional details, see “To Filter the Alarms Table” on page 184 and “To Sort the Alarms Table” on page 183.

Alarm Display Pages

The maximum number of alarms that can be displayed on a page is 20. The current page number and total number of alarms for the selected object in the database are displayed at the top of the table.

When new alarms occur, the currently displayed alarms table does not change, even if these alarms affect the current page. Instead, the Refresh button displays a two-state icon. This icon indicates that new alarms have arrived, and you should update the table to include the new alarms soon.

When you delete alarms, the table is updated immediately. The deleted alarms no longer appear in the table. When another user deletes alarms, you might see blank rows in the alarms table. A refresh request recomputes the pages and updates the table to remove the deleted alarms. Only one page of alarms is displayed per request. You can see additional pages by using the page navigation buttons above the alarms table.

Navigation for the Alarm Table Page

The Alarms Details window contains navigation buttons that enable you to move through the alarm pages. Informational messages inform you when the first and last pages of the table are displayed. A scrollbar enables you to scroll through each page of the table.

Alarm Categories

The alarms table presents different categories of detailed alarm information. The following information always appears in the alarms table.

Severity	Indicates the severity of the alarm. Black is most severe. Grey is least severe. A green check mark in this column indicates that the alarm was acknowledged.
Start time	Date and time that the alarm occurred
State	Indicates the state of the alarm: open, a “ringing” bell icon, or closed, a “silent” bell icon
Action	Indicates the action taken by the user or the program in response to the alarm condition
Message	Abbreviated message that describes the alarm

The following information appears on the bottom of the page when an alarm row is selected. This information is only displayed for closed or acknowledged alarms.

Alarm Ended On	Date and time that the alarm condition was fixed
Alarm Acknowledged On	Date and time that the alarm was acknowledged, and the user ID of the person who acknowledged the alarm

Select an alarm row to display any available additional information that is associated with the alarm. The additional information includes the following data:

- The alarm end time
- The acknowledgment date and time
- The user ID of the user who acknowledged the alarm

Alarm States

A bell icon in the State column of the alarms table indicates the state of each alarm. Each alarm has two states: open and closed.

An open alarm is an alarm for which the condition that caused the alarm still exists. A closed alarm means the condition no longer exists. Open alarm icons show a “ringing” bell. Closed alarm icons show a “silent” bell.

Alarm Action Status

The Action column of the alarms table indicates the status of each alarm.

Each alarm can have one of three action conditions:

- **No action** – An action has not been registered for that alarm.
- **Pending action** – The action is manual. Click the Run button to execute the action.
- **Executed** – The action is automatic. The Alarm Manager software has already performed the action.

Viewing Alarm Information

The Alarm Manager software displays alarm information for managed objects. You can view object alarm information in an administrative domain in the main console and the Details Alarm windows.

▼ To View Alarms From the Main Console Window

When an alarm condition occurs, a colored alarm indicator appears in the console window. For more information about the alarm indicators, see “Alarm Severity Levels” on page 176.

To view more information about an alarm:

1. **To see a summary of current alarms, click one of the Domain Status Summary buttons in the main console window.**

A list of objects appears in the Domain Status Details window. This list includes those objects that have at least one open, unacknowledged alarm for which the highest

severity matches the icon on the button. For more information about these icons, see “Alarm Severity Levels” on page 176.

From the Domain Status Details window, you can do the following tasks:

- Change the sort order of the displayed alarms, as described in “To Sort the Domain Status Alarms” on page 183.
- Access detailed information about a specific alarm, as described in Step 2.
- Update the Domain Status Details window by clicking the Refresh Now button.

2. To view details about a specific alarm, use one of the following methods:

- Double-click the desired row in the Domain Status alarm table.
 - Click the desired row to select the row, and then click the Details button.
- The Details window for the applicable managed object appears with the Alarms tab selected and alarm information displayed. From this window, you can do the following tasks:

- Acknowledge the alarm, as described in “To Acknowledge New Alarms” on page 185.
- View and modify the suggested fix for the alarm, as explained in “To View and Add Suggested Fixes” on page 187.
- View and add user notes about the alarm, as described in “To Add an Alarm Note” on page 187.
- Modify a defined alarm action, as explained in “To Modify Pending Alarm Actions” on page 191.
- Delete the alarm, as described in “To Delete Alarms” on page 186.

▼ To Access an Alarm for a Specific Managed Object

When an alarm icon appears next to a managed object icon in the main console window, you can view the alarms for that specific object.

1. Double-click the managed object icon.

The Details window for that managed object appears with the Module Browser tab selected.

2. Click the Alarms tab.

The Details window changes to show all open alarms for the current managed object.

▼ To Access Alarms From the Details Window

1. Press mouse button three on a host icon in the main console window, and choose Details from the pop-up menu.

The Details window appears.

2. Click the Alarms tab.

The Alarms Details window appears.

Note – A bold header identifies the column on which the alarms table is sorted. A down or up arrow indicates the order on which the column is sorted. For example, the alarms table shown in Figure 12–2 is sorted in descending order (newest to oldest alarm) based on the start date and time. This order is the default sort order for the table.

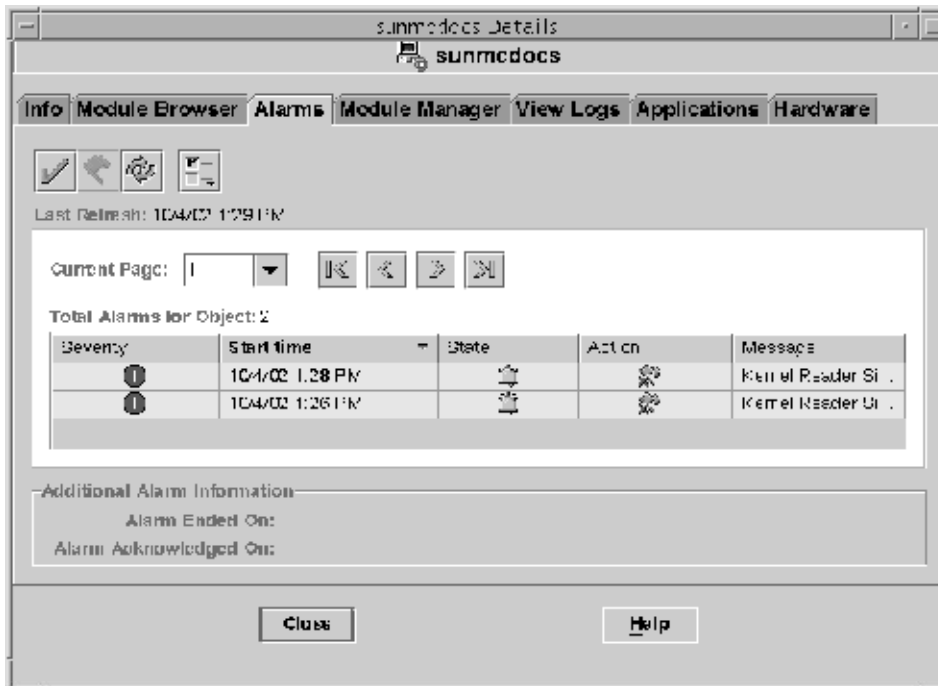


FIGURE 12–2 Alarms Details Window

For information about changing the sort order, see “To Sort the Alarms Table” on page 183.

▼ To Sort the Domain Status Alarms

By default, alarms in the Domain Status Details window are sorted from newest to oldest.

1. In the Domain Status Details window, click the Sort button.

The Sort Options window appears.

2. Determine whether to sort the alarms alphabetically or by time received:

- To sort alphabetically by status message, click Status Message (alphabetically).
- To sort the alarms by time received, newest to oldest, click Time (newest to oldest).

3. Click the OK button.

The Domain Status Details window updates with any order changes as appropriate.

▼ To Sort the Alarms Table

● **Double-click any column header in the alarms table.**

- If the alarms table is currently sorted in ascending order, the table is redisplayed immediately in descending order, based on the column that you select.
- If the alarms table is currently sorted in descending order, the table is redisplayed immediately in ascending order, based on the column that you select.

If the table contains many alarms, changing the sort order might take several seconds.

The column headers have a down or up arrow to the right of the header. These arrows indicate the order in which the table is sorted, descending (down arrow) or ascending (up arrow). The arrow indicator and the selected column header are boldface to identify current sort order. The following list identifies the default sort order for each column heading in the alarm table.

Severity	Alarms are sorted from highest severity (down) to lowest severity (off or disabled).
Start Time	Alarms are sorted from newest to oldest.
Action	Alarms are sorted as follows: <ul style="list-style-type: none">a. Alarms that have completed and executed actionsb. Alarms that have pending actionsc. Alarms that have no actions
State	Alarms are sorted from open to closed.
Message	Alarms are sorted alphabetically.

▼ To Update the Alarms Table

As new alarms are entered into the database, the currently displayed alarms table does not change. This behavior is true regardless of whether these alarms affect the currently displayed page. Instead, the Refresh button displays a two-state icon at the top of the Alarms Details window. This icon indicates that new alarms have arrived. You should update the display soon as it is convenient. As existing alarms are deleted, the alarms table is updated automatically.

- **To update the alarms table, click the Refresh button.**

The alarms table is updated to reflect the new alarms. The program recomputes the division of pages to add the new alarms. The date and time of refresh are displayed in the Last Refresh field.

▼ To Filter the Alarms Table

1. **With the Alarms tab selected in the Details window, choose View Alarms from the Options menu.**

The View Specific Alarms dialog box appears.

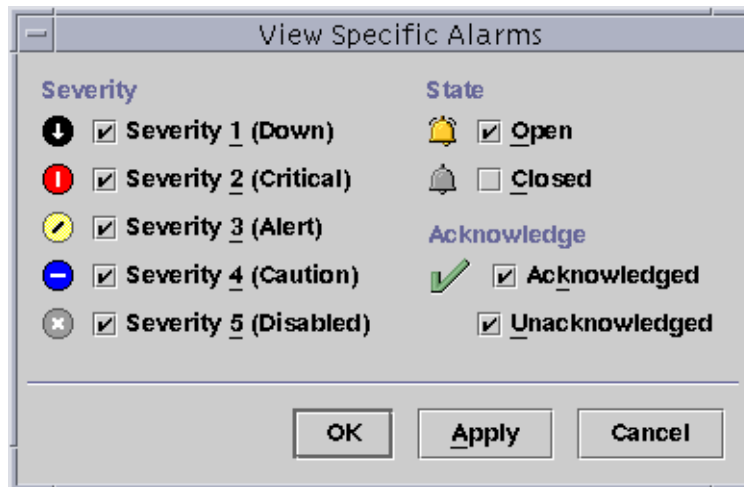


FIGURE 12-3 View Specific Alarms Dialog

2. **To select the items to include in the alarms table, click the boxes next to the items.**

A check mark is displayed in each box that you select. You can select the severity, state, and acknowledgement status of the alarms displayed in the table.

3. **Accept your selections.**

- To accept your selections and close the View Specific Alarms dialog box, click the OK button.
- To accept your selections and continue to display the View Specific Alarms dialog box, click the Apply button.

The alarms table is filtered. The table is redisplayed to reflect your selections.

▼ To View a Log of Alarm Activity

The Sun Management Center software can show alarm activity in a log file. To view the log, follow these steps:

1. **In the Details window for the Sun Management Center server, click the View Logs tab.**
2. **From the Choose Log File Type menu (the left-most icon at the top of the page), select Sun Management Center Log.**
3. **From the Sun Management Center Log list, select `eventHistory.log`.**

The `eventHistory.log` file contents display in the window.

Managing and Controlling Alarms

You can manage and control the alarms displayed in the alarms table.

▼ To Acknowledge New Alarms

If you acknowledge alarms when the alarms occur, you can more easily track new alarms. Unacknowledged alarms continue to be displayed in several locations:

- Domain Status Summary
 - Hierarchy (tree) view
 - Contents view
 - Topology view
 - Relevant row or relevant column in the property table (contents view)
1. **In the Details Alarms window, select the appropriate alarm row.**
The selected row is highlighted.

Tip – To select multiple rows in the table, use the Shift key or drag the cursor. To select multiple, non-contiguous rows from the table, use the Control key.

2. Click the acknowledge button, which looks like a check mark.

The user ID, date, and time of acknowledgment are registered. A green check mark appears next to the alarm icon in the Severity column. Information appears in the Alarm Acknowledged On section of the Additional Alarm Information pane.

▼ To Delete Alarms

You should delete closed alarms to conserve space and to keep the alarms database current.

You can delete open alarms. If you delete open alarms, alarm information in the Alarms windows might differ from alarm information in the hierarchy and topology views. The alarms are removed from the view in the alarms table, but *the alarm condition may still exist*. You should delete open alarms *only* if those alarms are *orphaned*. An example of when this action may be required would be in the case of an unloaded module. If the module has triggered alarms that were not closed before the module was unloaded, the alarms are orphaned. If orphaned alarms remain in view, you need to delete those alarms manually.



Caution – You should only delete open alarms when there is no other way to remove these alarms.

1. **To delete all closed alarms, choose Delete All Closed Alarms from the Options menu.**
2. **To delete only specific alarms:**
 - a. **With the Alarms tab selected in the Details window, click the appropriate rows in the alarms table.**

Tip – To select multiple rows in the table, use the Shift key or drag the cursor. To select multiple, non-contiguous rows from the table, use the Control key.

b. Choose Delete Alarms from the Options menu.

A confirmation alert appears.

▼ To Add an Alarm Note

You can track the history of an alarm by adding notes to an expanding list of notes for a specific alarm.

1. **With the Alarms tab selected in the Details window, choose Edit Note from the Options menu.**

The Edit Alarm Note window appears. The window shows any existing notes.

2. **Click the Add button.**

The Add window appears.

3. **Type your note in the text field of the Add window.**

4. **Click the OK button to accept your changes and close the Add window.**

The Edit Alarm Note window displays the following information:

- The date and time that you added the note
- The login identity that added the note
- The text of the note

▼ To View and Add Suggested Fixes

A default suggested fix might be displayed when a specific alarm is selected in the alarms table. You can also provide your own suggested fix to accompany the default suggestion.

1. **With the Alarms tab selected in the Details window, select an alarm in the alarms table.**

2. **Choose Edit Suggested Fix from the Options menu.**

The Edit Suggested Fix window appears. If a Sun Management Center suggested fix exists for this alarm, it is listed without a user identifier in the operator field.

3. **To view the suggested fix, select the suggested fix in the Add window. Then, click the View Alarms button.**

A read-only window appears that displays the text for the suggested fix. To close this window, click the Cancel button.

4. **To add your own suggested fix for this alarm, click the Add button in the Edit Suggested Fix window.**

The Add window appears.

5. **Type your suggested fix in the text field of the Add window.**

The length of the suggested fix text is limited to 4000 bytes.

6. Click the OK button to accept your changes and close the Add window.

▼ To Notify Users When a Host or Agent is Down

By default, the Sun Management Center software checks whether a host or agent is not responding. However, no default action is defined in response to these conditions.

1. Select the managed object on which you want this action performed.

Tip – To apply this action to all children of a managed object, select the parent managed object. For example, to apply the action to all objects within a particular subnet, select the subnet.

2. Press mouse button three and select Alarm Action from the pop-up menu.

The Alarm Action window appears.

3. To define an action for host not responding, click the Actions button next to Host Not Responding.

The Action Selection window appears. To select or define an action, see “To Select an Action” on page 191.

Tip – The Actions buttons are at the right side of the window. If you have made your window smaller than expected, you might need to scroll to the right or enlarge the window to access the button.

4. To define an action for agent not responding, click the Actions button next to Agent Not Responding.

The Action Selection window appears. To select or define an action, see “To Select an Action” on page 191.

5. (Optional) If the current managed object is the child of an object for which an alarm action has been defined, choose whether to include group actions.

By default, host not responding and agent not responding actions apply to all children. You can choose that a particular child should not share the group action. Click the appropriate checkbox to disable the inherited action.

Note – The Include Group Actions section of the Alarm Action window appears only for applicable child managed objects.

6. (Optional) To set the alarm action to apply only during certain times (for example, during business hours only), click the Scheduler button.
 - a. To run the alarm action starting on a day other than today, provide a date in the Start Date field.

You can edit the information in the Start Date field manually, or you can click on a date in the calendar to select the date.
 - b. Select an hour and minute from the pop-up menus next to Start Time.

Hours are based on a 24-hour clock. So, 16:00 is the same as 4:00 PM.
 - c. Select an hour and minute from the first pop-up menus next to End Time.
 - d. To allow this alarm action to occur more than once, choose how often it can occur from the Repeat Interval pop-up menu.

For example, to permit an alarm action to occur only on weekdays, select Mon-through-Fri.
 - e. (Optional) To limit how long the alarm action can be repeated, type a number in the Repeat Limit field.

For example, to run this alarm action for a month, type 4 in the Repeat Limit field when the word next to the field says "Weeks." The word next to the Repeat Limit field depends on your Repeat Interval choice.

Note – The alarm action is available indefinitely if you do both of the following:

 - You select a Repeat Interval other than One Time.
 - You do not provide a value in the Repeat Limit field.

 - f. Click OK to set this schedule, or click Cancel to exit from the Scheduler window.
7. To complete the alarm action definition and exit from the Alarm Action window, click the OK button.

▼ To Register an Alarm Action

Although alarms are defined, you need to tell Sun Management Center what to do when the alarm condition is met. For example, you might want to have the software send email notification to appropriate system administrators.

1. In the Attribute Editor, click the Actions tab.

The Attribute Editor Actions window is displayed.
2. Click the Actions button next to the action to be registered.

The Action Selection dialog box is displayed.

3. Select the type of alarm action that you want to register.

- To send an email, follow these steps:
 - a. Select the Email button. Then, type the username or alias to which to send the message.

Tip – To send to more than one username, separate the usernames with a space.

- b. Type the message text.

- To perform an action other than sending an email, follow these steps:
 - a. Define a script that specifies the action to take. For more information, see “To Define an Alarm Action Script” on page 192.
 - b. Select the Other button.
 - c. Choose a script to run from the list of available scripts.
 - d. Type any parameters that the script needs into the Arguments field.
- To clear the alarm, select Clear.

4. To set the action as you defined and close the Action Selection window, click the OK button.

5. Click the OK button to accept the entries and close the Alarm Action dialog box.
The entry is displayed in the corresponding Action field of the Actions dialog box.

▼ To Run a Registered Alarm Action

You can initiate some alarm actions manually after an alarm occurs.

- **Select one or more alarms with pending actions in the alarms table and click Run.**

The currently registered alarm actions for the alarm are started. The action state in the alarms table changes from pending to executed. For additional details, see “To Modify Pending Alarm Actions” on page 191.

Note – Several seconds can be needed for the action state in the alarm table to update.

▼ To Modify Pending Alarm Actions

For alarms with no registered actions, a “no action” icon is displayed in the Actions column of the alarms table. For alarms with a manual action, the “pending” icon is displayed until the user runs the action. Then, the “executed” icon is displayed. For alarms with an automatic action, the “executed” icon is always displayed.

1. **With the Alarms tab selected in the Details window, select an alarm that has a pending action in the Alarms table.**
2. **Choose Modify Action from the Options menu.**
The Action Selection dialog box is displayed. Only alarms that are pending manual action can be modified.
3. **Select the action that you want to modify and make the necessary changes as described in “To Select an Action” on page 191.**

▼ To Select an Action

When an alarm condition is met, you can choose to send an email, perform some other action, or clear the alarm.

1. **To send an email, follow these steps:**
 - a. **Select the Email button.**
 - b. **Type the username or alias to which to send the email message in the To field.**

Tip – To send to more than one username, separate the usernames with a space.

- c. **Type the message text in the Message field.**
2. **To perform an action other than sending an email, follow these steps:**
 - a. **Select the Other button.**
 - b. **Select a script to run from the list of available scripts.**
For information about creating a script to run, see “To Define an Alarm Action Script” on page 192.
 - c. **Type any parameters that the script needs into the Arguments field.**
 3. **To set the alarm to be cleared as the action, select the Clear button.**

4. To set the action as you defined and close the Action Selection window, click the OK button.

▼ To Define an Alarm Action Script

The following procedure describes how to customize an alarm action to notify a user when an alarm condition occurs.

1. Create your custom alarm action script, using the following optional arguments:

<code>%statusfmt</code>	The alarm severity, such as Warning, Critical, and so on.
<code>%statusstringfmt</code>	The complete alarm string, including severity. For example: Critical: Machine A Kernel Reader Number of User Sessions > 10.

2. At the command-line level, become superuser.

```
# su -
```

3. Install the script in the home Sun Management Center directory.

The default is the `/var/opt/SUNWsymon/bin/` directory. For example:

```
# cp custom-alarm-script /var/opt/SUNWsymon/bin/
```

4. Click the Module Browser tab in the Details window.

5. Set the alarm threshold.

For more information, see “Example: To Define and Respond to an Alarm” on page 193.

6. Open the Attribute Editor for the property to which you want this script to apply.

7. Click the Actions tab.

The action rows are displayed.

8. Type `custom-alarm-script %statusstringfmt` in the Critical Action field of the Actions panel.

9. Ensure that the Automatic check box on the Critical Action line is selected.

By default, your script will execute automatically.

10. To apply this action script and close the Attribute Editor window, click the OK button.

Alarm Management Examples

There are many methods that you can use to define and manage alarms. Here are a few examples to better illustrate how you might perform these functions in your environment.

▼ Example: To Define and Respond to an Alarm

This example illustrates how to create and acknowledge a simple critical alarm when the memory usage on the specified system exceeds 50%.

1. **Access the Details window for the managed object on which you want to define the alarm.**
2. **Click the Module Browser tab in the Details window.**
3. **Click the expansion icon next to the Operating System icon in the hierarchy tree view.**
The Operating System modules are displayed.
4. **Click the expansion icon next to the Kernel Reader icon.**
The Kernel Reader properties are displayed.
5. **Double-click the Memory Usage Statistics icon.**
The Memory Usage Statistics properties table is displayed in the contents view.
6. **Select the table cell for % Memory Used.**

Tip – If the Attributes button is unavailable and is dimmed when you select the table cell, verify that you selected the data cell not the label cell.

7. **Click the Attributes button.**
The Attribute Editor window is displayed.
8. **Click the Alarms tab.**
The Alarms panel appears on which you can define threshold values for Critical, Caution, and Alert alarms.
9. **Type 50 in the Critical Threshold (>) field.**

A critical alarm will be generated when the memory usage exceeds 50% on the selected managed object.

Note – This example uses a low threshold to create an alarm immediately. Normally, you might generate alarms according to the following criteria:

- An alert alarm when the usage exceeds 50%
 - A caution alarm when the usage exceeds 65%
 - A critical alarm when the usage exceeds 80%
-

10. Click the OK button to apply your changes and close the Attribute Editor window.

Almost immediately, the % Memory Used data field in the table turns red. In addition, red alarm icons are displayed on the Operating System, Kernel Reader, and Memory Usage Statistics folders and icons. If the red icon does not appear, verify whether your system has an open, unacknowledged black alarm.

11. Click the Alarms tab in the Details window.

The alarm that you created is listed in the alarms table. See Chapter 12 for more information.

12. Click the Acknowledge button to acknowledge this alarm.

Tip – The Acknowledge button looks like a check mark.

13. Create additional alarm thresholds, and familiarize yourself with their operation.

Once you have created these alarms, you can set up security permissions so that another Sun Management Center software user cannot change your alarm thresholds. For more information on security, see Chapter 18.

Note – You do not need to fill in alarm information for all alarm thresholds. For example, you may choose to create only a critical alarm threshold.

This example illustrates creating a situation where an alarm is registered if a value exceeds the alarm limit. Table 10–1 lists other common alarm limits in the software.

▼ Example: To Send an Email

This example sets up an email to be sent when the system load average exceeds the threshold.

1. **Click the Module Browser tab in the Details window.**
2. **Click the expansion icon next to the Operating System icon in the hierarchy tree view.**
The Operating System modules are displayed.
3. **Click the expansion icon next to the Kernel Reader icon.**
The Kernel Reader properties are displayed.
4. **Double-click the System Load Statistics icon.**
The System Load Statistics properties table is displayed in the contents view.
5. **Select the table cell for Load Averages Over the Last 5 Minutes.**
6. **Click the Attributes button.**
The Attribute Editor window is displayed.
7. **Click the Actions tab.**
The Action Selection screen appears.
8. **Click the Email radio button to activate the To and Message fields.**
9. **Type the usernames in the To field and the message in the Message field.**
10. **Click OK to accept the changes that you made and close this window.**
The following email is sent to the usernames whenever the load averages alert alarm occurs.

```
Date: Wed, 30 Jun 2000 15:25:39 -0800
From: root@MachineB (0000-Admin(0000))
Subject: Sun Management Center - Alert Alarm Action
Mime-Version: 1.0
```

```
Sun Management Center alarm action notification ... {Alert:
machineB Kernel Reader Load Average Over The Last 5 Minutes > 0.01Jobs}
```


Managing Group-related Jobs

The Manage Jobs function enables you to define a task request or collection of attribute settings that applies to a user-defined group of objects. The following topics are described in this chapter:

- “Job Management Concepts” on page 197
- “To Define a Job” on page 199
- “To View Job Status” on page 200
- “Using Filters” on page 212
- “To Define a Task” on page 202
- “To Create a Module Task” on page 203
- “To Create a Data Property Task” on page 205
- “To Create a Module Table Task” on page 207
- “To Create a Configuration Task” on page 208
- “To Update the File Set for a Configuration Task” on page 210
- “To Create an Agent Update Task” on page 210
- “To Schedule a Job” on page 201
- “To Modify a Task” on page 211
- “To Modify a Filter” on page 214
- “To Suspend a Running Job Request” on page 201
- “To Delete a Job Request” on page 202
- “To Delete a Task” on page 211
- “To Delete a Filter” on page 214

Job Management Concepts

A *job* consists of a task or activity and a set of filtering criteria used to define the objects to which that task applies. You can submit a job to run when you define the job. Alternatively, you can schedule a job to run at a specific time or on a repeating schedule. For example, you might define a job that sets several attributes for several

data properties that apply to several modules. Another example of a job might be to set a single attribute for several hosts within a domain. The remainder of this chapter describes how to define, schedule, and manage jobs.

Manage Jobs Window

You use the Manage Jobs window to define and schedule jobs. For any defined jobs, the Manage Jobs window displays the following information:

- Job name
- Date and time that the task was added to the server database
- Domain to which the job applies
- Name of any filter that applies to the job
- Indication of whether the job is run at user request or according to a periodic schedule
- Current state of the job

Features in the Manage Jobs window enable you to define and modify jobs. For more information, see the following tasks:

- “To Define a Job” on page 199
- “Using Filters” on page 212
- “To Define a Task” on page 202
- “To Create a Module Task” on page 203
- “To Create a Data Property Task” on page 205
- “To Create a Module Table Task” on page 207
- “To Create an Agent Update Task” on page 210
- “To Schedule a Job” on page 201
- “To Modify a Task” on page 211

Creating and Managing Jobs

A job consists of a task or activity and a set of filtering criteria used to define the objects to which that task applies. This section describes how to define, schedule, suspend, and delete jobs.

▼ To Define a Job

Note – This procedure describes the main steps that you follow to create a job request. Individual steps are explained in further detail in the referenced procedures.

1. **Choose Manage Jobs from the Tools menu in the main console window.**
2. **Type a unique name for the job in the Job Name field.**
The name should describe the job. For example, if the job is to load the Directory Monitoring module, the name could be Load Directory Monitoring.
3. **Specify the initial set of managed objects to which this job applies.**
 - To apply this job to all objects within the current domain, select All Objects in Domain.
 - To select objects manually, select Selected Objects in Main Window.

Note – You can select objects before you define the job. Alternately, you can go to the topology area of the main console window to select the objects now. In either case, you must select topology objects before you submit this job.

- To use objects that were selected previously for this job, select Objects Previously Selected in Main Window.

Note – This feature applies only to jobs that are being modified. For new jobs, this feature is unavailable and is dimmed.

4. **To limit the managed objects even further, specify a filter.**
 - Click the New Filter button to limit this task to objects that use a specific operating system version, platform, or other specified criteria.
The New Filter window appears from which you define the filter. See “Using Filters” on page 212 for more information.
 - Choose a defined filter from the Filter menu.
5. **To see what objects would be selected by the defined filter, click Preview Objects.**
6. **Specify the action for the job to execute.**
 - Click New Task to define a task.

The New Task window appears from which you define the task. See “To Define a Task” on page 202 for more information.

- Choose a defined task from the Task menu.

7. Determine whether to run the job immediately or to schedule the job.

- To run this job when you have finished defining it, click the radio button next to Run Job Immediately.
- To schedule this job to run, click the radio button next to Schedule Job, then click Set Schedule to access the scheduling function.

For more information about scheduling a job, see “To Schedule a Job” on page 201.

8. To complete the definition of this job, click Add Job.

Tip – To clear all fields in the job, click Reset Form.

▼ To View Job Status

The Jobs section of the Manage Jobs window shows a brief status for current jobs.

- 1. To view more detailed job status, select the job from the Jobs section of the Manage Jobs window.**
- 2. Click the View Log button.**

A window appears that displays detailed information about the selected job.

Tip – If the View Log window is mostly empty, the job probably has not finished. Exit from the View Log window. Wait until the status in the Manage Jobs window no longer says “Running” before you reopen the View Log window.

The View Log window provides the following information about the selected job:

- The name, type, and description for the task
- The domain in which the job was run
- The date and time that the job was run
- The overall job status
- The length of time it took for the job to run
- The username of the user that requested the job
- A list of managed objects to which the job applies
- For each managed object in the job, information about job activities and status

- 3. To view more information about the job status for a specific managed object, select the object in the Domain Object Status section of the View Log window.**

Specific information about the job status as it relates to the selected object appears in the Domain Object Status Details section of the window.

▼ To Schedule a Job

A similar Scheduler window is used for defining schedules for module loading and enabling, group-related jobs, alarm monitoring, and Discovery requests.

- 1. To set this job to begin on a day other than today, type a date in the Start Date field.**
To select a date from the calendar, click the date. To change the month, use the left and right arrows at the top of the calendar.
- 2. Select an hour and minutes from the Start Time menu.**
Hours are based on a 24-hour clock. For example, 16:00 is the same as 4:00 PM.
- 3. (Optional) Choose how often the action should occur from the Repeat Interval menu.**
You can schedule a task to occur more than once. For example, to schedule a task to run weekly, you would select Weekly.

Note – Repeat Interval values differ by scheduling activity.

- 4. (Optional) Select an appropriate time reference from the Repeat Interval menu. Then, type a number in the Repeat Interval field.**
You can run the action for a specific number of repeated intervals. For example, to run a task for the next two months, select Months from the Repeat Interval menu and type 2 in the Repeat Interval field.

Note – Some time intervals, such as Weekly, do not allow you to specify Repeat Intervals. In those cases, you cannot type a value in the Repeat Interval field.

- 5. Click OK to set this schedule.**

▼ To Suspend a Running Job Request

You can stop a job from running and restart the job later. For example, if you have major system maintenance that is going to be performed, you might want to temporarily disable some alarm processing.

- 1. In the Manage Jobs window, select the task request that you want to suspend from the list of jobs.**

2. **Click the Suspend Job button.**
 - If the job is running, the value in the State column changes to Suspended.
 - If the job is not running (for example, the current State is Queued), nothing appears to happen.
3. **To restart a suspended job, select the job and click the Resume Job button.**

▼ To Delete a Job Request

1. **In the Manage Jobs window, select the job that you want to delete from the list of jobs.**
2. **Click the Delete Job button.**

A Delete confirmation window appears to remind you that deleting the job is a permanent action.
3. **To permanently delete the job, click the Delete button.**

Creating and Modifying Tasks

A *task* is the actual action that you want to have performed for the job. This section describes how to create, change, and delete tasks.

▼ To Define a Task

1. **Choose Manage Jobs from the Tools menu in the main console window.**

The Manage Jobs window appears.
2. **Click New Task.**

The New Task window appears.
3. **Type a name for the task in the Task Name field.**

The task name should describe the task. For example, if you are defining a task to load a specific module, the task name might be Load Directory Monitoring Module.
4. **Select the type of task that you want to create from the Task Type menu.**

The task type that you select determines the remaining information on the New Task window.
5. **Follow the steps as appropriate for your task type.**

The following task types are available:

- Module task – Load, enable, disable, unload, or change security settings for modules. See “To Create a Module Task” on page 203.
- Data Property task – Set alarm thresholds and actions, set intervals for refreshing data or write the data to history logs. See “To Create a Data Property Task” on page 205.
- Module Table task – Add, remove, or change information in module tables. See “To Create a Module Table Task” on page 207.
- Configuration task – Copy a set of module configuration files and scripts from a source host to others. See “To Create a Configuration Task” on page 208.
- Agent Update task – Update agents by using an update image file. See “To Create an Agent Update Task” on page 210.

6. (Optional) Type a description for this task.

7. To confirm the definition of this task, click Add Task.

You remain in the New Task window to define additional tasks.

To redefine the task, click Clear Form.

8. When you have finished defining your tasks, click Close to close the New Task window.

▼ To Create a Module Task

A module task enables you to schedule the following actions for a group of modules:

- Load
- Unload
- Enable
- Disable
- Change security settings

Note – A single module task can include module actions for several modules.

1. In the New Task window, type a name for the task in the Task Name field.

The task name should describe the task. For example, if you are defining a task to load a specific module, the task name might be Load Directory Monitoring Module.

2. Choose Module from the Task Type menu.

3. Choose a module name from the Module menu.

If the selected module is a multi-instance module, a window appears in which you type the module instance name.

The instance name is used within the Sun Management Center agent to identify uniquely a particular module or a row within a module. You must specify a unique name for each instance when multiple instances of the same module are loaded.

An instance name is a single word or alphanumeric string. The only special character allowed in an instance name is the underscore (_).

4. Choose an action to perform for this module from the Module Action menu.

The following actions are available, depending on the current state of the selected module:

- None – Enables you to modify the security for the selected module
- Load – Loads the module
- Enable – Enables the module
- Disable – Disables the module
- Unload – Unloads the module

The action that you choose determines which buttons to the right of the module task table are active (bold font) or inactive (grayed out). In addition, the Load Parameters window appears automatically when you choose to load a module.

- Load Parameters – Active only if Load is the selected Action
- Set Schedule – Active if Load or Enable is the selected Action
- Set Security – Active if Load or None is the selected Action
- Delete Entry – Always active

5. To define the load parameters for the module, click the Load Parameters button.

The Module Loader window appears. Appropriate information is displayed for the selected module. For more information, see Chapter 11.

Note – This button is active only if Load is the selected action.

6. To set a time to perform the requested module action, click the Set Schedule button.

The Scheduler window appears, in which you define the schedule for loading and enabling this module. For more information, see “To Schedule a Job” on page 201.

Note – You can also set the schedule for when the overall task is to be performed in the Manage Jobs window. The Scheduler window differs slightly when scheduling a module task as opposed to scheduling a job. For a module task, you must specify an end time. Also, you use slightly different Repeat Interval values for the module task.

This button is active only if the selected action is either Load or Enable.

7. To define security parameters for the selected module, click the Set Security button.

The Attribute Editor window appears. Current security information is displayed for this module. For additional information on the Attribute Editor, see Chapter 10. For more information about security, see Chapter 18.

Note – This button is active only if the selected action is either Load or None.

- 8. (Optional) Because a module task can include actions for several modules, repeat the preceding five steps until you have identified all the modules and their associated actions for this task.**

Tip – To remove a module and its associated actions from the module list for this task, select the module and click Delete Entry.

- 9. (Optional) Type a description for this task.**
- 10. To confirm the definition of this task, click Add Task.**

You remain in the New Task window to define additional tasks.

To clear the data for the existing task so that you can define another task, click Reset Form.
- 11. When you have finished defining your tasks, click Close to close the New Task window.**

▼ To Create a Data Property Task

A data property task enables you to set a threshold for a particular data property, for example alarm thresholds and actions, across a group of objects.

- 1. In the New Task window, type a name for the task in the Task Name field.**

The task name should describe the task. For example, if you are defining a task to set some alarm thresholds, the task name might be `Set threshold for memory usage alarm`.
- 2. Choose Data Property from the Task Type menu.**
- 3. Click Select Property.**

The Select Property window appears.
- 4. Select a data property from the list.**

Note – The initial list of data properties is a hierarchical list. You need to expand the list several levels to get to an individual selectable data property.

The content of the Select Property window differs according to the property that you select. The next series of steps explains the different possible items that you might need to specify.

- a. **If there can be more than one instance of this module, type the instance name in the Module Instance field.**

The instance name is used within the Sun Management Center agent to identify uniquely a particular module or a row within a module.

An instance name is a single word or alphanumeric string. The only special character allowed in an instance name is the underscore (_).

- b. **If the data property can apply to more than one object of the same type, determine whether the task applies to all indices of the selected property or only to a specific index value of the selected property.**

- c. **To apply the task to a Specific Property Index, provide a unique value in the property index field.**

The labels and fields beneath the selection buttons differ according to the specific data property. In some instances, you might have one field in which you can enter one index. In other instances, you might have multiple fields in which to enter a range of index values.

For example, if you choose the CPU Number data property and you have an environment in which you have several CPUs, you might want to apply the task only to a specific CPU number. If you do not specify an index, the property updates on all CPUs.

On the other hand, if you choose the TCP Connection property, you have four fields in which to enter data. You must supply values in all four fields to enable this task.

5. **When you have provided all the information for this data property, click Apply.**

Continue to add properties until you have identified all the data properties that you want to use.

6. **To close the Select Property window, click Close.**

The data properties are added to the selected properties table. The Select Property window closes. You return to the New Task window.

7. **To define additional attributes for the specified data properties, select the data property entry in the table in the New Task window. Then, click Set Attributes.**

The Attribute Editor appears. You can define alarm, alarm action, refresh interval, or history log behavior. For more information, see Chapter 10 and Chapter 12.

8. **To remove a data property from the selected properties table, select the data property entry in the table. Then, click Delete Entry.**
A confirmation window appears from which you can accept or reject the removal.
9. **(Optional) Type a description for this task.**
10. **To confirm the definition of this task, click Add Task.**
You remain in the New Task window to define additional tasks.
To clear the data for the existing task so that you can define another task, click Reset Form.
11. **When you have finished defining your tasks, click Close to close the New Task window.**

▼ To Create a Module Table Task

Some Sun Management Center modules can only monitor an entity once the data parameters for that entity have been made known to the module. For example, for the File Monitoring module to function appropriately, you need to identify several specific items:

- The name of the file to be monitored
- A description of the file
- A table row index for displaying that information in the File Monitoring table

A module table task enables you to add entries as table rows to a group of module tables.

1. **In the New Task window, type a name for the task in the Task Name field.**
The task name should describe the task. For example, if you are defining a task to monitor specific file, the task name might be `Add monitoring for .cshrc file`.
2. **Choose Table from the Task Type menu.**
3. **Select the module to which this task applies from the Module Table menu.**
If the selected module is a multi-instance module, a window appears in which you type the module instance name.
4. **Add a row, or modify or delete a row.**
 - To add a row to a table, choose Add Row from the Table Action menu, and provide required values in the Add Row window as needed.
For example, you might need to provide a Name (for example, `CheckLog`), Description (for example, `log file`), and a Filename (for example, `/var/opt/SUNWsymon/cfg/sfix.log`).
 - To modify a row in a table, choose Edit Row from the Table Action menu and modify values in the Edit Row window as needed.

For example, you might need to change the name of the file that is being monitored.

Note – The index value that you provide here must match an index value for an existing row in the table. If the value does not match, nothing will match to be modified.

- To remove a row, choose Delete Row from the Table Action menu.
In the Delete Row window, provide name, description, and file name information that exactly matches the row as the row currently exists in the table.

5. **(Optional) Type a description for this task.**

6. **To confirm the definition of this task, click Add Task.**

You remain in the New Task window to define additional tasks.

To clear the data for the existing task so that you can define another task, click Reset Form.

7. **When you have finished defining your tasks, click Close to close the New Task window.**

▼ To Create a Configuration Task

A Configuration task enables you to copy scripts and module configuration files from one host to another host or to a group of hosts.

Note – To copy these files, you must be authorized as an Module Configuration Propagation (MCP) user. By default, any server `esadm` group member is an MCP user. To limit script propagation through MCP to specific users, you need to add users to the `es-mcp-users` file. To add users to the file, use the following command on the agent systems:

```
# es-config -m
```

1. **In the New Task window, type a name for the task in the Task Name field.**

The task name should describe the task. For example, if you are defining a task to copy just scripts from one host to several, the task name might be `Copy scripts from myhost`.

2. **Choose Configuration from the Task Type menu.**

The New Task window changes to display appropriate information for a Configuration task.

3. **Type the source host from which you want to copy in the Source Host Name field.**
The source host must be an agent in the current server context. You can identify the source host either by its name as known to the server or by its IP address.
4. **To define the files to be copied, click Edit File Set.**
The New File Set window appears.
 - a. **To add the configuration files for a specific module to be copied, select the module name from the list of Available Modules. Then, click Add.**
The selected module name moves from the list of Available Modules to the list of Selected Modules.
 - b. **To add a script to be copied, select the script name from the list of Available Scripts, then click Add.**
The selected script name moves from the list of Available Scripts to the list of Selected Scripts.
 - c. **When you have added all the modules and scripts that you want included in this set of files, click OK.**
5. **To specify which parts of the source configuration are to be copied, click Set Options.**
The Set Options window contains a series of radio buttons, grouped by related pairs. You can select one option of a related pair. For example, you can use the module security settings either from the source host or the destination host, but not both.
By default, the following options are selected:
 - Deploy to all destination hosts
 - Load on all destination hosts
 - Use module parameters on destination host
 - Use module schedule on source host
 - Use module security settings on source host
6. **When you have set the options, click OK to close the Set Options window.**
7. **(Optional) Type a description for this task.**
8. **To confirm the definition of this task, click Add Task.**
You remain in the New Task window to define additional tasks.
To clear the data for the existing task so that you can define another task, click Reset Form.
9. **When you have finished defining your tasks, click Close to close the New Task window.**

▼ To Update the File Set for a Configuration Task

The data in the file set that is defined for a configuration task is stored on the server. Over time, the various files that comprise a file set on a given source host may change.

1. **From the Manage Jobs window, click New Task.**
2. **Select the Configuration task for the source host for which you want to update data.**
3. **Click the Synchronize File Set Content button.**

Note – This button is disabled until a file set is defined.

The file set on the server is resynchronized with the file set on the source host.

Note – Resynchronizing the file set does not propagate the changed contents. To distribute the changed file set to the target hosts, you must re-run the task.

▼ To Create an Agent Update Task

An Agent Update task enables you to define and schedule software updates to agent systems.

1. **Create an Update Image file.**
Use the `es-imagetool` or `es-gui-imagetool` utilities as described in *Sun Management Center 3.5 Installation and Configuration Guide*.
2. **In the New Task window, type a name for the task in the Task Name field.**
The task name should describe the task. For example, if you are defining a task to install the latest version of the software on all agents, the task name might be `Update agents to latest management center software`.
3. **Choose Agent Update from the Task Type menu.**
4. **Choose an image file from the Image File menu.**

Note – If choices in this menu are unavailable, there are no Update images defined. See Step 1.

When you chose an image file, information about its contents appears in the Image Contents section of the New Task window.

5. **(Optional) Type a description for this task.**
6. **To confirm the definition of this task, click Add Task.**
You remain in the New Task window to define additional tasks.
To clear the data for the existing task so that you can define another task, click Reset Form.
7. **When you have finished defining your tasks, click Close to close the New Task window.**

▼ To Modify a Task

1. **In the Manage Jobs window, select New Task.**
2. **In the New Task window, select the name of the task that you want to change in the Tasks list.**
3. **Make the necessary changes.**
The task types are described in the following sections:
 - “To Create a Module Task” on page 203
 - “To Create a Data Property Task” on page 205
 - “To Create a Module Table Task” on page 207
 - “To Create a Configuration Task” on page 208
 - “To Create an Agent Update Task” on page 210
4. **To save your changes, click Update Task.**
5. **To close the New Task window, click Close.**
6. **To apply the changed task, click Update Job in the Manage Jobs window.**

▼ To Delete a Task

1. **In the Manage Jobs window, click New Task.**
2. **In the New Task window, select the task that you want to delete from the list of Tasks.**
3. **Click the Delete Task button.**
A Delete confirmation window appears to remind you that deleting the task is a permanent action.
4. **To permanently delete the task, click Delete.**
5. **To exit from the New Task window, click Close.**

Using Filters

Filters enable you to act on objects according to some criteria that you define, rather than having to explicitly select those objects.

▼ To Define a Filter

1. **Click the New Filter button in the Manage Jobs window.**

The New Filter window appears.

2. **Type a name in the Filter Name field.**

This name should describe the filter, such as Solaris8.

The next several steps explain how to define various filtering criteria. These criteria are used together to select the objects. For example, if you define a platform filter and an operating system filter, the managed object would need to match both criteria to be selected.

3. **To choose objects based on their labels, select Filter on Object Label and type a text string to be matched.**

To control the level of matching that occurs, use one of the following keywords:

- Contains – Equivalent to `*text*`, matches any object whose label contains the specified string. Contains is the default behavior.
- Starts with – Equivalent to `text*`, matches any object whose label starts with the specified string.
- Ends with – Equivalent to `*text`, matches any object whose label ends with the specified string.

Tip – For an exact match, type the text string, then click Exact Match.

4. **To choose objects based on the hardware platform, select Filter on Platform Types.**

- a. **Select the platform type from the list on the left.**

For example, to include all Sun Ultra™ 5 and Sun Ultra 10 computers, click Sun Ultra-5,10.

- b. **To add this type to the filtering criteria, click the Add button.**

- c. **To exclude rather than include objects based on the platform type, select Exclude.**

- d. **To remove a platform filter, select the platform type in the list on the right, then click the Remove button.**
5. **To choose objects based on the operating environment, select Filter on Operating Systems.**
 - a. **Select the operating environment from the list on the left.**
For example, to include all systems that are running Solaris 2.6, select SunOS 5.6.
 - b. **To add this operating environment to the filtering criteria, click the Add button.**
 - c. **To exclude rather than include objects based on the operating environment, select Exclude.**
 - d. **To remove an operating environment filter, select the operating environment from the list on the right. Then, click the Remove button.**
6. **To choose objects based on the modules that are loaded on that system, select Filter on Modules Loaded.**
 - a. **Select the module from the list on the left.**
For example, to include all systems on which the Kernel Reader is loaded, select Kernel Reader (Simple).
 - b. **To add this module to the filtering criteria, click the Add button.**
 - c. **To exclude rather than include objects based on the loaded modules, select Exclude.**
 - d. **To remove a module filter, select the module from the list on the right, then click Remove.**
7. **To choose objects based on their IP addresses, click the box next to Filter on IP Addresses.**
 - a. **Type an IP address from which to start including objects.**
For example, to include only those objects whose IP address is between 186.255.255.240 and 186.255.255.254, you would type 186 . 255 . 255 . 0.
 - b. **Type an IP address at which to stop including objects.**
For example, to include only those objects whose IP address is between 186.255.255.240 and 186.255.255.254, you would type 186 . 255 . 255 . 254.
8. **(Optional) Type a description for this filter.**
9. **To confirm the definition of this filter, click Add Filter.**

You remain in the New Filter window to define additional filters.

To clear the data for the existing filter so that you can define another filter, click Reset Form.

10. When you have finished defining your filters, click **Close** to close the **New Filter** window.

▼ To Modify a Filter

1. In the **Manage Jobs** window, click the **New Filter** button.
2. In the **New Filter** window, select the filter that you want to change in the **Current Filters** list.
3. Make the necessary changes.
See "Using Filters" on page 212 for more information about filters.
4. To save your changes, click **Update Filter**.
5. To close the **New Filter** window, click **Close**.
6. To apply the changed filter, click **Update Job** in the **Manage Jobs** window.

▼ To Delete a Filter

1. In the **Manage Jobs** window, click **New Filter**.
2. In the **New Filter** window, select the task that you want to delete from the list of **Current Filters**.
A deletion confirmation window appears to remind you that deleting the filter is a permanent action.
3. To permanently delete the filter, click **Delete**.

Dataviews

This chapter provides the following information:

- “Dataview Contents” on page 216
- “Creating a Dataview” on page 216
- “Working With Dataviews” on page 219
- “Navigating Through a Dataview Window” on page 216
- “Types of Dataviews” on page 220

Overview of Dataviews

Dataviews are customized data property tables. You can create dataviews for any of the following data:

- One type of data from several different hosts within a single domain
- Several types of data from one host
- Several types of data from different hosts within a single domain

An example of the first concept is a dataview that monitors CPU usage in group of hosts. An example of the second concept is a dataview that monitors disk space and CPU usage on one host.

Note – Dataviews allow you to combine information from different hosts within a Sun Management Center domain; however, you cannot create a dataview that combines data from different domains.

Dataview Contents

The data that is used to create a dataview is copied from different sources, including:

- Tables
- Modules
- Hosts

Dataviews are an excellent way of monitoring a collection of unrelated information. Because these views are presented in a table, a variety of data can be easily compared. Dataviews are created once and are refreshed automatically. Dataviews have all the features of module tables, except that cells cannot be edited. In dataviews, alarm status is correctly propagated. Cells that have triggered a critical alarm appear in red.

When you create a dataview, the dataview is stored in the database. The dataview persists until you explicitly delete the dataview. In addition, because dataviews are stored in the database, dataviews can be shared. Any dataview that is built on a particular Sun Management Center server can be viewed by all authorized users on that server.

Navigating Through a Dataview Window

The dataview window contains the following main menu items:

- File, which enables you to save the current dataview to a name or to close the current dataview
- Edit, which enables you to paste a dataview from the clipboard or to delete selected rows
- Tools, which provides direct access to the Attribute Editor for the selected cell
- Help, which displays online help

Creating a Dataview

From the Details and console windows, there are two options to create a dataview:

- Create a Dataview
- Copy to the Dataview Clipboard

▼ To Create a Dataview From the Context Pop-up Menu

1. **Open the Details window for the host in which you are interested.**
The Module Browser view appears in the Details window.
2. **Click the expansion icon next to the items in the hierarchy down to the desired data property.**
3. **Press mouse button three on a row or cell in the data property table. Then, choose Create Dataview from the pop-up menu.**
4. **Select Cell or Row(s) as appropriate.**
An automatically populated dataview window appears.

▼ To Create a Dataview From the Options Menu

1. **Open the Details window for the host in which you are interested.**
The Module Browser view appears in the Details window.
2. **Click the expansion icon next to the items in the hierarchy down to the desired data property.**
3. **In the data property table, select a row or a cell.**
4. **From the Options icon menu, choose Create Dataview.**

Tip – The Options icon menu is the second from the left icon above the hierarchy view. This icon looks like a list with a check mark.

5. **Select Cell or Row(s) as appropriate.**
An automatically populated dataview window appears.

▼ To Copy to the Dataview Clipboard From the Details Window

1. **Press mouse button three on a row or data cell in a data property table. Then, choose Copy to Dataview Clipboard from the pop-up menu.**
2. **Select Cell or Row(s) as appropriate.**
3. **To add the copied information to an existing dataview, follow these steps:**

- a. Open an existing dataview as explained in “To Open an Existing Dataview” on page 219.
 - b. From the Edit menu, choose Paste from Clipboard.
4. To add the copied information to a new dataview, follow these steps:
 - a. In the Details window, click the Dataview icon.

Tip – The Dataview icon is the third icon from the right above the data property table.

An empty Dataview window appears.

- b. From the Edit menu, choose Paste from Clipboard.

▼ To Copy to the Dataview Clipboard From the Console Window

1. Select a row or data cell in a data property table.
2. Press mouse button three and choose Copy to Dataview Clipboard from the pop-up menu.
3. Select Cell or Row(s) as appropriate.
4. To add the copied information to an existing dataview, follow these steps:
 - a. Open an existing dataview as explained in “To Open an Existing Dataview” on page 219.
 - b. From the Edit menu, choose Paste from Clipboard.
5. To add the copied information to a new dataview, follow these steps:
 - a. In the Console window, choose Dataview Manager from the Tools menu.
The Dataview Manager window appears.
 - b. Click the Create button.
An empty Dataview window appears.
 - c. From the Edit menu, choose Paste from Clipboard.

Working With Dataviews

The procedures in this section explain how to open, save, or delete a dataview.

▼ To Open an Empty Dataview Window

1. **In the console window, choose Dataview Manager from the Tools menu.**
The Dataview Manager window appears.
2. **Click the Create Button.**
An empty Dataview window appears.

▼ To Open an Existing Dataview

1. **In the Dataview Manager window, select the name of the dataview that you want to open.**
2. **Click the Open button.**

▼ To Delete a Dataview

1. **In the Dataview Manager window, select the name of the dataview that you want to delete.**
2. **Click the Delete button.**

Note – A Delete confirmation window appears to remind you that deleting a dataview is a permanent action.

▼ To Save a Dataview

1. **In the Dataview window, choose Save from the File menu.**
The Save Dataview window appears. You may type an optional description in the Description field.
2. **Click the Save Dataview button.**

Note – If the name that you have chosen for this dataview exists, a Warning window appears.

Types of Dataviews

There are two types of Dataviews:

- Scalar
- Vector

Scalar Dataviews

A scalar dataview is created from scalar data items, which are single cells from scalar or vector tables. A scalar dataview includes the following three columns:

- Host Name
- Data Property Name
- Value

Note – The Data Property Name column contains the name of the property for the data item in the following format: *module/object/property*.

▼ To Create a Scalar Dataview

The following example uses the CPU Utilization table.

1. **In the Details window, navigate to the CPU Utilization table.**
2. **Select a data cell in the table.**
3. **Copy the data cell to the dataview clipboard in either of the following ways:**
 - From the Options menu, choose Copy to Dataview Clipboard Cell(s) or Create Dataview Cell(s).
 - In the Details window, press mouse button three on the table and select Copy to Dataview Clipboard Cell(s) from the pop-up menu.

For additional information on the Copy to Dataview Clipboard and the Create Dataview options, see “Creating a Dataview” on page 216.

Vector Dataviews

The vector dataview contains one or more rows from a vector module table. You can simultaneously select one row or multiple rows from a vector table. You can select multiple rows that are not contiguous. For example, you could select the following rows:

- Row number 1
- Row number 3
- Row number 4
- Row number 6

You cannot select partial rows.



Caution – Do not paste rows from vector and scalar tables into the same dataview window.

▼ To Create a Vector Dataview

The following example uses the CPU Utilization table.

1. In the Browser Details window, navigate to the CPU Utilization table.
2. Select a row in the table.

Tip – To select multiple rows in the table, use the Shift key. To select multiple, non-continuous rows from the table, use the Control key.

3. To copy the data rows to the dataview clipboard, proceed with one of the following:
 - From the Options menu, choose Copy to Dataview Clipboard Row(s) or Create Dataview Row(s).
 - In the Details window, press mouse button three on the table and select Copy to Dataview Clipboard Row(s).

For additional information on the Copy to Dataview Clipboard and the Create Dataview options, see “Creating a Dataview” on page 216.



Caution – You can only paste compatible data types. If you try to paste an incompatible data type, an error dialog box appears.

Managing Objects Using the Web Console

The Sun Management Center web console provides many of the same host management functions as the Sun Management Center Java console provides. You can use the web console to monitor and manage alarms and modules. You can also use the web console to navigate the managed object topology. This chapter covers the following topics:

- “Web Console Features and Functions” on page 223
- “Overview of Main Web Console Page” on page 224
- “To Start the Sun Management Center Web Console ” on page 226
- “To View Detailed Information About a Host” on page 228
- “To Load a Module” on page 229
- “To View a Specific Log File” on page 229
- “Host Details Browser Page” on page 230
- “Attribute Editor in the Web Console” on page 232

Web Console Features and Functions

The Sun Management Center web console is a web-based management interface for the Sun Management Center platform. This host management system uses the secure HTTPS protocol to provide easy access to Sun Management Center management information. You can access the web console across the firewall to monitor and manage Sun Management Center information from any location. You can use widely available web browsers, such as Netscape Navigator™ and Internet Explorer.

The web console is an optional Sun Management Center component. The web console depends on the Sun Management Center server for retrieving and manipulating managed objects. For information about configuring the web server, see *Sun Management Center 3.5 Installation and Configuration Guide*.

The following table identifies the functions that the web console provides and relates the functions to the Java console.

TABLE 15–1 Web Console Functions

Function	Web Console Information	Related Java Console Information
View the objects in the database	“Overview of Main Web Console Page” on page 224	Chapter 5
View details about a specific managed object	“Host Details Browser Page” on page 230	Chapter 6
View more information about a specific managed object	“Info Tab in the Web Console” on page 230	“Info Tab” on page 99
Browse information about modules for a managed object	“Browser Tab in the Web Console” on page 230	“Module Browser Tab” on page 99 and Chapter 7
View system logs	“Log Tab in the Web Console” on page 231	“View Logs Tab” on page 100
Define and respond to alarm conditions	Chapter 16	Chapter 12
View and modify data property attributes	Chapter 17	Chapter 10
Load, unload, enable, or disable modules	“Modules Tab in the Web Console” on page 231	Chapter 11

Overview of Main Web Console Page

The main web console page provides similar features to the main Java console window. The left side of the page provides the hierarchy (tree) view for the current administrative domain. The right side of the page provides additional details about the item that is selected in the tree view.

From the main console page, you can perform the following tasks:

- Select another administrative domain to monitor or manage by choosing a domain from the Domain pop-up menu.
- View a summary of current alarms in the Status Summary section of the page.
- Expand the hierarchy to view additional levels of information within the current domain. For more information, see “To View and Expand the Topology Hierarchy” on page 227.

- Access detailed information about the currently selected managed object. For more information, see “To View Detailed Information About a Host” on page 228.
- Set options for automatically updating the contents of the main page by choosing from the Auto Refresh pop-up menu.
- Manually update the contents of the main console page by clicking the Refresh button.
- Exit from the web console by clicking the Logout button.
- View online information about the web console by clicking the Help button.
- Define and access alarms for a specific managed object. For more information, see Chapter 16.
- View and edit attributes for a specific data property. For more information, see Chapter 17.

By default, the object hierarchy tree for the Default Domain is displayed. Each tree node represents a managed object in the topology. All tree nodes are displayed with their associated icons, such as a topology type icon, an alarm icon, or an expansion icon for a group object. A triangle next to a node indicates that the managed object contains additional child objects. To view those child objects, click the triangle.

If any alarms apply to the domain, a status icon for the domain alarm state is displayed next to the domain icon. A timestamp display above the domain name shows when the current page was loaded from the server.

When you select a host object in the hierarchy view, information about that object appears in the right side of the page. The right side of the page displays general information about the selected host, including the state of the machine and a timestamp. To view additional information about the host object, click the Go to Details link. The Host Details page provides additional object and module monitoring information and management capabilities. For more information, see “Host Details Browser Page” on page 230.

The following table lists the buttons on the main console and Host Details pages and describes their functions.

TABLE 15-2 Buttons on the Main Console and Host Details Windows

Button	Function
Auto Refresh	Disables and enables the auto refresh feature. The Auto Refresh menu contains the following choices: <ul style="list-style-type: none">■ Disable■ 1 Minute■ 2 Minutes■ 3 Minutes■ 5 Minutes■ 10 Minutes The display refreshes according to the item that is selected. These options can be configured on the server through a configuration file.
Refresh	Refreshes the page display immediately.
Main Page	Redisplays the main console page.
Logout	Close the Sun Management Center application. After logging out, the Login page reappears.
Help	Displays the online help for this panel in another browser window.

Status Summary

The status summary displays the number of managed objects that have *unacknowledged open* alarms, by level of severity, in the selected administrative domain.

If a host has multiple alarms at several different severity levels, the host is represented at only the highest severity level for that host.

For more information on the status summary, see “To View Alarms From the Main Console Window” on page 180.

Using the Web Console

This section provides information about main console tasks. Detailed procedures for working with alarms and data properties are in Chapter 16 and Chapter 17.

▼ To Start the Sun Management Center Web Console

1. **Start your web browser.**

Note – You do not have to be superuser to run the Sun Management Center from your web browser.

2. Go to the Sun Management Center web server at `http://server-name:8080`.

The Sun Management Center server and web server are on the same host. By default, the server runs on port 8080. However, when you achieve secure access, the secure port changes to 8443.

The Sun Management Center Login page appears.

3. Type a user ID and password for a valid UNIX account, then click the Login button.

This account must be listed in the `/var/opt/SUNWsymon/cfg/esusers` file on the Sun Management Center server.

After you log in successfully, the main console page appears and displays the Default Domain.

Note – The web console pop-up windows are designed to be viewed using a 12-pixel font. Because the web console runs in your web browser, you can change the font size. However, if you select a very large font, some pop-up windows might be too small to display all contents correctly. You can enlarge the windows to display them properly.

Tip – To reload the page and all frames, click the web browser Reload button.

▼ To View and Expand the Topology Hierarchy

The topology view for the web console appears along the left side of the main console page.

1. If necessary, select a domain from the Domain menu.

When you first open the web console page, the Default Domain displays.

2. To expand information about a managed object, click the right-facing triangle next to the managed object.

The topology view expands to show any children of the managed object and the triangle changes to an upside-down triangle.

When the topology is fully expanded, you see a list of managed objects for which you can view detailed information. For more information, see “To View Detailed Information About a Host” on page 228.

3. **To collapse information about a managed object, click the upside-down triangle next to the managed object.**

The topology view collapses and the triangle changes to a right-facing triangle.

▼ To View Detailed Information About a Host

1. **If necessary, select a domain from the Domain menu.**
When you first open the web console page, the Default Domain displays.
2. **If necessary, expand the hierarchy until you see the object that you want.**

Tip – Click the triangle to show an object's child nodes.

3. **Click the name of the host for which you want to see more information.**
The right side of the page displays the general information and the system status for the selected managed object.
4. **Click the Go to Details link.**
By default, the Host Details page replaces the Main Console page.

Tip – Many web browsers enable you to open a link in a new window, instead of replacing the current page. For example, in Netscape Navigator, press mouse button three on a link. Then, choose "Open Link in New Window" from the pop-up menu.

For a managed object on which a Sun Management Center agent is installed, the default Details view is the module Browser view. In addition, the following links display at the top of the page: Info, Browser (disabled when currently shown), Alarms, Modules, and View Log. For other managed objects, the default Details view is the Info view. These tabs have the same basic functions as the Details window for the Java console, which is described in Chapter 6.

▼ To View Additional Host Properties

- **Click the Info link at the top of the Host Details page.**
The Info page displays general information about the object, such as IP address and operating system. The Info page provides the same information as the Details Info window for the Java console, which is described in "Info Tab" on page 99.

▼ To View Alarms for a Host

- **Click the Alarms link at the top of the Host Details page.**

The Host Details Alarms page is similar to the Java console functionality that is described in Chapter 12. The Alarms page enables you to perform the following tasks that are described in Chapter 16:

- View current alarms for the selected host
- Acknowledge open alarms for the current host
- Define or run an action for an alarm
- Delete a specific alarm or all closed alarms
- Add a note or a suggested fix to an alarm
- View additional alarm information for an alarm

▼ To Load a Module

1. **On the Host Details page, click the Modules link.**

The Modules page appears. From this page, you can do the following tasks:

- Load a new module.
- Enable a loaded, but not enabled, module.
- Disable a currently enabled module.
- Unload a module.

2. **To load a module, click the appropriate Load link in the Action column of the Modules Available for Loading table.**

The Module Loader dialog box appears.

3. **Click OK to load the selected module.**

▼ To View a Specific Log File

The Sun Management Center product maintains several types of log files.

1. **On the Host Details page, click Log.**

The Log page appears. By default, the System Log is displayed.

2. **To view another log file, choose a log file to view from the Log File Type pop-up menu.**

The Log page updates with the selected log file.

3. **To limit the information displayed from the selected log file, click Filter.**

The Filter dialog box appears. Use the following criteria to limit information:

- Specific dates and times

- Specific text
- Sequence in which the log file displays
- Number of entries to display

Host Details Browser Page

For any managed object on which the Sun Management Center agent is installed, you can view the information described in the following sections:

- “Info Tab in the Web Console” on page 230
- “Browser Tab in the Web Console” on page 230
- “Alarms Tab in the Web Console” on page 230
- “Modules Tab in the Web Console” on page 231
- “Log Tab in the Web Console” on page 231

For managed objects that do not have the agent installed, the only choice is the Info tab.

Info Tab in the Web Console

The Info page displays general information about the object, such as IP address and operating system. This page provides the same information as the Details Info window for the Java console, which is described in “Info Tab” on page 99.

Browser Tab in the Web Console

The Browser tab enables you to browse information about the modules that are loaded for the current managed object. This information is similar to the Module Browser window, which is described in Chapter 7.

This page has Auto Refresh, Refresh, Main Page, Logout and Help buttons, which are described in Table 15–2.

Alarms Tab in the Web Console

The Alarm Manager for the web console is similar to the Alarm Manager that is described in Chapter 12.

The Host Details Alarms page enables you to perform the following tasks:

- View current alarms for the selected host
- Acknowledge open alarms for the current host
- Define or run an action for an alarm
- Delete a specific alarm or all closed alarms
- Add a note or a suggested fix to an alarm
- View additional alarm information for an alarm

For details about performing these tasks, see Chapter 16.

Modules Tab in the Web Console

The Modules page displays all available modules and their status. The following module status values can appear:

- Loaded
- Unloaded
- Enabled, only applies if Loaded
- Disabled, only applies if Loaded

Note – Only authorized users can perform module actions. You must have the appropriate security permission to load, unload, enable, or disable a module. For more information, see Chapter 18.

The Host Details Modules page is similar to the Module Manager window that is described in “Working With Modules” on page 163. In some cases, you can edit information on the Host Details Modules page.

This page also has Auto Refresh, Refresh, Main Page, Logout and Help buttons, which are described in Table 15–2.

Log Tab in the Web Console

The Log page displays system log information. The Log page contains the following features:

- Log File Type menu that enables you to choose the log to view
- Text area that displays the content of the selected log file
- Filtered Messages button that enables you to filter the messages in the text area by criteria such as starting and ending date and time

The Log page is similar to the View Logs window for the Java console, which is described in “Viewing Log Files” on page 113.

Attribute Editor in the Web Console

The module data properties provide additional information about the modules. The Attribute Editor enables you to view additional information about the data properties and to customize the following monitoring activities:

- Set alarm thresholds for simple alarms
- Specify actions to take when alarm conditions occur
- Change the interval at which data updates on the page
- Define schedules for creating log files of historical data points

The Attribute Editor contains some or all of the following tabs: Info, Alarms, Actions, Refresh, and History. For more information about working with the Attribute Editor in the web console, see Chapter 17.

Note – Some of the more advanced features of the Attribute Editor in the Java console are not provided by the Attribute Editor in the web console.

Managing Alarms Using the Web Console

You use the web console to manage alarms in much the same way as you use the Java console, which is described in Chapter 12. However, some functions are different. Some advanced functions, such as alarm sorting, are not available in the web console. This chapter describes the functional differences, and provides additional instructions for using the web console to manage alarms.

This chapter covers the following topics:

- “Alarm Concepts for the Web Console” on page 233
- “To View a Summary of Alarms” on page 235
- “To View Alarms for a Selected Host” on page 236
- “To Display a Subset of Alarms for a Host” on page 236
- “To See When an Alarm Ended or Was Acknowledged” on page 237
- “To Create an Alarm Condition” on page 237
- “To Acknowledge Open Alarms” on page 238
- “To Add a Note to an Alarm” on page 239
- “To View or Provide a Recommended Response to an Alarm” on page 239
- “To Delete Alarms” on page 239

Alarm Concepts for the Web Console

This section describes the web console status summary panel, alarm categories, and alarm table navigation.

Status Summary Panel

The Status Summary panel displays the number of managed objects in the selected domain that have at least one *unacknowledged open* alarm of a specific severity. This panel is similar to the Domain Status Summary that is described in Chapter 12. However, the web console icons are not buttons. You cannot click these icons to display the Domain Status page.

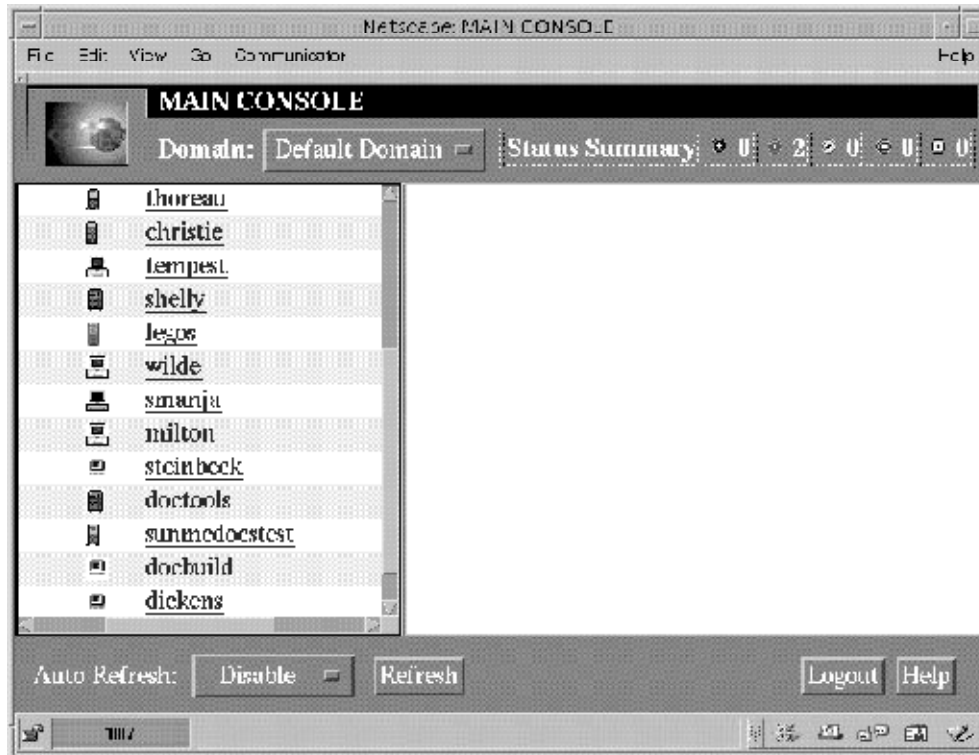


FIGURE 16-1 Main Web Console with Status Summary Panel

Alarm Categories in the Web Console

The Host Detail Alarms page presents a table of different categories of detailed alarm information. Except for the first column, the categories and information are the same as the categories that are described in "Alarm Categories" on page 179.

The first column in the Host Details Alarms page enables you to select the alarm row. You can select multiple alarm rows by holding down the Control key and clicking in this column. A check mark indicates that the column is selected.

Some alarm information is always displayed in the alarms table. Additional information is displayed on the bottom of the page when an alarm row is selected. This information is only displayed for closed or acknowledged alarms.

Alarms Table Navigation

Almost all alarm actions on the Host Details Alarms page function the same as the actions on the Alarms Details page described in Chapter 12. However, you cannot sort the alarms table by double-clicking on the column headers. A confirmation request is displayed when you delete an alarm.

Notifying Users When a Host or Agent Is Down

You can configure the Sun Management Center software to send an email notification if a host or agent is down. However, to define this notification, you must use the Java console rather than the web console. For more information, see “To Notify Users When a Host or Agent is Down” on page 188.

Viewing Alarm Information in the Web Console

Alarms information is displayed in the alarms table on the Host Details Alarms page. For additional details, see Chapter 12.

▼ To View a Summary of Alarms

To see a summary of alarms in another domain, choose a domain from the Domain menu.

- **Open the main console page.**

The Status Summary section shows the number of alarms for the current domain. For each severity level, the summary indicates how many *unacknowledged* open alarms exist.

Note – If a host has multiple alarms at several different severity levels, the host is represented at the highest severity level for that host.

For more information on the status summary, see “To View Alarms From the Main Console Window” on page 180.

▼ To View Alarms for a Selected Host

1. **Click a host icon in the main console page.**

The host description and status are displayed in the right side of the main console page.

2. **Click the Go to Details link.**

The Host Details Browser page appears.

3. **Click the Alarms link.**

The Host Details Alarms page appears. From this page, you can do the following tasks:

- See all current alarms for the selected host, or view a subset of alarms, as explained in “To Display a Subset of Alarms for a Host” on page 236.
- Acknowledge open alarms for the current host, as described in “To Acknowledge Open Alarms” on page 238.
- Delete a specific alarm or all closed alarms, as described in “To Delete Alarms” on page 239.
- Add a note or a suggested fix to an alarm, as illustrated in “To Add a Note to an Alarm” on page 239 and “To View or Provide a Recommended Response to an Alarm” on page 239.
- View additional alarm information for an alarm, as explained in “To See When an Alarm Ended or Was Acknowledged” on page 237.

▼ To Display a Subset of Alarms for a Host

1. **From the Host Details Alarms page, choose View Alarms from the Options menu, and click the Go button.**

The View Specific Alarms dialog box appears. By default, all open alarms are selected.

2. **Click the boxes next to the items to select or deselect the items.**

A check mark is displayed in each box that you select.

3. **Click OK to accept your changes and close the dialog box.**

The alarms table is filtered. The table is redisplayed to reflect your selections.

▼ To See When an Alarm Ended or Was Acknowledged

1. **From the Host Details Alarms page, click the first column of the alarm that you want to view.**

A check mark is displayed in the first column.

Note – You can view additional information only for one alarm at a time.

2. **Choose Additional Alarm Information from the Options menu, and click the Go button.**

The Additional Alarm Information section at the bottom of the page updates with appropriate information, if applicable.

- If the alarm has been acknowledged, the Alarm Acknowledged field indicates who acknowledged the alarm. This field also tells you when the alarm was acknowledged.
- If the alarm has ended, the Alarm Ended field indicates when the alarm ended.

Creating and Responding to Alarms

This section illustrates how to work with simple alarms in the web console. To work with more complex alarm conditions, use the Java console functions described in Chapter 12.

▼ To Create an Alarm Condition

The following example procedure shows how to create a simple alarm. This example creates an alarm condition when the system load over the past five minutes exceeds a specified value.

1. **Select a data property table from the Host Details Browser page.**

For this example, select the System Load Statistics table in the Kernel Reader (Simple) module.

2. **Choose a specific data property in the data property table.**

For this example, select the value for the Load Average Over Last 5 Minutes property. The Attribute Editor appears for the selected data property.

3. Click on the Alarms tab in the Attribute Editor window.

The Alarms page appears.

4. In the Critical Threshold (>) field, type an appropriate value.

For this example, type .050. This value is probably lower than what you would normally use, but will most likely generate an alarm to illustrate the process.

5. Click OK to apply your changes and close the Alarms tab page.

In a few moments, the Load Average Over the Last 5 Minutes data field in the System Load Statistics data properties table turns red. In addition, red alarm icons appear on the following folders and icons, unless your system has an open, unacknowledged black (down) alarm:

- Operating System
- Kernel Reader
- System Load Statistics

Click Reset to reset the Attribute Editor to the default parameters.

6. Click the Host Details Alarms tab.

The alarm that you created is reflected in the alarms table when the table is refreshed.

7. Acknowledge this alarm.

8. Create additional alarm thresholds. Then, familiarize yourself with their operation.

Once you have created these alarms, you can set up security permissions so that another Sun Management Center software user cannot change your alarm thresholds. For more information on security, see Chapter 18.

Tip – You do not need to fill in alarm information for all alarm thresholds. For example, you can choose to create only a critical alarm threshold.

▼ To Acknowledge Open Alarms

1. **Open the Host Details Alarms page for the managed object.**
2. **Select the alarm that you want to acknowledge.**
3. **Click the Acknowledge button.**

▼ To Add a Note to an Alarm

Alarm notes contain an expanding list of notes for a specific alarm. You can add notes over the life of the alarm to track its history.

1. **Open the Host Details Alarms page for the managed object.**
2. **Select the alarm to which you want to add the note.**
3. **Choose Add Note from the Options menu, and click the Go button.**
The Add Note window appears.
4. **Type text in the note.**
5. **Click OK to close the Add Note window.**
The note that you entered displays

▼ To View or Provide a Recommended Response to an Alarm

The Suggested Fix feature enables you to provide a recommended correction to an alarm condition.

1. **Open the Host Details Alarms page for the managed object.**
2. **Select the appropriate alarm.**
3. **Choose Suggested Fix from the Options menu, and click the Go button.**
The Suggested Fix window appears. Any default software-provided information appears in the Suggested Fix section of the window. Any existing user-provided information appears in the User Suggested Fix section of the window.
4. **Type your recommendation for responding to the alarm condition in the User Suggested Fix section of the window.**
5. **To close the Suggested Fix window, click OK.**

▼ To Delete Alarms

To conserve space and to keep the database current, you should delete alarms after the alarms have been closed. A closed alarm means that the condition no longer exists.

1. **Open the Host Details Alarms page for the managed object.**
2. **Select the alarm that you want to delete.**

3. Choose Delete Alarms from the Options menu, and click the Go button.

Tip – To delete all closed alarms, choose Delete All Closed Alarms from the Options menu, and click the Go button.

Managing Data Property Attributes Using the Web Console

This chapter explains the following topics:

- “Overview of Module Data Properties” on page 241
- “To Access Specify Data Property Attributes” on page 245
- “To Define an Alarm Condition” on page 247
- “To Define a Response for an Alarm” on page 248
- “To Define and Use an Alarm Action Script” on page 249
- “To Modify Alarm Actions” on page 250
- “To Specify How Often the Data Display Updates” on page 245
- “To Change How Often History Data is Collected” on page 246

Overview of Module Data Properties

The module data properties provide additional information about the modules. The Attribute Editor in the web console provides the same capabilities as the Attribute Editor in the Java console, which is described in Chapter 10. You can use the Attribute Editor to customize the monitoring criteria for the module data properties. Specifically, the Attribute Editor enables you to perform the following tasks:

- Set alarm thresholds for defined alarms
- Specify actions to take when alarm conditions occur
- Change the interval at which data updates on the screen
- Define schedules for creating log files of historical data points

The Attribute Editor in the web console has one or more tabs at the top of the page that enable you to switch between different panels. These tabs differ depending on the selected object. The possible tabs are described in the following sections:

- “Info Tab in the Web Console Attribute Editor” on page 242
- “Alarms Tab in the Web Console Attribute Editor” on page 242

- “Actions Tab in the Web Console Attribute Editor” on page 243
- “Refresh Tab in the Web Console Attribute Editor” on page 244
- “History Tab in the Web Console Attribute Editor” on page 244

Note – Each Attribute Editor displays one or more of these tabs, depending on the specific object to which an instance of the Attribute Editor applies.

Info Tab in the Web Console Attribute Editor

The Attribute Editor Info page provides additional information about the selected object, such as:

- Module name, version, and description for the selected module
- Host name for the host on which the module resides
- Other information about the specific module, such as folder and variable in which data property information is stored

Alarms Tab in the Web Console Attribute Editor

The Alarms tab enables you to set alarm thresholds only for those data properties that have associated simple alarms. These simple alarms use the `rCompare` rule, which is described in Appendix D. The Attribute Editor Alarms page enables you to set alarm thresholds for simple alarms only.

Note – To set an alarm threshold, you must have the appropriate security permission. For more information, see Chapter 18.

The alarm management software offers you the following flexibility in setting your alarms:

- Determine the thresholds that trigger an alarm of a particular severity
- Determine when alarms are sounded, for example, only on weekdays

Simple alarms are based on thresholds. A monitored data property is greater than, less than, not equal to, or equal to a single threshold value. By contrast, complex alarms are based on a set of conditions. For more information on alarm rules, see Appendix D.

The following table lists common simple alarm limits for monitored properties. The alarm limits are also displayed in the Parameter Description field. You can set thresholds for one or more of these alarm limits for selected data properties.

TABLE 17-1 Common Simple Alarm Limits in Sun Management Center Software

Alarm Limit	Description
Critical Threshold (>)	Critical (red) alarm occurs if the value exceeds the limit that is entered in this field.
Alert Threshold (>)	Alert (yellow) alarm occurs if the value exceeds the limit that is entered in this field.
Caution Threshold (>)	Caution (blue) alarm occurs if the value exceeds the limit that is entered in this field.
Critical Threshold (<)	Critical (red) alarm occurs if value is below the limit entered in this field.
Alert Threshold (<)	Alert (yellow) alarm occurs if value is below the limit entered in this field.
Caution Threshold (<)	Caution (blue) alarm occurs if value is below the limit entered in this field.
Alarm Window	Alarm occurs only during a specified time period. For example, if the value is <code>day_of_week=fri</code> , an alarm occurs only if the alarm condition exists on a Friday. If an alarm condition exists on Tuesday, no alarm is triggered.

Actions Tab in the Web Console Attribute Editor

The Attribute Editor Actions page enables you to instruct the software to perform a predetermined action if an alarm occurs.

Note – Acceptable actions include scripts that are stored in the `/var/opt/SUNWsymon/bin` directory. These scripts execute with `root` permissions.

For example, you can provide the name of a script in the critical action field. This script might send an email to a system administrator whenever a critical alarm is generated for the Load Average Over the Last 5 Minutes data property.

You can set separate actions for different alarm conditions. You can also define a single action to occur when any change happens to any of the alarm conditions. To define actions, you use the Action buttons on the Actions page.

Note – The check boxes that are to the right of the Action buttons enable you to specify automatic or manual execution of a specific alarm action. By default, all actions are set for manual execution. Only manual actions can be modified.

Use the Alarm Action Modification dialog box to modify the registered alarm actions. Two buttons in the dialog box (Email and Generic) allow you to choose one of two options for an alarm action.

Email	Enables you to specify an address, subject, and message to be sent as email
Generic	Enables you to select generic shell scripts that are installed on the managed node

Refresh Tab in the Web Console Attribute Editor

Use the Refresh page in the Attribute Editor to set the refresh interval for this object. The refresh interval is the interval between the times when the Sun Management Center agent samples the monitored property. For more information, see “To Specify How Often the Data Display Updates” on page 245.

History Tab in the Web Console Attribute Editor

Use the History page in the Attribute Editor to save older data for a monitored property. For example, you might choose to record a history of data points every 120 seconds as identified in the sample interval. You can also specify whether to store this information in a disk file or in the memory cache.

The two types of disk files are circular, which has a maximum of 1000 lines, and text. These files are located in the `/var/opt/SUNWsymon/log` directory in the file that is specified in the Text File Name field.

A circular disk file is automatically saved under the name `history.log`. If you do not choose a file name for your text file, data are automatically saved under the name `agent_default.history`.

If you select memory cache, you must indicate in the Max Size (sample) field the number of data points to save. For example, if you set this field to 1000, only the most current 1000 data points are stored in the memory cache. Any older data points are discarded. These data points can be graphed. See Chapter 9 for more information.

Note – You can view history data in a graph by opening the graph for the specific monitored property. If you have selected memory cache, the graph is displayed with historical data.

Using the Attribute Editor in the Web Console

The procedures in this section explain how to view specific attributes, change the refresh interval, and modify history information in the web console attribute editor.

▼ To Access Specify Data Property Attributes

1. Navigate through the hierarchy to a data property table.

For example, to view information about the memory on a host, follow these steps:

- a. **Select a managed object in the main console page.**
- b. **Click the Go to Details link.**
The Host Details page appears.
- c. **In the Host Details page, click the expansion icon to the left of Operating System.**
- d. **Click the expansion icon to the left of Kernel Reader (Simple).**
- e. **Click Memory Usage Statistics.**
The data property table for Memory Usage Statistics appears.

2. Select the value in the data property table whose attributes you want to view or modify.

The Attribute Editor appears in a separate window.

▼ To Specify How Often the Data Display Updates

The following example shows how to set a refresh interval in the System Load Statistics module.

1. **Select a data property, for example, System Load Statistics, on the Host Details Browser page.**
2. **Select the Value column for Load Averages Over the Last Five Minutes.**
The Attribute Editor Info page is displayed.
3. **Click the Refresh tab.**
The Refresh page is displayed.
4. **Type a value in seconds in the Refresh Interval field.**
For example, if you type 300, the page updates every five minutes.
5. **To change the refresh interval and exit from the Attribute Editor, click the OK button.**
When the properties table for System Load Statistics is displayed, the values in the table are refreshed every five minutes.

Tip – The agent uses less CPU cycles if you use a larger refresh interval.

▼ To Change How Often History Data is Collected

The Sample Interval on the History page controls how frequently history data is captured.

1. **Select a data property, for example, System Load Statistics, on the Host Details Browser page.**
2. **Select the Value column for a specific property, for example, Load Averages Over the Last Five Minutes.**
The Attribute Editor Info page is displayed.
3. **Click the History tab.**
The History page is displayed.
4. **Type a value in seconds in the Sample Interval field.**
For example, to collect a history data point every two minutes, you would type 120 in the Sample Interval field.
5. **Click the OK button to set the history interval and exit from the History page.**

Working With Alarms in the Web Console Attribute Editor

The procedures in this section explain how to create and respond to alarms using the web console attribute editor.

▼ To Define an Alarm Condition

The following example procedure shows how to create a simple alarm. This example creates an alarm threshold in the Kernel Reader module.

- 1. Select a data property, for example, System Load Statistics, from the Host Details Browser page.**
- 2. Click the Alarms tab.**

The Alarms page is displayed.
- 3. In the Critical Threshold (>) field, type a value that is less than the current value.**

Providing this value creates a critical alarm.
- 4. Click OK to apply your changes and close the Alarms page.**

In a few moments, the Load Average Over the Last One Minute data field in the data properties table for System Load Statistics turns red. In addition, red alarm icons are displayed on the following folders and icons unless your system has an open, unacknowledged severity one black alarm:

 - Operating System
 - Kernel Reader
 - System Load Statistics
- 5. Click the Host Details Alarms tab.**

The alarm that you created is reflected in the alarms table when the table is refreshed. For more information on this subject, see Chapter 16.
- 6. Click the acknowledge button, which looks like a check mark, to acknowledge this alarm.**
- 7. Create additional alarm thresholds. Then, familiarize yourself with their operation.**

Once you have created these alarms, you can set up security permissions so that another Sun Management Center software user cannot change your alarm thresholds. For more information on security, see Chapter 18.

Note – You do not need to fill in alarm information for all alarm thresholds. For example, you can choose to create only a critical alarm threshold.

▼ To Define a Response for an Alarm

The following procedure describes how to define an action to take when an alarm occurs.

- 1. Select a data property, for example, System Load Statistics, from the Host Details Browser page.**
- 2. Select an appropriate item in the Value column, for example, the value associated with Load Average Over Last Five Minutes .**
The Attribute Editor Info page is displayed.
- 3. Click the Actions tab.**
The Actions page is displayed.
- 4. Click the Action button for the alarm level for which you want to define the action.**
A window appears on which you choose the type of action and provide appropriate information.
 - To notify users through an email, click the Email radio button. Type a comma-separated list of email addresses and a message.
 - To run a script, click the Other radio button. Choose a script from the list of available scripts. Then, supply appropriate arguments as needed. See “To Define and Use an Alarm Action Script” on page 249.
 - To clear the alarm, click the Clear radio button.
- 5. Click OK to apply your changes and close this page.**
If you choose to send an email, a message is sent to the specified users whenever the specified alarm occurs. This message might be similar to the following message.

```
Date: Wed, 30 Jun 1999 15:25:39 -0800
From: root@MachineB (0000-Admin(0000))
Subject: Sun Management Center - Alert Alarm Action
Mime-Version: 1.0
```

```
Sun Management Center alarm action notification ...
{Alert: machineB Kernel Reader Load Average Over The Last 5 Minutes > 0.01Jobs}
```


▼ To Define and Use an Alarm Action Script

The following procedure describes how to customize an alarm action to automatically notify a user when an alarm condition occurs.

1. Create the script using the following arguments:

`%statusfmt` The alarm severity, such as Warning, Critical, and so on.
`%statusstringfmt` The complete alarm string, including severity. (For example: Critical: Machine A Kernel Reader Number of User Sessions > 10)

2. At the command-line level, become superuser.

```
# su -
```

3. Install the script in the home Sun Management Center directory.

The default is the `/var/opt/SUNWsymon/bin/` directory. For example:

```
# cp custom-alarm-script /var/opt/SUNWsymon/bin/
```

4. Click the Host Details Browser tab.

5. Set the alarm threshold.

For more information, see “To Define an Alarm Condition” on page 247.

6. Click the System Load Statistics icon.

The properties table for System Load Statistics is displayed in the contents view of the Host Details Browser page.

7. Select the Value column for Load Average Over Last Five Minutes.

The Attribute Editor Info page is displayed.

8. Click the Attribute Editor Actions tab.

The Actions page appears.

9. Click the Action button for the Critical Actions field.

The Alarm Action Modification dialog box appears.

10. Click the Other button.

11. Select *custom-alarm-script* from the Available Scripts menu.

12. Type the following string in the Arguments field:

```
%statusstringfmt
```

13. Click OK to apply your changes and close this page.

The script file name is displayed in the Critical Action field on the Actions page.

▼ To Modify Alarm Actions

1. **Click the Action button for the alarm action that you want to modify.**
The Alarm Actions modification dialog box is displayed.
2. **Select the type of alarm action that you want to modify (Email or Other).**
3. **Make your changes in the fields of the selected action.**
4. **Click OK to accept the changes and close the page.**
The change is displayed in the corresponding Action field of the Actions page.

Sun Management Center Security

This chapter discusses security features, users and groups, and their privileges. The chapter describes the following topics:

- “Sun Management Center Security Concepts” on page 251
- “Access Control Categories” on page 252
- “Default Privileges ” on page 255
- “Access Control Definitions and Limitations” on page 257
- “To Add Sun Management Center Users” on page 259
- “To Control Access to a Module” on page 259
- “To Add a User-Defined Group to an ACL” on page 261
- “To Grant a User esadm, esops, or esdomadm Privileges” on page 261
- “To Delete Sun Management Center Users” on page 261
- “To Override Default Agent Privileges” on page 262

Sun Management Center Security Concepts

Security in Sun Management Center software is based on Java™ security classes and SNMPv2 usec (SNMP version 2, user-based security model) security standards.

The software offers the following layers of security:

- Only valid Sun Management Center users can operate the software.
- The software enables you to set security permissions or access control (ACL) categories. The security features provide control at the administrative domain, group, host, and module levels.
- The software authenticates users and access control for individual managed properties.

Access Control Categories

The software offers the following ACL categories:

- Admin, like the superuser (`root`) in UNIX
- Operator, as an operator who runs and monitors the system
- General, like guest access with read-only viewing privileges

To understand ACL categories, you first need to understand Sun Management Center software users and groups. The following sections explain users and groups.

Sun Management Center Users

Sun Management Center users are valid UNIX users on the server host. As such, the system administrator has to add valid users into the file `/var/opt/SUNWsymon/cfg/esusers`. If a user's name is not in this file, that user cannot log into the Sun Management Center software.

General Users

The administrator has to add the list of user IDs for all users who need to log into Sun Management Center software. All users in this file have general access privileges, by default, unless the users are given additional privileges using the procedures described in "To Grant a User `esadm`, `esops`, or `esdomadm` Privileges" on page 261.

Any user who is part of the `esusers` file is known as a general user. Sun Management Center general users can, by default, perform the following functions:

- Log into the software
- View the administrative domains, hosts, and modules that are created
- View events
- Trigger manual refreshes
- Run ad hoc commands
- Graph data

Sun Management Center Superuser

The Sun Management Center superuser automatically belongs to all the groups that are described in the following sections. The Sun Management Center superuser has administrator privileges as described in "Sun Management Center Administrators or `esadm`" on page 253.

Sun Management Center Groups

The following groups are created by default on the server host during the Sun Management Center server setup:

- `esops`

- esadm
- esdomadm

In addition, all the Sun Management Center users belong to a hypothetical group, called ANYGROUP.

The listed groups must be defined on the machine where the Sun Management Center server layer is running. These groups do not need to be defined on other machines. These groups are described in greater detail in the sections that follow.

Note – The listed groups are defined in the `/etc/group` file.

Sun Management Center Operators or esops

Sun Management Center software users that belong to the group `esops` are usually operator users. These operators run, monitor, and to some extent, configure parameters on the managed systems. `esops` can perform operations, including some operations that are allowed for general users:

- Disable or enable modules
- Set alarm limits
- Set rule parameters
- Run alarm actions
- Run ad hoc commands
- Set the refresh interval
- Acknowledge, delete, or fix events
- Enable or disable history logging
- Set logging history parameters

Sun Management Center Administrators or esadm

Software users that belong to the group `esadm` can perform administrator operations. Administrator operations are a superset of the operations that can be performed by operator users as described in “Sun Management Center Operators or `esops`” on page 253. In addition to all the operations that operator users (`esops`) can perform, these administrator users (`esadm`) can perform the following operations:

- Load or unload modules
- Set ACL users and groups
- View administrative domains, hosts, or modules

Sun Management Center Domain Administrators or esdomadm

The users that belong to the group `esdomadm` can perform the following domain administrator operations:

- Create administrative domains

- Create groups within administrative domains
- Add objects to groups or administrative domains
- View administrative domains, hosts, or modules

Note – Other than the privileges listed above, a user that belongs to esdomadm is just a general user, unless configured otherwise.

Administrator, Operator, and General Functions

The following table lists the different types of functions that users can do by default. A mark in a given cell indicates that the specified user can perform the listed function.

This table applies to all modules. Individual modules may also have specific restrictions, which are under the control of the module.

TABLE 18-1 Domain Admin, Admin, Operator, and General Functions

Function	Domain Admin	Admin	Operator	General
Load modules		x		
Unload modules		x		
Create administrative domains	x			
Create groups within administrative domains	x			
Add objects to groups or administrative domains	x			
View administrative domains, hosts or modules	x	x	x	x
Set ACL users or groups		x		
Disable or enable modules		x	x	
Set module active time window		x		
Set alarm limits		x	x	
Set rule parameters		x	x	
Run alarm actions		x	x	
Run ad hoc commands		x	x	
Set the refresh interval		x	x	

TABLE 18-1 Domain Admin, Admin, Operator, and General Functions *(Continued)*

Function	Domain Admin	Admin	Operator	General
Manually trigger a refresh	x	x	x	x
Enable or disable history logging		x	x	
Set logging history parameters		x	x	
Acknowledge, delete, or fix events		x	x	
View events		x	x	x

In Sun Management Center software, the above categories maintain inclusive relationships. This means that a user who has `esadm` privileges can do anything that a user who has `esops` privileges can do. An administrator can change the default permissions so that a user who has `esops` privileges can do more than a `esadm` user. Inclusive relationships mean that there is nothing in the software that makes one of `esops`, `esadm`, or `esdomadm` more powerful than either of the others.

For more information on how to override default privileges, see “To Override Default Agent Privileges” on page 262.

Default Privileges

Administrative domains are manipulated by the Topology manager. This section describes the default privileges for the Topology manager, for other agents, and for other modules.

Default Privileges for the Topology Manager

The default privileges for Topology manager, where administrative domains are maintained, are listed in the following table.

TABLE 18-2 Default Privileges for Topology Manager

Topology Manager	Default Privileges
List of Admin Users	
List of Operator Users	
List of General Users	

TABLE 18-2 Default Privileges for Topology Manager (Continued)

Topology Manager	Default Privileges
List of Admin SNMP Communities	
List of Operator SNMP Communities	
List of General SNMP Communities	public
List of Admin Groups	esdomadm
List of Operator Groups	esops
List of General Groups	ANYGROUP

Other Sun Management Center Component and Module Default Privileges

The default privileges for components and modules not in the Topology manager are listed in the following table.

TABLE 18-3 Sun Management Center Component and Module Default Privileges

Components and Modules	Default Privileges
List of Admin Users	
List of Operator Users	
List of General Users	
List of Admin Groups	esadm
List of Operator Groups	esops
List of General Groups	ANYGROUP
List of Admin SNMP Communities	
List of Operator SNMP Communities	
List of General SNMP Communities	public

The keyword `ANYGROUP` is not a true UNIX group, but is a special keyword that means that *any user who can log into Sun Management Center software is given general access to the objects.*

Access Control Definitions and Limitations

The `esadm` group can specify ACL features for users and groups for the following components:

- Administrative domains
- Groups within administrative domains
- Hosts
- Modules

Admin, Operator, and General Access

An ACL specification consists of establishing or defining one or more of the following parameters:

- Administrator users and administrator groups – A list of users and groups who can perform administrator operations. By default, these users are `esadm` or `esdomadm`, wherever applicable.
- Operator users and operator groups – A list of users and groups who can perform operator operations. By default, these users are `esops`.
- General users and general groups – A list of users and groups who can perform general operations. By default, this category is a hypothetical group that is called `ANYGROUP`.
- Communities for administrators (SNMP) – A list of SNMP communities that can perform administrator operations that use SNMP.
- Communities for operators (SNMP) – A list of SNMP communities that can perform operator operations that use SNMP.
- Communities for general (SNMP) – A list of SNMP communities that can perform general operations that use SNMP.

Sun Management Center Remote Server Access

Users can access and view data from sessions that are running on remote Sun Management Center servers. When a user tries to gain access to such information, that user is provided access as a general user with read-only privileges. The behavior of Sun Management Center sessions that are running on different servers is defined in terms of each session's server context. See "Sun Management Center Server Context and Security" on page 258 for more information.

As a user, you can access and set up a different server context for a variety of reasons:

- To enable each server context to have different users and different administrators, and yet remain accessible to each other
- To allow for physical separation between elements, as in the context of a wide area network (WAN)
- To increase performance by enabling many hosts to be handled by one set of central components

By linking to a different server context, you can view the top level status of the objects in the other server context.

Sun Management Center Server Context and Security

A server context is a collection of Sun Management Center agents and the particular server layer to which the agents are connected. The agents and hosts within a server context share a single set of the following central components:

- Sun Management Center server
- Topology manager
- Event manager
- Trap handler
- Configuration manager

Every Sun Management Center component or agent is configured at installation to know the location of its trap handlers and event managers. Sun Management Center software identifies the trap handlers and the event managers by their IP and port addresses. To determine whether you are within your server context, you need to know the respective IP and port addresses of the servers that you access. Different server contexts have different port numbers.

A remote server context refers to a collection of remote agents and a particular server layer with which the remote agents are associated.

An agent receives security configuration from the server layer. This information enables the agent to authenticate the management request that is sent to the agent. Then, the agent can perform access control on the requested operation as part of the management request.

Limitations When Crossing Servers

Some security restrictions apply when a user tries to communicate across server contexts.

In the current Sun Management Center environment, you can access information from another server with a few limitations:

- If you try to access a remote server context, the server give you general user access. Thus, you can access data but cannot modify or use the objects within the different server. You are restricted to viewing only the remote server objects.

- You can view data in another context as a general user, but you cannot perform control actions, such as setting alarm thresholds and other similar functions.
- Edit functions work differently in a remote server. For example, you can *copy and paste* between contexts. You cannot *cut and paste* between contexts.

Note – In the console, the fact that you are accessing a different server context might not be obvious. To identify whether you are accessing a different server, check the server’s IP port number or address in the Info tab of the Details window.

Using Access Control

The following sections describe how to perform the following key access control functions:

- “To Add Sun Management Center Users” on page 259
- “To Control Access to a Module” on page 259
- “To Add a User-Defined Group to an ACL” on page 261
- “To Grant a User *esadm*, *esops*, or *esdomadm* Privileges” on page 261
- “To Delete Sun Management Center Users” on page 261
- “To Override Default Agent Privileges” on page 262

▼ To Add Sun Management Center Users

1. **Become superuser on the Sun Management Center server host.**

```
% su -
```

2. **Edit the file `/var/opt/SUNWsymon/cfg/esusers`.**

3. **Add the username on a new line.**

Make sure that the username is the username of a valid UNIX user.

4. **Save the file and exit the editor.**

Users that are added to the users list have default privileges. See “Default Privileges ” on page 255 and “To Override Default Agent Privileges” on page 262 for more information.

▼ To Control Access to a Module

1. **Access the Attribute Editor in either of the following ways:**

- Press mouse button three on the selected object, and choose Attribute Editor from the pop-up menu.
- Choose Attribute Editor from the Tools menu in the main console window.

The Attribute Editor is displayed. The buttons at the bottom of the window are inactive, with the exception of the Cancel and Help buttons. The remaining buttons become active when you modify any field in the window.

2. Select the Security tab in the Attribute Editor window.

3. Change the values as required.

The following list explains the data in each field and provides sample values.

Administrator Users	A list of users. <code>jim</code> is a user who can perform administrator operations.
Operator Users	A list of operators. <code>john</code> and others are users who can perform operator operations. Note that their entries are separated by one or more spaces.
General Users	A list of general users. <code>nick</code> and <code>richie</code> are users who can perform general operations.
Administrator Groups	All the users that belong to administrator groups can perform administrator operations. By default, the users are <code>esadm</code> or <code>esdomadm</code> , as applicable.
Operator Groups	All users that belong to <code>esops</code> can perform operator operations.
General User Groups	<code>ANYGROUP</code> is a hypothetical group that can perform general operations. All Sun Management Center users belong to this hypothetical group.
Communities for Administrators	This field is empty, denoting that there is no SNMP community that can perform administrator operations that use SNMP.
Communities for Operators	This field is empty, denoting that there is no SNMP community that can perform operator operations that use SNMP.
Communities for General Users	By default, <code>public</code> is an SNMP community that can perform general operations that use SNMP.

Use spaces or commas between multiple entries as illustrated in the entries for "Operator" under "Users."

For more information on security privileges, see "Access Control Categories" on page 252.

▼ To Add a User-Defined Group to an ACL

1. Become superuser on the Sun Management Center server host.
2. Use the `groupadd` command to create a group.

```
# /usr/sbin/groupadd groupname
```
3. Add users to the newly created group.
 - a. In the `/etc/group` file, add users to the group.
 - b. Save the file and exit the editor.
4. Add the new group to the ACL.
See “To Control Access to a Module” on page 259 for more information.

▼ To Grant a User `esadm`, `esops`, or `esdomadm` Privileges

1. Become superuser on the Sun Management Center server host.
2. If needed, add the username to the `/var/opt/SUNWsymon/cfg/esusers` file.
3. In the `/etc/group` file, add the user to one of the following lines as applicable:
`esadm`, `esops`, or `esdomadm`.
4. Save the file and exit the editor.

▼ To Delete Sun Management Center Users

1. Become superuser on the Sun Management Center server host.
2. In the file `/var/opt/SUNWsymon/cfg/esusers`, delete the line corresponding to the user name you want to delete.
3. Save the file and exit the editor.
4. Delete the user names from Sun Management Center groups.

Note – After a user is deleted from the list of Sun Management Center users, the user can no longer log into the Sun Management Center server. Make sure to delete that user from all the ACLs.

▼ To Override Default Agent Privileges

In Sun Management Center software, only administrators can override default privileges using the Attribute Editor to modify the ACL lists for that particular object.

1. **Access the Attribute Editor for the specific managed object on which you need to change the privileges.**
2. **To view and change security information, click the Security tab in the Attribute Editor window.**
3. **Change the information as needed.**
4. **To apply the security changes and close the Attribute Editor window, click OK.**
To leave the Attribute Editor window open and apply the security changes, click Apply.

Importing and Exporting Topology Information

The topology import and export utilities enable you to import and export the topology database from or to an ASCII file that uses XML markup. The import utility enables you to read data from a file and update the topology database and the data of the topology agent object. The export utility reverses this operation.

This chapter explains the following topics:

- “Topology Import and Export Concepts” on page 263
- “Topology Import and Export Architecture” on page 264
- “Exporting Topology Information” on page 265
- “Importing Topology Information” on page 266
- “Import and Export CLI Interface” on page 268
- “Import and Export File Contents” on page 273

Topology Import and Export Concepts

The topology import and export utilities are used to do the following tasks:

- Dump the topology data as backup regularly.
- Transfer data between different topology servers.
- Restore the data from backup if the topology data is damaged.
- Convert the data into another file format, and load the data into another management system in a third-party management platform.

You can access these functions from the Sun Management Center console main window or the CLI. You must specify the complete topology data and the domains to be imported or exported. The tool supports several methods of data handling, including overwrite and append.

- The import and export utilities support domain level operation. You can specify one domain to export or the whole topology hierarchy.
- You can recover backup data through the import utility.
- You can import objects of any domain to one domain.
- You can back up existing data through the export utility.
- You can export data in incremental mode.
- You can export topology information from the main console window only when the current topology hierarchy contains data.

Topology Import and Export Architecture

The topology import and export utilities communicate with the Sun Management Center server through client APIs. The import and export ASCII file resides on the console system. This file provides information through the client APIs to the server. The server sends that information to the topology agent which interacts with the topology database. The following figure shows the software structure that supports these utilities.

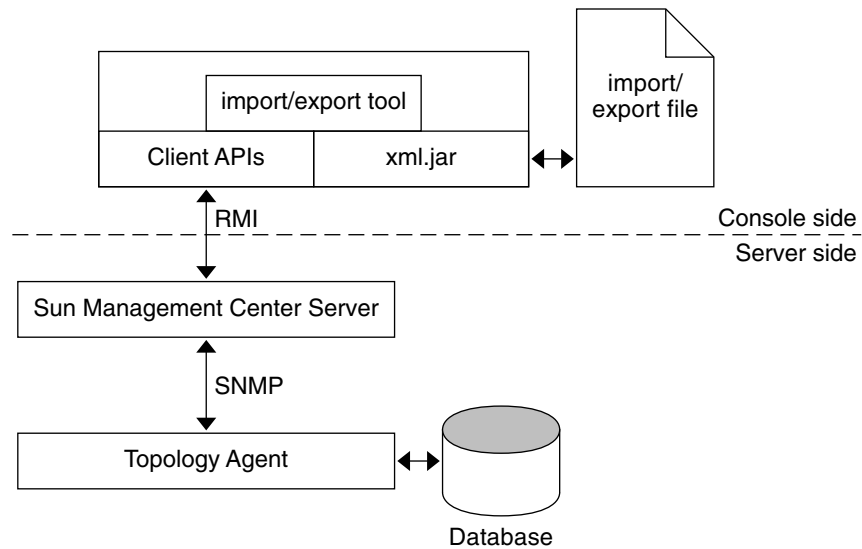


FIGURE 19-1 Software Structure for Importing and Exporting Topology

For export, two modes are provided: Append and Overwrite. In Overwrite mode, the dumped data replaces the contents of an existing file. In Append mode, the dumped data is added to the end of the file.

For import, two modes are provided to process the domain information that is contained in the dumped file. The first mode is to ignore the domain information. All objects are created in the specified or home domain. The second mode is to import domain information together with all other objects. In this case, new domains can be created. All nondomain objects are created in the corresponding domain.

Exporting Topology Information

You can start the topology export utility from the main console window or the CLI, which is described in “Import and Export CLI Interface” on page 268.

▼ To Export Topology Data From the Main Console Window

1. **Choose Export Topology from the Tools menu in the main console window.**

The Export Topology dialog box appears.

2. **Select a domain from the Export Domain Name list.**

The list shows all domains managed by the topology agent. You can select one domain to export. To export multiple domains, you can repeat the preceding operation to export another domain in the append mode.

3. **Type the name of the file to be exported, or select an existing file by using the Browse button.**

To export a file, you must have permission to write to the file or to create the file. Otherwise, an error message is displayed and the operation exits.

4. **Determine whether to append data to or overwrite data in an existing file.**

Append mode appends the data at the end of the file. Overwrite mode overwrites the file. When Append mode is used in the export, a more restrictive check is performed on the file. The existing file must be a valid import and export data file. A valid data file is a well-formed XML file with correct import and export file document type declaration (DTD).

5. **Choose the number of days for which the data is valid from the Valid for Days menu.**

You can choose from the following values:

- 7 days
- 15 days
- 30 days
- 90 days

By default, topology export data is valid for an unlimited number of days.

6. **(Optional) Provide comments about this export function.**

7. **Click OK to export the data to the specified file and close the Export Topology window.**

Importing Topology Information

You can start the topology import utility from the main console window or the CLI, which is described in “Import and Export CLI Interface” on page 268.

▼ To Import Topology Data From a File

1. **Select Import Topology from the Tools menu in the main console.**

The Import Topology window appears.

2. **Type the full path name to the file that contains topology data to import.**

Tip – You can also use the Browse button to find the file.

3. **Determine whether to import everything in the topology or only groups and entities.**

- Follow – Imports groups and domain information. The groups and entities are created in the domain contained in the file.
- Ignore – Ignores the domain information and imports only groups and entities to the target domain that you specify.

4. **Select the domain to which to import the data from the Name list.**

All data is imported into the home domain by default.

Note – You can specify the location in the topology hierarchy to which the data will import only if you chose the Ignore option in the previous step.

5. **Click OK to import the data and close the Import Topology window.**

The import utility updates the topology database. Therefore, a warning dialog box allows you to confirm the operation before the data is imported.

The warning dialog box tells you when the input file was generated and who generated the file. This warning helps you to ensure that the correct data file is being used.

Several additional checks are performed:

- Exported data files include information about the validity time of the file. If you are trying to import an out-of-date file, you receive an error message and the operation stops.
- The import utility checks that the file exists and that the file is readable. If these checks fail, you receive an error message, and the operation stops.
- For the import utility to analyze the import file, the file format must be correct. If the file is formatted incorrectly, the import utility generates an error message.
- If the entity exists in the current topology hierarchy, another warning dialog box asks whether the entity should be replaced. Select one of the following options:

Replace Replaces the conflicting data with new values.

Replace All	Replaces all conflicting data. The dialog box does not appear when the data conflict occurs again, and the old value is replaced
Ignore	Do not update the conflicting data.
Ignore All	The dialog box does not appear when another data conflict occurs. All conflicts are ignored and are left unchanged.
Cancel Import	Stops the import operation.

Import and Export CLI Interface

You can invoke the import and export utilities from CLI with the following commands:

```
# /opt/SUNWsymon/sbin/es-cli
> login
Host: servername
Login: username
Password: password
Login successful!
> export parameter
> import parameter
```

See “Import Command Parameters” on page 268 and “Export Command Parameters” on page 271 for information about appropriate command parameters.

Topology Import Utility

The `import` command retrieves previously exported topology data for the specified domain from a file.

Import Command Parameters

The `import` command takes the following parameters:

<i>domain</i>	The value of the <i>domain</i> parameter is the name of the domain whose topology is to be imported. If no domain is specified, all domains are imported.
<i>domainmode</i>	The value of the <i>domainmode</i> parameter determines whether new domains are created from the imported topology. If the value is

follow, then group and domain topology are imported into the current topology, and new domains can be created. If the value is ignore, then only groups and entities are imported to the specified target domain.

- filename* The value of the *filename* parameter is the name of the file from which the topology information should be retrieved.
- nodemode* The value of the *nodemode* parameter determines whether the imported topology replaces the existing topology. If the value of the *nodemode* parameter is *replace*, then conflicting data is replaced with the imported values. If the value of the *nodemode* parameter is *ignore*, then conflicting data is not updated.

The explicit assignment in the command line overrides the same assignment in the parameter file. For example, if *mode=ignore* is assigned in the command line and *mode=follow* is assigned in the parameter file, then *mode=ignore* is used.

EXAMPLE 19-1 Importing Topology Data from a File

In the following example, previously exported topology is imported from the file `/home/examples/snapshot`. New domains are created as necessary, and conflicting data is replaced by the imported topology.

```
> import filename=/home/examples/snapshot domainmode=follow \  
nodemode=replace
```

Confirmation Messages

The import utility prompts you to answer the following items before the operation is done or when the data conflicts:

- Warning message for confirmation – The following message asks you to confirm the import operation.

The data being used is exported by <user name> on <mm/dd/yyyy>.

The import operation will modify your topology database, are you sure you want to do this? [Yes/No]

Enter **y** for Yes or **n** for No.

- Data conflicts – The following message asks you to decide what to do with conflicting data.

The entity <entity name> already exists in your topology hierarchy, do you want to replace it?
[Replace(r)/replace All(a)/Ignore(i)/iGnore all(g)/Stop(s)]

Response values for this message include the following options:

- r Replaces the conflicting data with new values
- a Replaces all conflicting data with new values

- i Do not update the conflicting data
- g All conflicts are ignored and are left unchanged
- s Stops the import operation

Output Messages for the Import Command

This section describes the messages that might appear as a result of the import command.

`import: Done.`

Cause: Success.

Description: The operation completed successfully.

`filename: No such file.`

Cause: File does not exist.

Description: The specified file does not exist. The command line might use two files: a data file that provides the import data source, and a parameter file that provides a parameter list.

`import: Cannot open filename.`

Cause: Permission denied.

Description: The file cannot be opened for reading.

`import: File format is not supported.`

Cause: Format wrong.

Description: The source file is not a valid database file for exporting data.

`import: File out-of-date (xx days).`

Cause: Data out-of-date.

Description: You are using out-of-date data.

`import: Authentication failed.`

Cause: Authentication failed.

Description: The current user has no authority to create objects in the topology hierarchy.

`import: Wrong parameter file.`

Cause: Parameter file error.

Description: The parameter file should be a list of *name = value* pairs. If the format is not correct, the application generates an error message and stops.

```
import: illegal parameter - <para>.
```

Use `-h` option to get usage.

Cause: Illegal parameter.

Description: An illegal parameter has been passed to the import operation. Use `import -h` to view the available options and the available parameters.

Topology Export Utility

The `export` command saves the topology data for a domain, or for all domains, to a file.

Export Command Parameters

The `export` command takes the following parameters:

- | | |
|-----------------|--|
| <i>comment</i> | The value of the <i>comment</i> parameter is an annotation to be included in the file. |
| <i>domain</i> | The value of the <i>domain</i> parameter is the name of the domain whose topology is to be exported. If no domain is specified, all domains are exported. |
| <i>filename</i> | The value of the <i>filename</i> parameter is the name of the file to which the topology information should be exported. |
| <i>mode</i> | The value of the <i>mode</i> parameter determines how the topology information is incorporated into the file. If the value is <code>append</code> , then the data is appended to the contents of the file. If the value is <code>overwrite</code> , then the previous contents of the file are replaced by the new data. |
| <i>validity</i> | The value of the <i>validity</i> parameter is the length of time in days for which the data is valid. The following values are legal values for the validity parameter: <ul style="list-style-type: none">■ Unlimited■ 7■ 15■ 30■ 90 |

EXAMPLE 19-2 Exporting Default Domain Topology to a File

In the following example, the Default Domain is saved to a file that is named `snapshot`. The original contents of `snapshot` are overwritten by the new data. The new data is assumed to be valid for an unlimited period of time. The comment specifies that this data is for the system testing group.

```
> export filename=/home/examples/snapshot \  
domain="Default Domain" mode=overwrite validity=Unlimited \  
comment="System Test Group"
```

Export Comments

After invoking the export command, you are asked to enter comments. The prompt is `>`. Press the Return key to break the line. Press the Return key twice to end your comments.

EXAMPLE 19-3 CLI Export Comments

```
> export -p domain=ALL mode=append <return>  
Please enter comments for the export:  
> Comment text line 1 <Return>  
> Comment text line 2 <Return>  
> <Return>  
<  
State = OK  
message = Done.  
>
```

Output Messages for the Export Command

The following list shows the messages that might appear as a result of the export command.

`export: Done.`

Cause: Success.

Description: The operation completed successfully.

`export: Cannot open file.`

Cause: File does not exist.

Description: The parameter file does not exist.

`filename: Permission denied.`

Cause: File error.

Description: The file cannot be created or be opened for writing.

export: File format not supported.

Cause: Format wrong.

Description: The error occurs when appending the export data to a file that is not a valid export data file.

export: The domain <domainname> does not exist

Cause: Object error.

Description: The domain that you want to export does not exist.

export: Wrong parameter file.

Cause: Parameter file error.

Description: The parameter file contains a list of *name = value* pairs. If the file format is not correct, the application notifies you and stops.

export: The current user is different from the last one.

Cause: User conflict.

Description: The error occurs when you try overwrite or append the data to an existing data file created by others. You cannot modify or overwrite export data that another user created.

export: Data is out-of-date.

Cause: Data is too old.

Description: You are using an out-of-date export file. This message only occurs when you export data in append mode.

export: illegal parameter - <para>.

Please use -h option to get usage.

Cause: Illegal parameter.

Description: An illegal parameter was passed to the export operation.

Import and Export File Contents

The following list identifies the topology data that the import and export utilities process.

Entity information

The record information about every domain, group and host.

Adornment information	The adornment information about domains and groups. The adornment information contains only the layout and background index instead of the background content. For example, the information about background only contains the GIF file name, not the GIF file.
Relationship information	The relationship information describes the topology hierarchy, entity background and layout.

File Format Description

The Import/Export file describes the import and export data. You can use any text editor to edit this file. The file includes information about every entity in the topology hierarchy. Because the append export mode can append more object information to the file, the format is easy to extend and analyze. The exported data is saved in XML format.

File Format Design

The file is separated into four parts:

- Magic information
- DTD (Document Type Declaration)
- Header information
- Data blocks

Magic Information

The magic information identifies that the file is an XML format file. Typically, this information appears as follows:

```
<? XML version = 1.0 ?>
```

DTD (Document Type Declaration)

The DTD information defines the structure of the document. The DTD of an export file resembles the following example.

EXAMPLE 19-4 Import and Export File DTD

```
<!ELEMENT ENTITY (ENTITY* ADORNMENT*)>
/* Entity element describes a entity. If it is a group, it may
   contain groups and adornment. */
```

EXAMPLE 19-4 Import and Export File DTD (Continued)

```
<!ATTLIST ENTITY /* Entity attributes */
  desc          CDATA
  full_desc     CDATA
  hostname      CDATA
  ip            CDATA
  netmask       CDATA
  architecture  CDATA
  family        CDATA
  polling_type  CDATA
  url           CDATA
  x_coord       CDATA
  y_coord       CDATA
  topology_type CDATA
  event_dest    CDATA
  trap_dest     CDATA
  target_host   CDATA
  target_ip     CDATA
  read_info     CDATA
  write_info    CDATA>
<!ELEMENT ADORNMENT>
  <!ATTLIST ADORNMENT
    x_coord CDATA
    y_coord CDATA
    type    CDATA
    configuration CDATA>
]>
```

Header Information

The header information is used to record the general information, such as the following:

- User
- Data
- Version
- Platform
- Product

Data Blocks

Data blocks contain the topology hierarchy architecture and entities.

Topology and Export File Example

The following figure illustrates the topology for the My New domain.

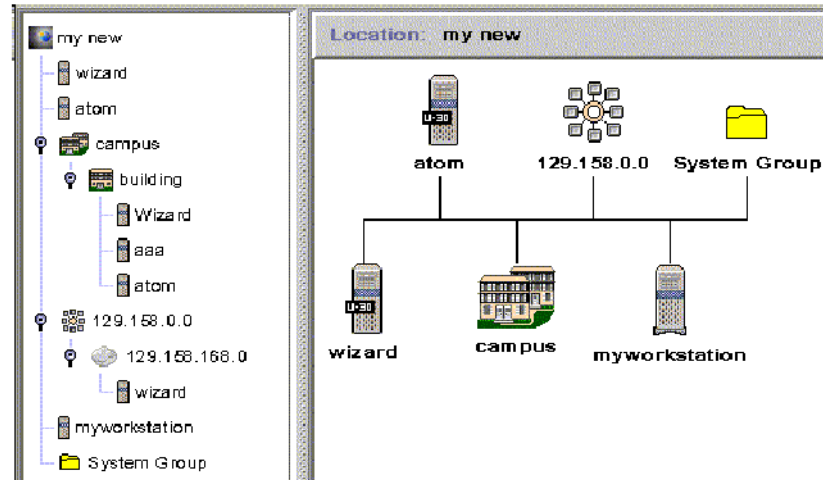


FIGURE 19-2 My New Topology Example

EXAMPLE 19-5 Export File for My New Domain

This example shows a topology export file for the My New domain.

```
<?xml version="1.0" encoding="UTF-8"?>
<DOCUMENT>
  <HEAD>
    <USER>jkang</USER>
    <DATE>1/7/1999</DATE>
    <VALIDITY>7 days</VALIDITY>
    <PRODUCT>Sun Management Center</PRODUCT>
    <VERSION>3.0</VERSION>
    <COMMENTS>This is an example.</COMMENTS>
  </HEAD>
  <DOMAIN name="my new">
    <ENTITY arch="SunOS 5.8" config="" desc="wizard" entityId="e-1"
      family="sun4u-Sun-Ultra-30" fulldesc="wizard" hostname="wizard"
      ipAddr="129.158.168.63" isPoll="false" isSoftGroupLink="false"
      netMask="255.255.255.255" pollType="ahost" readInfo="" targetHost=""
      targetIp="" targetUrl="snmp://129.158.168.63:1100/sym//base/mibman/modules"
      type="" writeInfo="" xCoord="23" yCoord="39"
    />
    <ENTITY arch="SunOS 5.8" config="" desc="atom" entityId="e-2"
      family="sun4u-Sun-Ultra-30" fulldesc="" hostname="u30-1"
      ipAddr="129.158.168.113" isPoll="false" isSoftGroupLink="false"
      netMask="255.255.255.255" pollType="ahost" readInfo=""
      targetHost="" targetIp=""
    />
  </DOMAIN>
</DOCUMENT>
```

EXAMPLE 19-5 Export File for My New Domain (Continued)

```
targetUrl="snmp://129.158.168.113:161/sym//base/mibman/modules"
type="" writeInfo="" xCoord="75" yCoord="39"
/>
<ENTITY arch="" config="" desc="campus" entityId="e-3" family="campus-view"
fulldesc="" hostname="" ipAddr="" isPoll="true" isSoftGroupLink="false"
netMask="" pollType="aview" readInfo="espublic" targetHost="" targetIp=""
targetUrl="snmp://129.158.168.63:164/mod/topology+view-101"
type="" writeInfo="" xCoord="27" yCoord="111">
<ENTITY arch="" config="" desc="building" entityId="e-1"
family="building-view" fulldesc="" hostname="" ipAddr=""
isPoll="true" isSoftGroupLink="false" netMask="" pollType="aview"
readInfo="espublic" targetHost="" targetIp=""
targetUrl="snmp://129.158.168.63:164/mod/topology+view-102"
type="" writeInfo="" xCoord="" yCoord="">
<ENTITY arch="SunOS 5.8" config="" desc="Wizard" entityId="e-1"
family="sun4u-Sun-Ultra-30" fulldesc="" hostname="wizard"
ipAddr="129.158.168.63" isPoll="false" isSoftGroupLink="false"
netMask="255.255.255.255" pollType="ahost" readInfo=""
targetHost="" targetIp=""
targetUrl="snmp://129.158.168.63:1100/sym//base/mibman/modules"
type="" writeInfo="" xCoord="" yCoord=""
/>
<ENTITY arch="SunOS 5.8" config="" desc="aaa" entityId="e-2"
family="sun4u-Sun-Ultra-30" fulldesc="" hostname="wizard"
ipAddr="129.158.168.63" isPoll="false" isSoftGroupLink="false"
netMask="255.255.255.255" pollType="ahost" readInfo=""
targetHost="" targetIp=""
targetUrl="snmp://129.158.168.63:1100/sym//base/mibman/modules"
type="" writeInfo="" xCoord="" yCoord=""
/>
<ENTITY arch="SunOS 5.8" config="" desc="atom" entityId="e-3"
family="sun4u-Sun-Ultra-30" fulldesc="" hostname="u30-1"
ipAddr="129.158.168.113" isPoll="false" isSoftGroupLink="false"
netMask="255.255.255.255" pollType="ahost" readInfo=""
targetHost="" targetIp=""
targetUrl="snmp://129.158.168.113:161/sym//base/mibman/modules"
type="" writeInfo="" xCoord="" yCoord=""
/>
</ENTITY>
</ENTITY>
<ENTITY arch="" config="" desc="129.158.0.0" entityId="e-4"
family="network-view" fulldesc="129.158.0.0" hostname="129.158.0.0"
ipAddr="129.158.0.0" isPoll="true" isSoftGroupLink="false"
netMask="255.255.255.0" pollType="aview"
readInfo="espublic" targetHost="129.158.0.0" targetIp="129.158.0.0"
targetUrl="snmp://129.158.168.63:164/mod/topology+view-103" type=""
writeInfo="" xCoord="38" yCoord="181">
<ENTITY arch="" config="" desc="129.158.168.0" entityId="e-1"
family="subnetwork-view" fulldesc="129.158.168.0"
hostname="129.158.168.0" ipAddr="129.158.168.0"
isPoll="true" isSoftGroupLink="false" netMask="255.255.255.0"
pollType="aview" readInfo="espublic" targetHost="129.158.168.0"
```

EXAMPLE 19-5 Export File for My New Domain (Continued)

```
targetIp="129.158.168.0"
targetUrl="snmp://129.158.168.63:164/mod/topology+view-104"
type="" writeInfo="" xCoord="" yCoord="">
<ENTITY arch="SunOS 5.8" config="" desc="wizard" entityId="e-1"
  family="sun4u-Sun-Ultra-30"
  fulldesc="SUNW,Ultra-30" hostname="wizard" ipAddr="129.158.168.63"
  isPoll="false" isSoftGroupLink="false" netMask="255.255.255.0"
  pollType="ahost" readInfo="public" targetHost="" targetIp=""
  targetUrl="snmp://129.158.168.63:1100/sym//base/mibman/modules"
  type="" writeInfo=""
  xCoord="" yCoord=""
/>
</ENTITY>
</ENTITY>
<ENTITY arch="" config="" desc="myworkstation" entityId="e-5"
  family="nonagent-sun4u-Sun-Ultra30" fulldesc="" hostname="wizard"
  ipAddr="129.158.168.63" isPoll="false" isSoftGroupLink="false"
  netMask="" pollType="snmp" readInfo="public" targetHost=""
  targetIp="" targetUrl="snmp://wizard:1100/oid//1.3.6.1.2.1.1.7.0"
  type="" writeInfo="private" xCoord="52" yCoord="253"
/>
<ENTITY arch="SunOS 5.8" config="" desc="System Group" entityId="e-6"
  family="base-agent" fulldesc="MIB tree branch" hostname="wizard"
  ipAddr="129.158.168.63" isPoll="false" isSoftGroupLink="false"
  netMask="255.255.255.255" pollType="amod" readInfo=""
  targetHost="wizard" targetIp="129.158.168.63"
  targetUrl="snmp://129.158.168.63:1100/mod/mib2-simple/system"
  type="" writeInfo="" xCoord="52" yCoord="329"
/>
<ADORNMENT Config="bus" Id="adorn-7" Type="layout" XCoord="0" YCoord="0" />
</DOMAIN>
</DOCUMENT>
```

Using the Command-Line Interface

The Sun Management Center command-line interface (CLI) is a lightweight, character-driven console alternative to the Java and web console graphical interfaces for monitoring and managing your system.

The following topics are discussed in this chapter:

- “Overview of the Sun Management Center CLI” on page 279
- “CLI Parameters” on page 282
- “CLI Commands” on page 287
- “CLI Output” on page 298
- “CLI Procedures” on page 300

Overview of the Sun Management Center CLI

The Sun Management Center command-line interface (CLI) is a character-driven console application for monitoring and managing your system. The CLI offers several useful features:

- **Low overhead** – Although the CLI provides most of the functionality of the Java console and web console, the CLI does not require bitmapped graphics. The CLI therefore can run on simple data terminal equipment over low-bandwidth connections. However, features that require a GUI, such as physical views or graphing, are unavailable through the CLI.
- **Batch mode processing** – The CLI supports a basic scripting functionality that enables the CLI to take command input from a file in batch mode.
- **Configurable output format** – You can configure the format of CLI output. The plain-text output is compatible with other text-based tools. For extended commands, you can specify output in HTML.

- **Help** – Online help for CLI commands is available from within the CLI.

You can use the CLI to perform the following tasks:

- Create topology objects such as domains, groups, and entities, and retrieve topology information about these objects.
- Retrieve and manipulate managed object properties or attributes.
- Load, unload, enable, and disable modules on Sun Management Center agents.
- Set and run alarm actions, retrieve alarm information, and acknowledge or delete alarms on Sun Management Center agents.

System Requirements

You can access the CLI from a user terminal session on one of the following system configurations:

- UNIX[®] workstation running the Solaris 8 or Solaris 9 operating systems
- PC running Windows 98, Windows 2000, or Windows NT

CLI Interaction Modes

The CLI supports the following two interaction modes:

- **Session mode** – Session mode is interactive. Once you log in to the Sun Management Center server, you can enter commands and receive output until you explicitly log out of the server.
- **Batch mode** – The CLI connects to the server and executes the commands contained in *filename*, where *filename* is the name of a file that contains CLI commands.

CLI Command and Parameter Overview

This section provides an overview of CLI commands and parameters.

CLI Command Overview

CLI commands can be divided into two types: *basic* commands and *extended* commands.

- **Basic commands** are commands that modify the environment in which other CLI commands are executed. You use basic commands to set parameter values, define command aliases, check command status, or log in and log out of the server. Basic commands always execute in the *foreground*.

- **Extended commands** are commands that interrogate or modify the topology of managed objects, their properties, and their attributes. You use extended commands to perform several functions:
 - Locate managed objects in the managed object topology
 - Enable or disable modules
 - Acknowledge or delete alarms

By default, extended commands run in the *background*. You can configure extended commands to run in the foreground.

In session mode, commands execute in either the foreground or the background.

- **Foreground** – Commands that execute in the foreground run to completion. These commands send their output directly to the screen unless otherwise redirected. Only one command at a time can run in the foreground. *Basic* commands can only run in the foreground. *Extended* commands run in the background by default, but can be configured to run in the foreground.
- **Background** – Commands that execute in the background run asynchronously and by default send no output or diagnostic messages to the screen. Output is buffered and can be displayed later by explicit request. Unlike the UNIX shells, only one extended command can run in the background at a time. While this command is running in the background, any number of basic commands can run in the foreground. By default, *extended* commands run in the background, although you can specify that extended commands run in the foreground. *Basic* commands cannot run in the background.

The CLI also supports aliases. You can define a shorthand term or pseudonym for a more complicated command and its parameters. User-defined aliases persist across different CLI sessions.

CLI Parameter Overview

CLI parameters are name-value pairs: each parameter has a *name* and a *value*. Some parameters are *built-in* to the CLI. Their names and the significance of their values are *predefined* within the CLI. You can define other parameters, also known as *variables*. Some parameters are *global* in scope. Global parameters affect the execution of all CLI commands that are run in a particular session. Other parameters are specific to a certain command or group of commands.

Input and Output Capabilities

The CLI provides several capabilities for input and output.

- **Input**
 - In session mode, the CLI accepts commands interactively from the keyboard.

- In batch mode, the CLI executes commands that are contained in a CLI command file whose name is specified on the shell command line.
- **Output**
 - For basic commands, output appears on the screen by default.
 - For extended commands, output is buffered in the background by default until you request that output.
 - The output of both basic and extended commands can be redirected to a file that you specify.
 - Commands and parameters can be saved in a log file that can later be used as input to the CLI in batch mode.

Note – To use a log file as input to the CLI in batch mode, you must edit the file. Remove the time stamps and any messages that appear before the actual commands and parameters in the log file.

- **Format**
 - You can specify the number of lines for the output display.
 - For multi-column output, you can specify which columns to display.
 - In addition to plain-text output, for some commands you can specify HTML output.

CLI Command Help

The CLI provides online help for each CLI command. CLI help is available from within the CLI. CLI help does not require a GUI. For each command, the help provides a synopsis of command usage and a list of the parameters associated with that command.

CLI Parameters

Most CLI parameters are name-value pairs: each parameter has a *name* and a *value*. A few parameters have names but no values. These parameters are known as *flags*.

Scope of Parameters

You can specify parameter values at several points in a CLI session:

- **CLI startup** – You can specify parameters on the UNIX command line when you start the CLI. Parameters that are specified at startup are *global* to the session. Global parameters retain their values unless overridden with the `set` command or removed from the current session with the `unset` command.
- **CLI commands** – You can specify parameters for individual CLI commands executed during a session. A value specified as part of a command temporarily overrides the value of a global parameter for the duration of that command.
- **Input file** – Parameter definitions can be stored in an external file and can be invoked at any time in a CLI session. Parameter values that are defined in an external file are overridden by global parameters and by individual command parameters.

Parameter Syntax

Parameters are specified as *name=value* pairs:

```
file=/home/examples/example1
```

where the parameter *name* is `file` and the parameter *value* is `/home/examples/example1`. There must be no whitespace between the equals sign (=) and the parameter name or parameter value. If the value contains whitespace such as a space or tab character, the value must be enclosed in double-quote characters (ASCII character 0x22):

```
moduleDesc="Local File Scanning"
```

Parameter values can be a list of comma-separated values. There must be no whitespace between the comma-separated values, as shown in the following example.

```
severity=DIS,DWN,ERR
```

A parameter list is a sequence of parameters separated by whitespace, as shown in the following example.

```
m=kernel-reader moduleDesc="My Kernel Reader"
```

Examples of Acceptable and Unacceptable Parameter Syntax

The following parameters have acceptable syntax:

```
ok1="This is just a test"
ok2=hello
ok3=hello,hi,aloha
ok4="hello,hi,aloha"
```

The following parameters do *not* have acceptable syntax:

```
broken1="How are you?", "Who are you?"
broken2="Testing", 1, 2, 3
broken3="Hello
broken4=Hello"
```

Parameter Input File Format

Parameters can be stored in a file and read when needed. You can create as many parameter files as needed. Use the built-in *i* parameter to specify the name of the desired parameter input file.

Predefined Parameters and Flags

This section describes parameters that have predefined meanings within the CLI.

Note – Several predefined parameters have single-letter names. Some examples include such as *a*, *f*, and *o*. These are correct parameter names and are not errors.

- b When included on the UNIX command line when the CLI is started, this flag instructs the CLI to run in batch mode. This flag is ignored in session mode.
- h When this flag is used as a parameter to a command in session mode, it instructs the CLI to display the help text for the command.
- l The name of this flag is the lowercase letter l (ASCII character 0x6c), not the numeral 1 (ASCII character 0x31). When this flag is used as a parameter to an extended command in session mode, it instructs the CLI to retain the parameters from the last extended command while executing the current command. If the -l flag is specified, any additional parameters specified for the current command are ignored. This flag has no effect on basic commands. The following example illustrates usage of the -l flag:

```
> getLoadModules a=myHostName
...
...
> getAlarms -l
```

When the `getAlarms` command executes, the command uses the value of parameter *a* (`myHostName`) from the previously executed `getLoadModules` command.

- a* The value of the *a* parameter is an agent, which is specified as the agent host and (optional) port number. If you specify the port number, separate the number from the host name by a colon (:). The general

syntax is `a=agentHost [:agentPort]`. For example, to specify an agent running on host `example_host` and listening to port 12345, you would use the following syntax:

```
a=example_host:12345
```

The value of the *a* parameter can also be a comma-separated list of agent specifications: `a=agent [,agent] +`.

append

The value of the *append* parameter is the name of a file to which the output of a command should be appended. If this file does not exist, the file is created. If you set the *append* parameter globally, all command output for that session is appended to the specified file. You can also set this parameter for a specific command, as shown in the following example.

```
append=/home/examples/cli_output
```

If both the *append* and *o* parameters are set, *append* takes precedence over *o*. Only command results are recorded in the specified file. The actual command is not recorded. Use the *log* parameter to record command information.

columns

The value of the *columns* parameter is the name of one or more columns of command output to be displayed by the `print` command. Column names are case-sensitive. Multiple column names are separated by commas. The following example uses several column names.

```
columns="Alarm Id,Node URL,Target Host,Severity"
```

f

The value of the *f* parameter determines the format of command output. The current formats are `plain` and `html`. See “Command Output Format” on page 298 for more information. To set the format to HTML, use the following syntax:

```
f=html
```

height

The value of the *height* parameter is the number of lines of command output to display on the screen. The following example sets the height to approximately the height of a standard terminal screen:

```
height=24
```

i

The value of the *i* parameter is the name of an input file that contains parameter definitions to be included in the current session. Within the input file, each parameter definition should be on a separate line. For example, assume that the following lines are in a `/home/examples/myParams` file:

```
more=off
serverHost=myserver
a=myagent:161
```

You could include these parameters in the current CLI session by using the following line:

```
i=/home/examples/myParams
```

log The value of the *log* parameter is the name of a file that records all CLI commands and the time that the commands were executed. Note that the log file only records command names and time of execution. Command output is logged in files specified by the *a* or *o* parameters. Once the parameter is set, all subsequent commands are appended to the file. If this file does not exist, the file is created. Because the log file is not overwritten when logging is turned on, be sure to specify a different file if you want a different log. To turn logging off, *unset* the *log* parameter. The following example starts a log, then later stops the log.

```
> log=/home/examples/sunmc-log
...
...
> unset log
```

m The value of the *m* parameter is the name of a Sun Management Center module. The value can also be a comma-separated list of modules.

```
m=kernel-reader
```

more The value of the *more* parameter controls paging of command output on your display. Possible values are *on* and *off*. If *more* is set to *on*, all subsequent output to the terminal is displayed one *screen* at a time. The size of a screen is defined by the *height* and *width* parameters. Default values are *off* for batch mode and *on* for session mode.

```
more=on
```

o The value of the *o* parameter is the name of a file to which command output should be written. If this file exists, the file is overwritten. You can use the *o* parameter to capture the output of a particular command by specifying the *o* parameter to that command. You can also set the parameter globally using the *set* command to write all subsequent output to a file.

If both the *append* and *o* parameters are set, *append* takes precedence over *o*. Output is appended to the specified file. Only command output is written to the file. The actual command is not recorded. Use the *log* parameter to record command information. The following example defines a file into which command output is written.

```
o=/home/examples/sunmc-output
```

serverHost The value of the *serverHost* parameter determines the server host to which the CLI connects at login. This global parameter cannot be changed once the CLI is connected to the server.

<i>serverPort</i>	The value of the <i>serverPort</i> parameter is the server port for login. This global parameter cannot be set after a login session is established. If this parameter is not set, the default port of 2099 is used.
<i>t</i>	The value of the <i>t</i> parameter is the name of an object that is managed in the topology agent. The object can be a domain, a view group, or an entity. The object name is the fully qualified name starting from the domain, for example, /domain/group/host.

CLI Commands

See “CLI Command and Parameter Overview” on page 280 for an overview of command types and concepts.

Basic CLI Commands

The following list describes the basic CLI commands.

alias Use the `alias` command to create an alias for frequently used commands or for commands that have complicated parameters. An alias cannot have the same name as an existing CLI command. Whitespace in an alias definition must be enclosed in double-quotes (" , ASCII character 0x22). The following example shows a simple `alias` command first, followed by a more complex `alias` command.

```
> alias assign=set
> alias alarms="getAlarms severity=dwn"
```

If called without arguments, the `alias` command prints a list of defined aliases and their values. The following example shows the result of the `alias` command when the command is called without arguments.

```
> alias
assign - set
alarms - getAlarms severity=dwn
```

clear The `clear` command removes all parameters from the current session. This command is similar to the `unset` command but does not require parameter names as arguments.

exit The `exit` command disconnects from the server and terminates the CLI session.

Note – There is no difference between the `exit` and the `quit` commands.

- `help` The `help` command displays information about CLI commands and their parameters. The help information is suitable for displaying on a non-bitmapped terminal screen. When `help` is executed without an argument, the help displays an alphabetical list and brief description of available CLI commands. Basic commands are listed first, followed by extended commands. When `help` is called with the name of a CLI command as an argument, `help` prints information specific to that command. The following example shows help for the `getAlarms` command.
- ```
> help getAlarms
getAlarms [a=host[,host]+] [alarm_filter_list]
- Get alarm information on an agent or a list of agents under a
set of filter conditions. If no agent is provided, all alarms will
be obtained. All the filter conditions are "ANDED" to provide the
result. The filter conditions as specified in alarm_filter_list
comprises:
 domain=domain and/or
 m=module[+instance] and/or
 managed_object=managed_object and/or
 property=property and/or
 property_instance=property_instance and/or
 qualifier=qualifier and/or
 severity=[DIS,DWN,ERR,OFF,INF,IRR,WRN] and/or
 state=[C,F,O] and/or
 ack=[A,N]
```
- `kill` The `kill` command terminates any commands that are running in the background.
- `login` The `login` command establishes a connection to a Sun Management Center server. You can specify the `serverHost` and, optionally, `serverPort` parameters as arguments. If no host is specified, you are prompted for a host. The `login` command also prompts you for your username and password.
- `logout` The `logout` command terminates your connection to the Sun Management Center server, but does not terminate the CLI session.
- `more` The `more` command displays help information on the parameters that you set to control the format of command output to the screen. Refer to the discussion of the predefined parameters `height` and `more` in "Predefined Parameters and Flags" on page 284 for additional information.



`print` The `print` command directs the output of the last extended command in the specified format to the specified destination. By default, `print` directs this output to the terminal screen in plain text format. If the parameters `a` or `o` are set, the output is directed to the file specified by those parameters. The output is not shown on the screen.

---

**Note** – The `print` command is not saved in the command history.

---

`quit` The `quit` command disconnects from the server and terminates the CLI session.

---

**Note** – There is no difference between the `quit` and the `exit` commands.

---

`reset` The `reset` command restores the values of all parameters that are specified on the command line to the values that were specified at the beginning of the CLI session. Parameters that were defined during the session but not on the command line remain unchanged. If a specific parameter name is supplied as an argument to `reset` and the parameter was specified on the command line, that parameter's value is restored to its original value. Otherwise, the parameter's value remains unchanged.

---

**Note** – The `reset` command is not saved in the command history.

---

`set` The `set` command enables you to specify parameter values or to display parameter values. Parameters whose values are specified with the `set` command are global to the current session. Global commands are available to all commands during that session. If you execute `set` with no arguments, the value of all parameters defined during the current session are displayed. If you execute `set` with a parameter that is specified as an argument, the value of that parameter is displayed. The following example shows all three variations of this command.

```
> set height=10
> set
height=10
> set height
height=10
```

`status` The `status` command displays the status of any commands that are running in the background.

|                      |                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------|
| <code>unalias</code> | The <code>unalias</code> command removes the alias that was specified as an argument.     |
| <code>unset</code>   | The <code>unset</code> command removes the specified parameters from the current session. |

---

**Note** – The `unset` command is not saved in the command history.

---

## Extended CLI Commands

Several types of extended commands that are available in the CLI are described in these sections:

- “Module Extended Commands” on page 290
- “Object Attribute Extended Commands” on page 291
- “Alarm Extended Commands” on page 293
- “Topology Extended Commands” on page 295
- Topology import and export commands described in “Import and Export CLI Interface” on page 268

## Module Extended Commands

There are seven extended commands for managing modules. For details about the *a*, *m*, *f*, and *columns* parameters, refer to “Predefined Parameters and Flags” on page 284.

### *Module Commands*

|                               |                                                                                                                                                                               |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>disableModule</code>    | Disable a module or modules in an agent or agents. The <code>disableModule</code> command takes the following parameters: <i>a</i> and <i>m</i>                               |
| <code>enableModule</code>     | Enable a module or modules in an agent or agents. The <code>enableModule</code> command takes the following parameters: <i>a</i> , <i>f</i> , <i>m</i> , and <i>columns</i> . |
| <code>getLoadedModules</code> | Get a list of loaded modules in an agent or agents. The <code>getLoadedModules</code> command takes the following parameters: <i>a</i> , <i>f</i> , and <i>columns</i> .      |
| <code>getModule</code>        | Get information for a particular module. The <code>getModule</code> command takes the following parameters: <i>a</i> , <i>f</i> , <i>m</i> , and <i>columns</i> .             |

|                           |                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>getModules</code>   | Get a list of modules in an agent. The <code>getModules</code> command takes the following parameters: <i>a</i> , <i>f</i> , and <i>columns</i> .                                                                                                                                                                                                                                |
| <code>loadModule</code>   | Load a module in an agent or agents. The <code>loadModule</code> command takes the following parameters: <i>a</i> , <i>f</i> , <i>m</i> , and <i>columns</i> .<br><br>The <code>loadModule</code> command can take two additional parameters: <i>moduleName</i> , which is the internationalized module name, and <i>moduleDesc</i> , which is a text description of the module. |
| <code>unloadModule</code> | Unload one or more modules in an agent or agents. The <code>unloadModule</code> command takes the following parameters: <i>a</i> , <i>f</i> , <i>m</i> , and <i>columns</i> .                                                                                                                                                                                                    |

### *Module Command Examples*

To determine which modules are loaded on a host whose *agentHost* name is `seattle`, you would type the following command at the CLI prompt:

```
> getLoadedModules a=seattle
```

To load the `kernel-reader` module on the host `seattle` at port `1776`, you would type the following command:

```
> loadModule a=seattle:1776 m=kernel-reader
```

## Object Attribute Extended Commands

There are four extended commands for managing object attributes and attribute values.

### *Parameters for the Object Attribute Command*

The following parameters can be used by the object attribute commands. For details about the *a*, *m*, *f*, and *columns* parameters, refer to “Predefined Parameters and Flags” on page 284.

|                 |                                                                                                                                                |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mgtObj</i>   | The value of the <i>mgtObj</i> parameter is the name of the managed object whose attributes and properties are being set or retrieved.         |
| <i>property</i> | The value of the <i>property</i> parameter is the name of the property whose attributes and values are being set or retrieved.                 |
| <i>propInst</i> | The value of the <i>propInst</i> parameter is the name of the instance of the property whose attributes and values are being set or retrieved. |

- rowValues* The value of the *rowValues* parameter is a comma-separated list of name-value pairs. *name* is the name of a column in the row. *value* is the value in that column.
- attributes* The value of the *attributes* parameter is a comma-separated list of attribute names that belong to the property whose attributes and values are being set or retrieved. When used with the `setAttributes` command, each attribute name in the *attributes* parameter must have a corresponding value in the *values* parameter.
- values* The value of the *values* parameter is a comma-separated list of values that correspond to the attributes that are specified in the *attributes* parameter. When used with the `setAttributes` command, there must be a value for each attribute specified.

### Object Attribute Commands

You can set and retrieve object attributes and attribute values with the following commands:

- `addRow` The `addRow` command adds a row to a table. The `addRow` command takes the following parameters: *a*, *m*, *mgtObj*, *property*, *propInst*, and *rowValues*.
- `delRow` The `delRow` command deletes a row from a table. The `delRow` command takes the following parameters: *a*, *m*, *mgtObj*, *property*, *propInst*, and *rowValues*.
- `getAttributes` The `getAttributes` command retrieves the specified attributes from an agent or a list of agents. The `getAttributes` command takes the following parameters: *a*, *f*, *m*, *columns*, *mgtObj*, *property*, *propInst*, and *attributes*.
- `setAttributes` The `setAttributes` command assigns values to the specified attributes in an agent or a list of agents. The `setAttributes` command takes the following parameters: *a*, *m*, *mgtObj*, *property*, *propInst*, *attributes*, and *values*.

For each attribute specified in the *attributes* parameter, there must be a corresponding value in the *values* parameter.

### Examples for the Object Attribute Command

The following command retrieves all attributes for the `size` property in the `totalstats` managed object in the `agent-stats` module at port 1161 on host `haiku`:

```
> getAttributes a=haiku:1161 m=agent-stats mgtObj=totalstats \
property=size
```

The following command sets the attribute `alarmlimits.error-gt` to the value of 2 in the `size` property specified in the previous example:

```
> setAttributes a=haiku:1161 m=agent-stats mgtObj=totalstats \
property=size attributes=alarmlimits.error-gt values=2
```

The following command deletes the row that is specified in `rowValues` from the managed object that is specified in `mgtObj`:

```
> delRow a=haiku:1161 \
m=filemon mgtObj=filemonstats/filemonTable/filemonEntry \
rowValues="name=test,desc=this,filename=/etc/passwd"
```

## Alarm Extended Commands

There are five extended commands for managing alarms.

### *Alarm Command Parameters*

The following parameters can be used by the extended commands for alarms. For details about the *a* and *m* parameters, refer to “Predefined Parameters and Flags” on page 284.

|                          |                                                                                                                                                                                                                                           |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ack</i>               | The value of the <i>ack</i> parameter is a comma-separated list of values that indicate whether the alarms being managed have been acknowledged. Legal values for the <i>ack</i> parameter are A (Acknowledged) and N (Not Acknowledged). |
| <i>command</i>           | The value of the <i>command</i> parameter is the alarm action to be performed.                                                                                                                                                            |
| <i>domain</i>            | The value of the <i>domain</i> parameter is the name of the Sun Management Center domain for which alarms are to be managed. If no domain is specified, the Default Domain is used.                                                       |
| <i>managed_object</i>    | The value of the <i>managed_object</i> parameter is the name of the managed object for which alarms are to be managed.                                                                                                                    |
| <i>note</i>              | The value of the <i>note</i> parameter is a text annotation for the command being run.                                                                                                                                                    |
| <i>property</i>          | The value of the <i>property</i> parameter is the name of the property for which alarms are to be managed.                                                                                                                                |
| <i>property_instance</i> | The value of the <i>property_instance</i> parameter is the name of the specific property instance for which alarms are to be managed.                                                                                                     |
| <i>qualifier</i>         | The value of the <i>qualifier</i> parameter is the name of the qualifier that is associated with the managed property whose alarms are to be managed.                                                                                     |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>severity</i> | <p>The value of the <i>severity</i> parameter is a comma-separated list of severity values for the alarms being managed. The following values are allowed for the <i>severity</i> parameter:</p> <ul style="list-style-type: none"> <li>■ ERR — Error</li> <li>■ WRN — Warning</li> <li>■ INF — Informative</li> <li>■ IRR — Irrational</li> <li>■ DWN — Down</li> <li>■ DIS — Disabled</li> <li>■ OFF — Off</li> </ul> |
| <i>state</i>    | <p>The value of the <i>state</i> parameter is a comma-separated list of state values for the alarms being managed. Legal values for the state parameter are O (Open) or C (Closed).</p>                                                                                                                                                                                                                                 |

### *Alarm Commands*

You can examine alarm values and set alarm actions with the following commands:

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>ackAlarms</code>      | <p>The <code>ackAlarms</code> command acknowledges alarms in an agent or a list of agents. The <code>ackAlarms</code> command takes the following parameters: <i>a</i>, <i>ack</i>, <i>columns</i>, <i>domain</i>, <i>f</i>, <i>m</i>, <i>managed_object</i>, <i>note</i>, <i>property</i>, <i>property_instance</i>, <i>qualifier</i>, <i>severity</i>, and <i>state</i>.</p> <p>If no value is specified for the <i>state</i> parameter, <i>state</i> defaults to O (Open).</p> |
| <code>delAlarms</code>      | <p>The <code>delAlarms</code> command deletes alarms in an agent or a list of agents. The <code>delAlarms</code> command takes the following parameters: <i>a</i>, <i>ack</i>, <i>columns</i>, <i>domain</i>, <i>f</i>, <i>m</i>, <i>managed_object</i>, <i>note</i>, <i>property</i>, <i>property_instance</i>, <i>qualifier</i>, <i>severity</i>, and <i>state</i>.</p> <p>If no value is specified for the <i>state</i> parameter, <i>state</i> defaults to C (Closed).</p>    |
| <code>getAlarms</code>      | <p>The <code>getAlarms</code> command retrieves alarm information for an agent or a set of agents. The <code>getAlarms</code> command takes the following parameters: <i>a</i>, <i>ack</i>, <i>columns</i>, <i>domain</i>, <i>f</i>, <i>m</i>, <i>managed_object</i>, <i>property</i>, <i>property_instance</i>, <i>qualifier</i>, <i>severity</i>, and <i>state</i>.</p> <p>If no parameters are specified, <code>getAlarms</code> returns <i>all</i> alarm information.</p>     |
| <code>runAlarmAction</code> | <p>The <code>runAlarmAction</code> command runs a manual or delayed alarm action in an agent or a list of agents. The <code>runAlarmAction</code> command takes the following parameters: <i>a</i> and <i>domain</i></p>                                                                                                                                                                                                                                                          |

`setAlarmAction` The `setAlarmAction` command sets a manual or delayed alarm action for an existing alarm in an agent or a list of agents. The `setAlarmAction` command takes the following parameters: *a*, *command*, and *domain*.

### *Alarm Command Examples*

The following command retrieves all alarms with severity of ERR or DWN from the host haiku:

```
> getAlarms a=haiku severity=ERR,DWN
```

## Topology Extended Commands

There are nine extended commands for managing topology.

### *Topology Command Parameters*

The following parameters can be used by the extended commands for topology. For details about the *a*, *columns*, *f*, and *t* parameters, refer to “Predefined Parameters and Flags” on page 284.

|                  |                                                                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>agentPort</i> | The value of the <i>agentPort</i> parameter is the agent port number. If <i>agentPort</i> is not specified, the default value of 161 is used. The <i>agentPort</i> parameter is optional. This parameter is only specified if the <i>url</i> parameter is not specified and if you do not want the default port. |
| <i>arch</i>      | The value of the <i>arch</i> parameter is the architecture of the topology object.                                                                                                                                                                                                                               |
| <i>domain</i>    | The value of the <i>domain</i> parameter is the name of the Sun Management Center domain that you must specify for the <code>setCurrentDomain</code> command.                                                                                                                                                    |
| <i>family</i>    | The value of the <i>family</i> parameter is the object family of the topology object.                                                                                                                                                                                                                            |
| <i>fullDesc</i>  | The value of the <i>fullDesc</i> parameter is a text description of the entity or group being created.                                                                                                                                                                                                           |
| <i>isPolled</i>  | The value of the <i>isPolled</i> parameter can be <code>true</code> or <code>false</code> . If the value is <code>true</code> , the entity polls for status information according to the polling type ( <i>pollType</i> ).                                                                                       |
| <i>pollType</i>  | The value of the <i>pollType</i> parameter is the type of polling for this entity. The following values are allowed for the <i>pollType</i> parameter: <ul style="list-style-type: none"><li>■ <code>ahost</code> – Identifies a host on which an active agent is installed and running</li></ul>                |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <ul style="list-style-type: none"> <li>■ <code>amod</code> – Identifies a module that has an active agent</li> <li>■ <code>aprox</code> – Identifies an agent that is running an SNMP proxy module</li> <li>■ <code>dummy</code> – Identifies a device that is not monitored</li> <li>■ <code>ping</code> – Identifies a host to be monitored using the ICMP <code>ping</code> command</li> <li>■ <code>snmp</code> – Identifies a host to be monitored using the SNMP <code>ping</code> command</li> </ul> |
| <code>readInfo</code>   | The value of the <code>readInfo</code> parameter is the name of the SNMPv1 read community for SNMP polled objects.                                                                                                                                                                                                                                                                                                                                                                                          |
| <code>targetHost</code> | The value of the <code>targetHost</code> parameter is the name of the target host.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <code>targetIp</code>   | The value of the <code>targetIP</code> parameter is the IP address of the target host.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <code>topoCfg</code>    | The value of the <code>topoCfg</code> parameter is configuration information for the topological representation of a managed entity.                                                                                                                                                                                                                                                                                                                                                                        |
| <code>topoType</code>   | The value of the <code>topoType</code> parameter is the topological representation type of a managed entity.                                                                                                                                                                                                                                                                                                                                                                                                |
| <code>url</code>        | <p>The value of the <code>url</code> parameter is the URL of the entity to be polled. The value of the <code>url</code> parameter can be specified in the following formats:</p> <pre>ping://hostname snmp://hostname:port/oid/#.#.#.# snmp://hostname:port/[mod,sym]/path</pre>                                                                                                                                                                                                                            |
| <code>writeInfo</code>  | The value of the <code>writeInfo</code> parameter is the name of the SNMPv1 write community for SNMP polled objects.                                                                                                                                                                                                                                                                                                                                                                                        |

## Topology Commands

There are nine extended commands for managing topology.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>createEntity</code> | <p>The <code>createEntity</code> command creates a managed entity. Properties of the managed entity are specified with the following parameters: <code>agentPort</code>, <code>arch</code>, <code>family</code>, <code>fullDesc</code>, <code>isPolled</code>, <code>pollType</code>, <code>readInfo</code>, <code>targetHost</code>, <code>targetIP</code>, <code>topoCfg</code>, <code>topoType</code>, <code>url</code>, <code>columns</code>, <code>f</code>, and <code>t</code>.</p> <p>If the <code>url</code> or <code>agentPort</code> parameters are specified, the default port of 161 is not used.</p> |
| <code>createGroup</code>  | <p>The <code>createGroup</code> command creates a topology domain or group. If the entity being created is a group, the group properties are specified with the following parameters: <code>family</code> and <code>fullDesc</code>. The <code>createGroup</code> command also takes the following parameters: <code>columns</code>, <code>f</code>, and <code>t</code>.</p>                                                                                                                                                                                                                                      |



|                                |                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | If the entity being created is a domain, the <i>family</i> and <i>fullDesc</i> parameters are ignored.                                                                                                                                                                                                                                                               |
| <code>delTopoObjects</code>    | The <code>delTopoObjects</code> command deletes a managed topology object in the managed topology hierarchy. All objects under the specified topology object are deleted as well. The <code>delTopoObjects</code> command takes the following parameters: <i>columns</i> , <i>f</i> , and <i>t</i> .                                                                 |
| <code>getAgentPort</code>      | The <code>getAgentPort</code> command returns a port number of the Sun Management Center agent running on the specified host in a topology domain. If there are multiple agents, a list of port numbers is returned. The <code>getAgentPort</code> command takes the following parameters: <i>columns</i> , <i>f</i> , and <i>t</i> .                                |
|                                | If <i>t</i> is not specified, the default domain is used.                                                                                                                                                                                                                                                                                                            |
| <code>getAllTopoObjects</code> | The <code>getAllTopoObjects</code> command returns a list of all managed objects in the managed topology hierarchy that satisfy conditions specified by the <i>arch</i> , <i>family</i> , or <i>pollType</i> parameters. The <code>getAllTopoObjects</code> command also takes the following parameters: <i>columns</i> , <i>f</i> , and <i>t</i> .                  |
| <code>getCurrentDomain</code>  | The <code>getCurrentDomain</code> command returns the name of the current domain.                                                                                                                                                                                                                                                                                    |
| <code>getDomains</code>        | The <code>getDomains</code> command returns a list of all managed domains.                                                                                                                                                                                                                                                                                           |
| <code>getTopoObject</code>     | The <code>getTopoObject</code> command returns a list of managed topology objects directly under the topology object specified by parameter <i>t</i> that satisfy conditions specified by the <i>arch</i> , <i>family</i> , or <i>pollType</i> parameters. The <code>getTopoObject</code> command also takes the following parameters: <i>columns</i> and <i>f</i> . |
| <code>setCurrentDomain</code>  | The <code>setCurrentDomain</code> command sets the home domain to the value specified in the <i>domain</i> parameter.                                                                                                                                                                                                                                                |

For information about exporting and importing topology information from the CLI, see “Import and Export CLI Interface” on page 268.

### *Topology Command Examples*

The following command returns a list of all Sun Management Center agent hosts on the `sun4u` family in group `building12` in the `menlo_park` domain that are running SunOS 5.7 software:

```
> getTopoObject t=/menlo_park/building12 pollType=ahost \
arch="SunOS 5.7" family=sun4u
```

The following command creates a group that is named `building19` under an existing domain that is named `headquarters_test`:

```
> createGroup t=/headquarters_test/building19 \
fullDesc="test headquarters domain" family=building-location
```

The following command creates a managed entity that is named `myHost` in the group `building12` in the domain `test_domain`. The topology object is a Sun Ultra-2 host with the agent running in port 1161.

```
> createEntity t=/test_domain/building12/myHost \
fullDesc="my test host" family=ultra-2 topoType="" \
topoCfg="" isPolled=false pollType=ahost readInfo="" \
writeInfo="" targetHost=osftserv targetIp="" agentPort=1161
```

---

## CLI Output

The CLI provides the following output options:

- Log command execution to a file
- Log command output to a file
- Control appearance of command output on the screen
- Specify output as plain text or HTML

---

**Note** – All commands and log files are available only in English. However, command descriptions and help text follow the Java internationalization guidelines for languages other than English.

---

## Command Output Format

The output of basic commands is available only in plain text. Refer to “CLI Command and Parameter Overview” on page 280 for an explanation of basic and extended commands.

The output of extended commands is available in two formats:

- Plain text
- HTML

To specify the output format, set the *f* parameter to the value of the desired format. Currently supported values are `plain` and `html`.

You can define a logical screen size for command output by setting the *height* parameter to a desired value. You can set the *more* parameter to display output one screen at a time. See “Predefined Parameters and Flags” on page 284 for an explanation of these parameters.

#### EXAMPLE 20–1 Plain Text Command Output

The following example shows the partial output of the `getLoadedModules` command in plain text.

```
== getLoadedModules: Results 1/16 =====
Module Name=Dynamic Reconfiguration
Module Key=dr
Description=Dynamic Reconfiguration (Sunfire)
Agent Name=myhost-dev86
Agent Port=161
Version=2.0
== getLoadedModules: Results 2/16 =====
Module Name=Config-Reader (sun4u/sun4d)
Module Key=Config-Reader4u
Description=Config Reader (sun4u/sun4d)
Agent Name=myhost-dev86
Agent Port=161
Version=1.0
...
== getLoadedModules: Results 15/16 =====
Module Name=DNS Synthetic Transaction [dns]
Module Key=dnsST+dnstest
Description=DNS Synthetic Transaction
Agent Name=myhost-dev86
Agent Port=161
Version=1.0
=====
```

## CLI Log File

To record CLI commands in a log file, set the *log* parameter to the name of the file in which to record the commands. The log file has the following format:

*DATE & TIME ; duration or message ; command and parameters*

#### EXAMPLE 20–2 Partial CLI Log File

The following example is an excerpt of the log of the command sequence from which the previous `getLoadedModules` command output was obtained.

```
Fri Dec 21 14:15:12 PST 2001;0 second;set o=\
/home/examples/output.3c23b455
```

**EXAMPLE 20-2** Partial CLI Log File (Continued)

```
Fri Dec 21 14:15:23 PST 2001;0 second;set f=plain
Fri Dec 21 14:15:45 PST 2001;0 second;set a=smtg-dev21
Fri Dec 21 14:16:08 PST 2001;== START OF THREAD ==;getLoadedModules
Fri Dec 21 14:16:08 PST 2001;2 seconds;getLoadedModules
Fri Dec 21 14:16:12 PST 2001;9 seconds;print
Fri Dec 21 14:21:28 PST 2001;== START OF THREAD ==;getAgentPort
Fri Dec 21 14:21:28 PST 2001;0 second;getAgentPort
Fri Dec 21 14:21:31 PST 2001;0 second;print
Fri Dec 21 14:22:01 PST 2001;0 second;exit
```

---

## CLI Procedures

This section describes some common CLI procedures.

### ▼ To Access the CLI in the Solaris Operating Environment

1. To begin an interactive session, type the command `/opt/SUNWsymon/sbin/es-cli` followed by any desired global parameters.
2. Type `login` in response to the CLI prompt (`>`).
3. Type the name of the host to which you wish to connect in response to the **Host** prompt.
4. Type your login name and password in response to the **Login** and **Password** prompts.

The result of steps 1-4 resembles the following example:

```
/opt/SUNWsymon/sbin/es-cli parameters
> login
Host: myhost
Login: mylogin
Password: mypassword
Login is successful.
>
```

---

**Tip** – You can run the CLI in batch mode using a previously prepared file of CLI commands as input by using the following command: `/opt/SUNWsymon/sbin/es-cli -b file`.

---

## ▼ To Access the CLI in Microsoft Windows Environments

1. **After you have installed the Sun Management Center console layer, double-click `es-cli` in the CLI folder.**

The CLI screen is displayed.

2. **Type the `login` command.**

The login process prompts you to specify the desired host name and your login name.

In the following example, `seattle` is the host, and `susan` is the login name:

```
> login
Host: seattle
Login: susan
Password:
>
```

## ▼ To Access CLI Online Help

1. **To obtain a list of all available CLI commands, type `help` at the CLI prompt.**
2. **To obtain a more detailed explanation of a particular command, type `help` followed by the name of the command.**

For example, to obtain additional help about the `getLoadedModules` command, you would type:

```
> help getLoadedModules
```

## ▼ To Control Command Output Screen Size

1. **Define a screen size by setting the `height` parameter to the number of lines to display.**

For example, to define a screen 20 lines high, you would type:

```
> set height=20
```

2. To enable output to be viewed one page at a time, set the *more* parameter to on.

```
> set more=on
```

## ▼ To Record CLI Commands in a Log File

1. Set the *log* parameter to the name of the file in which to record the commands.

```
> set log=/home/examples/log.3c254030
```

Once the *log* parameter is set, all subsequent commands are appended to the file. If this file does not exist, the file is created.

The file is not overwritten, so make sure a new file is created if you want a new set of records.

2. To stop recording, unset the *log* parameter.

```
> unset log
```

## ▼ To Record Command Output in a File

- To record command output in a file, set the *o* parameter to the name of the output file.

```
> set o=/home/examples/output.3c254030
```

To stop recording, unset the *o* parameter.

```
> unset o
```

## ▼ To Terminate a CLI Session

- To terminate a CLI session, type *exit*.

```
> exit
```

## Miscellaneous Sun Management Center Procedures

---

This appendix describes several procedures that do not readily fit into other sections of this document. Specifically, this appendix includes the following information:

- “Monitoring Topology Manager and Event Manager” on page 303
- “To Create a Server Component as a Monitored Object” on page 304
- “To Increase the Critical Threshold for the Virtual Size Data Property in the Topology Manager” on page 305
- “To Change the Default Values for Smart Delete in the Event Manager” on page 307
- “Reading Sun Management Center Log Files” on page 308
- “Adding Customized Menu Items” on page 309
- “SNMP MIBs for Sun Management Center Modules” on page 311
- “When an Agent Exits During Startup” on page 313
- “Hanging Main Console Window” on page 314
- “Database Backup and Recovery” on page 316

---

## Monitoring Topology Manager and Event Manager

There are five components in the server layer:

- Sun Management Center server
- Topology manager
- Trap handler
- Configuration manager
- Event manager

With the exception of the server, the other four components are Sun Management Center agents that are loaded with specialized modules.

The default configuration for the Topology manager and the Event manager and all other Sun Management Center agents is defined by the Agent Statistics module. This module includes features that guard against errors that can bring down the host. The default action is for the software to terminate the Topology manager process if predefined thresholds are exceeded. See “Agent Statistics Module Version 2.0” on page 378 for more information about the Agent Statistics module.

## ▼ To Create a Server Component as a Monitored Object

You might want to monitor the Topology manager, Trap handler, Configuration manager, and Event manager to determine their status. The Configuration manager and the Trap handler are configured so that you do not need to perform any maintenance procedures. In addition, the default configurations of both the Topology manager and the Event manager work for most user environments. However, you can modify the default configurations for specialized environments.

1. **In the main console window, choose Create Object from the Edit menu.**

The Create Object window is displayed. By default, the tab is set to Node. For more information, see “To Create a Node ” on page 60.

2. **Choose Sun Management Center Agent - Host from the Monitor Via menu.**
3. **Type the name of the server component in the Node Label field.**
4. **(Optional) Type a description of the server component.**
5. **Type the name of the Sun Management Center server in the Hostname field.**
6. **Type the port number for the server component in the Port field.**

Sun Management Center software uses the following default port values:

- Agent component : port 161
- Server trap handler: port 162
- Server event manager: port 163
- Server topology manager: port 164
- Server configuration manager: port 165

---

**Note** – The server component uses port 2099 by default. However, you cannot change the server component port number here.

---

7. **Complete this procedure with one of the following actions:**

- Click OK to create the server component object and close this window.



- Click the Apply button to create the server component object without closing this window.

## To Change the Registry Port Number

The Sun Management Center server includes a registry feature that enables value-added products, such as Hardware Diagnostics Suite, to register its existence with the server. By default, the registry feature uses port 5600. If this port is being used by another application, the application will fail. To change the registry port, follow these steps:

1. **Change the `ServiceRegistryPort` value in the `/var/opt/SUNWsymon/cfg/javaserver.properties` file.**
2. **Change the `ServiceRegistryPort` value in the `/var/opt/SUNWsymon/cfg/javaservice.properties` file to match the value you provided in the previous step.**
3. **Restart the Sun Management Center server.**

---

**Note** – When you set up the Sun Management Center server, the installation process prompts you to provide a different port number for the registry service, if the default port is in use.

---

## ▼ To Increase the Critical Threshold for the Virtual Size Data Property in the Topology Manager

The Topology manager enables the main console window to present logical objects in a topology view. The Topology manager also provides the ability to create a logical object, such as a group, whose status summarizes the statuses of multiple managed objects.

Managed objects include networks, hosts, hardware components, and software components. The total number of objects and the contents of these objects determine the system resource requirement, for example, Virtual Size, for the Topology manager. This requirement must be less than the defaults set for the Topology manager.

If the Virtual Size of the Topology manager exceeds the default value, then the Topology manager exits with the following error message:

```
error excessive virtual memory use
```

To solve this error, increase the default virtual size as described in the following steps.

1. **Evaluate the situation carefully.**

2. **Create the Topology manager monitored object.**  
See "To Create a Server Component as a Monitored Object" on page 304.
3. **Open the Details window using one of the following methods:**
  - Press mouse button three on the Topology manager object icon. Choose Details from the pop-up menu in the hierarchy view or the topology view.
  - Double-click the Topology manager icon.
  - Select the Topology manager icon in the main console window, then choose Details from the Tools menu.
4. **In the Browser Details window, double-click the Local Applications icon in the hierarchy (tree) view.**
5. **Double-click the Agent Statistics icon in the contents view, or click the expansion icon next to the Agent Statistics icon in the hierarchy view.**  
The Agent Statistics folders are displayed.
6. **Double-click the folder icon for the PA Process Statistics.**  
The monitored properties are displayed in a property table.
7. **Select the Virtual Size table cell, then open the Attribute Editor through one of the following methods:**
  - Press mouse button three in the table row, and choose Attribute Editor from the pop-up menu.
  - Click the Attributes button.
8. **Click the Alarms tab button.**  
The alarm rows are displayed.
9. **Type the desired value in the Critical Threshold (>) field.**
10. **Complete this procedure with one of the following actions:**
  - Click OK to create a new Critical Threshold value and close this window.
  - Click the Apply button to create a new Critical Threshold value without closing this window.

## ▼ To Change the Default Values for Smart Delete in the Event Manager

The Event manager communicates with other server components through SNMP using the default port 163. Similar to the Topology manager, the Event manager is also loaded with the Agent Statistics module. In addition, the Event manager is automatically loaded with a specialized Event Management module. The Event Management module is displayed in the Browser Details window in the Local Applications category.

The Event Management module is responsible for the overall maintenance of the event database. This module's responsibilities include purging deleted events, renaming the trash file, and Smart Delete.

Smart Delete means that Sun Management Center software automatically deletes closed, fixed, and open events from the event database after a set period of time. By default, the closed or fixed events are removed from the database after 7 days and the open events are removed after 30 days. To change these defaults, perform the following steps.

1. **Create the Event manager monitored object.**  
See "To Create a Server Component as a Monitored Object" on page 304.
2. **Open the Details window through one of the following methods:**
  - Press mouse button three on the Event manager icon. Choose Details from the pop-up menu in the hierarchy view or the topology view.
  - Double-click the Event manager icon in the hierarchy view or the topology view.
  - Select the Event manager icon in the main console window, then choose Details from the Tools menu.
3. **In the Browser Details window, double-click the Local Applications icon in the hierarchy (tree) view.**
4. **Open the Module Editor through one of the following methods:**
  - Press mouse button three on the Event Management module. Choose Edit Module from the pop-up menu in the hierarchy view or in the contents view.
  - Select the Event Management module in the Details window, then choose Edit Module from the Module menu.

The Module Parameters Editor is displayed. For more information, see "To Modify Module Parameters" on page 171.
5. **Type the new time values into the editable fields.**  
By default, the closed or fixed events are removed from the database after 7 days. The open events are removed after 30 days.

6. To turn off Smart Delete, choose Disabled from the Smart Delete Enabled Switch menu.
7. Click OK to accept the changes that you made and close this window.

---

## Reading Sun Management Center Log Files

The Sun Management Center server and agents write to various log files in the directory `/var/opt/SUNWsymon/log`.

These files are circular log files. A circular log file does not grow in size after a certain limit. As new messages are logged into the file, the oldest messages are removed.

Use the `es-run` interface with the `ctail` and `ccat` commands to view these log files. The `es-run` interface sets up the proper environment to run Sun Management Center utilities. The utilities `ccat` and `ctail` display only the relevant data, after sorting the data in chronological order. The `ccat` and `ctail` commands are similar to the UNIX `cat` and `tail` commands, but are intended for use with Sun Management Center circular log files.

### Using `ccat` to Read Sun Management Center Log Files

The `ccat` command reads the specified log file, sorts the messages in chronologically ascending order, and writes to the standard output. The `ccat` command takes one argument, which is the full path to the circular log file.

To use the `es-run` interface with the `ccat` command, you type:

```
/opt/SUNWsymon/sbin/es-run ccat path_to_file/filename
```

### Using `ctail` to Read Sun Management Center Log Files

The `ctail` command reads the circular log file and by default writes the last 15 lines of the file to standard output.

The `ctail` command takes four arguments:

- filename* The *filename* argument is the full path name to the circular log file. The *filename* argument is mandatory.
- f The -f option is used to monitor the growth of the log file. As the log file grows, the messages appended to the file are also written to the standard output. The `ctail -f` option is similar to the -f option for the UNIX `tail` command.
- l The -l option is used to print the absolute line number at the beginning of each message.
- n The -n *NumOfLines* option is used to change the number of lines that are displayed. By default, only the last 15 lines are printed.

To use the `es-run` interface with the `ctail` command, you type:

```
/opt/SUNWsymon/sbin/es-run ctail [-f, -l, -n NumOfLines] path_to_file_filename
```

---

## Adding Customized Menu Items

Sun Management Center software enables you to customize the Tools menu by adding external, standalone applications that can be launched from the main console window. The application must be written in the Java programming language. Non-Java applications can be accommodated by the `ExampleSystemCommand` Java wrapper class that executes another program or shell script in a separate process. The application does not require a selected host object. The application has no further interaction with Sun Management Center once the application has been launched.

The name of the application is specified in the `console-tools.cfg` file. The application name is added to the Tools menu in the main console window below the standard Sun Management Center menu items. The application is launched in a separate window.

The `console-tools.cfg` file is a plain text file that resides on the Sun Management Center server host. The file may be modified at any time, including while the console is running. However, changes that are introduced by editing the files do not take effect until the `es-tool` script is executed and the console is restarted. The file consists of a series of lines, each of which describes an application. Blank lines and lines beginning with the pound sign (#) are ignored. Fields within each line are separated by commas (,).

Each application that is implemented as a shell script or as an executable binary is defined by a line with the following format:

```
menu_label, class [args]
```

where:

- *menu label* is the string that is displayed in the Tools menu. The string can be either localized or nonlocalized text. Nonlocalized text can contain embedded spaces. Localized text must be specified as a *property-file:key* pair, where:
  - *property-file* is the name of the file containing the localizable messages for a particular locale
  - *key* is the identifier used to locate the string that is displayed in the Tools menu in the property fileNote that spaces are not allowed in the key.
- *class* is the fully qualified Java class name.
- *args* is the list of arguments to the class.

For example, the following file shows entries for three applications to be added to the Tools menu: Example GUI, rlogin, and ftp.

```
Format:
menu_label, class arguments

Example GUI,exampleApp.ExampleGUITool

Rlogin,com.sun.symon.base.client.console.SMSystemCommand
"/usr/openwin/bin/xterm -e rlogin $host" "start rlogin $host"

exampleApp.ExampleSystemCommand:ftp,exampleApp.ExampleSystemCommand
"/usr/openwin/bin/xterm -e ftp $host" "start ftp $host"
```



---

**Caution** – Each entry must be specified on a single line, even though the text is shown wrapped in the example.

---

The Java wrapper class `SMSystemCommand` enables you to execute an arbitrary shell command. This class takes two arguments. The first argument is the shell command to execute.

- If a program name is specified, give a full path name.
- If the command contains embedded spaces, enclose the entire shell command in double quotes.

The second argument is the command to run on a Microsoft Windows client. The following line is an example of this command:

```
com.sun.symon.base.client.console.SystemCommand "<shell command>" "<windows command>"
```

In this case, the first argument is ignored. Variable substitution is performed on the arguments if special variable references are present. Two variables are allowed:

- *\$host*, which is replaced with the currently selected agent host name

- *\$port*, which is replaced with the currently selected port number

## ▼ To Customize the Tools Menu

1. Use a standard text editor to add a line to the `/var/opt/SUNWsymon/cfg/console-tools.cfg` file.

This line specifies the following items:

- Name to display on the Tools menu
- Fully-qualified Java class name for the application
- Any required class arguments

See the detailed description in the section introduction for more information.

2. Place the Java class files for the applications in the `/opt/SUNWsymon/apps/classes` directory.
3. Run the `es-tool` update script on the Sun Management Center server host.
4. Stop the console by choosing Exit from the File menu on the main console window.
5. Click the Exit button to exit the application.
6. Restart the console for the application to be added to the Tools menu.

```
/opt/SUNWsymon/sbin/es-tool /var/opt/SUNWsymon/cfg/console-tools.cfg
```

```
/opt/SUNWsymon/sbin/es-start -c
```

---

**Note** – Your site’s configuration might also require you to restart the Sun Management Center server.

---

---

## SNMP MIBs for Sun Management Center Modules

Sun Management Center software publishes the Simple Network Management Protocol Management Information Bases (SNMP MIBs) for the modules. The MIB file is an Abstract Syntax Notation (ASN.1) specification of the data that is modeled, in this case, by the Sun Management Center module. These MIBs can be used as the data definition by third-party SNMP-based management stations, such as HP OpenView and Unicenter™. Sun Management Center has MIBs for the following modules:

- file-scan.mib
- health-monitor-mib.mib
- kernel-reader-mib.mib
- nfsmon-mib.mib
- nfsstat-mib.mib
- print-spool-mib.mib
- process-details-mib.mib
- process-monitor.mib
- trap-mib.mib

The above MIBs are installed by default, in the `/opt/SUNWsymon/util/cfg` directory by the Sun Management Center software during installation of the agent layer. In your installation, your base directory might be different.

## ▼ To Use the Sun Management Center SNMP MIBs in a Third-Party Management Station

### 1. Preprocess the MIBs.

Some SNMP management stations can read the ASN.1 MIBs. Others require the ASN.1 MIBs to be converted to some other format in order to be read. For example, you might need to convert the MIB to a Guidelines for the Description of Managed Objects (GDMO) format or use a MIB compiler to generate another intermediate format.

### 2. Load the MIB.

Load the ASN.1 MIB or a preprocessed format of that MIB into the third-party management station. This step informs the third-party management station about the layout and composition of the data that is modeled by the MIB.

### 3. Use the MIB information to talk to the Sun Management Center agent.

Once the MIB is successfully loaded into the third-party SNMP agent, you can communicate with the Sun Management Center agent to get the data from the MIB. The MIB-II Proxy Monitoring module must be loaded and be enabled in the Sun Management Center agent.

For example, you can start issuing the SNMP `Get` commands on some of the variables in the MIB.

By default, the Sun Management Center modules are enabled for SNMP `Get` commands by using the SNMPv1 community `public` and SNMPv2 user name `public`. However, if the Sun Management Center module has different settings, then you need to use the correct community name and user name to communicate with the Sun Management Center agent.



---

**Note** – Because Sun Management Center agents operate with SNMPv2 usec-based security, SNMP `set` commands on the agent are involved. Refer to the SNMPv2 usec-related Request For Comments (RFCs) for more information.

---

## Accessing Multiple Instance Modules

SNMPv2 uses the term *context* for the MIBs that can have multiple instances of the module loaded on the agent. If you use an SNMPv2-based third-party management station to communicate with this type of agent, be sure that you are using the right context information. However, if you are using a SNMPv1-based management station, then add the context information to the SNMP community as follows:

```
community:context
```

By adding this context information, you can access data from multiple instances of the same module running on an agent.

---

## When an Agent Exits During Startup

The Sun Management Center agent has the ability to monitor itself and restrict its memory usage. Some predefined limits have been set for the memory usage of the agent process. These limits depend on the following criteria:

- Number of modules loaded
- Type of modules loaded
- Type of the system being managed

On rare occasions, the limit for default memory usage is exceeded during the agent startup and when the agent stops running. If this limit is exceeded, the default limits set for the agent memory size are not enough for your configuration.

To confirm that memory usage is the cause, look in the `/var/opt/SUNWsymon/log/agent.log` file for one of the following messages:

```
Excessive Virtual Memory Use
Excessive Physical Memory Use
```

If you see one of these messages during the agent startup, reconfigure the memory usage limits on the agent host using the following procedure.

## ▼ To Increase Agent Memory Size

1. Become superuser on the agent host.

```
su -
```

2. Copy the file `agent-stats-d.def` to `/var/opt/SUNWsymon`.

```
cp /opt/SUNWsymon/modules/cfg/agent-stats-d.def /var/opt/SUNWsymon/cfg/
```

3. In the `/var/opt/SUNWsymon/cfg/agent-stats-d.def` file, increase the `alarmlimit:error-gt` to the desired value as shown in the following code segment.

The value is in Kbytes.

```
procstats = {
 size = {
 statusActions(error-gt)
 }
 = abort
 statusService(abort)
 = _internal
 statusCommand(abort)
 = abort "Excessive Virtual Memory Use"
 alarmlimit:error-gt = 70000
 alarmlimit:warning-gt = 60000
 alarmlimit:info-gt =
 }

}
```

4. Save the file and restart the agent.

---

## Hanging Main Console Window

This section explains how to respond to a hanging console window in certain circumstances. In this case, the main console window hangs when users attempt to start a new console window and to connect to the Sun Management Center server. However, existing console window connections encounter no problems.

The main console window can hang for the following reasons:

- **The server memory is used up.** Threads that are reading from a socket can hang when there is a large discrepancy between the read and write rates at either end of a socket. The memory problem occurs when the Sun Management Center server has a large amount of buffered data waiting to be sent to its clients. The buffered data can become so large that the server runs out of memory while trying to write to the socket. Once the server is out of memory, the server does not recover.

---

**Note** – If you are monitoring the server log file, use the following command to check for messages that the server is out of memory:

```
/opt/SUNWsymon/sbin/es-run ctail -f
/var/opt/SUNWsymon/log/server.log
```

---

- **The console memory for the console process is used up.** You might be able to confirm that the console process is out of memory. Choose Sun Management Center Console Messages from the File menu on the main console window. The Sun Management Center Console Messages window might display one or more messages that the console is out of memory.

The method that you use to resolve a hanging main console window depends on which memory is filled:

- If the server memory is used up, increase the memory that is available to the server process. The default size is 64 Mbytes.

For example, to double the default memory from 64 Mbytes to 128 Mbytes, use this command:

```
es-start -s -- -Xmx128m
```

---

**Note** – If you typically invoke your server by using the `es-start -A` command or by rebooting, you can automatically set the memory size. To customize the default memory size, change `-Xmx64m` to the desired size in the `/opt/SUNWsymon/classes/base/server/bin/es-server.sh` file.

---

- If the console memory is used up, restart the console with a bigger memory size. For example, to increase the memory to 100 Mbytes, use this command:

```
es-start -c -- -Xmx100m
```

This process allocates more memory to the console for the current session.

---

**Note** – To allocate more memory automatically, change the default memory size from `-Xmx64m` to the desired size in the `/opt/SUNWsymon/classes/base/console/bin/es-console.sh` file.

---

---

## Database Backup and Recovery

Your Sun Management Center database sometimes needs to be backed up to prevent loss of data. For example, you should back up your database before you upgrade the hardware or the operating environment. To back up your database, use one of the following approaches:

- The following script runs in interactive mode. This script enables you to specify the location where the database files should be saved:

```
/opt/SUNWsymon/sbin/es-backup
```

- To run `es-backup` in silent mode and use default answers to the script's questions, use the following command:

```
/opt/SUNWsymon/sbin/es-backup -y
```

The database files are saved in the directory `/var/opt/SUNWsymon/backup`.

If you need to periodically run the `es-backup` script, you can set a `cron` program for the script to be run on a routine basis. In this case, use the `-y` option for the `es-backup` script so that no interaction is needed.

---

**Note** – Both scripts shut down the Sun Management Center processes before starting the restore or backup. These scripts also restart the processes once the recovery or backup has been completed.

---

If your Sun Management Center database has been inadvertently corrupted due to a system failure, run the following interactive script as superuser to restore your database:

```
/opt/SUNWsymon/sbin/es-restore
```

For example, you might want to follow this process if the system failure is due to a file system problem.

## Internet Protocol Routing

---

This appendix provides an overview of IP routing. The chapter describes the following topics:

- “Overview of IP Addressing” on page 317
- “Using Subnets” on page 318
- “Using Netmasks” on page 319

For more comprehensive information about these subjects, see *System Administration Guide: IP Services*.

---

## Overview of IP Addressing

Internet protocol (IP) addresses are 32 bits long. Thus, there is a possibility of approximately a total 4 billion addresses for the entire Internet. An IP address is expressed as a series of octets separated by dots. For example, the address 11111111 00000001 00000101 00001010 is written as 127.1.5.10, or using hexadecimal notation, 7f.1.5.a0.

Because of this vast number of addresses, the network is organized hierarchically into administrative domains. This organization led to the definition of name administrative domains and network classes. Since each site can vary in size, IP addresses are divided into three main types or classes. A large site can reserve a class A address and receive  $2^{24}$  individual addresses. A small site can reserve a class C address and receive  $2^8$  individual addresses.

## Network Classes

Class A uses the first octet for the network address, and the rest for host addresses within this network. For example, a site whose network address is 129.0.0.0 would own the  $2^{24}$  addresses between 129.0.0.0 and 129.255.255.255.

| Network  | Host    |         |         |
|----------|---------|---------|---------|
| 0xxxxxxx | xxxxxxx | xxxxxxx | xxxxxxx |

Class B uses two octets for the network address, and two for the host address. For example, a site whose network address is 129.123.0.0 would own the  $2^{16}$  addresses between 129.123.0.0 and 129.123.255.255.

| Network  |         | Host    |         |
|----------|---------|---------|---------|
| 10xxxxxx | xxxxxxx | xxxxxxx | xxxxxxx |

Class C uses three octets for the network address, and one octet for the host address. For example, a site whose network address is 129.123.56.0 would own the  $2^8$  addresses between 129.123.56.0 and 129.123.56.255.

| Network |         |         | Host    |
|---------|---------|---------|---------|
| 110xxxx | xxxxxxx | xxxxxxx | xxxxxxx |

---

## Using Subnets

Subnetting divides a network into smaller segments, or subnets. This technique is imperative for Class A and B networks. Routers do not forward packets outside a subnet if the destination address is within the same subnet. Thus, network traffic is decreased dramatically by segmenting a large network. For example, suppose a class B network is segmented into 255 subnets. Unless a packet destination is a host outside the subnet, a local packet is sent to 255 hosts instead of 256,000.

---

## Using Netmasks

The format of the netmask is a series of 1s followed by a series of 0s. By ANDing an IP address with a netmask, you can get the address of the subnet.

Routers use netmasks to decide whether to forward a packet to an external subnet. For example, suppose a machine with an IP address of 129.123.56.95 sends an email to another machine whose IP address is 129.123.56.100. By ANDing both IP addresses with a netmask (255.255.255.0), the result is 129.123.56.0 for both machines. The router then concludes that the source machine and the destination machine are in the same subnet. Therefore, the router does not forward the email to external subnets.

On the other hand, if the destination address is 129.123.67.100, then the resulting subnet address is 129.123.67.0. The router forwards the email to the external subnet (129.123.67.0).

---

**Note** – Although some of these examples only apply to Ethernet links, the principles apply regardless of the network type.

---





## Sun Management Center Software Modules

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The Sun Management Center software uses modules to monitor various components of your system. The modules can be separated into four categories: hardware, operating environment, local applications, and remote systems. This appendix provides additional information about the modules that are described in Chapter 11. In addition, this chapter identifies the modules that are in the four categories.

For more information on other modules that may be applicable to your particular system, see the Sun Management Center web site:  
<http://www.sun.com/sunmanagementcenter/>.

This appendix describes the following modules:

- Hardware
  - “Sun StorEdge A5x00 Array Module” on page 324
  - “Sun StorEdge T3 Array Module” on page 331
- Operating System
  - “File Monitoring Module Version 2.0” on page 344
  - “IPv6 Instrumentation Module Version 1.0” on page 345
  - “Kernel Reader (Simple) Module Version 1.0” on page 351
  - “MIB-II Instrumentation Module Version 1.0” on page 362
  - “MIB-II (Simple) Module Version 1.0” on page 371
  - “NFS File Systems Module Version 2.0” on page 374
  - “NFS Statistics Module Version 2.0” on page 374
  - “Solaris Process Details Module Version 2.0” on page 376
- Local and Remote Applications
  - “Agent Statistics Module Version 2.0” on page 378
  - “Data Logging Registry Module Version 2.0” on page 382
  - “Logview ACL Version 1.0” on page 383
  - “Print Spooler Module Version 3.0” on page 383
  - “HP JetDirect Module Version 2.0” on page 385
  - “MIB-II Proxy Monitoring Module Version 2.0” on page 385

- Advanced System Monitoring
  - “Directory Size Monitoring Module Version 2.0” on page 386
  - “File Scanning Module Version 2.0” on page 387
  - “Hardware Diagnostic Suite Version 2.0” on page 388
  - “Health Monitor Module Version 2.0” on page 388
  - “Kernel Reader Module Version 2.0” on page 392
  - “Process Monitoring Module Version 2.0” on page 393

---

## Overview of Module Relationships

Most of the Sun Management Center modules have default monitoring conditions that generate alarms when system values fall outside of these conditions. You can alter these default thresholds by creating your own alarm thresholds, as explained in Chapter 12.

Some modules utilize the Add Row operation to define the data properties to monitor. These modules start with empty tables. You have to execute an Add Row operation to activate the specifics for monitoring these modules.

The following table lists the modules described in this appendix. The table identifies the following information for each module:

- The module name
- The version of the module that applies to the Sun Management Center 3.5 product
- An indication that the module is loaded automatically
- An indication that more than one copy of the module can be loaded
- An indication that the module uses the Add Row operation

**TABLE C-1** Module Summary Table

| Alphabetical Listing of Modules | Version | Module Loads Automatically | Module Loads Multiple Times | Module Uses Add Row Utility |
|---------------------------------|---------|----------------------------|-----------------------------|-----------------------------|
| Agent Statistics                | 2.0     | X                          |                             |                             |
| Agent Update                    | 1.0     |                            |                             |                             |
| Config-Reader <sup>1</sup>      | 1.0     | X                          |                             |                             |
| Data Logging Registry           | 2.0     |                            |                             |                             |
| Directory Size Monitoring       | 2.0     |                            | X                           | X                           |

Refer to your platform-specific supplement for more information on the Config-Reader module.

**TABLE C-1** Module Summary Table (Continued)

| Alphabetical Listing of Modules             | Version | Module Loads Automatically | Module Loads Multiple Times | Module Uses Add Row Utility |
|---------------------------------------------|---------|----------------------------|-----------------------------|-----------------------------|
| Dynamic Reconfiguration Module <sup>2</sup> | 1.0     |                            |                             |                             |
| File Monitoring                             | 2.0     |                            | X                           | X <sup>3</sup>              |
| File Scanning                               | 2.0     | X <sup>4</sup>             | X <sup>5</sup>              | X <sup>6</sup>              |
| HP JetDirect                                | 2.0     |                            | X                           |                             |
| Hardware Diagnostic Suite                   | 2.0     |                            |                             |                             |
| Health Monitor                              | 2.0     |                            |                             |                             |
| IPv6 Instrumentation                        | 1.0     |                            |                             |                             |
| Kernel Reader                               | 2.0     |                            |                             |                             |
| Kernel Reader (Simple)                      | 1.0     | X                          |                             |                             |
| Logview ACL                                 | 1.0     |                            |                             | X                           |
| MCP Manager                                 | 1.0     |                            |                             |                             |
| MIB-II Instrumentation                      | 1.0     |                            |                             |                             |
| MIB-II Proxy Monitoring                     | 2.0     |                            | X                           |                             |
| MIB-II System (Simple)                      | 1.0     | X                          |                             |                             |
| NFS File Systems                            | 2.0     |                            | X                           |                             |
| NFS Statistics                              | 2.0     |                            |                             |                             |
| Print Spooler                               | 3.0     |                            |                             | X                           |
| Process Monitoring                          | 2.0     |                            | X                           | X <sup>7</sup>              |
| Solaris Process Details                     | 2.0     |                            |                             |                             |
| Storage A5x00                               | 1.0     |                            |                             |                             |
| Sun StorEdge T3                             | 1.0     |                            |                             |                             |

Refer to your platform-specific supplement for more information on the Dynamic Reconfiguration module.

Each added row defines which file to monitor.

File Scanning is loaded automatically for the System Log file.

Each instance identifies the file to be scanned.

Each added row defines which pattern within the monitored file to match. The row needs to be added to the Scan Table table.

Each row defines the pattern to match from all the processes that are running on the agent host.

---

## Hardware Modules

When the following modules are loaded, these modules are found under the Hardware section of the Module Browser tab in the Details window:

- “Sun StorEdge A5x00 Array Module” on page 324
- “Sun StorEdge T3 Array Module” on page 331

### Sun StorEdge A5x00 Array Module

This module enables you to monitor the state of Sun StorEdge A5000, 5100, and 5200 storage devices, and manage alarms on these devices. The following series of tables identifies the specific rules for each Sun StorEdge A5x00 array.

**TABLE C-2** Rules for Sun StorEdge A5x00

| Rules         | Property                                                                                                                                          |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| sunSmTreeProp | tree prop                                                                                                                                         |
| sunSmNodeName | Name                                                                                                                                              |
| timestamp_raw | timestamp_raw                                                                                                                                     |
| timestamp     | Name                                                                                                                                              |
| status_change | Number Of Model property /value changed.<br>This value changes when there is a difference between the previous snapshot and the current snapshot. |

**TABLE C-3** Sun StorEdge A5x00 Sena Table

| Property      | Description       |
|---------------|-------------------|
| sunSmTreeProp | sunSmTreeProp     |
| sunSmNodeName | Current node name |
| entry_no      | Entry number      |
| # dataFormat  | Instance          |
| rowstatus     | Row status        |
| box_rev       | Box_rev           |
| device_count  | Device_count      |

**TABLE C-3** Sun StorEdge A5x00 Sena Table (Continued)

| Property      | Description   |
|---------------|---------------|
| box_id        | Box Id        |
| instance      | Instance      |
| logical_path  | Logical Path  |
| machine       | Machine       |
| name          | Name          |
| node-wwn      | Node-wwn      |
| physical_path | Physical Path |
| platform      | Platform      |
| set_flg       | Set Flag      |
| slot_count    | Slot_count    |
| type          | Type          |
| vendor_name   | Vendor_name   |
| virtual_node  | Virtual_node  |

**TABLE C-4** Sun StorEdge A5x00 Front Table

| Property      | Description       |
|---------------|-------------------|
| sunSmTreeProp | sunSmTreeProp     |
| sunSmNodeName | Current node name |
| entry_no      | Entry number      |
| instance      | Instance          |

**TABLE C-5** Sun StorEdge A5x00 Rear Table

| Property      | Description       |
|---------------|-------------------|
| sunSmTreeProp | sunSmTreeProp     |
| sunSmNodeName | Current node name |
| entry_no      | Entry number      |
| entry number  | Instance          |

**TABLE C-6** Sun StorEdge A5x00 Disk Backplane Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current node name  |
| entry_no        | Entry number       |
| byp_a_enabled   | Byp_a_enabled      |
| byp_b_enabled   | Byp_b_enabled      |
| fru             | fru                |
| status          | Status             |
| alarmRules      | rpho400            |

**TABLE C-7** Sun StorEdge A5x00 Fan Tray Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| entry_no        | entry number       |
| fan_fail        | Fan_fail           |
| fru             | fru                |
| speed           | Speed              |
| status          | Status             |
| alarmRules      | rpho401            |
| type            | Type               |

**TABLE C-8** Sun StorEdge A5x00 Led Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | tree prop          |
| sunSmNodeName   | Name               |
| entry_no        | entry number       |
| led-num         | Led No             |
| state           | State              |

**TABLE C-9** Sun StorEdge A5x00 Front Slot Table

| <b>Property</b>    | <b>Description</b> |
|--------------------|--------------------|
| front_slotTbl      | Front_slot Table   |
| sunSmTreeProp      | sunSmTreeProp      |
| sunSmNodeName      | Current Name       |
| entry_no           | entry number       |
| connect_disk       | connect_disk_name  |
| id                 | Id                 |
| loop_status        | Loop_status        |
| alarmRules         | rpho411            |
| power_status       | power-status       |
| alarmRules         | rpho414            |
| slot-num           | Slot-num           |
| status             | Status             |
| temperature        | Temperature        |
| temperature_status | Temperature_status |
| alarmRules         | rpho407            |

**TABLE C-10** Sun StorEdge A5x00 Rear Slot Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| entry_no        | entry number       |
| connect_disk    | connect_disk_name  |
| id              | Id                 |
| loop_status     | Loop_status        |
| alarmRules      | rpho412            |
| power_status    | power-status       |
| alarmRules      | rpho414            |
| slot-num        | Slot-num           |

**TABLE C-10** Sun StorEdge A5x00 Rear Slot Table *(Continued)*

| <b>Property</b>    | <b>Description</b> |
|--------------------|--------------------|
| status             | Status             |
| temperature        | Temperature        |
| temperature_status | Temperature_status |
| alarmRules         | rpho408            |

**TABLE C-11** Sun StorEdge A5x00 Disk Table

| <b>Property</b>    | <b>Description</b> |
|--------------------|--------------------|
| sunSmTreeProp      | sunSmTreeProp      |
| sunSmNodeName      | Current Name       |
| entry_no           | entry number       |
| capacity           | Capacity           |
| device_type        | Device Type        |
| firmware_revision  | firmware_revision  |
| fru                | Fru                |
| hard_address       | Hard Address       |
| instance           | Instance           |
| logical_path       | logical_path       |
| mounted_partitions | Mounted Partitions |
| name               | Name               |
| node-wwn           | Node Wwn           |
| physical_path      | physical_path      |
| port-wwn           | Port Wwn           |
| product_name       | product_name       |
| revision           | revision           |
| serial_number      | serial_number      |
| status             | Status             |
| alarmRules         | rpho406            |
| vendor_name        | vendor_name        |



**TABLE C-12** Sun StorEdge A5x00 Sena Power Supply Table

| <b>Property</b>    | <b>Description</b> |
|--------------------|--------------------|
| sunSmTreeProp      | sunSmTreeProp      |
| sunSmNodeName      | Current Name       |
| entry_no           | entry number       |
| fru                | Fru                |
| AC_status          | AC_status          |
| DC-current         | DC-current         |
| DC-voltage         | DC-voltage         |
| ps-instance        | Ps-instance        |
| status             | Status             |
| alarmRules         | rpho402            |
| temperature_status | Temperature_status |
| alarmRules         | rpho409            |
| type               | Type               |

**TABLE C-13** Sun StorEdge A5x00 Interconnect Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| entry_no        | entry number       |
| eprom_failure   | Eprom_failure      |
| fru             | Fru                |
| status          | Status             |
| alarmRules      | rpho405            |

**TABLE C-14** Sun StorEdge A5x00 Interface\_board Table

| <b>Property</b>       | <b>Description</b> |
|-----------------------|--------------------|
| interface_board-entry | entry_no           |
| sunSmTreeProp         | sunSmTreeProp      |

**TABLE C-14** Sun StorEdge A5x00 Interface\_board Table (Continued)

| Property                 | Description        |
|--------------------------|--------------------|
| sunSmNodeName            | Current Name       |
| entry_no                 | entry number       |
| fru                      | Fru                |
| interface_board-instance | Ib-Instance        |
| loop                     | Loop               |
| loop0_fault              | Loop0_fault        |
| loop1_fault              | Loop1_fault        |
| status                   | Status             |
| alarmRules               | rpho400            |
| temperature_status       | temperature_status |
| alarmRules               | rpho410            |

**TABLE C-15** Sun StorEdge A5x00 Loop – Gbic Table

| Property                  | Description        |
|---------------------------|--------------------|
| sunSmTreeProp             | sunSmTreeProp      |
| sunSmNodeName             | Current Name       |
| entry_no                  | entry number       |
| fru                       | Fru                |
| loop-instance             | Gbic-Instance      |
| status                    | Status             |
| alarmRules                | rpho413            |
| loop_configuration_status | Loop Configuration |

**TABLE C-16** Sun StorEdge A5x00 Rules

| Rule    | Description             |
|---------|-------------------------|
| rpho414 | Fibre Channel OFFLINE   |
| rpho415 | Fibre Channel CRC Error |
| rpho416 | ASC 0x47                |

**TABLE C-16** Sun StorEdge A5x00 Rules (Continued)

| Rule    | Description                 |
|---------|-----------------------------|
| rpho417 | Drive operation marginal    |
| rpho418 | Failure prediction          |
| rpho419 | Incomplete DMA XFER on sbus |
| rpho420 | Offline Timeout             |
| rpho421 | soc lilp map failed         |

## Sun StorEdge T3 Array Module

This module enables you to monitor the state of Sun StorEdge T3 storage devices and to manage alarms on these devices.

**TABLE C-17** Sun StorEdge T3 Module – Basic Properties Table

| Property      | Description                                                         |
|---------------|---------------------------------------------------------------------|
| sunSmTreeProp | sunSmTreeProp                                                       |
| sunSmNodeName | Current Name                                                        |
| t300name      | t300name                                                            |
| rowstatus     | Row Status                                                          |
| sysId         | id                                                                  |
| sysVendor     | vendor                                                              |
| sysModel      | model                                                               |
| sysRevision   | firmware revision                                                   |
| sysStatus     | Status of the connection between the agent and the T300 storage box |
| sysIpAddr     | IP address                                                          |
| sysSubNet     | subnet mask                                                         |
| sysGateway    | gateway                                                             |
| sysBootMode   | boot mode                                                           |
| sysBootDelay  | boot delay                                                          |
| sysMpSupport  | multi-pathing support                                               |
| sysHasVolumes | has volumes                                                         |

**TABLE C-18** Sun StorEdge T3 Module – Advanced Properties Table

| <b>Property</b>   | <b>Description</b> |
|-------------------|--------------------|
| t300name          | t300name           |
| rowstatus         | Row Status         |
| sysStripeUnitSize | stripe unit size   |
| sysCacheMode      | cache mode         |
| sysCacheMirror    | cache mirror       |
| sysReadAhead      | read ahead         |
| sysReconRate      | reconRate          |
| sysOndgMode       | ondgMode           |
| sysOndgTimeslice  | ondgTimeslice      |
| sysTftpHost       | tftp host          |
| sysTftpFile       | tftp file          |
| sysLastRestart    | ast restart time   |
| sysDate           | date               |
| sysTime           | time               |
| sysTimezone       | time zone          |

**TABLE C-19** Sun StorEdge T3 Module – Statistical Properties Table

| <b>Property</b>     | <b>Description</b> |
|---------------------|--------------------|
| t300name            | t300name           |
| sysTotalRequests    | total requests     |
| sysWriteRequests    | write requests     |
| sysReadRequests     | read requests      |
| sysTotalBlocks      | total blocks       |
| sysBlocksWritten    | blocks written     |
| sysBlocksRead       | blocks read        |
| sysCacheWriteHits   | cacheWriteHits     |
| sysCacheWriteMisses | cacheWriteMisses   |
| sysCacheReadHits    | cacheReadHits      |

**TABLE C-19** Sun StorEdge T3 Module – Statistical Properties Table *(Continued)*

| <b>Property</b>       | <b>Description</b> |
|-----------------------|--------------------|
| sysCacheReadMisses    | cacheReadMisses    |
| sysCacheRmwFlushes    | sysCacheRmwFlushes |
| sysCacheReconFlushes  | cacheReconFlushes  |
| sysCacheStripeFlushes | cacheStripeFlushes |
| clear-flag            | clear flag         |

**TABLE C-20** Sun StorEdge T3 Module – Unit Table

| <b>Property</b>      | <b>Description</b> |
|----------------------|--------------------|
| sunSmTreeProp        | sunSmTreeProp      |
| sunSmNodeName        | Current Name       |
| t300name             | t300name           |
| unitId               | unit id            |
| unitType             | unit type          |
| unitStandby          | standby            |
| unitIsControllerUnit | isControllerUnit   |
| machine              | machine            |
| platform             | platform           |

**TABLE C-21** Sun StorEdge T3 Module – Disk Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| entry_no        | entry number       |

**TABLE C-22** Sun StorEdge T3 Module – Disk Properties Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| t300name        | t300name           |

**TABLE C-22** Sun StorEdge T3 Module – Disk Properties Table (Continued)

| Property        | Description   |
|-----------------|---------------|
| unitId          | unit id       |
| fruStatus       | status        |
| alarmRules      | rple400       |
| fruDiskRole     | disk role     |
| fruDiskCapacity | disk capacity |
| fruDiskTemp     | temperature   |
| fruID           |               |
| fruState        |               |
| fruVendor       |               |
| fruModel        |               |
| fruRevision     |               |
| fruSerialNo     |               |
| fruErrors       |               |

**TABLE C-23** Sun StorEdge T3 Module – Advanced Properties Table

| Property               | Description   |
|------------------------|---------------|
| t300name               | t300name      |
| unitId                 | unit id       |
| fruId                  | fru id        |
| fruDiskPort1State      | port1 state   |
| fruDiskPort2State      | port2 state   |
| fruDiskStatusCode      | status code   |
| fruDiskVolId           | disk volid    |
| fruDiskVolIndex        | disk volindex |
| fruDiskVolName         | disk volname  |
| fruDiskIsRebuildable   |               |
| fruDiskIsRoleData      | isRoleData    |
| fruDiskIsRoleStandby   | isRoleStandby |
| fruDiskIsRoleUndefined | sUndefined    |

**TABLE C-23** Sun StorEdge T3 Module – Advanced Properties Table *(Continued)*

| Property            | Description  |
|---------------------|--------------|
| fruDiskIsExpendable | isExpendable |

**TABLE C-24** Sun StorEdge T3 Module – Controllers

| Property      | Description   |
|---------------|---------------|
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |
| entry_no      | entry number  |

**TABLE C-25** Sun StorEdge T3 Module – Controller Table

| Property      | Description   |
|---------------|---------------|
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |
| t300name      | t300name      |
| unitId        | unit id       |
| fruStatus     | status        |
| fruState      |               |
| fruVendor     |               |
| fruModel      |               |
| fruRevision   |               |
| fruSerialNo   |               |
| fruErrors     |               |
| alarmRules    | rple401       |

**TABLE C-26** Sun StorEdge T3 Module – Loopcards

| Property        | Description   |
|-----------------|---------------|
| loopcards-entry | entry_no      |
| sunSmTreeProp   | sunSmTreeProp |
| sunSmNodeName   | Current Name  |
| entry_no        | entry number  |

**TABLE C-27** Sun StorEdge T3 Module – Loop Card Table

| <b>Property</b>    | <b>Description</b> |
|--------------------|--------------------|
| sunSmTreeProp      | sunSmTreeProp      |
| sunSmNodeName      | Current Name       |
| t300name           | t300name           |
| unitId             | unit id            |
| fruId              |                    |
| fruState           |                    |
| fruVendor          |                    |
| fruModel           |                    |
| fruRevision        |                    |
| fruSerialNo        |                    |
| fruErrors          |                    |
| fruStatus          | status             |
| fruLoopMode        | loop mode          |
| fruLoopCable1State | cable1 state       |
| fruLoopCable2State | cable2 state       |
| fruLoopTemp        | temperature        |
| alarmRules         | rple402            |

**TABLE C-28** Sun StorEdge T3 Module – Power Cooling Unit Table

| <b>Property</b>   | <b>Description</b> |
|-------------------|--------------------|
| sunSmTreeProp     | sunSmTreeProp      |
| sunSmNodeName     | Current Name       |
| t300name          | t300name           |
| unitId            | unit id            |
| fruStatus         | status             |
| fruPowerPowOutput | output state       |
| fruPowerPowSource | input source       |
| fruPowerPowTemp   | temperature        |



**TABLE C-28** Sun StorEdge T3 Module – Power Cooling Unit Table *(Continued)*

| <b>Property</b>   | <b>Description</b> |
|-------------------|--------------------|
| fruPowerFan1State | fan1 state         |
| fruPowerFan2State | fan2 state         |
| fruPowerBatState  | battery state      |
| fruPowerBatLife   | battery life       |
| fruPowerBatUsed   | battery used       |
| fruId             |                    |
| fruState          |                    |
| fruVendor         |                    |
| fruModel          |                    |
| fruRevision       |                    |
| fruSerialNo       |                    |
| fruErrors         |                    |
| alarmRules        | rple403            |

**TABLE C-29** Sun StorEdge T3 Module – Midplane Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | true               |
| sunSmNodeName   | Current Name       |
| t300name        | t300name           |
| unitId          | unit id            |
| fruStatus       | status             |
| fruId           |                    |
| fruState        |                    |
| fruVendor       |                    |
| fruModel        |                    |
| fruRevision     |                    |
| fruSerialNo     |                    |
| fruErrors       |                    |
| fruId           |                    |

**TABLE C-29** Sun StorEdge T3 Module – Midplane Table *(Continued)*

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| fruState        |                    |
| fruVendor       |                    |
| fruModel        |                    |
| fruRevision     |                    |
| fruSerialNo     |                    |
| fruErrors       |                    |

**TABLE C-30** Sun StorEdge T3 Module – Volume (Basic Properties Table)

| <b>Property</b>    | <b>Description</b>                                                           |
|--------------------|------------------------------------------------------------------------------|
| sunSmTreeProp      | sunSmTreeProp                                                                |
| sunSmNodeName      | Current Name                                                                 |
| t300name           | t300name                                                                     |
| unitId             | unit id                                                                      |
| volId              | volume id                                                                    |
| volName            | volume name                                                                  |
| volWWN             | volume WWN                                                                   |
| volStatus          | volume status                                                                |
| volCacheMode       | cache mode                                                                   |
| volCacheMirror     | cache mirror                                                                 |
| volCapacity        | volume capacity                                                              |
| volArrayWidth      | drive number                                                                 |
| volRaidLevel       | RAID (Redundant Array of Independent/Inexpensive Disks) level for the volume |
| volDisabledDisk    |                                                                              |
| volSubstitutedDisk |                                                                              |
| volInitRate        |                                                                              |
| volVerifyRate      |                                                                              |

**TABLE C-31** Sun StorEdge T3 Module – Statistical Properties Table

| <b>Property</b>       | <b>Description</b> |
|-----------------------|--------------------|
| t300name              | t300name           |
| unitId                | unit id            |
| volId                 | volume id          |
| volTotalRequests      | total requests     |
| volWriteRequests      | write requests     |
| volReadRequests       | read requests      |
| volTotalBlocks        | total blocks       |
| volBlocksWritten      | blocks written     |
| volBlocksRead         | blocks read        |
| volSoftErrors         | soft errors        |
| volFirmErrors         | firm errors        |
| volHardErrors         | hard errors        |
| volCacheWriteHits     | cacheWriteHits     |
| volCacheWriteMisses   | cacheWriteMisses   |
| volCacheReadHits      | cacheReadHits      |
| volCacheReadMisses    | cacheReadMisses    |
| volCacheRmwFlushes    | cacheRmwFlushes    |
| volCacheReconFlushes  | cacheReconFlushes  |
| volCacheStripeFlushes | cacheStripeFlushes |
| clear-flag            | clear flag         |

**TABLE C-32** Sun StorEdge T3 Module – Ports

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| entry_no        | entry number       |

**TABLE C-33** Sun StorEdge T3 Module – Port (Basic Properties Table)

| <b>Property</b>   | <b>Description</b> |
|-------------------|--------------------|
| sunSmTreeProp     | sunSmTreeProp      |
| sunSmNodeName     | Current Name       |
| t300name          | t300name           |
| unitId            | unit id            |
| portId            | portId             |
| portWWN           | port WWN           |
| portStatus        | port status        |
| portType          | port type          |
| portFruId         | port fruId         |
| portSunHost       | port sunHost       |
| portFibreCount    | fibre count        |
| portFibreAlpaMode | ALPA mode          |
| portFibreAlpa     | ALPA               |

**TABLE C-34** Sun StorEdge T3 Module – Statistical Properties Table

| <b>Property</b>   | <b>Description</b>                                 |
|-------------------|----------------------------------------------------|
| t300name          | 300name                                            |
| unitId            | Unit ID                                            |
| portId            | Port ID                                            |
| portTotalRequests | Total requests (read requests plus write requests) |
| portWriteRequests | Write requests                                     |
| portReadRequests  | Read requests                                      |
| portTotalBlocks   | Total blocks                                       |
| portBlocksWritten | Blocks written                                     |
| portBlocksRead    | Blocks read                                        |

**TABLE C-35** Sun StorEdge T3 Module – Attachments Table

| Property      | Description   |
|---------------|---------------|
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |
| entry_no      | entry number  |

**TABLE C-36** Sun StorEdge T3 Module – Attachment Table

| Property      | Description    |
|---------------|----------------|
| sunSmTreeProp | sunSmTreeProp  |
| sunSmNodeName | Current Name   |
| t300name      | t300name       |
| unitId        | unit id        |
| portId        | portId         |
| attachId      | attach id      |
| attachLun     | attach Lun     |
| attachMode    | attach mode    |
| attachVolId   | attach volid   |
| attachVolName | attach volname |

**TABLE C-37** Sun StorEdge T3 Module – Loops

| Property      | Description   |
|---------------|---------------|
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |
| entry_no      | entry number  |

**TABLE C-38** Sun StorEdge T3 Module – Loops Table

| Property      | Description   |
|---------------|---------------|
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |
| t300name      | t300name      |

**TABLE C-38** Sun StorEdge T3 Module – Loops Table (Continued)

| Property        | Description |
|-----------------|-------------|
| unitId          | unit id     |
| loopId          | loop id     |
| loopStatus      | loop status |
| loopMux         | loop mux    |
| loopIsAvailable | isAvailable |
| loopIsReserved  | isReserved  |
| loopIsIsolated  | isIsolated  |
| loopIsTop       | isTop       |
| loopIsBottom    | isBottom    |
| loopIsMiddle    | isMiddle    |

**TABLE C-39** Sun StorEdge T3 Module – Midplanes Table

| Property      | Description   |
|---------------|---------------|
| entry_no      | Entry number  |
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |

**TABLE C-40** Sun StorEdge T3 Module – Powerunits Table

| Property      | Description   |
|---------------|---------------|
| entry_no      | Entry number  |
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |

**TABLE C-41** Sun StorEdge T3 Module – Volumes Table

| Property      | Description   |
|---------------|---------------|
| entry_no      | Entry number  |
| sunSmTreeProp | sunSmTreeProp |
| sunSmNodeName | Current Name  |

**TABLE C-42** Sun StorEdge T3 Module – Logging Table

| <b>Property</b> | <b>Description</b> |
|-----------------|--------------------|
| t300name        |                    |
| sunSmTreeProp   | sunSmTreeProp      |
| sunSmNodeName   | Current Name       |
| rowstatus       |                    |
| logStatus       |                    |
| logPort         |                    |
| logTo           |                    |
| logLevel        |                    |

**TABLE C-43** Sun StorEdge T3 Module – Rules

| <b>Rule</b> | <b>Description</b>         |
|-------------|----------------------------|
| rple201     | Controller Error           |
| rple202     | Power Cooling Unit Error   |
| rple203     | Loop Card Error            |
| rple204     | Disk Error                 |
| rple205     | Controller Warning         |
| rple206     | Power Cooling Unit Warning |
| rple207     | Loop Card Warning          |
| rple208     | Disk Warning               |
| rple209     | DC error                   |
| rple210     | Power supply unit disabled |
| rple211     | Power supply off           |
| rple212     | Power supply error         |
| rple213     | Battery missing            |
| rple214     | Loop card missing          |
| rple215     | Interconnect cable missing |
| rple216     | Loop card disabled         |
| rple220     | Disk Error                 |

**TABLE C-43** Sun StorEdge T3 Module – Rules (Continued)

| Rule    | Description                |
|---------|----------------------------|
| rple221 | Power Cooling Unit Error   |
| rple222 | Power Cooling Unit Error   |
| rple223 | Controller Warning         |
| rple224 | Loop Card Warning          |
| rple225 | Disk Warning               |
| rple226 | Disk Warning               |
| rple227 | Power Cooling Unit Warning |

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## Operating System

The software provides several modules that monitor the operating system on your host. When the following modules are loaded, these modules are found under the Operating System section of the Module Browser tab in the Details window:

- “File Monitoring Module Version 2.0” on page 344
- “IPv6 Instrumentation Module Version 1.0” on page 345
- “Kernel Reader (Simple) Module Version 1.0” on page 351
- “MIB-II Instrumentation Module Version 1.0” on page 362
- “MIB-II (Simple) Module Version 1.0” on page 371
- “NFS File Systems Module Version 2.0” on page 374
- “NFS Statistics Module Version 2.0” on page 374
- “Solaris Process Details Module Version 2.0” on page 376

### File Monitoring Module Version 2.0

This module enables you to monitor the files on a host. You can isolate any file or number of files and monitor those files individually by loading multiple instances of the File Monitoring module. This module requires you to add rows for the data property tables. For more information, see “To Add a Row to a Data Property Table” on page 137.

The following table lists the File Monitoring Status properties and their descriptions.



**TABLE C-44** File Monitoring Properties

| Property          | Description                                        |
|-------------------|----------------------------------------------------|
| Name              | Name of the file being monitored                   |
| Description       | Descriptive name provided for this file when added |
| Filename          | File being monitored                               |
| Last Modified     | Date and time the file last changed                |
| File Size (Bytes) | Size of the file                                   |
| Size Rate (Bytes) | Number of bytes written per second                 |

## IPv6 Instrumentation Module Version 1.0

This section presents information on the IPv6 Instrumentation module, which comprises the groups that are described in the following sections:

- “IPv6 IP Group Properties” on page 345
- “IPv6 TCP Properties” on page 348
- “IPv6 UDP Properties” on page 349
- “IPv6 ICMP Properties” on page 349

## IPv6 IP Group Properties

The tables that are in this section identify the IPv6 IP Group properties.

The following table identifies the properties that are shown in the IPv6 IP Group Table.

**TABLE C-45** IPv6 IP Group Table

| Property               | Description                |
|------------------------|----------------------------|
| IPv6 Forwarding        | Number of forwards enabled |
| IPv6 Default Hop Limit | Hop limit (default 255)    |
| IPv6 Interface         | Number of interfaces       |
| IPv6 Route Number      | Route number               |

The following table identifies the properties that are shown in the IPv6 If Table.

**TABLE C-46** IPv6 If Table

| <b>Property</b>           | <b>Description</b> |
|---------------------------|--------------------|
| IPv6 If Index             | Index              |
| IPv6 If Descr             | Description        |
| IPv6 If Lower Layer       |                    |
| IPv6 If Effective Mtu     |                    |
| IPv6 If Reasm Max Size    |                    |
| IPv6 If Identifier        |                    |
| IPv6 If Identifier Length |                    |
| IPv6 If Physical Address  |                    |
| IPv6 If Admin Status      |                    |
| IPv6 If Oper Status       |                    |

The following table identifies the properties that are shown in the IPv6 If Stats Table.

**TABLE C-47** IPv6 If Stats Table

| <b>Property</b>                  | <b>Description</b>                             |
|----------------------------------|------------------------------------------------|
| IPv6 If Index                    |                                                |
| IPv6 If Stats In Receives        |                                                |
| IPv6 If Stats In Hdr Errors      | Number of incoming headers that had errors     |
| IPv6 If Stats In Too Big Errors  | Number of incoming packets that were too big   |
| IPv6 If Stats In No Routes       |                                                |
| IPv6 If Stats In Addr Errors     |                                                |
| IPv6 If Stats In Unknown Protos  |                                                |
| IPv6 If Stats In Truncated Pkts  | Number of incoming packets that were truncated |
| IPv6 If Stats In Discards        |                                                |
| IPv6 If Stats In Delivers        |                                                |
| IPv6 If Stats Out Forw Datagrams |                                                |
| IPv6 If Stats Out Requests       |                                                |
| IPv6 If Stats Out Discards       |                                                |

**TABLE C-47** IPv6 If Stats Table (Continued)

| Property                       | Description  |
|--------------------------------|--------------|
| IPv6 If Stats Out Frag OKs     |              |
| IPv6 If Stats Out Frag Fails   |              |
| IPv6 If Stats Out Frag Creates |              |
| IPv6 If Stats Reasm Reqds      | Reassembled? |
| IPv6 If Stats Reasm OKs        |              |
| IPv6 If Stats Reasm Fails      |              |
| IPv6 If Stats In Mcast Pkts    |              |
| IPv6 If Stats Out Mcast Pkts   |              |

The following table identifies the properties that are shown in the IPv6 Addr Prefix Table.

**TABLE C-48** IPv6 Addr Prefix Table

| Property                         | Description                 |
|----------------------------------|-----------------------------|
| IPv6 If Index                    |                             |
| IPv6 Addr Prefix                 | Prefix for physical address |
| IPv6 Addr Prefix Length          |                             |
| IPv6 Addr Prefix On Link Flag    |                             |
| IPv6 Addr Prefix Autonomous Flag |                             |

The following table identifies the properties that are shown in the IPv6 Addr Table.

**TABLE C-49** IPv6 Addr Table

| Property               | Description |
|------------------------|-------------|
| IPv6 If Index          |             |
| IPv6 Addr Address      |             |
| IPv6 Addr Pfx Length   |             |
| IPv6 Addr Type         |             |
| IPv6 Addr Anycast Flag |             |
| IPv6 Addr Status       |             |

The following table identifies the properties that are shown in the IPv6 Route Table.

**TABLE C-50** IPv6 Route Table

| <b>Property</b>         | <b>Description</b> |
|-------------------------|--------------------|
| IPv6 Route Dest         |                    |
| IPv6 Route Pfx Length   |                    |
| IPv6 Route Index        |                    |
| IPv6 Route If Index     |                    |
| IPv6 Route Next Hop     |                    |
| IPv6 Route Type         |                    |
| IPv6 Route Protocol     |                    |
| IPv6 Route Policy       |                    |
| IPv6 Route Age          |                    |
| IPv6 Route Next Hop RDI |                    |
| IPv6 Route Metric       |                    |
| IPv6 Route Weight       |                    |
| IPv6 Route Info         |                    |
| IPv6 Route Valid        |                    |

The following table identifies the properties that are shown in the IPv6 Net to Media Table.

**TABLE C-51** IPv6 Net To Media Table

| <b>Property</b>              |
|------------------------------|
| IPv6IfIndex                  |
| IPv6NetToMediaNet Address    |
| IPv6NetToMedia PhysAddress   |
| IPv6NetToMedia Type          |
| IPv6IfNetToMedia State       |
| IPv6IfNetToMedia LastUpdated |
| IPv6NetToMedia Valid         |

## IPv6 TCP Properties

The following table identifies the properties that are shown in the IPv6 Conn Table.

**TABLE C-52** IPv6 Conn Table

| Property                | Description                     |
|-------------------------|---------------------------------|
| IPv6 Conn State         | Connectivity state              |
| IPv6 Conn Local Address | Connectivity local IP address   |
| IPv6 Conn Local Port    | Connectivity local port number  |
| IPv6 Conn Rem Address   | Connectivity remote IP address  |
| IPv6 Conn Rem Port      | Connectivity remote port number |

## IPv6 UDP Properties

The following table identifies the properties that are shown in the IPv6 UDP Table.

**TABLE C-53** IPv6 UDP Table

| Property               | Description |
|------------------------|-------------|
| IPv6 Udp Local Address | IP address  |
| IPv6 Udp Local Port    | Port number |
| IPv6 Udp If Index      | Index       |

## IPv6 ICMP Properties

The following table identifies the properties that are shown in the IPv6 If ICMP Table.

**TABLE C-54** IPv6 If ICMP Table

| Property                      | Description                                 |
|-------------------------------|---------------------------------------------|
| IPv6 If Index                 |                                             |
| IPv6 If Icmp In Msgs          | Number of incoming messages                 |
| IPv6 If Icmp In Errors        | Number of incoming errors                   |
| IPv6 If Icmp In Dest Unreachs | Number of unreachable incoming destinations |
| IPv6 If Icmp In Admin Prohibs |                                             |
| IPv6 If Icmp In Time Excds    |                                             |
| ivp6 If Icmp In Parm Problems |                                             |
| ivp6 If Icmp In Pkt Too Bigs  |                                             |

**TABLE C-54 IPv6 If ICMP Table** (Continued)

| <b>Property</b>                          | <b>Description</b> |
|------------------------------------------|--------------------|
| IPv6 If Icmp In Echos                    |                    |
| IPv6 If Icmp In Echo Replies             |                    |
| IPv6 If Icmp In Router Solicits          |                    |
| IPv6 If Icmp In Router Advertisements    |                    |
| IPv6 If Icmp In Neighbor Solicits        |                    |
| IPv6 If Icmp In Neighbor Advertisements  |                    |
| IPv6 If Icmp In Redirects                |                    |
| IPv6 If Icmp In Group Memb Queries       |                    |
| IPv6 If Icmp In Group Memb Responses     |                    |
| IPv6 If Icmp In Group Memb Reductions    |                    |
| IPv6 If Icmp Out Msgs                    |                    |
| IPv6 If Icmp Out Errors                  |                    |
| IPv6 If Icmp Out Dest Unreachs           |                    |
| IPv6 If Icmp Out Admin Prohibs           |                    |
| IPv6 If Icmp Out Time Excds              |                    |
| IPv6 If Icmp Out Parm Problems           |                    |
| IPv6 If Icmp Out Pkt Too Bigs            |                    |
| IPv6 If Icmp Out Echos                   |                    |
| IPv6 If Icmp Out Echo Replies            |                    |
| IPv6 If Icmp Out Router Solicits         |                    |
| IPv6 If Icmp Out Router Advertisements   |                    |
| IPv6 If Icmp Out Neighbor Solicits       |                    |
| IPv6 If Icmp Out Neighbor Advertisements |                    |
| IPv6 If Icmp Out Redirects               |                    |
| IPv6 If Icmp Out Group Memb Queries      |                    |
| IPv6 If Icmp Out Group Memb Responses    |                    |
| IPv6 If Icmp Out Group Memb Reductions   |                    |

## Kernel Reader (Simple) Module Version 1.0

The Kernel Reader (Simple) module generates a warning alarm if the module finds any disk with an increasing wait queue while busy.

A warning alarm occurs when the disk is over 75% busy and the average queue length is over 10 with an increasing wait queue. The warning alarm is on until the disk is not over 70% busy and the average queue length is no longer than 8. Similarly, this module generates a warning alarm if 90% of swap space is in use. The alarm remains open until the swap space in use is less than 80% of the total swap space.

The following table provides default alarm thresholds for applicable Kernel Reader modules.

**TABLE C-55** Alarm Thresholds for the Kernel Reader Module

| Alarm Threshold Message | Condition                               |
|-------------------------|-----------------------------------------|
| Error                   | If file system kpctUsed is > 98         |
| Warning                 | If file system kpctUsed is > 90         |
| Error                   | If file system inode percentage is > 90 |
| Warning                 | If file system inode percentage is > 80 |

## User Statistics Table

The following table provides a brief description of the properties for User Statistics.

**TABLE C-56** User Statistics Properties

| Property                | Description                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------------------|
| Console User            | User currently logged in on the console                                                         |
| Number Of Users         | Number of unique users currently logged in                                                      |
| Number Of User Sessions | Number of currently active user sessions                                                        |
| Max Console User        | Login name of the user that logged into the system console the most times since the last reboot |

## Interprocess Communication Tables

The following tables describe interprocess communication properties.

The following table describes the shared memory properties.

**TABLE C-57** IPC Shared Memory Properties

| <b>Property</b>                  | <b>Description</b>                                                  |
|----------------------------------|---------------------------------------------------------------------|
| Total Shared Memory Segments     | Total number of shared memory segments initially available for use. |
| Available Shared Memory Segments | Number of currently available shared memory segments.               |
| Shared Memory Segments Used      | Shared memory segments used as a percentage of the total units.     |

The following table describes semaphores properties.

**TABLE C-58** IPC Semaphores Properties

| <b>Property</b>            | <b>Description</b>                              |
|----------------------------|-------------------------------------------------|
| Total Semaphores Available | Total number of semaphores currently available. |
| Semaphores Used            | Semaphores used as a percentage of the total.   |

The following table provides a brief description of the properties for System Load Statistics.

**TABLE C-59** System Load Statistics Properties

| <b>Property</b>     | <b>Description</b>                    |
|---------------------|---------------------------------------|
| 1 Min Load Average  | Load average over the last 1 minute   |
| 5 Min Load Average  | Load average over the last 5 minutes  |
| 15 Min Load Average | Load average over the last 15 minutes |

## Disk Statistics Managed Objects Tables

The following tables provide a brief description of the properties for Disk Statistics.

The following table provides a brief description of the properties for Disk Details.



**TABLE C-60** Disk Details Properties

| <b>Property</b>                            | <b>Description</b>                           |
|--------------------------------------------|----------------------------------------------|
| Disk Name                                  | Name of the disk, such as sd0                |
| Disk Alias                                 | Name of the disk, such as c0t0d0             |
| Read Operation Per Sec                     | Read operations per second                   |
| Writes Operation Per Sec                   | Write operations per second                  |
| Operation Per Sec (read + write)           | Operations per second (read and write)       |
| Number Of Bytes Read                       | Number of bytes read                         |
| Number Of Bytes Written                    | Number of bytes written                      |
| Number Of Bytes Transferred (read + write) | Number of bytes transferred (read and write) |
| Average Number Of Transactions Waiting     | Average number of transactions waiting       |
| Average Number Of Transactions Running     | Average number of transactions running       |

The following table provides a brief description of the properties for Disk Service Time.

**TABLE C-61** Disk Service Time Properties

| <b>Property</b>                                               | <b>Description</b>                                                                |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Diskname                                                      | Name of the disk , such as sd0                                                    |
| Disk Alias                                                    | Name of the disk, such as c0t0d0                                                  |
| Percentage Of Time There Is A Transaction Waiting For Service | Percentage of time there is a transaction waiting for service (wait queue length) |
| Percentage Of Time The Disk Is Busy                           | Percentage of time the disk is busy (transaction running)                         |
| Average Wait Service Time                                     | Average wait service time                                                         |
| Average Run Service Time                                      | Average run service time                                                          |

**TABLE C-61** Disk Service Time Properties *(Continued)*

| Property             | Description          |
|----------------------|----------------------|
| Average Service Time | Average service time |
| Rule 404             | Meta Disk Rule       |

The following table provides a brief description of the properties for I/O error statistics.

**TABLE C-62** I/O Error Statistics Properties

| Property         | Description                                    |
|------------------|------------------------------------------------|
| Device           | The name of the device in a descriptive format |
| Software Errors  | The total number of software errors            |
| Hardware Errors  | The total number of hardware errors            |
| Transport Errors | The total number of transport errors           |
| Total Errors     | Total number of errors                         |

Under the I/O Error Statistics Table, there are the following two tables.

**TABLE C-63** Device Error Table

| Property         | Description                                  |
|------------------|----------------------------------------------|
| Device           | The name of the device in descriptive format |
| Software Errors  | Total number of software errors              |
| Hardware Errors  | Total number of hardware errors              |
| Transport Errors | Total number of transport errors             |
| Total Errors     | Total number of errors                       |

**TABLE C-64** Tape Error Table

| Property        | Description                                  |
|-----------------|----------------------------------------------|
| Device          | The name of the device in descriptive format |
| Software Errors | Total number of software errors              |
| Hardware Errors | Total number of hardware errors              |

**TABLE C-64** Tape Error Table (Continued)

| Property         | Description                      |
|------------------|----------------------------------|
| Transport Errors | Total number of transport errors |
| Total Errors     | Total number of errors           |

## File System Usage Table

The following table provides a brief description of the properties for file system usage.

**TABLE C-65** File System Usage Properties

| Property                  | Description                                        |
|---------------------------|----------------------------------------------------|
| Index                     | Mount point index                                  |
| Mount Point               | Mount point for the file system                    |
| Disk Name                 | Name of the device (/dev/dsk/ . . .)               |
| Size (KB)                 | Total size of the file system in Kbytes            |
| Free (KB)                 | Available disk space in Kbytes                     |
| Free KB (Non Root)        | Available disk space for non-superusers in Kbytes  |
| Percent Used              | Percentage of disk space used                      |
| Total Inodes              | Total size of the file system in Kbytes            |
| Available Inodes          | Available disk space for the file system in Kbytes |
| Percentage Of Inodes Used | Percentage of inodes used                          |

**Note** – The Find All Recent Files (>2 or >10Meg) probe commands for the UFS Filesystem Usage and VXFS Filesystem Usage folders find *only* files that were created or modified less than 24 hours ago. The Find All Files (>2 or >10Meg) probe commands for UFS Filesystem Usage and VXFS Filesystem Usage find all files, regardless of the date/time they were created or modified. For more information on the probe command, see “To Probe a Property” on page 140.

## CPU Statistics Managed Object Tables

The tables that are in this section provide a brief description of the properties for CPU Statistics managed objects.

The following table provides a brief description of the properties for CPU Utilization.

**TABLE C-66** CPU Usage Properties

| Property                    | Description                                               |
|-----------------------------|-----------------------------------------------------------|
| CPU Number                  | CPU number                                                |
| % CPU Idle Time             | Percentage of time spent by CPU on idle mode              |
| % CPU User Time             | Percentage of time spent by CPU on user mode              |
| % CPU Kernel Time           | Percentage of time spent by CPU on kernel mode            |
| % CPU Wait Time             | Percentage of time spent by CPU on wait mode              |
| % CPU Wait Time On I/O      | Percentage of time spent by CPU on wait mode for I/O      |
| % CPU Wait Time On Swap     | Percentage of time spent by CPU on wait mode for swap     |
| % CPU Wait Time On Pio      | Percentage of time spent by CPU on wait mode for Pio      |
| Times Idle Thread Scheduled | Percentage of idle time spent by CPU on threads scheduled |
| Rule 403                    | Meta CPU Rule                                             |

The following table provides a brief description of the properties for CPU processes.

**TABLE C-67** CPU Process Table

| Property               | Description            |
|------------------------|------------------------|
| Processes in Run Queue | Processes in run queue |
| Processes Waiting      | Waiting processes      |
| Processes Swapped      | Swapped processes      |
| Total Number of CPUs   | Total number of CPUs   |

The following table provides a brief description of the properties for CPU I/O.

**TABLE C-68** CPU I/O Properties

| Property              | Description                          |
|-----------------------|--------------------------------------|
| CPU Number            | Central Processing Unit (CPU) number |
| Physical Block Reads  | Number of physical block reads       |
| Physical Block Writes | Number of physical block writes      |

**TABLE C-68** CPU I/O Properties (Continued)

| Property                        | Description                                        |
|---------------------------------|----------------------------------------------------|
| Logical Block Reads             | Number of logical block reads                      |
| Logical Block Writes            | Number of logical block writes                     |
| Raw I/O Reads                   | Number of raw I/O reads                            |
| Raw I/O Writes                  | Number of raw I/O writes                           |
| Bytes Read By Rdwr()            | Number of bytes read by Rdwr()                     |
| Bytes Written By Rdwr()         | Number of bytes written by Rdwr()                  |
| Terminal Input Characters       | Number of terminal input characters                |
| Chars Handled In Canonical Mode | Number of chars handled in canonical mode          |
| Terminal Output Characters      | Number of terminal output characters               |
| Physical Block Writes           | Number of physical block writes                    |
| Procs Waiting For Block I/O     | Number of processes that are waiting for block I/O |

The following table provides a brief description of the properties for CPU Interrupts.

**TABLE C-69** CPU Interrupts Properties

| Property                              | Description                                                    |
|---------------------------------------|----------------------------------------------------------------|
| CPU Number                            | CPU number                                                     |
| Context Switches                      | Number of context switches                                     |
| Traps                                 | Number of traps                                                |
| Device Interrupts                     | Number of device interrupts                                    |
| Interrupts As Threads                 | Number of interrupts as threads                                |
| Interrupts Blocked/Preempted/Released | Number of interrupts that were blocked, pre-empted or released |

The following table provides a brief description of the properties for CPU system calls.

**TABLE C-70** CPU System Call Properties

| Property     | Description            |
|--------------|------------------------|
| CPU Number   | CPU number             |
| System Calls | Number of system calls |

**TABLE C-70** CPU System Call Properties (Continued)

| Property                            | Description                                    |
|-------------------------------------|------------------------------------------------|
| Read+Readv System Calls             | Number of read+ready system calls              |
| Write+Writev System Calls           | Number of Write+Writev system calls            |
| Forks                               | Number of forks                                |
| Vforks                              | Number of Vforks                               |
| Execs                               | Number of executables                          |
| Msg Count                           | Number of message count                        |
| Semaphore Ops Count                 | Number of semaphore operation count            |
| Pathname Lookups                    | Number of pathname lookups                     |
| Ufs_iget () Calls                   | Number of ufs_iget () calls                    |
| Directory Blocks Read               | Number of directory block reads                |
| Inodes Taken With Attached Pages    | Number of indexes taken with attached pages    |
| Inodes Taken With No Attached Pages | Number of indexes taken with no attached pages |
| Inode Table Overflows               | Number of Inode table overflows                |
| File Table Overflows                | Number of file table overflows                 |
| Proc Table Overflows                | Number of process table overflows              |

The following table provides a brief description of miscellaneous CPU properties.

**TABLE C-71** CPU Miscellaneous Properties

| Property                       | Description                              |
|--------------------------------|------------------------------------------|
| CPU Number                     | CPU number                               |
| Involuntary Ctx Switches       | Number of involuntary context switches   |
| Thread_create()s               | Number of thread_create()s               |
| Cpu Migrations By Threads      | Number of CPU migrations by threads      |
| Xcalls To Other Cpus           | Number of Xcalls to other CPUs           |
| Failed Mutex Enters (adaptive) | Number of failed mutex enters (adaptive) |
| Rw Reader Failures             | Number of read/write reader failures     |
| Rw Write Failures              | Number of read/write write failures      |
| Loadable Module Loaded         | Number of loadable module loaded         |

**TABLE C-71** CPU Miscellaneous Properties (Continued)

| Property                 | Description                                |
|--------------------------|--------------------------------------------|
| Loadable Module Unloaded | Number of loadable module unloaded         |
| Tries To Acquire RW Lock | Number of tries to acquire read/write lock |

The following table provides a brief description of the properties for CPU Regwindow.

**TABLE C-72** CPU Regwindow Properties

| Property              | Description                     |
|-----------------------|---------------------------------|
| CPU Number            | CPU number                      |
| User Overflows        | Number of user overflows        |
| User Underflows       | Number of user underflows       |
| System Overflows      | Number of system overflows      |
| System Underflows     | Number of system underflows     |
| System User Overflows | Number of system user overflows |

The following table provides a brief description of the properties for CPU Pageinfo.

**TABLE C-73** CPU Pageinfo Properties

| Property                    | Description                           |
|-----------------------------|---------------------------------------|
| CPU Number                  | CPU number                            |
| Reclaims                    | Number of reclaims                    |
| Reclaims From Free List     | Number of reclaims from free list     |
| Pageins                     | Number of pageins                     |
| Pages Paged In              | Number of pages that were paged in    |
| Pageouts                    | Number of pageouts                    |
| Pages Paged Out             | Number of pages that were paged out   |
| Swapins                     | Number of swap ins                    |
| Pages Swapped In            | Number of pages that were swapped in  |
| Swapouts                    | Number of swap outs                   |
| Pages Swapped Out           | Number of pages that were swapped out |
| Pages Zero Filled On Demand | Number of pages zero filled on demand |

**TABLE C-73** CPU Pageinfo Properties (Continued)

| Property                            | Description                                    |
|-------------------------------------|------------------------------------------------|
| Pages Freed By Daemon               | Number of pages fixed by daemon                |
| Pages Examined By Pageout Daemon    | Number of pages examined by the pageout daemon |
| Revolutions Of The Page Daemon Hand | Number of revolutions of the page daemon hand  |
| Times Pager Scheduled               | Number of times pager scheduled                |

The following table provides a brief description of the properties for CPU Faults.

**TABLE C-74** CPU Faults Properties

| Property                                       | Description                                                  |
|------------------------------------------------|--------------------------------------------------------------|
| CPU Number                                     | CPU number                                                   |
| Minor Page Faults Via <code>hat_fault()</code> | Number of minor page faults through <code>hat_fault()</code> |
| Minor Page Faults Via <code>as_fault()</code>  | Number of minor page faults through <code>as_fault()</code>  |
| Major Page Faults                              | Number of major page faults                                  |
| Copy-on-write Faults                           | Number of copy-on write faults                               |
| Protection Faults                              | Number of protection faults                                  |
| Faults Due To Software Locking Req             | Number of software locking faults                            |
| <code>as_fault()</code> s In Kernel addr Space | Number of in kernel addr space                               |

## Memory Usage Statistics Table

The following table provides a brief description of the properties for Memory Usage Statistics.

**TABLE C-75** Memory Usage Statistics Properties

| Property                       | Description                                 |
|--------------------------------|---------------------------------------------|
| Physical Memory Available (MB) | Physical memory that is available in Mbytes |
| Physical Memory In Use (MB)    | Physical memory in use in Mbytes            |
| Percent Memory Used            | Percentage of memory used                   |
| Physical Memory Free (MB)      | Physical memory that is free in Mbytes      |



**TABLE C-75** Memory Usage Statistics Properties (Continued)

| Property            | Description                       |
|---------------------|-----------------------------------|
| Percent Memory Free | Percentage of memory that is free |

## Swap Statistics Table

The following table provides a brief description of the properties for Swap Statistics.

**TABLE C-76** Swap Statistics Properties

| Property                                             | Description                                |
|------------------------------------------------------|--------------------------------------------|
| Available KB (Anon Memory Not Reserved)              | Swap available. Total reserved swap space. |
| Reserved KB (Anon Memory Reserved But Not Allocated) | Swap reserved                              |
| Allocated KB (Anon Memory Not Free)                  | Swap allocated                             |
| Used KB                                              | Swap used                                  |
| Total KB (Used + Available)                          | Swap total                                 |
| Percent Swap Used                                    | Percentage of swap used                    |
| Rule 405                                             | Meta Swap Rule                             |

## Streams Statistics Managed Objects Table

The following section provides the various Streams Statistics properties for the following managed objects:

- Stream Head Cache
- Queue Cache
- Streams Messages
- Linkinfo Cache
- Strevent Cache
- Syncq Cache
- Qband Cache

The following table briefly describes the managed objects.

**TABLE C-77** Streams Statistics Managed Objects

| Properties        | Description                              |
|-------------------|------------------------------------------|
| Stream Head Cache | Kernel statistics for streams head cache |

**TABLE C-77** Streams Statistics Managed Objects (Continued)

| Properties     | Description                                  |
|----------------|----------------------------------------------|
| Queue Cache    | Kernel statistics for queue cache            |
| Streams Msgs   | Kernel statistics for streams messages       |
| Linkinfo Cache | Kernel statistics for link information cache |
| Strevent Cache | Kernel statistics for streams event cache    |
| Syncq Cache    | Kernel statistics for synoq cache            |
| Qband Cache    | Kernel statistics for qband cache            |

All of the Streams Statistics managed objects have the same properties. The following table presents these common properties.

**TABLE C-78** Streams Statistics Table Properties

| Property                        | Description                       |
|---------------------------------|-----------------------------------|
| The Name Of The Cache           | Name of the cache                 |
| Current Usage (total - avail)   | Cache's current usage             |
| Maximum Capacity                | Maximum capacity of the cache     |
| Cumulative Total Of Allocations | Number of total cache allocations |
| Number of Allocation Failures   | Number of allocation failures     |
| Percent Used                    | Percentage of cache used          |

## Software Rules Table

The following table provides a brief description of the properties for Software Rules.

**TABLE C-79** Software Rules Properties

| Property      | Description                                          |
|---------------|------------------------------------------------------|
| Rule rknrd105 | Software rule (refer to rule rknrd105 in Appendix D) |
| Rule rknrd106 | Software rule (refer to rule rknrd106 in Appendix D) |

## MIB-II Instrumentation Module Version 1.0

This section presents information on the MIB-II Instrumentation module. The MIB-II Instrumentation module includes the property tables described in the following sections:

- “MIB-II System Group Table” on page 363
- “MIB-II Interfaces Group Tables” on page 363
- “MIB-II IP Group Table” on page 364
- “MIB-II ICMP Group Table” on page 367
- “MIB-II TCP Group Tables” on page 368
- “MIB-II UDP Group Tables” on page 370

## MIB-II System Group Table

The following table provides a brief description of the properties for MIB-II System Group.

**TABLE C-80** MIB-II System Group Properties

| Property                | Description                                                           |
|-------------------------|-----------------------------------------------------------------------|
| System Description      | MIB-II system description or the description of the host (read-write) |
| System OID              | Object identifier or the Object ID (OID) of the software system       |
| Time Since System Is Up | Time in microseconds since the system booted                          |
| System Contact          | The contact name for this system                                      |
| System Name             | The qualified host name on which the agent is running (read-write)    |
| System Location         | The physical location of the host (read-write)                        |
| System Services         | Sum integer value indicating the set of services primarily offered    |

## MIB-II Interfaces Group Tables

The following tables provide a brief description of the properties for the MIB-II Interface group.

The following table provides a brief description of the properties for MIB-II Interfaces Group.

**TABLE C-81** MIB-II Interfaces Group Properties

| Property             | Description                                                 |
|----------------------|-------------------------------------------------------------|
| Number of Interfaces | Number of interfaces to the machine, including the loopback |

The following table provides a brief description of the properties for MIB-II Interfaces.

**TABLE C-82** MIB-II Interface Properties

| Property               | Description                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|
| IF Index               | Index of the interface in this table                                                                                  |
| IF Descr               | Description of the interface                                                                                          |
| IF Type                | Type of the interface                                                                                                 |
| IF Largest MTU         | Size of the largest datagram that can be sent on the interface                                                        |
| IF Speed               | Bandwidth of the interface                                                                                            |
| IF Physical Address    | Physical address of the interface                                                                                     |
| IF Admin Status        | Desired state of the interface                                                                                        |
| IF Oper Status         | Operational state of the interface                                                                                    |
| IF Last Change         | Value of sysUpTime (that is, time when the system is up and running) when the operational state has changed last time |
| IF In Octets           | Octets received on the interface                                                                                      |
| IF In Unicast Pkts     | Unicast packets received on the interface                                                                             |
| IF In NonUnicast Pkts  | Non-unicast packets received on the interface                                                                         |
| IF In Discards         | Number of packets on the interface that are chosen to be discarded                                                    |
| IF In Errors           | Number of inbound packets on the interface that contained errors                                                      |
| IF In Unknown Protos   | Number of packets with unsupported protocol that were received on the interface                                       |
| IF Out Octets          | Number of octets that are transmitted out on the interface                                                            |
| IF Out Unicast Pkts    | Number of unicast packets transmitted out on the interface                                                            |
| IF Out NonUnicast Pkts | Number of non-unicast packets transmitted out on the interface                                                        |
| IF Out Discards        | Number of outbound packets on the interface that contained errors                                                     |
| IF Out Errors          | Number of outbound packets that could not be transmitted because of errors                                            |
| IF Out Queue Length    | Length of the output packet queue                                                                                     |
| IF Specific            | Reference to the MIB definitions specific to the particular media                                                     |

## MIB-II IP Group Table

The following tables provide a brief description of the properties for MIB-II IP.

The following table provides a brief description of the properties for MIB-II IP Group.

**TABLE C-83** MIB-II Group Properties

| <b>Property</b>          | <b>Description</b>                                                                         |
|--------------------------|--------------------------------------------------------------------------------------------|
| IP Forwarding            | Indicates whether this entity is a gateway                                                 |
| IP Default TTL           | Default Time-to-Live inserted into the IP headers                                          |
| IP In Receives           | Number of datagrams received                                                               |
| IP In Header Errors      | Number of input datagrams that are discarded because of errors in IP headers               |
| IP In Address Errors     | Number of input datagrams that are discarded because of errors in destination IP address   |
| IP Forwarded Datagrams   | Number of forwarded datagrams                                                              |
| IP In Unknown Protos     | Number of locally addressed datagrams that were discarded because of unsupported protocols |
| IP In Discards           | Number of input datagrams that were discarded                                              |
| IP In Delivers           | Number of input datagrams that were successfully delivered                                 |
| IP Out Requests          | Number of datagrams that were supplied to IP for transmission                              |
| IP Out Discards          | Number of output IP datagrams that were discarded                                          |
| IP Out No Routes         | Number of output IP datagrams that were discarded because no route destination was found   |
| IP Reassemble Timeouts   | Maximum time in seconds for which the received fragments were held for reassembly          |
| IP Reassemble Requireds  | Number of IP fragments received that required reassembly                                   |
| IP Reassemble OKs        | Number of IP datagrams that were successfully reassembled                                  |
| IP Reassemble Fails      | Number of failures detected by the reassembly algorithm                                    |
| IP Fragmentation OKs     | Number of IP datagrams that were successfully fragmented                                   |
| IP Fragmentation Fails   | Number of IP datagrams that have failed fragmentation                                      |
| IP Fragmentation Creates | Number of IP datagram fragments that were generated due to fragmentation                   |

The following table provides a brief description of the properties for IP Addresses.

**TABLE C-84** IP Addresses Properties

| Property                 | Description                                                            |
|--------------------------|------------------------------------------------------------------------|
| IPAT IP Address          | IP address to which this entry's addressing information pertains       |
| IPAT IfIndex             | Index in the interface table for the corresponding interface           |
| IPAT Net Mask            | Subnet mask associated with the IP address                             |
| IPAT Broadcast Address   | Value of the least significant bit in the IP broadcast address         |
| IPAT Reassemble Max Size | Size of the largest IP datagram that can be reassembled by this entity |

The following table provides a brief description of the properties for IP Route.

**TABLE C-85** IP Route Properties

| Property             | Description                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------|
| IP Route Destination | Destination IP address of the route                                                                |
| IP Route IfIndex     | Index of the interface in the interface table through which the next hop of this route is reached  |
| IP Route Metric1     | Primary routing metric for the route that is specific to the routing 1 protocol                    |
| IP Route Metric2     | Alternate routing metric for the route that is specific to the routing 2 protocol                  |
| IP Route Metric3     | Alternate routing metric for the route that is specific to the routing 3 protocol                  |
| IP Route Metric4     | Alternate routing metric for the route that is specific to the routing 4 protocol                  |
| IP Route NextHop     | IP address of the next hop of this route                                                           |
| IP Route Type        | Type of route                                                                                      |
| IP Route Proto       | Routing mechanism through which this route was learned                                             |
| IP Route Age         | Number of seconds since the route was last updated                                                 |
| IP Route Mask        | Mask to be logical and with the destination address before being compared to the route destination |
| IP Route Metric5     | Alternate routing metric for the route that is specific to the routing 5 protocol                  |
| IP Route Info        | Reference to MIB definitions specific to the routing protocol                                      |

The following table provides a brief description of the properties for IP NetToMedia.

**TABLE C-86** IP NetToMedia Properties

| Property          | Description                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------|
| IPN2M IfIndex     | Index of the interface in the interface table on which this entry's equivalence is effective |
| IPN2M PhysAddress | Media-dependent physical address                                                             |
| IPN2M NetAddress  | IP address corresponding to the physical address                                             |
| IPN2M Type        | Type of mapping                                                                              |

## MIB-II ICMP Group Table

The following table provides a brief description of the properties for MIB-II ICMP Group.

**TABLE C-87** MIB-II ICMP Group Properties

| Property                   | Description                                                       |
|----------------------------|-------------------------------------------------------------------|
| ICMP In Messages           | Number of ICMP messages received                                  |
| ICMP In Errors             | Number of ICMP messages received with errors                      |
| ICMP In Dest Unreachs      | Number of ICMP destination unreachable messages received          |
| ICMP In Time Exceeds       | Number of ICMP time exceeded messages received                    |
| ICMP In Parameter Problems | Number of messages received that describe ICMP parameter problems |
| ICMP In Src Quenches       | Number of ICMP source quench messages received                    |
| ICMP In Redirects          | Number of ICMP redirect messages received                         |
| ICMP In Echos              | Number of messages received that describe ICMP echo requests      |
| ICMP In Echo Repls         | Number of messages received that describe ICMP echo replies       |
| ICMP In Timestamps         | Number of messages received that describe ICMP timestamp requests |

**TABLE C-87** MIB-II ICMP Group Properties (Continued)

| Property                    | Description                                                        |
|-----------------------------|--------------------------------------------------------------------|
| ICMP In Timestamp Repls     | Number of messages that relate to ICMP timestamp replies           |
| ICMP In Address Masks       | Number of ICMP address mask request messages received              |
| ICMP In Address Mask Repls  | Number of ICMP address mask reply messages received                |
| ICMP Out Messages           | Number of ICMP messages that were attempted to be sent             |
| ICMP Out Errors             | Number of ICMP messages that were not sent due to problems         |
| ICMP Out Dest Unreachs      | Number of ICMP destination unreachable messages sent               |
| ICMP Out Time Exceeds       | Number of ICMP time exceeded messages sent                         |
| ICMP Out Parameter Problems | Number of messages sent that relate to ICMP parameter problems     |
| ICMP Out Src Quenches       | Number of ICMP source quench messages sent                         |
| ICMP Out Redirects          | Number of ICMP redirect messages sent                              |
| ICMP Out Echos              | Number of messages sent that relate to ICMP echo requests          |
| ICMP Out Echo Repls         | Number of number of messages sent that relate to ICMP echo replies |
| ICMP Out Timestamps         | Number of request messages sent for ICMP timestamps                |
| ICMP Out Timestamp Repls    | Number of ICMP timestamp reply messages sent                       |
| ICMP Out Address Masks      | Number of ICMP address mask request messages sent                  |
| ICMP Out Address Mask Repls | Number of ICMP address mask reply messages sent                    |

## MIB-II TCP Group Tables

The following tables provide a brief description of the properties for MIB-II TCP.



The following table provides a brief description of the properties for MIB-II TCP Group.

**TABLE C-88** MIB-II TCP Group Properties

| Property                     | Description                                                                                                                   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| TCP Retransmission Algorithm | Algorithm used to determine the timeout value to be used for retransmitting unacknowledged octets                             |
| TCP Retransmit Min Timeout   | Minimum value permitted by TCP implementation for the retransmission timeout                                                  |
| TCP Retransmit Max Timeout   | Maximum value permitted by TCP implementation for the retransmission timeout                                                  |
| TCP Max Connections          | Limit on the number of TCP connections                                                                                        |
| TCP Active Opens             | Number of times TCP connections have transitioned to SYN-SENT from CLOSED state                                               |
| TCP Passive Opens            | Number of times TCP connections have transitioned to SYN-RCVD from LISTEN state                                               |
| TCP Attempt Fails            | Number of times TCP connections have transitioned from SYN-SENT or SYN-RCVD to COLSED state and from SYN-RCVD to LISTEN state |
| TCP Established-to-Resets    | Number of times TCP connections have transitioned from ESTABLISHED or CLOSE-WAIT to CLOSED state                              |
| TCP Current Established      | Number of TCP connections for which the current state is ESTABLISHED or CLOSE-WAIT                                            |
| TCP In Segments              | Number of segments received                                                                                                   |
| TCP Out Segments             | Number of segments sent                                                                                                       |
| TCP Retransmitted Segments   | Number of segments retransmitted                                                                                              |
| TCP In Errors                | Number of segments that were received in error                                                                                |
| TCP Out With Reset Flag      | Number of segments sent containing the RST flag                                                                               |

The following table provides a brief description of the properties for TCP Connections.

**TABLE C-89** TCP Connections Properties

| Property               | Description                                |
|------------------------|--------------------------------------------|
| TcpConn State          | State of this TCP Connection               |
| TcpConn Local Address  | Local IP address for this TCP connection   |
| TcpConn Local Port     | Local port number for this TCP connection  |
| TcpConn Remote Address | Remote IP address for this TCP connection  |
| TcpConn Remote Port    | Remote port number for this TCP connection |

## MIB-II UDP Group Tables

The following tables provide a brief description of the properties for MIB-II UDP.

The following table provides a brief description of the properties for MIB-II UDP Group.

**TABLE C-90** MIB-II UDP Group Properties

| Property              | Description                                                                                |
|-----------------------|--------------------------------------------------------------------------------------------|
| UDP In Datagrams      | Number of UDP datagrams that were delivered to UDP users                                   |
| UDP No Port Datagrams | Number of received UDP datagrams for which there is no application at the destination port |
| UDP In Errors         | Number of received UDP datagrams that could not be delivered                               |
| UDP Out Datagrams     | Number of UDP datagrams sent                                                               |

The following table provides a brief description of the properties for UDP.

**TABLE C-91** UDP Properties

| Property          | Description                                 |
|-------------------|---------------------------------------------|
| UDP Local Address | The local IP address for this UDP listener  |
| UDP Local Port    | The local port number for this UDP listener |

## MIB-II (Simple) Module Version 1.0

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**Note** – The MIB-II (simple) module is used to identify a Sun Management Center agent. If this module is not loaded, the agent can only be created as a ping host or as an SNMP host.

---

The tables that are in this section provide a brief description of the properties for Simple MIB-II managed objects.

### System Group

The following table provides a brief description of the properties for System Group.

**TABLE C–92** System Group Properties

| Property           | Description                                                           |
|--------------------|-----------------------------------------------------------------------|
| System Description | MIB-II system description or the description of the host (read-write) |
| System OID         | Object identifier or the Object ID (OID) of the software system       |
| Time Since Up      | Time in microseconds since the system is up                           |
| System Contact     | The contact name for the system                                       |
| System Name        | The qualified host name on which the agent is running (read-write)    |
| System Location    | The physical location of the host (read-write)                        |
| System Services    | Sum integer value indicating the set of services primarily offered    |

### Interfaces Group

The Number of Interfaces group property indicates the number of interfaces to the machine, including the loopback. Additional interfaces properties are described in the following table.

**TABLE C–93** Interfaces Table

| Property | Description                          |
|----------|--------------------------------------|
| IF Index | Index of the interface in this table |
| IF Descr | Description of the interface         |

**TABLE C-93** Interfaces Table (Continued)

| Property               | Description                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|
| IF Type                | Type of the interface                                                                                                 |
| IF Largest MTU         | Size of the largest datagram that can be sent on the interface                                                        |
| IF Speed               | Bandwidth of the interface                                                                                            |
| IF Physical Address    | Physical address of the interface                                                                                     |
| IF Admin Status        | Desired state of the interface                                                                                        |
| IF Oper Status         | Operational state of the interface                                                                                    |
| IF Last Change         | Value of sysUpTime (that is, time when the system is up and running) when the operational state has changed last time |
| IF In Octets           | Octets received on the interface                                                                                      |
| IF In Unicast Pkts     | Unicast packets received on the interface                                                                             |
| IF In nonUnicast Pkts  | Non-unicast packets received on the interface                                                                         |
| IF In Discards         | Number of packets on the interface that are chosen to be discarded                                                    |
| IF In Errors           | Number of inbound packets on the interface that contained errors                                                      |
| IF In Unknown Protos   | Number of packets with unsupported protocol that were received on the interface                                       |
| IF Out Octets          | Number of octets that are transmitted out on the interface                                                            |
| IF Out Unicast Pkts    | Number of unicast packets transmitted out on the interface                                                            |
| IF Out nonUnicast Pkts | Number of non-unicast packets transmitted out on the interface                                                        |
| IF Out Discards        | Number of outbound packets on the interface that contained errors                                                     |
| IF Out Errors          | Number of outbound packets that could not be transmitted because of errors                                            |
| IF Out Queue Length    | Length of the output packet queue                                                                                     |
| IF Specific            | Reference to the MIB definitions specific to the particular media                                                     |

## IP Group

The IP Forwarding group property indicates whether this entity is a gateway. Additional IP route properties are described in the following table.

**TABLE C-94** IP Route Table

| <b>Property</b>      | <b>Description</b>                                                                                 |
|----------------------|----------------------------------------------------------------------------------------------------|
| IP Route Destination | Destination IP address of the route                                                                |
| IP Route IfIndex     | Index of the interface in the interface table through which the next hop of this route is reached  |
| IP Route Metric1     | Primary routing metric for the route that is specific to the routing 1 protocol                    |
| IP Route Metric2     | Alternate routing metric for the route that is specific to the routing 2 protocol                  |
| IP Route Metric3     | Alternate routing metric for the route that is specific to the routing 3 protocol                  |
| IP Route Metric4     | Alternate routing metric for the route that is specific to the routing 4 protocol                  |
| IP Route NextHop     | IP address of the next hop of this route                                                           |
| IP Route Type        | Type of route                                                                                      |
| IP Route Proto       | Routing mechanism through which this route was learned                                             |
| IP Route Age         | Number of seconds since the route was last updated                                                 |
| IP Route Mask        | Mask to be logical and with the destination address before being compared to the route destination |
| IP Route Metric5     | Alternate routing metric for the route that is specific to the routing 5 protocol                  |
| IP Route Info        | Reference to MIB definitions specific to the routing protocol                                      |

The following table describes the IP address properties.

**TABLE C-95** IP Address Table Properties

| <b>Property</b>    | <b>Description</b>                          |
|--------------------|---------------------------------------------|
| IPAT IP Address    | IP Address Table Entry IP Address in MIB-II |
| IPAT IfIndex       |                                             |
| IPAT Net Mask      |                                             |
| IPAddTab R MaxSize |                                             |

## NFS File Systems Module Version 2.0

The NFS File Systems module enables you to monitor the NFS file systems on hosts that are running the Solaris 8 or Solaris 9 operating systems. The NFS File Systems module monitors the amount of disk space occupied by mounted or unmounted file systems. The module monitors the amount of used and available space as well as the remaining total capacity.

When loading the NFS File Systems module, you may define the file systems that you want to monitor by using pattern matching. Patterns may be used to filter which NFS file systems are monitored by file system or mount point.

The following table provides a brief description of the properties for NFS Filesystem Usage.

**TABLE C-96** Filesystem Usage Properties

| Property    | Description                                            |
|-------------|--------------------------------------------------------|
| NFS Filesys | Name of the NFS file system                            |
| Size        | Total size of the NFS file system in Kbytes            |
| Used        | Used disk space for the NFS file system in Kbytes      |
| Available   | Available disk space for the NFS file system in Kbytes |
| % Used      | Percentage of NFS disk space used                      |
| Rate        | Percentage capacity change per second                  |
| Mount Point | Mount point for the NFS file system                    |
| Entry Index | Entry index of the NFS file system                     |

## NFS Statistics Module Version 2.0

This section presents property tables for NFS Statistics:

- RPC Information Table
- NFS Information Table

You can use the NFS Statistics module to monitor statistical information on the remote procedure calls (RPC) and Sun's distributed computing file system (NFS) calls. The number of RPC and NFS calls that the client made and the server received are displayed in the main console window along with the status of the transaction activity on the local host. The following tables list some of the properties monitored by this module with both the server and the client statistics.

## RPC Information Table

The following table provides a brief description of the properties for RPC Information.

**TABLE C-97** RPC Server and Client Information Properties

| Property        | Description                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------|
| RPC Calls       | Total number of RPC calls made by the host                                                        |
| Bad RPC Calls   | Total number of calls rejected by the RPC layer                                                   |
| Bad RPC Calls % | Percentage of rejected calls compared to the total number of calls made (bad RPC Calls/RPC calls) |
| RPC Call Rate   | Number of RPC calls that are made per second                                                      |

## NFS Information Tables

The following table provides a brief description of the properties for NFS information.

**TABLE C-98** NFS Server and Client Information Properties

| Property        | Description                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------|
| NFS Calls       | Total number of NFS calls sent by the host                                                            |
| Bad NFS Calls   | Total number of NFS calls rejected                                                                    |
| Bad NFS Calls % | Percentage of rejected NFS calls compared to the total number of sent calls (bad NFS calls/NFS calls) |
| NFS Call Rate   | Number of NFS calls that were sent per second                                                         |

The following table provides a brief description of the properties for NFS server statistics.

**TABLE C-99** NFS Server Statistics

| Property              | Description                                              |
|-----------------------|----------------------------------------------------------|
| Server NFS Calls      | Number of bad server NFS calls since the last init       |
| Server Bad NFS Call % | Bad NFS calls as a percent of the total NFS calls made   |
| Server NFS Call Rate  | Rate at which server NFS calls are being made per second |

The following table provides a brief description of the properties for NFS client statistics.

**TABLE C-100** NFS Client Statistics

| Property      | Description                                               |
|---------------|-----------------------------------------------------------|
| NFS Calls     | Client NFS calls                                          |
| Bad NFS Calls | Number of bad client NFS calls since the last init        |
| Bad NFS %     | Bad NFS calls as a percentage of the total NFS calls made |
| NFS Call Rate | Rate at which client NFS calls are being made per second  |

## Solaris Process Details Module Version 2.0

The parameters for the Solaris Process Details module are listed in the following table. This table is displayed when you try to load the module.

**TABLE C-101** Solaris Process Details Parameters

| Property            | Description                                                                                                                                   |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Module Name         | Name of the module (not editable)                                                                                                             |
| Module Description  | Description of the module (not editable)                                                                                                      |
| Version             | Version of the module (not editable)                                                                                                          |
| Enterprise          | SNMP enterprise in which the module is loaded (not editable)                                                                                  |
| Module Type         | Type of the module (not editable)                                                                                                             |
| Number of Processes | Number of processes that is obtained by the module based on the selection criteria. One of the given numbers can be selected by the user.     |
| Selection Criteria  | Selection criteria by which the processes are sorted and selected. For example, the user can select the top 10 processes using this function. |

The following table provides a brief description of the properties for Solaris Process.

**TABLE C-102** Process Properties

| Property             | Description                             |
|----------------------|-----------------------------------------|
| PS Process ID        | Process ID of the process               |
| PS Parent Process ID | Process ID of the parent of the process |
| PS User ID           | Login ID of the user of the process     |
| PS User Name         | Login name of the user of the process   |



**TABLE C-102** Process Properties (Continued)

| Property              | Description                                                       |
|-----------------------|-------------------------------------------------------------------|
| PS Effective User ID  | Effective user ID of the process                                  |
| PS Group ID           | Real group ID of the process                                      |
| PS Effective Group ID | Effective group ID of the process                                 |
| PS Session ID         | Process ID of the session leader of the process                   |
| PS Process Group ID   | Process ID of the process group leader of the process             |
| PS TTY                | Controlling terminal for the process                              |
| PS Start Time         | Starting time of the process                                      |
| PS Time               | Cumulative execution time of the process                          |
| PS State              | State of the process                                              |
| PS Wait Channel       | Address of an event for which the process is waiting              |
| PS Scheduling Class   | Scheduling class of the process                                   |
| PS Address            | Memory address of the process                                     |
| PS Size               | Total size of the process in virtual memory                       |
| PS Priority           | Priority of the process                                           |
| PS Nice               | Nice value of the process, which is used for priority computation |
| PS Percent CPU Time   | Percent CPU time                                                  |
| PS Percent Memory     | Percent memory                                                    |
| PS Command            | Base name of the executable file for the process                  |
| PS Command Line       | Full command name of the process, including the arguments         |

---

## Local and Remote Application Modules

The software enables you to monitor local and remote applications. An example of a local application would be a print spooler. An example of a remote application would be an HP printer that is equipped with a JetDirect card.

When the following modules are loaded, they are found under the Local Applications section on the Module Browser tab in the Details window:

- “Agent Statistics Module Version 2.0” on page 378
- “Data Logging Registry Module Version 2.0” on page 382
- “Logview ACL Version 1.0” on page 383

- “Print Spooler Module Version 3.0” on page 383

When the following modules are loaded, they are found under the Remote Systems section on the Module Browser tab in the Details window:

- “HP JetDirect Module Version 2.0” on page 385
- “MIB-II Proxy Monitoring Module Version 2.0” on page 385

The local and remote applications modules are described in the following sections.

## Agent Statistics Module Version 2.0

This section presents the following information on Agent Statistics:

- “Object Statistics Table” on page 380
- “Commands Executed Table” on page 380
- “Transactions Performed Table” on page 380
- “Sun Management Center Process Statistics Table” on page 380
- “Sun Management Center Total Process Statistics Table” on page 381

The Agent Statistics module monitors the health of the agent installed on a host. This module monitors the objects, processes, and execution of processes by the agent.

**TABLE C-103** Agent Statistics Main Sections

| Agent Statistics Tables | Description                                                                                                                                                                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Object Section          | Displays data on the objects that are loaded onto the agent. Status field displays the current status of the TOE and binary objects loaded into and used by the agent.                                                                                            |
| Execution Section       | Displays data on the number of Tcl or TOE commands invoked by the agent interpreter. Also displays data on the number of asynchronous transactions initiated by the agent. Status field displays a brief description of the current status of the objects listed. |

The following table provides a brief description of the Agent Statistics managed objects.

**TABLE C-104** Agent Statistics Section Properties

| Property          | Description                                                                                                                                   |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Object Statistics | TOE Count – Number of TOE objects loaded into the agent binary object buffer<br><br>Count – Number of binary object buffers used by the agent |

**TABLE C-104** Agent Statistics Section Properties (Continued)

| Property                    | Description                                                                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Commands Executed           | Total – Total number of commands that have been executed by the agent<br>Rate (#/sec) – Number of commands executed by the agent per second |
| Transactions Performed      | Total – Total number of transactions performed by the agent<br>Rate (#/sec) – Number of transactions performed by the agent per second      |
| PA Process Statistics       | Process statistics pertaining to the PA                                                                                                     |
| PA Total Process Statistics | Total process statistics pertaining to the PA                                                                                               |

The following lists default alarm thresholds for applicable Agent Statistics modules.

**TABLE C-105** Agent Statistics Alarm Thresholds

| Agent Statistics | Condition                   |
|------------------|-----------------------------|
| Error            | If toeCount > 6000          |
| Warning          | If toeCount > 5000          |
| Error            | If bobcount > 1200          |
| Warning          | If bobcount > 1000          |
| Warning          | If commands rate > 6000     |
| Warning          | If transactions rate > 8    |
| Error            | If process size > 35000     |
| Warning          | If process size > 30000     |
| Error            | If rss > 25000              |
| Warning          | If percentage CPU time > 90 |
| Warning          | If totalstats.count > 15    |
| Error            | If totalstats.size > 40000  |
| Warning          | If totalstats.size > 35000  |
| Warning          | If totalstats.rss > 35000   |

The following sections describe the individual property tables for Agent Statistics.

## Object Statistics Table

The Objects section displays information about the Objects that are loaded onto the agent. The Status field displays the current status of the TOE and binary objects loaded into and used by the agent.

The following table provides a brief description of the properties for Object Statistics.

**TABLE C-106** Object Statistics Properties

| Property          | Description                                       |
|-------------------|---------------------------------------------------|
| Total TOE Objects | Number of TOE objects loaded into the agent       |
| Total Bobs        | Number of binary object buffers used by the agent |

## Commands Executed Table

The following table provides a brief description of the properties for commands executed.

**TABLE C-107** Executed Commands Properties

| Property       | Description                                                   |
|----------------|---------------------------------------------------------------|
| Total Commands | Total number of commands that have been executed by the agent |
| Rate (/sec)    | Number of commands executed by the agent per second           |

## Transactions Performed Table

The following table provides a brief description of the properties for performed transactions.

**TABLE C-108** Transactions Performed Properties

| Property                | Description                                              |
|-------------------------|----------------------------------------------------------|
| Total Transactions      | Total number of transactions performed by the agent      |
| Transaction Rate (/sec) | Number of transactions performed by the agent per second |

## Sun Management Center Process Statistics Table

The software monitors the Sun Management Center process statistics. The following table provides a brief description of the properties for Sun Management Center process statistics.

**TABLE C–109** Sun Management Center Process Statistics Properties

| Property              | Description                                                  |
|-----------------------|--------------------------------------------------------------|
| Process ID            | Identification number of the process                         |
| Process Unique Id     | Unique identification number of the process                  |
| Process Name          | Name of the process                                          |
| Process Status        | Status of the process                                        |
| Process State         | State of the process                                         |
| User ID               | User ID of the process                                       |
| Virtual Size          | Total size of the process                                    |
| Resident Set Size     | Resident size of the process                                 |
| Start Time<br>Seconds | Startup time of the process in seconds since January 1, 1970 |
| Start Date            | Startup date of the process                                  |
| Start Time            | Startup time of the process                                  |
| CPU Time              | CPU time used by the process                                 |
| Percent CPU Time      | Percentage of CPU time used by the process                   |
| Context Switches      | Context switches of the process                              |
| System Calls          | System calls made by the process                             |
| Command Line          | Command line of the process                                  |

## Sun Management Center Total Process Statistics Table

The software monitors the total Sun Management Center process statistics.

The following table provides a brief description of the properties for total Sun Management Center process statistics.

**TABLE C–110** Total Sun Management Center Process Statistics Properties

| Property               | Description                                   |
|------------------------|-----------------------------------------------|
| Number of<br>Processes | Number of agent and child processes           |
| Total Virtual Size     | Total virtual size of agent and children      |
| Total Res Size         | Total resident set size of agent and children |

## Agent Update Module Version 1.0

The Agent Update module enables you to update agents across your enterprise using a single feature. When loaded, information about this module appears in the Local Applications section of the Module Browser window.

**TABLE C-111** Agent Update Data Properties

| Property                 | Description of Value                                   |
|--------------------------|--------------------------------------------------------|
| Server Name              | Name of Sun Management Center server                   |
| HTTP Server Port         | Port number on which the web server is running         |
| Update Image Name        | The name of the agent update image file on this server |
| Product Layers Installed | Agent, Console, and Server as appropriate              |

**TABLE C-112** Addons List

| Column        | Description                             |
|---------------|-----------------------------------------|
| Addon Name    | Name of Sun Management Center component |
| Addon Version | Version of component                    |

## Data Logging Registry Module Version 2.0

The Data Logging Registry consists of the registry table.

The following table provides a brief description of the properties for Data Logging Registry.

**TABLE C-113** Data Logging Registry Properties

| Property              | Description                                                                  |
|-----------------------|------------------------------------------------------------------------------|
| Log Destination State | State of the logged file destination.                                        |
| Module Name           | Module name for data value (data from this module is logged in the registry) |
| Instance Name         | Module instance name for data value.                                         |
| Property Name         | Property name for data value                                                 |
| Logging Interval      | Logging interval for data value                                              |

**TABLE C-113** Data Logging Registry Properties (Continued)

| Property             | Description                             |
|----------------------|-----------------------------------------|
| File Logging         | File logging status.                    |
| Logging Destination  | The logging destination for data value. |
| Data Cache           | Data cache status                       |
| Cache Size (samples) | Size of data cache                      |

## Logview ACL Version 1.0

The Logview module creates a file list that allows you to specify which user or group can access this file in the logviewer. This list provides the following information:

Instance name  
File name  
User name  
Group name

## Print Spooler Module Version 3.0

The Print Spooler module monitors the status of the printer daemon and print queue on the local host as well as the printer devices installed on it.

- “Printer LPsched” on page 383
- “Printer Devices Table” on page 384
- “Printer Queues Table” on page 384

The following table describes the print spooler managed objects.

**TABLE C-114** Print Spooler Properties

| Property        | Description                                       |
|-----------------|---------------------------------------------------|
| Lpsched Status  | Status of the lpsched process                     |
| Printer Devices | Table lists information about the printer devices |
| Printer Queues  | Table lists information about the printer queue   |

## Printer LPsched

The printer daemon section displays data on the LP Request Scheduler. The Line Printer’s Schedule (LPsched) state property describes the current status of the printer.

## Printer Devices Table

The Printer Devices table lists the printers that are already added to the table.

The instance name or alias of the printer is displayed in the Name field. The description of the printer is displayed in the Description field. The name of the host on which the printer is installed is displayed in the Host Name field. If you are running a console that shows data monitored by an agent on a print server host, the path name of the printer device is displayed in the Device field. The printer state displays in the Printer State field.

The following table provides a brief description of the properties for Printer Devices.

**TABLE C-115** Printer Devices Properties

| Property     | Description                                      |
|--------------|--------------------------------------------------|
| Row Status   | Status of the row                                |
| Printer name | Name of the printer device                       |
| Description  | Description of the row                           |
| Host name    | Name of the host to which the device is attached |
| Device name  | Alphanumeric device name                         |
| Device state | State of the device                              |

## Printer Queues Table

The Print Queues table lists the print queues on the local host and displays the status of each queue. The following table provides a brief description of the properties for Printer Queues.

**TABLE C-116** Printer Queues Properties

| Property                | Description                                                                      |
|-------------------------|----------------------------------------------------------------------------------|
| Printer Queue Name      | Name of the printer queue                                                        |
| Printer Queue State     | Current status of the printer queue (values are "accepting" and "not accepting") |
| # of Printer Queue Jobs | Total number of jobs in the queue                                                |
| Current Printer Job     | Number of jobs currently spooled in the queue                                    |



**TABLE C-116** Printer Queues Properties (Continued)

| Property           | Description                                                       |
|--------------------|-------------------------------------------------------------------|
| Printer Queue Size | Total size (in Kbytes) of the jobs currently spooled in the queue |

## HP JetDirect Module Version 2.0

Agents can monitor HP printers that are equipped with a JetDirect card by proxy using the HP JetDirect module. Multiple HP printers may be monitored by loading multiple instances of this module.

The following table provides a brief description of the properties for Printer Status.

**TABLE C-117** General Printer Status Properties

| Property        | Description        |
|-----------------|--------------------|
| Status Display  | LED status display |
| SNMP Get Status | Status of SNMP Get |

For platform-specific information, see your supplement.

## MIB-II Proxy Monitoring Module Version 2.0

The MIB-II Proxy Monitoring module monitors the MIB-II parameters for remote systems. The various categories that monitor the MIB-II parameters on remote systems are listed in the following sections, which list MIB-II group tables:

- “MIB-II System Group Table” on page 363
- “MIB-II Interfaces Group Tables” on page 363
- “MIB-II IP Group Table” on page 364
- “MIB-II ICMP Group Table” on page 367
- “MIB-II TCP Group Tables” on page 368
- “MIB-II UDP Group Tables” on page 370

For more information on the properties of these parameters, see “IPv6 Instrumentation Module Version 1.0” on page 345, which lists the properties for local systems. The same functionality is applied on remote systems by the MIB-II Proxy Monitoring module. For more information on the definition of MIB-II, see the standards documentation RFC1213 (Request For Comments 1213).

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# Advanced System Monitoring Modules

Advanced System Monitoring (ASM) is a licensed value-added software product. You choose to install it when you install the Sun Management Center 3.5 software. ASM provides additional modules that support more complete system monitoring capabilities. ASM includes the following modules, which are described in this section:

- “Directory Size Monitoring Module Version 2.0” on page 386
- “File Scanning Module Version 2.0” on page 387
- “Hardware Diagnostic Suite Version 2.0” on page 388
- “Health Monitor Module Version 2.0” on page 388
- “Kernel Reader Module Version 2.0” on page 392
- “Process Monitoring Module Version 2.0” on page 393

## Directory Size Monitoring Module Version 2.0

This module enables you to isolate and monitor the size of any directory and its subdirectories on a host on which an agent is installed. The subdirectories and links may be viewed recursively using a window that is accessible from the modules pop-up menu.

---

**Note** – To monitor several directories individually, either load multiple instances of the Directory Size Monitoring module or add rows for additional directories in the properties table. See “To Monitor Directory Size” on page 136 for more information.

---

The following table provides a brief description of the properties for Directory Size Monitoring.

**TABLE C-118** Directory Size Monitoring Properties

| Property            | Description                                                                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Instance Name       | Single word or alpha-character string that is used internally within the Sun Management Center agent to identify uniquely a particular module or a row within a module |
| Directory Name      | Name of the directory being monitored                                                                                                                                  |
| Directory           | Directory Existing Check                                                                                                                                               |
| Directory Size (KB) | Current size of the directory in Kbytes                                                                                                                                |

**TABLE C-118** Directory Size Monitoring Properties (Continued)

| Property      | Description                                                       |
|---------------|-------------------------------------------------------------------|
| Rate (KB/sec) | Rate at which the directory is changing size in Kbytes per second |

## File Scanning Module Version 2.0

The File Scanning module scans files on a host for user-specified patterns. Multiple instances of the File Scanning module may be loaded to scan multiple files. This module requires you to add rows for the data property tables. For more information, see “To Add a Row to a Data Property Table” on page 137.

The File Scanning module has the following managed objects:

- File ID Table
- File Statistics Table
- Scan Table

The following table provides a brief description of the properties for file scanning.

**TABLE C-119** File Scanning Properties

| Property   | Description                               |
|------------|-------------------------------------------|
| File ID    | Name of the pattern used in the file scan |
| File Stats | State of the pattern listed               |
| Scan Table | Name of the pattern used in the file scan |

The following table provides a brief description of the properties for file ID.

**TABLE C-120** File ID Properties

| Property   | Description                              |
|------------|------------------------------------------|
| Filename   | Full path name of the file to be scanned |
| Scan Mode  | Mode in which the file is being scanned  |
| Start Time | Time the file scan was first started     |

The File Statistics table displays summary information on the file that is to be scanned. The following table provides a brief description of the properties for file statistics.

**TABLE C-121** File Statistics Properties

| Property          | Description                                            |
|-------------------|--------------------------------------------------------|
| Modification Time | Date and time when the file was last modified          |
| File Size         | Size of the file in bytes                              |
| Number of Lines   | Number of lines that are in the file                   |
| Lines Per Second  | Rate at which the file is changing in lines per second |

The following table provides a brief description of the properties for scan.

**TABLE C-122** Scan Table Properties

| Property            | Description                                                                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------|
| Row Status          | Status of the row                                                                                                  |
| Pattern Name        | Name of the pattern that was used in the file scan                                                                 |
| Pattern Description | Name of the pattern entry to be displayed in the name field of the Scan Results section                            |
| Regex Pattern       | Regular expression pattern to be used when scanning the file for entries                                           |
| Pattern State       | State of the pattern listed (on/off). The off state indicates that the listed pattern is not used in the file scan |
| Matches             | Number of lines that contain the pattern                                                                           |

## Hardware Diagnostic Suite Version 2.0

The Hardware Diagnostic Suite tests the system for hardware faults. When the module is loaded and the Hardware Diagnostic Suite software is installed, the Applications tab on the Details window allows you to initiate the tests. For more information about the Hardware Diagnostic Suite, see *Sun Management Center Hardware Diagnostic Suite 2.0 User's Guide*.

## Health Monitor Module Version 2.0

The Health Monitor module monitors the health of your host. When alarm conditions occur, this module offers suggestions, if necessary, on how to improve the performance of the system.

For example, this module monitors the swap space that is available, reserved, allocated, and used. Sample alarm messages, from lowest to highest severity, include:

- No Worries: sufficient swap space available

- There is lots of unused swap space
- Not much swap left: perhaps add some more
- Swap space shortage: add some more now
- Dangerous swap space shortage: add more immediately

This section describes properties of the following Health Monitor module managed objects:

- Swap Table
- Kernel Contention Table
- NFS Table
- CPU Table
- Disk Table
- RAM Table
- Kernel Memory Table
- Directory Cache Table

The Health Monitor module tracks the system properties for the above as described in the following table.

**TABLE C-123** Health Monitor Properties

| Property          | Description                                       |
|-------------------|---------------------------------------------------|
| Swap              | Details the swap space                            |
| Kernel Contention | Monitors the kernel contention (mutex) properties |
| NFS               | Provides NFS client information                   |
| CPU               | Provides information on the power of the CPU      |
| Disk              | Presents the disc I/O information                 |
| RAM               | Random access memory (RAM) information            |
| Kernel Memory     | Information on kernel memory                      |
| Directory Cache   | Cache of the directory                            |

## Swap Table

The following table provides a brief description of the properties for Swap.

**TABLE C-124** Swap Properties

| Property          | Description                |
|-------------------|----------------------------|
| Swap Available KB | Swap space value available |
| Swap Reserved KB  | Swap space value reserved  |

**TABLE C-124** Swap Properties (Continued)

| Property          | Description                |
|-------------------|----------------------------|
| Swap Allocated KB | Swap space value allocated |
| Swap Used KB      | Swap space value used      |
| Swap Rule         | Rule for swap              |

## Kernel Contention Table

The following table provides a brief description of the properties for Kernel Contention (mutex).

**TABLE C-125** Kernel Contention Properties

| Property              | Description                                                          |
|-----------------------|----------------------------------------------------------------------|
| Spins On Mutexes      | Spins on mutexes (lock not acquired on first try) - Sum for all CPUs |
| Number Of CPUs        | Number of CPUs                                                       |
| Spins On Mutexes Rule | Spins on mutexes (lock not acquired on first try) - Sum for all CPUs |

## NFS Table

The following table provides a brief description of the properties for NFS client information.

**TABLE C-126** NFS Client Information Properties

| Property | Description                                                                                     |
|----------|-------------------------------------------------------------------------------------------------|
| Calls    | Total number of RPC calls received                                                              |
| Badcalls | Total number of calls rejected by the RPC layer                                                 |
| Retrans  | Call retransmitted due to a timeout                                                             |
| Badxids  | Reply from server not corresponding to any outside call                                         |
| Timeouts | Call timed-out while waiting for a reply from server                                            |
| Newcreds | Number of times authentication information was refreshed                                        |
| Badverfs | Calls failed due to a bad verifier in response                                                  |
| Timers   | Number of times that calculated timeouts exceed the minimum specified timeout value for a call. |

**TABLE C-126** NFS Client Information Properties *(Continued)*

| Property     | Description                  |
|--------------|------------------------------|
| Nomem        | Failure to allocate memory   |
| Can't Send   | Failure to send NFS/RPC rule |
| NFS/RPC Rule | Value of the NFS/RPC rule    |

## CPU Table

The following table provides a brief description of the properties for the central processing unit (CPU).

**TABLE C-127** CPU Properties

| Property               | Description                                     |
|------------------------|-------------------------------------------------|
| Processes In Run Queue | Number of processes in run queue                |
| Processes Waiting      | Number of processes blocked for resources       |
| Processes Swapped      | Number of processes that can be run but swapped |
| CPU Power Rule         | CPU power rule                                  |

## Disk Table

The following table provides a brief description of the properties for disk.

**TABLE C-128** Disk Properties

| Property          | Description                                        |
|-------------------|----------------------------------------------------|
| Disk Name         | Name of the disk                                   |
| Disk Alias        | Name of the disk, such as c0t0d0                   |
| Percent Disk Wait | Average number of transactions waiting for service |
| Percent Disk Busy | Percent of time disk is busy                       |
| Service Time (ms) | Average service time in milliseconds               |
| Disk Rule         | Disk rule                                          |

## RAM Table

The following table provides a brief description of the properties for random access memory (RAM).

**TABLE C-129** RAM Properties

| Property         | Description                                           |
|------------------|-------------------------------------------------------|
| Handspread       | Value of hand spread (one of kernel parameters) pages |
| Scan rate        | Page scan rate                                        |
| Real Memory rule | Real memory rule                                      |

## Kernel Memory Table

The following table provides a brief description of the properties for Kernel Memory.

**TABLE C-130** Kernel Memory Properties

| Property                      | Description                        |
|-------------------------------|------------------------------------|
| Total Kernel Allocation Fails | Value of kernel allocation failure |
| Physical Memory Free          | Value of free physical memory      |
| Kernel Memory Rule            | Value of kernel memory rule        |

## Directory Cache Table

The following table provides a brief description of the properties for Directory Cache.

**TABLE C-131** Name Cache Statistics Properties

| Property     | Description                                          |
|--------------|------------------------------------------------------|
| Cache Hits   | Number of times a previously accessed page is found  |
| Cache Misses | Number of times a previously accessed page is missed |
| DNLC Rule    | Directory name lookup cache rule                     |

## Kernel Reader Module Version 2.0

The Kernel Reader module monitors kernel statistics and all kernel information including CPU statistics, system load statistics, disk statistics, file system usage, and so on. This section includes properties and their descriptions for all Kernel Reader managed objects:

- User Statistics Table
- Interprocess Communication Tables
- Disk Statistics Managed Objects Tables



- I/O Error Statistics Table
- Filesystem Usage Table
- CPU Statistics Managed Object Tables
- Memory Usage Statistics Table

## Process Monitoring Module Version 2.0

The following section describes the Process Monitoring module parameters and their property descriptions. This module requires you to add rows for the data property tables. For more information, see “To Add a Row to a Data Property Table” on page 137.

When a matching process is found, the %CPU and a count of the number of processes that match is displayed. If you want to change the module parameters, you can edit all the parameters except for the entry name by accessing the pop-up menu. See “To Access a Pop-Up Menu” on page 87 for more information.

### Process Statistics Table

The following table provides a brief description of the properties for Process Statistics.

---

**Note** – When you add a row to the process statistics table, you must provide the information in the first five rows in the following table. See “To Add a Row to a Data Property Table” on page 137 for more information.

---

**TABLE C-132** Process Statistics Properties

| Property           | Description                                                                       |
|--------------------|-----------------------------------------------------------------------------------|
| Entry Name         | Name of the process statistics table entry (must be a unique name).               |
| Name Pattern       | Pattern to match the name of the binary for the process that you want to monitor. |
| Argv Pattern       | Pattern to match the arguments of the command that executes the process.          |
| User Specification | User name that is executing the process.                                          |
| Entry Description  | Description of the entry (required field).                                        |
| Process Command    | Command used to initiate the process, if applicable.                              |
| Process Count      | Number of processes currently running that match the patterns.                    |

**TABLE C-132** Process Statistics Properties (Continued)

| Property           | Description                                                                                                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| % System CPU Usage | Percentage CPU used by the system processes. This value is a time-weighted average that is taken at different time intervals. Do not confuse this percentage with the value that might result after you enter the UNIX <code>ps</code> command. |
| % User CPU Usage   | Percentage CPU used by the user processes.                                                                                                                                                                                                      |
| Virtual Size       | Total size of the processes in Kbytes.                                                                                                                                                                                                          |
| Resident Set Size  | Resident size of the processes in Kbytes.                                                                                                                                                                                                       |
| Monitoring State   | Toggle between on (row is enabled) and off (row is disabled). When the row is disabled, all the entries are displayed as 0 (zero).                                                                                                              |

## Microstate Information Table

The following table provides a brief description of the properties for Microstate Information.

**TABLE C-133** Microstate Information Properties

| Property                     | Description                                                                                    |
|------------------------------|------------------------------------------------------------------------------------------------|
| Entry Name                   | Name of the entry (must be a unique name).                                                     |
| CPU wait time                | Percentage of time for CPU wait.                                                               |
| Text page fault time         | Percentage of time for text page faults.                                                       |
| Data page fault time         | Percentage of time for data page faults.                                                       |
| Major page faults            | Number of major page faults per second (text and data faults).                                 |
| Characters in I/O            | Number of characters read and written per second.                                              |
| Involuntary context switches | Number of involuntary context switches per second.                                             |
| CPU time for reaped children | Percentage of CPU time used by child processes that have detached from their parent processes. |
| User lock time               | Percentage of time spent for user locks.                                                       |
| System trap time             | Percentage of time spent for system traps.                                                     |
| Total swaps                  | Percentage of time spent on swaps.                                                             |
| Entry Description            | Description of the entry (required field).                                                     |

**TABLE C-133** Microstate Information Properties (Continued)

| Property             | Description                           |
|----------------------|---------------------------------------|
| Executable code Rule | Rule that applies to executable code. |
| File access rule     | Rule that applies to file access.     |

**Note** – You might see extremely high percentages on a per-CPU basis if the following facts are true:

- A particular process has a number of  $n$  threads that are waiting to become active.
- User Lock Time is 100% times the number of  $n$  threads.



# Sun Management Center Software Rules

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This appendix lists the Sun Management Center rules for the following modules:

- “Kernel Reader” on page 398
- “Health Monitor” on page 400

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## Rules Concepts

A rule is an alarm check mechanism that allows for complex or special purpose logic in determining the status of a monitored host or node.

There are two types of rules:

- *Simple* rules are based on the `rCompare` rule, in which monitored properties are compared to the rule. If the rule condition becomes true, an alarm is generated. For example, a simple rule can be the percentage of disk space used. If the percentage of disk space used is greater than or equal to the percentage specified in the rule, then an alarm is generated.
- *Complex* rules are based on multiple conditions. For example, one complex rule states that an alert alarm is generated when the following conditions are met:
  - The disk is over 75% busy
  - The average queue length is over 10
  - The wait queue is increasing

---

**Note** – Any user-customized Solstice SyMON™ 1.x rules must be ported to the Sun Management Center environment before the rules can be used in Sun Management Center software.

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# Kernel Reader

The following table lists the Kernel Reader simple rules.

**TABLE D-1** Kernel Reader Simple Rules

| <b>Property</b> | <b>Description</b>                               |
|-----------------|--------------------------------------------------|
| avg_1min        | Load average over the last minute                |
| avg_5min        | Load average over the last 5 minutes             |
| avg_15min       | Load average over the last 15 minutes            |
| cpu_delta       | Difference between the previous and current time |
| cpu_idle        | CPU idle time                                    |
| cpu_kernel      | CPU kernel time                                  |
| cpu_user        | CPU user time                                    |
| cpu_wait        | CPU wait time                                    |
| ipctused        | Percent of inodes used                           |
| kpctused        | Percent of Kbytes used                           |
| mem-inuse       | Physical memory in use (Mbytes)                  |
| numusers        | Number of users                                  |
| numsessions     | Number of user sessions                          |
| swap_used       | Swap used (Kbytes)                               |
| wait_io         | CPU wait time breakdown                          |
| wait_pio        | CPU wait time breakdown                          |
| wait_swap       | CPU wait time breakdown                          |

The following table lists the Kernel Reader complex rules.

**TABLE D-2** Kernel Reader Complex Rules

| Rule ID  | Description                                                                                                                                                                                                                                                                                                                                                                | Type of Alarm                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| rknrd100 | This rule covers a transitory event. The rule generates an alert alarm when the disk is over 75% busy, the average queue length is over 10, and the wait queue is increasing. The alert alarm remains until the disk is less than 70% busy and the average queue length is less than 8.                                                                                    | Alert                                  |
| rknrd102 | This rule covers a transitory event. The rule generates an alert alarm if 90% of swap space is in use. The event causing the alarm remains until swap space in use is less than 80% of the total swap space.                                                                                                                                                               | Alert                                  |
| rknrd103 | This rule covers a transitory event. The rule generates an alert alarm if swapping and paging is high for a given CPU. This behavior indicates that a CPU may be thrashing. An alert alarm is generated when CPU exceeds 1 swap-out, 10 page-ins, and 10 page-outs per second. The alert alarm stays on if CPU exceeds 1 swap-out, 8 page-ins, and 8 page-outs per second. | Alert                                  |
| rknrd105 | File System Full error. This rule looks for a file system full error message in the syslog (/var/adm/message).                                                                                                                                                                                                                                                             | Alert alarm that is closed immediately |
| rknrd106 | No swap space error. This rule looks for a no swap space error message in the syslog (/var/adm/message).                                                                                                                                                                                                                                                                   | Alert alarm that is closed immediately |
| rknrd400 | This rule checks for a continuous CPU load over six per CPU for four hours.                                                                                                                                                                                                                                                                                                | Informational                          |
| rknrd401 | This rule checks for disks that are busy more than 90% of the file for <i>x</i> hours. The parameters field holds the last time CPU load was below six, and is initialized to some date in the year 2001.                                                                                                                                                                  | Informational                          |
| rknrd402 | This rule checks if available swap space drops below 10% for <i>x</i> hours. The parameters field indicates the last time that the CPU load was below six. This field is initialized to some date in the year 2001.                                                                                                                                                        | Informational                          |
| rknrd403 | This rule is not currently supported.                                                                                                                                                                                                                                                                                                                                      | Informational                          |
| rknrd404 | An informational alarm is generated if rule rknrd401 gets triggered 4 times.                                                                                                                                                                                                                                                                                               | Informational                          |
| rknrd405 | An informational alarm is generated if rule rknrd402 gets triggered 4 times.                                                                                                                                                                                                                                                                                               | Informational                          |

---

# Health Monitor

The following table lists the Health Monitor complex rules.

**TABLE D-3** Health Monitor Complex Rules

| Rule ID  | Description                                                                                                                                                                                                                                                                                                                                                                | Type of Alarm            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| rhltm000 | This rule checks whether there is enough swap space.                                                                                                                                                                                                                                                                                                                       | Critical, Alert, Caution |
| rhltm001 | CPU power is wasted each time a CPU has to wait for a lock to become free. This event is counted because the kernel uses mutually exclusive locks to synchronize its operation and to keep multiple CPUs from concurrently accessing critical code and data regions.                                                                                                       | Critical, Alert, Caution |
| rhltm002 | NFS remote procedure call timeouts may be associated with duplicate responses after the call is retransmitted. These timeouts indicate that the network is okay but the server is responding slowly.                                                                                                                                                                       | Critical, Alert, Caution |
| rhltm003 | The run queue length is divided by the number of CPUs because every CPU takes a job off the run queue in each time slice.                                                                                                                                                                                                                                                  | Critical, Alert, Caution |
| rhltm004 | A busy disk or a slow disk reduces system throughput and increases user response times. This rule identifies the disks that are loaded so that the load can be rebalanced.                                                                                                                                                                                                 | Critical, Alert, Caution |
| rhltm005 | RAM rule based on residency time for an unreferenced page. The virtual memory system indicates that the system needs more memory when the system scans to look for idle pages to reclaim for other uses.                                                                                                                                                                   | Critical, Alert, Caution |
| rhltm006 | This rule refers to the problem with kernel memory allocation that occurs when login attempts or network connections fail unexpectedly. There are two possible causes: Either the kernel has reached the extent of its address space, or the free list does not contain any pages to allocate. The repeated failures signify a problem that might otherwise be overlooked. | Critical, Alert, Caution |
| rhltm007 | A global cache of directory path name components exists. This cache is called the directory name lookup cache (DNLC). If this cache does not exist, directory entries must be read from disk and be scanned to locate the right file.                                                                                                                                      | Critical, Alert, Caution |



# Glossary

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|                              |                                                                                                                                                                                                                                                                                                                                       |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>administrative domain</b> | An arbitrary collection of hosts and networks that the Sun Management Center monitors as a single hierarchal entity. You can choose to divide your enterprise into several domains, each domain to be managed by different users.                                                                                                     |
| <b>agent</b>                 | A software process, usually corresponding to a particular local managed host, that carries out manager requests. An agent makes local system and application information available to remote users.                                                                                                                                   |
| <b>alarm</b>                 | An abnormal event that is detected by a Sun Management Center agent and that might indicate current or impending problems. The agent passes information about the abnormal event to the Sun Management Center server. The server passes this information on as an alarm when the abnormal event matches a predefined alarm threshold. |
| <b>alarm acknowledgment</b>  | Sun Management Center users can acknowledge alarms, indicating that the alarm does not represent a serious problem or that the problem is being resolved. Acknowledged alarms take a lower priority than unacknowledged alarms.                                                                                                       |
| <b>Attribute Editor</b>      | A window that provides information about the selected object. In addition, the Attribute Editor enables you to customize various monitoring criteria for that object. The monitoring criteria are dependent on the type of object. There are Attribute Editors for domains, hosts, modules, and data properties.                      |
| <b>autonomous agents</b>     | Agents that can work independently from each other.                                                                                                                                                                                                                                                                                   |
| <b>bus</b>                   | A point-to-point network component. Used by the software to represent a network link to which many other hosts may be connected.                                                                                                                                                                                                      |
| <b>community</b>             | A string that is similar to a password and that is used to authenticate access to an agent's monitored data.                                                                                                                                                                                                                          |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>complex alarm</b>            | A complex alarm is based on a set of conditions being true. Unlike simple alarms, you cannot set thresholds for complex alarms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>composite object</b>         | Hardware that has multiple instances of the Solaris operating environment running inside a single chassis. These objects are “composites” from the Sun Management Center point of view because the objects consist of several parts shown inside a group or container. These parts include the following: <ul style="list-style-type: none"> <li>■ One object for each instance of the Solaris operating environment</li> <li>■ Two objects that represent an active and backup system controller</li> <li>■ One object that represents the hardware chassis and related equipment such as fans and power supplies</li> </ul> |
| <b>console window</b>           | A graphical user interface component of Sun Management Center software used to view information and status for monitored hosts and managed objects and to interact with Sun Management Center agents. All Sun Management Center functions are available from a Java console. Some functions are also available from a web console.                                                                                                                                                                                                                                                                                            |
| <b>developer environment</b>    | A demonstration environment in which developers can test customized modules designed to work with the Sun Management Center software. See the <i>Sun Management Center 3.5 Developer Environment Reference Manual</i> for more information.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Discovery</b>                | A Sun Management Center tool available from the main console window that is used to find hosts, routers, networks, and Simple Network Management Protocol (SNMP) devices that can be reached from the Sun Management Center server.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>dynamic loadable modules</b> | A Sun Management Center agent module that can be loaded or unloaded at runtime, enabling monitored properties to be displayed on the main console window without having to restart the console or agent.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>event</b>                    | A change in the state of a managed object.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>file scanning</b>            | The act of scanning a file, usually a log file, for certain patterns (regular expressions) that may be indicative of problems or significant information. Sun Management Center agents use file scanning to assist in the monitoring of systems and applications when these components do not provide direct access to status information.                                                                                                                                                                                                                                                                                    |
| <b>graphical user interface</b> | The graphical user interface, or GUI, is a window that provides the user with a method of interacting with the computer and its special applications, usually with a mouse or other selection device. The window usually includes such things as windows, an intuitive method of manipulating directories and files, and icons.                                                                                                                                                                                                                                                                                               |

|                               |                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>hierarchy view</b>         | A window view that defines objects in a hierarchy or tree relationship. Objects are grouped depending on the rank of the object in the hierarchy.                                                                                                                                                                                                                                                           |
| <b>hop</b>                    | The number of routers through which a packet goes before reaching its destination.                                                                                                                                                                                                                                                                                                                          |
| <b>instance</b>               | A single word or alpha-character string that is used internally within the Sun Management Center agent to identify uniquely a particular module or a row within a module.                                                                                                                                                                                                                                   |
| <b>manage</b>                 | In Sun Management Center software, manage is defined as being able to observe (monitor) and manipulate the object. For example, management privileges include acknowledging and closing alarms, loading and unloading modules, changing alarm thresholds, and so on. Management privileges are similar to read, write, and execute access.                                                                  |
| <b>MCP</b>                    | Module Configuration Propagation. MCP refers to the process of copying scripts and module configuration files from one host to another host or group of hosts.                                                                                                                                                                                                                                              |
| <b>MIB</b>                    | Management information base. A MIB is a hierarchical database schema that describes the data that is available from an agent. Sun Management Center agents use the MIB to store monitored data that can be accessed remotely.                                                                                                                                                                               |
| <b>module</b>                 | A software component that may be loaded dynamically to monitor data resources of systems, applications, and network devices.                                                                                                                                                                                                                                                                                |
| <b>monitor</b>                | In Sun Management Center software, monitor is defined as being able to observe objects, alarms, and properties. Monitoring privileges are similar to read-only access. Contrast with manage.                                                                                                                                                                                                                |
| <b>NAT</b>                    | Network Address Translation. A network configuration feature that enables an IP address to appear as a different IP address, often used for security or efficiency reasons.                                                                                                                                                                                                                                 |
| <b>node</b>                   | A workstation or server.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>object</b>                 | A particular resource, such as a computer host, network interface, or software process, that Sun Management Center software can monitor or manage. A managed object is an object that you can manipulate. For example, you can acknowledge and turn off an alarm condition for an object that you can manage. A monitored object is an object that you can observe but not acknowledge or otherwise manage. |
| <b>production environment</b> | One of two environments in which Sun Management Center software is deployed. The production environment is a real environment (as opposed to a test environment) in which you manage and monitor your hardware.                                                                                                                                                                                             |

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>remote server context</b>           | A collection of Sun Management Center agents and a particular server layer with which the remote agents are associated.                                                                                                                                                                                                                                                                                 |
| <b>request caching</b>                 | The consolidation of duplicate outstanding requests that originated from multiple consoles. This strategy eliminates the execution of redundant requests.                                                                                                                                                                                                                                               |
| <b>rule</b>                            | An alarm check mechanism that allows for complex or special purpose logic in determining the status of a monitored host or node.                                                                                                                                                                                                                                                                        |
| <b>seed</b>                            | The password used to generate the Sun Management Center security keys. The seed is an alpha-numeric string of up to eight characters. This string is not necessarily a UNIX password. You can select your own seed, or accept the default seed ( <code>maplesyr</code> ) provided by the Sun Management Center software. If you select your own seed, be sure to record the seed for later reference.   |
| <b>segment</b>                         | An object that represents a network segment and that is used as a basis for a local network.                                                                                                                                                                                                                                                                                                            |
| <b>server</b>                          | The collection of programs and processes (SNMP-based trap, event, topology, configuration, and Java server) that work on behalf of a Sun Management Center user to help manage a particular set of networks, hosts, and devices. The server usually sends requests to Sun Management Center agents, accepts collected data from the agents, and passes the data to the main console window for display. |
| <b>server context</b>                  | A Sun Management Center sever layer and its associated agents.<br><br>See also remote server context.                                                                                                                                                                                                                                                                                                   |
| <b>simple alarm</b>                    | Alarms that are based on one condition becoming true. You may set alarm thresholds for simple alarms.                                                                                                                                                                                                                                                                                                   |
| <b>SNMP</b>                            | Simple Network Management Protocol. A simple protocol that enables networked entities (hosts, routers, and so on) to exchange monitoring information.                                                                                                                                                                                                                                                   |
| <b>SNMPv2 usec</b>                     | SNMP version 2, user-based security model security standards.                                                                                                                                                                                                                                                                                                                                           |
| <b>Sun Management Center superuser</b> | A valid user on a server host. The superuser decides what the agents are in the context of the server. By default, the superuser password is used as a seed for security key generation.                                                                                                                                                                                                                |
| <b>Sun Management Center user</b>      | Members of the <code>symon</code> group in the <code>/etc/group</code> file.                                                                                                                                                                                                                                                                                                                            |
| <b>topology view</b>                   | The view that displays the members of the object selected in the hierarchy view.                                                                                                                                                                                                                                                                                                                        |
| <b>URL</b>                             | Uniform Resource Locator. A URL is a textual specification that describes a resource that can be accessed through the network.                                                                                                                                                                                                                                                                          |

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