



Sun™ Management Center 3.0 Software User's Guide

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Part No. 806-5942-10
November 2000, [Revision A](#)

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Preface

The *Sun Management Center 3.0 User's Guide* provides instructions on how to use the Sun™ Management Center system management solution. These instructions are designed for a system administrator with networking knowledge.

Note – In the Sun Management Center software, all alarm messages are displayed in English.

Using UNIX Commands

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

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook™ online documentation for the Solaris™ software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface	Meaning	Examples
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. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type <code>rm filename</code> .

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#
MS-DOS Microsoft Windows	C:\

Related Documentation

For a list of related documents, see the *Sun Management Center 3.0 Software Release Notes* on the Sun Management Center website:

<http://www.sun.com/sunmanagementcenter>

Accessing Sun Documentation Online

The `docs.sun.comsm` web site enables you to access Sun technical documentation on the Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at:

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Please include the part number of your document in the subject line of your email.

Introduction

This chapter provides an overview of the Sun™ Management Center version 3.0 product, its component layers, and how they interact with one another.

This chapter includes the following topics:

- Sun Management Center Overview
- Sun Management Center Architecture
- Sun Management Center Concepts
- Sun Management Center Monitoring Features
- Sun Management Center Software Environments
- Installing Sun Management Center
- Available Features

Sun Management Center Overview

Sun Management Center software is an open, extensible system monitoring and management solution that uses Java™ software protocol and Simple Network Management Protocol (SNMP) to provide an integrated and 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.

TABLE 1-1 Sun Management Center Technology

Feature	Description
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 including 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 real-time control systems.
Scalability	Provides an open, scalable, and flexible solution to configure and manage multiple management administrative domains (consisting of many systems) spanning across an enterprise. The software can be configured and used in a centralized or distributed fashion by multiple users.

Sun Management Center Architecture

Sun Management Center software comprises three component layers: console, server, and agent. It is based on the manager/agent architecture, in which:

- The console is the user interface which interacts with you to initiate management tasks.
- The server (manager) executes management applications and sends requests to agents in order to perform management tasks on your behalf.
- The agents (that are executing on the managed nodes) access the management information, monitor local resources, and respond to manager requests.

The three component layers are depicted in FIGURE 1-1.

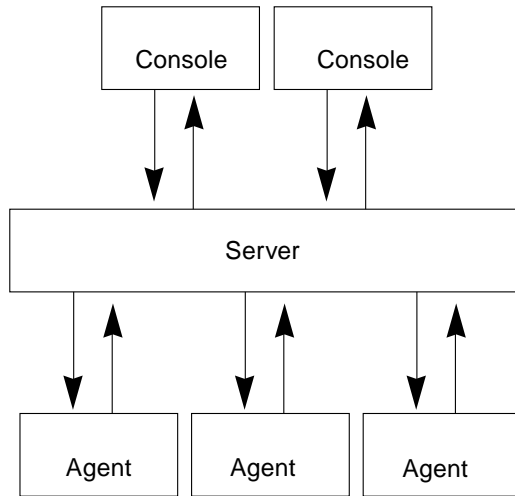


FIGURE 1-1 Sun Management Center Component Layers

The major Sun Management Center layers and their functionality are described below.

Console Layer

You may have multiple consoles, serving multiple users, for the same Sun Management Center server. The consoles provide you with:

- Visual representations of the managed objects (for example, hosts and networks)
- The ability to manipulate attributes and properties associated with the managed objects (for example, create alarm thresholds)
- The ability to initiate management tasks (for example, dynamic reconfiguration)

The Sun Management Center console layer is the interface between you and the other component layers of Sun Management Center software.

Server Layer

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

For example, if you want information on the number of users accessing a host, the server layer receives this request from the console, and sends it to the agent on that host. The agent finds the answer, sends it back to the server, which passes on the information to you (through the console)

Similarly, if an error condition is created on one of the hosts, the agent on that host sends notification of this error (an event) to the server, which forwards the information to you (through the console) as an alarm.

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

The server layer includes five components (FIGURE 1-2):

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

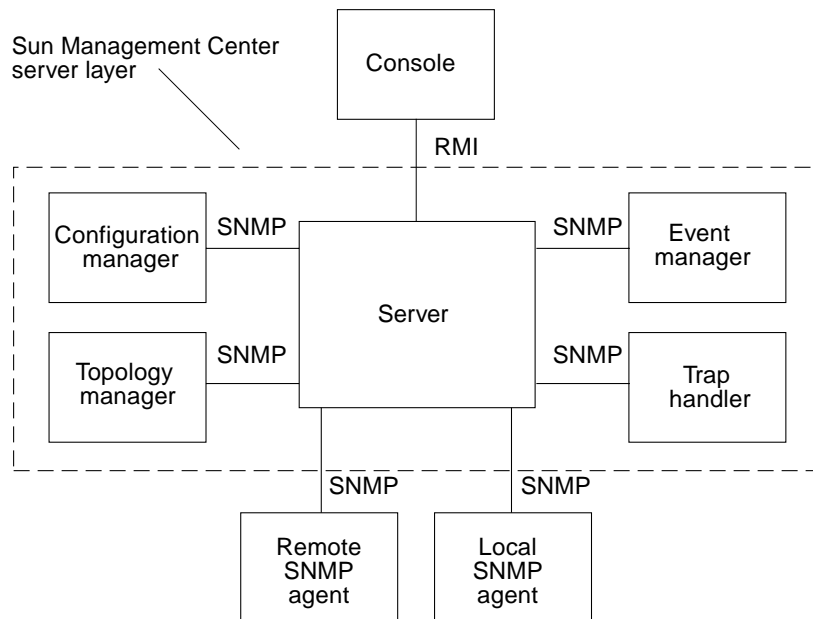


FIGURE 1-2 Sun Management Center Server Layer

The server component is the core of the server layer. It is based on Java technology and is multi-threaded, and it handles multiple data requests from various Sun Management Center users.

Sun Management Center Topology manager provides services including the management of user administrative domains and the topology layout of managed objects.

The Trap handler is a centralized SNMP trap receptor that performs logging and forwarding of traps to interested components. It is this server layer component that is responsible for receiving all alarm notifications.

The Sun Management Center Configuration manager provides security services to the server and the agents.

The Sun Management Center Event manager sends and receives event information from the agents. These events can trigger alarms, which are forwarded to the console.

Agent Layer

The agent layer performs the actual information gathering, monitoring, and management of objects on the nodes managed by the Sun Management Center software. The server layer interacts with the agent layer to gain access to the managed objects by using SNMP.

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

The agents use rules to determine the status of the managed objects. When the conditions specified by a rule become true, the software automatically generates alarms or performs actions as specified in the rules.

Server Context

A Sun Management Center server context is defined as the server layer and the agent layers. When starting the console, you log into a particular server context. The managed objects whose agents send information to that same server also belong to the same server context.

A managed object can belong to the same server context or a remote server context. (A managed object in a remote server context sends information to a different server while 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 a precise definition of manage and monitor, see the Glossary. For more information on the server context, see Chapter 14.

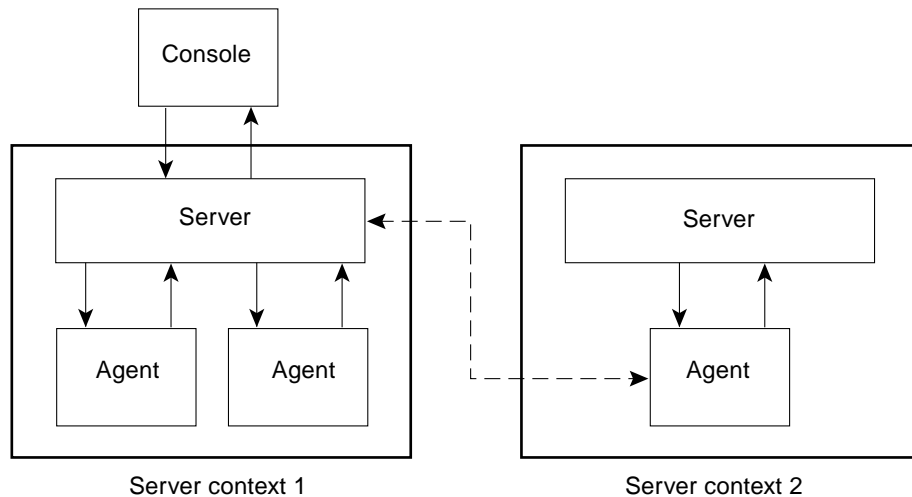


FIGURE 1-3 Console Logs Into a Server Context

Sun Management Center Concepts

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

- Administrative domains
- Modules
- Alarms and Rules

Note – In this document, “domain” refers to a Sun Management Center administrative domain, and 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 may consist of these resources, which can be combined with other resources to form groups within a administrative domain. Each of these groups may contain additional groups of resources, providing a multilevel, hierarchical administrative domain.

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

The Sun Management Center software displays the administrative domain and its members in a visual representation (FIGURE 1-4).

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 Sun Management Center Main Console Window Showing an Administrative Domain and Its Members

Modules

Unlike most agents, the Management Information Base (MIB) provided by Sun Management Center agents is not implemented in a monolithic code that contains a wide variety of functionality in a single program. Instead, Sun Management Center software uses several components, 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 (FIGURE 1-5).

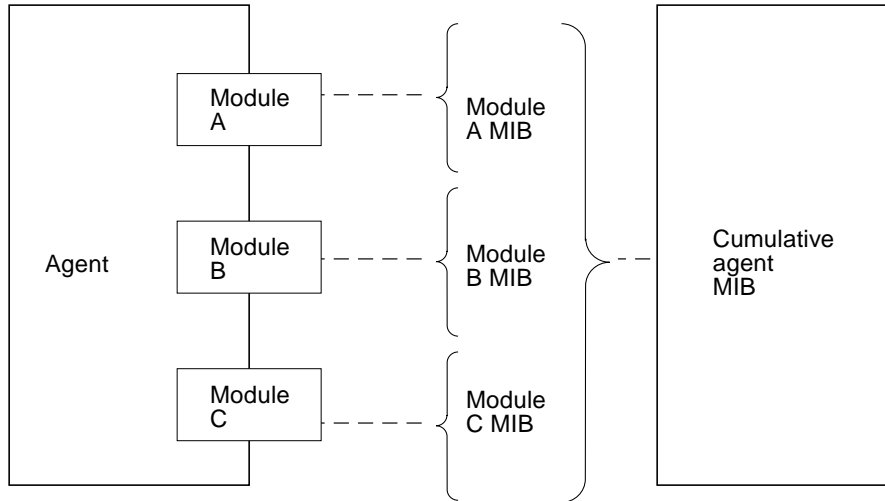


FIGURE 1-5 Sun Management Center Agent MIB

Sun Management Center modules monitor and manage the resources of systems, applications, and network devices.

The modules serve two purposes:

- To monitor and notify you (through alarms) when error conditions occur
- To monitor and notify you (through alarms) when performance tuning is required

For more information on alarms, see “Alarms and Rules” on page 9.

Each module consists of one or more properties that can be monitored on your system. For example, one of the default modules loaded during installation is the Kernel Reader. This module monitors 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 loaded on each agent (object), based on your need.

Alarms and Rules

Sun Management Center software enables you to monitor your system with alarms of 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 the threshold that generates the alarm. For example, you may tell Sun Management Center software to generate a critical alarm when there are seven or greater user sessions. Similarly, you may also tell the software to generate only a cautionary alarm when there are five-to-six user sessions.

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

Complex rules also generate alarms. For example, one complex rule states that when a disk is over 75 percent busy, the average queue length is over 10 entries and the wait queue is increasing, then an alert alarm is generated. 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 and cannot be modified. Consequently, you cannot set thresholds for complex alarms.

When an alarm is generated, the software notifies you through the main console window, and with a message sent to a specified e-mail address. You can also write a customized program that will notify you in other ways that an alarm condition has occurred, such as sending a message to your pager.

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

Sun Management Center Monitoring Features

Sun Management Center software includes the following monitoring features:

- Autonomous Agents
- Main Console Window
- Hierarchy and Topology Views

- View Log
- Applications
- Hardware
- Graph
- Security

These are graphical user interface or GUI-based features, except for autonomous agents. Security is both a GUI-based and command-line feature.

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, it checks the data against the alarm threshold set for the resource and determines whether the data values constitute an alarm condition. If the monitored data meets the alarm threshold, the agent performs the action 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.

Main Console Window

Sun Management Center software provides a main console window to depict, monitor, and interact with your system. You can monitor multiple administrative domains, spanning different locations, through multiple console windows.

Hierarchy and Topology Views

Sun Management Center software offers both hierarchy and topology views (for every administrative domain) and hierarchy and contents views (for every object). The hierarchy 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 may 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 tabs are dependent on the type of object. For example, a typical host object contains the following tabs: Info, Browser, Alarms, View Log, Applications, and Hardware. The View Log, Applications View, and Hardware tabs are described briefly below.

View Log

The view log tab button enables you to view informational messages, including error messages, about your host.

Applications

This 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 custom applications or third-party applications. The displays are continually updated.

Hardware

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

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

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

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

Graph

Sun Management Center software enables you to create a two-dimensional graph of any monitored data property that has a numerical value.

Security

The Sun Management Center security feature authenticates user login and access control privileges for users and groups. It 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, one group of users can see and modify properties on a host while a second group of users can only see the host (with no modification privileges).

You can access Sun Management Center security features from the Attribute Editor within the software.

Sun Management Center Software Environments

Sun Management Center software may be deployed in two different environments:

- production environment
- developer environment

The *production* environment is an “active” or “real” 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 in which developers can test customized modules designed to work with the Sun Management Center software. While the developer environment may appear to be a production environment, its sole purpose is to serve as a “demo” environment for developers to create Sun Management Center modules. For more information on developer environments, refer to the *Sun Management Center 3.0 Developer Environment Reference Manual*.

Installing Sun Management Center

For information on installing Sun Management Center 3.0, see the *Sun Management Center 3.0 Software Installation Guide*.

Getting Started With the Sun Management Center Software

Note – For additional documentation describing new functionality, refer to the *Sun Management Center Software Release Notes*, which is located on the Sun Management Center web site: <http://www.sun.com/sunmanagementcenter> and on the Sun Management Center 3.0 CD.

Sun Management Center supports multiple hardware platforms. Refer to the *Sun Management Center Configuration and Deployment Guide* on the Sun Management Center web site for more information on the supported hardware platforms: <http://www.sun.com/sunmanagementcenter>.

This *Sun Management Center 3.0 Software User's Guide* describes the software functionality that is common to all the supported hardware platforms while platform-specific information is included in the supplements. For example, Sun Management Center functionality specific to the SPARCserver™ 1000 and 1000E, the SPARCcenter™ 2000 and 2000E, and the Sun Enterprise™ 6x00/5x00/4x00/3x00 is contained in the *Sun Management Center 3.0 Supplement for Sun Enterprise Midrange Servers*. This supplement is located on the Sun Management Center web site: <http://www.sun.com/sunmanagementcenter> and in the Sun Management Center 3.0 CD.

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

After installing Sun Management Center software, spend some time navigating through the various windows and testing their functionality. By exploring and testing the software, you will have a better understanding of how you can customize Sun Management Center software to aid in your system monitoring. See Appendix A for more information.

If you prefer to set up your monitoring environment now, see Chapter 14 for information on security.

Available Features

This documentation includes a description of basic and advanced features available in the Sun Management Center version 3.0 software product. The features available in your installation of the product are highly dependent on the terms of your site license. Your installation of the product may or may not include all features.

Using Sun Management Center Administrative Domains

A Sun Management Center administrative domain is an arbitrary collection of resources that can include a complete campus, 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, and should not be confused with other uses of the term “domain” related to other Sun products or documentation.

This chapter describes the following topics:

- To Set a Home Administrative Domain
- To Select Domain Manager
- To Create Administrative Domains
- To Select an Administrative Domain
- To Delete an Administrative Domain
- To Set a Remote Administrative Domain
- To Set Security for an Administrative Domain

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 biggest (highest level) grouping is a administrative domain. An administrative domain is an arbitrary grouping of hosts, subnets, networks, buildings, and so on.

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

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

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

You may 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 (FIGURE 1-4).

Each of these campus locations may be broken into smaller groups; for example, buildings. Similarly, each building may be broken into smaller groups; for example, networks, subnets, and groups. Finally, each group comprises individual hosts.

In this particular example, the hierarchical order, from highest level to lowest level, is administrative domain, campus, building, network, subnet, group, and individual host. For detailed information on creating administrative domains, see “To Create Administrative Domains” on page 20.

Starting Sun Management Center Software

When starting the software for the first time, a dialog is displayed that prompts you to set a Sun Management Center home administrative domain. The home domain is the administrative domain that is displayed whenever the console is started.

During installation, a default administrative domain (named after your server host) is automatically created for you.

- **Proceed with one of the following:**
 - Select the default administrative domain and click on the Set Home button. Your default administrative domain is set as your home administrative domain and is displayed. For more information, see “To Set a Home Administrative Domain” on page 17.
 - Select the default administrative domain and click on the Go To button. The main console window is displayed with this default domain.

The default administrative domain consists of one object, your server host.

- If you want to explore the main console window, see Chapter 5.
- If you want to explore monitoring features, see Chapter 6.

- If you want to create additional administrative domains, see “To Create Administrative Domains” on page 20.
- If you want to create additional objects in your administrative domain, see “Populating Administrative Domains” on page 20.

▼ To Set a Home Administrative Domain

1. Proceed with one of the following:

- Click the Set Home button in the Set Home Domain dialog.
- Select File ► Set Home Domain in the Sun Management Center main console window.

The Set Home Domain dialog is displayed.

2. Select the administrative domain you want to set as your home administrative 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.

Setting Home Domain...Please wait

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

Home domain successfully set.

4. Click the Close button.

The main console window is updated and the home administrative domain is displayed.

At this time, you may want to populate your administrative domain. See “Populating Administrative Domains” on page 20 for more information.

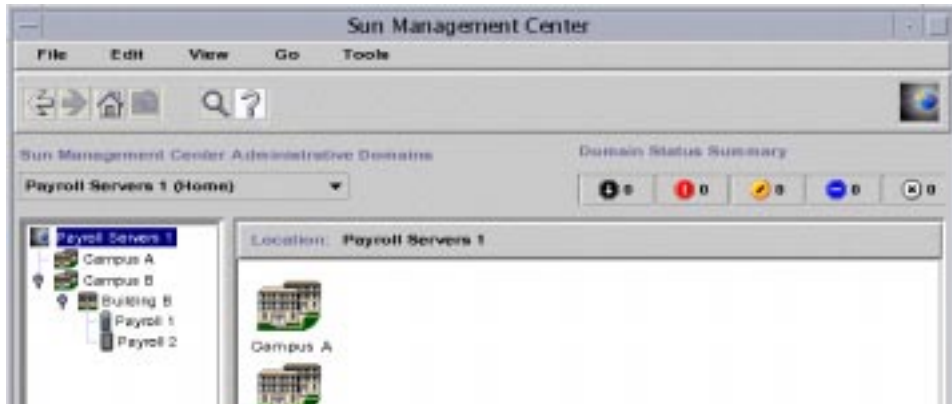


FIGURE 2-1 Home Domain

Creating Administrative Domains

The Sun Management Center software enables you to create Sun Management Center administrative domains with the Domain Manager window.

▼ To Select Domain Manager

- In the main console window, select **File ► Domain Manager**.

The Domain Manager is displayed (FIGURE 2-2).

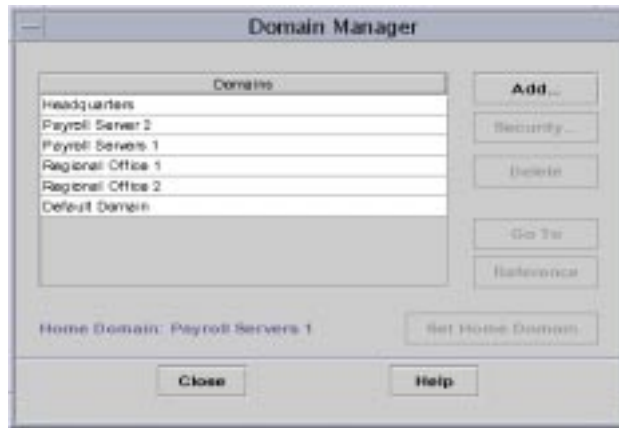


FIGURE 2-2 Domain Manager

Note – In the Domain Manager, some of the buttons are grayed out until you select an administrative domain.

TABLE 2-1 Domain Manager Buttons

Button	Description
Add	Displays the Create Domain dialog.
Security	Displays the Attribute Editor with the security tab selected for the highlighted administrative domain.
Delete	Deletes the selected administrative domain and all its members.
Go To	Updates the main console window to display the selected administrative domain. You may also “go to” an administrative domain by double-clicking on it.
Reference	Inserts the selected administrative domain into the current administrative domain.
Set Home Domain	Sets the selected administrative domain as the administrative domain that is always displayed whenever the console is started. See “To Set a Home Administrative Domain” on page 17 for more information.

▼ To Create Administrative Domains

1. Select **File ► Domain Manager** from the main console window.

The Domain Manager is displayed (FIGURE 2-2).

2. In the Domain Manager, click the left mouse button on **Add**.

The Create Domain dialog is displayed (FIGURE 2-3).

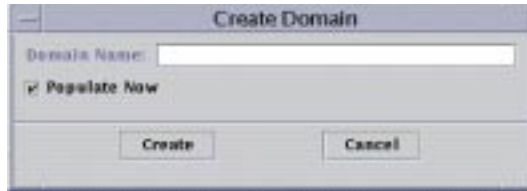


FIGURE 2-3 Create Domain Dialog

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

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

5. Click the **Create** button.
6. Create additional administrative domains or populate your administrative domain manually.

If you do not have the right security permissions to create an administrative domain, an error message is displayed. See Chapter 14 for more information on security.

Populating Administrative Domains

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

Note – To populate an administrative domain, you must have esdomadm privileges. See “Sun Management Center Groups” on page 235 in for more information.

There are three methods to add hosts and other resources to an administrative domain collection:

- Populate with the Discovery Manager—see Chapter 4. Discovery Manager searches the network for resources. This is the default method for populating a newly created administrative domain. The search can be time-consuming, but you can shorten the search by setting limits.
- Populate with the Discovery Manager at scheduled intervals by using the Scheduling feature—see “Starting the Discovery Requests Window” on page 52. You can set the search to occur hourly, daily, weekly, or monthly. This feature enables you to search periodically for new managed objects on the network.
- Manually populate with the Create an Object menu—see Chapter 3. This method enables you to add objects one at a time and 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.

Managing Administrative Domains

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

Selecting Administrative Domains

You can list administrative domains through the Domain Manager window (FIGURE 2-2) or the Sun Management Center main console window.

▼ To Select an Administrative Domain

1. Proceed with one of the following:

- Select File ► Domain Manager in the main console window.
- In the main console window, click the left mouse button on the Sun Management Center Administrative Domains pull-down menu (FIGURE 2-4).

The current list of administrative domains is displayed.

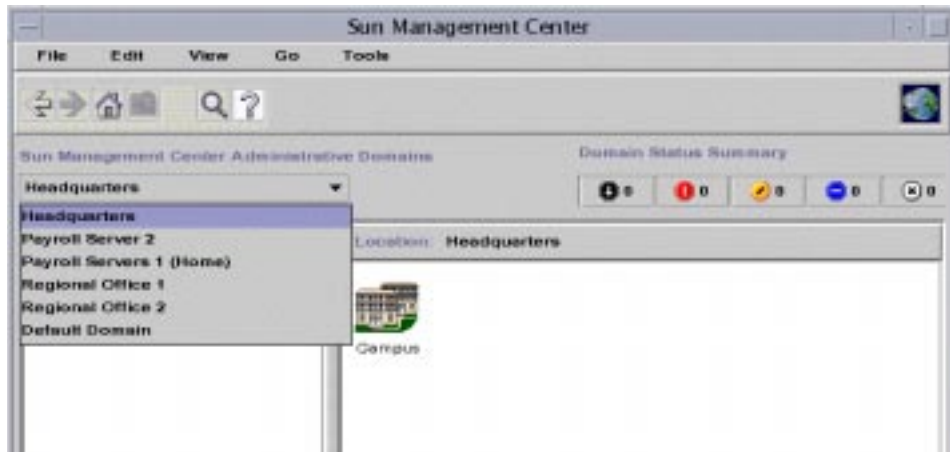


FIGURE 2-4 Sun Management Center Main Console Window with a List of Current Administrative Domains

2. **Click the left mouse button on the administrative domain you want to view.**

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

Deleting Administrative Domains

You must have the appropriate security permission to delete an administrative domain. For more information on Sun Management Center security, see Chapter 14.

▼ To Delete an Administrative Domain



Caution – Deleting an administrative domain also deletes all the members of that domain.

1. **In the Domain Manager window, highlight the name of the administrative domain you want to delete.**
2. **Click the Delete button.**

The Confirm Domain Deletion dialog is displayed.

Note – There are two versions of the Domain Deletion dialog box. One is for any administrative domain. The other is for the administrative domain you are currently viewing. The latter deletion dialog is shown below.

3. Click Delete.

The Confirm Domain Deletion dialog displays the following message.

Deleting domain...Please wait.

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

4. Click the Close button in the Domain Manager.

Monitoring Remote Administrative Domains

Remote administrative domains are Sun Management Center administrative domains created in a different Sun Management Center server context. See Chapter 14 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 by referencing the remote administrative domain in your local administrative domain. However, you are not able to *manage* the remote resource unless you 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 on that resource sends event management information to 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 14.

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, system administrators in Headquarters can monitor the regional office administrative domains 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.

Here is an example of how remote monitoring works. In the following figure, administrative Domain A is monitoring objects 1 and 2 (which are assigned to Domain A) as well as remotely monitoring 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.

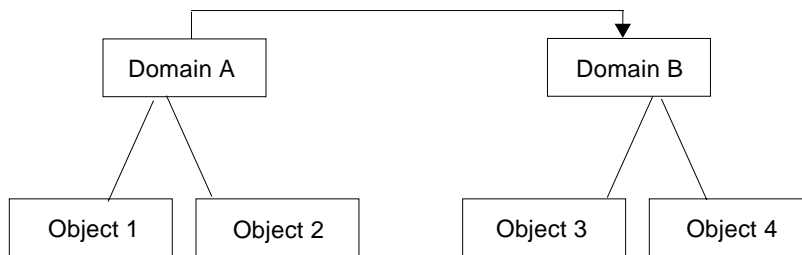


FIGURE 2-5 Remote Administrative Domain



Caution – Do not create an administrative domain with a circular reference (to itself).

For example, do not create an administrative domain (Domain A) which references another administrative domain (Domain B) which in turn, contains a reference to Domain A.)

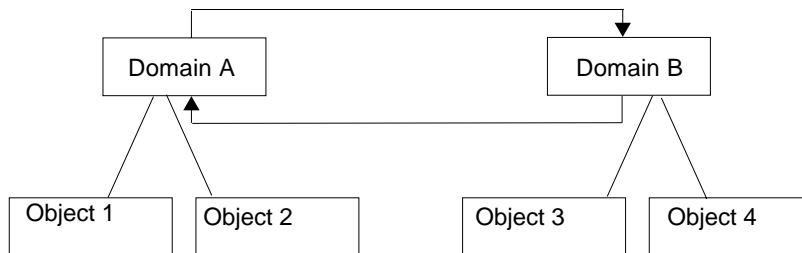


FIGURE 2-6 Remote Administrative Domain - Circular Domain Reference

If it is necessary for the two administrative domains to monitor each other, to avoid creating a circular administrative domain reference, create a domain member (for example, a group) under Domains A and B as shown below.

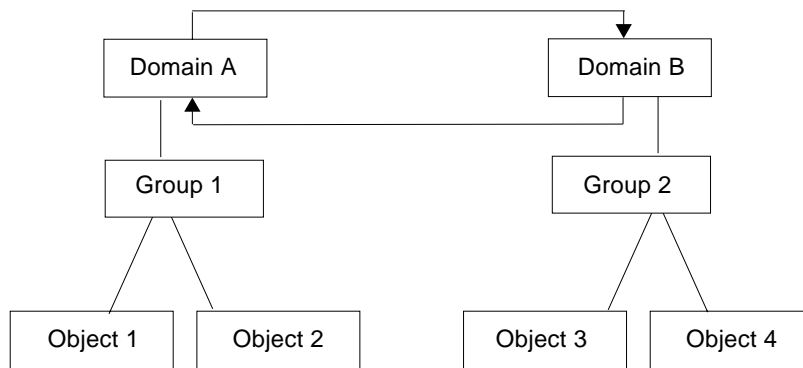


FIGURE 2-7 Remote Administrative Domains - Setting Up for Successful Cross-Monitoring

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 Set a Remote Administrative Domain

1. **In the main console window, select File ► Remote Domain Manager.**

The Remote Domain Manager dialog is displayed.

2. **Type the name of the remote server in the Host field. If applicable, also type the appropriate number in the Port field.**

By default, the Topology manager is installed on the server on port 164.

3. **Click the List Domains button.**

A list of administrative domains on the remote server is displayed.

4. **Click the administrative domain you want to reference.**

The selected administrative domain is highlighted.

5. **Click the Reference button.**

The selected administrative domain is created as a reference domain in the currently selected administrative domain in the main console window.

Attribute Editor for an Administrative Domain

The administrative domain Attribute Editor provides additional information about the selected administrative domain and the rules governing 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 Attribute Editor. The Attribute Editor that is displayed is dependent on the selected object.

▼ To Set Security for an Administrative Domain

1. Proceed with one of the following:

- Open the Attribute Editor for an administrative domain by clicking the right mouse button on the domain icon and highlight Attribute Editor from the pop-up menu in the hierarchy view.
- Select File ► Domain Manager in the main console window. Then select an administrative domain and click the Security button.



FIGURE 2-8 Attribute Editor for an Administrative Domain

2. If not already selected, click the **Security** tab (FIGURE 2-8).
3. Type the name(s) of user and administrator groups in the appropriate fields.
See Chapter 14 for more information.
4. Complete this procedure with one of the following actions:
 - Click OK to accept the changes you have made and close this window.
 - Click Apply to apply your changes without closing this window.
 - Click Reset to reset the Attribute Editor to the default parameters.
 - Click Cancel to cancel your request.

Objects

This chapter describes how to create and monitor objects.

This chapter discusses:

- To Create a Node
- To Create a Module Object
- To Create a Group
- To Create a Composite Object
- To Create a Segment
- To Connect Objects
- To Copy an Object
- To Copy a Group of Objects
- To Modify an Object
- To Cut and Paste Objects
- To Delete Objects

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

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

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

You can create and monitor or manage one or more administrative domains containing nodes for multiple objects (such as the workstations and other devices connected to the server). For information about administrative domains, see Chapter 2.

Creating a Node

You create nodes through the Edit pull-down menu in the main console window.

▼ To Create a Node

Note – An administrative domain must exist before you can create a node. To create an administrative domain, see “To Create Administrative Domains” on page 20.

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

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

For example, if you want to create a node in a building that is in one of the campuses of a administrative domain, then select the building in the administrative domain as the lowest level group.

2. **In the main console window, select Edit ► Create an Object.**

The Create Topology Object window is displayed. By default the tab is set to Node (FIGURE 3-1).



The image shows a software window titled "Create Topology Object". It has four tabs: "Group", "Composite", "Node", and "Segment". The "Node" tab is selected. Inside the window, there is a "Monitor View" dropdown menu set to "Sun Management Center Agent - Host". Below this, there are two text input fields: "Node Label" with the value "Payload 3" and "Description" which is empty. Further down, there is a "Hostname" field with the value "machine_x", and an "IP Address" field which is empty, followed by a "Port" field with the value "161". At the bottom of the window, there are four buttons: "OK", "Apply", "Cancel", and "Help".

FIGURE 3-1 Create Topology Object Window—Node Tab

3. In the upper half of the Create Topology Object menu, set up the new node:

- a. Click the Monitor Via button to see the pull-down menu, then select the software or agent to monitor the new node.

There are seven categories of agents and monitors (TABLE 3-1). 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.

TABLE 3-1 Types of Sun Management Center Monitoring

Type	Description	Effect
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.
Agent – Platform	For more information, see your supplement.	
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 and Browser 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 by using the Load Module dialog. See Chapter 11.) 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 can be seen. The Details window contains the Info and Browser tabs. The Entity Polling Type in the Info tab is aprox.

TABLE 3-1 Types of Sun Management Center Monitoring (*Continued*)

Type	Description	Effect
SNMP Ping	Monitor the device by using SNMP ping command. The Sun Management Center Topology manager communicates with the device using SNMPv1. (There are no management capabilities provided for devices 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 <code>snmp</code> .
ICMP Ping	Monitor the device by using the Internet Control Message Protocol (ICMP) ping command. (There are no management capabilities provided for devices 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 <code>ping</code> .
Non-Monitored	Created node is for display only. Its 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 <code>dummy</code> .

Note – For information about creating an object for your specific platform, see the 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.

TABLE 3-2 Choices Available in the Type Pull-Down Menu

Monitor by	Agent - Host	Agent - Platform	Agent - Module	SNMP Proxy	SNMP Ping	ICMP Ping	Non-monitored
Type					Server Workstation PC Router Printer Concentrator	Server Workstation PC Router Printer Concentrator	Server Workstation PC Router Printer Concentrator

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

For some types of monitoring, the right side of the Create Topology 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 new 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 Topology 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 4a, above. The Non-Monitored selection does not require further information, but most agent or monitor selections ask you to enter:

- Node host name
- Node IP address

You can enter 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.

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

- Sun Management Center agent port number (the default is 161)
- Proxy host name and IP address
- Read/write SNMP communities
- Module name

5. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Cancel to cancel your request.

This message is displayed at the bottom of the Create Topology 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 Topology Object window. The cause of the error may be that you do not have permission to create this node, or that you must start a Sun Management Center agent on the node.

Note – If you are connected to one Sun Management Center server context and create a node on another Sun Management Center server context, ownership of the new node on the second server context defaults to the `espublic` identity instead of your login identity. This situation is normal. The `espublic` 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 239.

If you want to make any changes to the new node, see “Modifying Objects” on page 47.

Creating a Monitored Module Object

If you want to monitor one or more module objects on a number of hosts, you may find it useful to create module objects for each host and place all of the modules in a common location (that is, in the same group or administrative domain). The procedure for creating a module object is similar to that for creating a node.

▼ To Create a Module Object

1. In the hierarchy view of the main console window, select the administrative domain in which you want to create the new object.
2. In the main console window, select **Edit ► Create an Object**.
3. Select the **Node** tab in the **Create Topology Object** window.
4. Select **Sun Management Center Agent – Module** in the **Monitor Via** field (FIGURE 3-2).



FIGURE 3-2 Create Topology Object Window for Sun Management Center Agent – Module

- 5. (Optional) Type a node label.**
- 6. (Optional) Type a description.**
- 7. Type a host name or IP address.**

You can enter 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. If necessary, change the port number.**
- 9. Click the List Modules button to display a list of modules that are currently loaded on the host.**

If the module that you want to use is not loaded, see “To Load a Module” on page 171. If the module that you want to use is not enabled, see “To Enable a Module” on page 178.

The module list is displayed (FIGURE 3-3).



FIGURE 3-3 Module List

10. Select the module that you want to monitor and click OK.

The module list closes.

11. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Cancel to cancel your request.

Creating Groups

You can create two types of groups, General and IP-based. General groups are based on geography (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 235 in for more information.

▼ To Create a Group

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

Select (by clicking) a location in the administrative domain where the new group should be created.

For example, if you want to create a group in a building that is in one of the campuses of an administrative domain, then click the building icon in the administrative domain.

2. In the main console window, select Edit ► Create an Object.

The Create Topology Object window is displayed.



FIGURE 3-4 Creating a Group in the Create Topology Object Window

3. In the Create Topology Object window:

- a. Click the **Group** tab (FIGURE 3-4).
- b. Change the **Type** field, if desired (General or IP-Based).
- c. Select the object type (Building, Campus, or General).
The right side of the window is updated with an icon corresponding to the object type.
- d. Create a new group Label.
- e. (Optional) Type a description in the optional Description field.
- f. For an IP-based group, specify the IP address and the subnet mask.

Note – The creation of an IP-based group results in the creation of an empty network or subnet “container” which you can populate using the Create Topology Object window.

4. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Cancel to cancel your request.

If you selected OK or Apply, this message is displayed at the bottom of the Create Topology 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 Topology Object window. The cause of the error may be that you do not have the right permission to create this group.

If you want to make any changes to the new group, see “Modifying Objects” on page 47.

5. Add components to your group:

- Use the Create Topology Object window. See “To Create a Node” on page 30.
- Copy and paste objects from other groups into the new group. See “Copying Objects” on page 44.

Creating a Composite Object

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

You create composite objects through the Edit pull-down menu in the Create Topology Object window.

▼ To Create a Composite Object

1. In the hierarchy view of the main console window, select the **Sun Management Center** administrative domain in which you want to create the new 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, select **Edit ► Create an Object**.

The Create Topology Object window is displayed. By default the tab is set to Node.

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

The window changes to display settings available for composite objects (FIGURE 3-5).

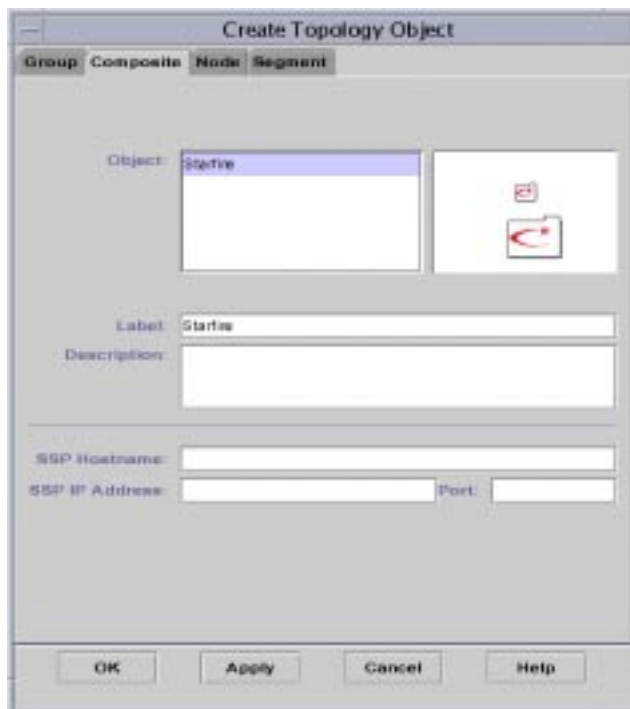


FIGURE 3-5 Create Topology Object Window—Composite Tab

4. Select an object in the **Create Topology Object** window.

For some types of monitoring, the right side of the Create Topology 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 new name in the Label field.

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

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

- SSP Hostname
- SSP IP Address
- Sun Management Center agent port number (the default is 161)

You can enter 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. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Cancel to cancel your request.

This message is displayed at the bottom of the Create Topology 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 Topology Object window. The cause of the error may be that you do not have the permission to create this object, or that you must start a Sun Management Center agent on the object.

Note – If you are connected to one Sun Management Center server context and create an object on another Sun Management Center server context, ownership of the new object on the second server context defaults to the `espublic` identity instead of your login identity. This situation is normal. The `espublic` 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 239.

If you want to make any changes to the new object, see “Modifying Objects” on page 47.

Creating Segments

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

▼ To Create a Segment

1. In the main console window:

- a. **In the left window, select a location in the administrative domain where the new segment should be created.**

The segment is created at the selected (highlighted) level.

For example, if you want to create a segment in a building that is in one of the campuses of an administrative domain, then select the building in the administrative domain.

- b. **In the main console window, select **Edit ► Create an Object**.**

The Create Topology Object window is displayed (FIGURE 3-1).

2. In the Create Topology Object window:

- a. **Click the **Segment** tab (FIGURE 3-6).**



FIGURE 3-6 Segment Tab in the Create Topology Object Window

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

c. Select the object type.

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

At the right in the Create Topology Object window is a window that displays large and small icons corresponding 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.

d. Type a new segment label.

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

f. Type the IP address for this segment.

g. Type a subnet mask for this segment.

3. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.

- Click Cancel to cancel your request.

This message is displayed at the bottom of the Create Topology Object window:

Creating segment... Please Wait

If the request is completed successfully, the Create Topology 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 Topology Object window.

If you want to make any changes to the new segment, see “Modifying Objects” on page 47.

Connecting Objects

You can connect objects in the topology view.

▼ To 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 using the mouse button.

- 2. Select Edit ► Create a Connection.**

A link is displayed between the objects.

Copying Objects

To move an object from one location in the topology view to another, use the Edit commands, **Cut** and **Paste**. (Sun Management Center 3.0 software does not support drag and release as an operation for moving objects.) To copy an object into other topology views (leaving the original object in its current location), use **Copy** instead of **Cut**.

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 (see Chapter 2), then copy existing objects into the new administrative domain as described in the following procedure.

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

Note – You can select multiple objects by using the mouse button while holding down the Shift key.

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

Note – 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 your right mouse button on the object.

▼ To Copy an Object

This procedure is for a single object. To copy a group, see “To Copy a Group of Objects” on page 46.

1. **In the main console window, select the existing object in the topology view.**
2. **At the top of the main console window, select Edit ► Copy in the pull-down menu.**

This 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, select Edit ► Paste.**

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

`Paste successful`

▼ To Copy a Group of Objects

To copy objects that are in one group and paste the copies into another group:

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

To copy all objects in the topology view, select **Edit ► Select All** in the main console window menu bar.

To copy two or more objects selectively:

a. Click the first object to select it.

b. On the keyboard hold down the Shift key and click one or more additional objects.

2. Select **Edit ► Copy in the main console window menu bar.**

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

Copy Successful

3. In the hierarchy view, select (highlight) the new group or administrative domain where the group is to be copied.

4. Select **Edit ► Paste Into in the main console window menu bar.**

Alternatively, you can click with your right mouse button on the destination administrative domain and select **Paste Into** from the pop-up menu.



Caution – If you select **Edit ► Paste** (instead of **Edit ► Paste Into**), the objects may be pasted into the wrong group. If this occurs, highlight the duplicate objects and select **Edit ► Delete Object/Connection**.



Caution – When you copy a group in the Sun Management Center software, the new copy (a symbolic link) is labelled with italic font. The italic font is a reminder that this is a link. If you add or remove objects from this group, the original group and all copies of the group are affected.

Note – An object in the cut (pre-move) state remains visible—and selected with dashed lines—until it has been successfully pasted. If you change your mind and no longer want to paste the object, you can remove it from the cut state by clicking on it a second time.

Modifying Objects

Once you have created or 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.

▼ To Modify an Object

1. Select the object in the main console window.
2. Select **Edit ► Modify** in the main console window.

The Modify Object window is displayed (FIGURE 3-7). (The appearance of the window varies widely, depending on whether the object is a group, node, composite object, or segment.) The following example shows how to modify a node.



FIGURE 3-7 Modify Object Window—Example for a Node

3. Edit the characteristics as needed.

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

- 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 available characteristics are:

- Monitor Via: Sun Management Center Agent - Host, Sun Management Center Agent - Module, Sun Management Center Agent - Platform, SNMP Proxy, SNMP Ping, ICMP Ping, or Non-Monitored
- 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 available characteristics are:

- 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 available characteristics are:

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

See your supplement for more information.

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

Note – If the object you are modifying is a host,

Cutting and Pasting Objects

Objects can be cut (to be moved) or deleted (permanently) from the topology view in the main console window. An object that is cut is temporarily saved in memory and can be immediately pasted into one or more areas. (Sun Management Center 3.0 software does not support drag and release as an operation for moving objects.) An object that is deleted cannot be recalled. For instructions on deleting objects, see “Deleting Objects” on page 50. 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).



Caution – Do not use the cut function to delete objects. This function should only be used to move objects. To delete an object, use Edit ► Delete in the main console window. See “Deleting Objects” on page 50.

▼ To Cut and Paste Objects

1. Select an existing object in the topology view.

If you have not selected an object, the Cut and Delete functions are grayed out.

2. Select Edit ► Cut in the main console window.

A dashed line is displayed around the selected object. (The object does not immediately disappear. This allows objects, such as processes which should not be interrupted, to continue running until they are pasted into a new location.) The object remains visible until it has been successfully pasted.

Note – You can cancel a Cut operation by clicking on the object a second time.

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

Cut successful

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

4. Select Edit ► Paste. The object is displayed in this location and is removed from the previous location.

Deleting Objects

The Edit ► Delete command removes an object completely. To move an object to another location, see “To Copy an Object” on page 45 or “To Cut and Paste Objects” on page 49.

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

▼ To Delete Objects

Note – To delete an administrative domain, use the delete command in the Domain Manager window; see “Deleting Administrative Domains” on page 22.

1. Select an existing object in the topology view.

If you have not selected an object, the Delete function is grayed out.

2. Select Edit ► Delete Object/Connection from the top of the main console window.

You are prompted to confirm or cancel the deletion.

If the Delete operation succeeds, the object is removed, and this message is displayed at the bottom of the main console window:

Delete successful

Discovery Manager

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

The following topics are described in this chapter:

- To Start the Discovery Requests Window
- To Initiate a Discovery Request
- To Customize a Discovery Request
- To Modify a Discovery Request
- To Start, Stop, or Delete a Discovery Request

The Discovery Manager can find or “discover” hosts, routers, networks, and subnets (see “Overview of IP Addressing” on page 509). The Discovery Manager also discovers objects where a Sun Management Center agent is configured to a different server context (see “Sun Management Center Server Context” on page 239).

The Discovery Manager can also find and group topology objects which are related; either to a single hardware platform/chassis or a group of cooperating hardware platform/chassis. This discovery and grouping allows convenient management of the related objects and is described in the add-on supplement for those machine architectures which have this grouping requirement.

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

You can create one or more discovery requests. Each request runs as a separate process and populates the administrative domain with the objects that it has discovered.

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

Starting the Discovery Requests Window

To begin a Discovery Request, start the Discovery Requests Window.

▼ To Start the Discovery Requests Window

Start the Discovery Requests window in one of two ways:

- When you create an administrative domain in the Create Domain dialog (FIGURE 2-3) the Populate Now option is selected by default.

If you click Create in the Create Domain dialog while the Populate Now option is selected, a dialog window enables you to start the discovery process immediately.

For more information on creating administrative domains, see Chapter 2.

- Select the administrative domain in the Sun Management Center Administrative Domains pull-down menu. then select Tools ► Discover in the main console window (FIGURE 4-1).



FIGURE 4-1 Tools Pull-down Menu

The Discovery Requests window is displayed (FIGURE 4-2).



FIGURE 4-2 Discovery Requests Window

The Discovery Requests window displays information containing the fields in TABLE 4-1.

TABLE 4-1 Discovery Requests Window Fields

Field	Description
Name	A name which you create for the request. You can have multiple requests with the same name.

TABLE 4-1 Discovery Requests Window Fields

Field	Description
Scheduled	“Yes” if the request is scheduled, “No” if not scheduled
Status	Reflects the current state of the discovery request. The states may be: <ol style="list-style-type: none">1. New. A new request was added but has never been processed.2. Queued. A request has been sent to the server but processing has not yet started.3. Running. The request is currently being processed.4. Succeeded. The request has been successfully processed.5. Failed. Processing of the request has failed.6. Stopped. The user has stopped the process.7. 0 Host found. The request did not find any hosts that passed the filter limits.

The Discovery Requests window has the buttons listed in TABLE 4-2.

TABLE 4-2 Discovery Requests Window Buttons

Button	Description
Add	Click this button to create a new Discovery Request through the New Discovery Request window (FIGURE 4-2).
Modify	Select a Discovery Request and click this button to make changes.
Duplicate	Select a Discovery Request and click this button to create a copy of the request.
Delete	Select a Discovery Request and click this button to delete the request.
Start	Select a Discovery Request that is not running and is not scheduled to run at a different time, and click this button to start the request.
Stop	Select a Discovery Request that is running and click this button to stop the request.
Log	Select a Discovery Request and click this button to see a log of the results generated from the selected discovery request runs.

Initiating a Discovery Request

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

Note – Currently the Discovery feature is supported only for administrative domains and not for any subordinate groups. You can add requests only for an administrative domain.

Note – Read Appendix C before initiating a discovery request using routing tables. Appendix C explains the basic concepts of routing, network classes, and netmasks.

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

▼ To Initiate a Discovery Request

1. Click the Add button in the Discovery Requests window.

The New Discover Request window is displayed (FIGURE 4-3). The Discover tab is highlighted by default.

Tip – You can copy an existing discovery request by highlighting the existing request and clicking the Duplicate button. To edit the settings for the new discovery request, see “Modifying a Discovery Request” on page 65.



FIGURE 4-3 New Discover Request Window

2. (Optional) Type a new name for your discovery request in the Request Name field.

Multiple requests are listed in the Discovery Requests window, enabling you to select a request and edit the related search pattern.

3. In the Discover Using field, select the method that should be used for discovering the network (Ping or Routing Table).

- If you selected Ping, type the start and end IP addresses and netmask (FIGURE 4-3).

The discovery process uses the `Ping` command and searches for hosts and routers in the specified IP address range. It then places the hosts in the appropriate networks and subnets based on the netmask.

- If you selected Routing Table, type the number of hops (the number of routers a packet goes through before reaching its destination).

The discovery process starts from the Topology manager/ Sun Management Center server host and 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 discovery requests require that you run an SNMP agent at port 161. This can be a Sun Management Center agent, `snmpdx`, or any SNMP agent provided by your network management package.

For more information on routing tables, see Appendix C.

4. **Click the OK button to start the discovery process, or go to the other tabs in this window to customize your discovery request. See “Customizing Your Discovery Request” on page 58.**

When you start the discovery process:

- The discovery process discovers all nodes that are running the Sun Management Center agent. The discovery process includes agent nodes that belong to another Sun Management Center server context. That is, nodes that are running Sun Management Center agents in a remote Sun Management Center server context are ignored.
- Nodes that are not running a Sun Management Center agent are listed as ping hosts.
- The discover process discovers all nodes running an SNMP agent, where the nodes are not connected to any Sun Management Center server. The information gathered for SNMP agents is very limited.

Note – Each discovery request is assigned a Request ID. This ID is an unique Sun Management Center internal identifier of the request. Therefore, the Request IDs are not in sequential order. The Request ID displays in the Request Details portion of the Discovery Requests Window.

Note – If a host is extremely busy, a discovery process that is gathering data for that host may time out. If a timeout occurs for a host that is a Sun Management Center agent, the host is reported as a ping host. If this happens, you may want to increase the SNMP timeout period. See ““Customizing Your Discovery Request” on page 58” for more information.

5. **If a Sun Management Center server or agent is incorrectly reported to be a ping host, create a new icon by re-running discovery with larger timeout and retry values.**

Customizing Your Discovery Request

You can customize your new discovery request by clicking on one of the four tabs on the New Discover Request window. The tabs are labeled Discover, Preferences, Filters, and Scheduling. TABLE 4-3 summarizes the tabs and the options for these tabs. (If you want to change an existing Discovery Request, see “Modifying a Discovery Request” on page 65).

TABLE 4-3 Summary of Discovery Variables

Variable	Definition
Discover	
Request Name	Descriptive name for this request, for example, “My Lab.” This name is optional.
Discover Using	Ping: Sweeps all addresses within the range specified by a Start IP Address, an End IP Address, and netmask. Routing Table: Discovery Manager consults the routing table of the Sun Management Center server and determines its address, subnet address, and router(s). It proceeds from there to discover more routers, networks, and subnets.
Start IP Address End IP Address	These parameters apply to ping discovery requests. They specify the address range within which the Discovery Manager tries to find hosts and routers.
Netmask	This parameter applies to ping discovery requests. It is used to segment networks into subnets. To find out if your network is subnetted and the value of the netmask, check the <code>/etc/netmasks</code> file or the name service maps if you are using NIS (network information service) or DNS (domain name service).
Port	Port 161 is the default setting for Sun Management Center objects. The Discovery Manager also tries an alternate port that you can specify in the Also Check Port field. If neither port responds, the Discovery Manager concludes that the object is not running a Sun Management Center agent.
Preferences	
Logging	
Log discover request progress?	Setting this flag enables logging for that request. The discovery process places the log files in the <code>/var/opt/SUNWsymon/cfg/discover</code> directory. There is one log file per user-administrative domain. Currently, this directory is used for debugging only.
Ping	
Timeout (sec.)	Amount of time (in seconds) that the Discovery Manager should wait for a response to a ping request before timing out.

TABLE 4-3 Summary of Discovery Variables *(Continued)*

Variable	Definition
Retries	Number of times the Discovery Manager should send a ping request before giving up.
SNMP	
Timeout (sec.)	Amount of time that the Discovery Manager should wait for a response to a SNMP request before timing out.
Retries	Number of times the Discovery Manager should attempt a SNMP request.
Community String	One or more strings separated by the pipe () character. The default value is public.
General	
Maximum Hosts	Maximum number of hosts that should be discovered.
Maximum Time (sec.)	Maximum amount of time (in seconds) of the discovery process in real time.

TABLE 4-3 Summary of Discovery Variables (*Continued*)

Variable	Definition
Filters	
Criteria	
Select Filter Criteria	Filter by host name, operating system, or platform type. Filtering uses the <code>grep</code> command to search for the supplied value.
Host Name or Label	
Operating System	
Platform Type	
Modules	
Filters	This field remains blank until you select a filter criteria. The contents of this field vary according to your selection(s). You can choose to include or exclude values in the filtering process. For host names, you specify names and wildcard characters. For operating systems and platform types, you select from pull-down menus.
Scheduling	
Discover new hosts periodically?	If selected, then the specified discovery request is scheduled to run at the specified start time and frequency.
Settings	
Start Time (hh:mm)	Specify the time (between 00:00 and 23:59) when discovery should be started.
Frequency	In the pull-down menu, select Hourly, Daily, Weekly, or Monthly.
Day of Week	In the pull-down menu, select the day when discovery should run.
Day of Month (1..28)	Specify the (numerical) day of the month when discovery should run. You cannot enter a day unless you have selected Monthly as the frequency.

▼ To Customize a Discovery Request

You can specify limits for the New Discover Request window through the Preferences and Filters tabs. You can also schedule the new discovery request to run periodically through the Scheduling tab.

1. Click the Preferences tab.

The New Discover Request Preferences window is displayed (FIGURE 4-4).

New Discover Request

Discover Preferences **Filters** Scheduling

Logging

☒ Log discover request progress?

PING

Timeout(sec.):

Retries:

SNMP

Timeout(sec.):

Retries:

Community String:

General

Maximum Hosts:

Maximum Time(sec.):

OK Close

FIGURE 4-4 New Discover Request Preferences Window

2. Type your selections in the Logging, PING, SNMP, and General fields.

TABLE 4-3 lists the variables in the New Discover Request Preferences window.

3. Click the Filters tab.

The New Discover Request window is displayed (FIGURE 4-5).



FIGURE 4-5 New Discover Request Window

4. Click a checkbox to include host names, operating system, platform type, or module in the filter process.

In TABLE 4-4, below, you will find a list of the buttons under the Filters tab.

TABLE 4-4 Buttons under Filters Tab

Button	Description
Include	Enables a feature be included in the filter process.
Exclude	Enables a feature to be excluded during the filter process.
Add	Enables a feature to be added to the filter process.
Delete	Enables a feature to be deleted from the filter process.
OK	Confirms your actions
Close	Closes this window.

By default, the options on this tab are greyed out. If the checkbox next to an option is checked, the buttons become activated. For example, if you check Modules, you can use the scrollable menu to highlight a loaded module. You can then choose whether you want to include or exclude this module in the filter, and then add it to the field next to the Add and Delete buttons.

5. Once you have defined the filter, click the OK button to confirm your selection.

You can now set filters in one of the following ways:

- The Filters tab in the New Discovery Request window
- Filter Manager under the Tools menu option in the console window

Note – If you use a filter, the discovery finds only hosts running the Sun Management Center agent.

6. Click the Scheduling tab.

The New Discover Request Scheduling window is displayed (FIGURE 4-6).



FIGURE 4-6 New Discover Request Scheduling Window

7. If you want to schedule automatic discoveries, click the button for “Periodically discover new hosts?” and customize the settings in the Settings area of the window.
8. When you have finished your edits, click OK to save the new discovery request, or click Cancel to cancel your changes.

If you click OK and you have not selected Periodically discover new hosts in the Scheduling tab, a pop-up dialog is displayed, offering several choices for running the new discovery request.

- To save the discovery request and begin running it periodically at the scheduled times, click Yes.

If your discovery request has already been scheduled, no confirmation dialog window will appear.

- To save the discovery request, but not schedule it to run, click No.
 - To cancel the new discovery request without saving it, click Cancel.
9. Click Close to exit the window.

Modifying a Discovery Request

If you have previously created a periodic discovery request, you can change the search patterns for that discovery request through the Discovery Requests window (FIGURE 4-2).

▼ To Modify a Discovery Request

1. **Select Tools ► Discover in the main console window (FIGURE 4-1).**

The Discovery Requests window is displayed.

2. **Find and select the name of the discovery request you want to modify.**

3. **Click the Modify button.**

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

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

5. **Complete this procedure with one of the following actions:**

- Click OK to accept the changes you have made and close this window.
- Click Cancel to cancel your request.

If you click OK, a pop-up dialog is displayed, offering several choices for running the modified discovery request.

6. **Exit from the window:**

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

Starting, Stopping, or Deleting a Discovery Request

If you have previously created a discovery request, you can start, stop, or delete it through the Discovery Requests window (FIGURE 4-2).

▼ To Start, Stop, or Delete a Discovery Request

1. **Select Tools ► Discover in the main console window (FIGURE 4-1).**

The Discovery Requests window is displayed.

2. **Select the name of the discovery request you want to modify.**
3. **Click the Start, Stop, or Delete button to start, stop, or delete a request, respectively.**

Sun Management Center Software Main Console Window

The following topics are described in this chapter:

- To Use the Main Console Window Menu Bar
- To Search For a Name
- To View the Current List of Administrative Domains

Main Console Window

The main console window (FIGURE 5-1) is the primary user interface. It provides:

- Visual representations of the managed objects (for example, hosts and networks)
- Ability to manipulate attributes and properties associated with the managed objects (for example, create alarm threshold conditions).

The features shown in FIGURE 5-1 are described in this chapter.

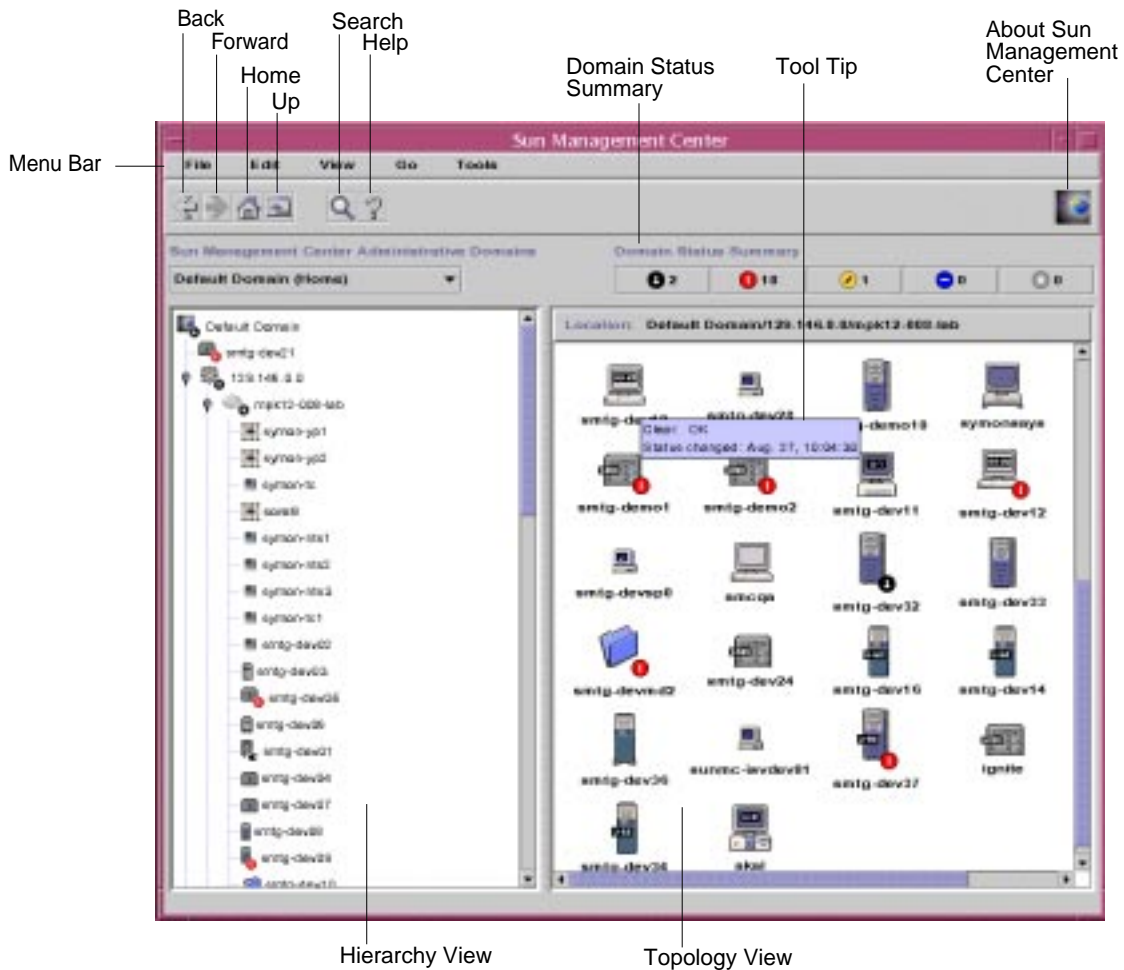


FIGURE 5-1 Main Console Window

Administrative Domain View

Once you have created an administrative domain and have populated it with objects (groups and hosts, and so forth), 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 selectively view all objects (such as hosts, routers, and servers) in the administrative domain, or selected objects (such as the servers) that support a specific function that interests you.

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

FIGURE 2-1 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.

You may choose to create a similar type of administrative domain, and you can group your machines by subnet, rather than by building. You should create a 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 (tree) view and the right side is the topology view.

- **Hierarchy tree**

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

In FIGURE 2-1, Building B is an object contained in the administrative domain named Headquarters, but is also a group itself. 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 69.

- **Topology view**

The topology view displays the member(s) of an object selected in the hierarchical tree.

For more information, see “Topology View” on page 71.

Hierarchy View

Two types of windows contain hierarchy views:

- **Domain view in the main console window (FIGURE 5-1)**

■ Browser view in the Details window (FIGURE 13-1)

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 (Chapter 6).

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.

The mouse actions in the hierarchy view are summarized in TABLE 5-1.

TABLE 5-1 Mouse Actions in the Hierarchy View

Mouse Action	Result
Click with left or right mouse button on the expansion/compression icon next to the object	“Expands” (opens) details or “collapses” (closes) details of the selected object.
Double-click with the left mouse button on an object icon	For a host object, starts the Details window or moves the Details window to the foreground if it is already open. For an administrative domain or group object, unrolls or rolls details of the selected object. Also, the topology view is updated with the members of the selected object.
Click with the left mouse button on object icon	Displays the members of the selected object in the topology view. However, if the object icon is a host (in the main console window), then the Details window is displayed.
Click with the right mouse button and hold on the object label	Pop-up menu is displayed. See “Pop-up Menu” on page 72 for more information.

▼ To Obtain Specific Information About the Hierarchy View

If an object has an expansion/compression next to it, there are additional levels of information that are hidden. You can obtain more information about the object by examining its subordinate objects. To obtain specific information about subordinate objects, complete the step in one of the following methods.

Method 1

- **Click on the expansion/compression icon next to the object to “unroll” the tree branch.**

The icon changes to a darker color, and the subordinate objects are displayed.

Method 2

- **Double-click with the left mouse button on the object icon or the label.**

▼ **To Obtain General Information About the Hierarchy View**

If an object has a compression icon next to it, lower levels of the hierarchy are currently displayed (in most cases). You can obtain information about the container object by “rolling up” (hiding) the lower levels. To obtain general information about a container object, complete the step in one of the following methods.

Method 1

- **Click on the expansion/compression icon next to the object to “roll up” the tree branch.**

The group (container) object is displayed.

Method 2

- **Double-click with the left mouse button on the object icon or the label.**

Topology View

The topology view displays the members of the object selected in the hierarchy view.

There are two types of windows that contain topology views:

- Domain view in the main console window (FIGURE 5-1).
- Browser contents view in the Details window (Chapter 6).

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

The mouse actions in the topology view are summarized in TABLE 5-2.

TABLE 5-2 Mouse Actions in the Topology View

Mouse Action	Result
Double-click with the left mouse button on the icon	Opens details about the selected object. However, if the object is a host (in the main console window), then the Details window is displayed.
Click with the left mouse button on the icon	Selects icon.
Click with the right mouse button and hold on the icon	Pop-up menu is displayed. See “Pop-up Menu” on page 72 for more information.

Tool Tip

As you move the mouse 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 (Chapter 7). Property tables provide information about the monitored property and are described in Appendix D.

▼ To See a Tool Tip

- **Place your mouse over an object.**

After a brief delay, a tool tip is displayed that provides a short description of that object (FIGURE 5-1).

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 object selected.

▼ To Access a Pop-Up Menu

1. **Click the right mouse button on the object.**

The pop-up menu is displayed.

2. Click the left button to select a menu item (TABLE 5-3).

The following table lists common items in the approximate order in which they are displayed in the pop-up menus. Some items are not displayed in all menus.

TABLE 5-3 Common Pop-Up Menu Items

Menu Item	Description
Cut	Cuts the selected object. The cut object is enclosed in a dashed box until it is pasted into a new location. To cancel the cut operation, click on 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 information about editing an administrative domain, see Chapter 2. For information about editing a host, see Chapter 9. For information about editing a module, see Chapter 11. For information about editing security, see Chapter 14.
Load Module	Displays the Load Module dialog. For more information on the Load Module dialog, see “To Load a Module” on page 171.
Details	Displays the Details window. For more information on the Details window, see Chapter 13.

Note – Depending on the object you selected, all the pop-up menu items listed in TABLE 5-3 may not be displayed.

Menu Bar

The menu bar is at the top of the main console window (FIGURE 5-1).

Select (highlight) an object by clicking it in the hierarchy or topology view, then click a menu name (File, Edit, View, Go, or Tools). If a menu name is grayed out, that option is not available for the object that you have selected.

▼ To Use the Main Console Window Menu Bar

The menus are of the pull-down style.

1. **Click an entry in the menu bar to display a pull-down menu.**
2. **Click an entry in the pull-down menu to initiate that action.**

The menus in the menu bar are described below.

File Menu Options

TABLE 5-4 Options for the File Menu

Option	Description
Domain Manager	The Domain manager enables you to create your administrative domain(s). For more information on Domain Manager, see Chapter 2.
Remote Domain Manager	For more information on Remote Domain Manager, see Chapter 2.
Set Home Domain	Sets your home administrative domain.
Sun Management Center-Console Messages	Opens the Sun Management Center-Console Messages window. The window displays messages generated by the Sun Management Center application, but does not include general UNIX messages.
Exit	Exits the current console session and all related Sun Management Center windows. A pop-up dialog asks you to confirm the exit request.

Edit Menu Options

TABLE 5-5 Options for the Edit Menu

Option	Description
Create an Object	Creates a group, a composite object, a node, or a network segment in the administrative domain that is currently highlighted in the console window. See Chapter 3.
Create a Connection	Connects two objects in the topology view. You may choose the type of connection to be General, RS-232, T1, or T3. The connection is represented by a line between the objects.
Delete Object/Connection	Deletes the highlighted object or connection. A dialog asks you to confirm the deletion request.
Rename	Enables you to rename the highlighted object. Displays a dialog for you to enter the new name.
Modify	Brings up the Modify Object menu. For more information on the Modify Object menu, see “Modifying Objects” on page 47.
Cut	Displays a dashed line around the selected object. The object is not removed until you paste it into a new location.
Copy	Copies the selected object into a temporary buffer.

TABLE 5-5 Options for the Edit Menu *(Continued)*

Option	Description
Paste	Pastes the cut or copied object into the administrative domain or group that is currently displayed in the hierarchy or the topology view.
Paste Into	Pastes the cut or copied object into the selected administrative domain or group.
Select All	Selects all objects in the topology view.

View Menu Options

TABLE 5-6 Options for View

Option	Description
Topology Layouts	Enables you to change the style of display in the topology view. The styles are: Network, Grid (square grid pattern), List (single vertical list), Bus, Star (equidistant lines connected to a center), Spoked Ring (equidistant lines in a circle).
Set Topology Background	Displays the Set Topology Background window. You can add a background image to a topology view by selecting from a list of graphics files. (The list may not be in alphabetical order.) You can also use this window to remove a background image by clicking the Unset button.

Go Menu Options

TABLE 5-7 Go Menu Items

Menu Item	Action
Back	Takes you to the previous console view. This option performs the same function as the Back navigation button on the toolbar.
Forward	Takes you to the next console view (if applicable). This option performs the same function as the Forward navigation button on the toolbar.
Home	Takes you to the top of your home administrative domain in the hierarchy view. This option performs the same function as the Home navigation button on the toolbar.
Up	Takes you up one level in the hierarchy view. This option performs the same function as the Up navigation button on the toolbar.
History	Lists recent locations that you have viewed in the current console session. Select an entry to return to that location.
Search	Opens the Topology Search window to search for the object label that you specify. If one or more objects are found, the full path or paths are displayed. This option performs the same function as the Search navigation button on the toolbar.

Tools Menu Options

TABLE 5-8 Tools Menu Items

Menu Item	Action
Details	Enables you to see detailed information (if available) for a selected object. For more information about the Browser Details window, see Chapter 6. For more information about the Details Alarm window, see Chapter 12. For more information about the remaining categories in the Details window, see Chapter 13.
Attribute Editor	Displays the Attribute Editor. For information about editing an administrative domain, see Chapter 2. For information about editing a host, see Chapter 9. For information about editing a module, see Chapter 11. For information about editing security, see Chapter 14.
Graph	Displays the Open Graph window. You can select from a list of saved graphs. For information on the graphing function, see Chapter 7.

TABLE 5-8 Tools Menu Items

Menu Item	Action
Discover	Enables you to search for objects in a geographical location. For information about the Discovery Requests window, see Chapter 4.
Load Module	Enables you to load a Sun Management Center module for a selected object. For information about the Load Module window, see Chapter 11.
Dataview Manager	Enables you to create customized data property tables and can be created for one type of data from several different hosts or different types of data from one host.
Group Operation	Enables you to manage an object group, which is a named collection of objects with an optional filter.
Topology Export	Enables you to export data between different topology servers.
Topology Import	Enables you to import data between different topology servers.
Telnet	Enables you to launch Telnet. The Telnet application is displayed in a separate window. The application has no further interaction with the Sun Management Center software (except that you are able to launch it from within the Sun Management Center software for your convenience.)

Navigation Buttons

As you move through different administrative domains and through different levels within the administrative domains, the administrative domain views are stored in memory. The navigation buttons (FIGURE 5-1) in the main console window help you move back and forth between these views.

Note – The navigation buttons perform the same function as the Go menu items.

TABLE 5-9 Navigation Buttons

Button	Description
Back Button	The back button is represented by an arrow facing left (FIGURE 5-1). Clicking this button displays the previous screen.
Forward Button	The forward button is represented by an arrow pointing right (FIGURE 5-1). Clicking this button displays the next screen.
Home Button	The home button is represented by a house (FIGURE 5-1). Clicking on this button returns you to the highest level of the administrative domain.
Up Button	Clicking the up button enables you to navigate up one level in the topology view.
Search Button	The search button enables you to search for a text string in the current domain.
Help Button	Clicking the Help button (FIGURE 5-1) displays the online Sun Management Center 3.0 Software User's Guide.

▼ To Search For a Name

1. **On the console, click the Search icon (FIGURE 5-1).**
The Search window is displayed (FIGURE 5-2).

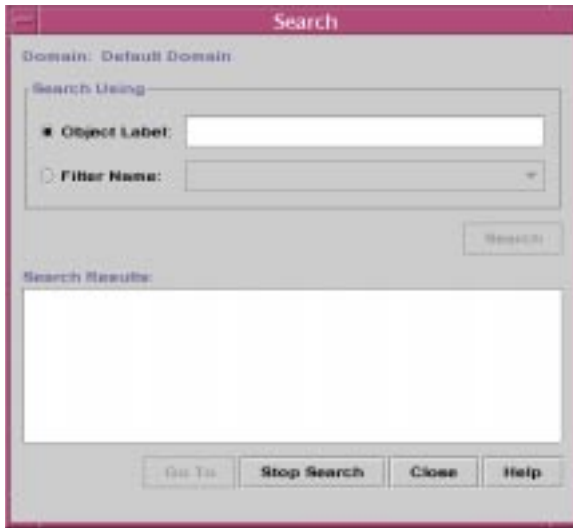


FIGURE 5-2 Search Window

2. **Type the name or part of the name in the Object Label: field and click the Search button.**

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

3. **Highlight the appropriate name and click on the Go To button.**

The topology view of the main console window is updated and the object with the selected name is highlighted.

Sun Management Center Administrative Domains Pull-Down Menu

The Sun Management Center Administrative Domains pull-down menu is shown in FIGURE 2-6. This menu displays the current list of administrative domains and enables you to switch from one administrative domain to another. Clicking on the administrative domain updates and displays the selected administrative domain.

The default administrative domain is the administrative domain that is always displayed whenever the main console is started.

▼ To View the Current List of Administrative Domains

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

The pull-down menu with the current list of administrative domains is displayed.

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

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

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. (FIGURE 5-3).

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

For more information on the administrative domain status summary, see “To Access Alarms From the Main Console Window” on page 190.

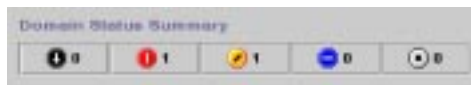


FIGURE 5-3 Domain Status Summary

Browser

This chapter describes the following topics:

- To Start the Details Window
- To Exit the Details Window
- To Enable the Alarms Filter
- To Set Security for a Host or Module

Details View

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 35. Unlike the administrative domain view, the details view enables you to see modules and the various monitored properties and statistics contained in the modules.

Using the Details Window

You can start the Details window from the main console window.

The Details window provides you with detailed information about that individual host. This window has several tab buttons, that may include the following:

- Info
- Browser
- Alarms
- View Log
- Applications

■ Hardware

Note – The tab buttons that are displayed in the Details window are dependent on the type of object selected. In addition, the Hardware tab is missing if the Config-Reader module is not supported on your system. For additional information on the tabs for your specific hardware object, see your supplement.

Each tab button, as described in the following table, updates the window with a new panel consisting of information represented by that tab button.

TABLE 6-1 Details Window—Common Tab Buttons

Tab Button	Description
Info	Provides general information about the host including host name, IP address, polling type, and so on. This information is collected at the time the object is created.
Browser	Enables you to navigate through the hierarchy and contents views of the host, set alarm thresholds, and view and graph monitored data properties. This is the default view when the Details window opens.
Alarms	Displays the alarms for this host. Enables you to acknowledge or delete alarms.
Modules	Displays available modules, which modules are loaded, scheduled, and enabled, and whether the modules are multi-instance modules. Enables you to change the status of these module parameters.
View Log	Displays informational messages, including error messages, about your host. Enables you to search, monitor, and examine system, Sun Management Center, and other log messages.
Applications	Displays a list of applications. These applications include the processes running on the host (if the Solaris Process Details module is loaded) and other applications installed by the user. Depending on your licensing agreement, this tab also provides access to the Hardware Diagnostics Suite software. You can display the Hardware Diagnostic Suite online help text by selecting the Hardware Diagnostic Suite link, and then clicking the Help button.
Hardware	Displays hardware configuration information about your host for selected hardware platforms. Configuration information may include the physical and logical view of your host. If the hardware platform is not supported by the Config-Reader module, this tab button is missing in the Details window.

For more information on these buttons, see Chapter 13.

▼ To Start the Details Window

- **Proceed with one of the following:**

- Click the right mouse button on the selected object and highlight Details from the pop-up menu in the hierarchy view (FIGURE 6-1) or the topology view.
- With your left mouse button, double-click on the selected host icon in the hierarchy view or the topology view.
- In the main console window, select the object then select Tools ► Details (FIGURE 4-1).

Be sure to select a managed object, not a administrative domain, as the Details window is not available for administrative domains.

The Details window (with the browser tab pre-selected) is displayed.



FIGURE 6-1 Opening the Details Window from the Pop-Up Menu

▼ To Exit the Details Window

- Click the Close button located at the bottom of the Details window.

Browser Tab

The host contains four subordinate groups: hardware, operating system, local applications, and remote systems. The Sun Management Center modules belong to one of these four categories.

Note – Not all modules display in the hierarchy. For example, if you have the IPv6 monitoring module, it does not appear in the topology.

Sun Management Center software monitors hosts by using modules. Modules are software components that monitor data pertaining to the health indicators and resources of systems, applications, and network devices.

Note – Depending on your licensing agreement, you may not have access to all of the modules described.

FIGURE 6-2 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 Instrumentation (Simple) and the Kernel Reader (Simple) modules.

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

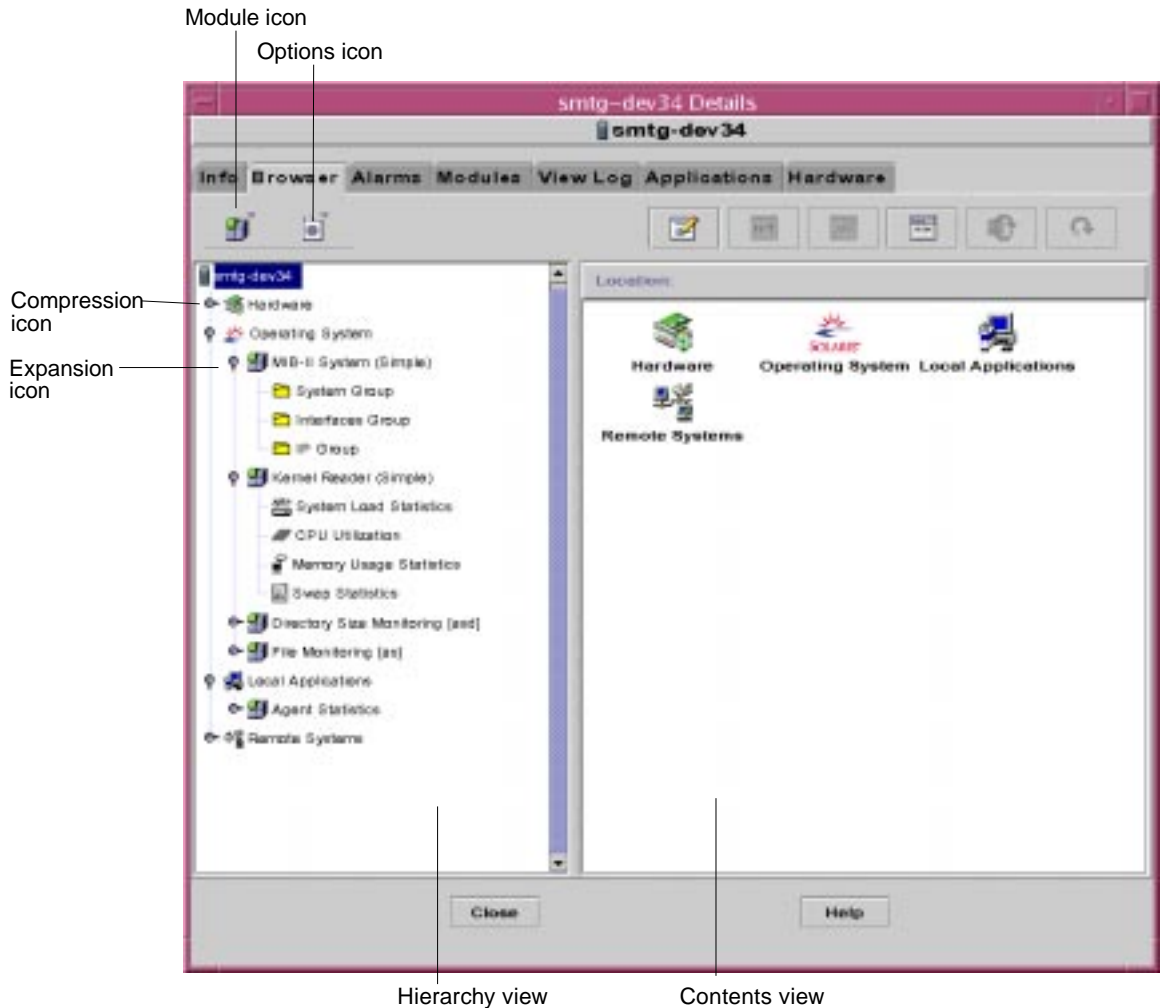


FIGURE 6-2 Browser Details Window

The Browser tab (FIGURE 6-2) contains the hierarchy and contents view for a host.

Tip – You may be able to see more information by holding the mouse pointer over the object for several seconds. A pop-up balloon (tool tip) is displayed, showing additional information about the object. These 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.

Tip – The hierarchy can be expanded or compressed, depending on the position of the expansion/compression icon (FIGURE 6-2). The icon is compressed when the “handle” is pointing right. The icon is expanded when the “handle” is pointing down.

Each host contains categories for Hardware, Operating System, Local Applications, and Remote Systems. For more information on modules, see Appendix D.

Hardware

- Config-Reader module
- Sun StorEdge A5x00
- Sun StorEdge T3

Note – The Config-Reader module monitors the host configuration, including information and status for power supplies, keyswitch, 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, it is automatically loaded during installation. For more information on the Config-Reader module for your hardware platform, refer to your platform supplement and Appendix D.

Operating System

The Operating System category includes modules that monitor 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

The Local Applications category includes modules that monitor the local applications on the host:

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

Remote Systems

The Remote Systems category includes modules that monitor remote systems:

- MIB-II Proxy Monitoring module
- HP JetDirect module (monitors HP printers equipped with a JetDirect card)

The next section is about some of the new browser table enhancements available in Sun Management Center 3.0.

Browser Icons

The Browser Details window includes a row of icons at the top of the panel. The Module and Options icons enable you to select one of several choices. The Attributes, Graph, Probe, and Refresh Now icons serve a single purpose. The icons and their functions are described in the following table.

TABLE 6-2 Browser Icons

Menu Item	Definition
Module	Available selections for the Module icon (FIGURE 6-2) are Load Module, Edit Module, Enable Module, Disable Module, and Unload Module, as described below.
Load Module	Enables you to add a module to the host. The host must be selected or this option is grayed out. For more information, see “To Load a Module” on page 171.
Edit Module	Enables you to edit module parameters. The module must be selected or this option is grayed out. For more information, see “To Edit Module Parameters” on page 176.

TABLE 6-2 Browser Icons

Menu Item	Definition
Enable Module	Enables you to enable a module. The module must be selected or this option is grayed out. For more information, see “To Enable a Module” on page 178.
Disable Module	Enables you to disable a module. The module must be selected or this option is grayed out. For more information, see “To Disable a Module” on page 177.
Unload Module	Enables you to unload a module from the host. The module must be selected or this option is grayed out. For more information, see “To Unload a Module” on page 179.
Options	Available selections for the Options menu (FIGURE 6-3) are Copy, Copy to Dataview Clipboard, Create Dataview, Copy to Graph Clipboard, Alarms Filter Enabled, Add Row, Edit Row, Enable Row, Disable Row, and Delete Row, as described below.
Copy	Enables you to copy a module. You may paste the copied module in the topology or hierarchy view of the main console. This enables you to monitor the module properties without having the Details window open. For more information, see “To Create a Module Object” on page 35.
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. Used with Add From Graph Clipboard menu item in graphing window. See “To Graph Two Data Properties” on page 120.
Alarms Filter Enabled	Enables you to filter 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 (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)” on page 106.
Edit Row	Enables you to edit information for a row in a data property table.
Enable Row	Enables a row (that has been disabled) 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.
Attribute Editor	Displays the attribute editor for the selected object. The Attribute Editor provides additional information about the selected object and the rules governing its behavior. Use the Attribute Editor to edit information about the object.

TABLE 6-2 Browser Icons

Menu Item	Definition
Set Property Value	Enables you to add property values to a multi-instance task.
Graph	Graphs the selected monitored data property.
Dataview	Displays the dataviews clipboard.
Probe	Enables you to run selected commands on the monitored data property.
Refresh	Refreshes the information in the displayed data property table.

Note – The browser buttons are grayed out when the command is not appropriate for the selected object.

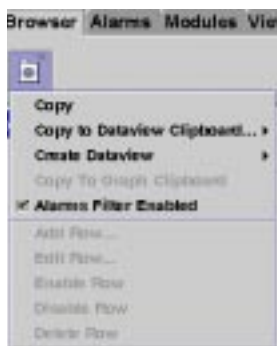


FIGURE 6-3 Options Menu Selections in Details Window

Alarms Filter

In Sun Management Center 3.0, you can now filter tables based on alarm states. For example, if you want to only see rows that in a critical (red) state, there are two items in the Options menu to support this view. These filter settings are per-browser tab on a per-session basis and are not persistent across sessions.

The default state for the Alarms filter is that all boxes are unchecked and Alarms Filter Enabled is set to Off.

▼ To Enable the Alarms Filter

1. In the Details window, choose the **Browser** tab.
2. Under the **Options** pull-down menu, select **Alarms Filter Enabled**.

A check in the checkbox indicates that filters are enabled; no check indicates that alarms are disabled.

Host Security

In the Details window, Sun Management Center software offers security at two levels: the host itself and at the module level. You may also 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.

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

Consequently, only user A can create alarm thresholds for the Health Monitor module. For more information on security, see Chapter 14.

▼ To Set Security for a Host or Module

1. **Open the Attribute Editor for a host or module by proceeding with one of the following:**
 - Click the right mouse button on the host or module and highlight Attribute Editor from the pop-up menu.
 - Click the Attributes button.
2. **Click the Security tab (FIGURE 2-8).**

3. Type the name(s) of user and administrator groups in the appropriate fields.

For more information on the security fields, see Chapter 14.

4. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the Attribute Editor to the default parameters.
- Click Cancel to cancel your request and close the window.

Monitoring Data Properties

This chapter describes the following topics:

- To Display a Data Property
- To Confirm an Edit
- To Choose an Option from a Combo Box
- To Access The Column Header Context Menu
- To Select a Row
- To Select Multiple Contiguous Rows
- To Select Multiple Row Ranges
- To Define a Directory
- To Add a Row (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)
- To Add a Printer
- To Refresh Displayed Data
- To Probe a Property

Monitoring Data Properties

Using your mouse, you can navigate through the hierarchy (tree) view in the Details window to view the monitored properties. The lowest-level object in the host hierarchy is the monitored property. The software provides both tabular and graphical information about a monitored property.

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

▼ To Display a Data Property

Note – The following example uses the Kernel Reader module.

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

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

2. **Double-click on the Kernel Reader icon in the contents view or single click in the expansion/compression icon next to the Kernel Reader icon in the hierarchy view.**

The Kernel Reader statistics are displayed.

3. **Double-click on the System Load Statistics icon in either the hierarchy or the contents view (FIGURE 7-1).**

The monitored properties are displayed in a property table.

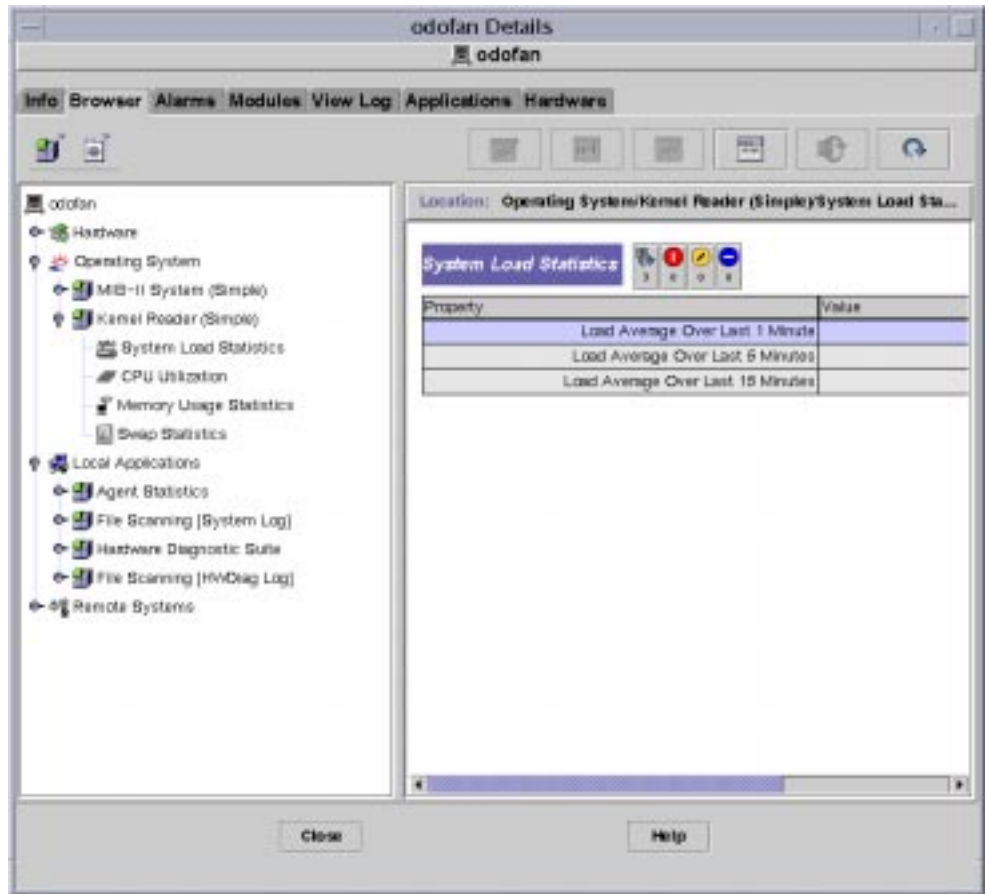


FIGURE 7-1 System Load Statistics

Browser Table Operations

Sun Management Center property tables display information using a standard format. The format includes:

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

A row is a horizontal group of cells. A column is a vertical group of cells.

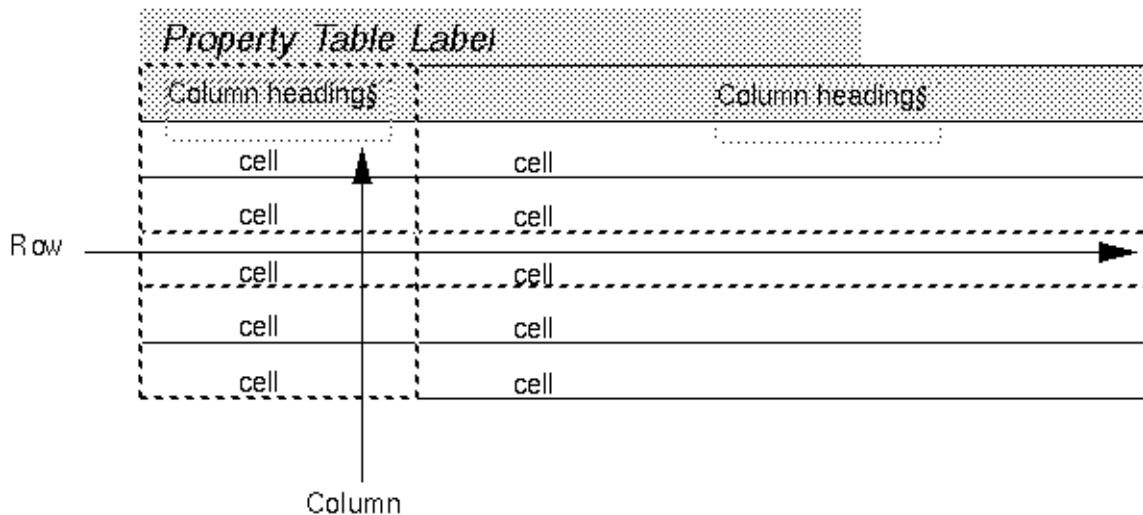


FIGURE 7-2 Table Components

Sun Management Center tables contain two types of cells, editable and noneditable. Information in an editable cell can be changed, and this cell has a white background with black text.

Information in a non-editable cell is display-only. These cells have a colored background with black text. The default background color for non-editable cells is light gray (also called Secondary 3). However, Sun Management Center allows you to customize colors for table cells, borders, and other aspects of the table.

The following Cell Color Specifications table describes the default colors and how they are used:

TABLE 7-1 Cell Color Specifications

Color Name	Use
White	Enabled cell background
Black	Enabled font color
Primary 1 (dark blue)	Active cell border
Primary 2 (medium blue)	Highlighted and selection for menu titles and menu items
Primary 3 (pale blue)	Highlighted rows and columns, noneditable highlighted cell, and selected text

TABLE 7-1 Cell Color Specifications (*Continued*)

Color Name	Use
Secondary 1 (dark gray)	Table borders
Secondary 2 (medium gray)	Table shadows
Secondary 3 (pale gray)	Canvas or background table color

Cell Operations

Two types of cells appear in Sun Management Center property tables. These are editable cells, and noneditable cells.

Editable and Noneditable Cells

The key difference between editable and noneditable cells is the background. When you click in an editable cell, there is a white background and in noneditable cells, there is a gray background.

For example, in FIGURE 7-3 below, the cells in Pattern Description and Regexp Pattern columns of the Scan table are white, indicating that they are editable. The remaining cells in the Scan table as well as all of the cells in the File ID and File Stats tables are gray, indicating that they are noneditable.

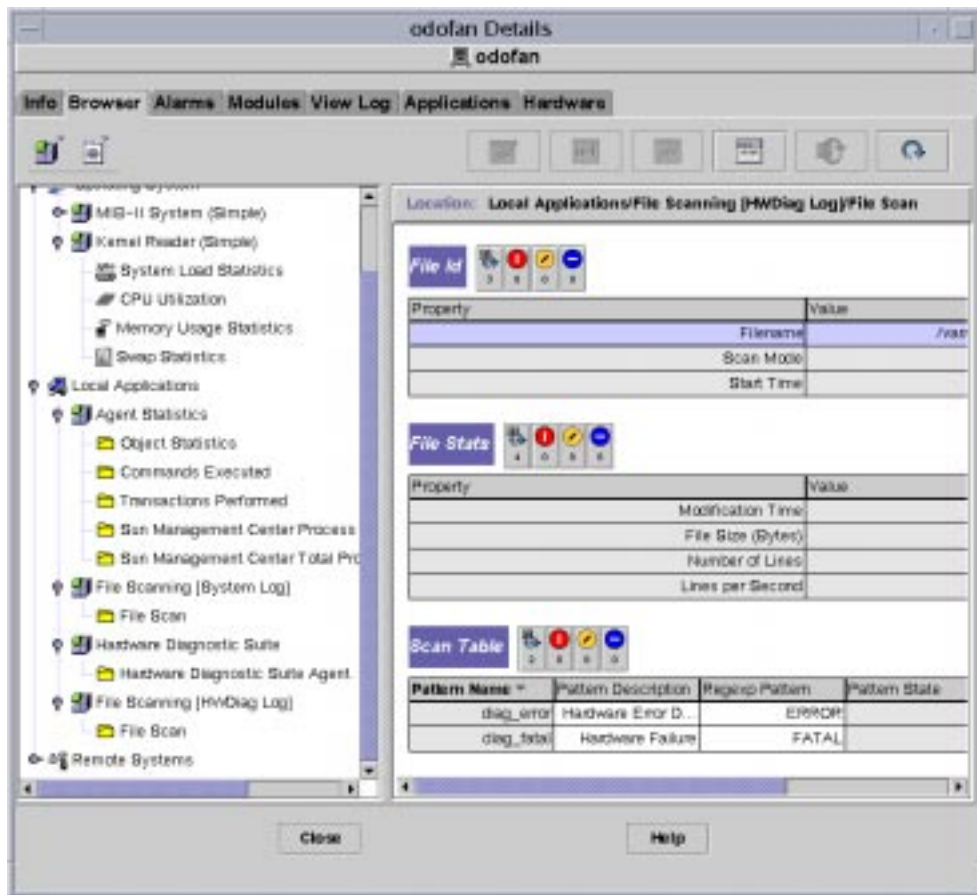


FIGURE 7-3 Editable and Noneditable Cells

▼ To Confirm an Edit

If you change data in an editable cell, you must confirm this change. When you edit a cell, the Change Value Confirmation window displayed.

- **In the Change Value Confirmation window, proceed with one of the following:**
 - Click the OK button to confirm this change.
 - Click the Cancel button to cancel this change.

Set Value Errors

If the value you used to set the value of a cell is invalid, an error window is displayed. In this window, click the OK button to accept this error message.

Default Cell Editors

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

■ Text Cell Editor

This 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 will be aligned left in the cell. To save the information in the cell, click the Return button.

■ Checkbox Cell Editor

A checkbox is a component with only two choices:

- On
- Off

As you can see in FIGURE 7-4, the state of the editor is indicated by a square that is checked (on) or unchecked (off). Here, the checkbox is off.

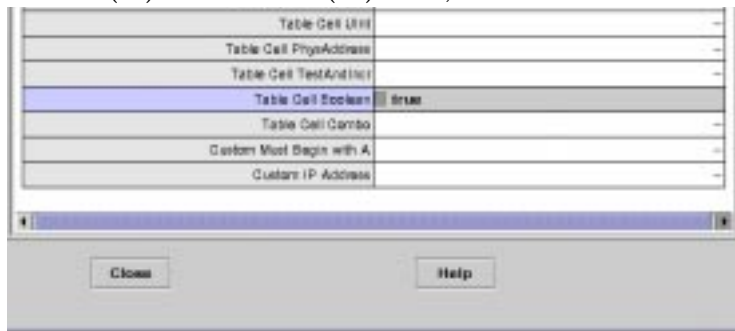


FIGURE 7-4 Checkbox Cell Editor

■ Combo Box Cell Editor

This 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 you choose from the list replaces the current selection.

▼ To Choose an Option from a Combo Box

1. Click the drop-down arrow in the combo box.
2. Choose an item from the list.
3. Click anywhere outside the combo box.

The following three screenshots illustrate how to work with combo boxes. As you can see, in FIGURE 7-5 below, the widget in the “Power On” cell tells you that there are other text options available if the widget is clicked.

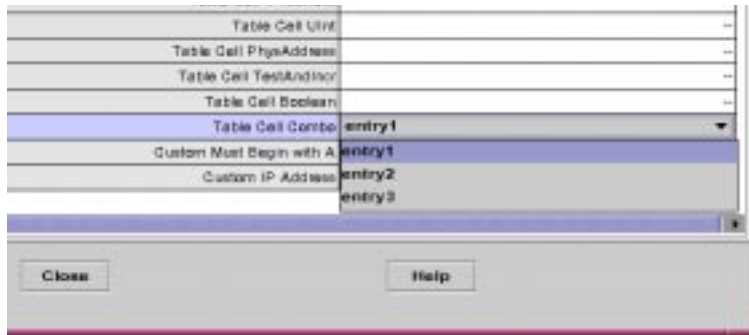


FIGURE 7-5 The Details Window Showing a Combo Box

Column Operations

This section discusses how the new enhancements affect the design of table columns.

▼ To Access The Column Header Context Menu

- In a table, click the right mouse button on a column header.

The column header context menu is displayed. For example, in FIGURE 7-6 below, you can see the column header context menu is displayed with the following menu options:

- Attribute Editor
- Set Property Value
- Refresh

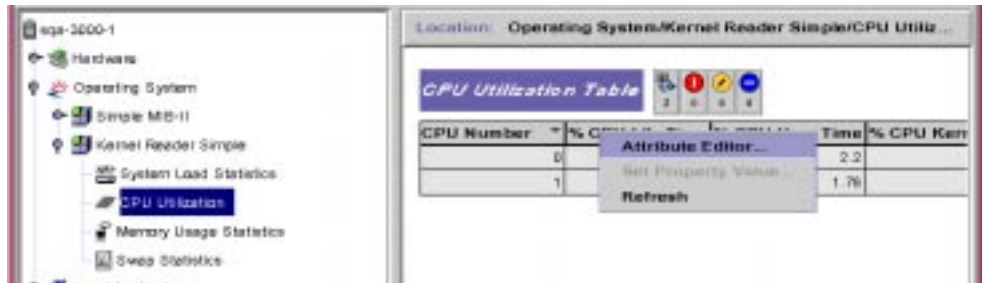


FIGURE 7-6 Column Header Context Menu

Row Operations

This section discusses how the table operations affect the layout and design of table rows.

▼ To Select a Row

- Place your cursor and click the right mouse button in the first cell of the row you want to select.

This step enables you to highlight the entire row and 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 be shown in a table is equal to the page size for tables.

▼ To Select Multiple Contiguous Rows

1. Click in the first target row to highlight the entire row.
2. Click the Shift button to either drag-click or click into any cell in the last row of the desired group of rows.

All rows between the last and first anchor points will be selected.

▼ To Select Multiple Row Ranges

1. Select the first range of a single or contiguous group of rows by completing the procedure above.

2. Place the cursor in a row and proceed with the following:

- Click the Control key
- Click the right mouse button

This step adds a new range to the selection of rows between the existing range and the new anchor point.

3. To extend the range of highlighted rows, proceed with the following:

- Click the Shift button.
- Click the right mouse button.

Row Context Menu

Use the context menu for a row or set of rows when these rows are highlighted and a cell does not have focus. The context menu may be activated from anywhere in the highlighted row(s) by clicking the right mouse button. For example, in FIGURE 7-7 below, the row context menu appears once you select a row and click the right mouse button.

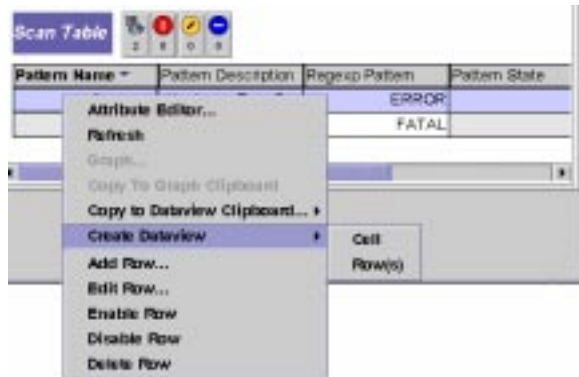


FIGURE 7-7 Row Context Menu

For selected modules, the software enables you to add, delete, enable, or disable rows for the data property tables (TABLE 7-2). 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.

TABLE 7-2 Sun Management Center Modules That Enable You to Add Rows

Module Name	Description
Directory Size Monitoring	Each added row enables you to define another directory for monitoring.
File Monitoring	Each added row defines the monitored “file”.
File Scanning	Each added row defines the “pattern” that must be matched within the monitored file.
Print Spooler	Each added row enables you to define another printer for spooler monitoring.
Directory Size Monitoring	Each added row 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 D.

▼ To Define a Directory

The following example procedure uses the Directory Size Monitoring module. If this module is not loaded, see “To Load a Module” on page 171.

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

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

- 2. Double-click on the Directory Size Monitoring icon in the contents view or single click in the expansion/compression icon next to the Directory Size Monitoring icon in the hierarchy view.**

The Directory Size Monitoring Status folder is displayed.

- 3. Double-click on the Directory Size Monitoring Status folder in either the hierarchy or the contents view.**

The Directory Monitoring property table is displayed.



FIGURE 7-8 Directory Size Monitoring Table

4. Proceed with one of the following:

- Click the right mouse button in the table row and select the Add Row command from the pop-up menu.
- In the Details window, click in the table to select it. The options icon turns white (instead of gray) when the table is selected. Then select Options ► Add Row.

The Row Adder window is displayed.

5. Type the appropriate information in the text fields.

6. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the window to the default parameters.
- Click Cancel to cancel your request.

The added row is displayed in the contents view.

▼ To Add a Row (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)

The following example procedure uses the File Monitoring module. If this module is not loaded, see “To Load a Module” on page 171.

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

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

2. Double-click on the File Monitoring icon in the contents view or single click in the expansion/compression icon next to the File Monitoring icon in the hierarchy view.

The File Monitoring Status folder is displayed.

3. **Double-click on the File Monitoring Status folder in either the hierarchy or the contents view.**

An empty property table is displayed.

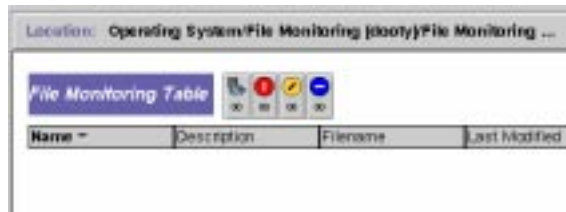


FIGURE 7-9 File Monitoring Table

4. **Proceed with one of the following:**

- Click the right mouse button in the table row and select the Add Row command from the pop-up menu (FIGURE 7-9).
- In the Details window, select Options ► Add Row.

The Row Adder window is displayed (FIGURE 7-10).

5. **Type the appropriate information in the text fields.**



FIGURE 7-10 Row Adder Window for the File Monitoring Module

6. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the window to the default parameters.
- Click Cancel to cancel your request.

The added row is displayed in the contents view (FIGURE 7-11).

Location: Operating System/File Monitoring [root]/File Monitoring Status

File Monitoring Table

Name	Description	Filename	Last Modified	File
log_file	log file	/etc/passwd	08/23/98 20:48:32	

FIGURE 7-11 Updated File Monitoring Table

Note – The Row Adder window that is displayed is dependent on the selected module. FIGURE 7-12, FIGURE 7-13, and FIGURE 7-14 illustrate examples of the Row Adder window for the Directory Size Monitoring, File Scanning and Process Monitoring modules, respectively.



FIGURE 7-12 Row Adder Window for the Directory Size Monitoring Module



The image shows a 'Row Adder' window with a title bar. Inside, there is a 'Table Fields' tab. Below the tab, there are three text input fields. The first field is labeled 'Pattern Name:' and contains the text 'unix_err0'. The second field is labeled 'Pattern Description:' and contains the text 'UNIX anst'. The third field is labeled 'Regex Pattern:' and contains the text 'unix: (ALERT|EMERG|ERR)'. At the bottom of the window, there are four buttons: 'OK', 'Apply', 'Reset', and 'Cancel'.

Table Fields	
Pattern Name:	unix_err0
Pattern Description:	UNIX anst
Regex Pattern:	unix: (ALERT EMERG ERR)

FIGURE 7-13 Row Adder Window for the File Scanning Module



FIGURE 7-14 Row Adder Window for Process Monitoring Module

Other Operations

Sorting

Sorting is supported on all columns, and the following data properties are recognized:

- String
- Numeric
- Date

In the column, you will notice that the:

- Label is flush left
- Text is bold & black
- Sort widget for ascending or descending is flush right

The widget appears as a triangle that points up or down. By double-clicking on the header of the sorted column, you can toggle between a descending and ascending sort.

As you can see in FIGURE 7-15 below, the sorting widget is visible next to CPU Number. Since this widget is pointing down, you can perform a descending sort.

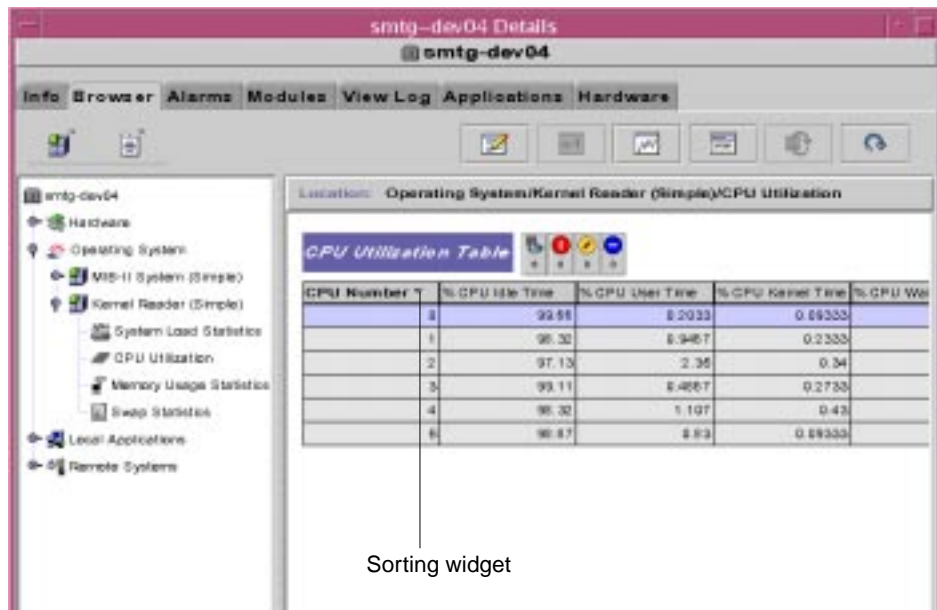


FIGURE 7-15 Sorting

Working with Large Data Property Tables

In large data property tables, you can see only one page of rows at a time. Icons are displayed above the table (FIGURE 7-16) that enable you to scroll through these tables.

The icons enable you to:

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

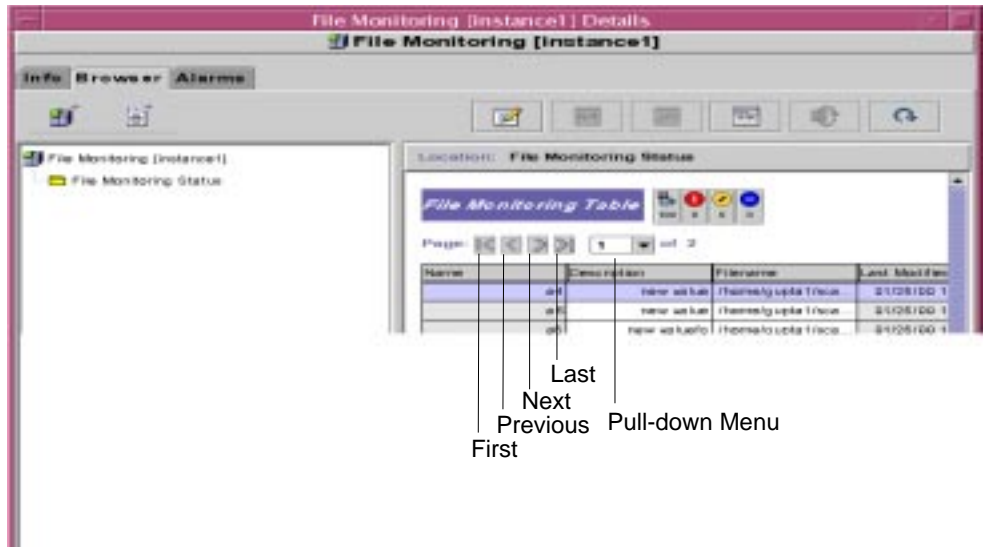


FIGURE 7-16 Scrolling Through Large Tables

Next to these icons is a pull-down menu that enables you to go to a specific page. For example, in the File Monitoring Table (FIGURE 7-16), there are two pages. You can click on the pull-down menu, choose 2 and proceed to page 2.

▼ To Add a Printer

The following example procedure uses the Print Spooler module. If this module is not loaded, see "To Load a Module" on page 171.

1. **In the Browser Details window, double-click on the Print Spooler icon in the hierarchy (tree) view.**
The operating system modules are displayed in both the hierarchy and contents views.
2. **Double-click on the Print Spooler icon in the contents view or single click in the expansion/compression icon next to the Print Spooler icon in the hierarchy view.**
The Print Spooler folder is displayed.
3. **Double-click on the Print Spooler folder in either the hierarchy or the contents view.**

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

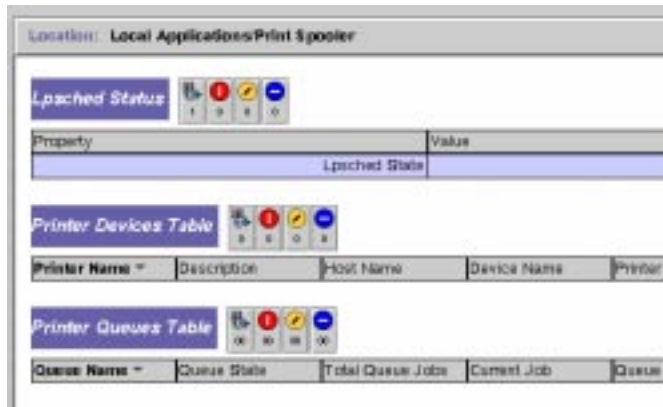


FIGURE 7-17 Print Spooler Property Tables

4. Proceed with one of the following:

- Click the right mouse button in the Printer Devices table row and select the Add Row command from the pop-up menu.
- In the Details window, select Options ► Add Row.

The Row Adder window is displayed (FIGURE 7-18).

5. Type the appropriate information in the text fields.

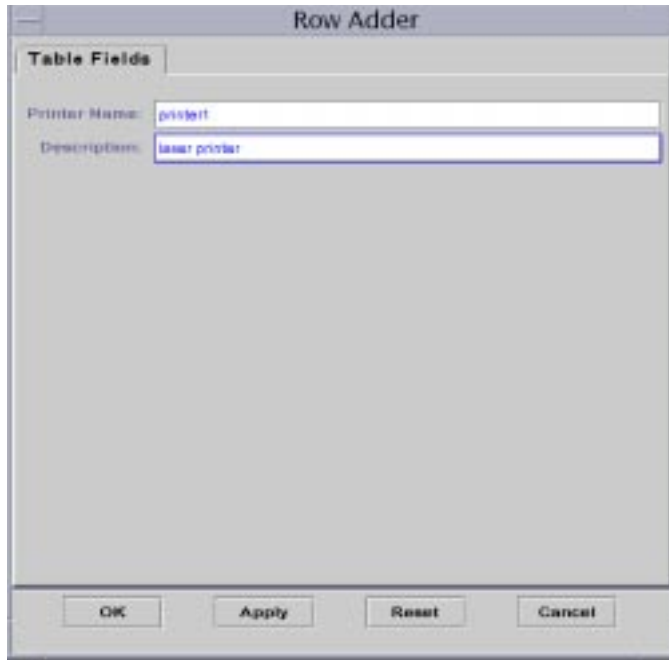


FIGURE 7-18 Row Adder Window for the Print Spooler Module

6. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the window to the default parameters.
- Click Cancel to cancel your request.

The added row is displayed in the contents view.

▼ To Refresh Displayed Data

● **Proceed with one of the following:**

- Click the right mouse button in the data property table row and select Refresh from the pop-up menu (FIGURE 7-19).
- Click the Refresh Now button.

In this example, the System Load Statistics table is updated with the latest information.

Note – You may also set up a refresh interval and the Sun Management Center software automatically updates your monitored data at your designated time interval. For information on accomplishing this task, see “Refresh Tab in the Attribute Editor” on page 144.



FIGURE 7-19 Monitored Data Property Pop-up Menu

Probing Properties

On selected module properties, the software enables you to use pre-determined UNIX commands including list files, the `vmstat` command, and so on. The Probe button is not grayed out when probe commands are applicable for the selected property.

Note – The Find All Recent Files probe commands for the Filesystem Usage properties (Kernel Reader module) 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/time they were created or modified. For more information on the Filesystem Usage, see “Filesystem Usage Table” on page 560.

The following 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 171.

▼ To Probe a Property

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

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

2. Double-click on the Directory Size Monitoring icon in the contents view or single click in the expansion/compression icon next to the Directory Size Monitoring icon in the hierarchy view.

The Directory Monitoring Status folder is displayed.

3. Double-click on the Directory Monitoring Status folder icon in either the hierarchy or the contents view.

The monitored data properties are displayed in a property table.

4. Proceed with one of the following:

- Click the right mouse button in the Directory Monitoring table row and select the List Files or Recursively List Files command from the pop-up menu (FIGURE 7-20).
- Click the Probe icon, select the appropriate command from the Probe Select dialog (FIGURE 7-21), and click the OK or Cancel button.



FIGURE 7-20 Probe Commands in the Pop-up Menu



FIGURE 7-21 Probe Select Dialog

Graphing Data Properties

This chapter describes the following topics.

- To Graph A Monitored Data Property
- To Graph Two Data Properties
- To Save Graphing Parameters
- To Open a Graph
- To Apply a Graph Template

Graphing Properties

Sun Management Center software enables you to graph most monitored data properties.

▼ To Graph A Monitored Data Property

- **Proceed with one of the following:**

- Click the right mouse button in any table cell containing a data property you want to graph, and select Graph from the pop-up menu (FIGURE 7-19).
- Select (highlight) the desired data property, and then click the Graph button at the top of the Details window.

The graphing window is opened and the values of the property are plotted as a function of time. The plotting is dynamic and continues even if the graphing window is iconified on the desktop. Plotting stops, however, if the window is closed.

Note – Placing your cursor and clicking with the right mouse button in a property row or column displays the pop-up menu for that property.

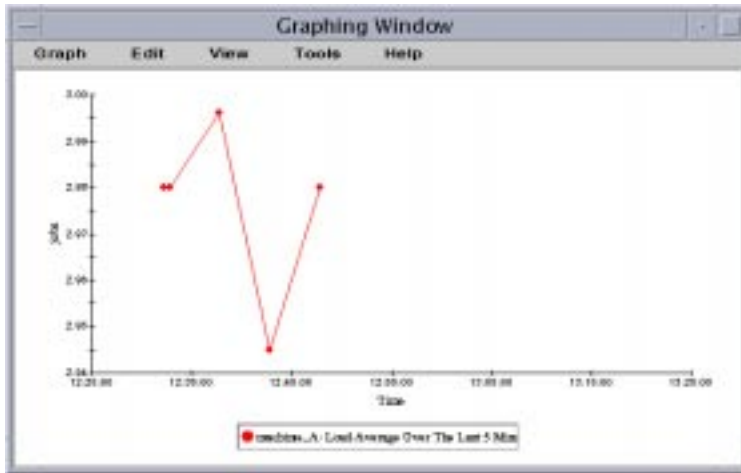


FIGURE 8-1 Graph of System Load Statistics Average Over the Last Five Minutes

▼ To Graph Two Data Properties

1. Click the right mouse button in the data property table cell.

In this example, the Load Averages Over the Last 1 Minute table cell is selected.

2. Proceed with one of the following:

- Click the right mouse button in the table cell and select the Copy to Graph Clipboard command from the pop-up menu (FIGURE 8-2).
- In the Details window, select Options ► Copy to Graph Clipboard.

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 step.

3. Go to the graphing window in which you want the additional property to be plotted. Select Graph ► Add From Graph Clipboard (FIGURE 8-3).

The second data property is added (FIGURE 8-4).

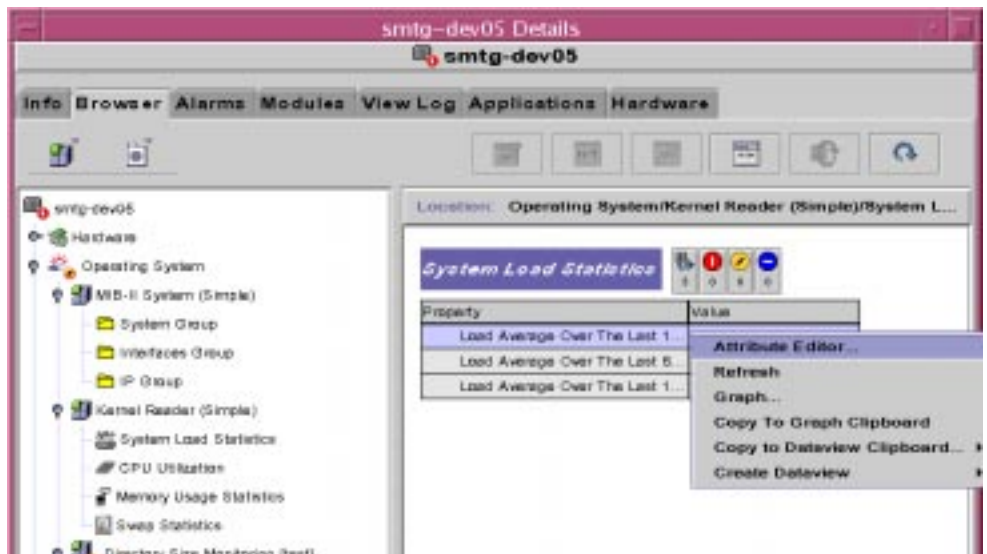


FIGURE 8-2 Copying Load Averages Over the Last One Minute to the Graph

Note – You may graph up to 5 datasets at one time on a single graph.

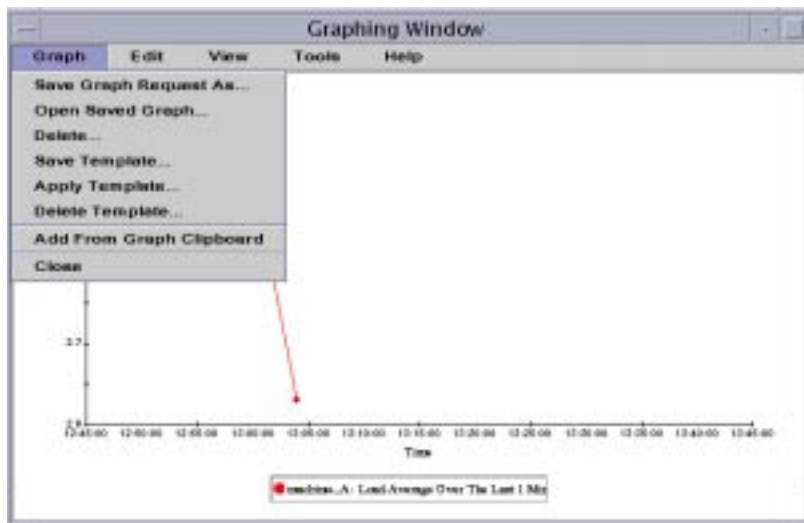


FIGURE 8-3 Adding Load Averages Over the Last One Minute to the Graph

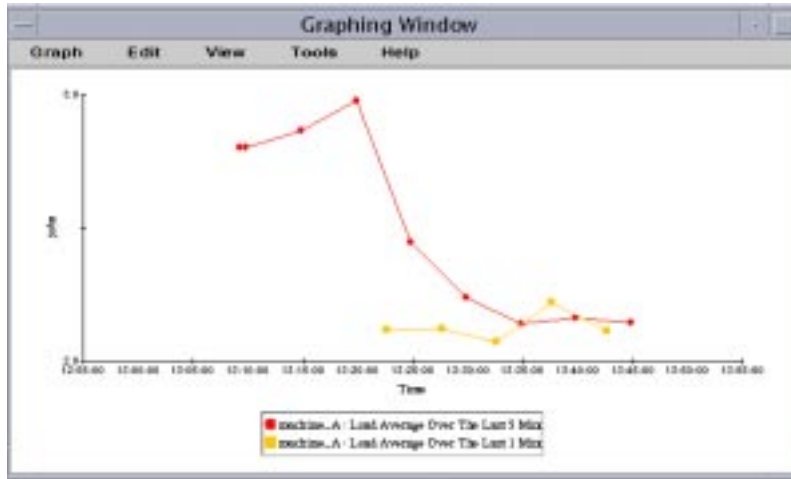


FIGURE 8-4 Load Averages Over the Last One and Five Minutes

▼ To Save Graphing Parameters

1. Select **Graph ► Save Graph Request As** or **Select Graph ► Save Template in the Graphing window**.

The Save Graph Request 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 (as shown here) or from the main console window under the Tools menu. A newly opened graph starts plotting fresh data.

The Save Template function enables you to save any custom features you have added to your graph including axis labeling, headers, footers, legend, and so on. (For more information see “Graphing Menus” on page 123.)

2. Type the name in the **Enter Graph Name** or **Enter Template Name** fields.
3. Click the **Save** button to save your graph request (template) or click the **Cancel** button to cancel your request.

▼ To Open a Graph

1. Select **Graph ► Open Saved Graph in the Graphing window**.

The Open Graph dialog is displayed.

2. Select (highlight) a saved graph from the list.

3. Click the OK button to open the graph or the Cancel button to cancel your request.

▼ To Apply a Graph Template

1. Select Graph ► Apply Template in the Graphing window.

The Apply Template dialog is displayed. This dialog enables you to apply saved custom features to the current graph.

2. Select (highlight) a saved template from the list.

3. Click the OK button to apply the template to the current graph or the Cancel button to cancel your request.

Graphing Menus

There are five Graphing window menu items:

- Graph
- Edit
- View
- Tools
- Help

Graph Menu Items

TABLE 8-1 Graph Menu Items

Menu Item	Description
Save Graph Request as	Saves the host name and data property (properties) that are plotted.
Open Saved Graph	Opens a previously saved graph.
Delete	Deletes a previously saved graph.
Save Template	Saves any custom changes you make on the graph.
Apply Template	Applies a saved template to the current graph.

TABLE 8-1 Graph Menu Items

Menu Item	Description
Delete Template	Deletes a previously saved graph template.
Add From Graph Clipboard	Adds an additional dataset to an existing graph. Choose this menu item after selecting a property to “copy to graph clipboard.”
Close	Closes the graphing window.

The graph utility enables you to customize the look and feel of your graphs through the edit menu items (TABLE 8-2).

Note – Header, Footer, Axes, and Legend changes are not visible unless the view option corresponding to that part of the graph is toggled on (TABLE 8-4).

Edit Menu Items

TABLE 8-2 Edit Menu Items

Menu Item	Description
Chart Type	Changes graph type to line, area, or bar graph.
Main Titles	Changes the text, font, font style, point size, and orientation of the header, footer, legend, x-axis or y-axis title. In addition, this dialog enables you to select and customize the border around the title.
Axes	Edits the range and the spacing of the x- and y-axes. This menu item is suggested for advanced users only (FIGURE 8-6 and FIGURE 8-8).
Border	Determines the border type (including a no border option).

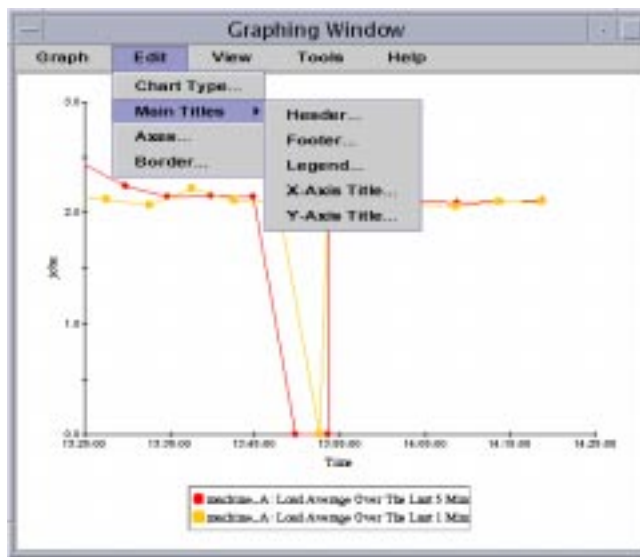


FIGURE 8-5 Edit Menu Items

Note – Editing axes requires some care in choosing the correct values. If you should choose values for Min and Max that are impossible to plot, the dialog, in most cases, gives you an error message describing the problem. However, if you simply choose values that are possible, but result in the plotted points no longer being visible, you are not warned with an error message.

FIGURE 8-6 and FIGURE 8-8 show the axes dialog for the x-axis and y-axis.

X-axis Title Dialog

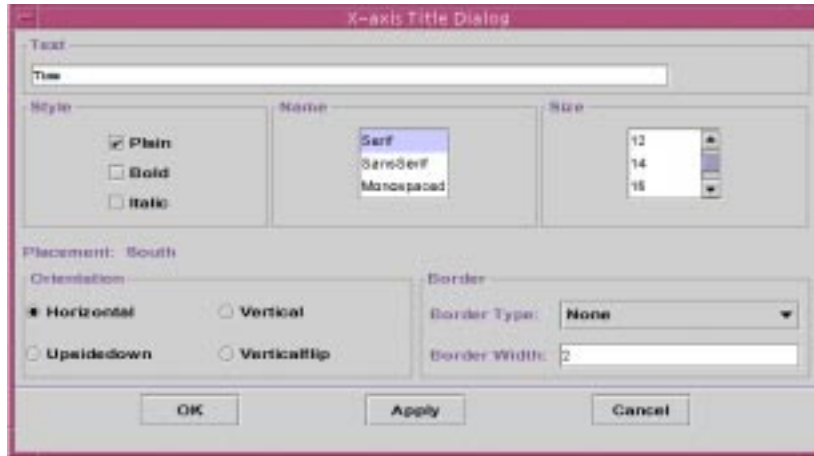


FIGURE 8-6 X-axis Editing Dialog

Sun Management Center software chooses default x-axis values. You can change the values in the fields on this screen. These fields and the possible range of values are described in the following table.

TABLE 8-3 Fields on the X-axis Title Dialog Box

Field Name	Description
Text	Enter the label for the x-axis of your graph.
Style	Select plain, bold, or italic font style for the x-axis label.
Name	Select serif, sans serif, or monospaced font for the x-axis label.
Size	Select a font size for the label, ranging from 6-point to 26-point font.
Placement	This field indicates that the label is always below the graph. This value cannot be changed.
Orientation	Select one of four types of orientation for the axis label. Examples are shown in FIGURE 8-7.
Border Type	Select no border for the label, or select a type of border.
Border Width	Set the border width for the label. This field does nothing if the border type you select is "None."

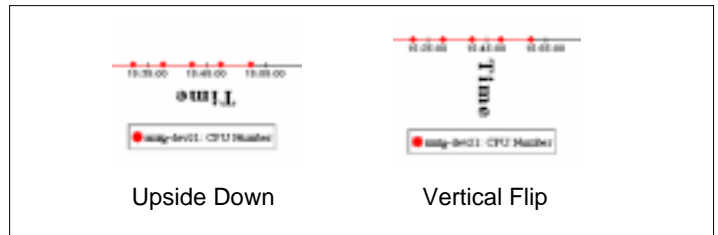
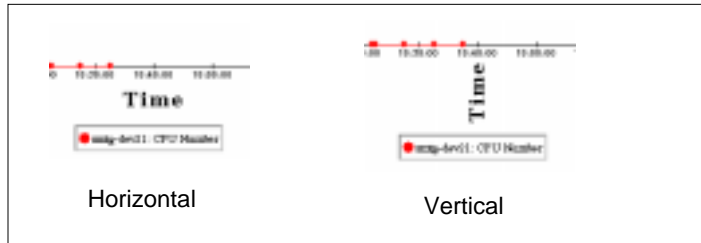


FIGURE 8-7 Examples of X-axis Label Orientation

Y-axis Title Dialog

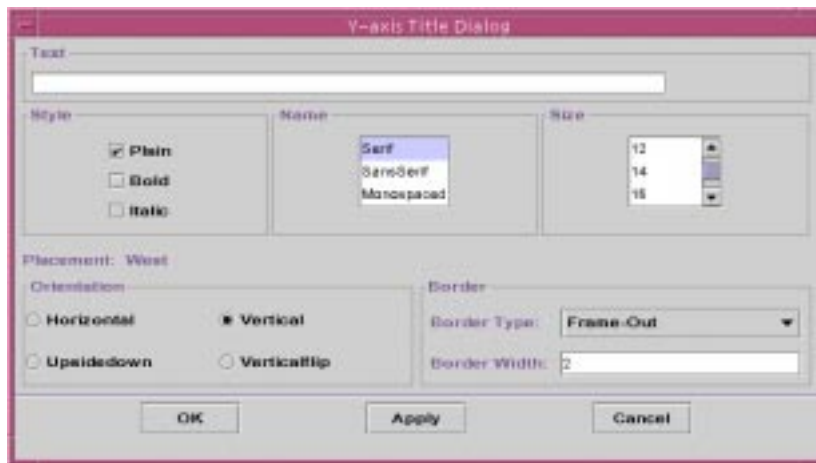


FIGURE 8-8 Y-axis Editing Dialog

Sun Management Center software chooses default y-axis values. You can change the values in the fields on this screen. See TABLE 8-3 for a description of the fields on the y-axis screen. They are the same as those described for the x-axis label, except that in the Placement field, the default value is “West,” which indicates that the label is always left of the graph. This value cannot be changed.

View Menu Items

TABLE 8-4 View Menu Items

Menu Item	Description
Live Data	Displays the monitored property (properties) data points.
Show Header	Displays the header text.
Show Footer	Displays the footer text.
Show Axis Titles	Displays the x-and y-axes titles.
Show Axes	Displays the x-and y-axes.
Show Grids	Displays a grid pattern in the graphing window.
Show Legend	Displays the legend text.
Rotate Graph	Rotates the graph by 90, 180, or 270 degrees.
Flip	Flips the graph over (x-axis flips the x-axis, y-axis flips the y-axis).
Reset View	Resets rotate and flip options to the default (graph upright) setting.

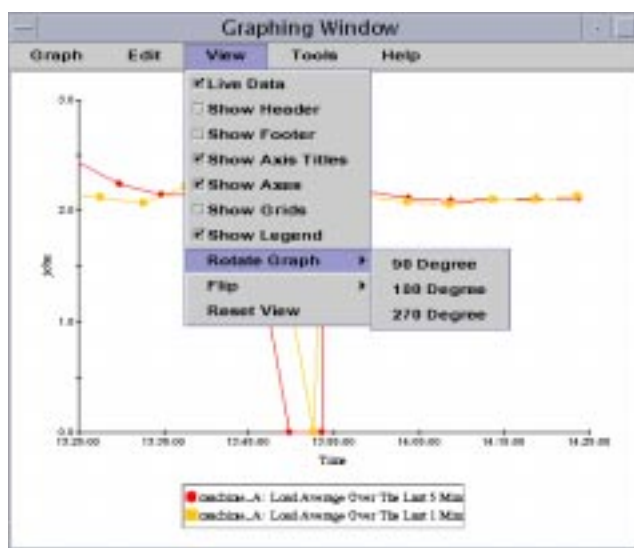


FIGURE 8-9 View Menu Items

Tools Menu Items

TABLE 8-5 Tools Menu Items

Menu Item	Description
Zoom	Toggle to turn on the zoom option, which focuses on a selected area of the graph. Hold down the Shift key while dragging out a rectangle with the mouse.
Translate	Toggle to turn on the translate option, which moves the graphing window side to side or back and forth. Hold down the Control key while moving the mouse left-right or up-down.
Restore	Removes the effects of the zoom and translate options; undo option.

Help Menu Items

TABLE 8-6 Help Menu Items

Menu Item	Description
Help	Access the Help documentation.

Attribute Editor

This chapter describes the following topics:

- To Open the Attribute Editor
- To Create an Alarm
- To Register an Alarm Action
- To Modify Alarm Actions
- To Send an Email
- To Define Your Own Alarm Action Script
- To Set a Refresh Interval
- To Set a History Interval

Attribute Editor for a Data Property

The Attribute Editor for a data property provides additional information about the property and enables you to customize various monitoring criteria. You can use the Attribute Editor to set:

- Alarm thresholds
- Actions when alarm conditions occur
- The refresh interval
- A logging schedule for 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. The tabs for the System Load Statistics data property are:

- Info
- Alarms
- Actions
- Refresh
- History

Note – Each Attribute Editor displays one or more of these tabs, depending on the type of Attribute Editor. The Attribute Editor that is displayed depends on the selected object.

▼ To Open the Attribute Editor

1. **Click the right mouse button and select a data property table cell (FIGURE 8-2).**
2. **Proceed with one of the following:**
 - Click the right mouse button in a table row and select Attribute Editor from the pop-up menu.
 - Click the Attributes icon.

Information Tab in the Attribute Editor

The Information panel (FIGURE 9-1) provides you with additional information about the selected object.



FIGURE 9-1 Attribute Editor Info Tab for a Monitored Property

Alarms Tab in the Attribute Editor

The Alarms panel (FIGURE 9-2) enables you to set alarm thresholds (TABLE 9-1) for simple alarms only.

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 becoming true. For more information on alarm rules, see Appendix E.

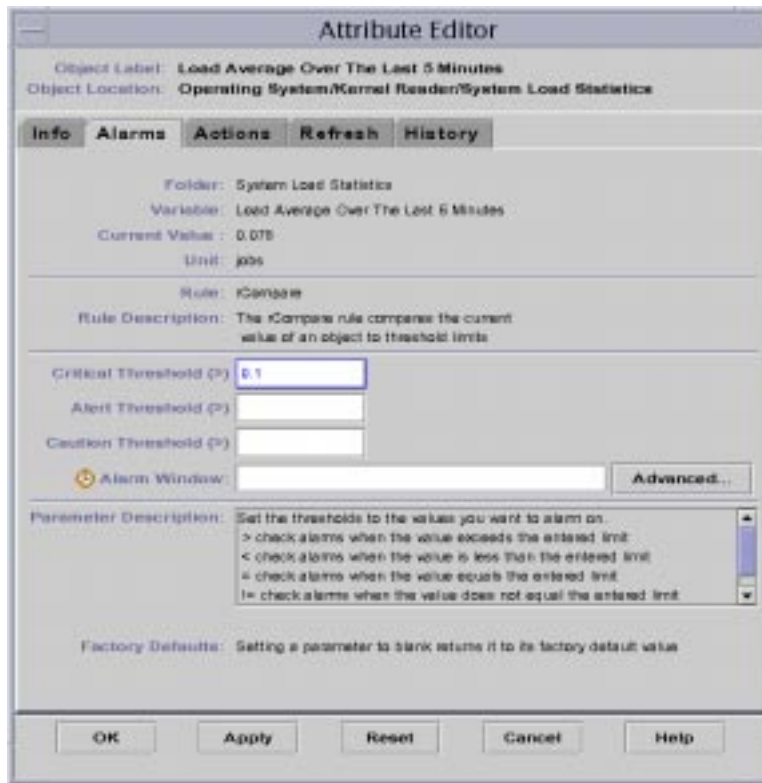


FIGURE 9-2 Attribute Editor Alarms Tab for a Monitored Property

TABLE 9-1 shows common simple alarm limits for monitored properties. The alarm limits are also displayed in the Parameter Description field (FIGURE 9-2). You may set thresholds for one or more of these alarm limits for selected data properties.

TABLE 9-1 Common Simple Alarm Limits in Sun Management Center Software

Alarm Limit	Description
Critical Threshold (>)	Critical (red) alarm occurs if value exceeds limit entered in this field.
Alert Threshold (>)	Alert (yellow) alarm occurs if value exceeds limit entered in this field.
Caution Threshold (>)	Caution (blue) alarm occurs if value exceeds limit 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 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.

The 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)

Note – You need the appropriate security permission to set an alarm threshold. See Chapter 14 for more information.

▼ To Create an Alarm

The following example illustrates how to create a simple alarm. This example creates an alarm threshold in the Kernel Reader module.

1. Click the Browser tab button in the Details window.

2. Click the expansion/compression icon next to the Operating System icon in the hierarchy tree view.

The Operating System modules are displayed.

3. Click the expansion/compression icon next to the Kernel Reader icon.

The Kernel Reader properties are displayed.

4. Double-click on the System Load Statistics icon.

The System Load Statistics properties table is displayed in the contents view.

5. Click with your left mouse button and 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 on the Alarms tab button.

The alarm rows are displayed.

8. Type a value in the Critical Threshold (>) field which is less than the current value (FIGURE 9-2).

Entering this value enables you to create a critical alarm.

9. Complete one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the Attribute Editor to the default parameters.
- Click Cancel to cancel your request.

After some time, the Load Average Over the Last 1 Minute data field in the table turns red. In addition, red alarm icons are displayed on the following folders and icons: Operating System, Kernel Reader, and System Load Statistics (unless your system has an open, unacknowledged severity 1 black alarm).

10. Click the Alarms tab button in the Details window.

The alarm you created should be reflected in the alarms table. See Chapter 12 for more information on this subject.

11. Acknowledge this alarm.

12. 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 14.

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.

The preceding example illustrates creating a situation where an alarm is registered if a value exceeds the alarm limit. TABLE 9-1 lists other common alarm limits in the software.

Actions Tab in the Attribute Editor

The Actions panel (FIGURE 9-3) 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 enter the name of a script in the critical action field 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 shown in FIGURE 9-3, you can set separate actions for different alarm conditions or one for any alarm condition (action on any change). The conditions are:

TABLE 9-2 Alarm Conditions

Condition	Action specified in this field allows you to:
Critical	Notify a user that a critical alarm has occurred, or specify a script or application to invoke in response to the critical alarm.
Alert	Notify a user that a alert alarm has occurred, or specify a script or application to invoke in response to the alert alarm.
Caution	Notify a user that a caution alarm has occurred, or specify a script or application to invoke in response to the caution alarm.

TABLE 9-2 Alarm Conditions

Condition	Action specified in this field allows you to:
Indeterminate Action	Notify a user that a indeterminate event (not associated with an alarm) has occurred, or specify a script or application to invoke in response to the event.
Close Action	Notify a user that an alarm has been closed, or specify a script or application to invoke in response to alarm closing.
Action on Any Change	Notify a user that any of the previous conditions in this table has occurred, or specify a script or application to invoke in response to any one of these previous conditions.

Note – The check boxes shown 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.



FIGURE 9-3 Attribute Editor Actions Panel for a Monitored Property

When you activate the check box and click the Actions button, the Action Dialog Selection window is displayed (FIGURE 12-8). This window enables you to modify the registered alarm actions. Two buttons in the dialog (Email and Other) allow you to choose one of two options for an alarm action.

TABLE 9-3 lists these buttons and their functions.

TABLE 9-3 Alarm Actions Modification Dialog Buttons

Tab	Function
Email	Allows you to specify an address and message to be sent as email.
Other	Allows you to select generic shell scripts installed on the managed node.

▼ To Register an Alarm Action

- 1. Click on the Attribute Editor Actions tab.**
The Attribute Editor Actions dialog is displayed.
- 2. Press the Actions... button next to the action to be registered.**
The Action Selection dialog is displayed.
- 3. Select the type of alarm action you want to register (E-mail or Other).**
- 4. Make your entries in the fields of the selected action.**
- 5. Click OK to accept the entries and close the Alarm Action dialog.**
The entry is displayed in the corresponding Action field of the Actions dialog.

▼ To Modify Alarm Actions

- 1. Click the Action button for the alarm action you want to modify.**
The Action Selection dialog is displayed.
- 2. Select the type of alarm action you want to modify (E-mail or Other).**
- 3. Make your changes in the fields of the selected action.**
- 4. Click OK to accept the changes and close the Alarm Action dialog.**
The change is displayed in the corresponding Action field of the Actions dialog.

▼ To Send an Email

The following describes an example of how to send an email to a user when a critical alarm occurs.

1. Click the Browser tab button in the Details window.

2. Click the expansion/compression icon next to the Operating System icon in the hierarchy tree view.

The Operating System modules are displayed.

3. Click the expansion/compression icon next to the Kernel Reader icon.

The Kernel Reader properties are displayed.

4. Double-click on the System Load Statistics icon.

The System Load Statistics properties table is displayed in the contents view.

5. Click with your left mouse button and 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 displays.

8. Click Email to activate the To and Message fields.

9. Type *username* in the To field and the message in the Message field.

10. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Cancel to cancel your request.

The following email is sent to the user whenever an 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}
```

▼ To Define Your Own Alarm Action Script

The following procedure describes how to customize an alarm action (other than an email message as described previously) to notify a user when an alarm condition occurs.

1. **Create your custom alarm action script, using the following optional arguments:**

TABLE 9-4 Arguments for Custom Alarm Action Script

Argument	Definition
%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/
```

Note – The script filename should *not* have a .sh extension.

4. **Click the Browser tab button in the Details window.**
5. **Set the alarm threshold.**
For more information, see “To Create an Alarm” on page 136.
6. **Click the expansion/compression icon next to the Operating System icon in the hierarchy tree view.**
The Operating System modules are displayed.
7. **Click the expansion/compression icon next to the Kernel Reader icon.**
The Kernel Reader properties are displayed.
8. **Double-click on the System Load Statistics icon.**
The System Load Statistics properties table is displayed in the contents view.

9. **Click the left mouse button to select the table cell for Load Averages Over the Last 5 Minutes.**
10. **Click the right mouse button.**
The selection menu is displayed.
11. **Click the Attribute Editor... item.**
The Attribute Editor window is displayed.
12. **Click the Actions tab.**
The action rows are displayed.
13. **Type `custom_alarm_script %statusstringfmt` in the Critical Action field of the Actions panel (FIGURE 9-4).**
14. **Click the box next to the Critical Action field to remove the check mark.**
Your script will be executed automatically.
15. **Complete this procedure with one of the following actions:**
 - Click OK to accept the changes you have made and close this window.
 - Click Apply to apply your changes without closing this window.
 - Click Reset to reset the Attribute Editor to the default parameters.
 - Click Cancel to cancel your request.

Note – If the script is not valid, the message “Failed to save attribute information.” is displayed at the bottom of the Attribute Editor window.



FIGURE 9-4 Specifying a Custom Script for an Alarm Action

Refresh Tab in the Attribute Editor

The Refresh panel (FIGURE 9-5) enables you 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.



FIGURE 9-5 Attribute Editor Refresh Tab for a Monitored Property

▼ To Set a Refresh Interval

The following example illustrates how to set a refresh interval in the System Load Statistics module.

1. **Click the Browser tab button in the Details window.**

2. **Click the expansion/compression icon next to the Operating System icon in the hierarchy tree view.**

The Operating System modules are displayed.

3. **Click the expansion/compression icon next to the Kernel Reader icon.**

The Kernel Reader properties are displayed.

4. **Double-click on the System Load Statistics icon.**

The System Load Statistics properties table is displayed.

5. **Click with your left mouse button and 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.**

In this example, type 300 in the entry field. The refresh interval is five minutes. For more information on the Advanced button, see “Using the Time Editor” on page 149.

9. **Complete this procedure with one of the following actions:**

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the Attribute Editor to the default parameters.
- Click Cancel to cancel your request.

Whenever the System Load Statistics table is displayed, the values in the table are refreshed every five minutes.

Note – By increasing the refresh interval to a larger interval, then the agent uses less CPU cycles.

History Tab in the Attribute Editor

The History panel enables you to save older data for a monitored property. In FIGURE 9-6, a history of data points is recorded every 120 seconds (sample interval). This information can be stored in a disk file or in the memory cache. There are two types of disk files: circular (maximum of 1000 lines) and text. These files are located in the `/var/opt/SUNWsymon/log` directory. If you select memory cache, you must also indicate how many data points should be saved in the Max Size (sample) field.

Note – You can view this data in a graph by opening the graph for this monitored property. If you have selected memory cache, the graph is displayed with the historical data.



FIGURE 9-6 Attribute Editor History Tab for a Monitored Property

▼ To Set a History Interval

1. **Click the Browser tab button in the Details window.**
2. **Click the expansion/compression icon next to the Operating System icon in the hierarchy tree view.**

The Operating System modules are displayed.
3. **Click the expansion/compression 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. **Click with your left mouse button and 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 History tab button.**

The history panel is displayed.
8. **Type a value (in seconds) in the Sample Interval field or click on the Advanced button.**

In this example, type 120 in the entry field. A history data point is collected every two minutes. For more information on the Advanced button, see “Using the Time Editor” on page 149.
9. **Click in the check box next to Save History as Disk File or Save History in Memory Cache.**
10. **If you decided to save history as a disk file, determine the file type (circular or text) and type the file name in the Text File Name field (text file only).**

A circular disk file is automatically saved under the name `history.log`. If you do not choose a file name for your text file, it is automatically saved under the name `agent_default.history`.
11. **If you decided to save history in memory cache, type the number of history data points in the Max Size (sample) field.**

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 may be graphed. See “To Graph A Monitored Data Property” on page 119 for more information.
12. **Complete this procedure with one of the following actions:**
 - Click OK to accept the changes you have made and close this window.

- Click Apply to apply your changes without closing this window.
- Click Reset to reset the Attribute Editor to the default parameters.
- Click Cancel to cancel your request.

Time Editor

This chapter describes the following topics:

- To Create a Time Expression Using the Cyclic and Comparison Tabs
- To Create a Time Expression Using the Absolute and Cron Tabs
- To Create an Alarm Schedule Using the Comparison Tab

Using the Time Editor

Use the Time Editor (FIGURE 10-1) to schedule monitoring activities. For example, you may want a particular module to be operational only during business hours. Or you may want to record the history of a monitored property only during peak activity.

You can use the Time Editor to set the schedule for a module, for alarms, for a refresh interval, and for history data collection.

Note – The schedule (set by the Time Editor) for a module overrides the schedule for alarms, refresh intervals, and history. If the module is not “on,” the data properties are not monitored and the alarms, refresh, and history schedules are meaningless.

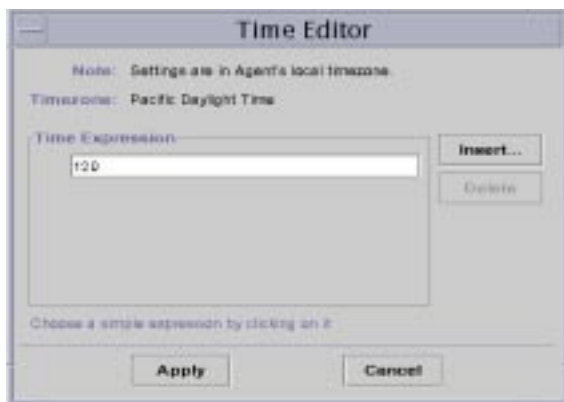


FIGURE 10-1 Time Editor

There are four basic types of Time Expressions:

- Cyclic – Periodic events
- Absolute – Starting at a particular time
- Comparison – Allowing events at specific times
- Cron – Allowing events at specified times using cron input format

These Time Expressions can be used separately or in combination.

Note – All four Time Expressions are valid for history sample and refresh intervals. However, only the comparison tab is valid for alarm and module schedules.

Combining Time Expressions

The following examples illustrate combining Time Expressions to set a history interval.

Note – Sampling for the history interval does not occur unless the module is also on (according to the module schedule).

▼ To Create a Time Expression Using the Cyclic and Comparison Tabs

Note – This procedure is also valid for a refresh interval.

1. **Click on the Advanced button in the History tab of the Attribute Editor for a data property.**

See “To Set a History Interval” on page 147 for more information.

The Time Editor is displayed (FIGURE 10-1).

2. **If any value is in the Time Expression field, highlight the value and delete it by clicking the Delete button.**

3. **Click the Insert button.**

The Time window is displayed with the Cyclic tab selected.

4. **Determine the frequency for the history interval (FIGURE 10-2).**

In this example, the history interval is set for every hour. That is, the software checks the System Load Average Over the Last 5 Minutes every hour.

- a. **Highlight the number field and click the up or down arrows until the number 1 is displayed.**
- b. **Highlight the units field and click the up or down arrows until hours is displayed.**

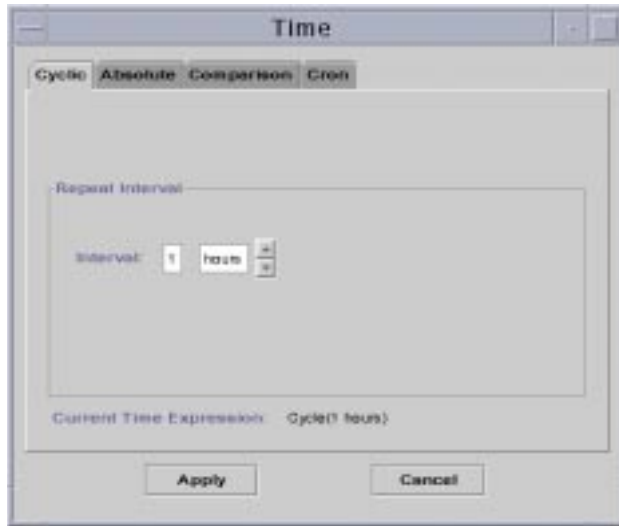


FIGURE 10-2 Setting a Cyclic Time of One Hour

5. Click the Apply button.

- Cycle(1 hours) is displayed in the Time Editor (FIGURE 10-3).



FIGURE 10-3 Time Editor With Cyclic Time of One Hour

6. Click the Insert button.

The Time window is displayed with the Cyclic tab selected.

7. Click the Comparison tab.

The Time window is displayed with the Comparison tab selected.

8. Determine the start of the Time Range (Monday).

The time range determines the time period when the software checks the system load average every hour. The software does not check the system load average outside the time period specified by this window. In this example, the time range is from Monday to Friday, inclusive.

a. Select Day of week from the left pull-down menu.

b. Select >= from the middle pull-down menu.

c. Select Monday from the right pull-down menu.

The time expression is displayed in the Current Time Expression field (FIGURE 10-4).

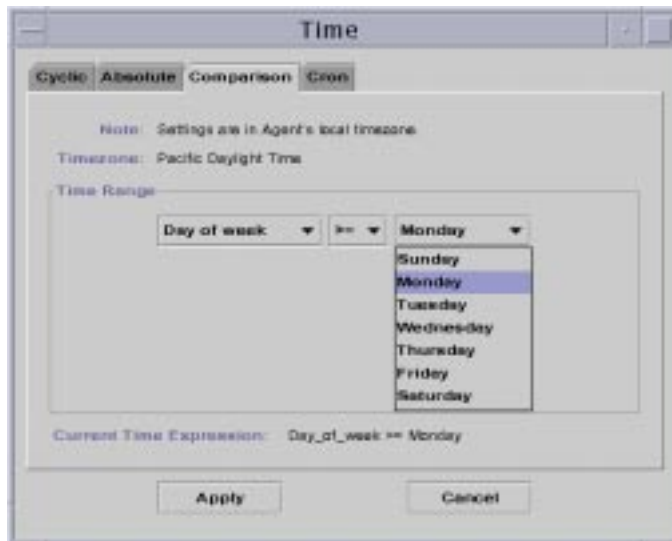


FIGURE 10-4 Setting the Start Range to Monday

9. Click the Apply button.

The Time Editor is updated. The Current Time Expression now reads Day_of_week>=Monday. However, the Time Editor also enables you to select the Or expression (FIGURE 10-5).



FIGURE 10-5 Time Editor Is Updated With a Start Range of Monday

10. Determine the end of the Time Range by clicking the Insert button.

11. Click on the Comparison tab of the Time window.

The Time window is displayed with the Comparison tab selected.

12. Determine the end of the Time Range (Friday).

a. Select Day of week from the left pull-down menu.

b. Select <= from the middle pull-down menu.

c. Select Friday from the right pull-down menu.

The Time expression is displayed in the Current Time Expression field (FIGURE 10-6).

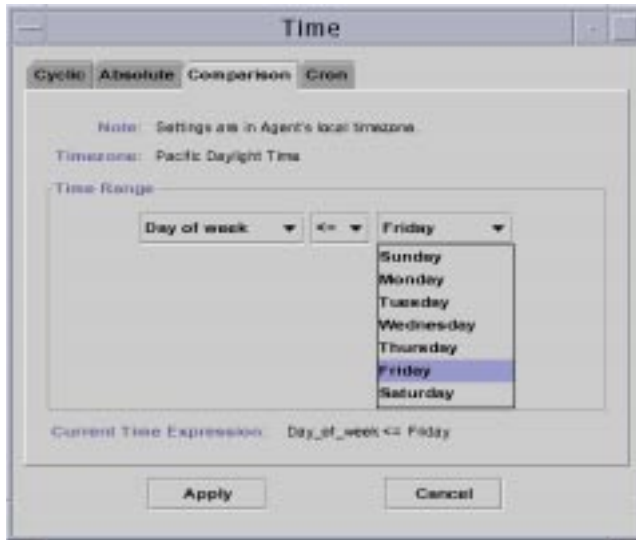


FIGURE 10-6 Setting the End Range to Friday

13. Click the Apply button.

The Time Editor is updated. The Time Expression fields now read Cycle(1 hours) and Day_of_week>=Monday and Day_of_week<=Friday (FIGURE 10-7).



FIGURE 10-7 Time Editor Showing a Cycle Time of One Hour From Monday to Friday

14. Click the Apply button.

The Sample Interval field in the Attribute Editor is updated. The software will check the system load average (over five minutes) at every hour, from 12:00 AM Monday to 12:00 AM Saturday morning.



FIGURE 10-8 Updated History Attribute Editor Showing a Cycle Time of One Hour From Monday to Friday

▼ To Create a Time Expression Using the Absolute and Cron Tabs

Note – This procedure is also valid for a refresh interval.

1. **Click on the Advanced button in the History tab of the Attribute Editor for a data property.**

See “To Set a History Interval” on page 147 for more information.

The Time Editor is displayed (FIGURE 10-1).

2. **If any value is in the Time Expression field, highlight the value and delete it by clicking the Delete button.**

3. **Click the Insert button.**

The Time window is displayed with the Cyclic tab selected.

4. **Click the Absolute tab.**

The Time window is displayed with the Absolute tab selected.

5. **Determine the starting time and date (FIGURE 10-9).**

- a. **Highlight the hour, minute, and if desired, the seconds fields and click the up or down arrow until the correct time is displayed.**

- b. **Highlight the month, date, and year fields and click the up or down arrow until the correct date is displayed.**

The starting date and time are displayed in the Current Time Expression field.

Note – Time is displayed using the 24-hour clock.

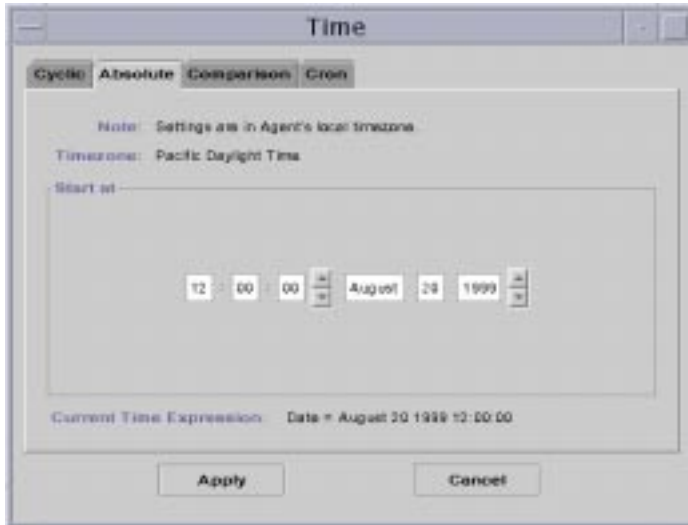


FIGURE 10-9 Starting Time of 12:00:00 PM on August 20, 1999

6. Click the Apply button.

The starting date and time are displayed in the Time Editor (FIGURE 10-10).

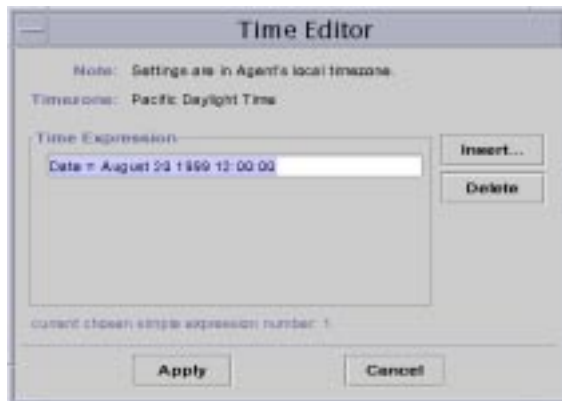


FIGURE 10-10 Time Editor With Starting Time of 12:00:00 PM August 20, 1999

7. Click the Insert button.

8. Click the Cron tab.

The Time window is displayed with the Cron tab selected.

9. Select the time when the history interval is active.

The software does not check the system load average outside the time specified by this window. In this example, the condition is at 3:00 AM every Monday through Friday.

a. Select 0 from the Minute pull-down menu.

b. Select 3rd from the hour pull-down menu.

These first two pull-down menus set the time at 3:00 AM.

c. Select Every from the Day of month pull-down menu.

d. Select Every from the Month pull-down menu.

These two pull-down menus set the date for every day.

e. Select Monday from the final pull-down menu.

The Current Time Expression field reads Cron(03**1). This expression states that the history window is only active at 3:00 AM every Monday (FIGURE 10-11).

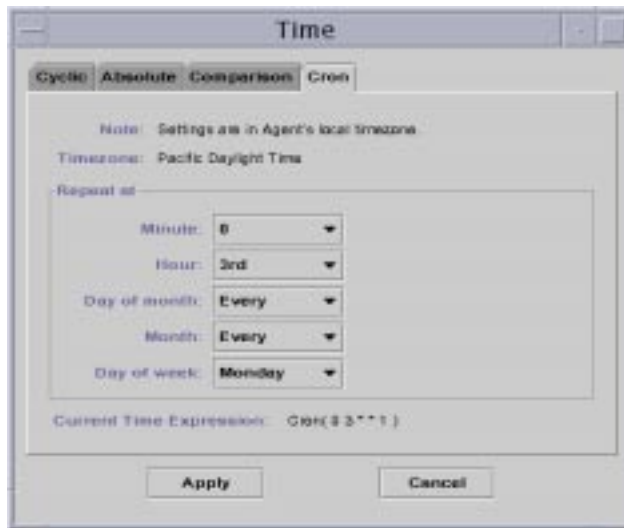


FIGURE 10-11 Cron Tab Selected With 3:00 AM Every Monday

10. Click the Apply button.

The Time Editor is updated. The Time Expression now states Cron(03**1) (FIGURE 10-12).



FIGURE 10-12 Time Editor Selected With Starting Date/Time 12:00:00 PM, August 20, 1999, and History Interval Start Time of 3:00 AM Every Monday

- 11. Place the cursor in the Cron field on the Time Editor screen. Backspace using the left arrow key until the cursor is between the ending parenthesis and the number 1. Type -5, so that the value in this field now reads Cron(03**1-5).**

This expression states that the history interval is only active at 3:00 AM every Monday through Friday (FIGURE 10-13).



FIGURE 10-13 Time Editor With Starting Date/Time of 12:00:00 PM, August 20, 1999 and History Interval of 3:00 AM Every Monday Through Friday

- 12. Click the Apply button.**

The Time Editor is updated. In this example, the history window is active at 3:00 AM every Monday through Friday after the starting date and time of 12:00 PM August 20, 1999 (FIGURE 10-14).

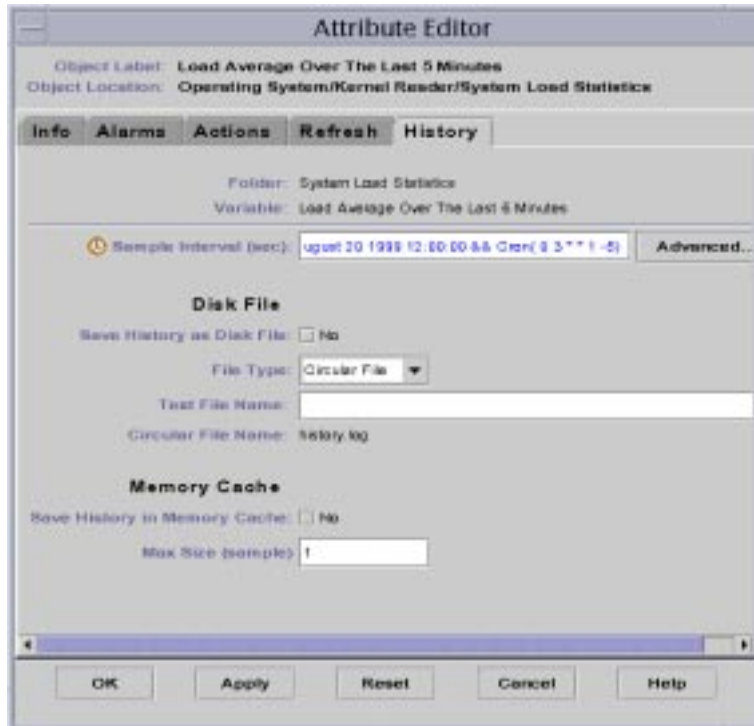


FIGURE 10-14 History Interval With Starting Time of 12:00 PM August 20, 1999 and 3:00 AM Every Monday Through Friday

▼ To Create an Alarm Schedule Using the Comparison Tab

Note – This procedure is also valid for a module schedule.

1. **Click on the Advanced button in the Alarms tab of the Attribute Editor for a data property.**

See “To Create an Alarm” on page 136 for more information.

The Time Editor is displayed (FIGURE 10-1).

2. **If any value is in the Time Expression field, highlight the value and delete it by clicking the Delete button.**

3. **Click the Insert button.**

The Time window is displayed with the Comparison tab selected.

4. **Determine the start of the Time Range (9:00 AM).**

The time range determines the time period when the software checks the system load average. The software does not check the system load average outside the time period specified by this window. In this example, the time range is from 9:00 AM to 5:00 PM every day.

a. Select Hour from the left pull-down menu.

b. Select \geq from the middle pull-down menu.

c. Select 9 from the right pull-down menu.

The Time expression Hour \geq 9 is displayed in the Current Time Expression field (FIGURE 10-15).



FIGURE 10-15 Comparison Tab With Greater Than or Equal to 9:00 AM

5. Click the Apply button.

The Time Editor is updated. The Current Time Expression now reads Hour>=9. In this example, both conditions should occur in the alarm window time range. However, the Time Editor also enables you to select the Or expression (FIGURE 10-16).

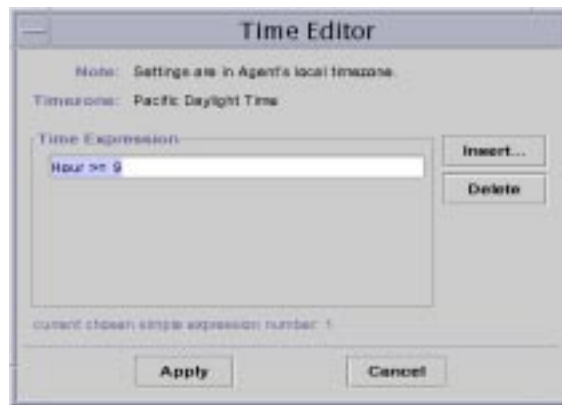


FIGURE 10-16 Time Editor With Greater Than or Equal to 9:00 AM

6. Determine the end of the Time Range by clicking the Insert button.

The Time window is displayed with the Comparison tab selected.

7. Determine the end of the Time Range (Friday).

a. Select Hour from the left pull-down menu.

b. Select <= from the middle pull-down menu.

c. Select 17 from the right pull-down menu.

The Time expression Hour<=17 is displayed in the Current Time Expression field (FIGURE 10-17).

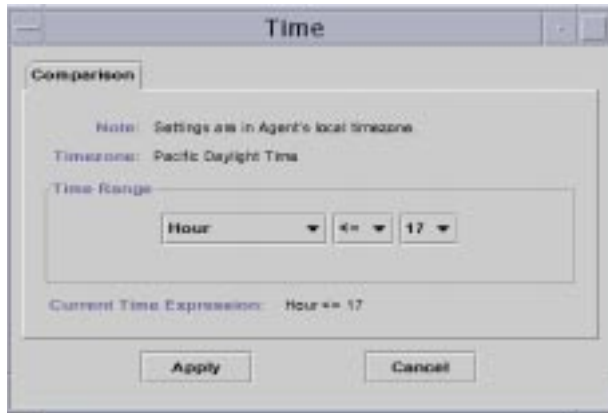


FIGURE 10-17 Comparison Tab With Less Than or Equal to 5:00 PM

8. Click the Apply button.

The Time Editor is updated. The Time expression now reads Hour>=9 And Hour<=17 (FIGURE 10-18).



FIGURE 10-18 Time Editor With Time Interval Between 9:00 AM and 5:00 PM

9. Click the Apply button.

The alarm window field in the Attribute Editor is updated. The software will check the system load average (over five minutes) from 9:00 AM Monday to 5:00 PM Friday (FIGURE 10-19).

The screenshot shows the 'Attribute Editor' window with the 'Alarms' tab selected. The 'Object Label' is 'Load Average Over The Last 5 Minutes' and the 'Object Location' is 'Operating System/Kernel Reader/System Load Statistics'. The 'Info' tab is also visible. The 'Folder' is 'System Load Statistics', the 'Variable' is 'Load Average Over The Last 5 Minutes', the 'Current Value' is '0.059', and the 'Unit' is 'jobs'. The 'Rule' is 'rCompare' and the 'Rule Description' is 'The rCompare rule compares the current value of an object to threshold limits'. The 'Critical Threshold (P)' is empty, the 'Alert Threshold (P)' is empty, and the 'Caution Threshold (P)' is empty. The 'Alarm Window' is set to 'Hour >= 9 && Hour <= 17'. The 'Advanced...' button is next to it. The 'Parameter Description' is 'check alarms when the value exceeds the entered limit', 'check alarms when the value is less than the entered limit', 'check alarms when the value equals the entered limit', 'check alarms when the value does not equal the entered limit', or 'matches a regular expression'. The 'Factory Defaults' are 'Setting a parameter to blank returns it to its factory default value'. The 'Apply' button is highlighted.

FIGURE 10-19 Alarms Attribute Editor With Alarm Window From 9:00 AM to 5:00 PM Every Day

Managing Modules

This chapter describes the following topics:

- To Load a Module
 - To Edit Module Parameters
 - To Disable a Module
 - To Enable a Module
 - To Unload a Module
 - To Set a Module Schedule
 - To Set Security Permissions for a Module
-

Sun Management Center Modules

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.

- Loading a module adds the module icon to the Browser Details window, defines the managed object and data properties, and starts data acquisition. The data properties for the managed object are displayed in the Details window. The data display is periodically refreshed.
- Enabling a module restarts data acquisition if the module has been previously disabled. The data display for the managed object is periodically refreshed in the Details window.
- Disabling a module temporarily stops data acquisition for the managed object until the module is enabled. While a module is disabled, the data is not refreshed. Also, it also does not trigger an alarm (even if you do a manual refresh). Alarms are not triggered until the module is re-enabled.
- Unloading a module stops data acquisition for the managed object. The managed object and data properties are undefined and the module icon is removed from the Browser Details window.

Default Modules

Some or all of the following modules are loaded by default when you install the software.

- Agent Statistics
- File Scanning
- Kernel Reader
- Config-Reader (for supported hardware platforms)
- Simple MIB-II

Module List

TABLE 11-1 lists generic modules that you can load and use. The list of modules that is displayed for your system is dependent on the type of platform you have. 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 D.

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.
Config-Reader	1.0	Provides the hardware configuration of the host. Both the physical view and the logical view require that this module be loaded.
Data Logging Registry	2.0	Provides information about data logging in agents including 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 Sun Management Center software users to perform dynamic reconfiguration operations on DR-enabled monitored hosts.

TABLE 11-1 Sun Management Center Modules (*Continued*)

Module	Module Version Number	Description
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 (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)” on page 106.
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 (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)” on page 106.
HP JetDirect	2.0	Monitors the status of HP printers 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.
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.

TABLE 11-1 Sun Management Center Modules *(Continued)*

Module	Module Version Number	Description
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 as well as 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 and print queue on the monitored host as well as the printer devices installed on it.
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 (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)" on page 106.
Simple MIB-II	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 is a scaled-down version of the MIB-II Instrumentation module.
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 D.

Note – The Config-Reader and Dynamic Reconfiguration modules are supported only on specific hardware platforms. For more information, refer to your supplement.

Note – Depending on your system hardware, additional modules may be supported. For more information, refer to the Sun Management Center web site: <http://www.sun.com/sunmanagementcenter>.

Loading Modules

To load a module, follow these steps.

▼ To Load a Module

1. **Select the host machine on which the module will be loaded by clicking on the host machine icon.**

Note – If you haven't selected a host before attempting to load a module, the Load Module option in the Tools pull-down menu is gray and cannot be used.

2. **Open the Load Module dialog by doing one of the following:**
 - Click the right mouse button on the selected host icon and highlight Load Module from the pop-up menu in the hierarchy view or the topology view (FIGURE 11-1).
 - In the main console window, select Tools ► Load Module.
 - In the Details window, select host name and then Module ► Load Module.
 - In the Details window, select the Modules tab to display the Module status screen.

Note – See Chapter 16 for more information on managing modules, using the Module status screen.

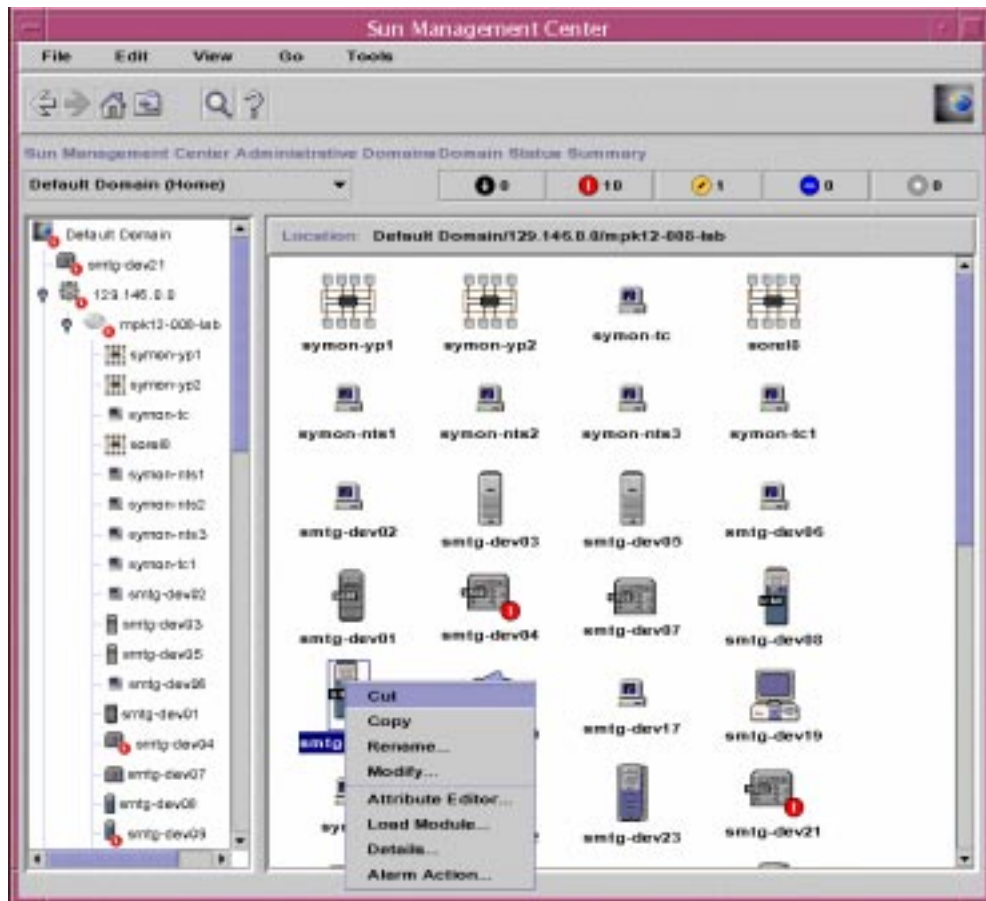


FIGURE 11-1 Load Module Pop-Up Menu in Topology View

The Load Module dialog is displayed (FIGURE 11-2).

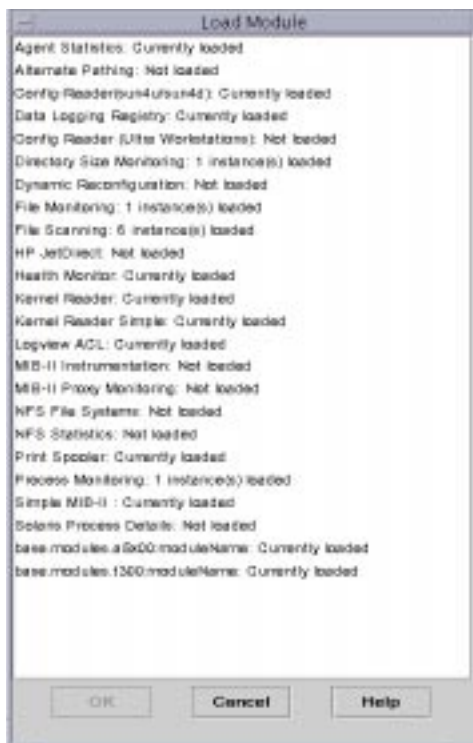


FIGURE 11-2 Load Module Dialog

The Load Module dialog lists Sun Management Center modules. If a number appears next to the module name, for example as shown above for the File Scanning Module, the number indicates the number of existing instances of that module on your host. An instance is 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.

Note – Some modules can have multiple instances loaded on a host.

Note – You must specify a unique name for each instance when multiple instances of the same module are loaded.

3. Click the name of the module you want to load.

4. Click the OK button.

The Module Loader dialog is displayed. The contents of the dialog varies with the module that is selected. FIGURE 11-3 and FIGURE 11-4 show possible examples of the dialog.

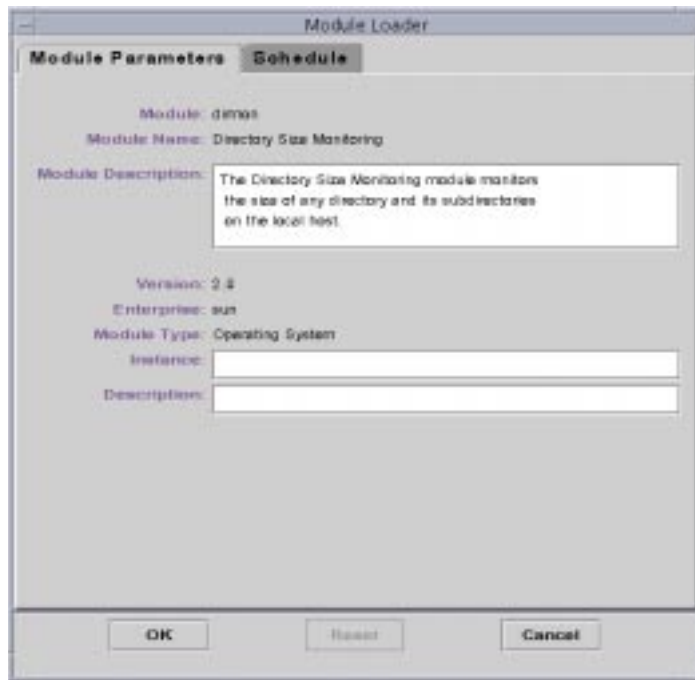


FIGURE 11-3 Module Loader Dialog For Directory Size Monitoring

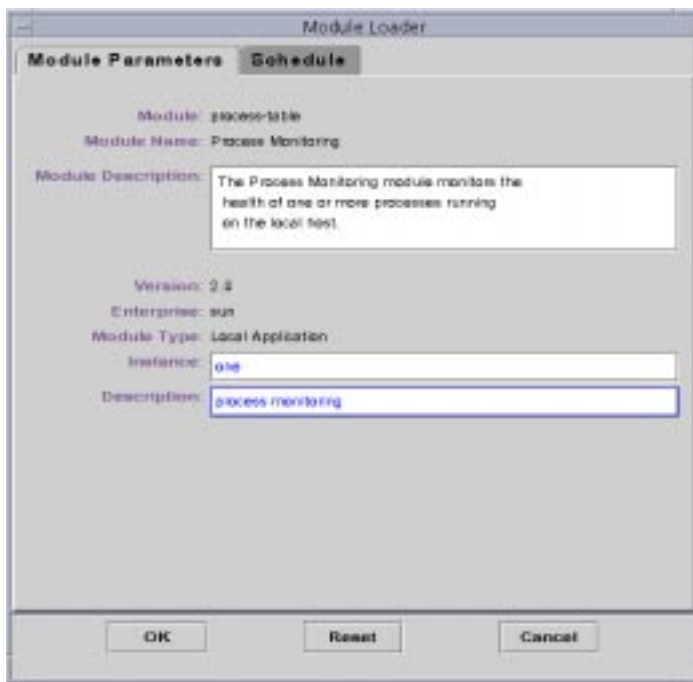


FIGURE 11-4 Module Loader Dialog for Process Monitoring

5. If necessary, type the relevant information into any editable name fields.

For example, the Directory Size Monitoring module requires you to enter the name of the instance and a description. (An instance is 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.)

If you do not type in information for a necessary field, the software responds with an error message and the module is not loaded.

6. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this dialog.
- Click Reset to undo your changes.
- Click Cancel to cancel your request.

Note – You can also double-click a module name in the Load Module dialog to load that module.

Editing Modules

The Sun Management Center software enables you to edit modules by changing module parameters and enabling or disabling modules.

▼ To Edit Module Parameters

1. **Select the module for editing.**
2. **In the Details window, select Module ► Edit Module (FIGURE 11-5).**



FIGURE 11-5 Module Menu in Details Window

3. Edit Module Menu in Details Window

The Module Parameters Editor is displayed.

4. Type the relevant information into the editable fields.

FIGURE 11-6 shows an example. The actual display varies with the module that is selected.

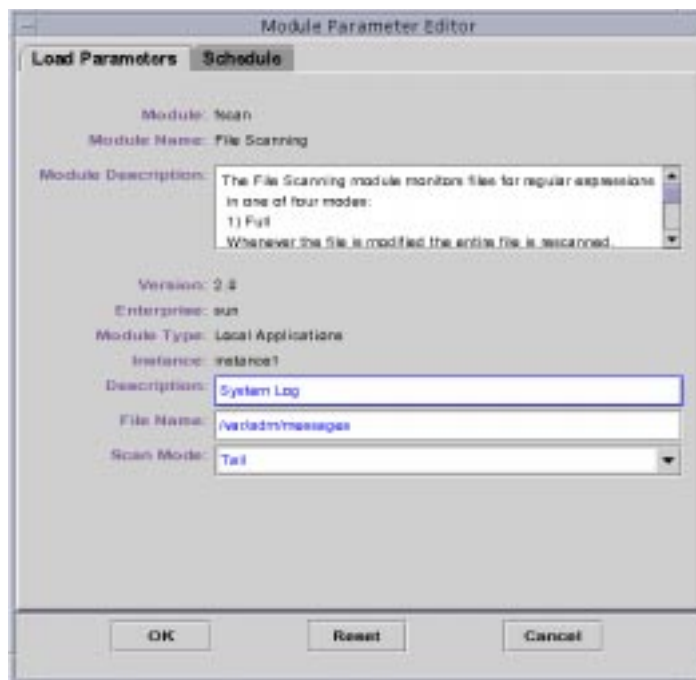


FIGURE 11-6 Module Parameter Editor

5. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Reset to reset the module to the default parameters.
- Click Cancel to cancel your request.

▼ To Disable a Module

- Click the right mouse button on the selected module and highlight **Disable Module** from the pop-up menu in the hierarchy or contents view.

OR

- In the Details window, select **Module ► Disable Module** (FIGURE 11-5).

When the module has been disabled (turned off), the following message is displayed at the bottom of the Details window (FIGURE 11-7).

Module successfully disabled.

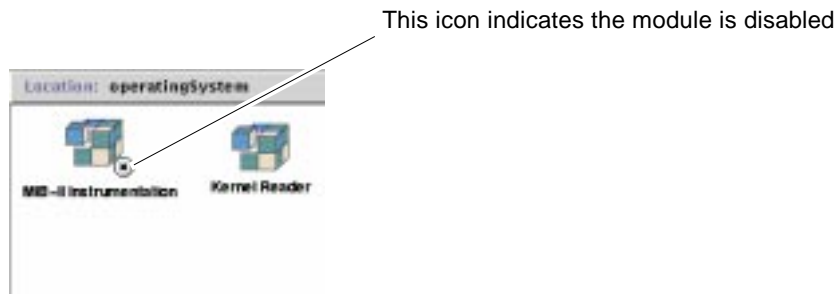


FIGURE 11-7 MIB-II Instrumentation Module Is Disabled

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 will not trigger an alarm until you re-enable the module (even if you manually refresh the data).

▼ To Enable a Module

- Click the right mouse button on the selected module and highlight **Enable Module** from the pop-up menu in the hierarchy or contents view.

OR

- **In the Details window, select Module ► Enable Module** (FIGURE 11-5).

When the module has been enabled (turned on), the following message is displayed at the bottom of the Details window.

Module successfully enabled.

▼ To Unload a Module

1. **Proceed with one of the following:**

- Click the right mouse button on the selected module and select Unload Module from the pop-up menu in the hierarchy view or the contents view.
- In the Details window, select Module ► Unload Module (FIGURE 11-5).

The Confirm Module Unload dialog is displayed.

2. **Click the Unload button to remove the module or the Cancel button to cancel this request.**

Monitoring Modules

Tip – If you want to monitor one type of module on a number of hosts, you can create module objects for each host and place all of the objects in a common location (that is, in the same group or administrative domain). To create a module object, see “To Create a Module Object” on page 35.

Attribute Editor for a Module

The Attribute Editor for a module provides additional information about the module and enables you to customize various monitoring criteria. You can use the module Attribute Editor to set:

- Module schedules
- Security permissions

Note – The Attribute Editor consists of a series of one or more tab buttons at the top of the window that enables you to switch between different panels. The buttons that are displayed are dependent on the selected object.

Setting a Module Schedule

You may determine when a module should be active and when it should be inactive by setting a schedule. For example, you can schedule a module to run between 8:00 AM and 5:00 PM every day. At all other times, the module is inactive, whether or not an alarm condition exists.

▼ To Set a Module Schedule

1. Open the Attribute Editor for a module by proceeding with one of the following:

- Click the right mouse button on the selected module icon and highlight Attribute Editor from the pop-up menu in the hierarchy view (FIGURE 11-1) or the topology view (FIGURE 11-1).
- In the Details window, click the Attributes button.

2. Click the Schedule tab (FIGURE 11-8).

3. Click the Advanced button and set the module schedule.

See “To Create an Alarm Schedule Using the Comparison Tab” on page 162 for details.

4. Complete this procedure with one of the following actions:

- Click OK to accept the changes you have made and close this window.
- Click Apply to apply your changes without closing this window.
- Click Reset to reset the Attribute Editor to the default parameters.
- Click Cancel to cancel your request.

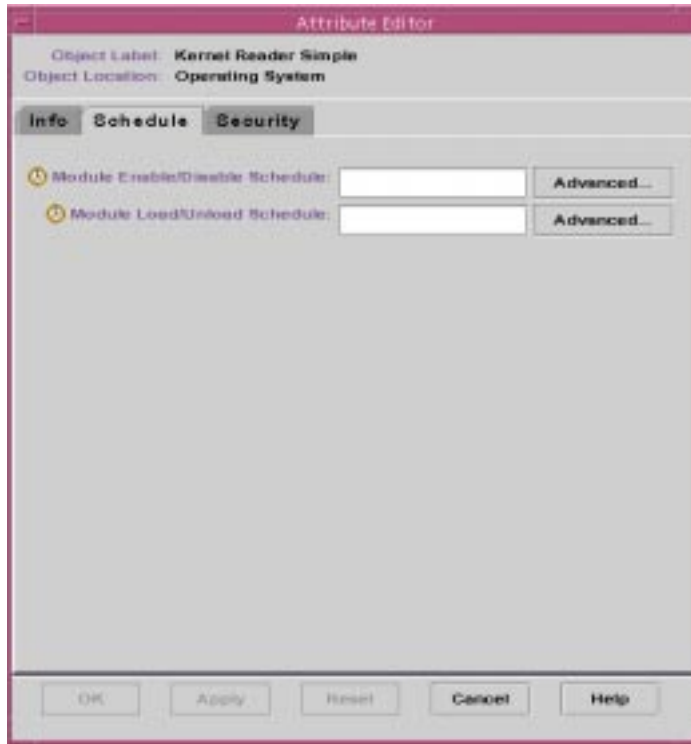


FIGURE 11-8 Setting a Module Schedule

Setting Security Permissions for a Module

You can set security permissions for an individual module.

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 14.

▼ To Set Security Permissions for a Module

- 1. Open the Attribute Editor for a module by proceeding with one of the following:**
 - Click the right mouse button on the selected host icon and highlight Attribute Editor from the pop-up menu in the hierarchy view (FIGURE 11-1) or the topology view (FIGURE 11-1).
 - In the Details window, click the Attributes button.
- 2. Click the Security tab (FIGURE 11-9).**
- 3. Type the name(s) of user and administrator groups in the appropriate fields.**
- 4. Complete this procedure with one of the following actions:**
 - Click OK to accept the changes you have made and close this window.
 - Click Apply to apply your changes without closing this window.
 - Click Reset to reset the Attribute Editor to the default parameters.
 - Click Cancel to cancel your request.

Attribute Editor

Object Label: Kernel Reader (Simple)
Object Location: Operating System

Info **Schedule** **Security**

Security Levels Users

Administrator:
Operator:
General:

Groups

Administrator: esadm
Operator: esops
General: ANYGROUP

SNMP Communities

Administrators:
Operators:
General: public

OK Apply Reset Cancel Help

FIGURE 11-9 Setting Module Security in the Attribute Editor

Alarm Manager

The Alarm Manager software monitors your hardware and software and notifies you, through alarms, when abnormal conditions occur. These alarms are triggered by conditions outside of preset range or by Sun Management Center rules. Default alarm conditions and rules are included in the modules. You can also set up your own alarm thresholds. For a list of Sun Management Center rules, see Appendix E.

The Sun Management Center 3.0 Alarm Manager enables you to:

- 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-default suggested fix for a rule
- Keep a running record of user notes for an alarm instance

This chapter describes the following topics:

- To Access Alarms From the Main Console Window
- To Access Alarms From the Alarms Tab in the Details Window
- To Acknowledge New Alarms
- To Filter the Alarms Table
- To Delete Alarms
- To Enter an Alarm Note
- To View and Add Suggested Fixes
- To Modify Currently Registered Actions

Note – The messages displayed in the Alarms page of the Details window are always in English. They are not translated in other languages. However, the text in all dialog windows and in suggested fixes is internationalized.

Alarm Information

The Alarms Manager software displays alarm information for managed objects. You can view object alarm information in an administrative domain in the Main Console and Details Alarm windows.

Tip – Pointing your cursor at the alarm icons in these windows displays an object status description.

Note – The Sun Management Center agent is configured so that only one server receives alarm information from that agent.

You can acknowledge, delete, and manage the object alarms by using the Alarms Details window. For more information, see “To Access Alarms From the Main Console Window” and “To Access Alarms From the Alarms Tab in the Details Window.”

Domain Status Summary

A managed object status summary is displayed in the Main Console window (FIGURE 5-1) in the Domain Status Summary. These colored icons (FIGURE 5-3) designate the severity of the alarms.

Tip – Pointing your cursor at the alarm icons in this summary displays the icon definitions.

Numbers next to the alarm icons in the Domain Status Summary (FIGURE 5-3) indicate the number of managed objects for which the highest severity open, unacknowledged alarm is represented. For example, a number 1 next to the yellow alarm icon (center) indicates that there is *one* managed object for which the highest severity alarm is yellow (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 two or more types of alarms exist in the host, the color of the more severe *unacknowledged open* alarm is displayed in the Domain Status Summary.

If the most severe alarm on one host is critical (red) and the most severe alarm on another host is alert (yellow), you see the number 1 next to both the red alarm icon and the yellow alarm icon.

Down Alarms

A down alarm (the black alarm icon with a down arrow in FIGURE 12-2) indicates that a service-affecting condition has occurred and an immediate corrective action is required. An example of this condition is when a resource defined by a managed object has gone out of service and that resource is required; for example, a module has gone down (exited).

Critical Alarms

A critical alarm (the red alarm icon with the vertical bar in) indicates that a service-affecting condition has developed and an urgent corrective action is required. An example of this condition is when a severe degradation in the capability of an object has occurred and the object needs to be restored to full capability.

Alert Alarms

An alert alarm (the yellow alarm icon with the slanted bar in FIGURE 12-2) indicates that a non-service-affecting condition has developed and a corrective action should be taken in order to prevent a more serious fault.

Caution Alarms

A caution alarm (the blue alarm icon with the horizontal bar in FIGURE 12-2) indicates the detection of a potential or an impending service-affecting fault, before any significant effects have occurred. Action should be taken to diagnose further (if necessary) and correct the problem in order to prevent it from becoming a more serious service-affecting fault.

Off/Disabled Alarms

A disabled alarm (the white alarm icon with a black X in FIGURE 12-1) indicates that a resource for a managed object is disabled; for example, a module is disabled.

Note – Objects with black star icons that may look like a “splat” on your screen, 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 it. FIGURE 12-1 contains an example of the splat icons in the Browser Details window.

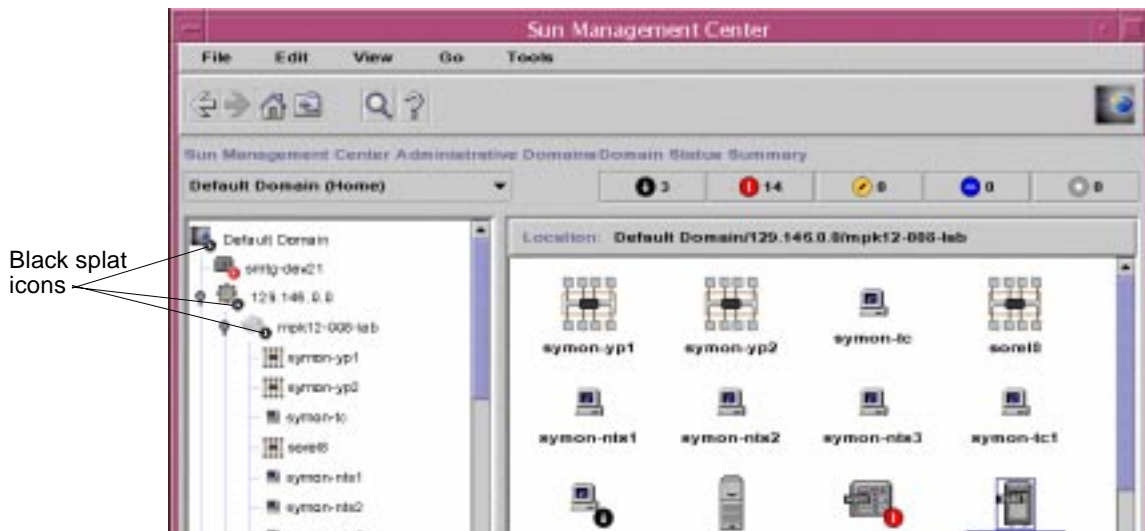


FIGURE 12-1 Objects With Indeterminate States Identified by Black Star or “Splat” Icon

Note – When you view the data property table for an object, a pink row is another indication of an indeterminate object state.

Alarm Icon Colors

The Alarm Manager software alerts you to an *unacknowledged open* alarm condition that exists using several different methods:

- Colored icons in the Domain Status Summary on the main console
- Colored icons in the hierarchy (tree) view

- Colored icons in the contents view
- Colored relevant row or 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 a critical condition has developed and corrective action is required immediately. By contrast, a blue alarm icon indicates a potential or an impending service-affecting fault.

FIGURE 12-2 shows an unacknowledged, open critical alarm in the Swap Statistics properties table Used KB row. The row is red, which indicates a critical alarm.

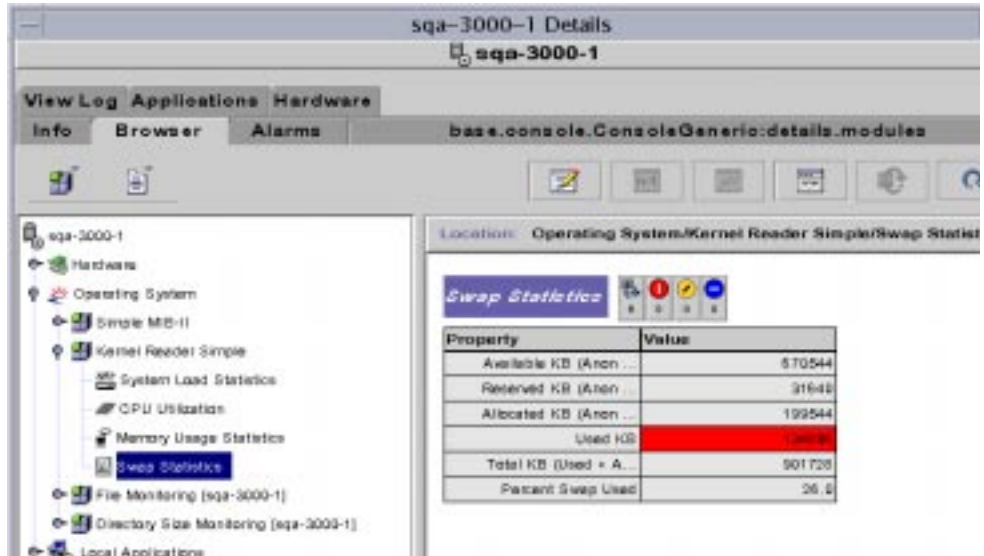


FIGURE 12-2 Browser Details Window Swap Statistics Alarm

The alarm icons are propagated up the hierarchy tree view, from the individual module up to the host. For example, FIGURE 12-2, shows an unacknowledged, open error condition (critical alarm) in the Swap Statistics icon. You see this same red alarm icon on the Swap Statistics icon, on the Kernel Reader icon module, on the Operating System icon, and the host icon.

In addition, you also see a red alarm icon on the corresponding host, group (if any), or administrative domain in the main console window unless an unacknowledged open black alarm (of higher severity) exists.

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 is propagated. However, if there is a yellow *unacknowledged* alarm in CPU usage, and a red *acknowledged* alarm in Disk Statistics, only the yellow alarm icon is propagated.

▼ To Access Alarms From the Main Console Window

1. **Click one of the buttons in the Domain Status Summary (FIGURE 5-1) in the Main Console window.**

A list of objects that have at least one open, unacknowledged alarm, the highest severity of which is that of the icon on the button, is displayed in the Domain Status Details window.

For example, if you click on the button with the yellow alarm icon (alert alarms), the Domain Status Details window displays a list of objects for which the highest severity, *unacknowledged, open* alarms are yellow (alert). The number of objects displayed is equal to the number on the button within approximately a five second delay period).

2. **Complete this procedure with one of the following actions:**

- Double-click on the desired row in the table.
- Single-click on the desired row to select it, and then click the Details... button.

The Alarms Details window (FIGURE 12-3) is displayed.

▼ To Access Alarms From the Alarms Tab in the Details Window

1. **With your right mouse button, click the selected host icon in the Main Console window and click Details in the pop-up menu.**

The Browser Details window is displayed.

2. **Click the Alarms tab.**

The Alarms Details window is displayed (FIGURE 12-3).

Note – A bold header and a down or up arrow indicate which column the table is sorted on and the sort order. The alarms table shown in FIGURE 12-3 is sorted in descending order (down arrow in Start time column) by start date and time, newest to oldest alarm. This is the default sort order for the table.

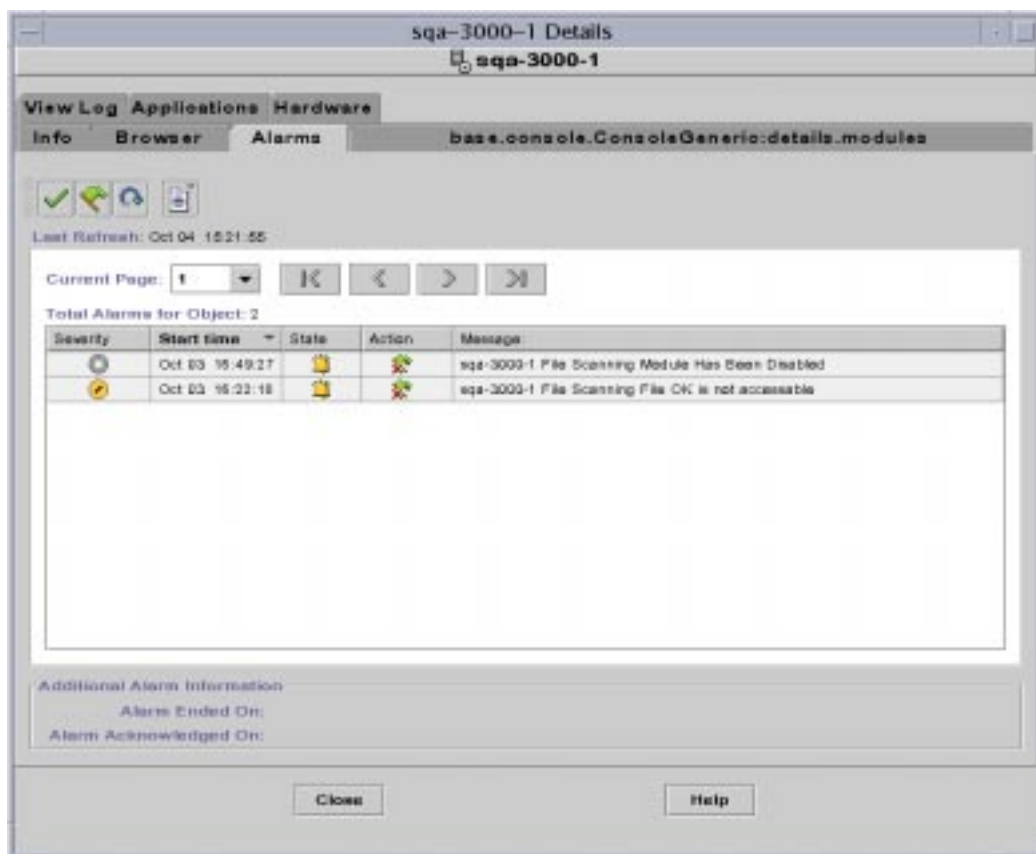


FIGURE 12-3 Alarms Details Window

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.

This table can be filtered and sorted to display only the information you currently want to see in the order that you want to see it. Alarms can be filtered and sorted from the alarms table. For additional details, see “To Filter the Alarms Table” and “To Sort the Alarms Table.”

Database Paging

The length of the alarms table, that is the maximum number of alarms that can be displayed on a page, is 50. 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, whether or not 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 (Refresh) the table to include the new alarms as soon as it is convenient.

When you delete alarms, the table is updated immediately; the deleted alarms no longer appear in the table. When alarms are deleted by another user, you may 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. Additional pages can be seen by using the Page Navigation buttons above the alarms table.

Page Navigation

TABLE 12-1 lists the Page Navigation information and buttons in the Alarms Details window. Informational messages inform you when the first and last pages of the table are displayed. A scroll bar enables you to scroll through each page of the table.

TABLE 12-1 Alarm Table Page Navigation Information and Buttons

Item	Function
Current Page	Indicates the number of the page currently being displayed. Any page can be selected by using the down arrow or typing in the desired page number.
First	Displays the first page of the alarms table
Previous	Displays the previous first page of the alarms table
Next	Displays the next page of the alarms table
Last	Displays the last page of the alarms table
Total Alarms for Object	Displays the total number of alarms currently registered for the selected object

Alarm Categories

The alarms table presents different categories of detailed alarm information. Some of this information (TABLE 12-2) is always displayed in the alarms table.

TABLE 12-2 Alarm Categories Displayed in Alarms Table

Category	Description
Severity	Indicates the severity of the alarm; black is most severe and grey is least severe. A green check mark in this column indicates that the alarm was acknowledged.
Start time	Date and time the alarm occurred
State	Indicates the state of the alarm: open (“ringing” bell icon) or closed (“silent” bell icon)
Action	Indicates the action taken by the user or the program in response to the alarm condition.
Message	Abbreviated message that indicates the type of alarm

Additional information (TABLE 12-3) is displayed on the bottom of the page when an alarm row is selected. This information is only displayed for closed and/or acknowledged alarms.

TABLE 12-3 Additional Alarm Information

Item	Description
Alarm Ended On	Date and time the alarm condition was fixed
Alarm Acknowledged On	Date and time the alarm was acknowledged and the user ID of the person who acknowledged it.

Selecting an alarm row displays any available additional information associated with that alarm. The additional information consists of the end time of the alarm, the acknowledgment date and time, and 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 one in which the condition that caused the alarm still exists. A closed alarm means the condition no longer exists. Open alarm icons are “ringing”; closed alarm icons are “silent.”

Alarm Action Status

Each alarm can have one of three action conditions: no action, pending or executed.

No action means that an action has not been registered for that alarm. Pending action means that the action is manual and must be executed using the Run button. Executed means that the action is automatic and has already been done by the Alarms Manager software.

A three-state icon in the Action column of the alarms table indicates the status of each alarm.

Sorting the Alarms Table

Table sorting is done in the database. Double-clicking a column header sorts the entire table in descending order according to the contents of that column. Double-clicking again reverses the sort order (ascending) and so on.

The column headers have an 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. TABLE 12-4 lists the default sort order for each header.

TABLE 12-4 Alarm Sorting Order

Table heading	Sorting Order
Severity	Alarms are sorted from highest severity to lowest severity.
Start Time	Alarms are sorted from newest to oldest.
Action	Alarms are sorted as follows: alarms with completed (executed) actions first, pending actions second, and no actions third.
State	Alarms are sorted from open to closed.
Message	Alarms are sorted alphabetically.

▼ To Sort the Alarms Table

- **Double-click any column header in the table.**

The alarms table is redisplayed immediately in descending order. To change the order to ascending, double-click the header again. There may be a time delay for large numbers of alarms.

Managing and Controlling Alarms

You can manage and control the alarms displayed in the alarms table by using the buttons and menu above the table: Acknowledge, Run, Refresh and the Options. TABLE 12-5 lists these items and describes their functions.

TABLE 12-5 Alarm Management and Control Buttons

Button	Functions
Acknowledge	Enables you to acknowledge the existence of a new alarm. A green check mark is displayed in the severity column after you acknowledge an alarm.
Run	Enables you to execute the registered action to be taken for a specific alarm. <i>Only pending manual actions</i> can be executed using this button.
Refresh	Updates the currently displayed alarms table. The date and time of the last refresh are displayed above the alarms table in the Last Refresh field.
Options	Displays a pull-down menu of alarm controls and actions. FIGURE 12-4 shows the Options Menu. TABLE 12-6 describes the optional controls and actions.

Acknowledging New Alarms

New alarms must be acknowledged so you can track the status of newer alarms more easily. Unacknowledged alarms continue to be displayed in the Domain Status Summary, hierarchy (tree) view, contents view, topology view and the relevant row or column in the property table (contents view).

▼ To Acknowledge New Alarms

- 1. Select the alarm(s) you want to acknowledge by clicking the alarm row(s) with your left mouse button.**

The selected row is highlighted.

Note – You can select several rows at once by holding down your left mouse button and dragging the cursor over the selected rows. If, after you select several rows, you want to skip a few rows and select other rows, hold down the Control key and select the additional rows by clicking each row. All selected rows are highlighted.

2. Click Acknowledge.

The user ID and date and time of acknowledgment are registered and displayed; a green check mark is displayed next to the alarm icon in the Severity column

▼ To Run a Registered Alarm Action

- **Select one or more alarms with pending actions in the alarms table and click Run.**

The currently registered alarm action(s) for the managed node are invoked; the action state in the alarms table changes from pending to executed. For additional details, see “To Run a Registered Alarm Action” on page 197 and “To Modify Currently Registered Actions” on page 203.

Refreshing the Alarms Table

As new alarms are entered into the database the currently displayed alarms table does not change, regardless of whether these alarms affect the currently displayed page. Instead, a two-state icon is displayed by the Refresh button at the top of the Alarms Details window. This icon indicates that new alarms have arrived and you should update the display soon as it is convenient. As existing alarms are deleted, the alarms table is updated automatically. For additional details, see “Database Paging” on page 192.

▼ To Refresh 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.

Using the Options Menu

FIGURE 12-4 shows the Options menu. TABLE 12-6 describes the alarm controls and actions in this menu.

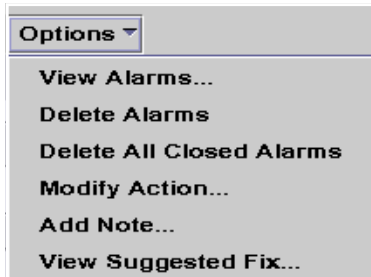


FIGURE 12-4 Alarm Control and Actions Options Menu

TABLE 12-6 Alarm Control and Actions Options

Option	Function
View Alarms	Enables you to filter the alarms table by severity, open or closed alarms, and/or acknowledged or unacknowledged alarms. FIGURE 12-5 shows the View Specific Alarms dialog.
Delete Alarms	Deletes all of the selected alarms from the table. The deleted alarm(s) are saved in an archive file on the server for 24 hours. A confirmation message is displayed before the alarm is deleted.
Delete All Closed Alarms	Deletes all the closed alarms from the table. The deleted alarm(s) are saved in an archive file on the server for 24 hours. A confirmation message is displayed before the alarm is deleted.
Modify Action...	Modifies the registered alarm action. FIGURE 12-8 shows the Action Selection dialog.
Add Note	Enables you to keep a set of historical notes related to a specific alarm instance to track the actions taken to correct a specific alarm condition and by whom.
View Suggested Fix	Displays the suggested fixes (Sun Management Center and user-suggested) for the selected alarm.

Filtering the Alarms Table

You can filter the alarms table by using the View Specific Alarms dialog (FIGURE 12-5). This dialog enables you to select the severity, state, and acknowledgement status of the alarms displayed in the table.

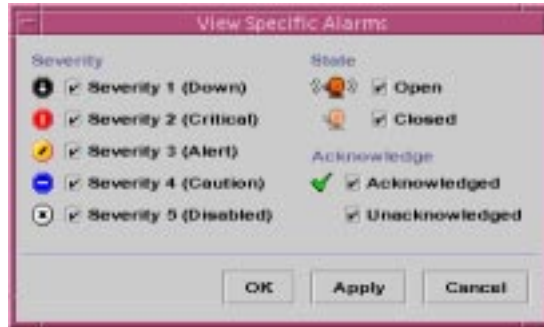


FIGURE 12-5 View Specific Alarms Dialog

▼ To Filter the Alarms Table

1. **Select Options ► View Alarms in the Details Alarms window.**

The View Specific Alarms dialog (FIGURE 12-5) is displayed.

2. **Select the items to include in the alarms table by clicking the box(es) next to the item(s).**

A check mark is displayed in each box you select.

3. **Complete this procedure with one of the following actions:**

- Click Apply to accept your selections and continue to display the View Specific Alarms dialog.
- Click OK to accept your selections and close the View Specific Alarms dialog.

The alarms table is filtered and redisplayed to reflect your selections.

Deleting Alarms

Closed alarms should be deleted to conserve space and keep the alarms database current. Open alarms should only be deleted if they are orphaned. You can delete open alarms, but the potential exists for alarm information in the Alarms windows to differ from alarm information in the hierarchy and topology views. That is, the alarms are removed from the view in the alarms table, but the *alarm condition may still exist*. 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 it was unloaded, the alarms are orphaned. Orphaned alarms may remain in view and may need to be deleted manually (forced deletion).



Caution – You should only delete open alarms when there is no other way to remove these alarms.

▼ To Delete Alarms

1. **Select the alarm(s) you want to delete by clicking the selected row(s) in the alarms table.**

A confirmation alert is displayed.

Note – You can select several rows at once by holding down your left mouse button and dragging the cursor over the selected rows. If, after you select several rows, you want to skip a few rows and select other rows, hold down the Control key and select the additional rows by clicking each row. All selected rows are highlighted.

2. **Select Options ► Delete All Closed Alarms or Delete Alarms.**

Entering Alarm Notes

This is an expanding list of notes for a specific alarm. You can enter notes over the life of the alarm to track its history. FIGURE 12-6 shows the Add Alarm Note dialog.

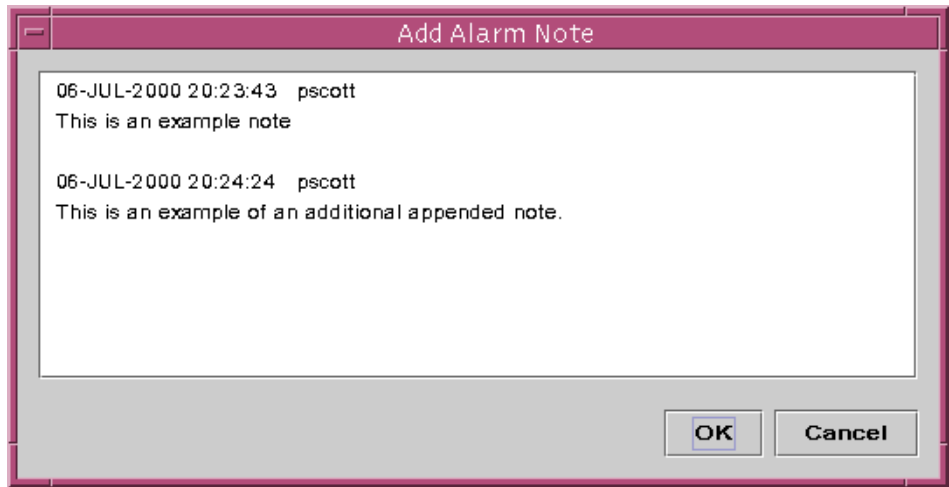


FIGURE 12-6 Add Alarm Note Dialog

▼ To Enter an Alarm Note

1. **Click Options ► Add Note.**

The Add Alarm Note dialog is displayed.

2. **Enter your comments in the text field of this dialog.**
3. **Click OK to accept your changes and close the Add Alarm Note dialog.**

Viewing Suggested Fixes

A factory default suggested fix can be displayed for each alarm when a specific alarm is selected from the alarms table. FIGURE 12-7 shows the View Suggested Fix dialog. The top half of this dialog displays the Sun Management Center suggested fix. If you find that this fix is not adequate, you can create your own suggested fix.

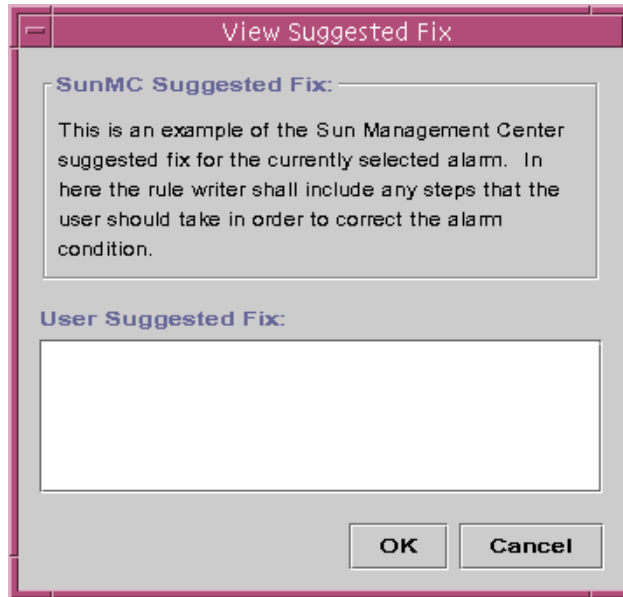


FIGURE 12-7 View Suggested Fix Dialog

▼ To View and Add Suggested Fixes

1. **Select an alarm from the alarms table.**
2. **Click Options View ► View Suggested Fix.**
The View Suggested Fix dialog is displayed.
3. **Enter your text in User Suggested Fix: field of this dialog.**
The length of the suggested fix text is limited by the database to 512 bytes.
4. **Click OK to accept your changes and close the View Suggested Fix dialog.**
The specified Sun Management Center suggested fix remains at the top of the dialog.

Registering and Modifying Alarm Actions

Some alarm actions can be initiated manually by you after an alarm occurs. Others are done automatically by the Alarms Manager software after you register them. Typically, you should register the actions to be taken before the alarm occurs.

For alarms with no registered actions, “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 action is Run by the user. Then, the “executed” icon is displayed. For alarms with an automatic action, the “executed” icon is always displayed.

You can register alarm actions for each object module before the alarm occurs by using the Attribute Editor Actions tab, which displays the Alarms Actions and, in turn, the Action Selection dialog (FIGURE 12-8). For additional details, see Chapter 9.

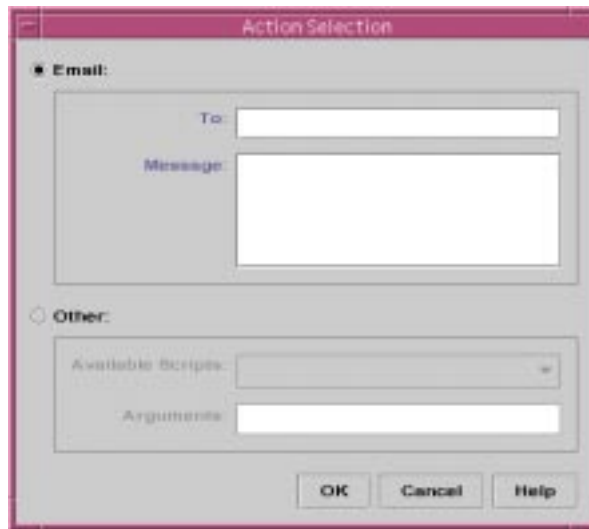


FIGURE 12-8 Action Selection Dialog

▼ To Modify Currently Registered Actions

1. **Select an action pending alarm in the table and click Options ► Modify Action... with your left mouse button.**

The Action Selection dialog is displayed. Only alarms that are pending manual action can be modified.

2. **Select the action that you want to modify (Email or Other) and make the necessary changes. For details, see Chapter 9.**

3. Click OK to accept your changes and close the Action Selection dialog.

Details

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

- To Start the Details Window
- To Close the Details Window
- To Display Online Documentation
- To View the System Log File Messages
- To View the SunMC Log File Messages
- To View Other Log File Messages
- To View a Hardware Configuration

The Details window displays several tab buttons. The commonly seen buttons are shown in TABLE 13-1.

Clicking a tab button updates the window with the panel for that tab.

Note – The tabs that are displayed in the Details window are dependent on the type of object selected. For example, the Hardware tab is missing if the Config-Reader module is not supported on your system. For additional information on the tabs for your specific hardware object, see your supplement.

TABLE 13-1 Details Window Tabs

Tab Button	Description
Info	Provides general information such as host name, IP address, and polling type.
Browser	Enables you to navigate through the hierarchy and contents views of the hardware, operating system, local applications, and remote systems (for navigation purposes). This view is the default view. (The Browser is covered separately in Chapter 6.)
Alarms	Displays alarm status messages and the alarm controls for the host or node. Enables you to acknowledge or delete alarms. (Alarms are covered separately in Chapter 12.)
Modules	Displays module status - which modules are currently installed, whether they are enabled, and so on. Also displays which modules are available, but not currently installed.
View Log	Displays entries from host log files (such as system message logs).
Applications	View Processes - Displays information about processes running in the host. This is the default selected for the Applications tab. Other applications - If you have installed custom or third-party applications, the entries for the application(s) display below the View Processes entry. Select an application and the application is displayed in the right side of the window. Depending on your licensing agreement, this tab also provides access to the Hardware Diagnostics Suite software. You can display the Hardware Diagnostic Suite online help text by selecting the Hardware Diagnostic Suite link, and then clicking the Help button.
Hardware	Displays configuration information (resources, physical view, logical view, and dynamic reconfiguration status and controls), if available, for a host.

Navigating the Details Window

▼ To Start the Details Window

1. Double click the left mouse button on an object icon in either the hierarchy view or the topology view.

Be sure to select an object, not an administrative domain, as the Details window is not available for administrative domains.

The Details window is displayed (FIGURE 13-1).

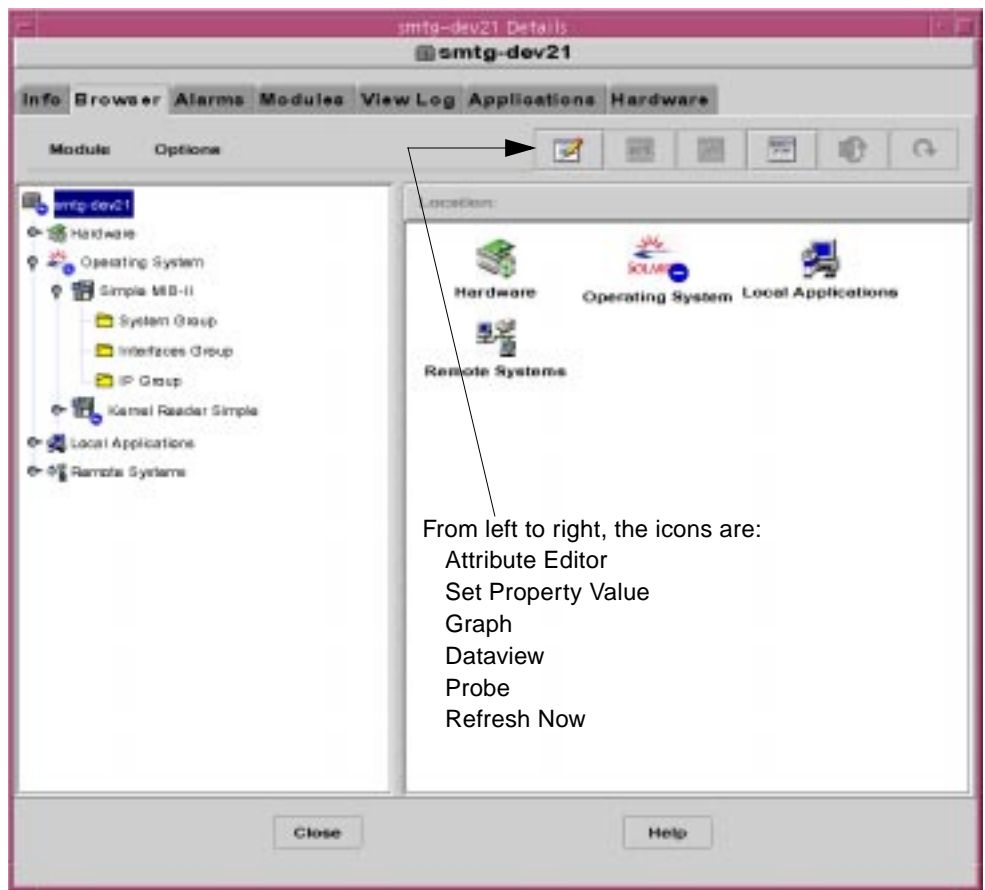


FIGURE 13-1 Details Window for a Selected Object

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

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

Tip – If information in a table cell is too long to be displayed in full, you may be able to see more information by holding the mouse pointer in the cell for several seconds. A pop-up balloon (tool tip) is displayed, showing the complete text contained in that cell.

Tip – The hierarchy can be expanded or compressed, depending on the position of the expansion/compression icon (FIGURE 6-2). The icon is compressed when the “handle” is pointing right. The icon is expanded when the “handle” is pointing down.

Click the compression icon to expand the hierarchy view (“unroll” and display more levels of detail).

▼ To Close the Details Window

- Click the Close button located at the bottom of the window.

▼ To Display Online Documentation

- Click the Help button located at the bottom of the window.

Info Tab

Clicking the Info tab displays the Properties table. The general properties are listed in the following table.

TABLE 13-2 General Properties in the Info Tab of the Details Window

Property	Description
Entity Desc	Label that you selected when you created the node.
Entity Full Desc	Optional description 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 which receives this host's trap information.
Entity Event Destination	Host IP address of Sun Management Center server which 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.

1. If you change the host name on the host device, the host name shown in this property table remains the old name. To update the information, either modify the host object (see "To Modify an Object" on page 47 for more information), or delete the host object with the old name, and recreate it with the new name.
2. When a Sun Management Center entity is added to the topology, the Topology Agent queries the entity for the IP address and port of the Trap Handler and Event Manager components, as configured for the entity. But this is the only time information is retrieved from the entity, so the information stored in the topology will be incorrect if the entity is ever reconfigured to correct a misconfiguration or change the server-context of the entity. If the information 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 reenter it.

Browser Tab

The Browser tab displays hierarchy and contents views of the hardware, operating system, local applications, and remote systems.

See Chapter 6 for detailed information on using the 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.

Modules Tab

The Modules tab displays currently loaded modules, as well as those modules that are available to your system but aren't currently scheduled. This screen also allows you to:

- 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 Modules tab, see Chapter 16.

View Log Tab

The View Log tab (FIGURE 13-2) enables you to view several types of messages:

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

File names in the `/var/adm` directory start with the word “messages”.

If you select the SunMC Log option on the Log File pulldown menu, a list of log file choices is displayed. An example is shown in FIGURE 13-5.

This 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 you select using the Monitor... button. New messages in this field are highlighted.

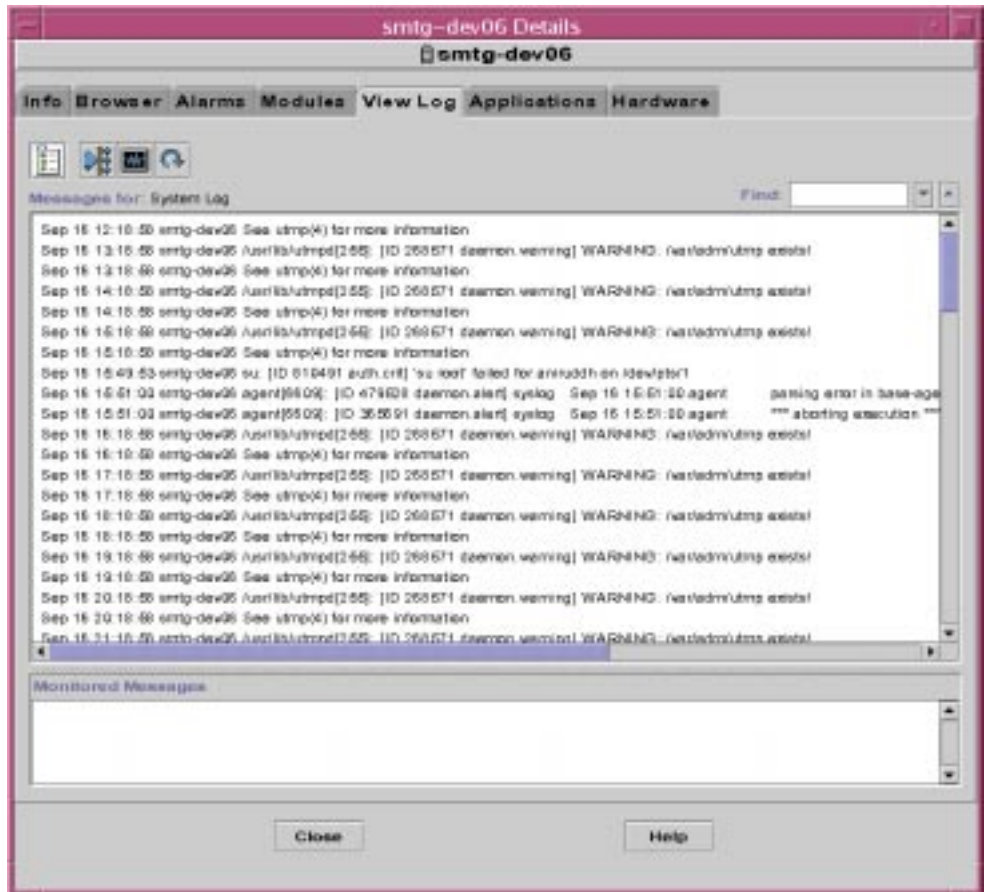


FIGURE 13-2 View Log Screen

Note – If no messages match the Filter criteria, the message “no matches found for this log file.” is displayed at the bottom of the View Log window.

▼ To View the System Log File Messages

- Select Log File ► System Log.

Click the Log File field and highlight Syslog. The System Log messages are displayed.

Note – Clicking the Reload button refreshes the display and adds the latest log messages.

Filtering Your Messages

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

▼ To Filter Your Log Request

1. Click the **Filter...** button (FIGURE 13-2).

The Message Filter Options dialog is displayed (FIGURE 13-3).



FIGURE 13-3 Message Filter Options Dialog

2. Using the down arrows, select the starting date.

Highlight the month, day, and year for the first log message you want to view.

3. Select the starting time by using the down arrows.

Highlight the hour and minute for the first log message you want to view.

4. Select the ending date.

Highlight the month, day, and year for the last log message you want to view.

5. Select the ending time.

Highlight the hour and minute for the last log message you want to view.

6. Type the text pattern to be matched in the Text pattern to match field.

Note – Select a text pattern that is unique to the type of message in which you are interested.

7. Click Forward or Backward to specify the direction of the message search through the log file.

Note – To begin searching from the end of the log file, select Backward; 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. Complete this procedure with one of the following actions:

- Click OK to filter and reload your log messages and close this window.
- Click Apply to filter and reload your log messages without closing this window.
- Click Cancel to cancel your request.

Reload Button

Click the Reload button to refresh and reload the currently filtered set of log messages.

Monitor Button

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

▼ To Monitor Log Messages

1. **Click the Monitor button on the View Log screen (FIGURE 13-2).**

The Monitor Filter Options dialog is displayed (FIGURE 13-4).



FIGURE 13-4 Monitor Filter Messages Dialog

2. **Click the check box next to Enable log file monitoring to enable or disable log file monitoring.**

A check mark in the box indicates log file monitoring is enabled. A blank box indicates that log file monitoring is disabled.

3. **To display only currently monitored log messages, click the check box next to Clear old monitored messages.**

A check mark is displayed in the box.

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.

Note – Select a text pattern that is unique to the type of message in which you are interested.

5. **Complete this procedure with one of the following actions:**

- Click OK to monitor your log messages and close this window.
- Click Apply to monitor your log messages without closing this window.
- Click Cancel to cancel your request.

Finding Specific Log Messages

You can search for a specific character sequence within that set of messages by using the Find field. This field enables you to search for a specific text pattern after the selected set of log messages has been loaded and displayed in the Messages for area.

Note – Wildcard searches using an asterisk (*) character, are *not* supported in the View Log find feature.

To search for a message that contains the asterisk character, precede the character with a backslash (\), for example, *.

After typing in the desired text pattern, the up/down arrow buttons find the next occurrence of the pattern and highlight it.

▼ To Find a Log Message

1. **Type the specific character sequence (part of the log message) in the Find field (FIGURE 13-2).**
2. **Click Return or the down or up arrow to search the log messages for that sequence.**
The first matching message is highlighted.
3. **Click the down or up arrow to continue your search and find additional occurrences of the matching sequence.**

▼ To View the SunMC Log File Messages

1. Click the **Log File** field and highlight **System Log**. The SunMC Log File Menu displays (FIGURE 13-5).

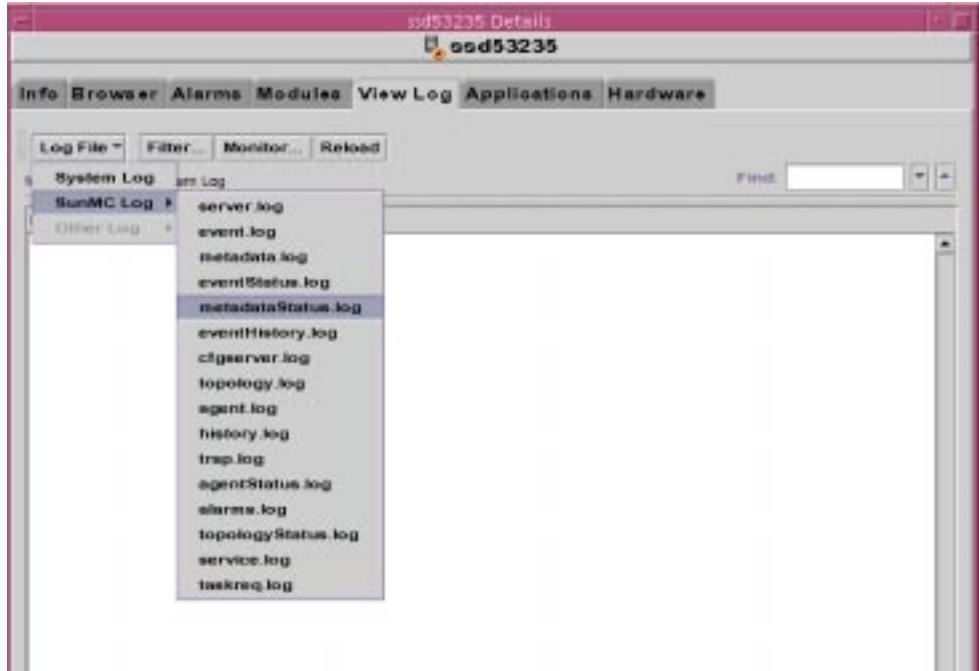


FIGURE 13-5 SunMC Log File Menu

2. Highlight the **Sun Management Center log file** you want to view.
The messages for the selected log file are displayed.
3. If you want to apply filters to the information, click the **Filter** button and enter the filter parameters on the **Message Filter Options** dialog box.
The information is redisplayed, using the filter you selected.

▼ To View Other Log File Messages

1. Click the down arrow under the **Log File** field and highlight **Other Log**.

Note – The Logview ACL module (Local Applications) must be loaded, or this option appears grayed out on the Module Status screen.

2. If you want to filter the information, click the **Filter** button and enter the filter parameters on the **Message Filter Options** dialog box.

The information is redisplayed using the filter you selected.

Applications Tab

This 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 custom applications or third-party applications. The displays are continually updated.

- **Click on the application listed in the Applications list.**

The right side of the window is updated with the selected application.

Note – The View Processes application is displayed by default whenever the Applications tab is selected.

View Processes

The View Processes application (FIGURE 13-6) enables you to view and select detailed information about processes running on the selected host or node.

Note – The Solaris Process Details module must be loaded to use the Process Viewer. For instructions, see “To Load a Module” on page 171.

Note – If the Solaris Process Details module is not loaded when you first click the Applications tab, then you must load the module, close the Details Window, and then reopen the Details window to see the processes. Thereafter, the Solaris Process Details module is unloaded or loaded dynamically. That is, you no longer need to close and reopen the Details window to see the processes whenever this module is unloaded or loaded.

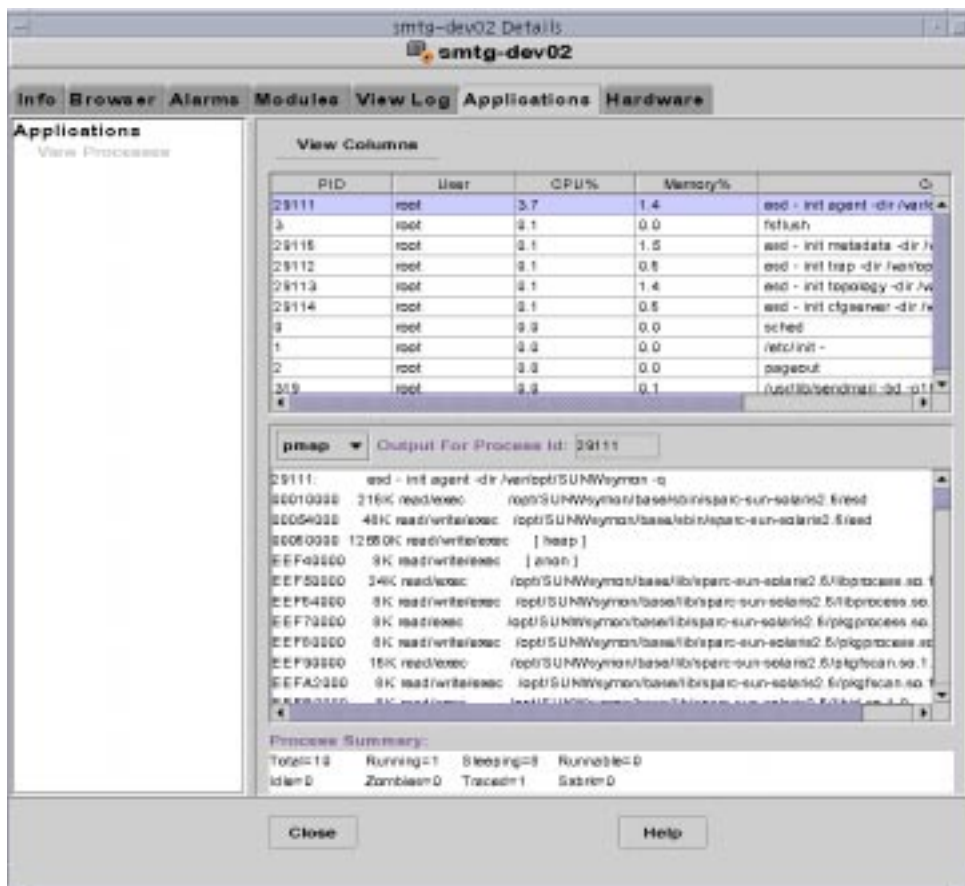


FIGURE 13-6 Process Viewer

Configuring the Process Display

▼ Selecting Columns for Viewing

1. Click the **View Columns** button above the Process table to display the **View Columns** pull-down menu.

A pull-down menu is displayed (FIGURE 13-7) that enables you to add or remove columns from the table.



FIGURE 13-7 View Columns Menu

2. Highlight one or more process properties that you want to display.

The check box next to each selected property is displayed with a check mark (FIGURE 13-7) and the right side of the Process Viewer window is updated. The new column or columns are added to the display, to the right of the existing columns.

The total number of processes displayed is listed in the Process Summary field at the bottom of the Details window.

TABLE 13-3 lists the properties that are available for the Processes view.

TABLE 13-3 Process Viewer Properties

Property	Description
PID	Process Identifier.
PPID	Process ID of the parent.
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.

TABLE 13-3 Process Viewer Properties (*Continued*)

Property	Description
Session ID	Process ID of the session leader.
PGroup	Process ID of the process group leader.
Tty	Controlling terminal for the process. A question mark (?) is printed when there is no controlling terminal.
Start time	Starting time of the process, 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 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.

Sorting Columns

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.

▼ To Sort Columns in Ascending Order

- **Click the property (table column header).**

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

▼ To Sort Columns in Descending Order

- **Click the property (table column header) while holding down the Shift key.**
The processes (rows) are updated in descending order for that property.

Moving Columns

You can rearrange the order of columns.

▼ To Reorder Columns in the Table

1. **Select a column by clicking and holding down the mouse button on the table column header.**
2. **Drag the column to the desired position.**

Process Statistics Window

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

TABLE 13-4 Process Statistics

Statistic	Description
pmap	Prints the address space map of each process.
pstack	Prints a stack trace for each lightweight process (lwp) in each process.
pfiles	Reports <code>fstat(2)</code> and <code>fcntl(2)</code> information for all open files in each process.
pldd	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 will need the Sun Management Center Developer Environment and documentation. See your Sun authorized sales representative for more information.

Custom or third-party applications, if you have any installed on your system, display 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 shown depend on the application selected.

Hardware Tab

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

The Hardware Details window (FIGURE 13-8) 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 supplement.

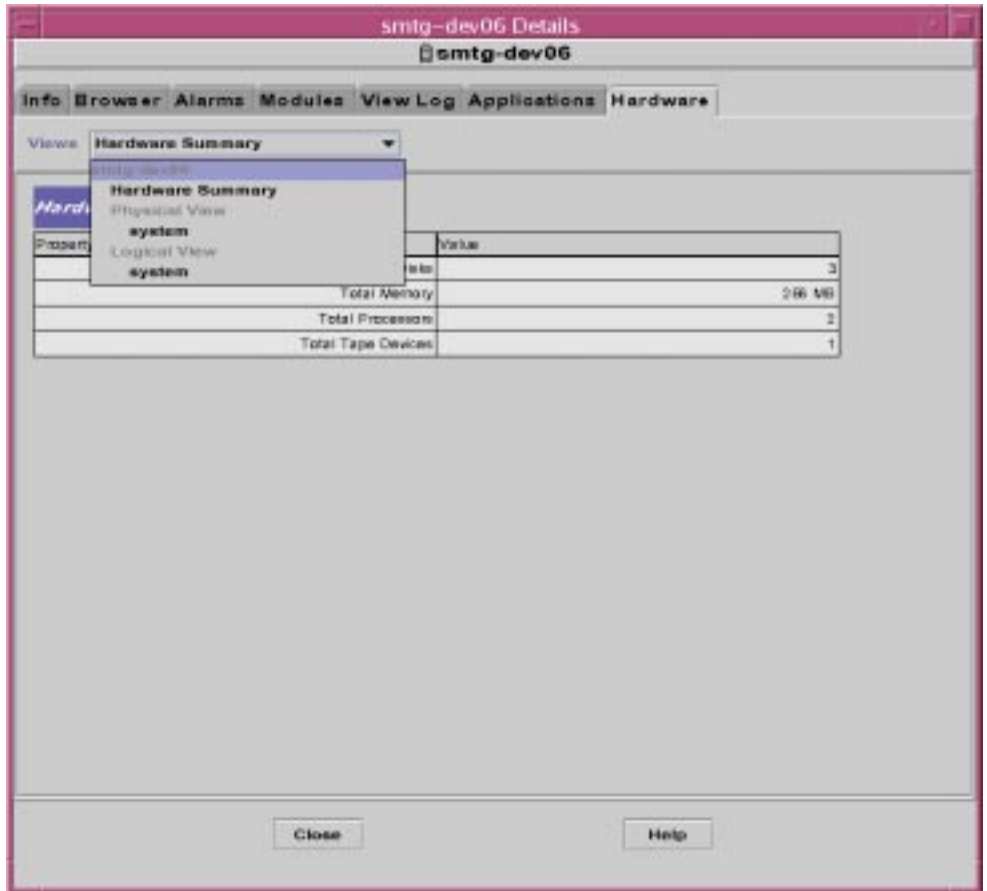


FIGURE 13-8 Hardware Details Window

To view the choices, pull down the Views Menu.

▼ To View a Hardware Configuration

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

- **Click once to highlight the configuration in which you are interested.**
The window is updated and the selected feature is displayed.

Hardware Summary

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

TABLE 13-5 Hardware Summary

Resource	Description
Total Disks	Total number of disks connected to the host
Total Memory	Total amount of memory connected to the host
Total Processors	Total number of processors connected to the host
Total Tape Devices	Total number of tape devices connected to the host

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

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

Close/Help

Click Close to close the Details window and return to the main console. Click Help to view online help text for the Details window.

Physical View

When you select the Physical view - system option, the software displays a photo-realistic picture of the selected host (FIGURE 13-9), 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.

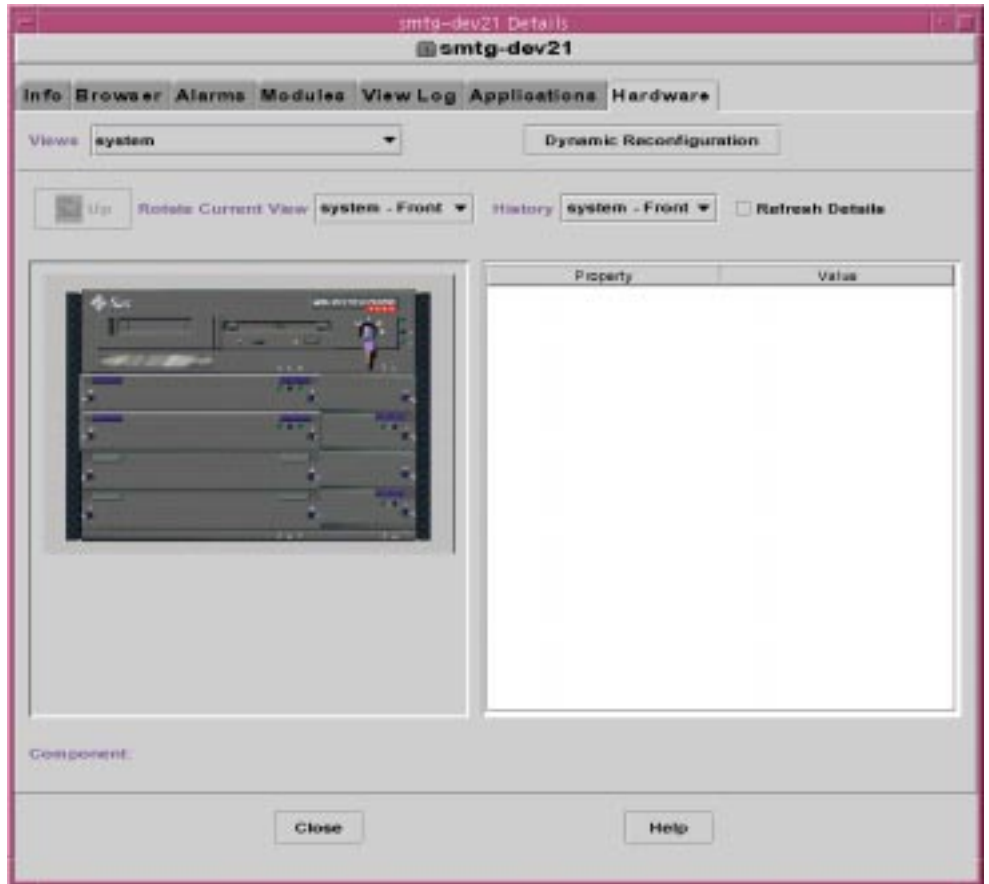


FIGURE 13-9 Hardware Configuration Physical View

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, and the path name of the component is displayed in the Component field at the bottom of the window.

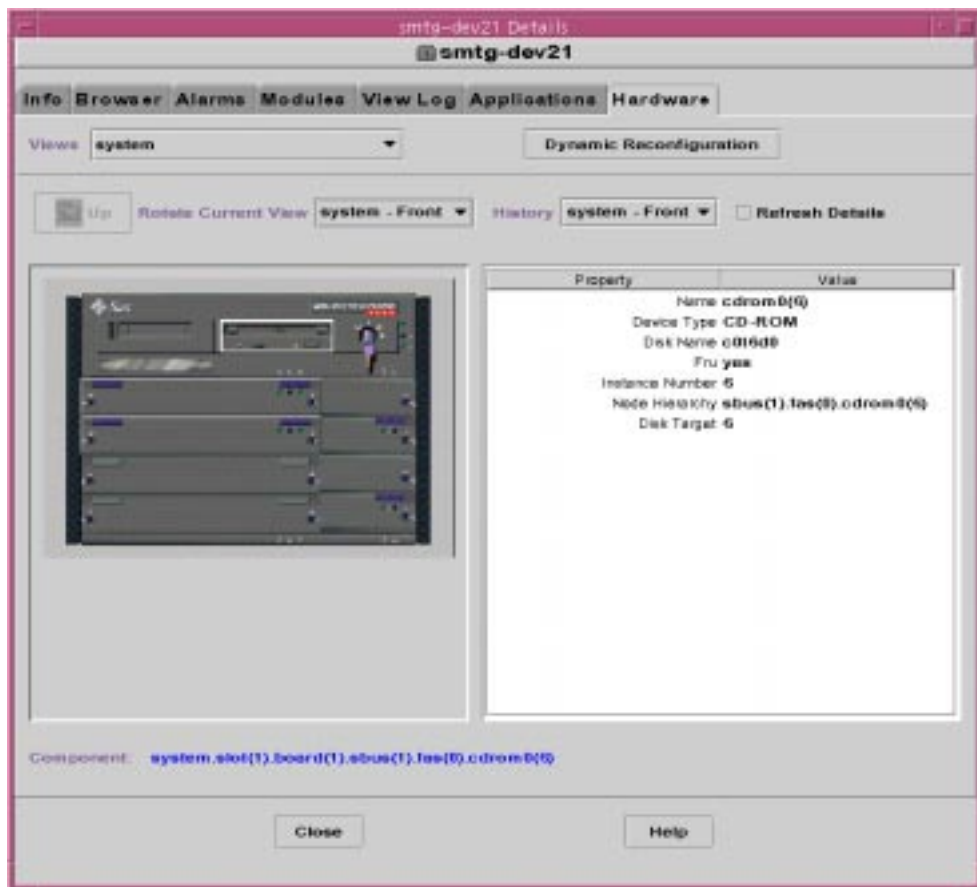


FIGURE 13-10 Hardware Configuration Physical View with Component Details (Property/Value View)

Rotate Current View

For some systems, you can select alternate front, rear, and side views by selecting entries in 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 various parts of the system picture, the mouse pointer changes from an arrow to a hand icon when a detailed picture is available for an individual component.

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, or A5200 is connected to the clicked component, the Views pull-down menu lists the devices that are connected, 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

The History pull-down menu allows you to revisit a view you had selected previously.

Refresh Details

Click Refresh Details to update the Property/Value information (in the right side of the viewing window) for a highlighted physical component in the topology. Otherwise, the information does not change from when you first opened the physical view.

Dynamic Reconfiguration

The Dynamic Reconfiguration button is displayed in the physical and logical views only for certain platforms. Refer to your hardware supplement for more information.

▼ To Reconfigure the System

1. **Open the Details window for the selected system.**
2. **Select the Modules tab in the Details window and verify that the Dynamic Reconfiguration (dr) module is loaded. Load the module if necessary.**
3. **Select the Hardware tab in the Details window.**
4. **Pull down the Views Menu and select “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 (FIGURE 13-11). The example shows the display for a Sun Enterprise 4500 Server.

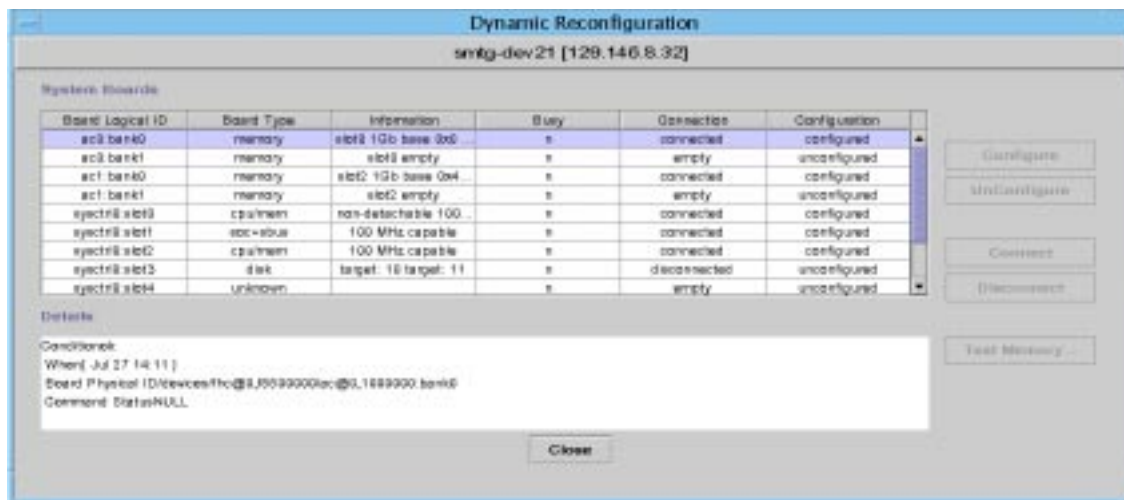


FIGURE 13-11 Dynamic Reconfiguration Pop-up Window

6. Select a board slot or memory bank.

The Dynamic Reconfiguration function buttons are highlighted for operations that are permitted for the selected board or memory. Buttons are grayed out for functions that are not permitted.

7. Click the desired function button for that memory or board.

TABLE 13-6 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.

TABLE 13-6 Dynamic Reconfiguration Functions

Function	Action
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 step.)
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 that memory tests can be time-consuming and may take an hour or more for large-capacity DIMMs.

Logical View

The software displays a logical view configuration of a host (FIGURE 13-12) if the host is monitored by a Sun Management Center agent. (Logical views are not available for ping hosts.)

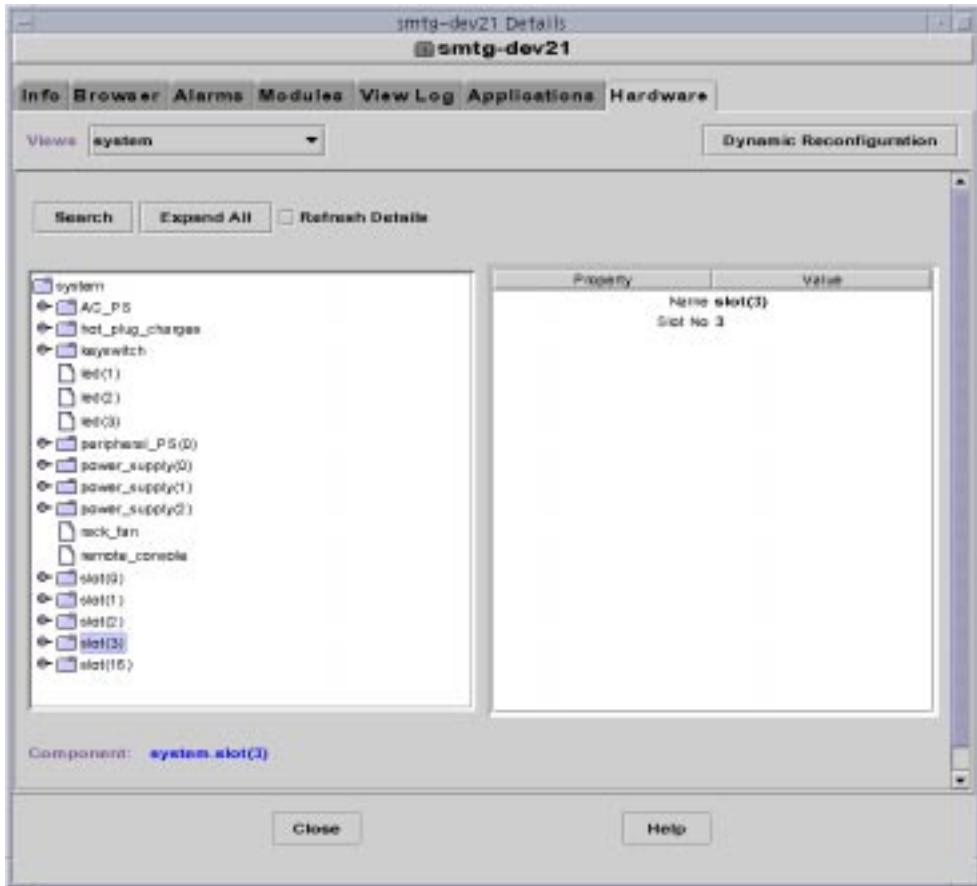


FIGURE 13-12 Hardware Configuration Logical View

Search

Clicking the Search button displays the Search window. Use the Search window to search for components in the Logical View topology (the left side of the viewing window).

Tip – The Search function is case-sensitive. The error message “Node not found” is displayed at the bottom of the Details window if the search does not locate the component in your system.

Tip – 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 board #2, enter enough of the board name. For example, `board(2)` or just `ard(2)` are sufficient to identify the specific target uniquely.

When the Search feature has located the component, it is highlighted in the topology view. The name of the component displays in the Component field in the bottom right section of the screen.

Expand All

Clicking the Expand All/Recover Default button decompresses and recompresses all the component icons in the topology area (left side) of the window. For example, here is the compressed view:

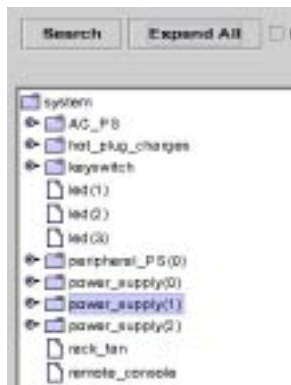


FIGURE 13-13 Compressed Topology of Components in Logical View

After you press Expand All, here is the expanded topology view:

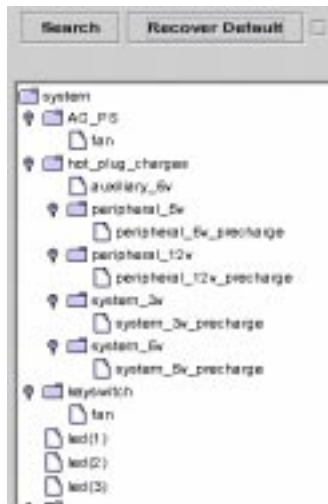


FIGURE 13-14 Expanded Topology of Components in Logical View

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

Click Refresh Details to update the Property/Value information (in the right side of the viewing window) for a highlighted logical component in the topology. Otherwise, the information does not change from when you first opened the logical view.

Dynamic Reconfiguration

The Dynamic Reconfiguration feature in the Logical View is the same as is described in the previous section, “Physical View” on page 224.

Sun Management Center Security

Security in Sun Management Center software is based on Java™ security classes and SNMPv2 usec (SNMP version 2, user-based security model) security standards. This chapter discusses security features, users and groups, and their privileges.

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 and provides control at the administrative domain, group, host, and module levels.
- It authenticates user login and access control for individual managed properties.

This chapter describes the following:

- To Add Sun Management Center Users
- To Access ACL on a Module
- To Add a User-Defined Group to an ACL
- To Grant a User esadm, esops, or esdomadm Privileges
- To Delete Sun Management Center Users
- To Override Default Privileges

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 following 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 unless the user logs in as `espublic` or `esmaster` since these two user names are part of this file. (See the following section for more information.)

Public and Private Users

During the Sun Management Center server setup, the file `/var/opt/SUNWsymon/cfg/esusers` is created and the following users are added to the file automatically:

- `espublic`
`espublic` is comparable to logging into a UNIX system as `guest`. It enables users to have “general” privileges. For example, when a user tries to access information from a session running in a different Sun Management Center server from their own, they are given access as `espublic` and are able to view the information as a `guest` only.
- `esmaster`
`esmaster` is comparable to being superuser in UNIX. It automatically gives “admin” access privileges to users logging into the software.

The administrator has to add the additional list of user IDs for all other users who need to log into Sun Management Center software. All users in this file have “general” access privileges, by default, unless they are given additional privileges using the procedures described in “Using Access Control” on page 241.

Note – The user names `espublic` and `esmaster` are not configurable during installation. They must specifically be defined as `espublic` and `esmaster`.

General Users

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 the events
- Trigger manual refreshes
- Run ad hoc commands
- Graph data

Sun Management Center Superuser

Implicitly, the Sun Management Center superuser belongs to all the groups described in the following sections. Sun Management Center superuser has “admin” privileges as described in “Sun Management Center Administrators or esadm” on page 236.

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 above groups must be defined on the machine where the Sun Management Center Configuration manager is running. They do not need to be defined on other machines. These groups are described in greater detail in the sections that follow.

Note – The preceding groups are defined in the `/etc/group` file. Note that although Sun Management Center `esmaster` and `espublic` users are configured as members of the preceding groups, they are not explicitly mentioned in the `/etc/group` file.

Sun Management Center Operators or esops

Sun Management Center software users belonging to the group `esops` are usually referred to as operator users who run, monitor, and to some extent, configure some parameters on the managed systems. As you can see in the following list, `esops` can perform operations, including some that are allowed for general users:

- Disable or enable modules
- Set module active time window
- Set alarm limits
- Set rule parameters
- Run alarm actions
- Run adhoc commands
- Set refresh interval
- Acknowledge, delete, or fix events
- Enable or disable history logging

- Set logging history parameters

Sun Management Center Administrators or `esadm`

Software users belonging to the group `esadm` can perform “admin” operations, which are a superset of the operations that can be performed by operator users as described in “Sun Management Center Operators or `esops`” on page 235. In addition to all the operations that “operator” users (`esops`) can perform, these “admin” users (`esadms`) 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 belonging 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 belonging to “`esdomadm`” is just a “general” user, unless configured otherwise.

Admin, Operator, and General Functions

TABLE 14-1 contains the different types of functions users can do by default.

This table is general in nature and applies to all modules. Individual modules may also have specific restrictions, which are under the control of the module.

TABLE 14-1 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	x		
Add objects to groups or administrative domains	x	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	x	
Set alarm limits		x	x	
Set rule parameters		x	x	
Run alarm actions		x	x	
Run adhoc commands		x	x	
Set refresh interval		x	x	
Manually trigger a refresh		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 or privileges. This means that, by default, a user who has `esadm` privileges can do anything that a user who has `esops` privileges can. But an administrator has the option to change the default permissions so that a user who has `esops` privileges can do more than a `esadm` user. Inclusive relationships means that these three groups, `esops`, `esadm`, and `esdomadm`, do not have any code enforcement behind them which makes one group more powerful than the other.

For more information on how to override default privileges, see “Overriding the Default Privileges” on page 247.

Specifying Access Control

The administrators (`esadm` group) can specify ACL features for users and groups for the following:

- 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:

- Administrator users and administrator groups
A list of users and groups who can perform administrator operations. By default, they are `esadm` or `esdomadm`, wherever applicable.
- Operator users and operator groups
A list of users and groups who can perform operator operations. By default, they are `esops`.
- General users and general groups
A list of users and groups who can perform general operations. By default, this is a hypothetical group called `ANYGROUP`.
- Communities for administrators (SNMP)
A list of SNMP communities that can perform admin operations using SNMP protocol.
- Communities for operators (SNMP)
A list of SNMP communities that can perform operator operations using SNMP protocol.

- Communities for general (SNMP)
A list of SNMP communities that can perform general operations using SNMP protocol.

Sun Management Center Remote Server Access

Users can access and view data from sessions running on remote Sun Management Center servers. When a user tries to gain access to such information, that user is provided access as `espublic` (guest) with read-only privileges. The behavior of Sun Management Center sessions running on different servers is defined in terms of each session's server context. See "Sun Management Center Server Context" on page 239 for more information.

As a user, you can access and set up a different server context for a variety of reasons:

- To provide for separate security access privileges so that each server context could have different users and administrators and yet be accessible to each other
- To allow for physical separation between elements, as in the context of a wide area network (WAN)
- To increase performance since this would allow 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

A server context is defined as agents running on many hosts, all sharing a single set of the following central components:

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

A server context is defined as a collection of Sun Management Center agents and the particular server layer to which the console is connected. Agents within the same server context can talk to each other. Agents in remote server contexts can talk using read-only privileges.

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 or

port addresses. This means that if you want to determine if you are within your server context or are accessing information from another server context, you need to know the respective IP or port addresses of the servers that you access. Different server contexts have different port numbers.

A remote server context refers to a collection of agents and a particular server layer with which the remote agents are associated.

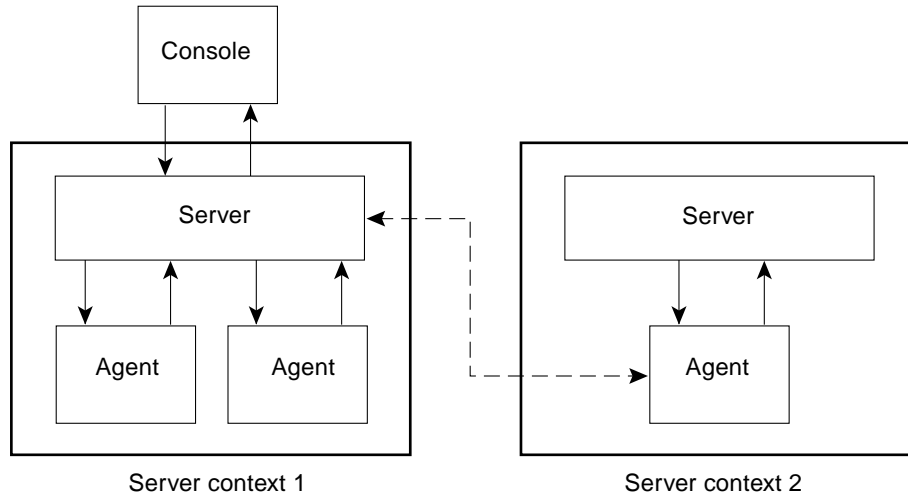


FIGURE 14-1 Remote Server Context

An agent gets its security configuration from the server layer. For example:

- Agents within the same server context can talk to each other.
- Agents in remote server contexts can talk remotely using read-only privileges.
- Requests to agents in remote servers are performed as the Sun Management Center `espublic` user. This allows successful requests across servers, as long as Sun Management Center sessions on both servers have the same password for user `espublic`.
- Each Sun Management Center server maintains a list of agent IP or port address, to distinguish objects in its own context from objects on a different Sun Management Center server.

Limitations While 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 different or remote server context, the server give you access with `espublic` user privileges. Thus you can access data but cannot modify or use the objects within the different server. You are restricted only to viewing the remote server objects. Therefore, the following consequences apply:
 - You can access other server contexts as long as the `espublic` user password is the same in all contexts.
 - You can view data in another context as user `espublic`, 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 but cannot *cut and paste* between contexts.

Note – From a graphical user interface perspective, it is important to note that it may not be obvious that you are accessing a different server context. To identify if 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 ACL functions:

- To Add Sun Management Center Users
- To Access ACL on a Module
- To Add a User-Defined Group to an ACL
- To Grant a User `esadm`, `esops`, or `esdomadm` Privileges
- To Delete Sun Management Center Users

▼ To Add Sun Management Center Users

1. Become superuser (on the Sun Management Center server host).
2. Edit the file `/var/opt/SUNWsymon/cfg/esusers`. Make sure that the user name is that of a valid UNIX user.
3. Add the user name on a new line.
4. Save the file and exit the editor.

Note – By adding a user to the users list, the user has default privileges. See “Default Privileges” on page 246 and “Overriding the Default Privileges” on page 247 for more information.

▼ To Access ACL on a Module

1. Proceed with one of the following:

- Click the right mouse button on the selected object and highlight Attribute Editor from the pop-up menu.
- Select Tools ► Attribute Editor in the main console window.

The Attribute Editor is displayed. The buttons at the bottom of the window are grayed out, with the exception of the Cancel and Help buttons. The remaining buttons become active if you modify any field in the window.

2. Select the Security tab within the Attribute Editor window (FIGURE 14-2).

3. Change the values as required.

For example, you may enter data as follows:

FIGURE 14-2 Example of Security Fields in the Attribute Editor

Note – Use spaces or commas between multiple entries as illustrated in the entries for “Operator” under “Users.”

The preceding example of the Attribute Editor with the Security tab selected contains the following field entries:

TABLE 14-2 Security Attributes

Attribute	Description
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. Here, <code>nick</code> and <code>richie</code> are users who can perform general operations

TABLE 14-2 Security Attributes

Attribute	Description
Administrator Groups	All the users belonging to <code>esadm</code> and administrators can perform administrator operations. By default, they are <code>esadm</code> or <code>esdomadm</code> , as applicable
Operator Groups	All users belonging 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 admin operations using the SNMP protocol
Communities for Operators	This field is empty denoting that there is no SNMP community that can perform operator operations using the SNMP protocol
Communities for General Users	<code>public</code> is an SNMP community that can perform general operations using the SNMP protocol

Note – For more information on security privileges, see “Access Control Categories” on page 233.

▼ To Add a User-Defined Group to an ACL

1. **Become superuser.**
2. **Create a group:**

```
# /usr/sbin/groupadd groupname
```

3. **Add users to the newly created group:**
 - a. **Edit the `/etc/group` file.**
 - b. **Add users to the group.**
 - c. **Save the file and exit the editor.**
4. **Add the new group to the ACL of interest.**
See “To Access ACL on a Module” on page 242 for more information.

▼ To Grant a User esadm, esops, or esdomadm Privileges

1. Become superuser.

2. Make sure that the user is a valid Sun Management Center user.

You may do this by adding the user to the `/var/opt/SUNWsymon/cfg/esusers` file.

3. Edit the `/etc/group` file.

4. Add the user to one of the following lines as applicable: esadm, esops, or esdomadm.

5. Save the file and exit the editor.

▼ To Delete Sun Management Center Users

1. Become superuser on the Sun Management Center server host.

2. Edit the file `/var/opt/SUNWsymon/cfg/esusers`.

3. Delete the line corresponding to the user name you want to delete.

4. Save the file and exit the editor.

5. Delete the user names from additional groups.

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.

Default Privileges

Administrative domains are manipulated by the Topology manager. This section illustrates the default privileges for the Topology manager and for other agents and modules.

Topology Manager Default Privileges

The default privileges for Topology manager (where administrative domains are maintained) are listed in the following table.

TABLE 14-3 Default Privileges for Topology Manager

Topology Manager	Default Privileges
List of Admin Users	
List of Operator Users	
List of General Users	
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 all other components and modules are listed in the following table.

TABLE 14-4 Sun Management Center Component and Module Default Privileges

Components/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.*”

Overriding the Default 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.

The following section illustrates how to override default list privileges.

▼ To Override Default Privileges

- **Create the following override files in the `/var/opt/SUNWsymon/cfg` directory:**

- `agent-acls-d.dat`
- `topology-acls-d.dat`
- `event-acls-d.dat`
- `cfgserver-acls-d.dat`
- `trap-acls-d.dat`

The following example creates an admin group wheel for the agent instead of the esadm. By default, it makes user 1, margot, and user 2, helen, admin users for that agent.

Note that the lists of names are separated by spaces, such as, helen and margot.

The lines beginning with a pound sign (#) are comment lines and you may ignore them. They are presented here for reference purposes only.

Note – Remember to create similar files for each component or machine.

```
# File: agent-acls-d.dat
# Version: %I% %E% %U%
#
# Copyright (c) 1993-1997 Halcyon Inc.
#
# e.g.
#   adminUsers =
#   operatorUsers =
#   generalUsers =
#   adminCommunities =
#   operatorCommunities =
#   generalCommunities =
#   adminGroups =
#   operatorGroups =
#   generalGroups =
#
#   adminUsers = helen margot
#   adminGroups = wheel
#   operatorGroups = esops
#   generalGroups = ANYGROUP
#   generalCommunities = public
```

For platform-specific information about security, see your supplement.

Grouping Operations

Note – This feature may or may not be available on your system, depending on your licensing agreement.

A group operation is a task instance that is applied to an object group and is (optionally) scheduled for execution. The key feature in this functionality is the Group Operations window (FIGURE 15-2). This window enables you to create and edit group operations. The main components of these group operations are:

- An object group with an optional filter
- A task, which could be one of the following types:
 - Module
 - Data Property
 - MCP Parcel (Module Configuration Propagation)

From the Group Operations window, you can create, modify, delete, and save these components.

As you scroll down and highlight each existing group operation, a summary of each main component is displayed under the Group, Filter, and Task Summary sections.

The following are described in this chapter:

- To Create an Object Group
- To Create a Task
- To Create an Object Group
- To Edit an Object Group
- To Delete an Object Group
- To Create a Filter
- To Edit a Filter
- To Delete a Filter
- To Create a Task
- To Create a Module Task
- To Edit a Module Task
- To Create a Data Property Task

- To Edit Data Property Tables
- To Delete a Task
- To Create an MCP Parcel
- To Delete an MCP Parcel
- To Create an MCP Task
- To Edit an MCP Task
- To Delete an MCP Task

Start by selecting Group Operation from the console Tools menu (FIGURE 15-1).

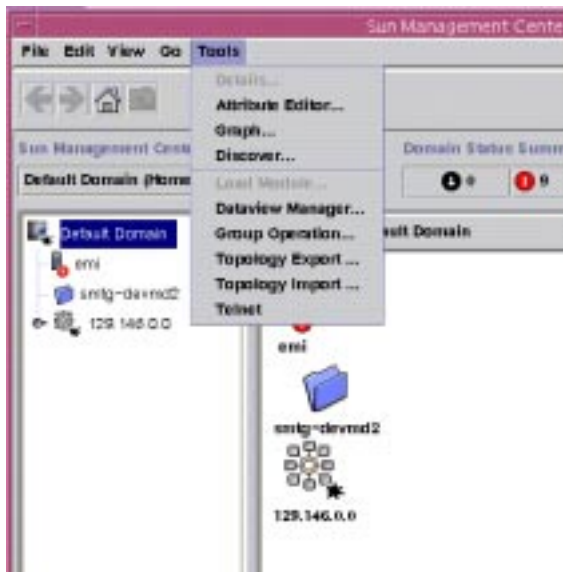


FIGURE 15-1 Console Window With The New Tools Menu

The main Group Operations window (FIGURE 15-2) is displayed by choosing Tools ► Group Operation in the Sun Management Center console window (FIGURE 15-1).



FIGURE 15-2 Main Group Operations Window

The Group Operations Window

This table at the top (FIGURE 15-2) displays:

- The group operation name
- A pull-down menu that lists existing groups (with optional filters)
- A pull-down menu that lists existing tasks
- Schedule information
- State (of the group operation)

Under the optional Description field, there are two read-only areas, Group Summary and Task Summary. To display the information in these two sections, select a group operation at the top of this window. For example, you can see the platform type, the operating system, and the modules that comprise a group operation.

The following tables describe the submenu options that are found under the following options on the menu bar:

- File
- Edit
- View
- Help

TABLE 15-1 File Menu Options

Menu Item	Description
New	Enables you to create a new group, filter, task, or MCP parcel.
Suspend	Enables you to suspend the execution of a group operation.
Resume	Enables you to resume the execution of a group operation.
Save	Enables you to save this group operation to the server, with or without a schedule.
Close	Enables you to close the Group Operations window.

TABLE 15-2 Edit Menu Options

Menu Item	Description
Delete	<p>Is enabled only when one or more completed group operations is selected.</p> <p>Can only delete a group operation if the group operation:</p> <ul style="list-style-type: none">• is inactive• has been suspended <p>When an operation is deleted, a confirmation window is displayed.</p>
Modify Group	Enables you to modify an existing group operation.
Modify Filter	Enables you to modify an existing filter.
Modify Task	Enables you to modify an existing task.

TABLE 15-3 View Menu Option

Menu Item	Description
View Log	Enables you to see the View Log window.

TABLE 15-4 Help Menu Options

Menu Item	Description
Help	Enables you to display the help documentation.

To create a group operation, you must first create a:

- Group with an optional filter
- Task

General Procedures

▼ To Create an Object Group

1. **In the main Group Operations window (FIGURE 15-2), click in the row under the Name column, that reads, “Click to enter name...”**
2. **Enter a group operations name.**
3. **Press the Return button or click in the next cell.**
Your cursor will now be in the blank cell under the Group column.
4. **Click on the pull-down menu and choose from the list of existing groups.**
If the pull-down menu is empty or you do not see a group name that you want to use, you must create a new object group.
5. **To create a new object group, proceed with one of the following:**
 - Choose File ► New ► Group.
 - Click the Create/Edit Group button from the toolbar.

The Create/Edit Groups window is displayed (FIGURE 15-4). For additional information on creating and editing groups, see “To Create an Object Group” and “To Edit an Object Group.” For additional information on creating and editing filters, see “To Create a Filter” and “To Edit a Filter.”

▼ To Create a Task

1. In the main Group Operations window (FIGURE 15-2), click in the empty row under the Task column.

2. Click on the pull-down menu and choose from the list of existing tasks.

If the pull-down menu is empty or you do not see a task name that you want to use, you must create a new task.

3. To create a new task, proceed with one of the following:

- Choose File ► New ► Task.
- Click the Create/Edit Task button from the toolbar.

The Create/Edit Groups Task window is displayed (FIGURE 15-6). For additional information on creating and editing tasks, see “To Create a Task.”

▼ To Set a Schedule

1. Click in the empty cell under the Schedule column.

2. Use the pull-down menu to select one of the following:

- Activate Upon Save
- Set Schedule

If you select Activate Upon Save, the group operation will be activated once you click File ► Save in the main Group Operations window. If you select Set Schedule, the Set Schedule window (FIGURE 15-3) is displayed.



FIGURE 15-3 Set Schedule window

3. From the Set Schedule window, you can use the various pull-down menus to set the date, time, and frequency of occurrence for your group operation.

▼ To Set the State of the Operation

Note – This column is read-only, so you cannot set anything.

1. Click in the empty cell under the State Column.
2. Use the pull-down to select one of the following group operation states:
 - Queued
 - Running
 - Suspended
 - Failed
 - Succeeded
 - Active
 - Inactive
 - Missed Schedule
 - Run & Failure
 - Failure & Suspended
 - Success & Suspended

Detailed Procedures

▼ To Create an Object Group

1. In the Create/Edit Groups window, under the Group column, click in the cell that says, “Click to enter name...”

For additional information on the buttons and columns in this window, see TABLE 15-5 and TABLE 15-6.



FIGURE 15-4 Create/Edit Groups Window

2. Enter a group name.
3. Select one of the following buttons and click the Update button.
 - “All Objects in Domain”

This means the object group refers to the entire domain.

- “Select Objects in Domain”

The objects that are preselected in the main console topology area will be displayed in the list after the Update button is clicked. This list comprises objects that do not have a filter applied to them. To see the list of objects after a filters has been applied to them, click the Preview button.

Note – You cannot choose domains, because it is a read-only field. The Domain field will be automatically filled in with the current domain name.

4. Click in an empty cell under the Filter column and use the pull-down menu to choose a filter name.

If this menu is empty or there is no filter you want to use, create a new filter. For additional information on creating and editing a filter, see “To Create a Filter” and “To Edit a Filter.”

5. Enter an optional description in the Description field.
6. Click the OK button to save this group.

TABLE 15-5 Buttons on the Create/Edit Group Window

Button	Description
Delete	Located at the top of the Create/Edit Group window, this button enables you to delete a row, which consists of the entire group object, the domain, and the filter.
Delete	Located next to the field that contains the list of objects in the Domain, this button enables you to delete specific objects from your list of selected objects.
Update	Enables the selections made in the main topology area to be added to your group and entered into this window.
Preview	Applies the optional filter to the current object group. The contents of the above list are shown in a new dialog with changes to reflect the filtering operation.
OK	Enables you to save the newly created group.
Cancel	Enables you to cancel the current operation.
Help	Enables you to display the online help documentation.

TABLE 15-6 Columns on the Create/Edit Group Window

Column Name	Description
Name	Enables you to click into this cell and add a new object group name.
Domain	Automatically populated by the current domain name (read-only).
Filter	Enables you to use the pull-down menu, which displays a list of existing filters.

▼ To Edit an Object Group

1. In the Create/Edit Group window, highlight a group.
2. Make all necessary changes.

3. Click the OK button.

▼ To Delete an Object Group

1. Highlight the group you would like to delete.
2. Click the Delete button located near the top of the Create/Edit Groups window.
3. Click the OK button.

▼ To Create a Filter

1. In the Create/Edit Filters window (FIGURE 15-5), under the Name column, click in the cell that says, “Click to enter name...”

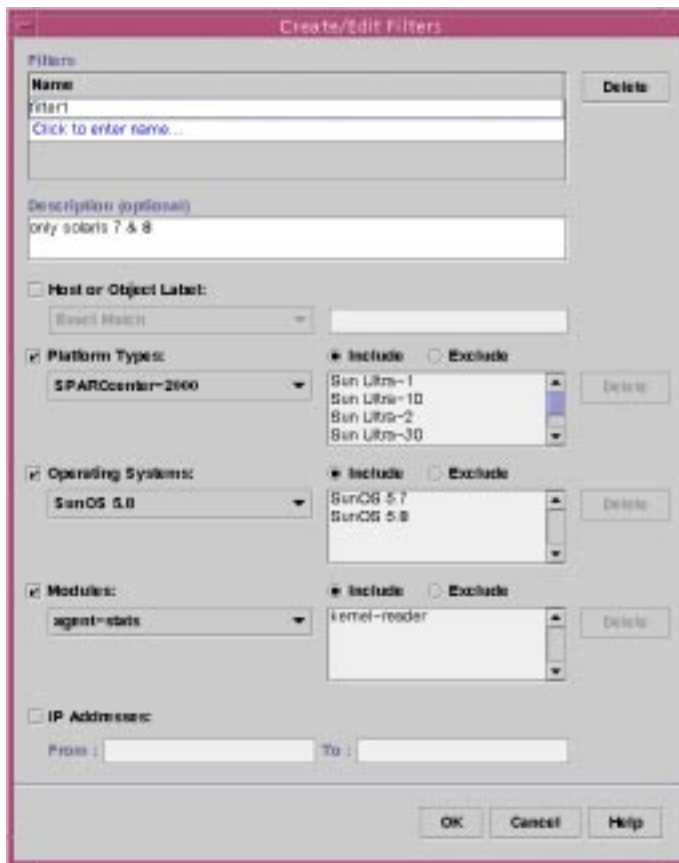


FIGURE 15-5 Create/Edit Filter Window

2. Click your left mouse button and enter your filter name.

3. Enter an optional description in the Description field.

4. Set filters by activating any, or all, of the following options:

To activate these options, click in the checkbox and use the pull-down menu to select an item from the displayed list.

- Host or Object Label
- Platform Types (Include/Exclude)

This pull-down menu has all possible platform types. This criterion selects only hosts which have at least one of the specified platform types.

- Operating Systems (Include/Exclude)

This pull-down menu lists all possible operating systems. This criterion selects only hosts which have at least one of the specified operating systems.

- Modules (Include/Exclude)

This pull-down menu has all possible modules. This criterion selects only objects which have at least one of the specified modules loaded.

- IP Addresses (Include/Exclude)

The fields next to this option enable you to enter a range of IP addresses. This criterion selects only hosts which have an IP address in the specified range.

TABLE 15-7 Buttons on the Create/Edit Filters Window

Button	Description
Include/Exclude	<ul style="list-style-type: none">• The Include button specifies that the host must match one of the items in the list.• The Exclude button means the host cannot match any item in the list.
Delete	Enables you to delete an included item from the list.
OK	Enables you to save the newly created filter.
Cancel	Enables you to close the current operation.
Help	Enables you to display the online help documentation.

5. Click the Save button.

▼ To Edit a Filter

1. In the Create/Edit Filters window, highlight the filter you want to modify from the list.

2. **Modify the filter.**
3. **Click the OK/Save button to save your changes.**

▼ To Delete a Filter

1. **In the Create/Edit Filters window, highlight the filter you want to delete.**
2. **Click the Delete button located next to the Name field.**

A deletion confirmation window is displayed, which reminds you that deleting the task is a permanent action.

3. **Click the OK button to confirm the deletion.**

Tasks

There are three types of tasks that will be described in this section:

- Module task
- Data Property task
- MCP Parcel Task

▼ To Create a Task

1. **In the Create/Edit Task window, under the Name column, click in the cell that says, “Click to enter name...”**
2. **Enter your task name.**

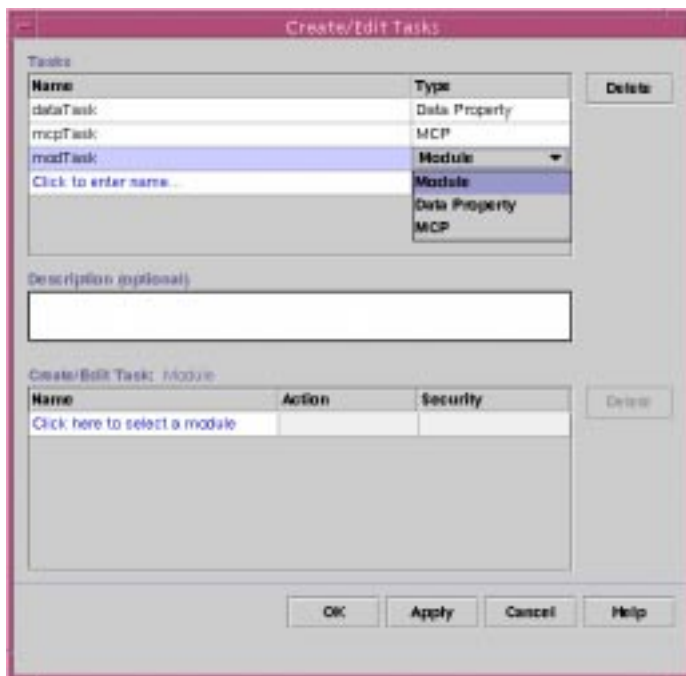


FIGURE 15-6 Create/Edit Tasks Window

3. Under the Type column use the pull-down menu to choose whether the task type will be a module, a data property, or MCP.

Module Task



FIGURE 15-7 Create/Edit Module Task Window

If you choose Module, the information in TABLE 15-8 will be displayed under the Create/Edit section:

TABLE 15-8 Module Properties Task - Table Columns

Column	Description
Action	The pull-down menu displays the type of action to be applied to the module. The following options are provided: <ul style="list-style-type: none">• None• Load• Unload• Disable• Enable• Set Schedule
Security	Enables you to set any security values for the module.

▼ To Create a Module Task

1. In the Create/Edit Task window, use the pull-down menu under the Type column, and choose **Module**.

After choosing Module, notice that the Create/Edit Task table at the bottom of the window (FIGURE 15-8) will contain the items found in TABLE 15-8.



FIGURE 15-8 Create/Edit Task Window - Module Task Option

2. In the **Module** column, choose a module from the pull-down list.
3. In the **Action** column, chose the type of module action from the pull-down menu. If you select Set Schedule For..., the Attribute Editor window is displayed with the Schedule tab activated. For additional information on the Attribute Editor, see Chapter 9.
4. Click in the **Security** column to display the Attribute Editor window with the Security tab activated.

Settings that are made here will be reflected as a checkmark in the Security column. Make your changes in the Attribute Editor window and click the OK button. For additional information on the Attribute Editor, see Chapter 9.

5. In the Create/Edit Task window, click the OK button to save your changes.

▼ To Edit a Module Task

1. In the Create/Edit Tasks window, highlight the task you want to modify.
2. Make the necessary changes.
3. Click the OK button to save your changes.

Data Property Tasks

▼ To Create a Data Property Task

1. In the Create/Edit Tasks window, use the pull-down menu under the Type column, and choose Data Property (FIGURE 15-9).



FIGURE 15-9 Create/Tasks Window - Data Property Option

TABLE 15-9 Data Properties Task - Table Columns

Column	Description
Name	When you click in this row, the Data Property Selection window (FIGURE 15-10) is displayed. To display a data property table in the right pane of the split pane, navigate down in the hierarchy tree and click the mouse button on a managed object name.
Alarm	Enables you to display the Attribute Editor window, with the Alarm tab activated.
Action	Enables you to display the Attribute Editor window, with the Action tab activated.
Refresh	Enables you to display the Attribute Editor window, with the Refresh tab activated.
History	Enables you to display the Attribute Editor window, with the History tab activated.

After choosing Data Property, the Create/Edit Task table at the bottom of the window will contain the items found in TABLE 15-9. If you click in any of the four right cells, the Attribute Editor window is displayed with that item's tab activated. For additional information on the Attribute Editor, see Chapter 9.

2. Click in the first empty cell under the Data Property column.

A Data Property Chooser window is displayed (FIGURE 15-10).

3. Under the Additional Specifiers section, enter a module instance name in the Module Instance field.

4. Click the OK or Apply button to save your changes.

This newly created data property task will appear in the table in the lower portion of the Create/Edit Tasks window (FIGURE 15-9).

The Data Property Selection Window

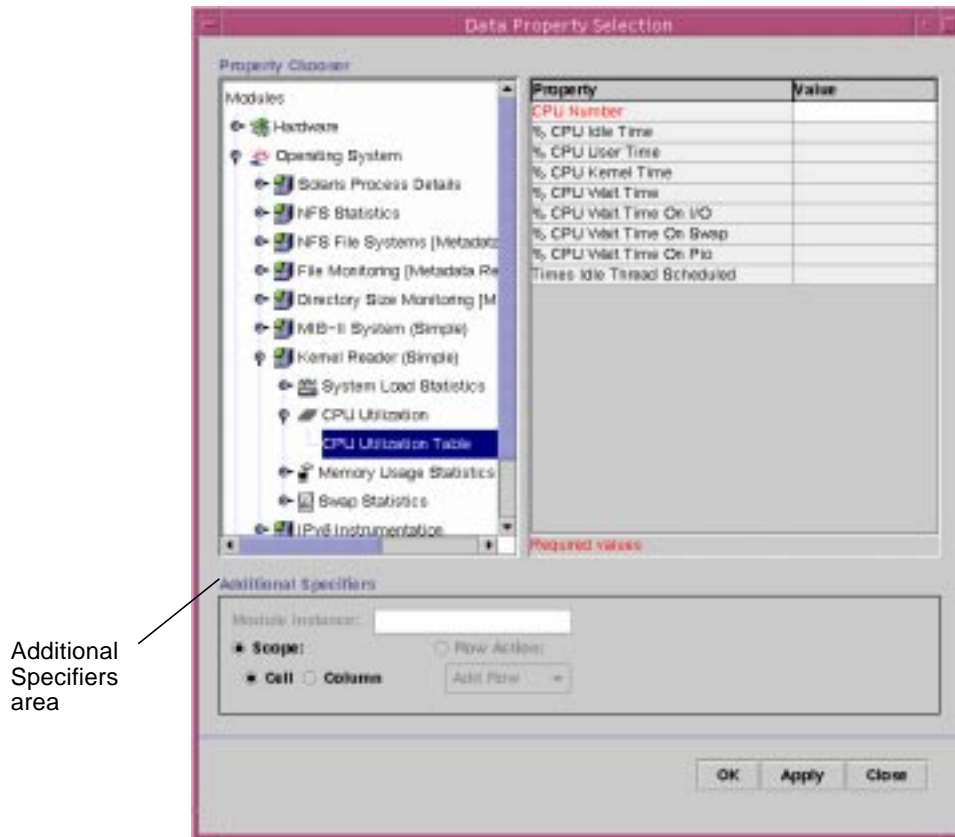


FIGURE 15-10 Data Property Selection Window

The use of this window is similar to the Host Details window. To navigate through this window, click on the expansion/compression icons in the hierarchy until you find a specific managed object. When you double-click on this managed object, the table will be displayed in the right frame. There are three types of data property tables that will be displayed:

- Simple, scalar tables (read-only values) (FIGURE 15-11)
- Simple, scalar tables with editable values (FIGURE 15-12)
- Vector tables (FIGURE 15-13)

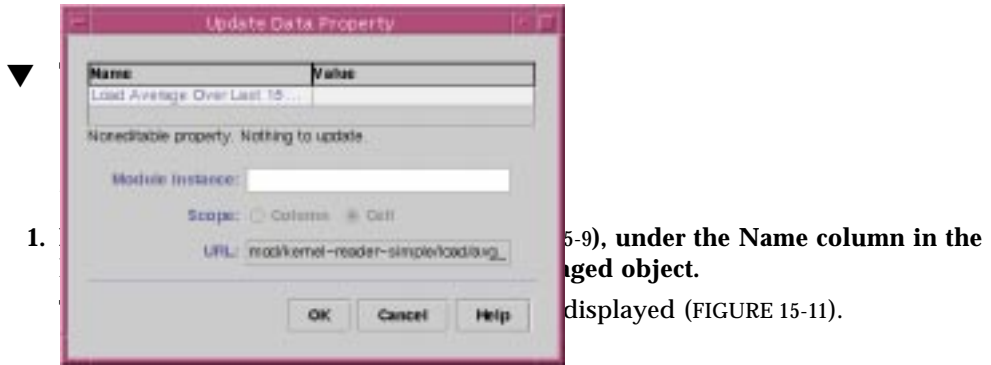


FIGURE 15-11 Update Data Property Window for a Simple, Scalar Data Property Table

2. Since this table is a scalar, noneditable table, click the OK button.
This type of managed object is noneditable, so the field under Name is grey.

Simple, Scalar Table With Editable Values

1. In the Create/Edit Tasks window (FIGURE 15-9), under the Name column in the lower part of this window, click on a managed object.
The Update Data Property window will be displayed (FIGURE 15-12).

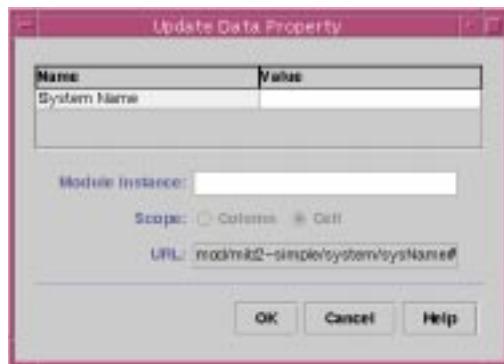


FIGURE 15-12 Update Data Property Window for a Simple, Scalar Data Property Table With Editable Values

2. Enter a value or edit an existing value.
3. Click either the OK button to save your changes.

Vector Tables

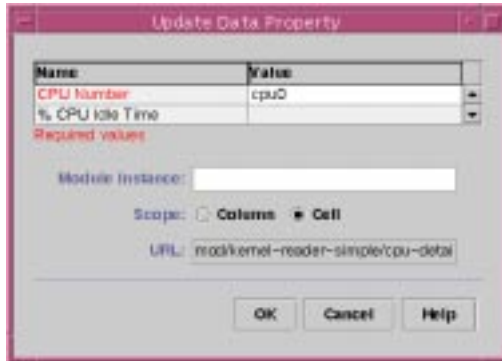


FIGURE 15-13 Update Data Property Window for a Vector Data Property Table

1. In the Create/Edit Tasks window (FIGURE 15-9), under the Name column in the lower part of this window, click on a managed object.

The Update Data Property window is displayed (FIGURE 15-13).

2. Modify the data property.

In the Data Property Chooser window (FIGURE 15-10), under the Additional Specifier section, use the following options for vector tables:

- Module Instance Name
- Scope
- Row Action

Module Instance Name

In this data property table type, you have to enter additional information. For example, if you have chosen a multi-instance module, you must provide a name for this instance. The Module Instance field is located at the bottom of the Data Property Selection window under the Additional Specifiers section.

Scope

Here, the scope of the task (FIGURE 15-10) on this data property must be specified as either a column or a cell. For example, in the CPU Utilization module, if the Column button is chosen, the task will apply to all CPUs. But, if the Cell button is selected, you will be required to enter an index value, such as a CPU number. To alert you that a field is for required values, the text accompanying this field will be displayed in red.

In a vector data property table, you can modify the following:

- Editable values
- Required values
- Module instance name
- Scope

Row Action

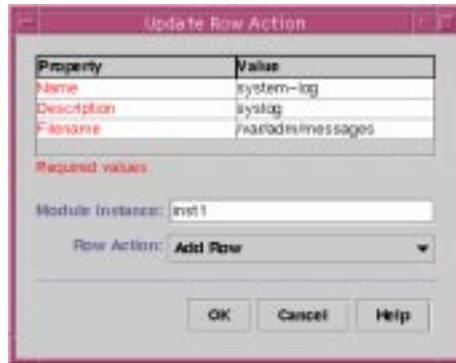


FIGURE 15-14 Update Row Action Window

If the module allows the addition of rows, you can select the Row Action button (FIGURE 15-10), and use the pull-down menu to choose one of the following options:

- Add row
- Modify row
- Delete row

For example, if you selected Add Row, the Update Row Action window (FIGURE 15-14) is display will list the required field and the values that you would enter (as you would find in the Add Row window). For additional information on adding rows, see Chapter 7.

3. Click the OK button to save your changes.

You will be returned to the Create/Edit Task window. Since you have completed your selections from the Data Property Chooser window, there will now be checkmarks under the corresponding columns.

▼ To Delete a Task

1. In the Create/Edit Task window, highlight the task you want to delete.

2. Click the Delete button, which is located next to the Name and Type columns.

The Delete confirmation window is displayed, which reminds you that deleting the task is a permanent action.

3. Click the OK button to confirm the deletion.

Module Configuration Propagation Tasks

▼ To Create an MCP Parcel

1. Proceed with one of the following:

- In the main Group Operations window, choose File ► New ► MCP Parcel.
- In the toolbar of the main Group Operations window, click the MCP Parcel icon.

The Create MCP Parcel window is displayed (FIGURE 15-15).

In this window, click your left mouse button in the first cell under the Name column, which says, “Click to enter new parcel name....”

For information on the buttons in the Create MCP Parcel window, see TABLE 15-10.

2. Enter the parcel name.

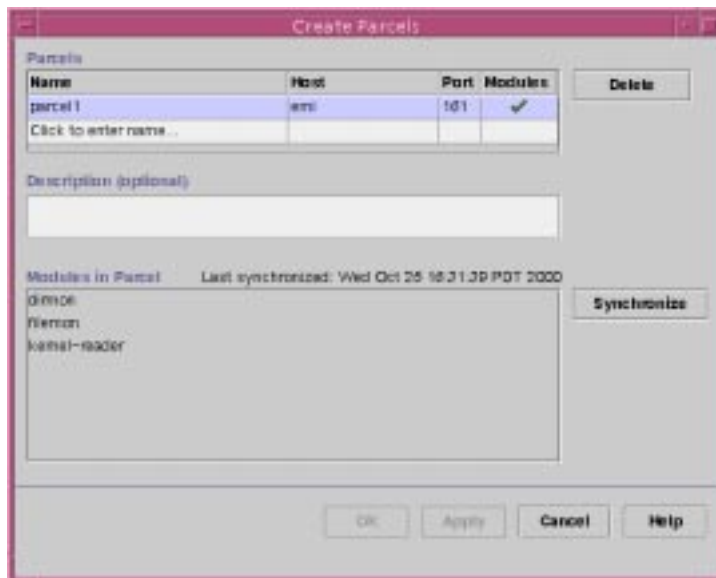


FIGURE 15-15 Create MCP Parcels Window

TABLE 15-10 Buttons on the Create MCP Parcel Window

Button	Description
Delete	Enables you to delete an existing parcel.
Synchronize	Enables you to copy any changes in the configuration files (changes that have been made since the last propagation) of the reference host out to all the target hosts. Ensures that the target hosts are in sync with the reference host.
OK	Enables you to save the parcel.
Apply	Enables you to save the current parcel and continue with another.
Cancel	Enables you to cancel the current operation.
Help	Enables you to access the online help documentation.

TABLE 15-11 Fields on the Create MCP Parcel Window

Field	Description
Name	Enables you to enter the name of your MCP Parcel.
Host	Enables you to enter your reference host name.
Port Number	Enables you to enter the port number of the reference host.
Module	Enables you to select modules for the parcel. (A checkmark appears in the cell if the parcel is complete.)
Modules in Parcel	Lists all the modules contained in a parcel.

3. Click in the first empty cell under the Host column and enter a host name.

This is the host whose configuration files will be used to propagate out to the target hosts in your group.

4. Click in the first empty cell under the Port column and enter a port number.

This is the port number that the agent is running for the reference host.

5. Click in the first empty cell under the Module column.

The Specify Modules in Parcel window (FIGURE 15-16) is displayed.



FIGURE 15-16 Specify Modules in Parcel Window

- 6. Under the Available Modules column, select a module name and click the Add button.**

The module name you chose will now appear under the Modules in Parcel column. You can add as many modules as you wish. To delete a module from the Modules in Parcel list, highlight the module's name and click the Delete button.

- 7. Click the OK button.**

In the Create MCP Parcel window (FIGURE 15-15), a checkmark is displayed in the cell under the Module column to indicate that a complete parcel has been created. Once this parcel is complete, the color of this row will change from white to light grey, which indicates that this row is selectable but not editable.



Caution – MCP Parcels cannot be edited. You must delete the existing parcel and create a new one.

To see a list of all the modules in a parcel, highlight a row under the Parcels section.

- 8. Enter an optional description in the Description field.**
- 9. Click the OK or Apply button to save this parcel.**

▼ To Delete an MCP Parcel

- 1. In the Create MCP Parcels window, click the Delete button.**

A deletion confirmation window is displayed, which reminds you that deleting the parcel is a permanent action.

- 2. Click the OK button to confirm the deletion.**

▼ To Create an MCP Task

1. In the Create/Edit Task window, use the pull-down menu under the Type column, and choose MCP Task (FIGURE 15-6).

The Create/Edit Tasks window is displayed (FIGURE 15-17). In the bottom of this window, under the Create/Edit Task: MCP section, there is a pull-down menu that lists all previously created parcels.

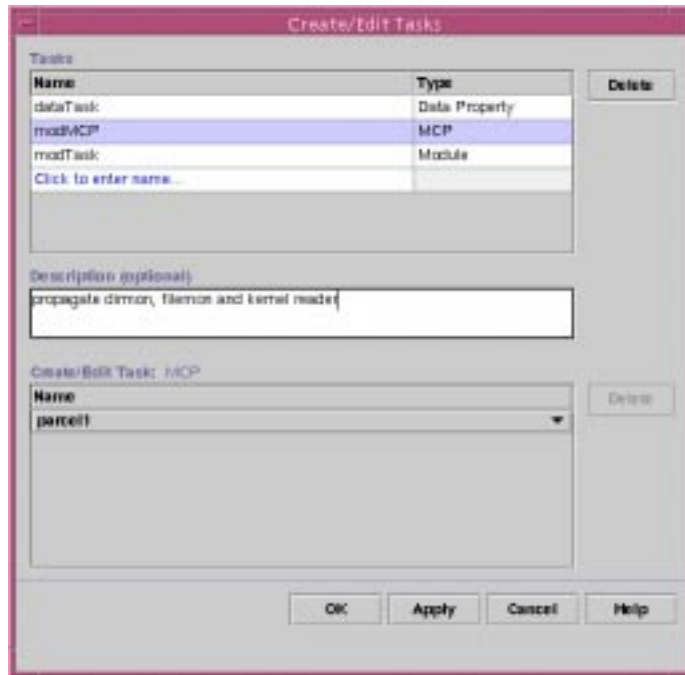


FIGURE 15-17 The Create/Edit Tasks window

2. Click this pull-down menu and select a parcel.
3. Click the OK/Apply button to save your changes.

▼ To Edit an MCP Task

- In the Create/Edit Task window, click on the pull-down menu under the Create/Edit Task: MCP section and choose a different parcel.

▼ To Delete an MCP Task

- In the Create/Edit Task window, under the Task section, highlight the task you want to delete and click the Delete button.

Module Management

Note – This feature may or may not be available on your system, depending on your licensing agreement.

This chapter describes the following topics:

- To Load a Module
- To Load a Scheduled Module
- To Unload a Module
- To Edit Module Parameters
- To Enable a Module
- To Disable a Module
- To Display Module Rules

These features are available on the Details window, using the Modules tab.

Modules Status Screen

When you click the Modules tab button in the Details window, the Modules status screen (FIGURE 16-1) is displayed. This screen has two main sections:

- Selected Modules with Load Status
- Available Unscheduled Modules

Note – Your system may not have all of the modules that are shown in the following examples, depending on the terms of your licensing agreement.

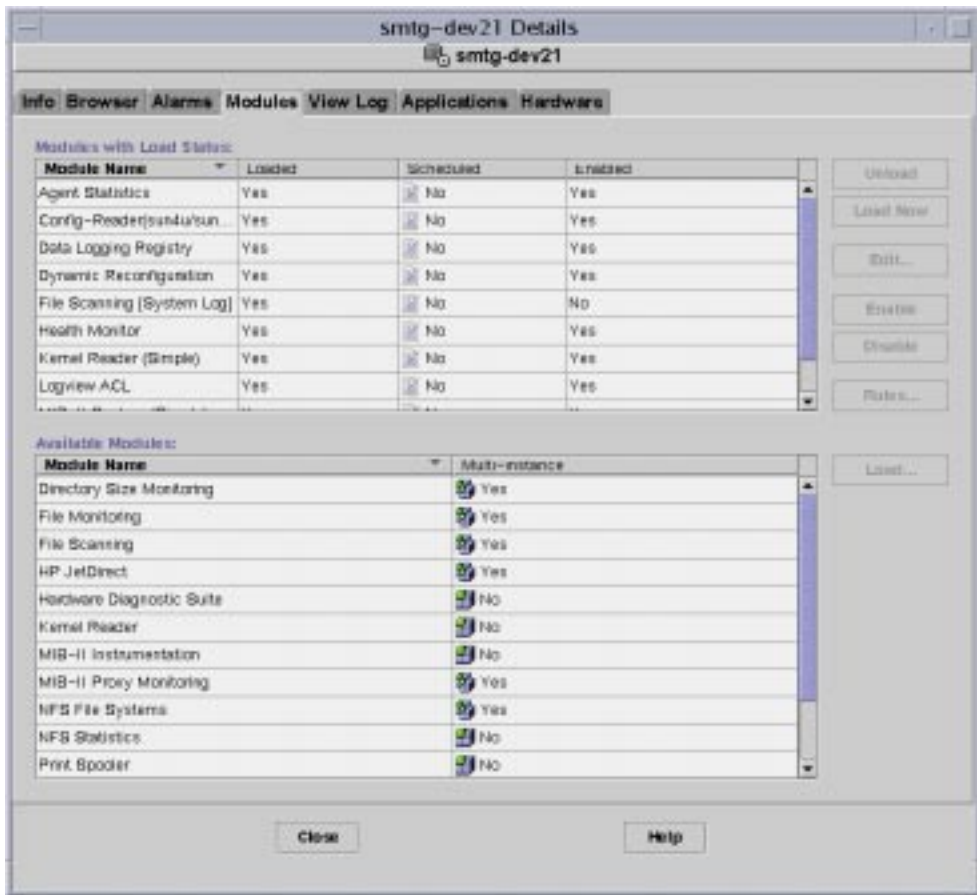


FIGURE 16-1 Modules Status Screen in the Details Window

Under “Selected Modules with Load Status,” information is segmented as shown in in TABLE 16-1.

TABLE 16-1 Columns in “Selected Modules with Load Status”

Column Name	Description
Module Name	Name of the module.
Loaded	Indicates whether the module is loaded.
Scheduled	Indicates whether the module is scheduled.
Enabled	Indicates whether the module is enabled.

The “Available Unscheduled Modules” section of the screen contains a list of modules that are available, but are not currently loaded.

Note – If the module is a multi-instance module, a special icon is displayed next to it (for example, the File Scanning Module in FIGURE 16-1).

For information on the buttons in this screen, see the following table.

TABLE 16-2 Modules Window Buttons

Button	Description
Unload	Unloads the selected module.
Load Now	Loads any modules that are scheduled but not currently loaded.
Edit	Allows you to edit module parameters.
Enable	Enables the selected module.
Disable	Disables the selected module.
Rules	Displays the Threshold Summary window.
Load	Loads a module that is highlighted in the Available Unschedule Modules section of the Modules status window.
Close	Closes the current screen
Help	Opens the Help documentation.

▼ To Load a Module

1. In the Details window, select the Modules tab.
2. Under the Modules tab, in the Available Unscheduled Modules section of the Modules status screen, select a module and click the Load button.

The Module Loader window is displayed (FIGURE 16-2). There are two tabs on this screen:

- Module Parameters (default tab)
- Schedule



FIGURE 16-2 Module Loader Screen With Module Parameters Tab Active

3. If the module being loaded is a multi-instance module, as shown in FIGURE 16-2, enter the instance name and description in the appropriate fields.

Note – Some modules do not have an editable fields on this screen, except the Module Description field. You can change the module description, but it is not recommended.

4. Click OK to load the module now and return to the Modules status screen.
5. To load the module at a specific time, click the Schedule Module tab.
The Module Loader screen is displayed with the Schedule tab active (FIGURE 16-3).

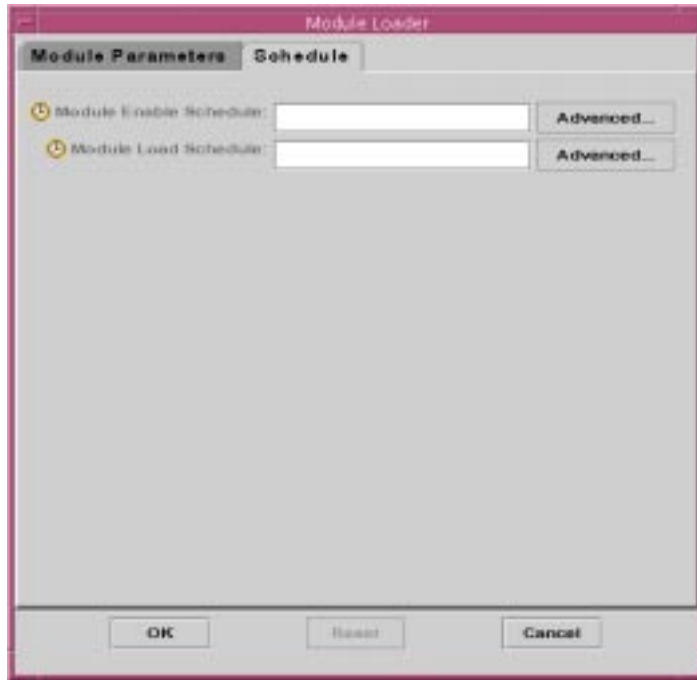


FIGURE 16-3 Module Loader Screen with Schedule Tab Active

6. Click the Advanced button.

The Time Editor screen is displayed (FIGURE 16-4).

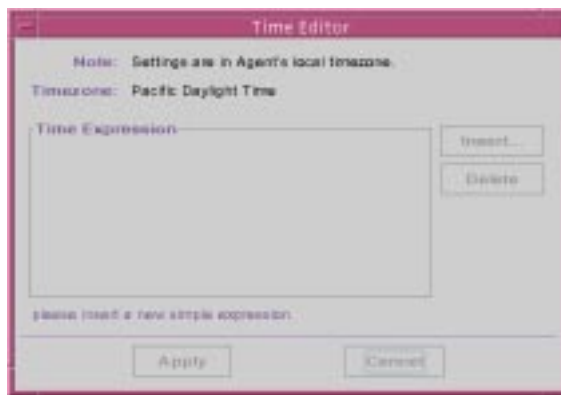


FIGURE 16-4 Time Editor Screen

7. Click Insert.

The Time screen is displayed (FIGURE 16-5).

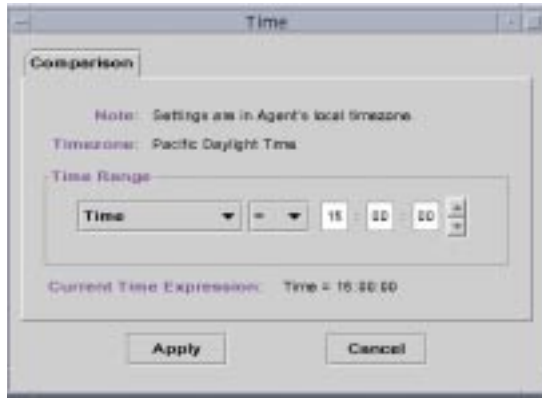


FIGURE 16-5 Time Screen

8. Select the time for the module to be loaded, and click Apply.

The Time screen closes, and you are returned to the Time Editor screen.

9. On the Time Editor screen, the time selected on the previous screen is displayed in the Time Expression field. Click Apply.

The Time Editor screen closes, and you are returned to the Module Loader screen.

10. On the Module Loader screen, click OK.

The Module Loader screen closes and you are returned to the Modules status screen. After a few seconds, the module name moves from the "Available Unscheduled Modules" section to the "Selected Modules with Load Status" section of the Modules status screen. The module status in the Scheduled column is Yes.

▼ To Load a Scheduled Module

1. In the “Selected Modules with Load Status” section, highlight a module that is currently scheduled not loaded (has a No in the Loaded column and a Yes in the Scheduled column). Click the Load Now button.

The Load Now dialog box (FIGURE 16-6) is displayed.

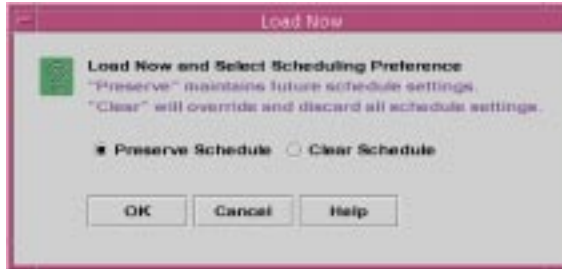


FIGURE 16-6 Load Now Dialog Box

2. To load the module at the time previously selected, click Preserve Schedule. Then click OK.

The module loads at the scheduled time. To cancel this screen, click Cancel. To display online help for this feature, click Help.

Note – To clear previous scheduling, click Clear Schedule, and click OK. the module status in the Loaded column remains No, and the status in the Scheduled column changes to No also.

▼ To Unload a Module

1. In the “Selected Modules with Load Status” section, select a module and click the Unload button.

The Confirm Module Unload window is displayed (FIGURE 16-7).



FIGURE 16-7 Confirm Module Unload Window

2. In the **Confirm Module Unload** window, click the **Unload** button to confirm that you want the module unloaded or the **Cancel** button to cancel the operation.

Once you click the **Unload** button, the module moves from the “Selected Modules with Load Status” to the “Available Unscheduled Modules” section and is now unloaded.

▼ To Edit Module Parameters

1. On the **Modules status** screen, click **Edit**.

The **Module Parameter Editor** screen is displayed.



FIGURE 16-8 Module Parameter Editor Screen

2. The screen is displayed with the default tab, **Module Parameters** selected.

Edit the module parameters. For some modules, the only information that can be changed on this screen is the module description.

The **Schedule** tab (FIGURE 16-3) is used to load or unload a module. See “To Load a Module” for more information.

3. When you are finished, click **Cancel** to close the **Module Parameter Editor** and return to the **Modules status** screen.

▼ To Enable a Module

1. Highlight a module listed in the “**Selected Modules with Load Status**” section of the screen.

Note – The module must have an “Disabled” status in the Enabled column.

2. Click **Enabled**.

The module status in the Enabled column changes to “Enabled.” A message “Succeed in enabling module” is displayed in the lower left corner of the Modules status screen.

▼ To Disable a Module

1. Highlight a module listed in the “**Selected Modules with Load Status**” section of the screen.

Note – The module must have an “Enabled” status in the Enabled column.

2. Click **Disabled**.

The module status in the Enabled column changes to “Disabled.” A message “Succeed in disabling module” is displayed in the lower left corner of the Modules status screen.

▼ To Display Module Rules

1. On the **Module Status** screen, highlight 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.

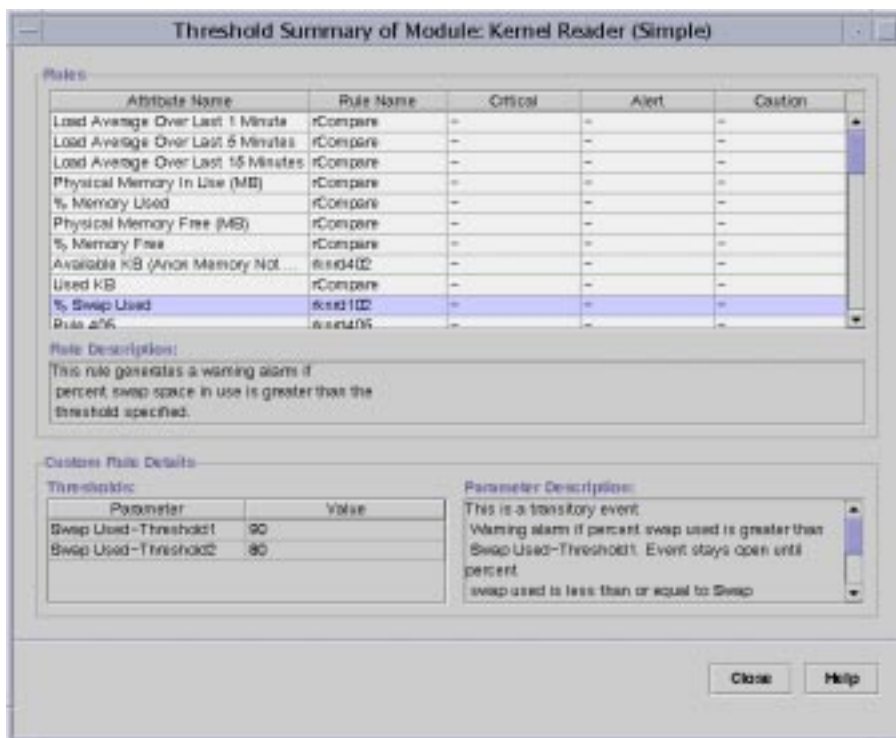


FIGURE 16-9 Threshold Summary of Module Screen

This window contains the sections listed in TABLE 16-3.

TABLE 16-3 Threshold Summary Window Fields

Table	Description
Attribute Name	Lists the data property.
Rule Name	Shows the rule name. If the rule is simple, it shows the threshold value. If the rule is complex, a "-" is listed, and these values, when selected, are listed in the Threshold list located at the bottom of the window.
Critical	The most severe alarm state.
Alert	The mid-point alarm state.
Caution	The least severe alarm state.

TABLE 16-3 Threshold Summary Window Fields

Table	Description
Rule Description	Displays a rule description for the selected attribute.
Thresholds	Displays threshold values for the selected attribute.
Parameter Description	Displays a description of the parameters shown in the Thresholds field.

TABLE 16-4 Threshold Summary Window Buttons

Button	Description
Close	Closes the Threshold Summary window.
Help	Accesses the Help documentation.

2. After you view the information, click **Close** to return to the **Module status** screen.

Dataviews

Note – This feature may or may not be available on your system, depending on your licensing agreement.

Dataviews are customized data property tables and can be created for one type of data from several different hosts, or different types of data from one host. 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.

Dataview Tables

The data required to create these tables is copied from different sources, including:

- Tables
- Modules
- Hosts

Dataviews are an excellent way of monitoring your group operations. Since these views are presented in a table, a variety of data can be easily compared. Also, these tables are created once and are automatically refreshed. Dataviews have all the features of module tables, except that cells are noneditable. Also, alarm status is correctly propagated. That is, cells that have triggered a critical alarm appear in red.

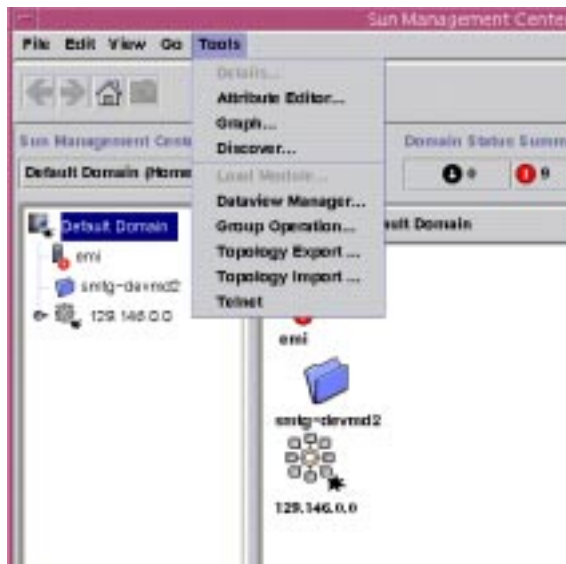


FIGURE 17-1 Tools Menu in the Console Window



FIGURE 17-2 Dataviews Manager Window

▼ To Open an Empty Dataview Window

1. **In the console window, choose Tools ► Dataview Manager (FIGURE 17-1).**

The Dataviews Manager Window is displayed (FIGURE 17-2).

2. **Click the Create Button.**

An empty Dataviews window is displayed.

▼ To Create a Dataview

From the Details and Console windows, there are two options to create a dataview:

- Create a Dataview
- Copy to the Dataview Clipboard

Create a Dataview Option

From the Context Pop-up Menu

1. **In the browser view, click the expansion/compression icon next to the items in the hierarchy (FIGURE 17-3) down to the desired data property.**
2. **On the data property, highlight a row or a cell and click the right mouse button.**
3. **Select Create Dataview (cell or row) from the context menu (FIGURE 17-3).**

An automatically populated dataview window is displayed.

From the Options Menu

1. **On the data property, highlight a row or a cell.**
2. **From the Options menu, select Create Dataview (cell or row).**

An automatically populated dataview window is displayed.

Copy to Dataview Clipboard Option

There are two locations from which you can create a dataview with this menu option:

- Details Window
- Console Window

Details Window

1. **Highlight a row or cell in a data property table.**
2. **Click the right mouse button and select Copy to Dataview Clipboard (cell or rows).**
3. **In the Details window, click on the Dataview icon.**
An empty Dataview window is displayed.
4. **Choose Edit ► Paste from Clipboard.**

Console Window

1. **Highlight a row or cell in a data property table.**
2. **Click the right mouse button and select Copy to Dataview Clipboard (cell or rows).**
3. **In the Console window, choose Tools ► Dataview Manager.**
A Dataview Manager window is displayed (FIGURE 17-2).
4. **Click the Create button.**
5. **Choose Edit ► Paste from Clipboard.**

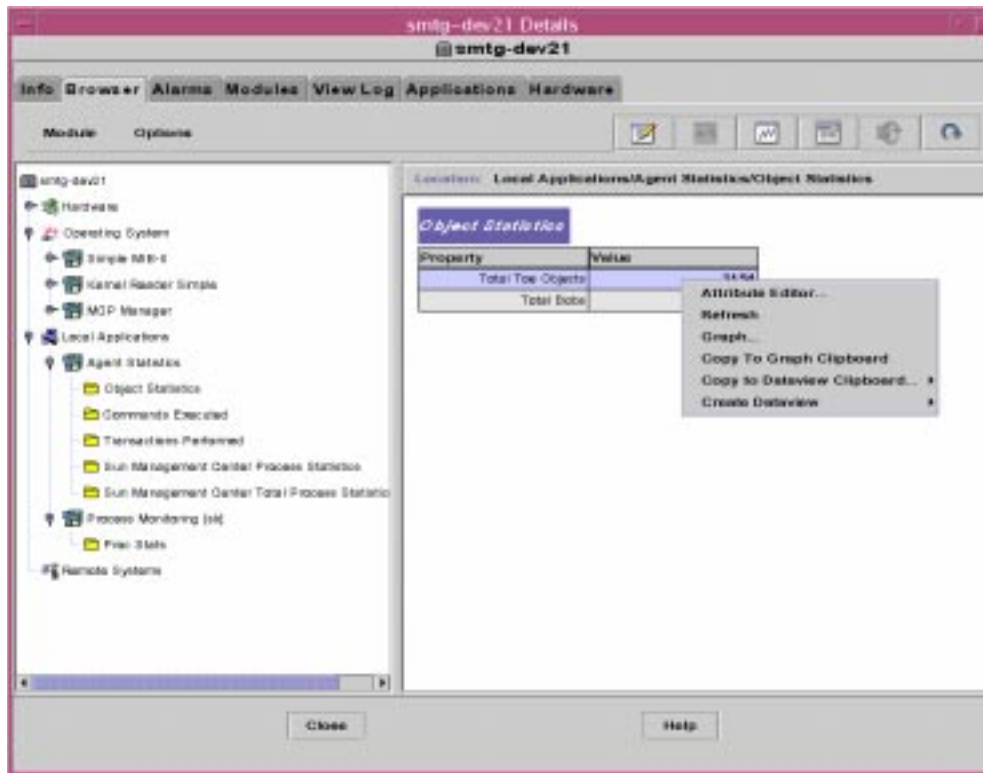
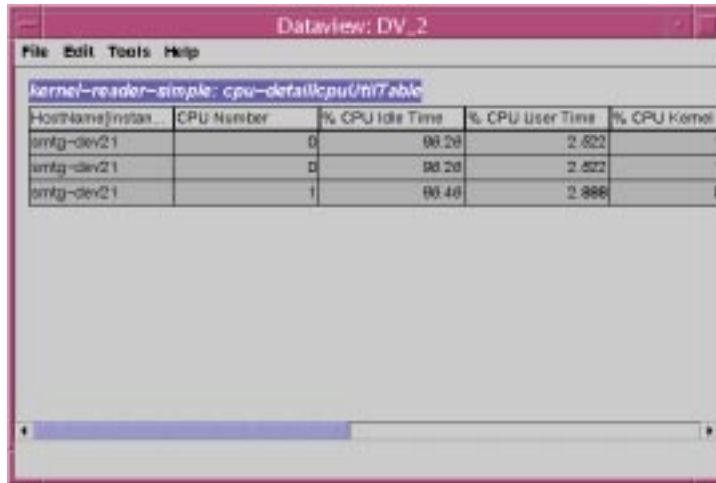


FIGURE 17-3 Row-Context Menu in the Details Window

▼ To Open an Existing Dataview



The screenshot shows a window titled "Dataview: DV_2" with a menu bar (File, Edit, Tools, Help) and a text area containing the URL "kernel-reader-simple: cpu-detail/cpuUtilTable". Below the text area is a table with five columns: HostName/Instan..., CPU Number, % CPU Idle Time, % CPU User Time, and % CPU Kernel. The table contains three rows of data for hosts named "smtg-dev21".

HostName/Instan...	CPU Number	% CPU Idle Time	% CPU User Time	% CPU Kernel
smtg-dev21	0	98.28	2.822	
smtg-dev21	0	98.28	2.822	
smtg-dev21	1	98.48	2.888	

FIGURE 17-4 Open Dataview Window

- From the Dataview Manager window (FIGURE 17-2), highlight the name of the dataview you want to open and click the Open button.

A populated dataview window is displayed (FIGURE 17-4).

Navigating Through a Dataview Window

- The dataview window (FIGURE 17-4) contains the following main menu items:
 - File
 - Edit
 - Tools
 - Help

For additional information on these menu items, see TABLE 17-2, TABLE 17-3, and TABLE 17-4.

TABLE 17-1 File Menu Items

Menu Item	Description
Save	Displays the Save window, which enables you to name and save the current dataview.
Close	Enables you to close the current dataview window.

TABLE 17-2 Dataview Edit Menu Items

Menu Item	Description
Paste From Clipboard	Is active only when the clipboard is not empty. If a table is open, this item adds the data property at the end of this table. If no table is open, a new one is created and the data property is pasted into it.
Delete Row(s)	Deletes the selected row from the table. Is active only when the row is selected.

TABLE 17-3 Dataview Tools Menu Items

Menu Item	Description
Attribute Editor	Brings up the Attribute Editor on the selected cell.

TABLE 17-4 Dataview Help Menu Item

Menu Item	Description
Help	Brings up the Help documentation.

▼ To Delete a Dataview

- From the Dataview Manager window (FIGURE 17-2), highlight the name of the dataview you want to delete and click the Delete button.

Note – Once you click the Delete button, a warning popup window (FIGURE 17-5) is displayed. This window reminds you that deleting a dataview is permanent and asks whether you want to continue.



FIGURE 17-5 Warning Window

▼ To Save A Dataview

1. In the Dataview window, choose **File ► Save**.

The Save Dataview window is displayed. You may enter an optional description in the Description field.

2. Click the Save Dataview button.



FIGURE 17-6 Save Dataview Window

Note – If the name you have chosen for this dataview exists, a Warning window (FIGURE 17-7) is displayed.



FIGURE 17-7 Save Warning Window

Types of Dataview Tables

There are two types of Dataview tables:

- Scalar
- Vector

Scalar Table

This table is created from scalar data items, which are single cells from scalar or vector tables and 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 Table

1. **In the Details window, click on the Operating System icon in the hierarchy (tree) view.**
2. **Double-click on the Kernel Reader icon in the Contents View window or single-click the Expansion/Compression icon next to the CPU Statistics icon.**
The CPU Statistics folder is displayed.
3. **Click on the CPU Utilization folder in either the hierarchy or the contents view.**
The CPU Utilization Table is displayed.

4. Select a cell from this table.

5. To copy the cell to the dataview clipboard, proceed with one of the following:

- From the Options menu, choose Copy to Dataview Clipboard ► Cell(s) or Create Dataview ► Cell(s).
- In the Details window, click the right mouse on the table and select Copy to Dataview Clipboard ► Cell(s).

For additional information on the Copy to Dataview Clipboard option, see “Copy to Dataview Clipboard Option” on page 290, and for additional information on the Create Dataview option, see “Create a Dataview Option” on page 289.

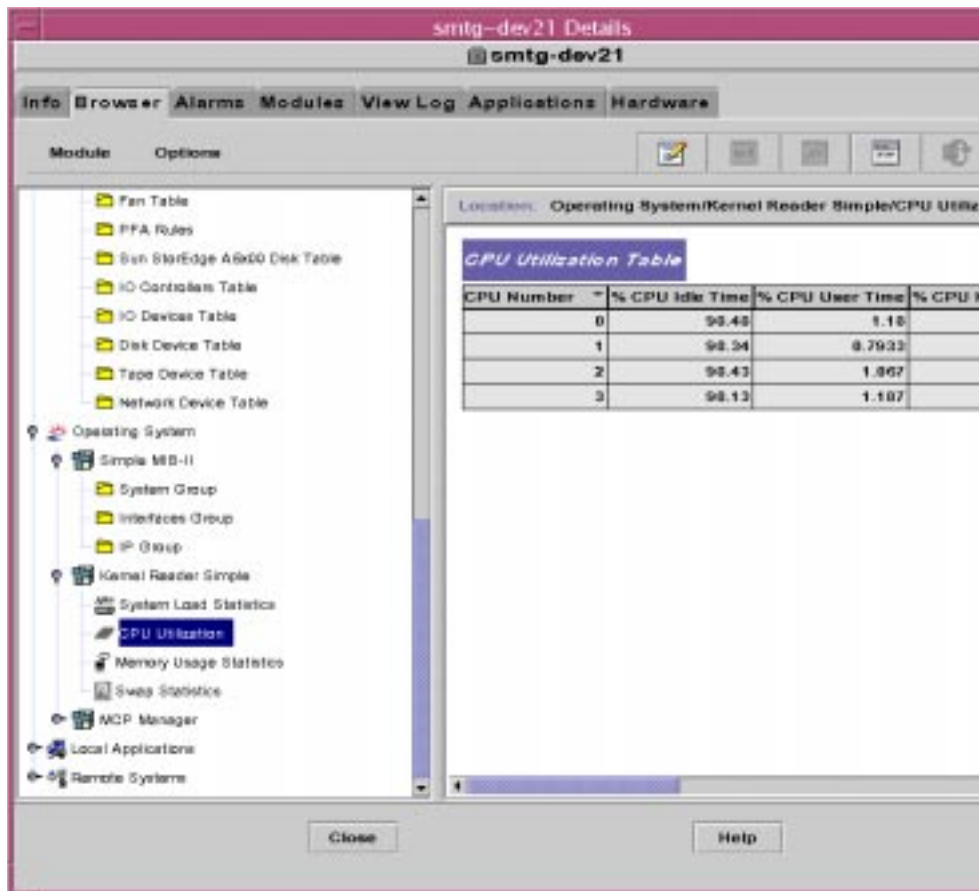


FIGURE 17-8 CPU Utilization Table

Vector Table

This table contains one or more rows from a vector module table. From this table, you can simultaneously select one row or multiple rows. If you select multiple rows, they do not have to be contiguous. For example, you can select row number 3 and row number 4 and not rows number 5 and then select number 6 and number 7 (FIGURE 17-9).

Note – When selecting rows, however, you cannot select partial rows; the entire row must be selected.

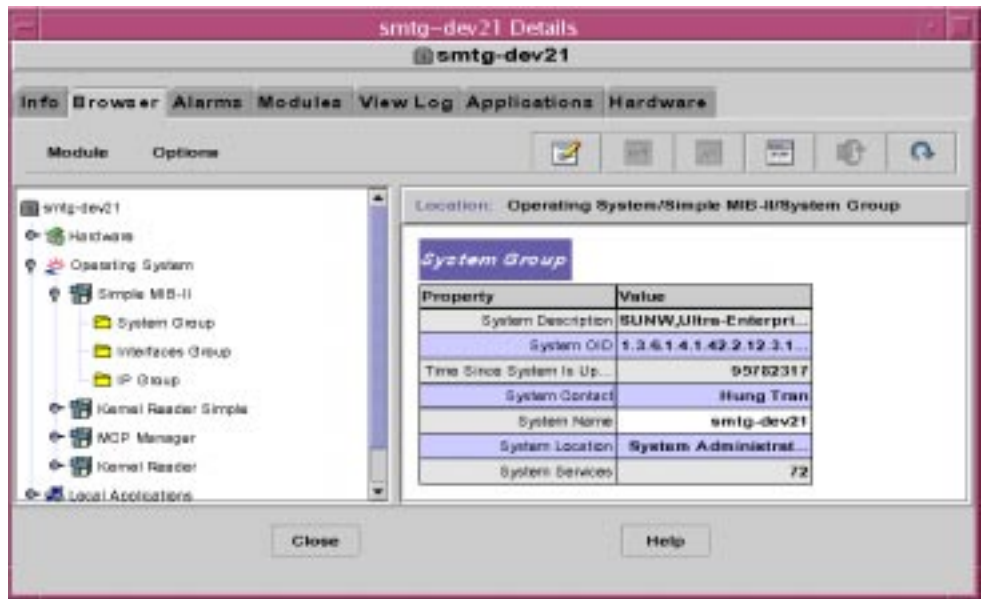


FIGURE 17-9 Contiguous Row Selection



Caution – Do not paste rows from vector and scalar tables into the same dataview window (though they can be from different hosts).

▼ To Create a Vector Dataview Table

1. In the Browser Details window, click on the Operating System icon in the hierarchy view (FIGURE 17-10).

2. Double-click on the Kernel Reader icon in the contents view or single-click the expansion/compression icon next to the CPU Statistics icon.

The CPU Statistics folder is displayed (FIGURE 17-10).

3. Click on the CPU Utilization folder in the hierarchy view.

The CPU Utilization table is displayed (FIGURE 17-10).

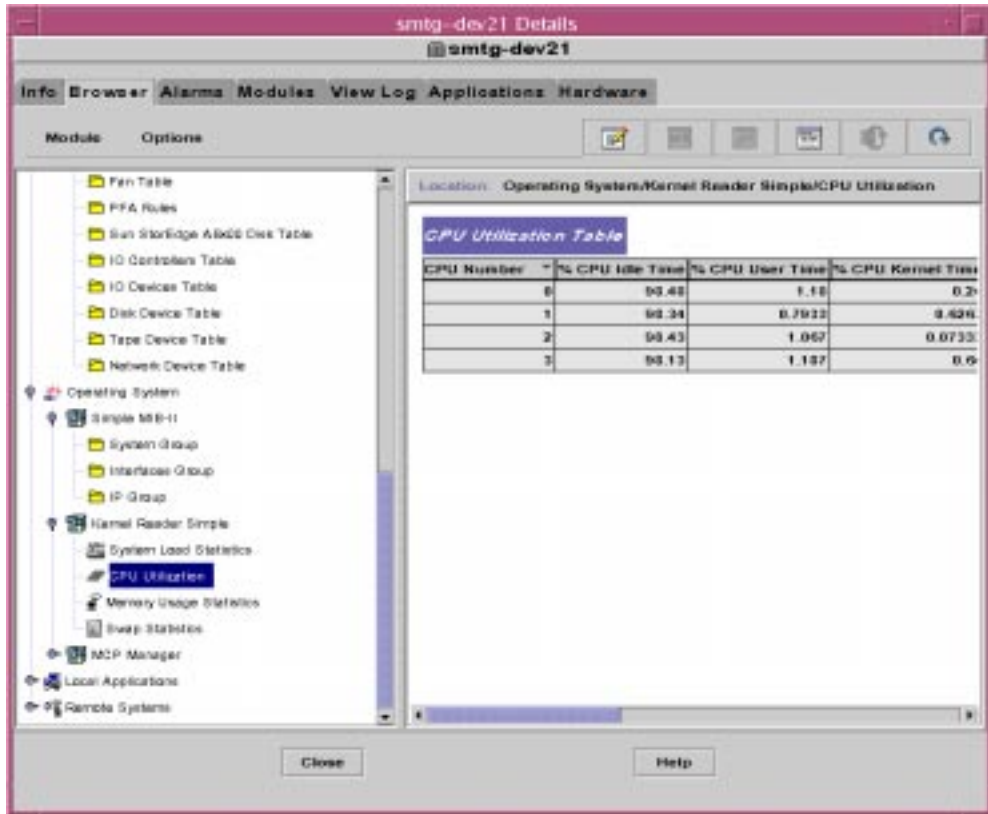


FIGURE 17-10 CPU Utilization Table

4. Select a row from this table.
5. To copy the cell to the dataview clipboard, proceed with one of the following:
 - From the Options menu, choose Copy to Dataview Clipboard ► Cell(s) or Create Dataview ► Cell(s).
 - In the Details window, click the right mouse on the table and select Copy to Dataview Clipboard ► Cell(s).

For additional information on the Copy to Dataview Clipboard option, see “Copy to Dataview Clipboard Option” on page 290, and for additional information on the Create Dataview option, see “Create a Dataview Option” on page 289.

Note – You can only paste compatible data types. If you try to paste an incompatible data type, an error dialog box (FIGURE 17-11) is displayed.



FIGURE 17-11 Mixing Data Warning Window

Sun Management Center Web Interface

Note – This feature may or may not be available on your system, depending on your licensing agreement.

This chapter covers the following topics:

- To Start the Sun Management Center Web Interface
- Main Console
- Host Details Browser Page
 - To Display the Host Details Browser Page
 - Info Tab
 - Browser Tab
 - Alarms Tab
 - To Filter the Alarms Table
 - Log Tab
- Attribute Editor

The Sun Management Center Web Interface is a web-based management interface for the Sun Management Center platform. It is a host management system that uses HTTP protocol to provide easy access to Sun Management Center management information. Sun Management Center users can access the Web Interface across the firewall to monitor and manage Sun Management Center information from any location using widely-available web browsers, such as Netscape Navigator and Internet Explorer.

The Sun Management Center Web Interface provides most of functions of the Sun Management Center Java Console for host management. It allows users to monitor and manage alarms and modules, and rapidly navigate the managed objects.

Web Interface

TABLE 18-1 lists the functions that are provided by the Web Interface and the chapters in which the corresponding Java-based functions are described. This chapter describes the Web-based functions and use.

TABLE 18-1 Web Interface Functions

Function	Location
Main Console	“Main Console Window” on page 67
Host Details Page	“Navigating the Details Window” on page 207
Info tab	“Info Tab” on page 307
Browser tab	“Browser Tab” on page 86
Alarms tab	“Alarms Tab” on page 309
Modules tab	“Modules Tab” on page 311
View Log tab	“Log Tab” on page 314
Attribute Editor	Chapter 9
Info tab	“Information Tab in the Attribute Editor” on page 133
Alarms tab	“Alarms Tab in the Attribute Editor” on page 134
Actions tab	“Actions Tab in the Attribute Editor” on page 137
Refresh tab	“Refresh Tab in the Attribute Editor” on page 144
History tab	“History Tab in the Attribute Editor” on page 146

The Sun Management Center Web Interface is an optional Sun Management Center component. It depends on the Sun Management Center Server for retrieving and manipulating managed objects.

▼ To Start the Sun Management Center Web Interface

1. Start your web browser.

Note – You do not have to be superuser to run the Sun Management Center from your web browser.

2. Enter the Sun Management Center web location URL:

`http://server_name`

3. The Sun Management Center Login page (FIGURE 18-1) is displayed.

This Login Page is for entering your user ID and password. The Sun Management Center server and web server are on the same host.



FIGURE 18-1 Sun Management Center Web Login Page

4. Log in using a valid UNIX account.

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 (FIGURE 18-2) is displayed.

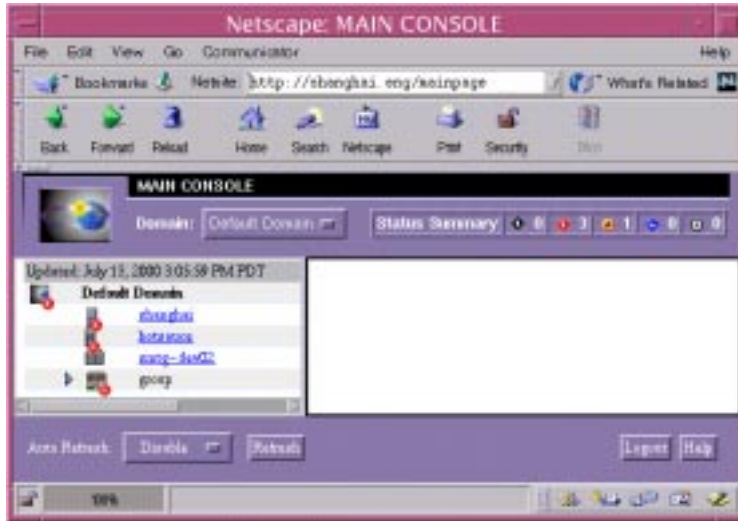


FIGURE 18-2 Main Console, Default Domain Selected

Main Console

All available domains are displayed in a drop-down Domain options menu. You can select one domain at a time to monitor or manage objects that are under the selected domain.

When you select a domain (FIGURE 18-2), the object hierarchy tree is displayed. Each tree node represents a topology object. If there are child objects under the node, the tree node can expand or collapse. All tree nodes are displayed along with their associated icons, such as topology type icon, alarm icon, and expandable (or collapsible) icons for group objects.

A domain alarm state status icon for the selected domain is displayed next to the domain icon. A time stamp display above the domain name shows when the current page was loaded from the server.

Selecting a domain splits the page in two. The contents view (right side) of the screen displays the details about the selected host, including the state of the machine and a time stamp. A hyper-link enables you to display the Host Details page, which provides additional object/module monitoring information and management capabilities. Only host objects can be selected.



FIGURE 18-3 Main Console, Example Host (Shanghai) in Default Domain Selected

TABLE 18-2 lists the Main Console and Host Details buttons and describes their functions.

Tip – Clicking the web browser Reload button reloads the entire page, including all frames.

TABLE 18-2 Main Console and Host Details Buttons

Button	Function
Auto Refresh	Disables and enables the auto refresh feature. The Auto Refresh enable menu contains: 1 Minute 2 Minutes 3 Minutes 5 Minutes 10 Minutes Automatically refreshes the display according to the item selected. These options can be configured on the server through a configuration file.
Refresh	Refreshes the screen display immediately.
Main Page	Redisplays the Main Page.
Logout	Enables users to close the Sun Management Center. After logging out, the Login page (FIGURE 18-1) is displayed.
Help	Displays the online help for this panel in another browser window.

Host Details Browser Page

▼ To Display the Host Details Browser Page

1. Select a domain from the Domain menu, for example Default Domain
2. Click on a leaf (host) tree node, for example, shanghai.
3. Click on “Go to host details.”

The Host Details Browser page (FIGURE 18-5) is displayed, replacing the Main Console page.

At the top of the Host Details page, some or all of the of the following tabs are displayed, depending on the type of host: Info, Browser, Alarms, Modules and View Log. These tabs have the same basic functions as the Details window described in Chapter 6.

Info Tab

The Info page displays the general information about the object. This window is the same as the Details Info tab window described in Chapter 6.

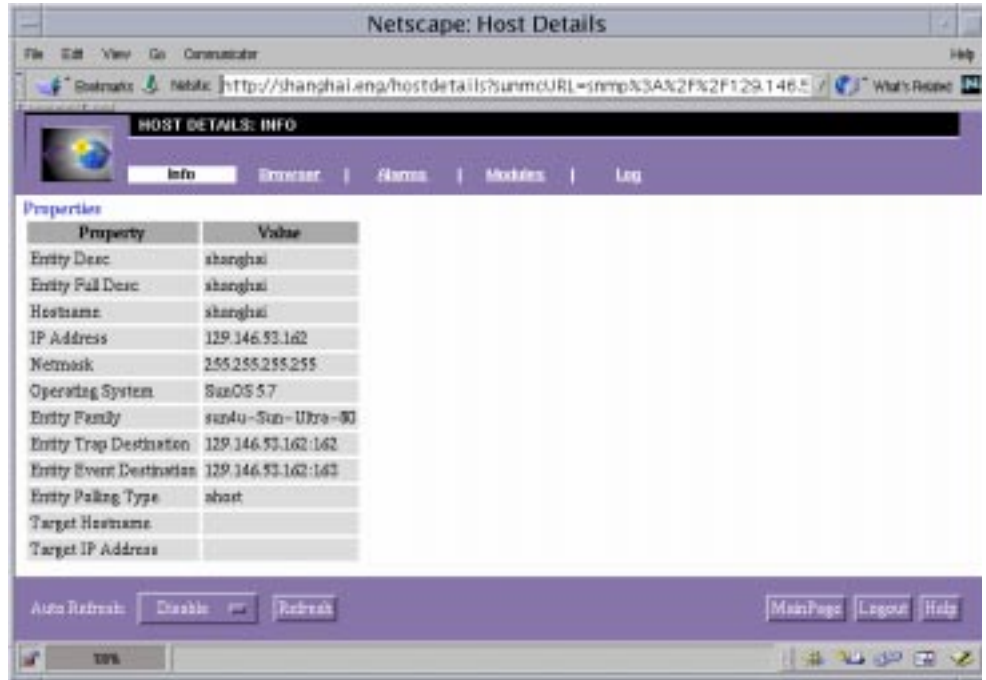


FIGURE 18-4 Host Details Info Page

Browser Tab

When the Browser tab is selected, the center of the page splits into two vertical frames (FIGURE 18-5) in the same manner as the Browser Window described in Chapter 6, and functions similarly.

This window has Auto Refresh, Refresh, Main Page, Logout and Help buttons, which are described in TABLE 18-2.

For additional details, see Chapter 6.

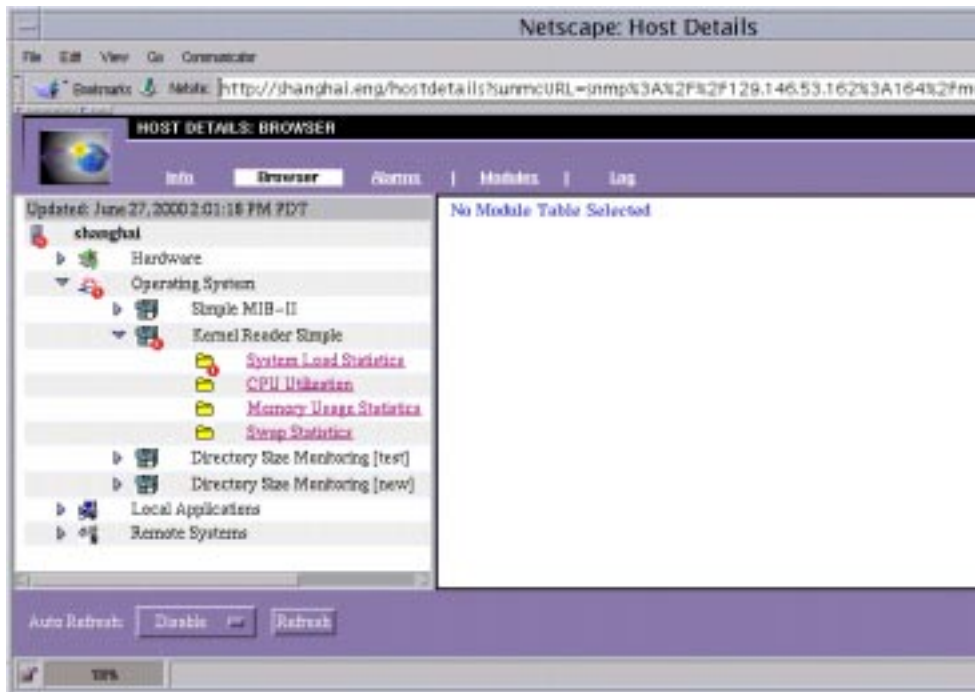


FIGURE 18-5 Host Details Browser Page with Expanded Tree

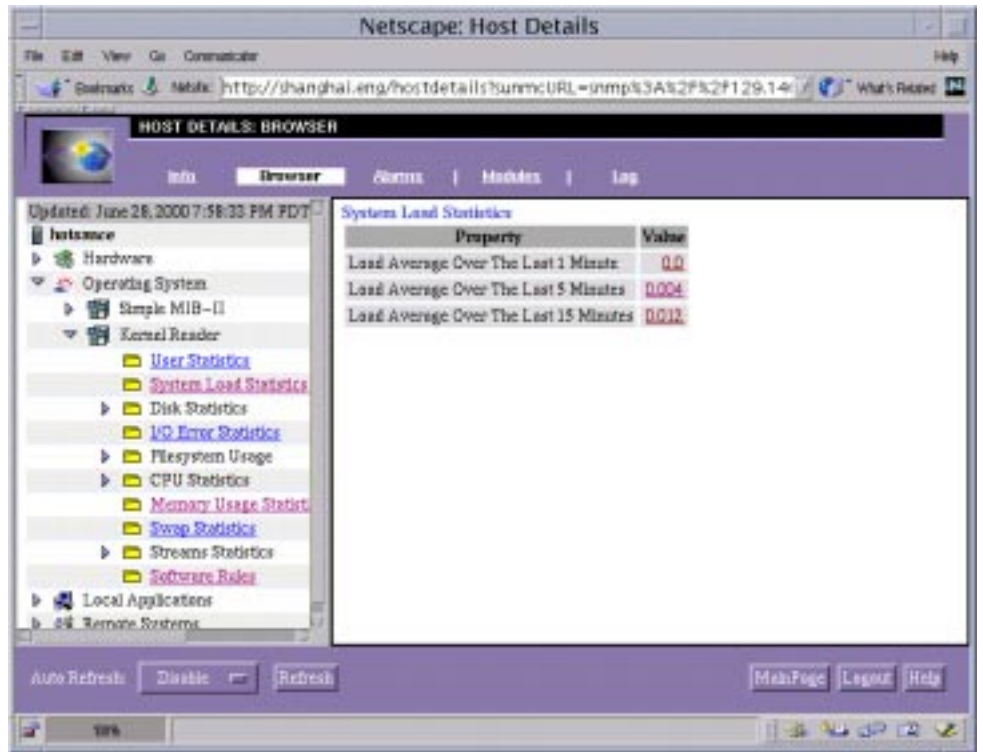


FIGURE 18-6 Host Details Browser Page with Module Properties Table

Alarms Tab

The Web Interface Alarms Manager is almost identical to the Sun Management Center 3.0 Alarms Manager described in Chapter 12. For Web Interface Alarm Manager details, see Chapter 19. When Auto refresh is enabled, all operation buttons and the selection column (column one) are disabled.

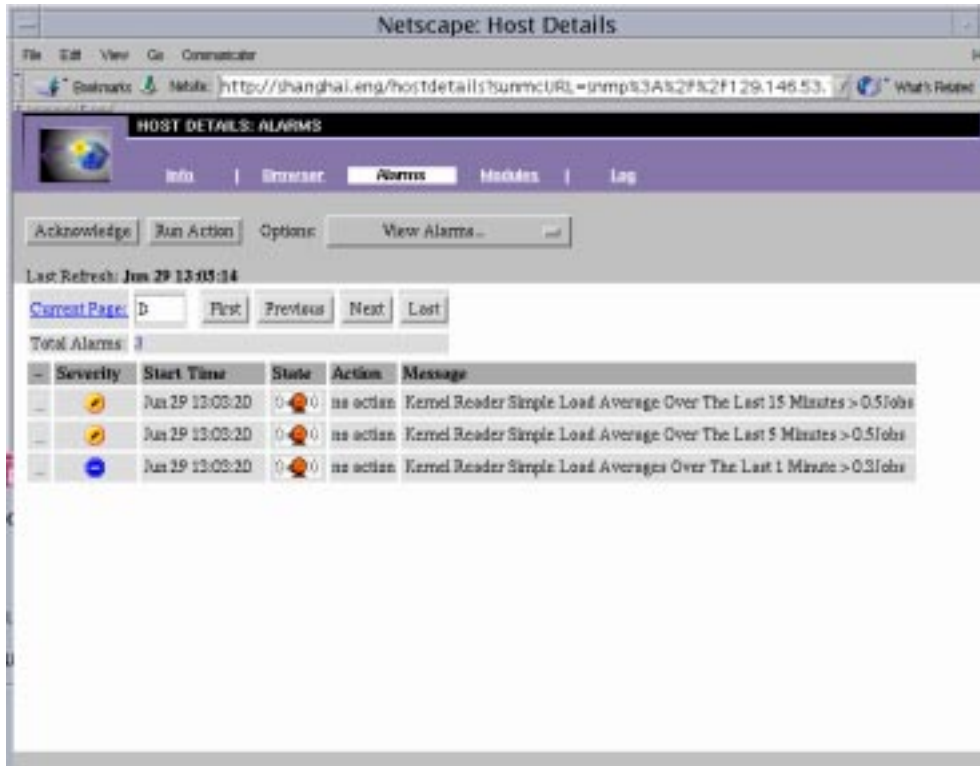


FIGURE 18-7 Hosts Details Alarms Page

The Alarms page is similar to the Sun Management Center 3.0 Alarms Details window. Auto Refresh Disable enables all of the operation buttons, except the Filter button, and disables the selection column (column one).

View Alarms in the Options menu enables you to filter the alarms table by severity, open or closed alarms, and/or acknowledged or unacknowledged alarms.

FIGURE 18-8 shows the View Specific Alarms dialog. For details, see Chapter 19.



FIGURE 18-8 View Specific Alarms Dialog

▼ To Filter the Alarms Table

1. Click the box(es) next to the item(s) to select (or deselect) the item.

A check mark is displayed in each box you select.

2. Click OK to accept the changes and close the dialog.

The alarms table is filtered and redisplayed to reflect your selections.

Modules Tab

The Modules page displays all available modules and their status (that is, whether they loaded or unloaded, and for the loaded modules, whether they are enabled or disabled). Modules can be loaded, unloaded, enabled, and disabled by an authorized user only.

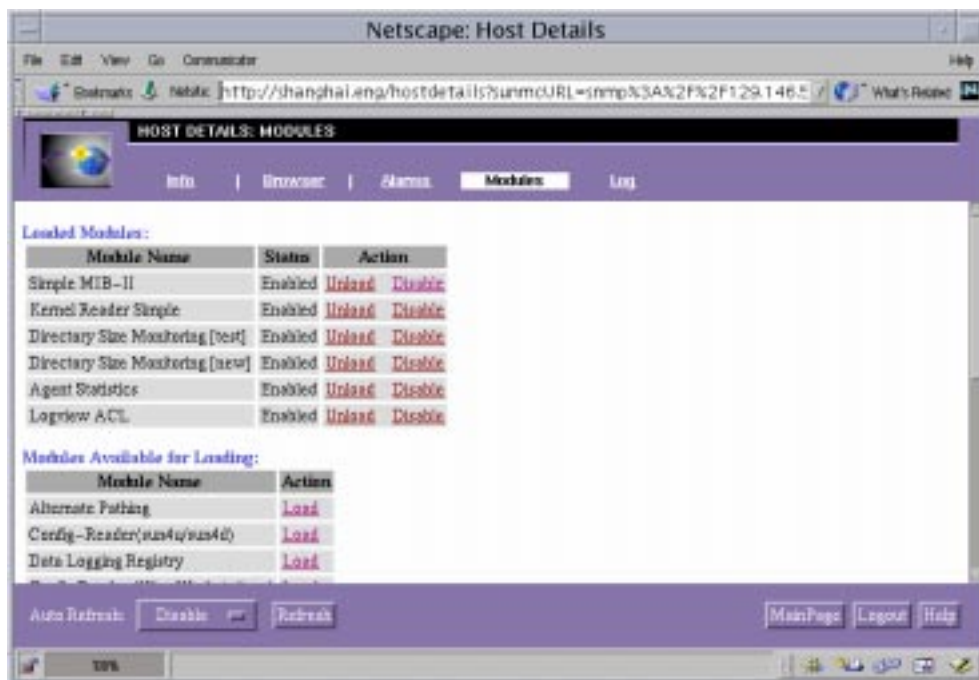


FIGURE 18-9 Host Details Modules Page

Note – To load or unload and enable or disable a module you must have the appropriate security permission. For more information, see Chapter 14.

The Host Details Modules page is similar to the Module Loader window described in Chapter 6. In some cases editing can be done on the Host Details Modules Page. TABLE 18-3 lists the Host Details Modules page hyperlinks.

TABLE 18-3 Host Details Modules Page Hyperlinks

Action	Function
Load	Loads the selected module. This action displays the Module Loader dialog (FIGURE 18-10).
Unload	Unloads the selected module.
Enabled	Enables module.
Disabled	Disables module.

This window also has Auto Refresh, Refresh, Main Page, Logout and Help buttons, which are described in TABLE 18-2.

Module Loader Dialog

The Module Loader dialog enables you to Load any of the modules listed in the Modules Available for Loading table on the Host Details Modules page.

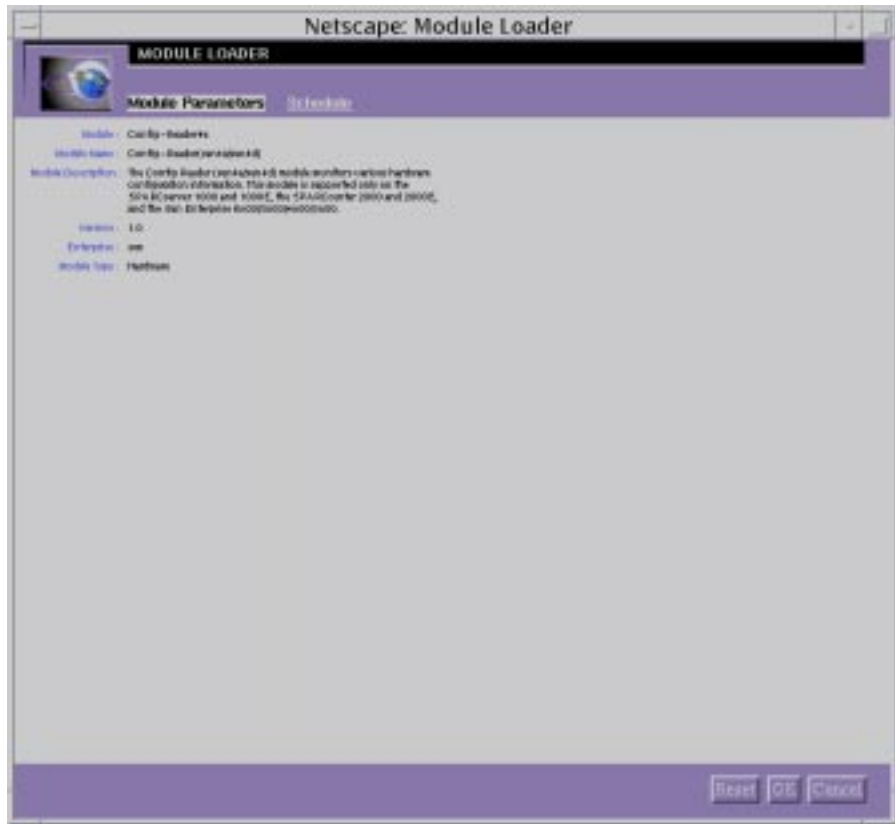


FIGURE 18-10 Module Loader Dialog

This page also enables you to schedule the modules.

▼ To Display the Module Loader Dialog

1. Click the **Load** link in the Action column of the Modules Available for Loading table for the module you want to load.

The Module Loader dialog is displayed.

2. Click **OK** to load the selected module.

Log Tab

The Log tab displays system log information. It has an option menu for log file types and a text area for log file content. The filtered messages are displayed. The Log tab page also has a Filtered Messages dialog that enables you to filter the messages displayed in the text area by Starting and Ending date and time, and so on.

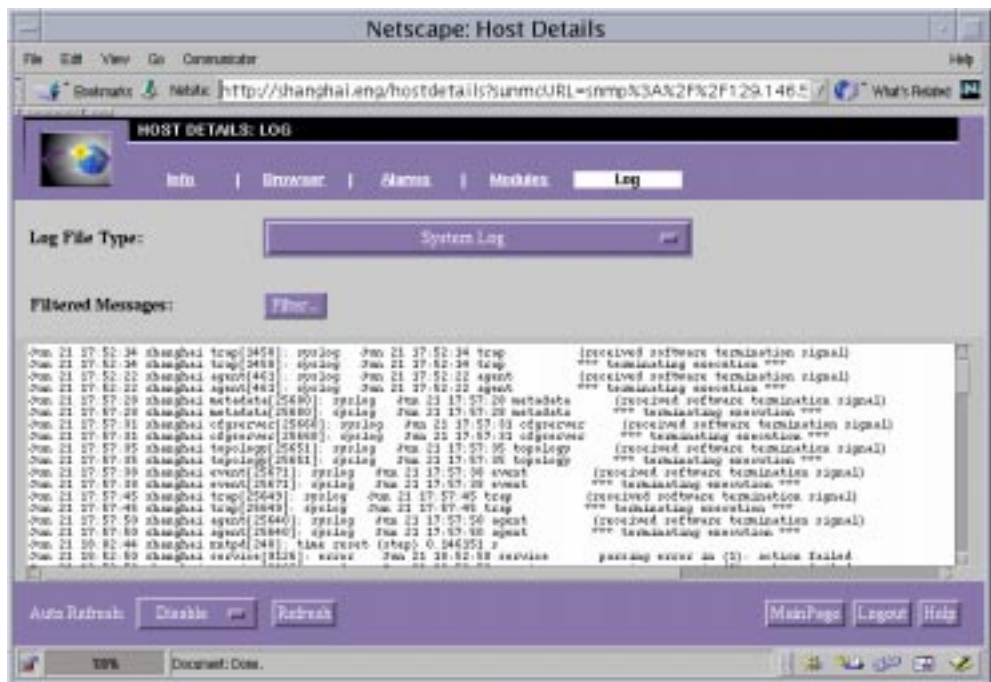


FIGURE 18-11 Log Page System Log

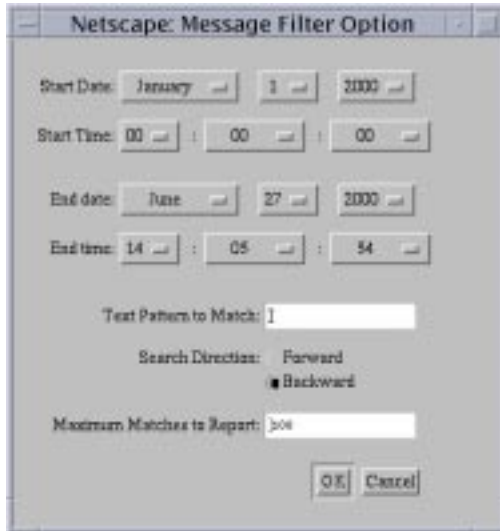


FIGURE 18-13 Message Filter Option Dialog

Attribute Editor

The Attribute Editor is displayed after a property value is selected in a properties table. Selecting one of the property values displays the Attribute Editor Info page in another browser window, which allows you to do limited editing for the property. If there is no value, a “__” is displayed for the hyperlink

The Attribute Editor has some or all of the following tabs: Info, Alarms, Actions, Refresh and History. This Attribute Editor, is similar to the Java-based Attribute Editor, which is described in Chapter 9.

Advanced editing, such as time editing, is not provided in this release. Otherwise, the Attribute Editor functions the same as described in Chapter 20.



FIGURE 18-14 Attribute Editor Info Page

Configuring the Sun Management Center Web Console to Use the Secure Socket Layer (SSL).

1. Log in as UNIX root account and stop the Web Console by using the `es-stop -w` command.

```
% /opt/SUNWsymon/sbin/es-stop -w
```

2. **Change current path to `/opt/SUNWsymon/netscape/https-admserv`, and start the Netscape fasttrack admin server.**

```
% cd /opt/SUNWsymon/netscape/https-admserv
% ./start
```

3. **Bring up the Web Browser and enter `http://[machine]:8888` in the URL text field.**
4. **Log in as admin (account name and password both are “admin”).**
5. **Select `localhost` from the Server Option menu and click the `manage` button to go to the `localhost` Server Manager page.**
6. **Click the `Security` tab, and select `Create Database`.**
7. **Enter the password in the Database Password field and click `OK` to create a Trust Database.**
8. **After you have successfully created a Trust Database, click the `Request a Certificate` tab and follow the instructions to request a certificate from the CA (Certification Authority).**
9. **Click on the `Install Certificate` tab to install the certificate from the CA.**
10. **Switch back to the `Preference` tab, click the `Encryption` tab, and turn on `Encryption`.**
11. **Click the `On/Off` tab to turn on your Web Server.**

You can now access the Sun Management Web Console through a secure `http` connection. The URL for the Sun Management Web Console starts with `https://`.

For more detailed information about web server administration, refer to the FastTrack Online Help.

Note – The Web Console runs under your Web Browser. Thus, you can change the font size. If you select a very large font, some pop-up windows may be too small to display all contents correctly. You can enlarge the windows to display them properly. All pop-up windows sizes are based on a 12-pixel font, so we suggest using this size font for the Web Console.

Web Interface Alarms Manager

Note – This feature may or may not be available on your system, depending on your licensing agreement.

The Web Interface Alarms Manager functions in the same manner as the Alarms Manager software, which is described in Chapter 12. However, some functions are different. This chapter describes these differences and provides additional instructions for using the Web Interface Alarms Manager. Some advanced functions, such as alarm table sorting, are not available. For additional details, see Chapter 12.

This chapter cover the following topics:

- Notifying Users That a Host or Agent is Down
 - To Set Up User Notification for Down Host or Agent
- Status Summary Panel
 - To View the Status Summary Panel
- Viewing Alarm Information
 - To View Alarm Information
 - Alarm Categories
 - To View Additional Alarm Information
 - Alarms Table Page Navigation
 - Alarm Actions

Notifying Users That 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. You can notify:

- Yourself only
- Several people
- All email recipients linked to the group to which the host or agent belongs

▼ To Set Up User Notification for Down Host or Agent

- 1. In the Main Console window, select the host or group of hosts about which you want to receive notification if the host or agent is down.**

The host information is displayed in the Contents View of the Main Console window.

- 2. Click Go to Host Details.**

The Host Details Browser page is displayed.

- 3. Click the Alarms tab.**

The Host Details Alarms page is displayed.

- 4. Select Options ► Modify Actions from the Options menu on the Host Details Alarms page.**

The Alarm Actions Attribute Editor dialog is displayed (FIGURE 19-1).



FIGURE 19-1 Attribute Editor Actions Dialog

5. Click the Action button next to the Critical Action field or enter the email address directly in the field.



FIGURE 19-2 Attribute Editor Alarm Actions

- 6. If the Alarm Actions dialog is displayed, click the email button.**
- 7. Enter the email address and username to be notified of the host down and agent down condition in the To: field.**

To notify more than one person, use the format `email username1, username2,` and so on.
- 8. Enter the appropriate text in the Subject and Message fields.**
- 9. Click OK to close the Attribute Editor Alarm Actions dialog.**

The email address(es) are displayed in the Critical Action field of the Attribute Editor Actions dialog.
- 10. Click OK to accept your changes.**

Status Summary Panel

The Status Summary panel on the Main Console page 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 described in Chapter 12, except that the icons are not buttons so they do not display the Domain Status window.

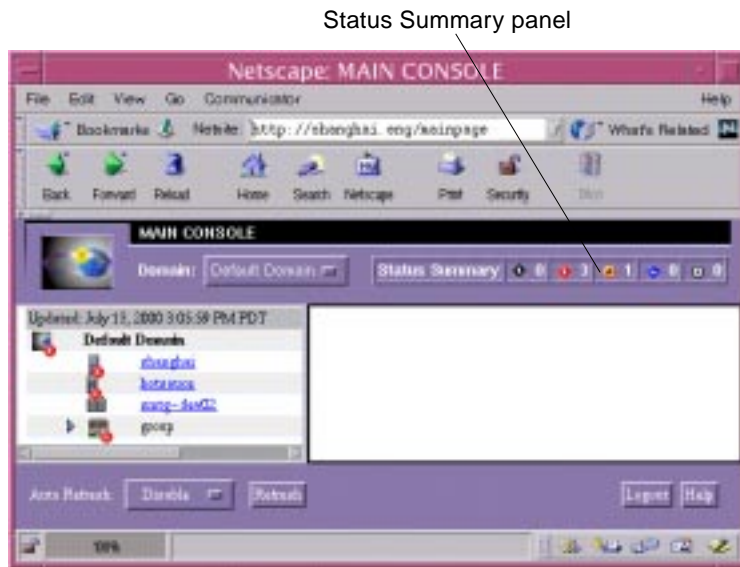


FIGURE 19-3 Main Console Default Domain with Status Summary Panel

▼ To View the Status Summary Panel

1. Go to the Sun Management Center Login Page from your Web Browser.
2. Log into the Sun Management Center 3.0.

The Sun Management Center 3.0 Main Console Default Domain is displayed.

Note – Select Domain *domainname* if you want to see a Status Summary for another domain.

Viewing Alarm Information

Alarms information is displayed in the alarms table (FIGURE 19-6) on the Host Details Alarms page. For additional details, see Chapter 12.

▼ To View Alarm Information

1. With the left mouse button, click on a host icon in the Main Console window.

The Host Description and Status are displayed in the Contents View of the Main Console page.

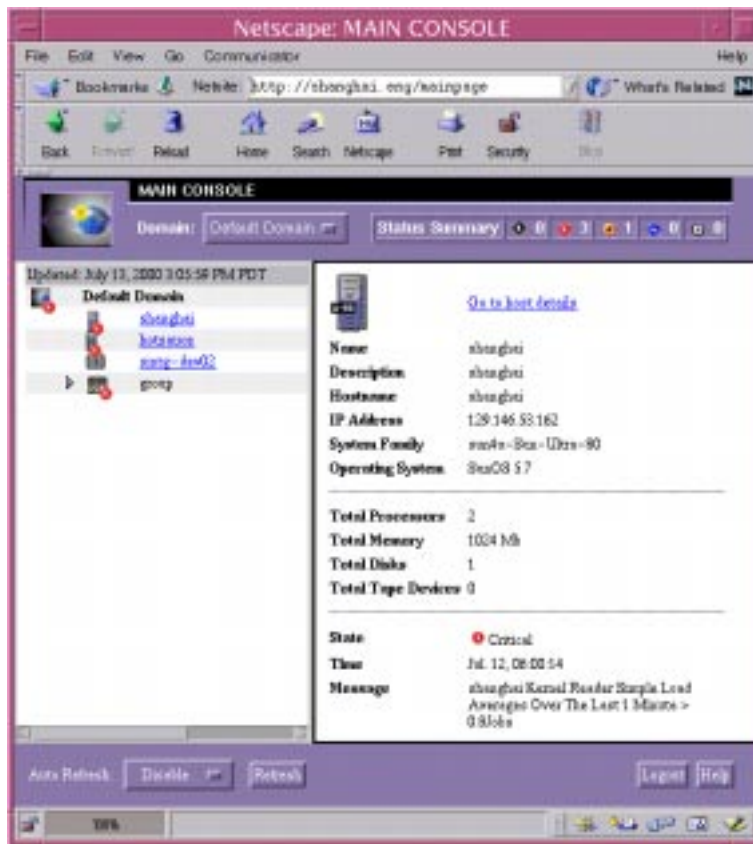


FIGURE 19-4 Main Console Contents View With “Go to Host Details” Hyperlink

2. Click on “Go to Host Details.”

The Host Details Browser page is displayed.



FIGURE 19-5 Host Details Browser Page

3. Click on the Host Details Alarms tab.

The Host Details Alarms page (FIGURE 19-6) is displayed.

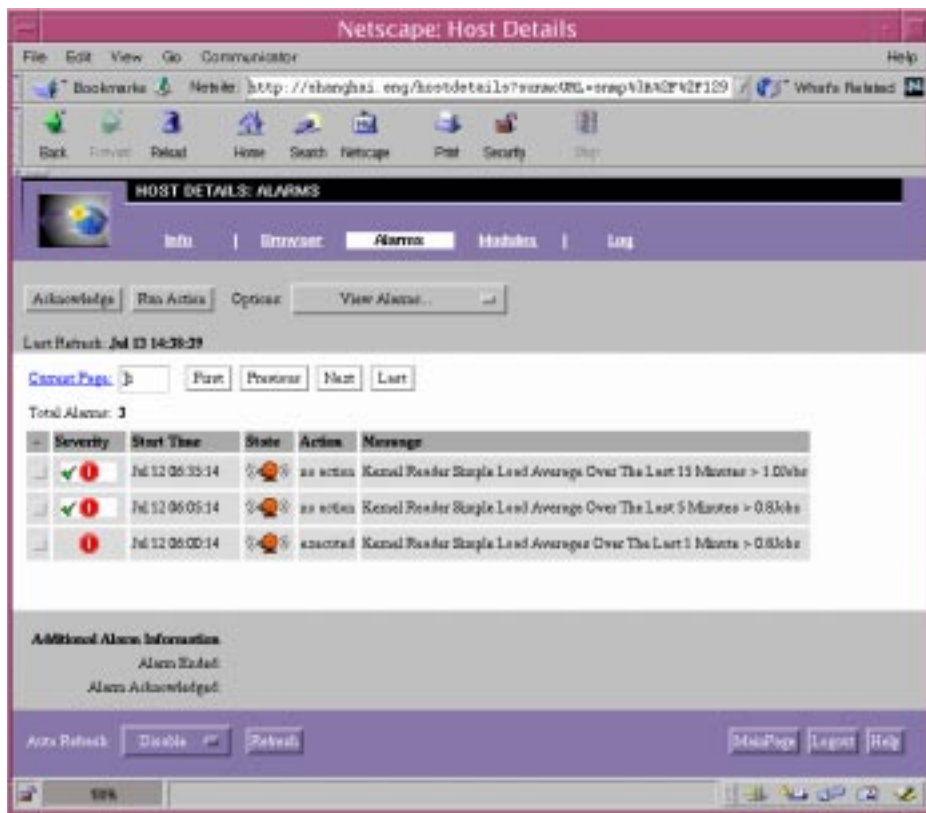


FIGURE 19-6 Host Details Alarms Page

Alarm Categories

The Host Detail Alarms page presents a table of different categories of detailed alarm information. Except for the first column (TABLE 19-1), the categories and information are the same as those described in TABLE 12-2 and TABLE 12-3.

TABLE 19-1 Alarm Selection Column

Category	Description
-	Selects 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.

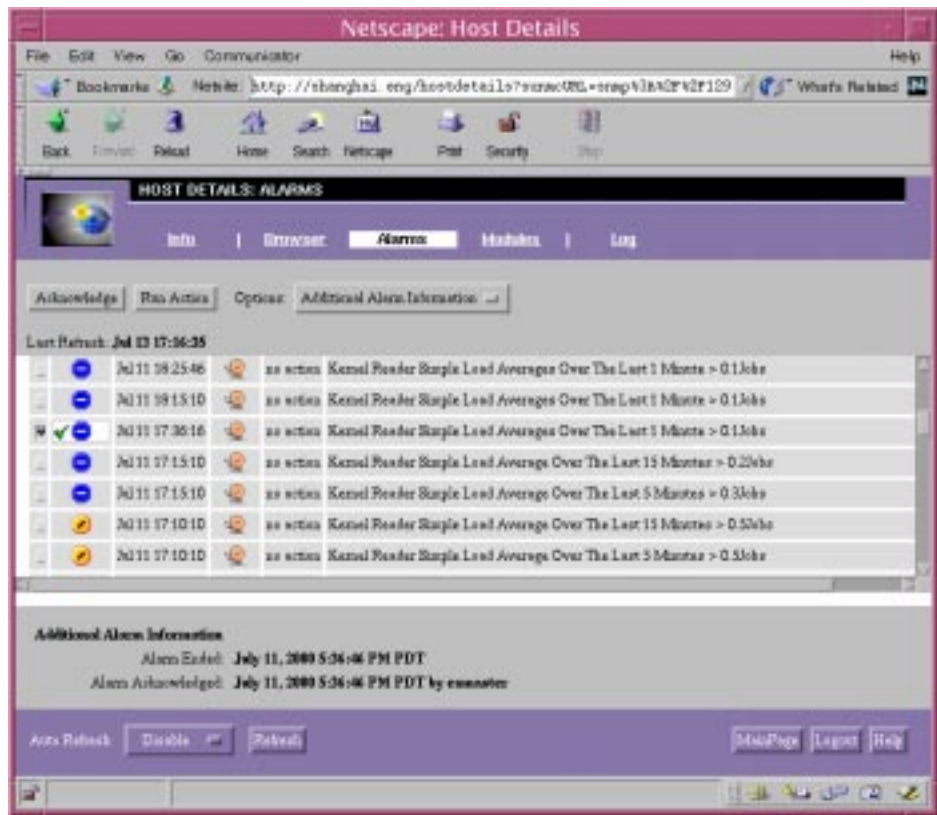


FIGURE 19-7 Host Details Alarms Page Additional Alarm Information

Some of this information is always displayed in the alarms table (FIGURE 19-6). Additional information (FIGURE 19-7) is displayed on the bottom of the page when an alarm row is selected. This information is only displayed for closed and/or acknowledged alarms.

▼ To View Additional Alarm Information

Note – Only one alarm can be viewed at a time.

- 1. Click the first column of the alarm you want to view.**

A check mark is displayed in the first column,

- 2. Select Options ► View Additional Information on the Host Details Alarms page.**

The information about the acknowledged and closed alarm is displayed at the bottom of the page.

Alarms Table Page Navigation

The alarms table navigation information and buttons are the same as those described in TABLE 12-1.

Alarm Actions

An additional button on the Host Details Alarms page, Auto Refresh, allows you to refresh the alarms table automatically, or turn off (disable) the automatic refresh capability to allow you to edit the alarms. When Auto Refresh is enabled, all operation buttons and the selection column are disabled.

The alarms table cannot be sorted by double-clicking on the headers. Otherwise, all Alarm actions on the Host Details Alarms page function the same as those on the Alarms Details page described in Chapter 12. A confirmation request is displayed when you delete an alarm or alarms.

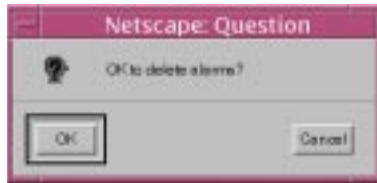


FIGURE 19-8 Alarm Deletion Confirmation Request

Web Interface Attribute Editor

Note – This feature may or may not be available on your system, depending on your licensing agreement.

This chapter explains the following topics:

- To Display the Attribute Editor
- To Modify Alarm Actions
- To Send an Email for a Critical Alarm
- To Define an Alarm Action Script
- To Set a Refresh Interval
- To Set a History Interval

Module Data Properties

The module data properties provide additional information about the modules. The Attribute Editor enables you to customize the monitoring criteria for these properties. You can use the Web Interface Attribute Editor to set:

- Alarm thresholds
- Actions when alarm conditions occur
- Refresh intervals
- Logging schedule for historical data points

The Web Interface Attribute Editor has a series of tabs that enable you to switch between different pages. Each Attribute Editor displays one or more of these tabs, depending on the type of object selected. For example, the tabs for the data properties Attribute Editor for the System Load Statistics module are:

- Info
- Alarms

- Actions
- Refresh
- History

▼ To Display the Attribute Editor

1. Click the Host Details Browser tab.

The Host Details Browser page is displayed.

2. Click the expansion/compression icon next to the Operating System icon in the hierarchy tree view.

The Operating System modules are displayed.

3. Click the expansion/compression icon next to the Kernel Reader icon.

The Kernel Reader modules are displayed.

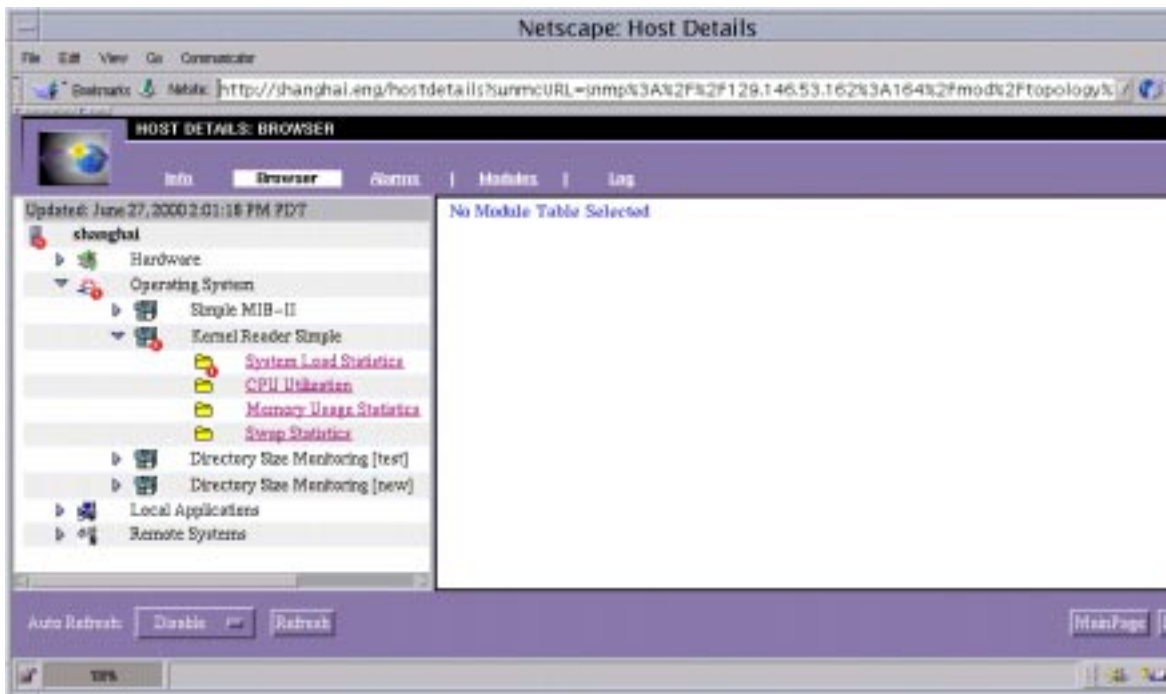


FIGURE 20-1 Host Details Browser Kernel Modules

4. Double-click on the System Load Statistics icon.

The System Load Statistics module properties table is displayed in the contents view.

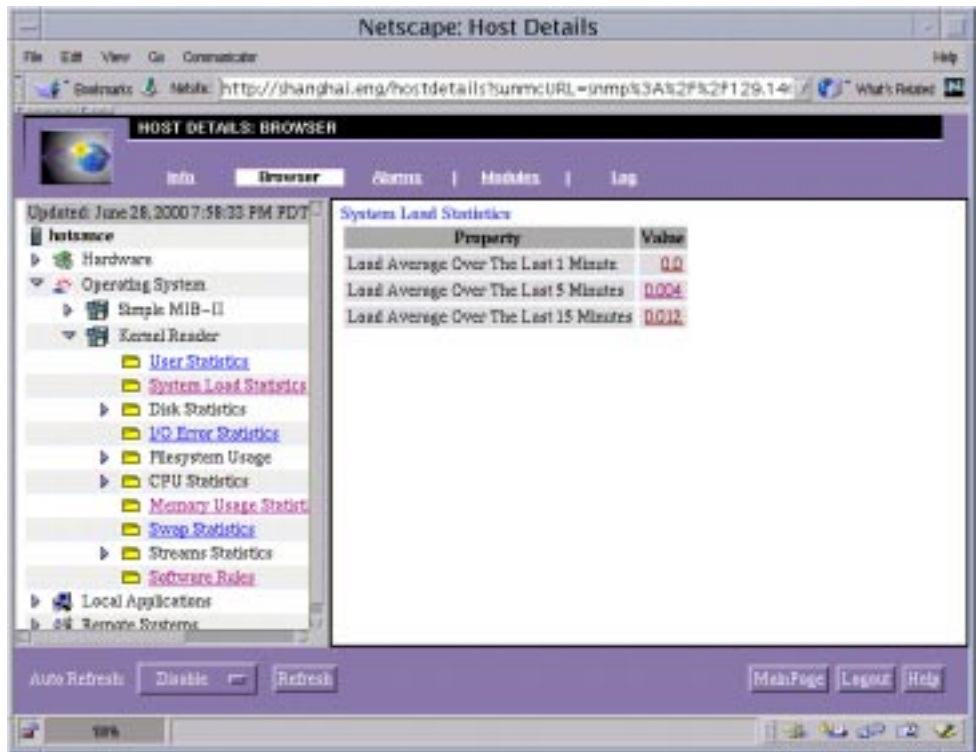


FIGURE 20-2 Kernel Reader System Load Statistics Module Properties Table

5. Select one of the Load Averages in the Value column and click with your left mouse button.

The Attribute Editor Info page is displayed.

Info Tab

The Attribute Editor Info page (FIGURE 20-3) provides additional information about the selected object.



FIGURE 20-3 Attribute Editor Info page for a Monitored Data Property (System Load Statistics)

Alarms Tab

The Attribute Editor Alarms page (FIGURE 20-4) enables you to set alarm thresholds (TABLE 20-1) for simple alarms only.

The alarms 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)

Note – To set an alarm threshold you must have the appropriate security permission. For more information, see Chapter 14.

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 being true. For more information on alarm rules, see Appendix E.

The screenshot shows the 'Netscape: Attribute Editor' window with the 'ALARMS' tab selected. The page displays configuration options for an alarm rule. The 'Name' is 'When Load Statistics', the 'Variable' is 'Load Average Over the Last 1 minute', the 'Current Value' is '8.137', and the 'Unit' is 'jobs'. The 'Rule' is 'Compare', and its description is 'The Compare rule compares the current value of an object to threshold tests.' Below this are three threshold input fields: 'Critical Threshold' with a value of 2, 'Alert Threshold' with a value of 6, and 'Action Threshold' with a value of 3. There is also an empty 'Alarm Message' field. A 'Parameter Description' section explains the threshold types: 'Greater than' (alerts when value is greater), 'Less than' (alerts when value is less), 'Not equal to' (alerts when value is not equal), and 'Equal to' (alerts when value is equal). A 'Parameter Details' section notes that a parameter is blank unless it is for a thresholded value. At the bottom are 'Reset', 'OK', and 'Cancel' buttons.

Field	Value
Name	When Load Statistics
Variable	Load Average Over the Last 1 minute
Current Value	8.137
Unit	jobs
Rule	Compare
Rule Description	The Compare rule compares the current value of an object to threshold tests.
Critical Threshold	2
Alert Threshold	6
Action Threshold	3
Alarm Message	

Parameter Description
Set the threshold to the value you want to alert on.
• Check alerts when the value exceeds the entered limit
• Check alerts when the value is less than the entered limit
• Check alerts when the value equals the entered limit
• Check alerts when the value does not equal the entered limit
• Check alerts when the value is greater than the entered limit

Parameter Details
Setting a parameter to blank returns it to the default value.

Reset OK Cancel

FIGURE 20-4 Attribute Editor Alarms Page for a Monitored Property

TABLE 20-1 lists common simple alarm limits for monitored properties. The alarm limits are also displayed in the Parameter Description field (FIGURE 20-4). You can set thresholds for one or more of these alarm limits for selected data properties.

TABLE 20-1 Common Simple Alarm Limits in Sun Management Center Software

Alarm Limit	Description
Critical Threshold (>)	Critical (red) alarm occurs if value exceeds limit entered in this field.
Alert Threshold (>)	Alert (yellow) alarm occurs if value exceeds limit entered in this field.
Caution Threshold (>)	Caution (blue) alarm occurs if value exceeds limit 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 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.

▼ To Create an Alarm

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 (System Load Statistics) (FIGURE 20-3) from the Host Details Browser page.**
- 2. Click on the Alarms tab.**
The Alarms page (FIGURE 20-4) is displayed.
- 3. In the Critical Threshold (>) field, type a value that is less than the current value.**
Entering this value creates a critical alarm.
- 4. Complete one of the following actions on the Alarms tab page:**
 - Click OK to apply your changes and close this page.
 - Click Reset to reset the Attribute Editor to the default parameters.

In a few moments, the Load Average Over the Last One Minute data field in the System Load Statistics data properties table turns red. In addition, red alarm icons are displayed on the following folders and icons: Operating System, Kernel Reader, and System Load Statistics (unless your system has an open, unacknowledged severity one (1) black alarm).

5. Click the Host Details Alarms tab.

The alarm you created is reflected in the alarms table when it is refreshed. For more information on this subject, see Chapter 19.

6. Acknowledge this alarm.

7. 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 14.

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.

The preceding example procedure creates an alarm that is registered if a value exceeds the specified alarm limit. TABLE 20-1 lists other common alarm limits.

Actions Tab

The Attribute Editor Actions page (FIGURE 20-5) 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 enter the name of a script in the critical action field 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.

Separate actions can be set for different alarm conditions or one action can be set for any alarm condition (action occurs on any change) using the Action button next to each Action field on the Actions page. These buttons enable you to display the Alarm Action Modification dialog (FIGURE 20-6).



FIGURE 20-5 Attribute Editor Actions Page for a Monitored Property (System Load Statistics)

Note – The check boxes shown 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.



FIGURE 20-6 Alarm Action Modification Dialog

The Alarm Action Modification dialog enables you to modify the registered alarm actions. Two buttons in the dialog (Email and Generic) allow you to choose one of two options for an alarm action.

TABLE 20-2 lists these buttons and their functions.

TABLE 20-2 Alarm Actions Modification Dialog Buttons

Tab	Function
Email	Allows you to specify an address, subject, and message to be sent as email.
Generic	Allows you to select generic shell scripts installed on the managed node.

▼ To Modify Alarm Actions

1. **Click the Action button for the alarm action you want to modify.**
The Alarm Actions modification dialog is displayed.
2. **Select the type of alarm action you want to modify (Email or Generic).**
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.

▼ To Send an Email for a Critical Alarm

The following example procedure describes how to send an email to a user when a critical alarm occurs.

1. Select a data property (System Load Statistics) (FIGURE 20-3) from the Host Details Browser page.

2. Select Load Averages Over the Last Five Minutes in the Value column and click with the left mouse button.

The Attribute Editor Info page is displayed.

3. Click the Actions tab.

The Actions page is displayed (FIGURE 20-5).

4. Type `email username` in the Critical Action field.

Note – You can also use the Alarm Actions Modification dialog (FIGURE 20-6) to enter the *username*.

5. Complete this procedure with one of the following actions:

- Click OK to apply your changes and close this page.
- Click Reset to reset the Attribute Editor to the default parameters.

The following email is sent to the user whenever an alert alarm occurs.

```
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 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:

TABLE 20-3 Arguments for Custom Alarm Action Script

Argument	Definition
%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/
```

Note – The script filename should *not* have a .sh extension.

4. Click the Host Details Browser tab.

5. Set the alarm threshold.

For more information, see “To Create an Alarm” on page 420.

6. Click on the System Load Statistics icon.

The System Load Statistics properties table is displayed in the contents view of the Host Details Browser page (FIGURE 20-2).

7. Select Load Averages Over the Last Five Minutes in the Value column and click with the left mouse button.

The Attribute Editor Info page is displayed.

8. Click the Attribute Editor Actions tab.

The Actions page is displayed (FIGURE 20-5).

9. Click on Action button for the Critical Actions field to display the Alarm Action Modification dialog (FIGURE 20-6).

10. Click the Generic Actions button.

11. Type custom_alarm_script %statusstringfmt in the Available Scripts field.

12. Complete this procedure with one of the following actions:

- Click OK to apply your changes and close this page.
- Click Reset to reset the Attribute Editor to the default parameters.

The script file name is displayed in the Critical Action field on the Actions page.

Refresh Tab

The Attribute Editor Refresh page (FIGURE 20-7) enables you 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.



FIGURE 20-7 Attribute Editor Refresh Tab for a Monitored Property

▼ To Set a Refresh Interval

The following example shows how to set a refresh interval in the System Load Statistics module.

1. **Select a data property (System Load Statistics) (FIGURE 20-1) on the Host Details Browser page.**
2. **Select Load Averages Over the Last Five Minutes in the Value column and click with the left mouse button.**

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.**

In this example, 300 was typed in the entry field. The refresh interval is five minutes.

5. **Complete this procedure with one of the following actions:**

- Click OK to apply your changes and close this page
- Click Reset to reset the Attribute Editor to the default parameters.

When the System Load Statistics properties table is displayed, the values in the table are refreshed every five minutes.

Note – By increasing the refresh interval to a larger interval, the agent uses less CPU cycles.

History Tab

The Attribute Editor History page enables you to save older data for a monitored property. In FIGURE 20-8, a history of data points is recorded every 120 seconds (sample interval). This information can be stored in a disk file or the memory cache.



FIGURE 20-8 Attribute Editor History Tab for a Monitored Property

The two types of disk files are: circular (maximum of 1000 lines) and text. These files are located in the `/var/opt/SUNWsymon/log` directory in the file specified in the Text File Name field.

If you select memory cache, you must indicate in the Max Size (sample) field the number of data points to save.

A circular disk file is automatically saved under the name `history.log`. If you do not choose a file name for your text file, it is automatically saved under the name `agent_default.history`.

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 “To Graph A Monitored Data Property” on page 119 for more information.

Note – You can view this data in a graph by opening the graph for this monitored property. If you have selected memory cache, the graph is displayed with historical data.

▼ To Set a History Interval

1. **Select a data property (System Load Statistics) (FIGURE 20-3) from the Host Details Browser page.**

The Attribute Editor Info page is displayed.

2. **Click the History tab.**

The History page is displayed.

3. **Type a value (in seconds) in the Sample Interval field.**

In this example, 120 was typed in the entry field. A history data point is collected every two minutes. For more information on the Advanced button, see “Using the Time Editor” on page 149.

4. **Complete this procedure with one of the following actions:**

- Click OK to apply your changes and close this page.
- Click Reset to reset the Attribute Editor to the default parameters.

Topology Import/Export Utility

Note – This feature may or may not be available on your system, depending on your licensing agreement.

This chapter explains the following topics:

- Database Requirements
- Main Console GUI
- Topology Export Utility
- Topology Import Utility
- Import/Export CLI Interface
- Import/Export File Contents

The Topology Import/Export Utilities enable Sun Management Center users to import or export the topology database from or to an ASCII file. The import utility is used 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.

The Topology Import/Export Utility is used to:

- 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 the another file format and load it into another management system in a third party management platform.

This utility can be invoked from the Sun Management Center console main window and the CLI. Users must specify the objects (the complete topology data and specified domains) to be imported or exported. The tool supports several methods of data handling, including overwrite and append.

- The import/export utility supports domain level operation. You can specify one domain to export or the whole topology hierarchy.
- The import utility allows you to retain backup data.
- You can import objects of any domain to one domain.
- The export utility allows you to back up the existing data.

- You can export data in incremental mode.

Database Requirements

The Topology Import/Export Utility communicates with the Sun Management Center server via client APIs. The operation on XML format file is based on `xml.jar` (Java X project). FIGURE 21-1 shows the import/export software structure.

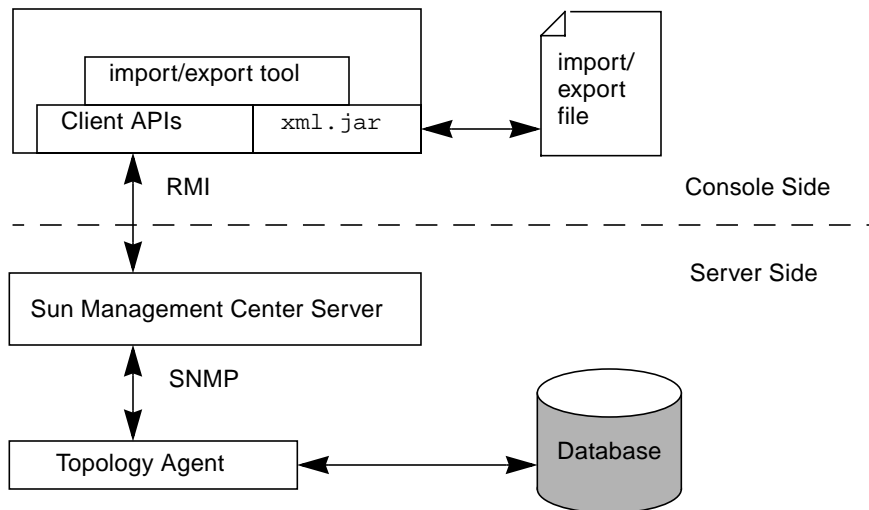


FIGURE 21-1 Software Structure

For export, two modes are provided: Append and Overwrite. In Overwrite mode, the dumped data will overwrite the file whether or not the file already exists. 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 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 and all nondomain objects are created in the corresponding domain.

Main Console GUI

The Main Console GUI has an individual menu item in the Tools menu for each operation: Topology Import and Topology Export. The export operation is only available when the current topology hierarchy contains data. Thus, the Topology Export item is gray (inactive) when the topology hierarchy is empty.

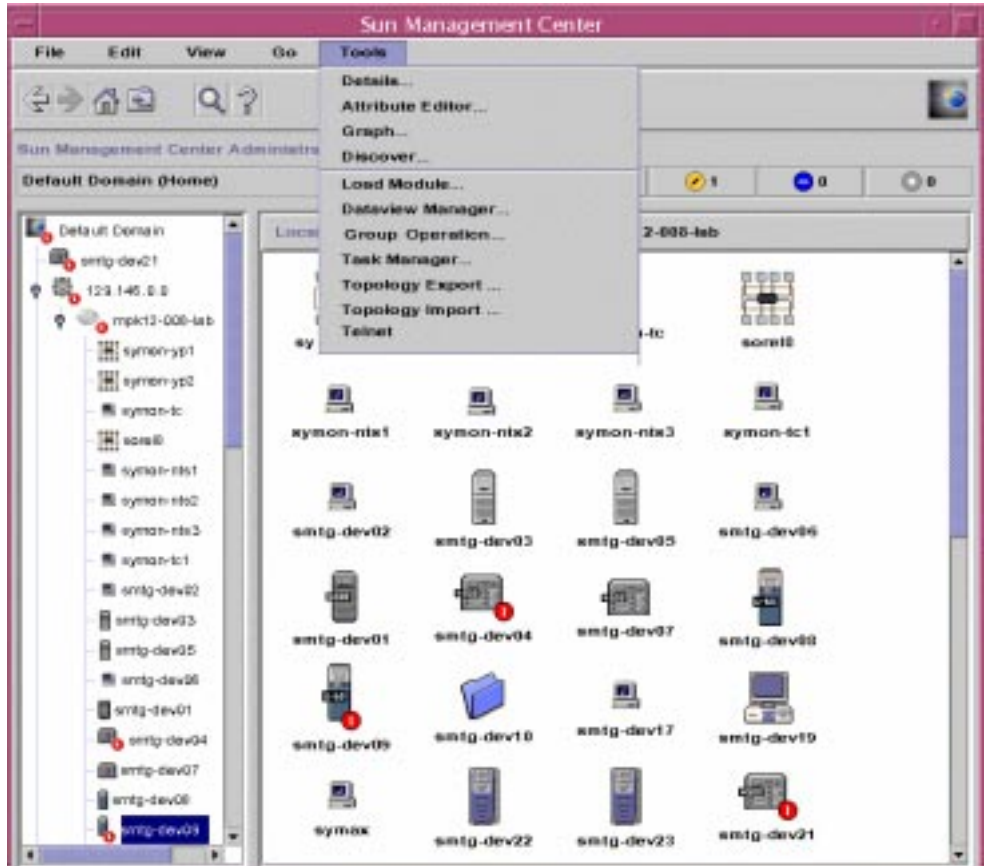


FIGURE 21-2 Tools Menu on the Sun Management Center Main Console

Topology Export Utility

You can start the Topology Export Utility from the main console window or the CLI, which is described in the “Import/Export CLI Interface” on page 438.

▼ To Start the Export Utility

- **Select Tools ► Topology Export from the Main Console GUI.**

After you select Topology Export menu from the Tools menu, a dialog is displayed to ask you to input a file as the target file. A list shows all domains managed by the topology agent. Users can select one domain to export. To export multiple domains, you can repeat the preceding operation to export another domain in the append mode.

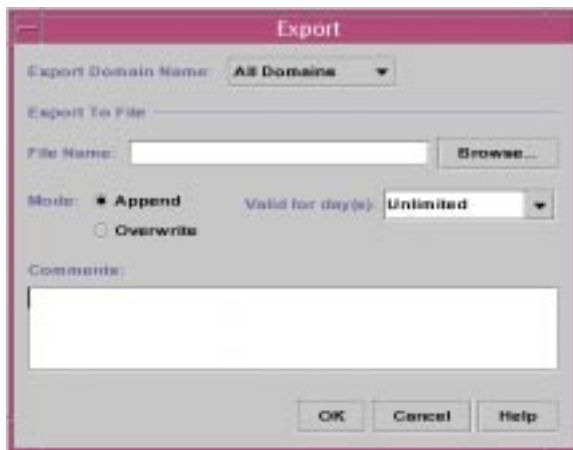


FIGURE 21-3 Export Domain Selection Dialog

TABLE 21-1 Export Domain Selection Dialog

Item	Description
Export Domain Name	Allows you to specify the name of the domain to export.
Export to File	Allows you to specify the name of the file to export to.
File Name	Allows you to specify the name of the file you want to export.
Browse	Allows you to select a file from a file selection dialog.
Mode	Append - appends the data at the end of the file. Overwrite - overwrites the file.
Valid for day(s)	Permits you to specify the amount of time the dumped data is valid, The default valid time is “unlimited.”
Comments	Allows users to input comments in the text area.

Users can select one of the following export policies: Append (incremental) and Overwrite (Overwrite is the default). Append mode is to append the data at the end of the file and Overwrite mode overwrites the file. When Append mode is used in the export, a more restrictive check is performed on the file; the file must be a valid import/export data file. A valid import/export data file is a well-formed XML file with correct import/export file document type declaration (DTD).

Valid Time in the preceding figure is an editable combo box. You can input the number of days of validity time or select a predefined value. The predefined values can be 7 days (1week), 30 days (1 month), 90 days (1 quarter).

To export a file you must have permission to write to the file (if the file exists) or to create the file (if the file does not exist). Otherwise, an error dialog is displayed and the operation exits.



FIGURE 21-4 Warning Message for Nonexistent File

Topology Import Utility

▼ To Start the Import Utility

- **Select Tools ► Topology Import from the Main Console GUI.**

After you select Topology Import menu from Tools menu, a dialog is displayed for you to input a file name as the data source. A list shows all domains managed by the topology agent.

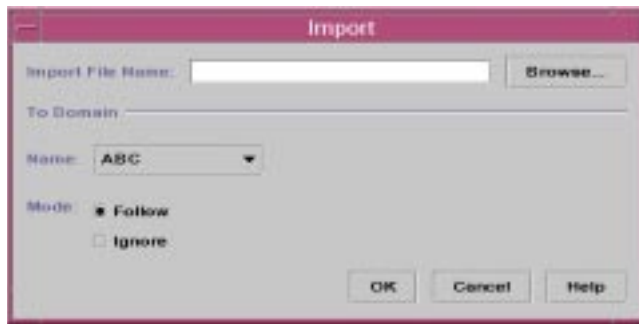


FIGURE 21-5 Domain Selection Dialog (Import)

TABLE 21-2 Export Domain Selection Dialog

Item	Description
Import to File	Allows you to specify the name of the file to import.
Browse	Allows you to select a file from a file selection dialog.
Import Domain Name	Allows you to specify the name of the domain to import.
Mode	Follow - imports groups and domain information (new domains can be created). Ignore - ignores the domain information and only imports groups and entities to the target domain that you specify.

Users are provided two policies to deal with the domain information: Follow and Ignore. Follow mode imports not only the groups, but also domain information (new domains can be created). Ignore mode ignores the domain information and only imports groups and entities to the target domain that the user specified. All data is

imported into the home domain by default. Users can specify the location in the topology hierarchy to which the data will be imported by selecting from the domain name selection box. The location selection is only available in the Ignore mode. In the Follow mode, the groups and entities are created in the domain contained in the file.

Because the import utility updates the topology database, a warning dialog lets you confirm the operation before the operation is executed.



FIGURE 21-6 Warning Dialog

The warning dialog also tells you when and by whom the input file was generated, helping you to ensure that the correct data file is being used.

Exported data files have an item about the validity time of the file. If you are trying to import an out-of-date file, importation stops and you are notified.

The import utility checks the accessibility of the file. If the file does not exist or is unreadable, you receive an error message, and the operation exits.

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, the user gets a warning dialog asking whether or not the entity should be replaced. Five options are provided: Replace, Replace All, Ignore, Ignore All and Cancel Import.

TABLE 21-3 Warning Dialog Buttons

Button	Description
Replace	Replaces the conflicting data with new values.
Replace All	Replaces all conflicting data. The dialog is not displayed when the data conflict occurs again, and the old value is replaced.
Ignore	Do not update the conflicting data.
Ignore All	The dialog is not displayed when a data conflict occurs; all conflicts are ignored and left unchanged.
Cancel Import	Stops the operation.

Import/Export CLI Interface

The import/export utilities are invoked from CLI with the following commands:

```
# SunMC -s <server> -p <port> -u <user> CLI_operation
password: *****
SunMC CLI> export [parameter]
SunMC CLI> import [parameter]
```

The import/export utilities follow the unified command format:

```
SunMC > operation [<options>] [-f <input file>] [-o <outputfile>]\
[-pf <parameter file>] [-p <parameter specifications>]
```

Topology Import Utility

Command Parameters

TABLE 21-4 lists the import utility command parameters. The parameter format follows the CLI general parameter template.

TABLE 21-4 Import Utility Command Parameters

Parameter	Description
file = <xml file name>	Specifies the import data source.
list = on off	Lists all entities (domains, groups and hosts) contained in the file. Users must know what objects will be imported before the operation is started.
mode = follow ignore	Specifies the import mode.
target = <domain>	Specifies the target domain.

All parameters can be passed through to command line, or obtained from a parameter file. For example, the import utility can be run with command line:

```
SunMC > import -p mode=follow target=domain1 <return>
```

Users can put all parameters into a parameter file (for example, /home/user/param_file).

The file /home/user/param_file will look like:

```
SunMC > import -pf /home/user/param_file <return>
```

The file /home/user/param_file will look like:

```
% cat /home/user/param_file <return>
mode = follow
target = domain1
%
```

The explicit assignment in the command line overrides the same assignment in the parameter file. For example, mode=ignore is assigned in command line and mode=follow is assigned in parameter file. The final parameter is mode=ignore.

Confirmation Messages

The import utility prompts the user to answer the following items before the operation is done or when the data conflicts:

Warning message for confirmation

```
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 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)]
```

Enter:

r for Replace - Replaces the conflicting data with new values.

a for Replace All - Replaces all conflicting data.

i for Ignore - Do not update the conflicting data.

g for Ignore All - All conflicts are ignored and left unchanged.

s for Stop - Stops the operation.

Output Messages

TABLE 21-5 lists the results of the import command and the corresponding messages.

TABLE 21-5 Import Utility Output Messages

Message	Reason	Description
import: Done.	Succeed	The operation is done successfully.
<filename>: No such file.	File does not exist	The file specified does not exist. Two files may be used by command line: data file (as import data source) and parameter file (as parameter list).
import: Cannot open <filename>.	Permission denied	The file cannot be opened for reading.
import: File format is not supported.	Format wrong	The source file is not a valid database export data file.
import: File out-of-date (xx days).	Data out-of-date	You are using out-of-date data.

TABLE 21-5 Import Utility Output Messages (*Continued*)

Message	Reason	Description
import: Authentication failed.	Authentication failed	The current user has no authority to create objects in the topology hierarchy.
import: Wrong parameter file.	Parameter file error	The parameter file should be a list of <i>name = value</i> pairs. If not, application generates an error message and stops.
import: illegal parameter - <para>. Use -h option to get usage.	Illegal parameter	An illegal parameter is passed to the import operation.

Topology Export Utility

Command Special Parameters

Export has command special parameters. The parameter format follows the CLI general parameter template.

Comments

TABLE 21-6 Export Parameter Comments

Parameter	Comments
domain = <i>domain</i> ALL	Specifies which domain or domains will be exported. By default, all domains are exported.
file = <i>xml file name</i>	Specifies the name of the target file in which to store the export data.
mode = append overwrite	Specifies export mode: append or overwrite. If not specified, the default mode is append. When append mode is used, the current user is the same as the last export operation.
validate = <i>xx</i> unlimited	Specifies the validation time of the export data in days.

After invoking the export command, you are asked to enter comments. The prompt is >. You can press Return anywhere to break the line. The input is ended with pressing Return twice. For example:

```
SunMC CLI> 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.
SunMC CLI>
```

Output Messages

TABLE 21-7 lists the results of the export command and the corresponding messages.

TABLE 21-7 Export Utility Output Messages

Message	Reason	Description
export: Done.	Succeed	The operation is done successfully.
export: Can not open <i>file</i> .	File does not exist.	The parameter file does exist.
<i>filename</i> : Permission denied.	File error	The file cannot be created or opened for writing.
export: File format not supported.	Format wrong	The error occurs when appending the export data to a file and the file is not a valid export data file.
export: The domain <...> not exist	Object error	The domain that the user wants to export does not exist.
export: Wrong parameter file.	Parameter file error	The parameter file shall be a list of <name = value> pairs. If not, the application will notify the user that the parameter file format is error and stop.

TABLE 21-7 Export Utility Output Messages (*Continued*)

Message	Reason	Description
export: The current user is different from the last one.	User conflict	The error occurs when you try overwrite or append the data to an existing data file created by others. You cannot modify or overwrite other's export data.
export: Data is out-of-date.	Data is too old.	You are using an out-of-date export file. It only occurs when you export data in append mode.
export: illegal parameter - <para>. Please use -h option to get usage.	Illegal parameter	An illegal parameter is passed to the export operation.

Import/Export File Contents

TABLE 21-8 lists the topology data that the import/export utilities process.

TABLE 21-8 Import/Export File Contents

Item	Description
Entity information	The record information about every domain, group and host.
Adornment information	The adornment information about domains and groups. The adornment information only contains the layout and background index instead of the background content. That is, the information about background only contains the GIF file name, but 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/export data. Users can edit it with a text editor. The file includes the 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. XML format is used to save the exported data.

File Format Design

The file is separated into four parts:

- Magic
- DTD (Document Type Declaration)
- Head Information
- Data Blocks

Magic

The magic information identifies that the file is an XML format file. It is `<? XML version = 1.0 ?>` typically.

DTD (Document Type Declaration)

The DTD information defines the structure of the document. The DTD of an export file is defined as:

```
<? XML version = 1.0 RMD = INTERNAL ?>
<!DOCTYPE DOCUMENT [
<!ELEMENT DOCUMENT (HEAD, COMMENTS ?, DOMAIN*)>
  <!ELEMENT HEAD (USER, DATE, VALIDATE?, PRODUCT, VERSION)>
    <!ELEMENT USER (#PCDATA)>      /* creator's user name */
    <!ELEMENT DATE (#PCDATA)>      /* the latest export date. */
    <!ELEMENT VALIDATE(#PCDATA)>   /* validity information: 7/30/90 days or
                                   unlimited. The field is not mandatory. */
    <!ELEMENT PRODUCT (#PCDATA)>   /* SunMC or Sun Management Center, which
                                   only specifies the XML is a SunMC export
                                   file. It is very useful to check the file
                                   validity when importing. */
    <!ELEMENT VERSION(#PCDATA)>    /* 3.0 */
    <!ELEMENT COMMENT(#PCDATA)>    /* Comments. */
    <!ELEMENT DOMAIN (ENTITY* ADORNMENT*)>
                                   /* The element describes a domain. A domain
                                   can contain groups and adornment
                                   information. */
  <!ATTLIST DOMAIN
    disc          CDATA
    field-test    CDATA
    family_type   CDATA
    hostname      CDATA
    ip            CDATA
    architecture CDATA
    netmask       CDATA
    flag          CDATA>
```

```

<!ELEMENT ENTITY (ENTITY* ADORNMENT*)>
/* Entity element describes a entity. If it is a group, it may contain groups
and adornment.
    <!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>
]>

```

Head Information

The head information is used to record the general information, including user, data, version, platform, product, and so forth.

Data Blocks

Data blocks contain the topology hierarchy architecture and entities.

Example

Here is the topology for the domain called “my new.”

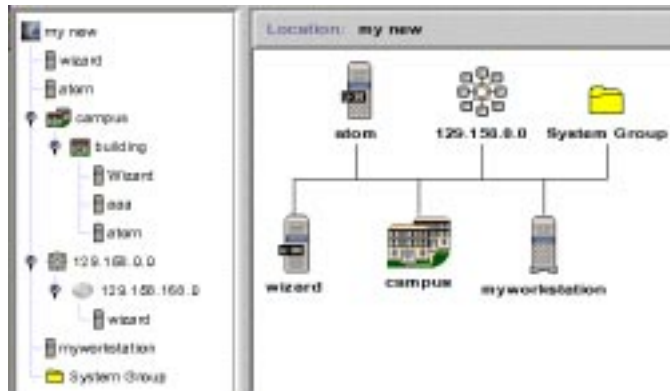


FIGURE 21-7 New Topology Example

Here is an example of the export file. The data contained in the file describes 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>SunMC</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="" 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="subnetview-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" 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>

```

Command Line Interface

Note – This feature may or may not be available on your system, depending on your licensing agreement.

The Sun Management Center Command Line Interface (CLI) provides an alternative method to the graphical user interface for monitoring and managing your system. The CLI also enables you to use the Sun Management Center server remotely.

The following topics are discussed in this chapter:

- Overview of the Sun Management Center CLI
- CLI User Interface
- CLI Interaction Modes
- Logging in to Sun Management Center Software
- CLI Command Parameters
- CLI Commands
- Format of CLI Output
- CLI Log File
- Internationalization and the CLI

Overview of the Sun Management Center CLI

CLI functionality is similar to that provided in the GUI and provides many of the functions available through the GUI.

You can use the CLI to:

- Retrieve topology information (domain/group/entity).
- Create topology objects (domain/group/entity).

- Retrieve/manipulate managed object properties/attributes.
- Load/unload module(s) on one or a set of Sun Management Center agents.
- Enable/disable module(s) on one or a set of Sun Management Center agents.
- Retrieve alarm information on one or a set of Sun Management Center agents.
- Acknowledge or delete alarms on one or a set of Sun Management Center agents.
- Set and run alarm actions on one or a set of Sun Management Center agents.

The CLI can be accessed from a user terminal session, using one of the following:

- UNIX workstation, running Solaris 2.6 and higher
- PC, running Windows98 or Windows NT

Relationship of the CLI to the System Structure

FIGURE 22-1 presents the Sun Management Center structure and the relationship of the CLI within the structure.

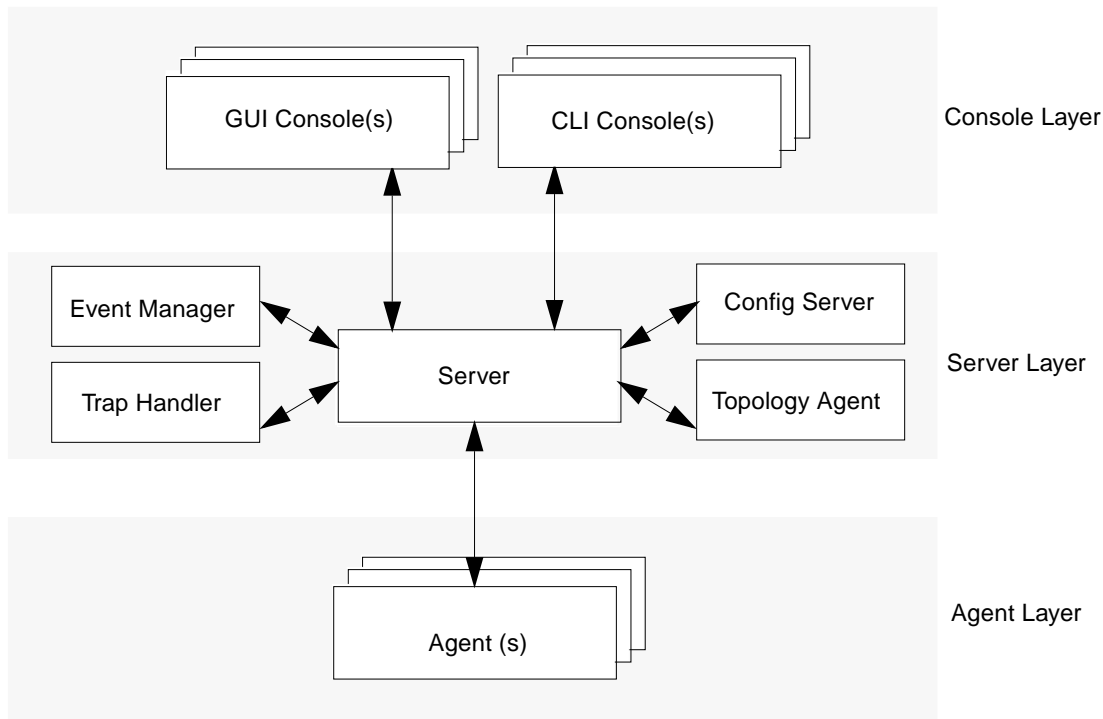


FIGURE 22-1 CLI in Sun Management Center System Structure

CLI Software Structure

FIGURE 22-2 describes the software structure of the CLI. It contains four basic components:

- The Command IO component is used to parse the command line arguments and present the operational results, including errors, warnings, and exit status.
- The Session Handler is used to set up a connection and maintain a session during the interaction.
- The Operation Implementation layer implements the CLI operation functionality.
- The Client API is used to implement all supported CLI operations.

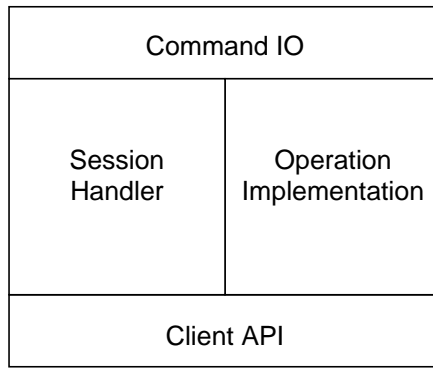


FIGURE 22-2 CLI Software Structure

Constraints

CLI output is available only in text format. Features that require a GUI, such as physical view and graphing, are not available through the CLI.

Also, creation and viewing of groups and tasks are not supported in the CLI.

Assumptions and Dependencies

- Functions supported in the CLI are a subset of the functions available in the GUI console.
- The CLI provides comparable information to the output retrieved using the associated GUI functionality, but the information is formatted differently.
- High-level operations can be performed by a single CLI command.

CLI User Interface

The following table describes characteristics of the CLI user environment.

TABLE 22-1 Characteristics of the CLI User Environment

Characteristic	Description
Secured user access	You specify the host and port number on which the server is running, and provide a Sun Management Center login ID on the Sun Management Center server. You will be prompted to enter your password.
Independency	Commands in the CLI are independent. This means that no command's execution is required as a condition for execution of any other command.
Help	The CLI provides a help system that tells you the available commands, and explains how to use the commands.
Input	The CLI allows users to specify which operation is going to apply and where (scope and condition) to apply it. These specifications can be entered through the command line as parameters, or through an input file. Operations can be spread over several input lines, with a backslash at the end of a line signifying continuation on the following line.
Output	The CLI reports results as well as errors in a readable format. Results can be output to a specified file, and should be formatted in such a way that it can be used as input to subsequent CLI commands. In batch mode, the CLI produces an exit status on termination that is indicative of the success of the operation.

User Authorization

Two levels of user authorization are available:

- *General end users* can retrieve monitored object properties.
- *Administrative users* have the same privileges as general users, and can also set up or modify the managed system.

CLI Interaction Modes

The CLI is designed to support two interaction modes:

- *Batch mode*: The CLI connects to the server, executes commands one at a time, and closes the connection.
- *Multiple-command or Session mode*: The CLI establishes a connection with the server, then accepts all operations until it receives an explicit closing request. The session can include multiple operations.

Batch Mode

The parameter `-b` enables batch mode with a *file* option. Once the CLI is started, it will automatically execute the login command and prompt the user for login information. If the login is successful, the commands in the file will be executed one at a time. See “To Access the CLI in Solaris Environments” on page 456.

Multiple-command (or Session) Mode

Multiple-command or session mode is similar to the Sun Management Center GUI mode, in that it establishes a connection with the server before it is ready to provide service. Once a session is established, it can accept many service requests.

Session mode is more efficient in the networked environment when you apply multiple requests to a remote server. Session mode commences whenever the CLI is invoked without providing a specific operation on the command line. The exit status of the process indicates the success of the connection and authentication of the session, but does not attempt to indicate the success of individual operations.

Note – The Sun Management Center CLI can consider batch mode as one extreme case of session mode, in which there is only one command in the session. In this case, the exit status of the CLI indicates the success or failure of the operation performed.

Logging in to Sun Management Center Software

▼ To Access the CLI in Solaris Environments

You can access the CLI in batch mode by typing the following command from `/opt/SUNWsymon/sbin:`

```
./es-cli -b file
```

Note – The `-b` parameter indicates batch mode.

For multiple-command (or session) mode, type the following:

```
./es-cli parameters
```

Go to Step 1.

▼ To Access the CLI in Microsoft Windows Environments

After you have already installed the Sun Management Center console layer, double-click on `es-cli` in the CLI folder. A screen displays for CLI login.

1. **Type the login command. The login requires you to specify the host name and your login name.**

In the following example, `seattle` is the `serverHost` name, and `joannm` is the login name:

```
> login serverHost=seattle
Login: joannm
Password:
>
```

Your login name and password are the same as the name and password you enter on the Sun Management Center Login screen when using the Sun Management Center software GUI.

2. **After the session is established, you can enter the desired commands:**

```
> command
```

The CLI commands are described in detail later in this chapter.

CLI Command Parameters

The CLI uses a set of reserved or predefined parameters in combination with the CLI commands to help you target the information you need. These parameters and corresponding values are listed in the following table:

TABLE 22-2 CLI Predefined Parameters and Values

Parameter	Value	Optional Notes or Description
-b		This parameter is used to start the CLI in batch mode. It is ignored in session mode.
-h		When used as a parameter to a command, the help for the command is displayed. This parameter takes precedence over all other parameters. When -h is set, other parameters are ignored.
-l		This parameter has no effect on basic commands. This parameter is only used in extended commands to feed the result of the last extended command as an input to the current one. If this parameter is set, all other parameters will be ignored, and the parser will automatically feed the last extended output (including all parameters and results, if any) to the current extended command. Use this parameter sparingly in circumstances that warrant its necessity.
a	agent agentList	agent=agentHost[:agentPort] agentList=agent[,agent]^
append	output file	The append parameter is used to append the results of a command to a file. If the file does not exist, it will be created. Use this parameter in conjunction with a command. Alternatively, set this parameter globally to append all subsequent output to a file. If the append and o parameters are both set, append takes precedence over o. Only results will be recorded. The command itself is not recorded. Use the log parameter to record command information.

TABLE 22-2 CLI Predefined Parameters and Values (*Continued*)

Parameter	Value	Optional Notes or Description
columns		This parameter is used in extended commands to print only column(s) that correspond to the column name(s) specified in the value of this parameter. Multiple column names are delimited by a comma (","), for example: columns="Alarm Id,Node URL,Target Host,Severity" The values of this parameter are case-sensitive.
f	plain xml html	Sets the output format to plain text, XML, or HTML. See "Format of CLI Output" on page 472 for more information.
serverHost	server host	This parameter sets the server host for login. It is a global parameter that cannot be set after a login session is established.
height	number of lines	Number of lines displayed on a screen.
i	input file	This parameter is used to read an input file that contains various parameter settings into the current session. Each parameter setting should reside on a separate line. For example, an input file with three parameter settings would look as follows: more=off serverHost=myserver a=myagent:161
log	log file	This parameter is used to activate the recording of all CLI commands (including the time each command is entered) onto the specified log file. Once the parameter is set, all subsequent commands will be appended to the file. If the file does not exist, it will be created. Because the file is not overwritten, be sure a new file is created if you want a new set of records.
m	module moduleList	module=moduleName[+moduleInstance] moduleList=module[,module]^
more	on off	If it is set to on, all subsequent outputs on the terminal will be displayed one screen at a time, which is defined by the height and width parameters. The default is off for batch mode and on for session mode.

TABLE 22-2 CLI Predefined Parameters and Values (*Continued*)

Parameter	Value	Optional Notes or Description
<code>o</code>	output file	This parameter is used to write the results of a command to a file. If the file exists, it will be overwritten. Use this parameter in conjunction with the <code>a</code> command. Alternatively, set this parameter globally to write all subsequent output to a file. If <code>append</code> and <code>o</code> are both set, <code>append</code> takes precedence over <code>o</code> . Only results will be recorded. The command itself is not recorded. Use the <code>log</code> parameter to record command information.
<code>serverPort</code>	server port	This parameter is the server port for login. It is a global parameter that cannot be set after a login session is established. If it is not set, the default port of 2099 will be used.
<code>t</code>	topoObject	The topology object is the object managed in the topology agent. It can be a domain, a view group, or an entity. It is specified in the fully qualified name started from the domain, for example, <code>/domain/group/host</code> .
<code>width</code>	number of characters	Number of characters in one line displayed on a screen.

Operation and Parameter Format

CLI operations support retrieval of information and manipulation of object attributes for topologies, modules, and alarms. The general format is:

```
> command [name=value]*
```

Parameters are a series of name-value pairs.

▼ To Override Parameters

Parameters passed on the command line are available throughout a session. The `set` command can be used to overwrite or store new parameters. For example:

```
./es-cli a=b  
> set  
a=b  
> set a=c  
> set x=y  
> set  
a=c  
x=y
```

The original values from the command line can be stored by entering `reset`. For example:

```
> reset  
a=b
```

The `unset` command can be used to remove a parameter from the current session. For example:

```
> set  
a=b  
c=d  
> unset a  
> set  
c=d
```

Specifying a parameter as part of an operation overrides the session parameter for the duration of that operation. When an explicit name value parameter is specified along with `i=inputFile`, the explicit name value overrides the value from the file. For example, if the file `x` contains:

```
a=b  
c=d
```

and you type:

```
> doSomething c=f i=x
```

then the `doSomething` command will see the value of `c` as `f`, and not `d`.

This applies also on the command line. For example:

```
./es-cli serverHost=bob i=serverFile
```

`bob` will override the value of `of` the host in the `serverFile`.

Command-Specific Parameters

The CLI uses parameter lists to define all required parameters for a specific command. A parameter list is a list of `name=value` pairs, with values encapsulated in quotes (if they contain white space), with pairs separated by whitespace, and with no whitespace between the parameter name, the equals sign and the quoted value.

The following is an example of a parameter list:

```
m=kernel-reader moduleDesc="My Kernel Reader"
```

If a parameter has a list of values, they are separated by a comma (",") with no whitespace between each value. For example:

```
severity=DIS,DWN,ERR
```

The following name-value pairs are acceptable:

```
test1="This is just a test"
test2=hello
test3=hello,hi,aloha
test4="hello,hi,aloha"
```

The following name-value pairs are *not* acceptable:

```
test1="How are you?","Who are you?"
test2="Testing",1,2,3
test3=Hello
test4=Hello"
```

Parameters can be entered during a session or read from a file. This file will contain key=value pairs separated by new lines. Values must be enclosed in quotes if they contain spaces. Use the `i=fileName` parameter to specify the location of the file.

CLI Commands

This section describes the commands supported in the CLI. There are two types of commands:

- Basic
- Extended

Basic commands run in the foreground. You cannot run subsequent commands until you stop running a basic command.

Extended commands run in the background by default (unless the foreground parameter is set to `on`). Only one command can run in the background at any one time. Commands that run in the background do not produce any output to the screen to indicate its success or failure, errors encountered (if any), its progress, and so on. Use the `print` command to send output to the screen.

Note – When a command is running in the background, the login and logout commands are not allowed to run. These commands can interfere with the command that is running in the background.

Basic CLI Commands

The following table describes the basic CLI commands:

TABLE 22-3 Basic Commands for the CLI

Command name	Description
<code>alias</code>	Lists all available pseudonyms or shorthand terms for commands.
<code>clear</code>	Removes all parameters from the current session.
<code>exit</code>	Logs out from the server and exits the CLI.

TABLE 22-3 Basic Commands for the CLI *(Continued)*

Command name	Description
help	Lists all available CLI commands in alphabetical order with a brief description of each. Basic commands are listed first, followed by extended commands. (Also see the <code>more</code> command below.)
kill	Kills the command that is running in the background.
login	Logs in to a Sun Management Center server. This command prompts you for your user name and password. You must log in before performing commands with the Sun Management Center server or agents. Once you log in to a session, no other login will be allowed until you run the <code>logout</code> command.
logout	Terminates your connection to the Sun Management Center server.
more	Displays help on a specified command, including parameters, defaults, and procedures.
print	Prints the results of the last extended command in the specified format to the specified destination. If the parameter <code>o</code> is set, the printout is directed to a file and is not shown on the screen. Note: This command is not saved in the command history.
quit	Logs out from the server and exits the session (same as the <code>exit</code> command).
reset	Resets all parameters to what was set from the command line. Any parameter that is set after the command line is left unchanged.
set	Store or display parameters in the current session. The parameter is available to all commands.
status	Shows the status of the command that is running in the background.
unalias	Removes a pseudonym or shorthand term for a command.
unset	Removes parameter settings from the current session. Note: This command is not saved in the command history.

Extended CLI Commands

There are four types of extended commands available in the CLI:

- Module commands
- Object attribute commands
- Alarm commands
- Topology commands

Module Extended Commands

There are seven extended commands for managing modules.

TABLE 22-4 Module Extended Commands in the CLI

Command name	Reserved Parameters	Description
disableModule	a=agent agentList m=module moduleList	Disable a module or modules in an agent or agents.
enableModule	a=agent agentList m=module moduleList	Enable a module or modules in an agent or agents.
getLoadedModules	a=agent agentList	Get a list of loaded modules in an agent or agents.
getModule	a=agent agentList m=module	Get information for a particular module.
getModules	a=agent agentList	Get a list of modules in an agent.
loadModule	a=agent agentList m=module moduleList moduleName=name moduleDesc=description	Load a module in an agent or agents.
unloadModule	a=agent agentList m=module moduleList	Unload one or more modules in an agent or agents.

Examples for Using the Module Extended CLI Commands

If you want to find out which modules are loaded on a particular host, the command format is `getLoadedModules a=agent`. In this example, the agentHost name is `seattle`. You would type the following:

```
> getLoadedModules a=seattle
```

Next, suppose you wanted to load a module that is not currently loaded. The command format is `loadModule a=agentHost:agentPort m=module`. In this example, the agentHost name is still `seattle` and the agentPort is the default, 161. The module is the kernel reader module. You would type the following:

```
> loadModule a=seattle:161 m=kernel-reader
```

Object Attribute Extended Commands

There are four extended commands for managing object attributes.

TABLE 22-5 Object Attribute Extended Commands in the CLI

Command name	Reserved Parameters	Description
addRow	a=agent[,agent]+ m=module mgtObj=managed_object property=property propInst=property_instance rowValues="name=value[,name=value]+"	Add a row in a table.
delRow	a=agent[,agent]+ m=module mgtObj=managed_object property=property propInst=property_instance rowValues="name=value[,name=value]+"	Delete a row in a table.
getAttributes	a=agent[,agent]+ m=module mgtObj=managed_object property=property propInst=property_instance	Get certain attributes in an agent or a list of agents.
setAttributes	a=agent[,agent]+ m=module mgtObj=managed_object property=property propInst=property_instance attributes=" " values=" "	Set certain attributes in an agent or a list of agents.

Examples for Using the Object Attribute Extended CLI Commands

In the following example to retrieve attributes, the agentHost name is `haiku` and the agentPort is `1161`. The module is `agent-stats`, the managed object is `totalstats`, and the property is defined as `size`:

```
> getAttributes a=haiku:1161 m=agent-stats mgtObj=totalstats \  
    property=size
```

The following shows example parameters for deleting a row from a table (as specified in `rowValues`):

```
> delRow a=haiku:1161 \  
    m=filemon mgtObj=filemonstats/filemonTable/filemonEntry \  
    rowValues="name=test,desc=this,filename=/etc/passwd"
```

Alarms Extended Commands

There are five extended commands for managing alarms.

TABLE 22-6 Alarms Extended Commands in the CLI

Command name	Reserved Parameters	Description
ackAlarms	a=agent agentList note=reason m=module[+moduleInstance] managed_object=managed_object property=property property_instance=property_instance qualifier=qualifier severity=ERR WRN INF IRR DWN DIS OFF state=O C F ack=A N	Acknowledge alarms with an optional note (or reason) in an agent or a list of agents.
delAlarms	a=agent agentList note=reason m=module[+moduleInstance] managed_object=managed_object property=property property_instance=property_instance qualifier=qualifier severity=ERR WRN INF IRR DWN DIS OFF state=O C F ack=A N	Delete alarms with an optional note (or reason) in an agent or a list of agents.
getAlarms	a=agent agentList m=module[+moduleInstance] managed_object=managed_object property=property property_instance=property_instance qualifier=qualifier severity=ERR WRN INF IRR DWN DIS OFF state=O C F ack=A N	Get alarm information of an agent or a set of agents.
runAlarmAction	a=agent agentList	Run an alarm action manually in an agent or a list of agents.
setAlarmAction	a=agent agentList command=command	Set an alarm action (manual or delay) in an agent or a list of agents.

Examples for Using the Alarms Extended CLI Commands

In the following example to retrieve alarms, the agentHost name is `haiku` and the alarms requested to be returned are specified as either `ERR` or `DWN`. The command `getAlarms` with no parameters would return *all* alarm information:

```
> getAlarms a=haiku severity=ERR,DWN
```

The following is an example parameter for deleting alarms with a specified notation:

```
> delAlarms note="by sysadm only"
```

Supported Parameter Lists for Topology Commands

Topology commands support the following parameter lists.

topoEntity_desc_list: specify a managed object information. It contains the following keywords:

```
fullDesc=text  
family=text  
topoType=text  
topoCfg=text  
isPolled=true|false  
pollType=dummy|ping|snmp|ahost|amod|aprox  
readInfo=text  
writeInfo=text  
targetHost=text  
targetIp=text  
agentPort=port
```

where `agentPort` is optional and is only used if `url` is not specified and the user does not want to use the default port.

topoEntity_filter_list: classify a group of managed objects under a certain condition

```
pollType=text  
arch=text  
family=text
```

topoGroup_desc_list: specify a managed view group. It contains the following keywords:

fullDesc=text
family=text

a=agent is a reserved parameter, where agent=agentHost[:agentPort].

Topology Extended Commands

There are seven extended commands for managing the topology.

TABLE 22-7 Topology Extended Commands in the CLI

Command name	Reserved Parameters	Description
createEntity	t=topoObject topoEntity_desc_list	Create a managed entity. The topoEntity_desc_list is used to specify the entity properties. If the url or the agentPort is not specified, the default port of 161 is not used.
createGroup	t=topoObject, topoGroup_desc_list	Create a topology domain or group. If it is a domain, topoGroup_desc_list is ignored. If it is a topology group, topoGroup_desc_list must be provided.
delTopoObjects	t=topoObject	Delete a managed topology object in the managed topology hierarchy. All objects under the specified topology object are deleted as well.
getAgentPort	a=agent,t=topoObject	Return a port number that the Sun Management Center agent is running on the specified host in a topology domain. If there are multiple agents, a list of port numbers is returned. If t is not specified, the default domain is used.
getAllTopoObjects	t=topoObject, topoEntity_filter_list	Get a list of all managed objects in the managed topology hierarchy that satisfy a certain condition as specified in the entity_filter_list.
getDomains		Get information for all managed domains.
getTopoObject	t=topoObject, topoEntity_filter_list	Get managed topology objects. If the topology object is a domain or a group, it returns all group/entity objects directly under this domain or group. These objects satisfy a certain condition specified in the topoEntity_filter_list.

Examples for Using the Topology Extended CLI Commands

In the following example, the command retrieves a list of managed topology objects under the default domain `headquarters`. The command would return a list of all groups and subgroups under the `headquarters` hierarchy:

```
> getTopoObject t=/headquarters
```

In the following example, the command creates a group under an existing domain named `headquarters_test`.

```
> createGroup t=/headquarters_test/build19 \  
  fullDesc="test headquarters domain" family=building-location
```

Format of CLI Output

The output of a basic command is available only in plain text. The output of an extended command is available in three formats:

- Plain text
- XML
- HTML

Use the `f` parameter to set the output to the intended format. Regardless of the format, an output will consist of a set of results. Each result contains a list of name=value pairs, with each pair occupying one row. Thus, each result may span multiple rows.

For retrieval commands, the name in the list of name=value pairs is the target attribute, or a managed object.

For set commands, each result will have the following format:

```
state=OK | Fail
message=" "
```

where `state` tells whether the command is successful, and `message` provides the details.

When an error is encountered, it should be generated in the following format:

```
state=Fail
message=" "
```

where `message` contains an error message.

Plain Text

When the `f` parameter is set to `plain`, the output format is set to plain text. To clearly delineate different results, each result begins and ends with a separator. The following example shows an output in plain text:

```
== <commandName>: Results 1/2 =====
attribute1=value1
attribute2=value2
== <commandName>: Results 2/2 =====
attribute1=value3
attribute2=value4
=====
```

XML

When the `f` parameter is set to `xml`, the output format is set to XML. In this format, each result is delineated by a `Row` tag. A set of results contains a list of `Row` tags.

Each `Row` contains a set of `Property` tags, which is a list of `name=value` pairs. Each `Row` has a `Type` attribute with either `Data` or `Error` as its value.

`Data` indicates that the set of `Properties` is information that has been retrieved, whereas `Error` indicates that the set of `Properties` is related to an error that has occurred. The following is an example of XML output:

```
<?xml version="1.0"?>
<Table Command="<commandName>">
  <Row Type="Data">
    <Property Name="attribute1">value1</Property>
    <Property Name="attribute2">value2</Property>
  </Row>
  <Row Type="Data">
    <Property Name="attribute1">value3</Property>
    <Property Name="attribute2">value4</Property>
  </Row>
</Table>
```

HTML

When the `f` parameter is set to `htm` or `html`, the output format is set to HTML. In this format, the set of results is enclosed in a table. Each result takes up one row, with the top row comprising the column headings, that is, the name of each `name=value` pair.

The first column heading is `Row`, and lists the row number for each row. Subsequent rows have columns that contain values.

Each column in a subsequent row contains the value of a `name=value` pair in the corresponding result. Each result that is related to an error will be displayed in another table. If a column has no data, it is grayed out.

The following example shows an incomplete excerpt of HTML output:

```
<TABLE BORDER=1 CELLPADDING=5 CELLSPACING=0 BGCOLOR="#FFFFCC">
<TR VALIGN=TOP>
<TD ALIGN=CENTER BGCOLOR=0><FONT COLOR=WHITE><B>Row</B></FONT></TD>
<TD ALIGN=CENTER BGCOLOR=0><FONT COLOR=WHITE><B>attribute1</B></FONT></TD>
<TD ALIGN=CENTER BGCOLOR=0><FONT COLOR=WHITE><B>attribute2</B></FONT></TD>
</TR>
<TR VALIGN=TOP>
<TD ALIGN=CENTER>1</TD>
<TD>value1</TD>
<TD>value2</TD>
</TR>
<TR VALIGN=TOP>
<TD ALIGN=CENTER>2</TD>
<TD>value3</TD>
<TD>value4</TD>
</TR>
</TABLE>
```

CLI Log File

CLI commands (including the time a command is entered) are recorded in a log file. The log file has the following format:

```
DATE & TIME;duration or message;command and parameters
```

For example:

```
Wed Jan 26 10:18:20 EST 2000;== START OF THREAD ==;getAlarms
Wed Jan 26 10:18:27 EST 2000;7 seconds;getAlarms
```

▼ To Record CLI Commands in a Log File

1. Set the `log` parameter to a file name. For example:

```
set log=/var/opt/SUNWsyman/history.log
```

Once the parameter is set, all subsequent commands are appended to the file. If the file does not exist, it will be created.

The file will not be 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. For example:

```
unset log
```

Internationalization and the CLI

All commands and log files are available only in English. Command descriptions and help text, however, follow the Java internationalization guidelines for the following additional languages:

- French
- German
- Italian
- Japanese
- Korean
- Simplified Chinese
- Spanish
- Traditional Chinese

Getting Started With Sun Management Center Software

TABLE A-1 is an example of how you can use the Sun Management Center software. This table includes a summary of some typical tasks and the order in which they should be done. Each task is referenced to a section in the manual, which provides detailed, step-by-step directions.

The tasks and the order in which they are included in this table is based on the assumption that you will explore and learn the software before setting up your actual monitoring environment.

TABLE A-1 Example Use of Sun Management Center Software

Task	For More Information, Go to
Create an administrative domain.	"To Create Administrative Domains" on page 20
Populate the administrative domain by creating objects.	Chapter 3
Populate the administrative domain with the Discovery manager.	Chapter 4
Familiarize yourself with the Console window.	Chapter 5
Navigate through Sun Management Center software using the hierarchy (tree) view.	"Hierarchy View" on page 69
Navigate through Sun Management Center software using the topology view.	"Topology View" on page 71
Open the Details window.	"To Start the Details Window" on page 85
Load other modules.	"To Load a Module" on page 171
Disable some modules.	"To Disable a Module" on page 177
Unload some modules.	"To Unload a Module" on page 179

TABLE A-1 Example Use of Sun Management Center Software *(Continued)*

Task	For More Information, Go to
Monitor your system using the modules.	Appendix D
Explore the different modules.	"Browser Tab" on page 86
Explore the processes view.	"View Processes" on page 217
Explore the view log function.	"View Log Tab" on page 210
Explore the physical view.	"Hardware Tab" on page 222
Explore the logical view.	"Hardware Tab" on page 222
View a property table.	"Monitoring Data Properties" on page 95
View a graph of a property table.	"To Graph A Monitored Data Property" on page 119
Create an alarm.	"To Create an Alarm" on page 136
Watch the alarm go up the hierarchy (tree) view.	"To Create an Alarm" on page 136
View the alarm through the Details window.	"The Alarm Manager software alerts you to an unacknowledged open alarm condition that exists using several different methods:" on page 188
View the alarm through the administrative domain status summary.	"To Access Alarms From the Main Console Window" on page 190
Sort the alarms and become familiar with the Alarms window.	"Alarm Information" on page 186
Acknowledge the alarm.	"Acknowledging New Alarms" on page 196
Delete the alarm.	"Deleting Alarms" on page 200
Create alarm conditions.	"To Create an Alarm" on page 136
Set the refresh interval.	"Refresh Tab in the Attribute Editor" on page 144
Set security.	Chapter 14

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

Miscellaneous Sun Management Center Procedures

This appendix documents the following procedures:

- To Regenerate the Security Keys
- To Configure a Legacy SNMP Agent as a Subagent of a Sun Management Center Agent
- To Increase Agent Memory Size
- To Determine If a Port Is Used
- To Reconfigure Sun Management Center Software to Use Nondefault Port Addresses
- To Reconfigure Sun Management Center SNMP Port Addresses
- To Reconfigure Sun Management Center RMI Port Address
- To Create a Server Component as a Monitored Object
- To Increase the Critical Threshold for the Virtual Size Data Property.
- To Change the Default Values for Smart Delete in the Event Manager
- To Use `ccat` to Read Sun Management Center Log Files
- To Use `ctail` to Read Sun Management Center Log Files
- To Resolve a Hanging Main Console Window
- To Customize the Tools Menu
- How to Use the Sun Management Center SNMP MIBs in a Third Party Management Station
- How to Access the Modules With Multiple Instances
- Database Backup and Recovery

Regenerating Security Keys

The Sun Management Center setup generates the security keys for Sun Management Center components using the following default settings:

- Valid Sun Management Center users are `espublic` and `esmaster`

- Sun Management Center superuser is `esmaster`

Note – The software uses an eight-character string as a seed to make the generated key unique. During setup, you have the option to use the default Sun Management Center seed or to use one that you create. The same seed must be used for all server and agent setups in a given server context. For more information on server context, see Chapter 14.

Sun Management Center setup does not create UNIX accounts for the special users `espublic` and `esmaster`. You should not need to log into the Sun Management Center console using these user IDs because they are reserved for internal communication between processes. However, some troubleshooting activities may require you to log in using one of these user IDs. If so, you have to create it and assign a password using the usual UNIX commands `useradd` and `passwd`.

The `esmaster` user ID bypasses normal permission checks, so use it with care. For normal operation, use an existing login account. Setup provides an opportunity to specify an existing user as a Sun Management Center administrator. This user ID is added to the `esadm` and `esdomadm` groups as well as the `esusers` file. For more information on security and the Sun Management Center superuser, see Chapter 14.

The security keys for the components need to be regenerated if one or more of the following is true:

- UDP ports of any of the Sun Management Center agents are changed.
- Host names or IP addresses of the Sun Management Center agent host change.

Note – Changing the host name or the IP address of the Sun Management Center server is not supported.

▼ To Regenerate the Security Keys

Note – In these examples, *shared_secret* stands for a secret string of up to 8 characters that is common to all machines in a server context. It is required as an argument to the script `base-usm-seed.sh`. A default (`maplesyr`) is provided by the software, but you can specify your own password if desired. This secret string or password is used to generate keys for communication between processes. `-u public` is needed to respond to external SNMP requests with `public` communities.

1. Log in as superuser.

2. Depending on your installation, type one of the following.

- If you installed only the agent layer, type:

```
# /opt/SUNWsymon/sbin/es_run base-usm-seed.sh -s shared_secret -c agent -u public
```

- If you installed only the server layer, type:

```
# /opt/SUNWsymon/sbin/es_run base-usm-seed.sh -s shared_secret -c topology -u public
# /opt/SUNWsymon/sbin/es_run base-usm-seed.sh -s shared_secret -c trap event
cfgserver servers
```

- If you installed both the agent and server layers on one host, type:

```
# /opt/SUNWsymon/sbin/es_run base-usm-seed.sh -s shared_secret -u public
```

3. Restart the Sun Management Center server.

For more information, see the *Sun Management Center 3.0 Software Installation Guide*.

Configuring a Legacy SNMP Agent as a Subagent of a Sun Management Center Agent

A legacy SNMP agent is a SNMP agent that is not part of the Sun Management Center agent framework. In real world situations, you may need to configure one or more legacy agents as subagents of a Sun Management Center agent.

Any legacy SNMP agent can be configured as a subagent of a Sun Management Center Agent provided that:

- The legacy agent can run on a port other than 161.
- The legacy agent configuration supports running that agent as a non-daemon process.
- You have the legacy agent MIB definition file.

▼ To Configure a Legacy SNMP Agent as a Subagent of a Sun Management Center Agent

1. Log in as superuser.

2. If the file `/var/opt/SUNWsymon/cfg/subagent-registry-d.x` does not exist, copy it from the `/opt/SUNWsymon/base/cfg` directory:

```
# cp /opt/SUNWsymon/base/cfg/subagent-registry-d.x /var/opt/SUNWsymon/cfg/
```

3. In the file `/var/opt/SUNWsymon/cfg/subagent-registry-d.x`, find the block that is similar to the following:

```
# sa2 = {
#     type           = legacy
#     persist        = false
#     snmpPort       = "20001"
#     errorAction     = restart
#     startCommand   = "/usr/lib/snmp/mibiisa -p %port"
#     stopCommand    = "kill -9 %pid"
#     pollInterval   = 60
#     pollHoldoff    = 60
#     oidTrees       = 1.3.6.1.2.1
#     snmpVersion     = SNMPv1
#     securityLevel   = noauth
#     securityName    = espublic
# }
```

- 4. Remove the comment symbol at the beginning of the line (#) so that the code now looks like the following.**

```
sa2 = {
    type           = legacy
    persist        = false
    snmpPort       = "20001"
    errorAction     = restart
    startCommand   = "/usr/lib/snmp/mibiisa -p %port"
    stopCommand    = "kill -9 %pid"
    pollInterval   = 60
    pollHoldoff    = 60
    managedTrees   = "mib-2 sun"
#     oidTrees     = 1.3.6.1.2.1
    snmpVersion     = SNMPv1
    securityLevel    = noauth
    securityName     = espublic
}
```

- 5. Modify the lines as follows:**

- Change sa2 to the unique subagent name for the agent.
- type is legacy.
- persist is false if the subagent is stopped when the Sun Management Center agent exits. If this value is true, then the Sun Management Center agent does not stop the subagent when the Sun Management Center agent exits.
- snmpPort is the UDP port number on which you want to run the subagent.

- `errorAction` can be `restart`, `ignore`, or `kill`. If the `restart` option is used, then the Sun Management Center agent tries to restart if it encounters an error when communicating with the subagent. The other options result in the respective behaviors.
- `startCommand` is the mandatory command to start the subagent. This command should contain `%port`, which is replaced by the value given in `snmpPort`.
- `stopCommand` is the command to stop the process. `%pid` can be used to represent the process ID (PID) of the subagent process.
- `pollInterval` defines the time (in seconds) in which the Sun Management Center agent polls the subagent.
- `pollHoldoff` is the time (in seconds) after which the first poll is done on the subagent after the latter is started by the Sun Management Center agent.
- `oidTrees` gives the space-separated list of SNMP OIDs managed by the subagent.
- `snmpVersion` can take values `SNMPv1` and `SNMPv2`.
- `securityLevel` can be `priv`, `auth`, or `noauth`.
- `securityName` is the SNMPv1 community name or SNMPv2 security name to use.

For more details, refer to the descriptions in the `subagent-registry-d.x` file.

6. Stop, then restart the agent:

```
# /opt/SUNWsymon/sbin/es-stop -a
# /opt/SUNWsymon/sbin/es-start -a
```

Agent Exits During Startup

The Sun Management Center agent has the ability to monitor itself and restrict its memory usage. To do this, there are some predefined limits that have been set for the memory usage of the agent process. These limits are highly dependent on:

- Number of modules loaded
- Type of modules loaded
- Type of the system being managed

On rare occasions, the default memory usage limit is exceeded during the agent startup and when the agent stops running. This is an indication that 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
```

or

```
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. Edit the file as shown in the following example:

```
# vi /var/opt/SUNWsymon/cfg/agent-stats-d.def
```

4. To increase the agent memory size, increase the `alarmlimit:error-gt` to the desired value 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 =

    }
    .....
}
```

5. Save the file and restart the agent.

Configuring Sun Management Center Software to Use Different Port Addresses

This section describes how to configure Sun Management Center software when there is potential conflict for port addresses.

▼ To Determine If a Port Is Used

- Determine if a specific port number is used in your system by typing:

```
# /bin/netstat -an|grep port_number
```

The Sun Management Center server communicates with the Sun Management Center agents and the other server components (Topology manager, Configuration manager, Event manager, and Trap handler) using SNMP. By contrast, the server communicates with the Sun Management Center consoles using remote method invocation (RMI).

Several components require the use of network ports, as shown in the following table.

TABLE B-1 Sun Management Center Default Port Addresses

Layer	Component	Default Port Number
Agent	Agent	161
Server	Trap handler	162
Server	Event manager	163
Server	Topology manager	164
Server	Configuration manager	165
Server	Server	2099

Note – The SNMP port definitions for Sun Management Center components are found in two files: the `/var/opt/SUNWsymon/cfg/domain-config.x` file, which exists in every machine running any Sun Management Center component, and the `/var/opt/SUNWsymon/cfg/server-config.x` file, which exists on machines that have the Sun Management Center server component installed.

In the `domain-config.x` file, there is one configuration block for each of the SNMP-based Sun Management Center agents. In each configuration block, there is (at least) one line that defines the port address for the corresponding agent. The default port definition for the Sun Management Center server is in the `server-config.x` file.

Setup scripts automatically configure the components by using the default port addresses. However, if any of the default ports are being used, then you must take action to avoid such conflicts in network port addresses.

▼ To Reconfigure Sun Management Center Software to Use Nondefault Port Addresses

1. Run the `es-setup` script to create the `domain-config.x` and `server-config.x` (server configuration setup) files.
2. Edit these files with the new port numbers.

See the next section and “To Reconfigure Sun Management Center RMI Port Address” on page 488 for more information.

▼ To Reconfigure Sun Management Center SNMP Port Addresses

1. **Log in as superuser.**
2. **Edit the `domain-config.x` file and change the address port to an unused port.**

This example illustrates changing the agent default port address from 161 to 1161.

Before:

```
agent = {  
    snmpPort = 161
```

After:

```
agent = {  
    snmpPort = 1161
```

3. **Save the file.**

Note – Hosts with Sun Management Center agents using port addresses other than 161 can be added to the administrative domain manually by using the Create Topology Object window or can be discovered automatically by specifying the port number in the discovery parameters. (For more information on the Create Topology Object window, see Chapter 3. For more information on how hosts are discovered automatically, see Chapter 4). Since you can only specify one port number in addition to port 161, it is best to select an alternate port number and use that number for all agent installations.

▼ To Reconfigure Sun Management Center RMI Port Address

1. **Log in as superuser.**
2. **Edit the `/var/opt/SUNWsymon/cfg/server-config.x` file.**

3. Search for the block which starts with `rmiReceptor`.

For example:

```
rmiReceptor = {  
    [ use RECEPTORS.RMI ]  
  
#    property:rmiPort = 2099  
#    property:rmiHost = localhost  
  
# 0 means user authentication is disabled  
# 1 means user authentication is enabled  
# property:securityFlag = 1  
  
# -1 means no limit  
# 0 means make a guess at a limit (base on # of fd's)  
# >0 specifies the exact limit  
#  
}
```

4. Uncomment the line that reads `property:rmiPort = 2099` by deleting the pound (#) character.

5. Change the address port to a new unused port number.

For example:

```
property:rmiPort = 1199
```

This example illustrates changing the server default port address from 2099 to 1199.

6. Save the file.

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 loaded with specialized modules.

You may 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.

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. See “Agent Statistics Module Version 2.0” on page 578 for more information about this 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.

▼ To Create a Server Component as a Monitored Object

1. In the main console window, select Edit ► Create an Object.

The Create Topology Object window is displayed. By default the tab is set to Group. For more information, see “To Create a Node” on page 30.

2. Click the Node tab.

The window changes to display settings available for nodes.

3. Click the Monitor Via button to see the pull-down menu, then select Sun Management Center Agent - Host.

4. Type the name of the server component in the Node Label field.

5. (Optional) Enter a description of the node.

6. Enter the name of the Sun Management Center server in the Hostname field.

7. Type the port number for the server component in the Port field (FIGURE B-1).

See the table entitled “Sun Management Center Default Port Addresses” on page 487 for the default port values for each of the server components.

8. Complete this procedure with one of the following actions:

- Click OK to create the server component object and close this window.
- Click Apply to create the server component object without closing this window.
- Click Cancel to cancel your request.

Create Topology Object

Group **Composite** **Node** **Segment**

Monitor Via: Sun Management Center Agent - Host ▼

Node Label: event

Description:

Hostname: Sun_Management_Center_server

IP Address: **Port:** 163

FIGURE B-1 Creating a Server Component as a Monitored Object

Topology Manager

The Topology manager enables the main console window to present logical objects in a topology view. It also provides the ability to create a logical object (such as a group) whose status summarizes the statuses of managed objects residing on multiple hosts.

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 error message, “error excessive virtual memory use.” To solve this error, you need to increase the default virtual size by completing the following procedure after you have carefully evaluated the situation.

▼ To Increase the Critical Threshold for the Virtual Size Data Property.

1. Create the Topology manager monitored object.

See “To Create a Server Component as a Monitored Object” on page 491.

2. Open the Details window by proceeding with one of the following:

- Click the right mouse button on the Topology manager object icon and highlight Details from the pop-up menu in the hierarchy view or the topology view.
- Double-click the left mouse button on the Topology manager icon in the hierarchy view or the topology view.
- Select the Topology manager icon in the main console window, then select Tools ► Details.

3. In the Browser Details window, double-click on the Local Applications icon in the hierarchy (tree) view.

4. Double-click on the Agent Statistics icon in the contents view or single click in the expansion/compression icon next to the Agent Statistics icon in the hierarchy view.

The Agent Statistics folders are displayed.

5. Double-click on the PA Process Statistics folder icon in either the hierarchy or the contents view.

The monitored properties are displayed in a property table (FIGURE B-2).

Sun Management Center Process Statistics

Property	Value
Process ID	1307
Process Unique Id	PID1307
Process Name	esd
Process Status	Up
Process State	O
User ID	0
Virtual Size (KB)	10104
Resident Set Size (KB)	9672
Start Date	09/01/99
Start Time	15:12:29
CPU Time	114
Percent CPU Time (%)	0
Context Switches	6917
System Calls	89741
Command Line	esd - init topology -dir /var/opt/SUNWsymon -q

FIGURE B-2 PA Process Statistics Property Table

6. Select the Virtual Size table cell, then proceed with one of the following:

- Click the right mouse button in the table row and select Attribute Editor from the pop-up menu.
- Click the Attributes button.

7. Click on the Alarms tab button.

The alarm rows are displayed (FIGURE B-3).

8. Type the desired value in the Critical Threshold (>) field.**9. Complete this procedure with one of the following actions:**

- Click OK to create a new Critical Threshold value and close this window.
- Click Apply to create a new Critical Threshold value without closing this window.
- Click Cancel to cancel your request.

Attribute Editor

Object Label: Virtual Size (KB)

Object Location: Local Applications/Agent Statistics/Sun Management Center Process Statistics

Info
Alarms
Actions
Refresh
History

Folder: Sun Management Center Process Statistics

Variable: Virtual Size (KB)

Current Value : 10120

Unit: KB

Rule: rCompare

Rule Description: The rCompare rule compares the current value of an object to threshold limits

Warning!: The Agent automatically shuts itself down when the Critical Threshold is exceeded. Do not decrease the Critical Threshold value unless you are confident the new value is appropriate.

Critical Threshold (>)

Alert Threshold (>)

Caution Threshold (>)

Alarm Window:

Parameter Description:

Set the thresholds to the values you want to alarm on.
> check alarms when the value exceeds the entered limit
< check alarms when the value is less than the entered limit
= check alarms when the value equals the entered limit
!= check alarms when the value does not equal the entered limit

Factory Defaults: Setting a parameter to blank returns it to its factory default value

FIGURE B-3 Alarms Tab for the Virtual Size Property in the Topology Manager Object

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 that 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. Its responsibilities include purging deleted events, renaming the trash file, and *smart delete* (FIGURE B-4).


Location: Local Applications/Event Management	
Module	
Property	Value
Purge Deleted Events	success
Rename Trash File	success
Smart Delete	success

FIGURE B-4 Event Management Module Data Properties

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 seven days and the open events are removed after 30 days. You can change these defaults with the following procedure.

▼ To Change the Default Values for Smart Delete in the Event Manager

1. Create the Event manager monitored object.

See “To Create a Server Component as a Monitored Object” on page 491.

2. Open the Details window by proceeding with one of the following:

- Click the right mouse button on the Event manager icon and highlight Details from the pop-up menu in the hierarchy view or the topology view.

- Double-click the left mouse button on the Event manager icon in the hierarchy view or the topology view.
 - Select the Event manager icon in the main console window then select Tools ► Details.
- 3. In the Browser Details window, double-click on the Local Applications icon in the hierarchy (tree) view.**
- 4. Select the Event Management module and proceed with one of the following:**
For more information, see “To Edit Module Parameters” on page 176.
- Click the right mouse button and highlight Edit Module from the pop-up menu in the hierarchy view or the contents view.
 - In the Details window, select Module ► Edit Module.
- The Module Parameters Editor is displayed.
- 5. Type the new time values into the editable fields.**
The default time values are displayed in FIGURE B-5.
- 6. Alternately, you may turn off “smart delete” by selecting Disabled in the pull-down menu next to the Smart Delete Enabled Switch field.**
- 7. Complete this procedure with one of the following actions:**
- Click OK to accept the changes you have made and close this window.
 - Click Reset to reset the Module Parameter Editor to the default parameters.
 - Click Cancel to cancel your request.

Module Parameter Editor

Module Parameters

Module: eventmgr

Module Name: Event Management

Module Description: The Event Management module provides periodic and on-demand functions for managing events.

Version: 2.0

Enterprise: sun

Module Type: localApplication

Auto Delete: Enabled ▼

Delete Closed Events After (Days): 7

Delete Open Events After (Days): 30

OK Reset Cancel

FIGURE B-5 Module Parameter Editor for the Event Management Module

Reading Sun Management Center Log Files

The 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.

▼ To Use `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.

- Use the `es-run` interface with the `ccat` command:

```
# /opt/SUNWsymon/sbin/es-run ccat path_to_file/filename
```

▼ To Use `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* and the `-f`, `-l`, and `-n` options where:

The *filename* argument is the full path name to the circular log file. The *filename* argument is mandatory.

`-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` option is used to print the absolute line number at the beginning of each message.

`-n NumOfLines` option is used to change the number of lines displayed. By default only the last 15 lines are printed.

- **Use the `es-run` interface with the `ctail` command:**

```
# /opt/SUNWsymon/sbin/es-run ctail [-f, -l, -n NumOfLines] path_to_file_filename
```

Sun Management Center Server Issues

This section discusses how the main console window hangs when users are attempting to start a new console window and connect to the Sun Management Center server. However, existing console window connections encounter no problems.

Hanging Main Console Window

This problem occurs because:

- *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. This buffered data is so large that the server runs out of memory while trying to write to the socket. Once this happens, the server does not recover.

Note – If you are monitoring the server log file, use the following command:

```
/opt/SUNWsymon/sbin/es-run ctail -f /var/opt/SUNWsymon/log/server.log.
```

You may see one or several messages that the server is out of memory.

- *The console memory for the console process is used up* - If that is the case, you may be able to confirm this by selecting the Sun Management Center Console Messages option under the File Menu on the main console window. The Sun Management Center Console Messages window may display one or several messages that the console is out of memory.

▼ To Resolve a Hanging Main Console Window

- If the server memory is used up, increase the memory available to the server process. The default size is 64 Mbytes.

For example, to double the default memory from 64 Mbytes to 128 Mbytes.:

```
# es-start -s -- -Xmx128m
```

Note – If your server is invoked using the `es-start -A` command, or by rebooting, customize the default memory size by changing `-Xmx64m` to the desired size in the `/opt/SUNWsymon/classes/base/server/bin/es-server.sh` file.

- If the console memory is used up, the solution is to restart the console with a bigger memory size.

For example, to increase the memory to 100 Mbytes:

```
# es-start -c -- -Xmx100m
```

This process allocates more memory to the console for this one session.

Note – To allocate more memory without having to re-enter the option `-- -Xmx<size>` for every session, change the default memory size from `-Xmx64m` to the desired size in the `/opt/SUNWsymon/classes/base/console/bin/es-console.sh` file.

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 Java, although non-Java applications are

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, and it has no further interaction with Sun Management Center once it has been launched.

The name of the application (as specified in the `console-tools.cfg` file) is added to the Tools menu in the main console window below the standard menu items provided by the Sun Management Center software. The application that is launched is displayed 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), but changes introduced by editing the files will 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 (`,`).

▼ To Customize the Tools Menu

1. Using a standard text editor, add the following line to the

`/var/opt/SUNWsymon/cfg/console-tools.cfg` file.

Each application implemented as a shell script or an executable binary is defined by a line with the following format:

```
menu_label,class [args]
```

where:

menu_label — the string that is displayed in the Tools menu. The string can be either *unlocalized* or *localized* text. Unlocalized 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, and *key* is the identifier used to locate the string that is displayed in the Tools menu in the property file. Note that spaces are not allowed in the key.

class — the fully qualified Java class name.

args — 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`.



Caution – Each entry must be specified on a single line, even though the text is shown wrapped in the example.

```
# 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"
```

Note – 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 there are embedded spaces, enclose the entire shell command in double quotes.

The second argument is the command to run on a Microsoft Windows client. For example: `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. The allowed variables are:

`$host` (replaced with the currently selected agent host name)

`$port` (replaced with the currently selected port number)

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.

```
# /opt/SUNWsymon/sbin/es-tool /var/opt/SUNWsymon/cfg/console-tools.cfg
```

4. Stop the console by selecting **File ► Exit** from the menu bar 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-start -c
```

Note – Depending upon your sites configuration, it may also be necessary 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 (for example HP OpenView and Unicenter TNG). 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. (Depending on your installation, your base directory may be different.)

▼ How 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 may 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. You are informing 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 and get the data from the MIB. However, the module must be *loaded* and *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.

Note – By default, the Sun Management Center modules are enabled for SNMP `Get` commands by using the SNMPv1 community 'public' and SNMPv2 username 'public'. However, if the Sun Management Center module has different settings, then you need to use the right community and username to communicate with the Sun Management Center agent.

Note – Since Sun Management Center agents operate with SNMPv2sec-based security, SNMP `Set` commands on the agent are involved. Refer to the SNMPv2sec related Request For Comments (RFCs) for more information.

▼ How to Access the Modules With Multiple Instances

SNMPv2 uses the term 'context' for the MIBs that can have multiple instances of the module loaded on the agent. If you are using a SNMPv2-based third party management station to communicate with this type of agent, then be sure you are using the right context information. However, if you are using a SNMPv1-based management station, then complete the following step.

- **Add the context information to the SNMP community as follows:**

```
community:context
```

Adding this context information enables you to access data from multiple instances of the same module running on an agent.

Database Backup and Recovery

- If your Sun Management Center database has been inadvertently corrupted due to a system failure (such as a file system problem), you can run the following interactive script as superuser to restore your database:

```
# /opt/SUNWsymon/sbin/es-restore
```

If you are already aware that your Sun Management Center database needs to be backed up to prevent loss of data (for example, before a hardware or operating environment upgrade), you can run either of the following two scripts to back up your database:

The following script will run in interactive mode and enable you to specify the location where the database files should be saved:

```
# /opt/SUNWsymon/sbin/es-backup
```

If you prefer to run `es-backup` in silent mode (with default answers to the script's questions), type the following command:

```
# /opt/SUNWsymon/sbin/es-backup -y
```

The database files will automatically be saved in the directory
`/var/opt/SUNWsymon/backup`.

If you need to periodically run the `es-backup` script with the `-y` option, you can also set your own cron program for the script to be run on a routine basis.

Note – Both scripts shut down the Sun Management Center processes before starting the restore or backup, and restart the processes once the recovery or backup has been completed.

Internet Protocol Routing

This appendix describes:

- Overview of IP Addressing
- Subnetting
- Netmasks

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, there was a need to organize the network hierarchically into administrative domains. This need 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, while 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	xxxxxxxx	xxxxxxxx	xxxxxxxx

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	xxxxxxxx	xxxxxxxx	xxxxxxxx

Class C uses three octets for the network address, and one 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
110xxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx

Subnetting

Subnetting is defined as dividing a network into smaller segments, or subnets, which 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, there is a class B network that 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.

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, we can get the address of the subnet.

Routers use netmasks to decide whether to forward a packet to an external subnet. For example, there is a machine with an IP address of 129.123.56.95 that is sending an email to another machine whose IP address is 129.123.56.100. By ANDing both IP addresses with a netmask (255.255.255.00), the result is 129.123.56.0 for both machines. The router then concludes that both the source machine and 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 apply to Ethernet links, the principles still apply regardless of the type of network.

Sun Management Center Software - Modules

The Sun Management Center software monitors various components of your system, including your hardware, operating environment, local applications, and remote systems. This section provides additional explanation for the core modules described in Chapter 11 and presents them in their respective 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
 - Sun StorEdge T3 Array
- Operating System
 - Directory Size Monitoring Module Version 2.0
 - File Monitoring Module Version 2.0
 - IPv6 Instrumentation Module Version 1.0
 - MIB-II Instrumentation Module Version 1.0
 - Kernel Reader Module Version 1.0
 - Kernel Reader Simple Module Version 3.0
 - NFS Statistics Module Version 2.0
 - Solaris Process Details Module Version 2.0
 - NFS File Systems Module Version 2.0
 - Simple MIB-II Module Version 1.0
- Local Applications
 - Agent Statistics Module Version 2.0
 - Data Logging Registry Module Version 2.0
 - Health Monitor Module Version 2.0
 - Logview ACL Version 1.0
 - Print Spooler Module Version 3.0
 - Process Monitoring Module Version 2.0

- File Scanning (System Log) Module Version 2.0
- Remote Systems
 - MIB-II Proxy Monitoring Module Version 2.0
 - HP JetDirect Module Version 2.0

Most of these modules have default monitoring conditions that generate alarms when system values fall outside of these conditions. You may alter these default thresholds by creating your own alarm thresholds, as explained in Chapter 11.

Also, there are modules that utilize the *Add Row* operation to define what data properties to monitor. These modules will come up with empty tables and you have to execute an Add Row operation to activate the specifics for monitoring the modules.

The following table lists the modules described in this appendix and provides details on those modules that are automatically loaded and those that can be loaded multiple times. It also points out those modules that utilize the Add Row utility.

TABLE D-1 Modules Loaded Automatically, Multiple Times, and Use Add Row Operation

Alphabetical Listing of Core Modules	Module Loads Automatically	Module Loads Multiple Times	Module Uses Add Row Utility
Agent Statistics Module Version 2.0	X		
Config-Reader Module ¹	X		
Data Logging Registry Module Version 2.0		X	
Directory Size Monitoring Module Version 2.0		X	X
Dynamic Reconfiguration Module ²			
File Monitoring Module Version 2.0		X	X ³
File Scanning (System Log) Module Version 2.0	X	X	X ⁴
HP JetDirect Module Version 2.0		X	
Health Monitor Module Version 2.0			
Kernel Reader Module Version 1.0	X		
Kernel Reader Simple Module 3.0			
Logview ACL Module 1.0			X

TABLE D-1 Modules Loaded Automatically, Multiple Times, and Use Add Row Operation

Alphabetical Listing of Core Modules	Module Loads Automatically	Module Loads Multiple Times	Module Uses Add Row Utility
MCP Manager Module 1.0			
IPv6 Instrumentation Module Version 1.0			
MIB-II Proxy Monitoring Module Version 2.0		X	
NFS File Systems Module Version 2.0			
NFS Statistics Module Version 2.0			
Print Spooler Module Version 3.0		X	X
Process Monitoring Module Version 2.0		X	X ⁵
Simple MIB-II Module	X		
Solaris Process Details Module Version 2.0			
Storage A5x00			
Sun StorEdge T3			

1. Refer to your platform-specific supplement for more information on the Config-Reader module.
2. Refer to your platform-specific supplement for more information on the Dynamic Reconfiguration module.
3. Each added row defines what file to monitor.
4. Each added row defines what pattern within the monitored file to match. The row needs to be added to the table, *Scan Table*.
5. Each row defines what pattern to match from all the processes that are running on the agent host.

Hardware

The following modules, when loaded, are found under the hardware icon:

- Sun StorEdge A5x00 Array
- Sun StorEdge T3 Array

Sun StorEdge A5x00 Array

Enables you to monitor the state of A5000, 5100, and 5200 storage devices, and manage alarms on these devices.

TABLE D-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. This value changes whenever there is a difference between previous snapshot and current snapshot.

TABLE D-3 Sun StorEdge A5x00 Sena Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
#dataFormat	instance
rowstatus	The row status
box_rev	Box_rev
device_count	Device_count
box_id	Box Id
instance	Instance
logical_path	Logical Path
machine	Machine
name	Name
node-wwn	Node-wwn
physical_path	Physical Path
platform	Platform

TABLE D-3 Sun StorEdge A5x00 Sena Table

Property	Description
set_flg	Set Flag
slot_count	Slot_count
type	Type
vendor_name	Vendor_name
virtual_node	Virtual_node

TABLE D-4 Sun StorEdge A5x00 Front Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
instance	Instance

TABLE D-5 Sun StorEdge A5x00 Rear Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
entry number	Instance

TABLE D-6 Sun StorEdge A5x00 Disk Backplane Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
byp_a_enabled	Byp_a_enabled
byp_b_enabled	Byp_b_enabled
fru	fru
status	Status
alarmRules	rpho400

TABLE D-7 Sun StorEdge A5x00 Fan Tray Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
fan_fail	Fan_fail
fru	fru
speed	Speed
status	Status
alarmRules	rpho401
type	Type

TABLE D-8 Sun StorEdge A5x00 Led Table

Property	Description
sunSmTreeProp	tree prop
sunSmNodeName	Name
entry_no	entry number
led-num	Led No
state	State

TABLE D-9 Sun StorEdge A5x00 Front Slot Table

Property	Description
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

TABLE D-9 Sun StorEdge A5x00 Front Slot Table

Property	Description
slot-num	Slot-num
status	Status
temperature	Temperature
temperature_status	Temperature_status
alarmRules	rpho407

TABLE D-10 Sun StorEdge A5x00 Rear Slot Table

Property	Description
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
status	Status
temperature	Temperature
temperature_status	Temperature_status
alarmRules	rpho408

TABLE D-11 Sun StorEdge A5x00 Disk Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
capacity	Capacity
device_type	Device Type

TABLE D-11 Sun StorEdge A5x00 Disk Table

Property	Description
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 D-12 Sun StorEdge A5x00 Sena Power Supply Table

Property	Description
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

TABLE D-12 Sun StorEdge A5x00 Sena Power Supply Table

Property	Description
temperature_status	Temperature_status
alarmRules	rpho409
type	Type

TABLE D-13 Sun StorEdge A5x00 Interconnect Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number
eprom_failure	Eprom_failure
fru	Fru
status	Status
alarmRules	rpho405

TABLE D-14 Sun StorEdge A5x00 Interface_board Table

Property	Description
interface_board-entry	entry_no
sunSmTreeProp	sunSmTreeProp
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 D-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_s tatus	Loop Configuration

TABLE D-16 Sun StorEdge A5x00 Rules

Rule	Description
rpho414	Fibre Channel OFFLINE
rpho415	Fibre Channel CRC Error
rpho416	ASC 0x47
rpho417	drive operation marginal
rpho418	failure prediction
rpho419	NCOMPLETE DMA XFER on sbus
rpho420	Offline Timeout
rpho421	soc lilp map failed

Sun StorEdge T3 Array

Enables you to monitor the state of T300 storage devices, and manage alarms on these devices.

TABLE D-17 Sun StorEdge T3 Module - Basic Properties Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name
dataFormat	instance
rowstatus	Row Status
sysId	id
sysVendor	vendor
sysModel	model
sysRevision	firmware revision
sysIpAddr	IP address
sysSubNet	subnet mask
sysGateway	gateway
sysBootMode	boot mode
sysBootDelay	boot delay
sysMpSupport	multi-pathing support
sysHasVolumes	has volumes

TABLE D-18 Sun StorEdge T3 Module - Advanced Properties Table

Property	Description
t300name	t300name
dataFormat	instance
rowstatus	Row Status
sysStripeUnitSize	stripe unit size
sysCacheMode	cache mode
sysCacheMirror	cache mirror
sysReadAhead	read ahead

TABLE D-18 Sun StorEdge T3 Module - Advanced Properties Table

Property	Description
sysReconRate	reconRate
sysOndgMode	ondgMode
sysOndgTimeslice	ondgTimeslice
sysIdleDiskTimeout	idle disk timeout
sysTftpHost	tftp host
sysTftpFile	tftp file
sysLastRestart	ast restart time
sysDate	date
sysTime	time
sysTimezone	time zone

TABLE D-19 Sun StorEdge T3 Module - Statistical Properties Table

Property	Description
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
sysCacheReadMisses	cacheReadMisses
sysCacheRmwFlushes	sysCacheRmwFlushes

TABLE D-19 Sun StorEdge T3 Module - Statistical Properties Table

Property	Description
sysCacheReconFlushes	cacheReconFlushes
sysCacheStripeFlushes	cacheStripeFlushes
clear-flag	clear flag

TABLE D-20 Sun StorEdge T3 Module - Unit Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name
unitId	unit id
unitType	unit type
unitStandby	standby
unitIsControllerUnit	isControllerUnit
machine	machine
platform	platform

TABLE D-21 Sun StorEdge T3 Module - Disk Table

Property	Description
disks-entry	entry_no
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number

TABLE D-22 Sun StorEdge T3 Module - Disk (Basic Properties Table)

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name

TABLE D-22 Sun StorEdge T3 Module - Disk (Basic Properties Table)

Property	Description
unitId	unit id
fruStatus	status
alarmRules	rpurple203, rpurple204, rpurple205

TABLE D-23 Sun StorEdge T3 Module - Disk (Common Fru Properties)

Property	Description
fruDiskRole	disk role
fruDiskCapacity	disk capacity
fruDiskTemp	temperature

TABLE D-24 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 valid
fruDiskVolIndex	disk volindex
fruDiskVolName	disk volname
fruDiskIsRoleData	isRoleData
fruDiskIsRoleStandby	isRoleStandby
	sUndefined
fruDiskIsRoleUndefined	
fruDiskIsExpendable	isExpendable

TABLE D-25 Sun StorEdge T3 Module - Controllers

Property	Description
controllers-entry	entry_no
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number

TABLE D-26 Sun StorEdge T3 Module - Controller Table

Property	Description
controller-entry	t300name unitId fruId
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name
unitId	unit id
fruStatus	status
alarmRules	rpurple20, rpurple202

TABLE D-27 Sun StorEdge T3 Module - Load Common FRU Properties

Property	Description
fruCtrlCpuDesc	CPU type
fruCtrlRole	controller role
fruCtrlPartnerId	partner id
fruCtrlCtState	current state
fruCtrlCacheSize	cache size
fruCtrlTemp	temperature
fruCtrlIsExpendable	isExpendable

TABLE D-28 Sun StorEdge T3 Module - Loopcards

Property	Description
loopcards-entry	entry_no

TABLE D-28 Sun StorEdge T3 Module - Loopcards

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number

TABLE D-29 Sun StorEdge T3 Module - Loop Card Table

Property	Description
loop_card-entry	t300name unitId fruId
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name
unitId	unit id
fruStatus	status
alarmRules	rpurple214 rpurple215 rpurple216

TABLE D-30 Sun StorEdge T3 Module - Load Common FRU Properties

Property	Description
fruLoopMode	loop mode
fruLoopCable1State	cable1 state
fruLoopCable2State	cable2 state
fruLoopTemp	temperature

TABLE D-31 Sun StorEdge T3 Module - Power Cooling Unit Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name
unitId	unit id
fruStatus	status
alramRules	rpurple206, rpurple207, rpurple208, rpurple209, rpurple210, rpurple211, rpurple212, rpurple213

TABLE D-32 Sun StorEdge T3 Module - Load Common FRU Properties

Property	Description
fruPowerPowOutput	output state
fruPowerPowSource	input source
fruPowerPowTemp	temperature
fruPowerFan1State	fan1 state
fruPowerFan2State	fan2 state
fruPowerBatState	battery state
fruPowerBatLife	battery life
fruPowerBatUsed	battery used

TABLE D-33 Sun StorEdge T3 Module - Midplane Table

Property	Description
sunSmTreeProp	true
sunSmNodeName	Current Name
t300name	t300name
unitId	unit id
fruStatus	status

TABLE D-34 Sun StorEdge T3 Module - Volume (Basic Properties Table)

Property	Description
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

TABLE D-34 Sun StorEdge T3 Module - Volume (Basic Properties Table)

Property	Description
volCacheMirror	cache mirror
volCapacity	volume capacity
volArrayWidth	drive number

TABLE D-35 Sun StorEdge T3 Module - Statistical Properties Table

Property	Description
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 D-36 Sun StorEdge T3 Module - Ports

Property	Description
ports-entry	entry_no
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number

TABLE D-37 Sun StorEdge T3 Module - Port (Basic Properties Table)

Property	Description
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

TABLE D-38 Sun StorEdge T3 Module - Statistical Properties Table

Property	Description
t300name	300name
unitId	unit id
portId	ortId
portTotalRequests	total requests
portWriteRequests	write requests
portReadRequests	read requests

TABLE D-38 Sun StorEdge T3 Module - Statistical Properties Table

Property	Description
portTotalBlocks	total blocks
portBlocksWritten	blocks written
portBlocksRead	blocks read

TABLE D-39 Sun StorEdge T3 Module - Attachments Table

Property	Description
attachments-entry	entry_no
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number

TABLE D-40 Sun StorEdge T3 Module - Attachments 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 valid
attachVolName	attach volname

TABLE D-41 Sun StorEdge T3 Module - Loops

Property	Description
loops-entry	entry_no

TABLE D-41 Sun StorEdge T3 Module - Loops

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
entry_no	entry number

TABLE D-42 Sun StorEdge T3 Module - Loops Table

Property	Description
sunSmTreeProp	sunSmTreeProp
sunSmNodeName	Current Name
t300name	t300name
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 D-43 Sun StorEdge T3 Module - Rules

Rule	Description
rpurple201	Controller Error
rpurple202	Controller Error
rpurple203	Disk Error
rpurple204	Disk Error
rpurple205	Disk Error
rpurple206	PowerSupply Error
rpurple207	PowerSupply Error
rpurple208	Fan fault

TABLE D-43 Sun StorEdge T3 Module - Rules

Ruole	Description
rpurple209	DC error
rpurple210	Power supply unit disabled
rpurple211	Power supply off
rpurple212	Power supply error
rpurple213	Battery missing
rpurple214	Loop card missing
rpurple215	Interconnect cable missing
rpurple216	Loop card disabled

Operating System

The following modules, when loaded, are found under the operating system icon:

- Directory Size Monitoring Module Version 2.0
- File Monitoring Module Version 2.0
- IPv6 Instrumentation Module Version 1.0
- Kernel Reader Module Version 1.0
- Kernel Reader Simple Module Version 3.0
- NFS Statistics Module Version 2.0
- Solaris Process Details Module Version 2.0
- NFS File Systems Module Version 2.0
- Simple MIB-II Module Version 1.0

These modules monitor the operating system on your host.

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 accessible from the modules pop-up menu.

Note – Any number of directories may be monitored individually by loading multiple instances of the Directory Size Monitoring module, or by adding rows for additional directories in the properties table. See “To Define a Directory” on page 105 for more information.

Directory Monitoring Status Table

The following table provides a brief description of the properties for Directory Size Monitoring:

TABLE D-44 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
Rate (KB/sec)	Rate at which the directory is changing size in Kbytes per second

File Monitoring Module Version 2.0

This module enables you to monitor the files on a host. Any file or number of files may be isolated and monitored 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 “Browser Table Operations” on page 97.

File Monitoring Status Table

The following table lists the File Monitoring Status properties and their descriptions:

TABLE D-45 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 following groups:

- IPv6 IP Group
- IPv6 TCP Group
- IPv6 UDP Group
- IPv6 ICMP Group

IPv6 IP Group

TABLE D-46 IPv6 Group Table

Property
IPv6 Forwarding
IPv6 Default Hop Limit
IPv6 Interface
IPv6 Route Number

TABLE D-47 IPv6 If Stats Table

Property
ipv6IfIndex
ipv6IfDescr
ipv6IfLowerLayer
ipv6IfEffectiveMtu
ipv6IfReasmMax Size
ipv6IfIdentifier
ipv6IfIdentifier Length
ipv6IfPhysical Address
ipv6IfAdminStatus
ipv6IfOperStatus

TABLE D-48 IPv6 If Stats Table

Property
ipv6IfIndex
ipv6IfStatsIn Receives
ipv6IfStatsInHdr Errors
ipv6IfStatsInTooBig Errors
ipv6IfStatsInNo Routes
ipv6IfStatsInAddr Errors
ipv6IfStatsIn UnknownProtos
ipv6IfStatsIn TruncatedPkts
ipv6IfStatsIn Discards
ipv6IfStatsIn Delivers
ipv6IfStatsOutForw Datagrams
ipv6IfStatsOut Requests
ipv6IfStatsOut Discards
ipv6IfStatsOutFrag OKs
ipv6IfStatsOutFrag Fails
ipv6IfStatsOutFrag Creates
ipv6IfStatsReasm Reqs
ipv6IfStatsReasm OKs

TABLE D-48 IPv6 If Stats Table

Property
ipv6IfStatsReasm Fails
ipv6IfStatsInMcast Pkts
ipv6IfStatsOutMcast Pkts

TABLE D-49 IPv6 Addr Prefix Table

Property
ipv6IfIndex
ipv6AddrPrefix
ipv6AddrPrefixLeng th
ipv6AddrPrefixOn LinkFlag
ipv6AddrPrefix AutonomousFlag

TABLE D-50 IPv6 Addr Table

Property
ipv6IfIndex
ipv6AddrAddress
ipv6AddrPfxLength
ipv6AddrType
ipv6AddrAnycast Flag
ipv6AddrStatus

TABLE D-51 IPv6 Route Table

Property
ipv6 RouteDest
ipv6RoutePfxLength
ipv6RouteIndex
ipv6RouteIfIndex
ipv6RouteNextHop
ipv6RouteType
ipv6RouteProtocol
ipv6RoutePolicy
ipv6RouteAge
ipv6RouteNextHop RDI
ipv6RouteMetric
ipv6RouteWeight
ipv6RouteInfo
ipv6RouteValid

TABLE D-52 IPv6 Net To Media Table

Property
ipv6IfIndex
ipv6NetToMediaNet Address
ipv6NetToMedia PhysAddress
ipv6NetToMedia Type

TABLE D-52 IPv6 Net To Media Table

Property
ipv6IfNetToMedia State
ipv6IfNetToMedia LastUpdated
ipv6NetToMedia Valid

IPv6 TCP Group

TABLE D-53 IPv6 Conn Table

Property
tcp6ConnState
tcp6ConnLocal Address
tcp6ConnLocalPort
tcp6ConnRem Address
tcp6ConnRemPort

IPv6 UDP Group

TABLE D-54 IPv6 UDP Table

Property
ipv6UdpLocal Address
ipv6UdpLocalPort
ipv6UdpIfIndex

IPv6 ICMP Group

TABLE D-55 IPv6 If ICMP Table

Property
ipv6IfIndex
ipv6IfIcmpMsgs
ipv6IfIcmpInErrors
ipv6IcmpInDest Unreachs
ipv6IfIcmpInAdmin Prohibs
ipv6IfIcmpInTime Excds
ivp6IfIcmpInParm Problems
ivp6IfIcmpInPktToo Bigs
ipv6IfIcmpInEchos
ipv6IfIcmpInEcho Replies
ipv6IfIcmpInRouter Solicits
ipv6IcmpInRouter Advertisements
ipv6IfIcmpIn NeighborSolicits
ipv6IfIcmpInNeighb orAdvertisements
ipv6IfIcmpIn Redirects
ipv6IfIcmpInGroup MembQueries
ipv6IfIcmpInGroup MembResponses
ipv6IfIcmpInGroup MembReductions

TABLE D-55 IPv6 If ICMP Table

Property
ipv6IfIcmpOutMsgs
ipv6IfIcmpOutErrors
ipv6IfIcmpOutDestUnreachs
Ipv6IfIcmpOutAdminProhibs
ipv6IfIcmpOutTimeExcds
ipv6IcmpOutParmProblems
ipv6IcmpOutPktTooBigs
ipv6IfIcmpOutEchos
ipv6IfIcmpOutEchoReplies
ipv6IfIcmpOutRouterSolicits
ipv6IcmpOutRouterAdvertisements
ipv6IfIcmpOutNeighborSolicits
ipv6IfIcmpOutNeighborAdvertisements
ipv6IfIcmpOutRedirects
ipv6IfIcmpOutGroupMembQueries
ipv6IfIcmpOutGroupMembResponses
ipv6IfIcmpOutGroupMembReductions

MIB-II Instrumentation Module Version 1.0

This section presents information on the MIB-II Instrumentation module. It describes the property tables that belong to the following MIB-II groups:

- MIB-II System Group Table
- MIB-II Interfaces Group Tables
- MIB-II IP Group Table
- MIB-II ICMP Group Table
- MIB-II TCP Group Tables
- MIB-II UDP Group Tables

MIB-II System Group Table

The following table provides a brief description of the properties for MIB-II System Group:

TABLE D-56 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 is up
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:

- MIB-II Interfaces Group Table
- MIB-II Interface Table

MIB-II Interfaces Group Table

The following table provides a brief description of the properties for MIB-II Interfaces Group:

TABLE D-57 MIB-II Interfaces Group Properties

Property	Description
Number of Interfaces	Number of interfaces to the machine, including the loopback

MIB-II Interface Table

The following table provides a brief description of the properties for MIB-II Interfaces:

TABLE D-58 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

TABLE D-58 MIB-II Interface Properties (*Continued*)

Property	Description
IF Out Octets	Number of octets 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:

- MIB-II Group Table
- IP Address Table
- IP Route Table
- IP NetToMedia Table

MIB-II Group Table

The following table provides a brief description of the properties for MIB-II IP Group:

TABLE D-59 MIB-II Group Properties

Property	Description
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 discarded because of errors in IP headers
IP In Address Errors	Number of input datagrams discarded because of errors in destination IP address
IP Forwarded Datagrams	Number of forwarded datagrams

TABLE D-59 MIB-II Group Properties (*Continued*)

Property	Description
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

IP Address Table

The following table provides a brief description of the properties for IP Addresses:

TABLE D-60 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 which can be reassembled by this entity

IP Route Table

The following table provides a brief description of the properties for IP Route:

TABLE D-61 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

IP NetToMedia Table

The following table provides a brief description of the properties for IP NetToMedia:

TABLE D-62 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 D-63 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 ICMP parameter problem messages received
ICMP In Src Quenchs	Number of ICMP source quench messages received
ICMP In Redirects	Number of ICMP redirect messages received
ICMP In Echos	Number of ICMP echo request messages received
ICMP In Echo Reps	Number of ICMP echo reply messages received
ICMP In Timestamps	Number of ICMP timestamp request messages received
ICMP In Timestamp Reps	Number of ICMP timestamp reply messages received

TABLE D-63 MIB-II ICMP Group Properties *(Continued)*

Property	Description
ICMP In Address Masks	Number of ICMP address mask request messages received
ICMP In Address Mask Reps	Number of ICMP address mask reply messages received
ICMP Out Messages	Number of ICMP messages that were attempted to send
ICMP Out Errors	Number of ICMP messages that were not send 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 ICMP parameter problem messages sent
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 ICMP echo request messages sent
ICMP Out Echo Reps	Number of ICMP echo reply messages sent
ICMP Out Timestamps	Number of ICMP timestamp request messages sent
ICMP Out Timestamp Reps	Number of ICMP timestamp reply messages sent
ICMP Out Address Masks	Number of ICMP address mask request messages sent
ICMP Out Address Mask Reps	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:

- MIB-II TCP Group Table
- TCP Connections Table

MIB-II TCP Group Table

The following table provides a brief description of the properties for MIB-II TCP Group:

TABLE D-64 MIB-II TCP Group Properties

Property	Description
TCP Retransmission Algorithm	Algorithm used to determine the timeout value 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 received in error
TCP Out With Reset Flag	Number of segments sent containing the RST flag

TCP Connections Table

The following table provides a brief description of the properties for TCP Connections:

TABLE D-65 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:

- MIB-II UDP Group Table
- UDP Table

MIB-II UDP Group Table

The following table provides a brief description of the properties for MIB-II UDP Group:

TABLE D-66 MIB-II UDP Group Properties

Property	Description
UDP In Datagrams	Number of UDP datagrams 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

UDP Table

The following table provides a brief description of the properties for UDP:

TABLE D-67 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

Kernel Reader Module Version 1.0

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

Kernel Reader Simple Module Version 3.0

- System Load Statistics
- Swap Statistics Table
- Streams Statistics Managed Objects Table
- Software Rules Table

The Kernel Reader module generates a warning alarm if it 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 D-68 Kernel Reader Alarm Thresholds

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 D-69 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
Primary User	Login name of the primary user

Interprocess Communication Tables

IPC Shared Memory Table

TABLE D-70 IPC Shared Memory Properties

Property	Description
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.

IPC Semaphores Table

TABLE D-71 IPC Semaphores Properties

Property	Description
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:

System Load Statistics Table

TABLE D-72 System Load Statistics Properties

Property	Description
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:

- Disk Details Table
- Disk Service Time Table

The following table provides a brief explanation of what these tables contain:

TABLE D-73 Disk Statistics Parameters

Property	Description
Disk Details	Details that pertain to the disk

Disk Details Table

The following table provides a brief description of the properties for Disk Details:

TABLE D-74 Disk Details Properties

Property	Description
Disk Name	Name of the disk (sd0 and so on)
Disk Alias	Name of the disk (c0t0d0 and so on)
Read Operation Per Sec	Read operation per sec
Writes Operation Per Sec	Writes operation per sec
Operation Per Sec (read + write)	Operation per sec (read and write)
Number Of Bytes Read	Number of bytes read
Number Of Bytes Written	Number of bytes written

TABLE D-74 Disk Details Properties (*Continued*)

Property	Description
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

Disk Service Time Table

The following table provides a brief description of the properties for Disk Service Time:

TABLE D-75 Disk Service Time Properties

Property	Description
Diskname	Name of the disk (sd0 and so on)
Disk Alias	Name of the disk (c0t0do, etc.)
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
Average Service Time	Average service time
Rule 404	Meta Disk Rule

I/O Error Statistics Table

TABLE D-76 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 (FIGURE D-1):

TABLE D-77 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 D-78 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
Transport Errors	Total number of transport errors
Total Errors	Total number of errors

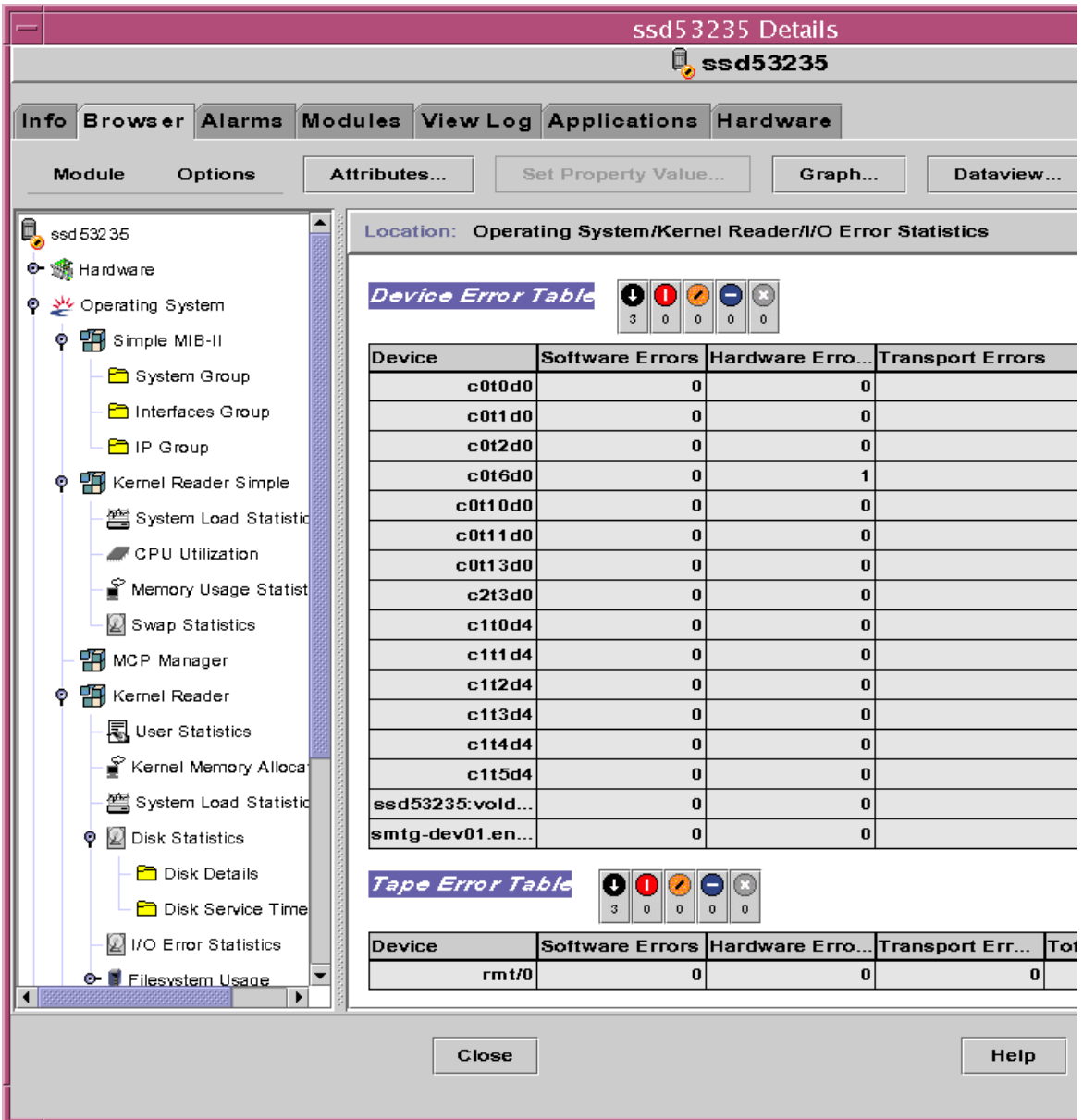


FIGURE D-1 I/O Error Statistics Tables

Filesystem Usage Table

The following table provides a brief description of the properties for Filesystem Usage:

TABLE D-79 Filesystem 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 filesystem 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 filesystem 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 *only* find 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 (FIGURE D-2) regardless of the date/time they were created or modified. For more information on the probe command, see “To Probe a Property” on page 117.

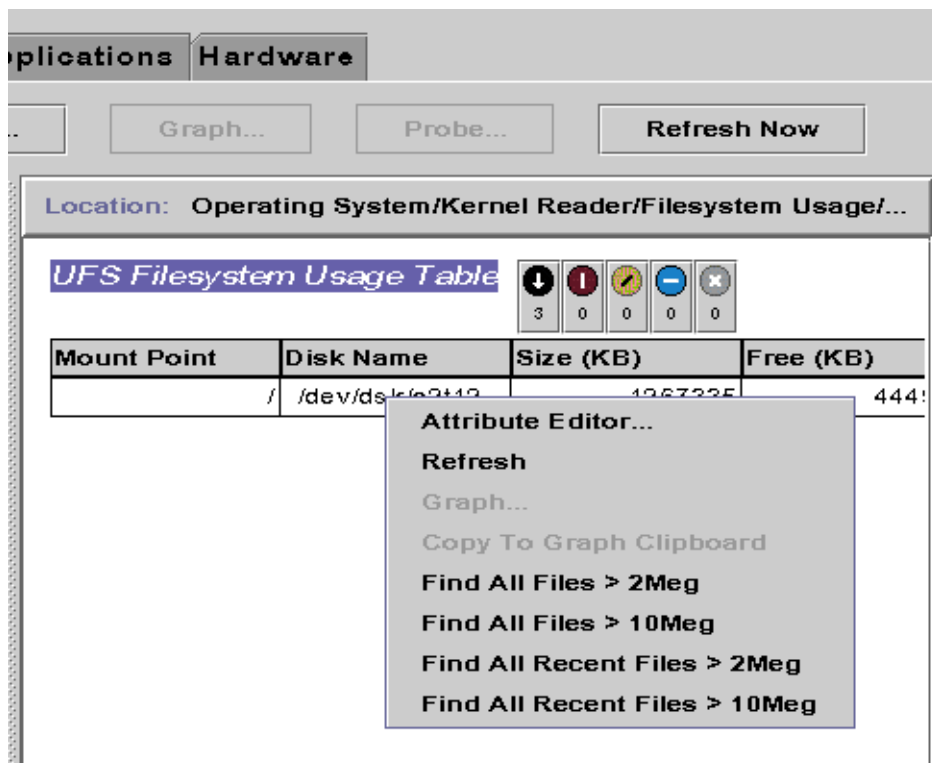


FIGURE D-2 Probe Commands for Filesystem Usage

CPU Statistics Managed Object Tables

The following tables provide a brief description of the properties for CPU Statistics managed objects:

- CPU Utilization Table
- CPU Process Table
- CPU I/O Table
- CPU Interrupts Table
- CPU Syscalls Table
- CPU Misc Table
- CPU Regwindow Table
- CPU Pageinfo Table
- CPU Faults Table

CPU Utilization Table

The following table provides a brief description of the properties for CPU Utilization:

TABLE D-80 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

CPU Process Table

The following table provides a brief description of the properties for CPU processes:

TABLE D-81 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

CPU I/O Table

The following table provides a brief description of the properties for CPU I/O:

TABLE D-82 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
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 waiting for block I/O

CPU Interrupts Table

The following table provides a brief description of the properties for CPU Interrupts:

TABLE D-83 CPU Interrupts Properties

Property	Description
CPU Number	CPU number
Context Switches	Number of context switches
Traps	Number of traps

TABLE D-83 CPU Interrupts Properties

Property	Description
Device Interrupts	Number of device interrupts
Interrupts As Threads	Number of interrupts as threads
Interrupts Blocked/ Preempted/Released	Number of interrupts blocked, pre-empted or released

CPU Syscalls Table

The following table provides a brief description of the properties for CPU system calls:

TABLE D-84 CPU System Call Properties

Property	Description
CPU Number	CPU number
System Calls	Number of system calls
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

CPU Misc Table

The following table provides a brief description of the properties for CPU Miscellaneous:

TABLE D-85 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
Loadable Module Unloaded	Number of loadable module unloaded
Tries To Acquire RW Lock	Number of tries to acquire read/write lock

CPU Regwindow Table

The following table provides a brief description of the properties for CPU Regwindow:

TABLE D-86 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

CPU Pageinfo Table

The following table provides a brief description of the properties for CPU Pageinfo:

TABLE D-87 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 paged in
Pageouts	Number of pageouts
Pages Paged Out	Number of pages paged out
Swapins	Number of swap ins
Pages Swapped In	Number of pages swapped in
Swapouts	Number of swap outs
Pages Swapped Out	Number of pages swapped out
Pages Zero Filled On Demand	Number of pages zero filled on demand
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

CPU Faults Table

The following table provides a brief description of the properties for CPU Faults:

TABLE D-88 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 <code>addr</code> Space	Number of in kernel <code>addr</code> space

Memory Usage Statistics Table

The following table provides a brief description of the properties for Memory Usage Statistics:

TABLE D-89 Memory Usage Statistics Properties

Property	Description
Physical Memory Available (MB)	Physical memory 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 free in Mbytes
Percent Memory Free	Percentage of memory free

Swap Statistics Table

The following table provides a brief description of the properties for Swap Statistics:

TABLE D-90 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 D-91 Streams Statistics Managed Objects

Properties	Description
Stream Head Cache	Kernel statistics for streams head cache
Queue Cache	Kernel statistics for queue cache
Streams Msgs	Kernel statistics for streams messages
Linkinfo Cache	Kernel statistics for link information cache

TABLE D-91 Streams Statistics Managed Objects

Properties	Description
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 preceding property tables have similar entries. These are listed in the following table.

All of the Streams Statistics managed objects have the same properties. The following table presents these common properties:

TABLE D-92 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 D-93 Software Rules Properties

Property	Description
Rule rknr105	Software rule (refer to rule rknr105 in Appendix E)
Rule rknr106	Software rule (refer to rule rknr106 in Appendix E)

NFS Statistics Module Version 2.0

This section presents property tables for NFS Statistics:

- RPC Information Table
- NFS Information Table

Using the NFS Statistics module, statistical information on the Remote Procedure Calls (RPC) and Sun's distributed computing file system (NFS) calls may be monitored. The number of RPC and NFS calls received by the server and made by the client are monitored and 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 D-94 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 made per second

NFS Information Table

The following table provides a brief description of the properties for NFS Information:

TABLE D-95 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 calls sent (bad NFS calls/NFS calls)
NFS Call Rate	Number of NFS calls sent per second

NFS Statistics

TABLE D-96 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.

TABLE D-97 Client NFS 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 Solaris Process Details module parameters are listed in the following table. This table is seen when you try to load the module.

TABLE D-98 Solaris Process Details Parameters

Property	Description
Module Name	Name of the module (this is not editable)
Module Description	Description of the module (this is not editable)
Version	Version of the module (this is not editable)
Enterprise	SNMP enterprise in which the module is loaded (this is not editable)
Module Type	Type of the module (this is not editable)
Number of Processes	Number of processes that is obtained by the module based on the following 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 section presents the Solaris Process property table.

Process Table

The following table provides a brief description of the properties for Solaris Process:

TABLE D-99 Process Properties

Property	Description
PS Process ID	Process ID of this process
PS Parent Process ID	Process ID of the parent of this process
PS User ID	Login ID of the user of this process
PS User Name	Login name of the user of this process
PS Effective User ID	Effective user ID of this process
PS Group ID	Real group ID of this process
PS Effective Group ID	Effective group ID of this process
PS Session ID	Process ID of the session leader of this process
PS Process Group ID	Process ID of the process group leader of this process
PS TTY	Controlling terminal for this process
PS Start Time	Starting time of this process
PS Time	Cumulative execution time of this process
PS State	State of this process
PS Wait Channel	Address of an event for which this process is waiting
PS Scheduling Class	Scheduling class of this process
PS Address	Memory address of this process
PS Size	Total size of this process in virtual memory
PS Priority	Priority of this process
PS Nice	Nice value of this 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 this process
PS Command Line	Full command name of this process, including the arguments

NFS File Systems Module Version 2.0

The NFS File Systems module enables you to monitor the NFS file systems on hosts running the Solaris 2 and Solaris 7 operating environments. The NFS File Systems module monitors the amount of disk space occupied by mounted or unmounted file systems: the amount of used and available space as well as the remaining total capacity.

When loading the NFS File Systems module, you may define which file systems 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.

File System Usage Table

The following table provides a brief description of the properties for NFS Filesystem Usage:

TABLE D-100 Filesystem Usage Properties

Property	Description
NFS Filesys	Name of the NFS filesystem
Size	Total size of the NFS filesystem 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 filesystem
Entry Index	Entry index of the NFS filesystem

Simple MIB-II Module Version 1.0

The following tables provide a brief description of the properties for Simple MIB-II managed objects:

- System Group
- Interfaces Group
- IP Group

System Group

The following table provides a brief description of the properties for System Group.

TABLE D-101 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 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

Interfaces Group

The following tables provides a brief description of the properties for Interfaces Group.

- Interfaces Group
- Interfaces Table

TABLE D-102 Interfaces Group Properties

Property	Description
Number of Interfaces	Number of interfaces to the machine, including the loopback

TABLE D-103 Interfaces Table

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

TABLE D-103 Interfaces Table (*Continued*)

Property	Description
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 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 following table provides a brief description of the properties for IP Group.

- IP Group
- IP Route Table

TABLE D-104 IP Group

Property	Description
IP Forwarding	Indicates whether this entity is a gateway

TABLE D-105 IP Route Table

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

IP Address Table

TABLE D-106 IP Address Table Properties

Property	Description
IPAT IP Address	IP Address Table Entry IP Address in MIB-II
IPAT IfIndex	
IPAT Net Mask	
IPAddTab R MaxSize	

Local & Remote Application Modules

The Sun Management Center software monitors various components of your system, including your hardware, operating environment, local applications, and remote systems. This section provides additional explanation for the core modules described in Chapter 11 and presents them in their respective categories.

This appendix describes the following modules. For more information on other modules that may be applicable to your particular system, see the previous appendix, your supplement, or go to the Sun Management Center web site: <http://www.sun.com/sunmanagementcenter>.

- Local Applications
 - Agent Statistics Module Version 2.0
 - Data Logging Registry Module Version 2.0
 - Health Monitor Module Version 2.0
 - Logview ACL Version 1.0
 - Print Spooler Module Version 3.0
 - Process Monitoring Module Version 2.0
 - File Scanning (System Log) Module Version 2.0
- Remote Systems
 - MIB-II Proxy Monitoring Module Version 2.0
 - HP JetDirect Module Version 2.0

Most of these modules have default monitoring conditions that generate alarms when system values fall outside of these conditions. You may alter these default thresholds by creating your own alarm thresholds, as explained in Chapter 11.

Also, there are modules that utilize the *Add Row* operation to define what data properties to monitor. These modules will come up with empty tables and you have to execute an Add Row operation to activate the specifics for monitoring the modules.

The following table lists the modules described in this appendix alphabetically and provides details on those modules that are automatically loaded and those that can be loaded multiple times. It also points out those modules that utilize the Add Row utility.

Local Applications

The following modules, when loaded, are found under the local applications icon:

- Agent Statistics Module Version 2.0
- Data Logging Registry Module Version 2.0
- Health Monitor Module Version 2.0
- Logview ACL Version 1.0
- Print Spooler Module Version 3.0
- Process Monitoring Module Version 2.0
- File Scanning (System Log) Module Version 2.0

Agent Statistics Module Version 2.0

This section presents the following information on Agent Statistics:

- Object Statistics Table
- Commands Executed Table
- Transactions Performed Table
- Sun Management Center Process Statistics Table
- Sun Management Center Total Process Statistics Table

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 D-107 Agent Statistics Main Sections

Agent Statistics Tables	Description
Object Section	Displays data on the objects 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 D-108 Agent Statistics Section Properties

Property	Description
Object Statistics	TOE Count - Number of TOE objects loaded into the agent bob Count - Number of binary object buffers used by the agent
Commands Executed	Total - Total number of commands that have been executed by the agent Rate (#/sec) - Number of commands executed by the agent per second
Transactions Performed	Total - Total number of transactions performed by the agent 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 D-109 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 property tables for Agent Statistics.

Object Statistics Table

The Objects section displays data on the Objects 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 D-110 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 D-111 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 D-112 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 D-113 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 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 D-114 Total Sun Management Center Process Statistics Properties

Property	Description
Number of 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

Data Logging Registry Module Version 2.0

The Data Logging Registry consists of the registry table.

Registry Table

The following table provides a brief description of the properties for Data Logging Registry:

TABLE D-115 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
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

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 D-116 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 D-117 Swap Properties

Property	Description
Swap Available KB	Swap space value available
Swap Reserved KB	Swap space value reserved
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 D-118 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 D-119 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

TABLE D-119 NFS Client Information Properties (*Continued*)

Property	Description
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 time-outs exceed the minimum specified timeout value for a call.
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 D-120 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 D-121 Disk Properties

Property	Description
Disk Name	Name of the disk
Disk Alias	Name of the disk (for example, c0t0d0)
Percent Disk Wait	Average number of transactions waiting for service

TABLE D-121 Disk Properties *(Continued)*

Property	Description
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 D-122 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 D-123 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 D-124 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	DNLC (Directory Name Lookup Cache) rule

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.

TABLE D-125 Logview Access Control Table

Property
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
- Printer Devices Table
- Printer Queues Table

The following table describes the print spooler managed objects:

TABLE D-126 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 following table provides a brief description of the properties for the Line Printer's Schedule (LPsched):

TABLE D-127 Printer LPsched Properties

Property	Description
LPsched state	Current status of the printer.

Printer Devices Table

The Printer Devices table lists the printers that are already added to the table (by selecting the Add option from the pop-up menu. The pop-up menu displays when you position the cursor in a row and click the right mouse button.)

The instance name or alias of the printer is displayed in the Name field followed by the description of the printer displayed in the Description field, and the name of the host on which it is installed, displayed in the Host Name field. If you are running a console displaying 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 D-128 Printer Devices Properties

Property	Description
Row Status	The 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	The 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 D-129 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
Printer Queue Size	Total size (in Kbytes) of the jobs currently spooled in the queue

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 “Browser Table Operations” on page 97.

When a process “hit” 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 “Pop-up Menu” on page 72 for more information.

Process Statistics Table

The following table provides a brief description of the properties for Process Statistics:

Note – The first five row entries in TABLE D-130 must be entered by you when adding a row to the process statistics table. See “To Add a Row (for the Directory Size Monitoring, File Monitoring, File Scanning, and Process Monitoring Modules)” on page 106 for more information.

TABLE D-130 Process Statistics Properties

Property	Description
Entry Name	Name of the entry (must be a unique name)
Name Pattern	Pattern to match the name of the process that you want to monitor
Argv Pattern	Pattern to match the arguments of the command which executes the process
User Specification	User name executing the command
Entry Description	Description of the entry (mandatory field)
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).
Process Command	Name process
% CPU Usage	Percentage CPU used by the processes. This is a time-weighted average taken at different time intervals (not to be confused with the value that might result after you enter the Unix ps command).
Virtual Size	Total size of the processes
Resident Set Size	Resident size of the processes
Process Count	Number of the processes that matched the pattern

File Scanning (System Log) 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 “Browser Table Operations” on page 97.

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 D-131 File Scanning (System Log) Properties

Property	Description
File ID	Name given by you to the pattern used in the file scan
File Stats	State of the pattern listed
Scan Table	Name given by you to the pattern used in the file scan

File ID Table

The following table provides a brief description of the properties for File ID:

TABLE D-132 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

File Statistics Table

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 D-133 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 contained in the file
Lines Per Second	Rate at which the file is changing in lines per second

Scan Table

The following table provides a brief description of the properties for Scan:

TABLE D-134 Scan Table Properties

Property	Description
Row Status	The status of the row
Pattern Name	Name given by you to the pattern 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 pattern listed will not be used in the file scan
Matches	Number of lines that contain the pattern

Remote Systems

The software enables you to monitor remote systems, such as HP printers equipped with a JetDirect card.

The following modules, when loaded, are found under the local remote system icon:

- MIB-II Proxy Monitoring Module Version 2.0
- HP JetDirect Module Version 2.0

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
- MIB-II Interfaces Group Tables
- MIB-II IP Group Table
- MIB-II ICMP Group Table
- MIB-II TCP Group Tables
- MIB-II UDP Group Tables

For more information on the properties of these parameters, see “IPv6 Instrumentation Module Version 1.0” on page 536, 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).

HP JetDirect Module Version 2.0

Agents can monitor HP printers 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.

Printer Status Table

The following table provides a brief description of the properties for Printer Status:

TABLE D-135 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.

Sun Management Center Software Rules

This appendix lists the Sun Management Center rules for the following modules:

- Kernel Reader
- Health Monitor

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 and complex:

- 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 equals or is greater than the percentage specified in the rule, then an alarm is generated.
- Complex rules are based on multiple conditions becoming true. For example, one complex rule states that when a disk is over 75% busy and the average queue length is over 10 and the wait queue is increasing, then an alert alarm is generated.

Note – Any user-customized Solstice SyMON 1.x rules must be ported to the new environment before the rules can be used in Sun Management Center software.

Kernel Reader

The following table lists the Kernel Reader simple rules.

TABLE E-1 Kernel Reader Simple Rules

Property	Description
avg_1min	Load Averages Over The Last 1 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 E-2 Kernel Reader Complex Rules

Rule ID	Description	Type of Alarm
rknrd100	This rule covers a transitory event and generates an alert alarm when the disk is over 75% busy, the average queue length is over 10, and the wait queue is increasing. Alert alarm stays on until the disk is not over 70% busy and the average queue length is no longer than 8.	Alert
rknrd102	This rule covers a transitory event and generates an alert alarm if 90% of swap space is in use. Event causing the alarm stays open until swap space in use is less than 80% of the total swap space.	Alert
rknrd103	This rule covers a transitory event and generates an alert alarm if swapping and paging is high for a given CPU. This indicates that a CPU may be thrashing. Alert alarm is generated when CPU exceeds 1 swap-out, 10 page-ins, and 10 page-outs per second. 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 6 per CPU for four hours.	Informational
rknrd401	This rule checks for disks being busy more than 90% of the file for x hours. The parameters field holds the last time CPU load was below 6, and is initialized to some date in the year 2001.	Informational
rknrd402	This rule checks if available swap space drops below 10% for x hours. The parameters field holds the last time CPU load was below 6, and 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 the rule rknrd401 gets triggered 4 times.	Informational
rknrd405	An informational alarm is generated if the rule rknrd402 gets triggered 4 times.	Informational

Health Monitor

The following table lists the Health Monitor complex rules.

TABLE E-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	Each time a CPU has to wait for a lock to become free, it wastes CPU power; and this event is counted, since the kernel uses mutually exclusive locks to synchronize its operation and keep multiple CPUs from concurrently accessing critical code and data regions.	Critical, Alert, Caution
rhltm002	This rule is based on the observation that NFS remote procedure call timeouts may be associated with duplicate responses after the call is retransmitted. This indicates that the network is okay but the server is responding slowly.	Critical, Alert, Caution
rhltm003	Here the run queue length is divided by the number of CPUs. This is based upon the fact that every CPU takes a job off the run queue in each time slice.	Critical, Alert, Caution
rhltm004	A busy or 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 it needs more memory when it scans looking for idle pages to reclaim for other uses.	Critical, Alert, Caution
rhltm006	This rule refers to the kernel memory allocation problem. It shows up 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. It is more a sign of a problem that may otherwise be overlooked.	Critical, Alert, Caution
rhltm007	There is a global cache of directory path name components called the directory name lookup cache, or Directory Name Lookup Cache Rule (DNLC). Missing a cache means that directory entries must be read from disk and scanned to locate the right file.	Critical, Alert, Caution

Glossary

administrative domain	An arbitrary collection of hosts and networks that are monitored by the software as a single hierarchical entity. Users may choose to divide their enterprise into several domains, each to be managed by different users.
agent	A software process, usually corresponding to a particular local managed host, that carries out manager requests and makes local system and application information available to remote users.
alarm	An abnormal event, which may be indicative of current or impending problems, is detected by a Sun Management Center agent. The agent passes information about the abnormal event to the Sun Management Center server. The server passes this information on to the user as an alarm, when the abnormal event matches a predefined alarm threshold.
alarm acknowledgment	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.
Attribute Editor	A window which 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.
bus	A point-to-point network component. Used by the software to represent a network link to which many other hosts may be connected.
community	A string similar to a password that is used to authenticate access to an agent's monitored data.
complex alarm	A complex alarm is based on a set of conditions becoming true. Unlike simple alarms, you cannot set thresholds for complex alarms.

composite object	Composite object refers to hardware with multiple instances of the Solaris operating environment running inside a single chassis. They are “composites” from the Sun Management Center point of view because they consist of several parts shown inside a group or container; one object for each instance of the Solaris operating environment, two objects representing an active and backup “system controller,” and one object representing the hardware chassis and related equipment such as fans and power supplies.
Console window	A graphical user interface component of Sun Management Center software based on Java technology that is used to view monitored hosts (and managed objects) information and status and to interact with Sun Management Center agents.
developer environment	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 3.0 Developer Environment Reference Manual</i> for more information.
Discovery	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.
dynamic loadable modules	A Sun Management Center agent module that can be loaded or unloaded at run time, enabling monitored properties to be displayed on the main console window without having to restart the console or agent.
event	A change in the state of a managed object.
file scanning	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.
graphical user interface	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.
hierarchy view	A window view that defines objects in a hierarchy or tree relationship to one another. Objects are grouped depending on the rank of the object in the hierarchy.
hop	The number of routers a packet goes through before reaching its destination.

instance	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.
manage	In Sun Management Center software, manage is defined as being able to monitor, as well as 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.
MIB	Management Information Base. A MIB is a hierarchical database schema describing the data available from an agent. The MIB is used by Sun Management Center agents to store monitored data that can be accessed remotely.
module	A software component that may be loaded dynamically to monitor data resources of systems, applications and network devices.
monitor	In Sun Management Center software, monitor is defined as being able to observe an object, view alarms and properties. Monitoring privileges are similar to read-only access.
node	A node is a workstation or server.
object	A particular resource (computer host, network interface, software process, and so on) which is subject to monitoring or management by Sun Management Center software. A managed object is one 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 one that you can observe but not acknowledge or otherwise manage.
production environment	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.
remote server context	A remote server context refers to a collection of Sun Management Center agents and a particular server layer with which the remote agents are associated.
request caching	The Sun Management Center server consolidates duplicate outstanding requests originating from multiple consoles and eliminates the execution of redundant requests.
rule	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.
segment	An object representing a “segment” of the network, and used as a basis for a local network.

seed	The password for the Sun Management Center user group called <code>esmaster</code> . The seed is an alpha-numeric string of up to 8 characters. (This 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 it for later reference.
server	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. Usually sends requests to Sun Management Center agents, accepts collected data from them, and passes the data to the main console window for display.
server context	See “remote server context.”
simple alarm	Simple alarms are based on one condition becoming true. You may set alarm thresholds for simple alarms.
SNMP	Simple Network Management Protocol. A simple protocol designed to allow networked entities (hosts, routers, and so on) to exchange monitoring information.
SNMPv2 usec	SNMP version 2, user-based security model security standards.
Sun Management Center superuser	Sun Management Center superuser is 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.
Sun Management Center user	Sun Management Center users are the members of the <code>symon</code> group in the <code>/etc/group</code> file.
topology view	The topology view displays the members of the object selected in the hierarchy view.
URL	Uniform Resource Locator. An URL is a textual specification describing a resource which is network-accessible.

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