Sun Enterprise SyMON™ 2.0 User's Guide

THE NETWORK IS THE COMPUTER™

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Preface

The *Sun Enterprise SyMON 2.0 User's Guide* provides instructions on how to use the Sun Enterprise SyMON™ system management solution. These instructions are designed for a system administrator with networking knowledge.

Note – In the Sun Enterprise SyMON 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 `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Sun Documentation on the Web

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CHAPTER 1

Introduction

This chapter provides an overview of the Sun Enterprise SyMON™ version 2.0 product, its components and how they interact with one another.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This chapter includes the following topics:

- SyMON Overview
- SyMON Architecture
- SyMON Concepts
- SyMON Monitoring Features

SyMON Overview

Sun Enterprise SyMON 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.

SyMON technology provides a solution to extend and enhance the management capability of Sun's hardware and software solutions.

TABLE 1-1 SyMON 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 domains (consisting of many systems) spanning across an enterprise. SyMON software can be configured and used in a centralized or distributed fashion by multiple users.

SyMON Architecture

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

SyMON 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.

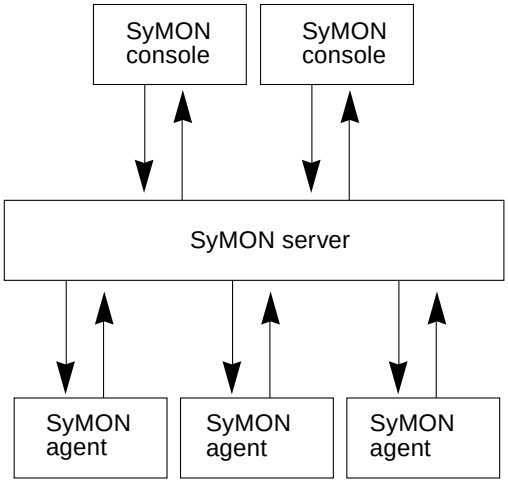

FIGURE 1-1 SyMON Component Layers

The major SyMON layers and their functionality and components are described below.

SyMON Console Layer

You may have multiple consoles, serving multiple users, for the same SyMON 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 SyMON console layer is the interface between you and the other components of SyMON software.

SyMON Server Layer

The server layer accepts requests from you through the console and passes these requests to the appropriate SyMON 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 SyMON agent on that host. The SyMON 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 SyMON console with a secure entry point to interface with the SyMON agents.

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

- SyMON server
- Topology manager
- Trap handler
- Configuration manager
- Event manager

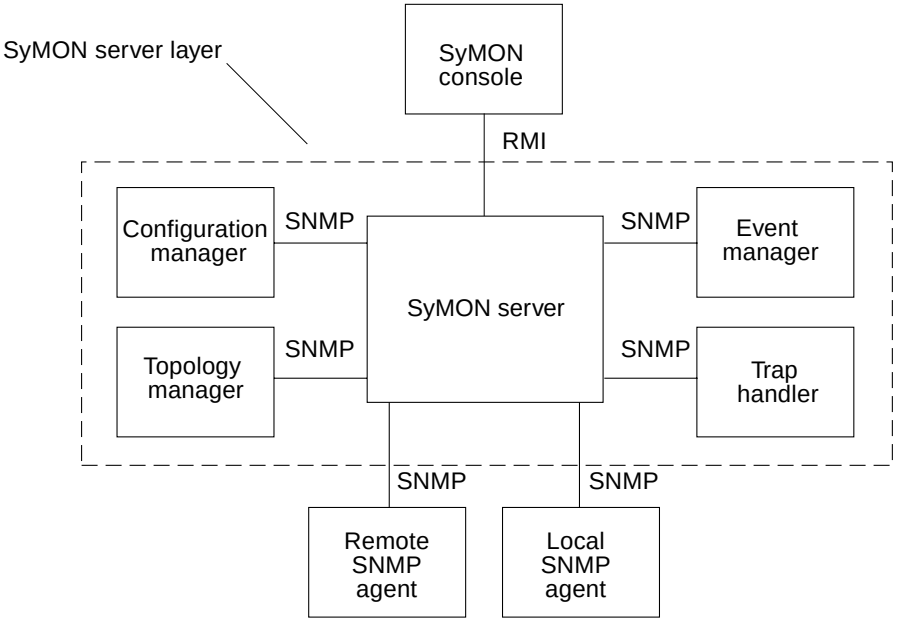

FIGURE 1-2 SyMON Server Layer

The SyMON server component is the core of the SyMON server layer. It is based on Java technology and is multithreaded, and it handles multiple data requests from various SyMON users.

SyMON Topology manager provides services including the management of user 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 SyMON Configuration manager provides security services to the SyMON server and the SyMON agents.

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

SyMON Agent Layer

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

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

SyMON Server Context

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

A managed object can belong to the same SyMON server context or a remote SyMON server context. (A managed object in a remote server context sends information to a different SyMON 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 SyMON 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 SyMON server context, see Chapter 11.

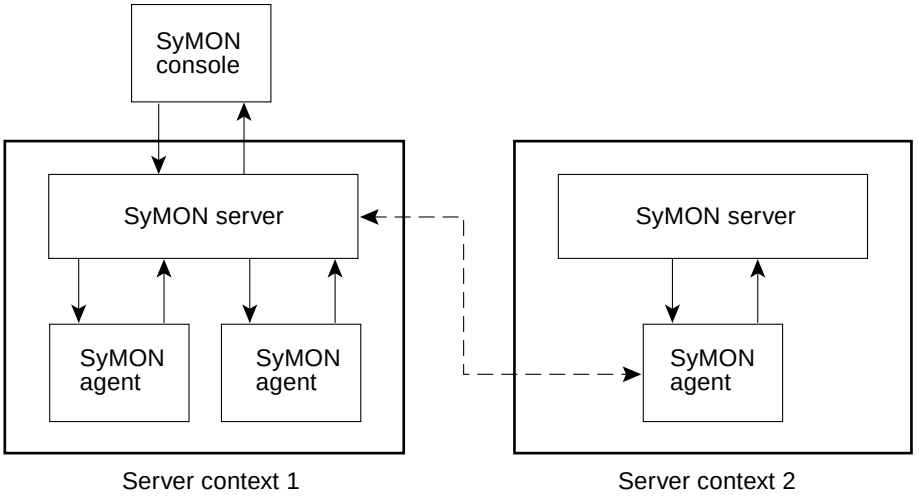

FIGURE 1-3 Console Logs Into a Server Context

SyMON Concepts

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following concepts are fundamental to understanding Sun Enterprise SyMON software:

- Domains
- Modules
- Alarms and Rules

Domains

A *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 domain may consist of these resources, which can be combined with other resources to form groups within a domain. Each of these groups may contain additional groups of resources, providing a multilevel, hierarchical domain.

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

The SyMON software displays the domain and its members in a visual representation (FIGURE 1-4).

The host, `Payroll2`, belongs to the `Building B` group, which belongs to the `Payroll Servers 1` domain.

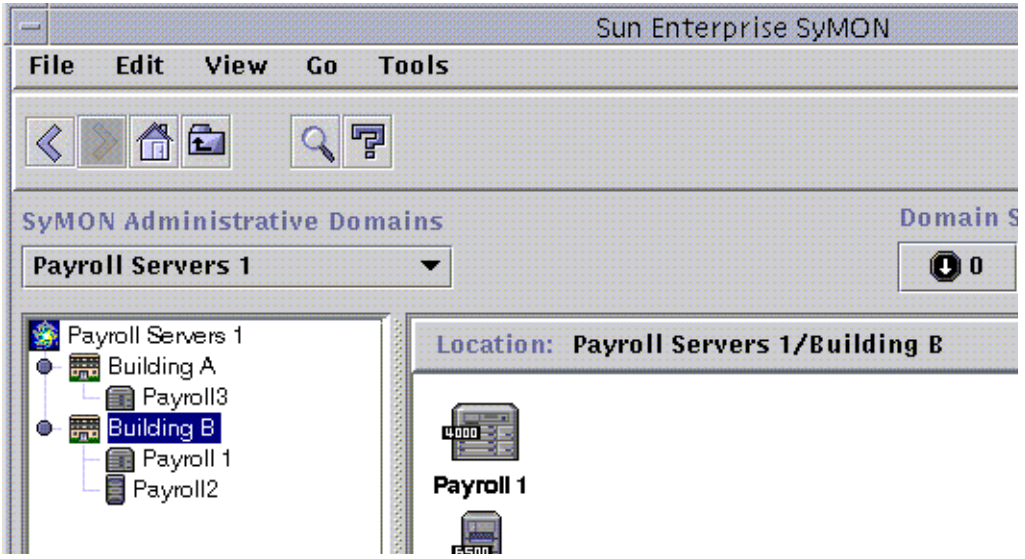

FIGURE 1-4 SyMON Main Console Window Showing a Domain and Its Members

Modules

Unlike most agents, the Management Information Base (MIB) provided by SyMON agents is not implemented in a monolithic code that contains a wide variety of functionality in a single program. Instead, SyMON software uses several components, called *modules*, for each agent. Each module implements its own MIB. Therefore, the SyMON agent MIB is the cumulative total of all the modules and their individual MIBs (FIGURE 1-5).

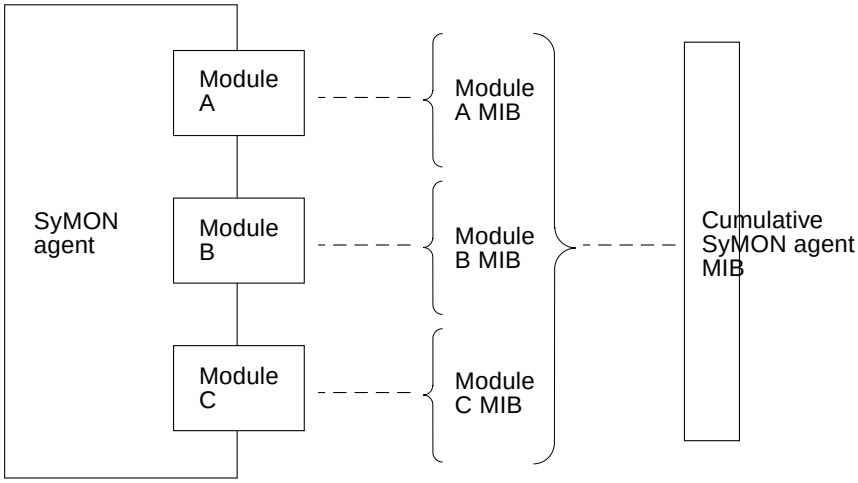

FIGURE 1-5 SyMON Agent MIB

SyMON modules monitor and manage the resources of systems, applications, and network devices.

SyMON 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 8.

Each module consists of one or more properties that can be monitored on your system. For example, one of the default modules loaded during SyMON 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

SyMON software enables you to monitor your system with alarms of differing severities. The thresholds that generate these alarms are defined in the modules. SyMON 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. SyMON software enables you to set the threshold that generates the alarm. For example, you may tell SyMON software to generate a critical alarm when there are seven or greater user sessions. Similarly, you may also tell SyMON software to generate only a cautionary alarm when there are five to six user sessions.

Although SyMON 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, SyMON software notifies you through the main console window.

For more information on alarms, see Chapter 9. For more information on rules, see Appendix D.

SyMON Monitoring Features

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Sun Enterprise SyMON software includes the following monitoring features:

- Autonomous Agents
- Main Console Window
- Hierarchy and Topology Views
- Process Viewer
- Log Viewer
- Physical View
- Logical View
- Graph
- Security

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

Autonomous Agents

SyMON 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 SyMON server, which delivers notification of the change in the status of the monitored data.

Main Console Window

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

Hierarchy and Topology Views

SyMON software offers both hierarchy and topology views (for every domain) or contents views (for every host). The hierarchy enables you to navigate through the 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. You may also customize the topology view by adding a background or creating a connection between objects.

Process Viewer

The process viewer enables you to view and select detailed information about processes running on the selected host or node.

Log Viewer

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

Physical View

The physical view provides you with photo-realistic front, back, and side views of the host. With your mouse button, you can click on the 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 not available for all systems.

Logical View

SyMON software provides a logical view of the overall hardware configuration of the host. Similar to the physical view, you can click on a single component and obtain detailed information about that hardware component.

Note – Logical views are not available for all systems.

Graph

SyMON software enables you to create a two-dimensional graph of monitored properties.

Security

The SyMON security feature authenticates user login and access control privileges for SyMON users and groups. It offers security at the following levels:

- Only valid SyMON users can use SyMON features.
- It enables SyMON users to set security permissions at the 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 SyMON security features from the Attribute Editor within the SyMON software.

Getting Started With the SyMON Software

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

After installing SyMON 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 SyMON software to aid in your system monitoring. See Appendix A.

If you prefer to set up your monitoring environment now, see Chapter 11 for information on SyMON security.

CHAPTER 2

Installing the SyMON 2.0 Software

This chapter describes the requirements your system must meet prior to installation and explains how to install the Sun Enterprise SyMON™ version 2.0 product on your system.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following topics are discussed in this chapter:

- System Requirements
- SyMON Agent Supported Systems
- Supported Operating Environments
- SyMON Compatibility
- Installation Packages
- Pre-Install Information
- To Install the SyMON Packages From the CD
- To Install the SyMON Packages From the Web
- To Set Up SyMON Components
- Starting the SyMON Software
- Exiting and Stopping the SyMON Software
- Uninstalling the SyMON Software

System Requirements

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON installation script enables you to install the console layer, the server layer, and the agent layer separately or together. TABLE 2-1 lists the minimum disk space requirements for the three SyMON layers.

Note – If you are installing all three SyMON layers on one machine, you must have a minimum of 50 Mbytes of disk space available. This is not the sum total of the disk space requirements for the individual SyMON layers, as the layers share some common packages.

TABLE 2-1 Minimum Disk Space Required for the SyMON Installation

SyMON Layer	Minimum Disk Space Required (Mbytes)
Server	45
Agent	25
Console	25

Note – Depending upon your system, disk space requirements may be different. Go to the following web site for more information on SyMON disk space requirements: `http://www.sun.com/symon/`.

SyMON Agent Supported Systems

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

For the latest information on supported hardware platforms, go to the following web site: `http://www.sun.com/symon/`. The Config-Reader module is required for hardware configuration information.

The Config-Reader and the Dynamic Reconfiguration modules are not supported on all Sun platforms. All the other core SyMON modules are supported on Sun platforms. For more information on supported platforms on SyMON core modules, see Appendix C. For more information, go to the SyMON web site.

Supported Operating Environments

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following Solaris operating environments are supported with the SyMON 2.0 product:

- Solaris 2.5.1 or subsequent compatible versions
- Solaris 2.6 or subsequent compatible versions
- Solaris 7 (32-bit and 64-bit versions)

Note – SyMON is only supported on SPARC platforms, not on X86 platforms.

SyMON Compatibility

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

SyMON software is compatible with:

- Any simple network management protocol SNMP V1, V2c, and V2usec entities, regardless of the operating environment and architecture
- Solstice Enterprise Agents™ of Solaris 2.6 and 7 can be converted to subagents of the SyMON agent

SyMON software *does not* offer:

- Backward compatibility with the SyMON 1.*x* software
- SunVTS™ support in the SyMON 2.0 software

Installation Packages

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

TABLE 2-2 describes the core packages provided with the SyMON 2.0 software. Your system may require more packages. Go to the web site: `http://www.sun.com/symon/` for more information.

TABLE 2-2 SyMON 2.0 Core Packages

Package Name	Description
`SUNWescon`	SyMON Console package
`SUNWesagt`	SyMON Agents package
`SUNWesmod`	SyMON Agent modules
`SUNWsycfd`	SyMON Config-Reader module for the core SyMON product[1]
`SUNWesdb`	SyMON Database
`SUNWescom`	SyMON Common Components
`SUNWeshlp`	SyMON Help
`SUNWesjp`	SyMON Additional Components
`SUNWessrv`	SyMON Server
`SUNWessa`	SyMON Server/Agent
`SUNWesae`	`/etc` files needed by the Agent
`SUNWesse`	`/etc` files needed by the Server

1. The Config-Reader module for the core SyMON product supports the SPARCserver™ 1000 and 1000E, the SPARCcenter™ 2000 and 2000E, and the Sun Enterprise™ 6x00/5x00/4x00/3x00.

These packages are located on the SyMON 2.0 Software CD or the SyMON web site (`http://www.sun.com/symon`). To install these packages, see the next section.

Pre-Install Information

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following table briefly lists some of the pre-requisite information that you should have available before you install the SyMON software.

TABLE 2-3 Information Needed on SyMON Components Prior to Installing

Component	Description
Install	Make sure to remove all the Symon 1.*x* packages. For example, the following packages must be removed: `SUNWsye`, `SUNWsym`, `SUNWsyrt`, `SUNWsys`, `SUNWsyu`, `SUNWsyua`, `SUNWsyub`, `SUNWsyuc`, `SUNWsyud`, `SUNWsyue`, and `SUNWsyuf`.
Components you want to install	Server, Agent, Console, Help
Space needed in `/opt`	Make sure you have enough space available in `/opt`. If not, make more space or make a soft link to an area with more space from `/opt/SUNWsymon`.
Permissions	Make sure you have permissions to write into the `/opt` (or `/opt/SUNWsymon`) directory as `root`. You also need privileges to run commands, such as `chmod`, in that directory.
Set up	Component(s) you want to set up are: Server, Agent, Console. Only components that have been installed can be set up.
Information needed for server	Note that when you install the server, you do not need to have the console on the same machine. Also, it helps if you have information on the following: license key for the software, ports to be used, seed to be used, and SyMON console help configuration.
Information needed for Agent	Seed to be used. SyMON server host if server is not installed on agent machine.
Information needed for Console	None.
Information needed for Addon components	Add-on dependent data.

SNMP Subagents

SyMON may conflict with port numbers that are used by legacy subagents. Systems with Solaris 2.6 or Solaris 7 operating environments have two potential conflicting processes in the following areas: `snmpdx` and `mibiisa`.

If you install the SyMON software using standard defaults, you may run into port conflicts with these processes and you are not able to start the agent. To understand the problem, refer to the `agent.log` file that displays error messages similar to the following:

```
error   Nov 05 13:24:59 agent parsing error in base-agent.x(132):
error creating intraface: inet://:161/udp: address already in use
error    Nov 05 13:24:59 agent         *** aborting execution ***
```

Note – View the log file with the command:
`/opt/SUNWsymon/sbin/es-run ccat /var/opt/SUNWsymon/log/agent.log`.

To resolve the problem, make *one* of the following changes:

- Change the port numbers used by SyMON or turn off `snmpdx` and `mibiisa`. For example, you can turn off `snmpdx` by using the following command:

```
# /etc/rc3.d/S76snmpdx stop
```

- Prevent `snmpdx` and `mibiisa` from starting the next time the machine is booted to avoid conflicts at installation. To do this, rename the start-up script with the following command to prevent the `snmpdx` daemon from starting the next time the machine is rebooted:

```
# mv /etc/rc3.d/S76snmpdx /etc/rc3.d/s76snmpdx
```

SyMON Add-on Components

The SyMON install and setup scripts automatically install and set up any add-on components that you may have available. However, note the following:

- The core components must be installed before you can install a corresponding add-on component.

- The install script looks for add-on components in a sibling directory from the directory you specified. If you are installing core components, make sure that they are present in the directory you specified when you execute the `inst-es` command. After the core components are installed, the `inst-es` script goes up one directory and installs any package found in any subdirectory. These packages must be set to include the SyMON software.

Note – You can get a listing of all packages related to SyMON that is currently installed with the following command: `pkginfo -c symon`.

- If an add-on package is already installed when found by the `inst-es` script, it is skipped automatically. To re-install a package that is already installed, do the following:
  - Remove the package manually using the `pkgrm` command.
  - Rerun the `inst-es` script to install the package.
- The setup script calls any `setup.sh` scripts found in the `/opt/SUNWsymon/addons/*/sbin` directory. Some of these scripts may require confirmation to help identify the appropriate hardware platform. Your responses determine if these add-on components are set up.

The uninstall program (`es-uninst`) removes all packages that are part of the SyMON software, including the add-on packages.

Note – To verify the packages that are removed, run the following command: `pkginfo -c symon`. For more information on uninstalling SyMON, see “Uninstalling the SyMON Software” on page 31.

Note – For more information, see ““Configuring a Legacy SNMP Agent as a Subagent of a SyMON Agent” on page 270 and ““Configuring SyMON to Use Different Port Addresses” on page 272.

Installing SyMON 2.0 Software

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This section describes how to install, set up, and run your SyMON 2.0 software. Follow the steps in the appropriate section, based on your installation platform.

The SyMON installation script enables you to install the SyMON console, server, and agent layers separately, or in combination, depending on your system configuration.

Note – The coexistence of the SyMON 1.*x* and 2.0 software is not supported on the same server. But you may have SyMON sessions running on different servers or server contexts. For more information on server context, see Chapter 1 and Chapter 11.

If you have SyMON 1.*x* packages installed on your system, the installation script fails. You must remove all SyMON 1.*x* packages before installing SyMON 2.0 software.

Caution – The SyMON 2.0 installation script may overwrite SyMON 1.*x* files. Consequently, you may lose your customized event rules. If you have modified SyMON 1.*x* rules, then you *must back up* these rules before installing SyMON 2.0 software. Depending on where you modified your event rules, back up the `/etc/opt/SUNWsymon` or `/opt/SUNWsymon/etc` directories.

If you have SyMON 2.0 components already installed on your system and they are out of date with the new version of the installation package and files that you are trying to install, then the install script prompts you to uninstall the previously installed packages. You may do so by either confirming the prompt to uninstall immediately and proceed with a fresh installation or quitting the current session and uninstalling the necessary packages manually by using the `es-uninst` command, and then proceeding with the installation.

Caution – After uninstalling the previous version of SyMON 2.0, be sure that the `/opt/SUNWsymon` directory does not exist. If this directory exists, *remove* the directory and all its contents before proceeding with the new installation.

If you are reinstalling SyMON and would like to restore to a clean state, do the following:
- Make sure to move any custom configuration files that may have been created within this directory during the previous sessions.
- Remove all subdirectories and files within the `/var/opt/SUNWsymon` directory by using the following command: `rm -rf /var/opt/SUNWsymon`.
- Complete the installation and setup as described in this chapter.
- Then restore the moved files back to this location.

SyMON packages are automatically installed in `/opt/SUNWsymon`.

If there is not enough disk space in the `/opt/SUNWsymon` directory to accommodate the SyMON packages, then do the following:

- **Create a symbolic link to any other file systems in which enough space is available.**

```
# ln -s /directory/SUNWsymon /opt/SUNWsymon
```

Caution – Install the SyMON agent on every monitored or managed host. In addition, you *must install* a SyMON agent on your SyMON server host (even if you choose not to run this agent). In the case where the agent is automatically installed when installing the server, SyMON prompts you with a note stating that the agent is also being installed.

▼ To Install the SyMON Packages From the CD

Note – Familiarize yourself with the following file on the CD before beginning your installation: `cdrom/cdrom0/`*operating_environment*`/Core/INSTALL.README`.

In addition to the *Sun Enterprise SyMON 2.0 Release Notes*, any late-breaking news that develops concerning this software installation procedure will be placed at the Sun Enterprise SyMON 2.0 web site: `http://www.sun.com/symon`.

1. **Place the Sun Enterprise SyMON 2.0 CD into the CD-ROM drive.**
2. **Open a command window and (if you are not already superuser) become superuser by using the `su` command.**
3. **Mount the CD-ROM.**
   - If the CD-ROM drive is not already mounted, mount the drive and change to the CD-ROM directory by typing:

```
# mount -o ro -F hsfs /dev/dsk/c0t6d0s0 /cdrom
# cd /cdrom/
```

   - If you are using the Volume Manager (`vold`), type:

```
# cd /cdrom/symon_2.0
```

4. **Run the Sun Enterprise SyMON installation script.**

```
# ./inst-es
```

An interactive menu is displayed that guides you through the installation procedure.

Then select the Sun Enterprise SyMON components (agent, server, or console) you want to install.

Sun Enterprise SyMON packages are automatically installed in `/opt/SUNWsymon`.

Note – The installation script automatically installs the Sun Enterprise SyMON packages applicable for your system.

▼ To Install the SyMON Packages From the Web

Note – Before installing SyMON on your system, read the `INSTALL.README` file on the web site. These files provide additional information that help you during the installation process.

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1. **Using your web browser, go to the SyMON 2.0 web site.**

```
http://www.sun.com/symon/
```

2. **Type the user name and the password.**

```
Username:
Password:
```

3. **Click the mouse button on Download SyMON.**
4. **Follow the instructions on this web page and download your SyMON packages.**

5. **Become `root`, if you are not already, and run the SyMON installation script.**

```
# ./inst-es
```

An interactive menu is displayed that guides you through the SyMON installation procedure. You may now select the SyMON components you want to install.

▼ To Set Up SyMON Components

Note – If you use `inst-es` to install the SyMON software, the `es-setup` script is run automatically for you. In this case, only execute Step 2 to edit the `/etc/nsswitch.conf` file directly.

Complete the following steps after a successful installation of SyMON. If your installation was unsuccessful, see "Uninstalling the SyMON Software" on page 31.

Note – If there is a potential conflict for port addresses, see "Configuring SyMON to Use Different Port Addresses" on page 272 before completing the steps in this section.

---

1. **Open a command window and (if you are not already `root`) become superuser.**
2. **If you are running the SyMON server for the first time, edit the `/etc/nsswitch.conf` file. Be sure the `groups` entry has `files` as the first token.**

```
groups:files nis
```

3. **Change to the directory that contains the SyMON setup script.**

```
# cd /opt/SUNWsymon/sbin
```

4. **Run the setup script to set up the SyMON components.**

```
# ./es-setup
```

A set of questions guides you through the SyMON setup procedure. The setup script finds the installed SyMON components on your system and enables you to set up these components.

The setup script enables you to specify an existing user to be the SyMON administrator. This user is added to the `esadm` and `esdomadm` groups.

SyMON Directories

After a successful SyMON installation, the following directories are created.

TABLE 2-4 SyMON Directories

Directory	Description
`/opt/SUNWsymon`	Root directory which contains the infrastructure and applications of SyMON
`/etc/opt/SUNWsymon`	Contains the `init` scripts for SyMON applications
`/var/opt/SUNWsymon/LS`	Contains the log viewer run time information files
`/var/opt/SUNWsymon/cfg`	Contains the `snmpd.conf` file which specifies the SNMP MIB2 system
`/opt/SUNWsymon/sbin`	Directory that stores command files

SyMON Licensing

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

SyMON software is free-of-charge to manage or monitor an individual object or host.

SyMON software automatically creates a default domain consisting of one managed object, the host where the SyMON server resides. You may manually configure the SyMON software to make the managed host be another system; however, this is the limit of free-of-charge use.

A SyMON right-to-use license is required to create more than one domain and to manage or monitor more than one host object. If you do not purchase a license, you will not be able to manage or monitor any additional objects. For information on purchasing a SyMON license, see the web site, `http://www.sun.com/symon/`.

During the setup of the server component, you are given the opportunity to specify a license token.

- If you have a license token, you may enter it during setup.
- If you do not have a license token, you may run the SyMON software without one as described above. When you get a license token, you can install it using the `es-lic` script.

```
# ./es-lic
  -------------------------------
  Enterprise SyMON License Program
  -------------------------------
What is your license token (q to quit) XXXX-XXXX-XXXX-XXXX-XX[X]
decrypt v5.11, Copyright (C) 1990-1997, Globetrotter Software,
Inc.
Licensed to Sun Microsystems
License key installed
```

Starting the SyMON Software

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

SyMON is started with the `es-start` utility. The syntax for this utility is:

```
# es-start -option(s)
```

Note – The SyMON processes are generally started in the background unless you specify the `-i` option (valid for only one process in the interactive mode). The console process is run in the foreground so it can be killed easily using Control-C.

The choices for *option(s)* are listed in TABLE 2-5.

TABLE 2-5 Options for `es-start`

Option	Definition
`a`	Starts SyMON agent
`c`	Starts SyMON console
`e`	Starts SyMON Event manager
`f`	Starts SyMON Configuration manager
`h`	Prints this usage report
`i`	Starts agent in interactive mode; valid only for one of the `a`, `t`, `f`, `p`, and `e` options
`p`	Starts SyMON Topology manager
`s`	Starts SyMON server
`t`	Starts SyMON Trap handler
`A`	Starts All SyMON components except the console. Equivalent to `es-start -aefpst`
`S`	Starts SyMON server and all the server subcomponents Equivalent to `es-start -efpst`

Note – You must be `root` to start any of the SyMON components except the console.

If you need to pass any arguments to the processes being started, you can do so by listing those arguments after these options. For example, if you wanted to start the console and tell it to use port 2090, you would use this command.

```
# es-start -c -- -p 2090
```

▼ To Start the SyMON Software

1. **Change directories to the** `/opt/SUNWsymon` **directory.**

```
# cd /opt/SUNWsymon/
```

2. **Start the SyMON server and agents by typing:**

```
# ./sbin/es-start -A
```

3. **Type** `es-start -c` **at the prompt to start the console.**

```
# ./sbin/es-start -c
```

Note – You do not have to be `root` to run the SyMON console.

The SyMON login panel (FIGURE 2-1) is displayed. See TABLE 2-6 for more information on the login panel buttons.

FIGURE 2-1 SyMON Login Panel

4. **Log in using a valid UNIX user account. This account must be listed in the** `/var/opt/SUNWsymon/cfg/esusers` **file in the SyMON server machine.**

Note – The user accounts, `espublic` and `esmaster`, should not be used.

---

5. **Type the host name of the SyMON server in the Server Host field.**

   TABLE 2-6 lists the buttons in the SyMON login panel.

6. **If you are not using the SyMON server default port addresses or want to set console to SyMON server message security:**

   a. **Click the Options button.**

b. Type the SyMON server RMI host port number in the Server Port Number field.

See“To Reconfigure SyMON RMI Port Address” on page 275 for more information.

c. Click the circle next to the appropriate security message option (FIGURE 2-2**).**

FIGURE 2-2 SyMON Login Options Dialog

These options allow you to choose among the following:

- No Message Authentication: If you select this, only the user login is authenticated. Messages between the console and the server are not verified for authentication.
- Console-to-Server Message Authentication: If you select this, the server verifies the authenticity of the messages coming from the console. However, the console does not verify the messages from the server.
- Console-Server-Console Message Authentication: If you select this, both the console and the server authenticate the messages coming from the other.

d. Click the OK button.

7. Check that you typed in all the information correctly in the Sun Enterprise SyMON Login window (FIGURE 2-1**).**

8. Click the Login button in the Sun Enterprise SyMON Login window to log into the SyMON software.

The message is displayed on the Current status line:
“`Login successful. Launching console.`”

The SyMON main console window is displayed (FIGURE 2-3).

FIGURE 2-3 SyMON Main Console Window

TABLE 2-6 lists the buttons in the login panel and their corresponding functions.

TABLE 2-6 SyMON Login Panel Buttons

Button	Function
Login	Enables users to open the SyMON application.
Help	Displays the online help for this panel.
Options	Displays a dialog box which enables you to specify the port number of the SyMON server and the security scheme for console to SyMON server messages.
Exit	Exits Sun Enterprise SyMON.

Exiting and Stopping the SyMON Software

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

You exit the SyMON console through the main console window, and the server and agent components through a shell window.

SyMON server and agent components are stopped with the `es-stop` utility. The syntax is:

```
# /opt/SUNWsymon/sbin/es-stop -option(s)
```

The choices for *option(s)* are listed in TABLE 2-7.

TABLE 2-7 `es-stop option` Choices

Option	Definition
c	Stops the SyMON console
s	Stops the SyMON server
S	Stops the SyMON server and all the server subcomponents (Trap handler, Topology manager, Configuration manager, and Event manager)
a	Stops the SyMON agent
t	Stops the SyMON Trap handler
p	Stops the SyMON Topology manager
f	Stops the SyMON Configuration manager
e	Stops the SyMON Event manager
A	Stops all the SyMON components except the console
h	Lists the options for the `es-stop` utility

Note – You must be `root` to stop the SyMON server and agents.

▼ To Exit the SyMON Console

1. **Select File ➤ Exit from the menu bar on the main console window.**

   The Exit Sun Enterprise SyMON dialog is displayed (FIGURE 2-4).

2. **Click the Exit button to exit the application or the Cancel button to cancel your request.**

FIGURE 2-4 Exit SyMON Dialog

▼ To Stop the SyMON Server and SyMON Agents

- **Stop the SyMON agents and the SyMON server subcomponents by typing:**

```
# /opt/SUNWsymon/sbin/es-stop -A
```

Uninstalling the SyMON Software

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON 2.0 software currently supports one method of removing software packages.

Caution – The package removal procedure for the SyMON software is complex, with packages requiring configuration information in order to function properly. Use the `es-uninst` utility for accurate removal of the software.

▼ To Remove SyMON 2.0 Software

1. **Type the following command.**

```
# /opt/SUNWsymon/sbin/es-uninst
```

2. **Type** `y` **to uninstall SyMON, or** `n` **to cancel your request.**

Caution – This utility does not enable you to remove SyMON packages selectively. Once you type `y`, all the SyMON packages are removed. There is no additional warning before package removal begins.

The contents of the `/var/opt/SUNWsymon` directory remain and are unaltered by the uninstall script. The state of the SyMON domain configuration is retained for subsequent installations or upgrades.

CHAPTER 3

Using Domains

A 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 a domain collection is in a hierarchy.

This chapter covers the following topics:

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

Sun Enterprise SyMON can monitor a multitude of hosts. To enable you to perform your monitoring tasks in an efficient manner, SyMON organizes hosts into groups. The biggest (highest level) grouping is a domain. A domain is an arbitrary grouping of hosts, subnets, networks, buildings, and so on.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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

Note – Spend some time and think about how you want to organize your hosts into different domains.

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

You may decide to break the domain into a set of smaller groups; for example, campuses. The Headquarters domain might consist of several campus locations (FIGURE 3-1).

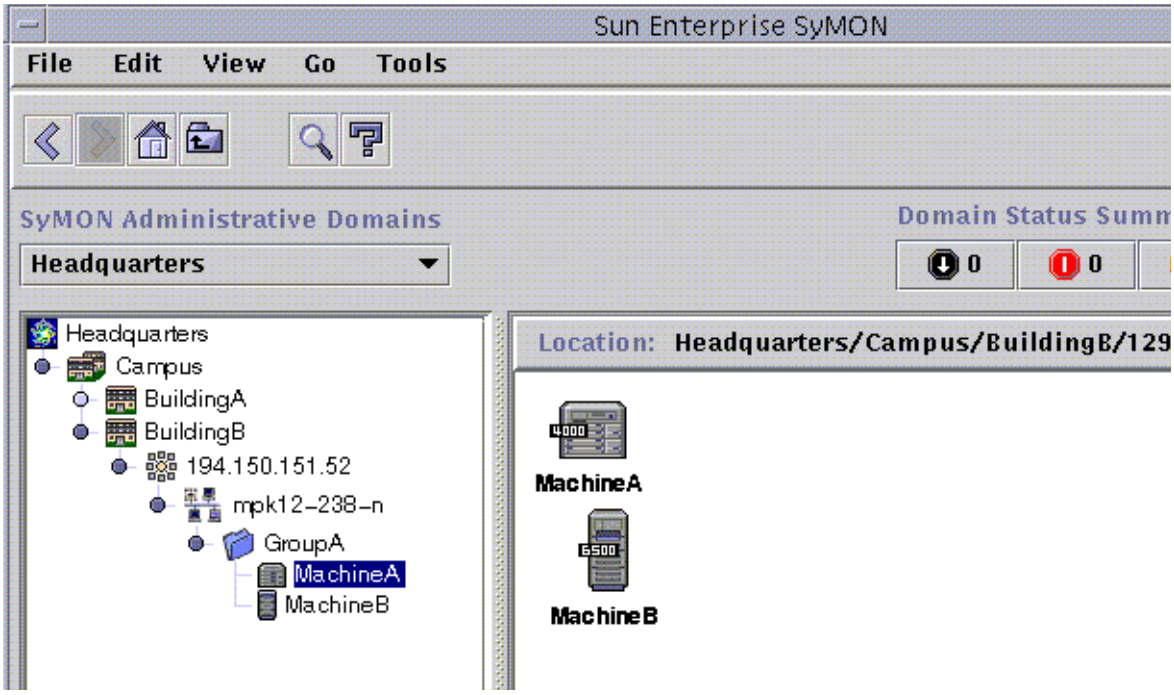

FIGURE 3-1 Example Domain

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 domain, campus, building, network, subnet, group, and individual host. For detailed information on creating domains, see “To Create Domains” on page 40.

Starting SyMON

When starting the Sun Enterprise SyMON software for the first time, a dialog is displayed (FIGURE 3-2) asking you to set a home domain. The home domain is the domain that is always displayed whenever the SyMON console is started.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

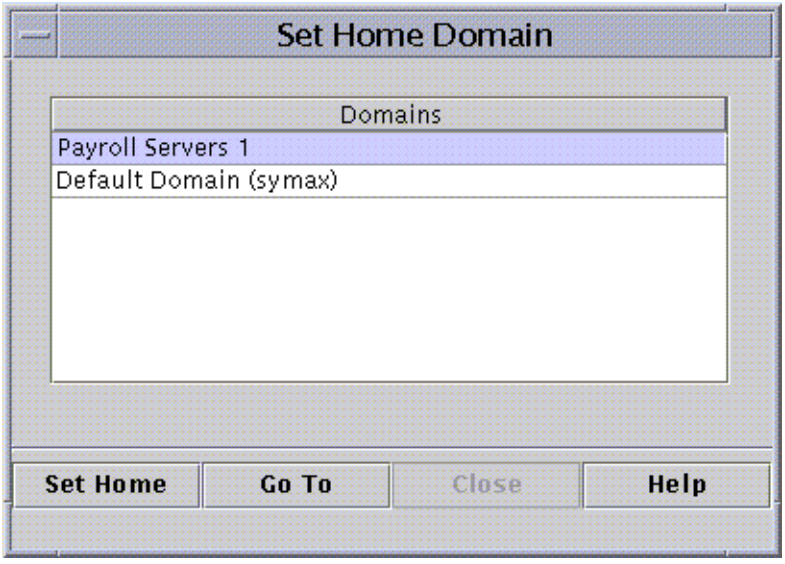

FIGURE 3-2 Set Home Domain Dialog

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

- **Proceed with one of the following**:
  - Select the default domain and click on the Set Home button. Your default domain is set as your home domain and is displayed. For more information, see “To Set a Home Domain” on page 36.
  - Select the default domain and click on the Go To button. The main console window is displayed with this default domain.

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

- If you want to explore the SyMON main console window, see Chapter 6.
- If you want to explore SyMON monitoring features, see Chapter 7.
- If you want to create additional domains, see “To Create Domains” on page 40.
- If you want to create additional objects in your domain, see “Populating Domains” on page 40.

▼ To Set a Home Domain

1. **Proceed with one of the following:**
   - Click the Set Home button (FIGURE 3-2) in the Set Home Domain dialog.
   - Select File ➤ Set Home Domain in the SyMON main console window (FIGURE 3-3).

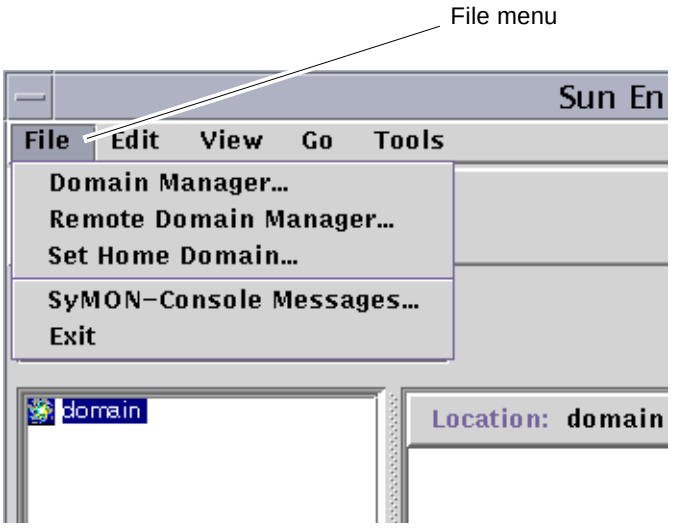

FIGURE 3-3 SyMON File Menu

The Set Home Domain dialog (FIGURE 3-4) is displayed.

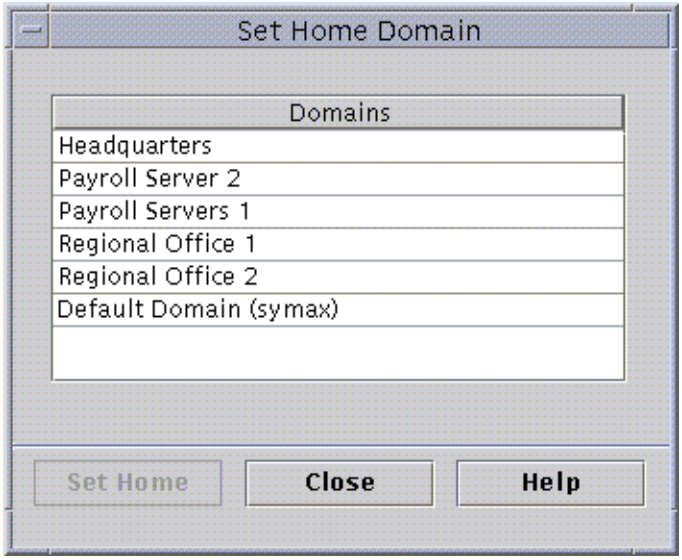

FIGURE 3-4 Set Home Domain Dialog

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

   The selected 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 domain has been set, the message changes.

```
Home domain successfully set.
```

4. **Click the Close button.**

   The SyMON main console window is updated and the home domain is displayed (FIGURE 3-5).

   At this time, you may want to populate your domain. See “Populating Domains” on page 40 for more information.

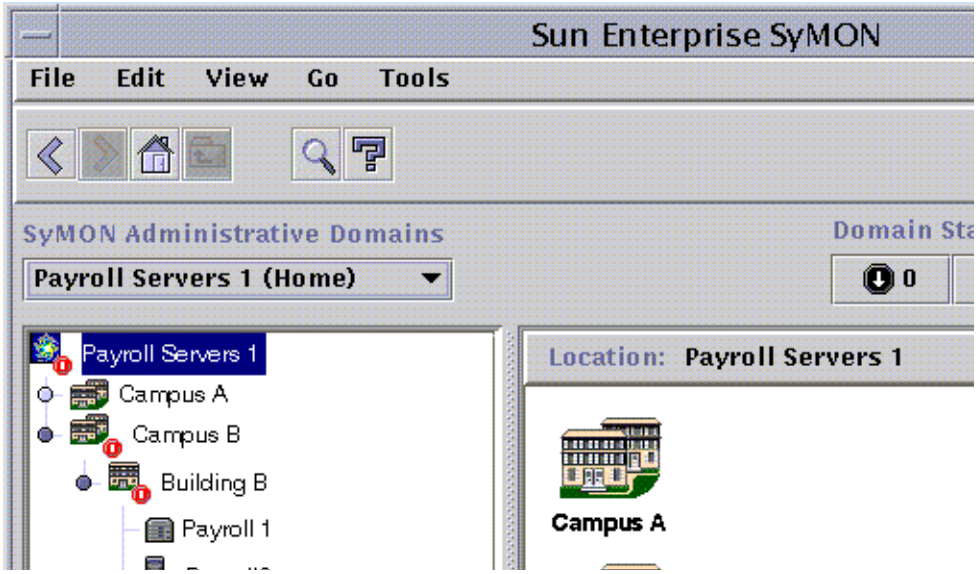

FIGURE 3-5 Home Domain

Creating Domains

The Sun Enterprise SyMON software enables you to create domains with the Domain manager window.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Select Domain Manager

- **In the SyMON main console window, select File ➤ Domain Manager (**FIGURE 3-3**).**
  The Domain Manager is displayed (FIGURE 3-6).

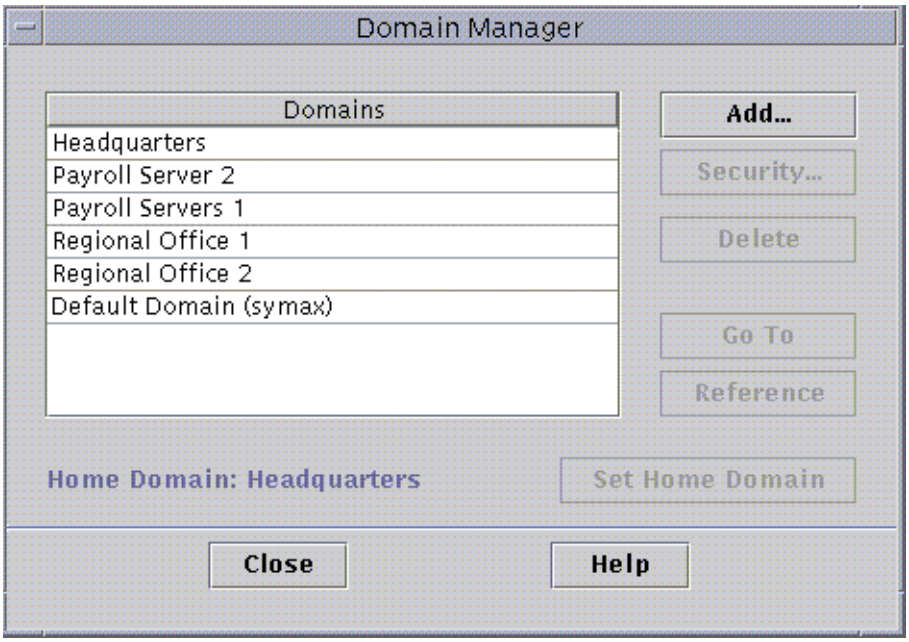

FIGURE 3-6 Domain Manager

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

TABLE 3-1 Domain Manager Buttons

Button	Description
Add	Displays the Create Domain dialog.
Security	Displays the Attribute Editor with the security tab selected for the highlighted domain.
Delete	Deletes the selected domain and all its members.
Go To	Updates the SyMON main console window to display the selected domain. You may also “go to” a domain by double-clicking on it.
Reference	Inserts the selected domain into the current domain.
Set Home Domain	Sets the selected domain as the domain that is always displayed whenever the SyMON console is started. See “To Set a Home Domain” on page 36 for more information.

▼ To Create Domains

1. **Select File ➤ Domain Manager (**FIGURE 3-3**) from the SyMON main console window.**

   The Domain Manager is displayed (FIGURE 3-6).

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

   The Create Domain dialog is displayed (FIGURE 3-7).

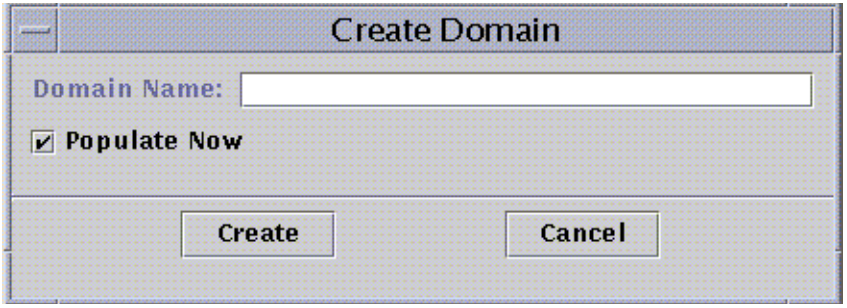

FIGURE 3-7 Create Domain Dialog

3. **Type in the name of the new domain in the Domain Name field.**

4. **If you do not want your domain populated now, be sure the Populate Now check box is turned off.**

   The default choice is for SyMON to display a dialog enabling you to start the Discovery Manager immediately after creating a domain. For more information about the Discovery Manager, see Chapter 5.

5. **Click the Create button.**

6. **Create additional domains or populate your domain manually.**

   If you do not have the right security permissions to create a domain, an error message is displayed. See Chapter 11 for more information on security.

Populating Domains

Once you have created your domain(s), you can begin to populate these domains (and their subordinate groups). There are three methods to add hosts and other resources to a domain collection:

- Populate with the Discovery Manager—see Chapter 5. Discovery Manager searches the network for resources. This is the default method for populating a newly created 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 76. 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 New Objects menu—see Chapter 4. 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 New Objects to add the host to the local domain immediately.

Managing Domains

Once you have created domains, you can manage them.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Selecting Domains

You can list domains through the Domain Manager window (FIGURE 3-6) or the Sun Enterprise SyMON main console window.

▼ To Select a Domain

1. **Proceed with one of the following**:
   - Select File ➤ Domain Manager in the main console window (FIGURE 3-3).
   - In the SyMON main console window, click the left mouse button on the SyMON Administrative Domains pull-down menu (FIGURE 3-8).

   The current list of domains is displayed.

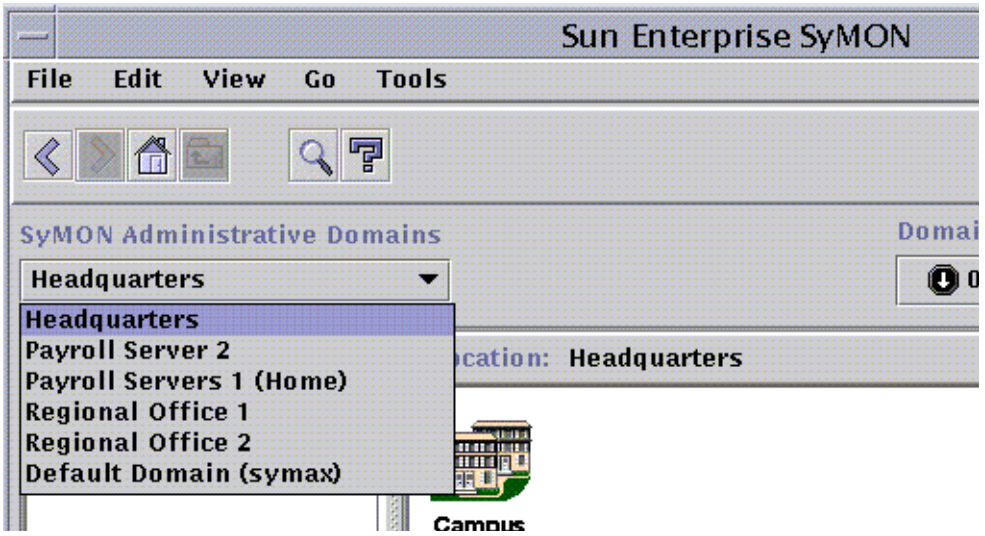

FIGURE 3-8 SyMON Main Console Window with a List of Current Domains

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

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

Deleting Domains

You must have the appropriate security permission to delete a domain. For more information on SyMON security, see Chapter 11.

▼ To Delete a Domain

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

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

   The Confirm Domain Deletion dialog (FIGURE 3-9 or FIGURE 3-10) is displayed.

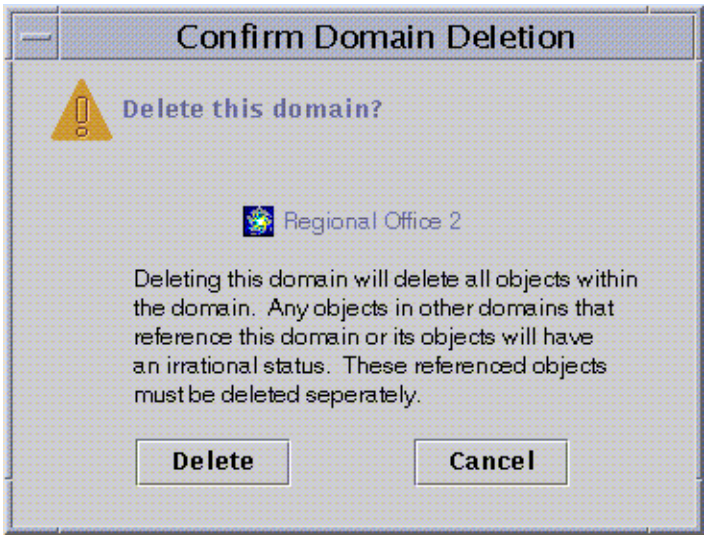

FIGURE 3-9 Confirm Domain Deletion Dialog

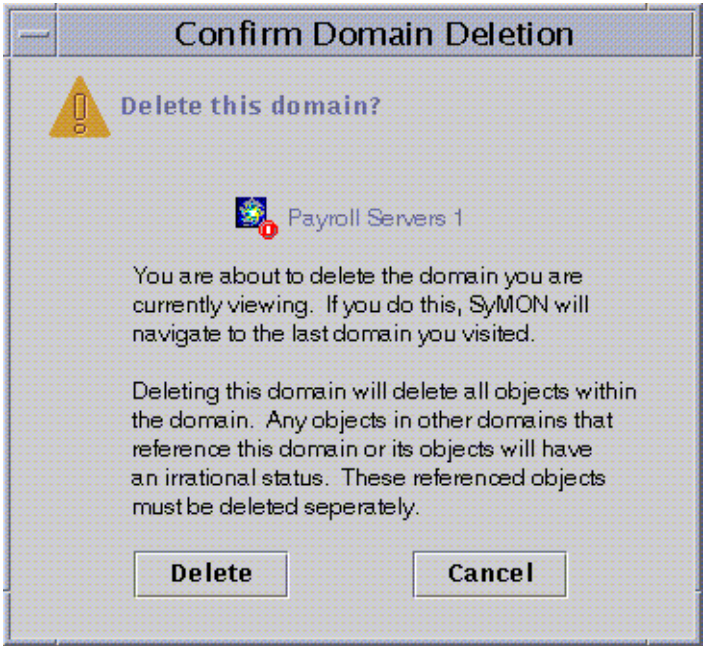

FIGURE 3-10 Confirm Domain Deletion Dialog for Current Domain

3. **Click Delete.**

   The Confirm Domain Deletion dialog displays the following message.

```
Deleting domain...Please wait.
```

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

4. **Click the Close button in the Domain Manager.**

Monitoring Remote Domains

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Remote domains are domains created in a different SyMON server context. See Chapter 11 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 domain in your local domain. However, you are not be able to *manage* the remote resource unless you log out of your current SyMON server context and log into the remote SyMON server context. You can manage monitored properties on a resource *only* if the SyMON agent on that resource sends event management information to the SyMON server to which your console is connected. By default, SyMON security gives you “read-only” privileges for remote domains. For more information on SyMON security, see Chapter 11.

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

For example, your current SyMON server context may be based in the Headquarters domain. A second, remote SyMON 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 domains by referencing these remote domains in the Headquarters server context. If an emergency occurs, administrators in Headquarters can notify a Regional Office 1 administrator immediately.

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

Caution – Do not create a domain with a circular reference (to itself). The remote domain which is being referenced should be at a lower level (for example, a subdomain) than the domain which is creating the reference.

For example, do not create a domain (Domain A) which references another domain (Domain B) which in turn, contains a reference to Domain A. Instead, reference a subdomain in Domain B. That is, if Domain B contains Subdomain 2, then create a reference between Domain A and Subdomain 2 (instead of Domain B).

▼ To Set a Remote Domain

1. **In the SyMON main console window, select File ➤ Remote Domain Manager (**FIGURE 3-3**).**

   The Remote Domain Manager dialog is displayed (FIGURE 3-11).

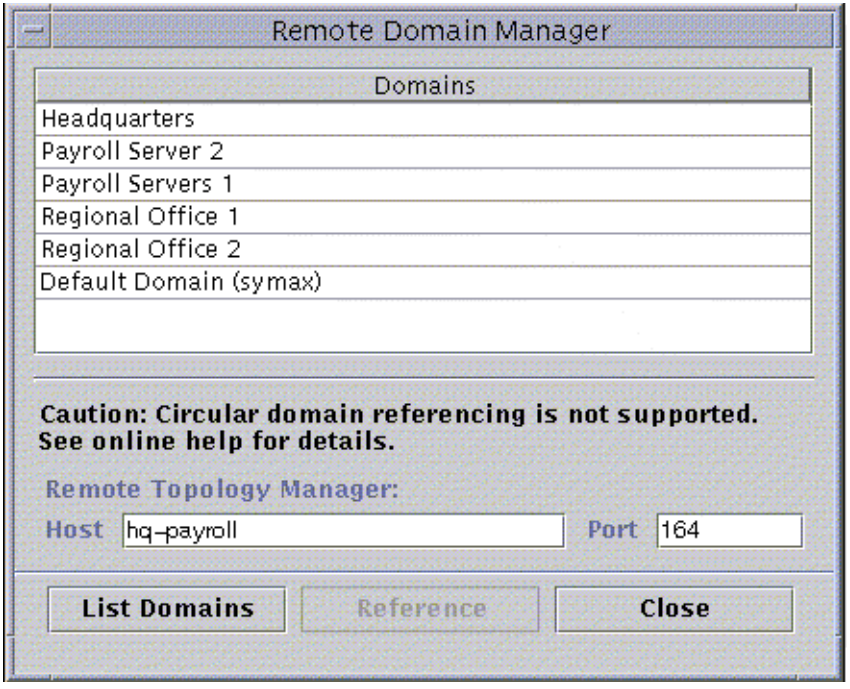

FIGURE 3-11 Remote Domain Manager

2. **Type the name of the remote SyMON 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 SyMON server on port 164.

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

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

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

   The selected domain is highlighted.

5. **Click the Reference button.**

   The selected domain is created as a reference domain in the currently selected domain in the SyMON main console window (FIGURE 3-12).

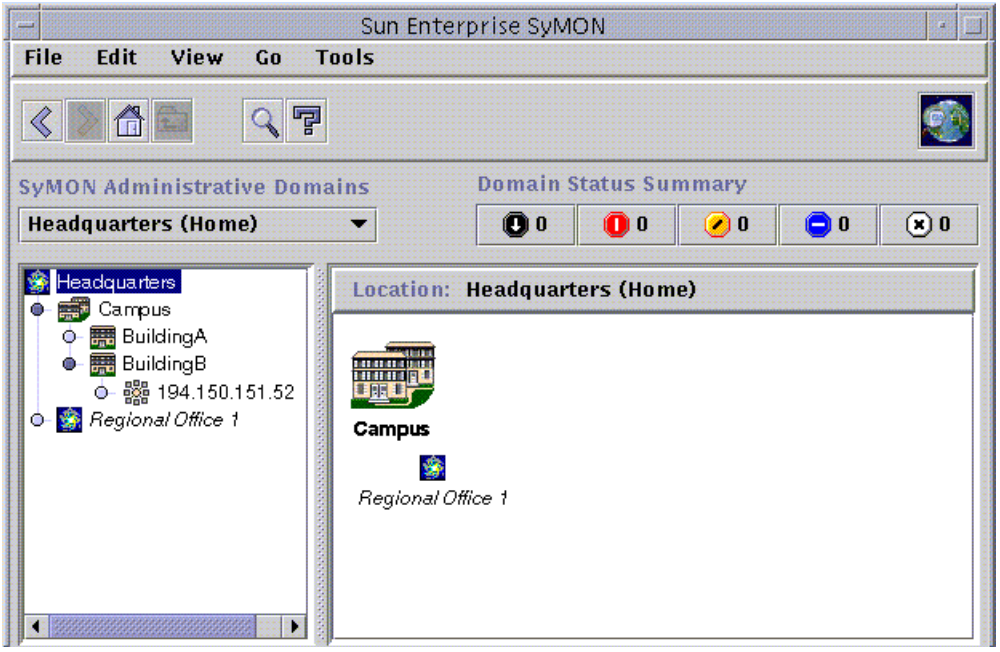

FIGURE 3-12 Referencing a Remote Domain

Attribute Editor for a Domain

The domain Attribute Editor provides additional information about the selected domain and the rules governing its behavior. Use the Attribute Editor to edit security information for the 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 a Domain

1. **Proceed with one of the following:**
   - Open the Attribute Editor for a 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 a domain and click the Security button.
2. **Click the Security tab (**FIGURE 3-13**).**
3. **Type the name(s) of user and administrator groups in the appropriate fields.**

   See Chapter 11 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.

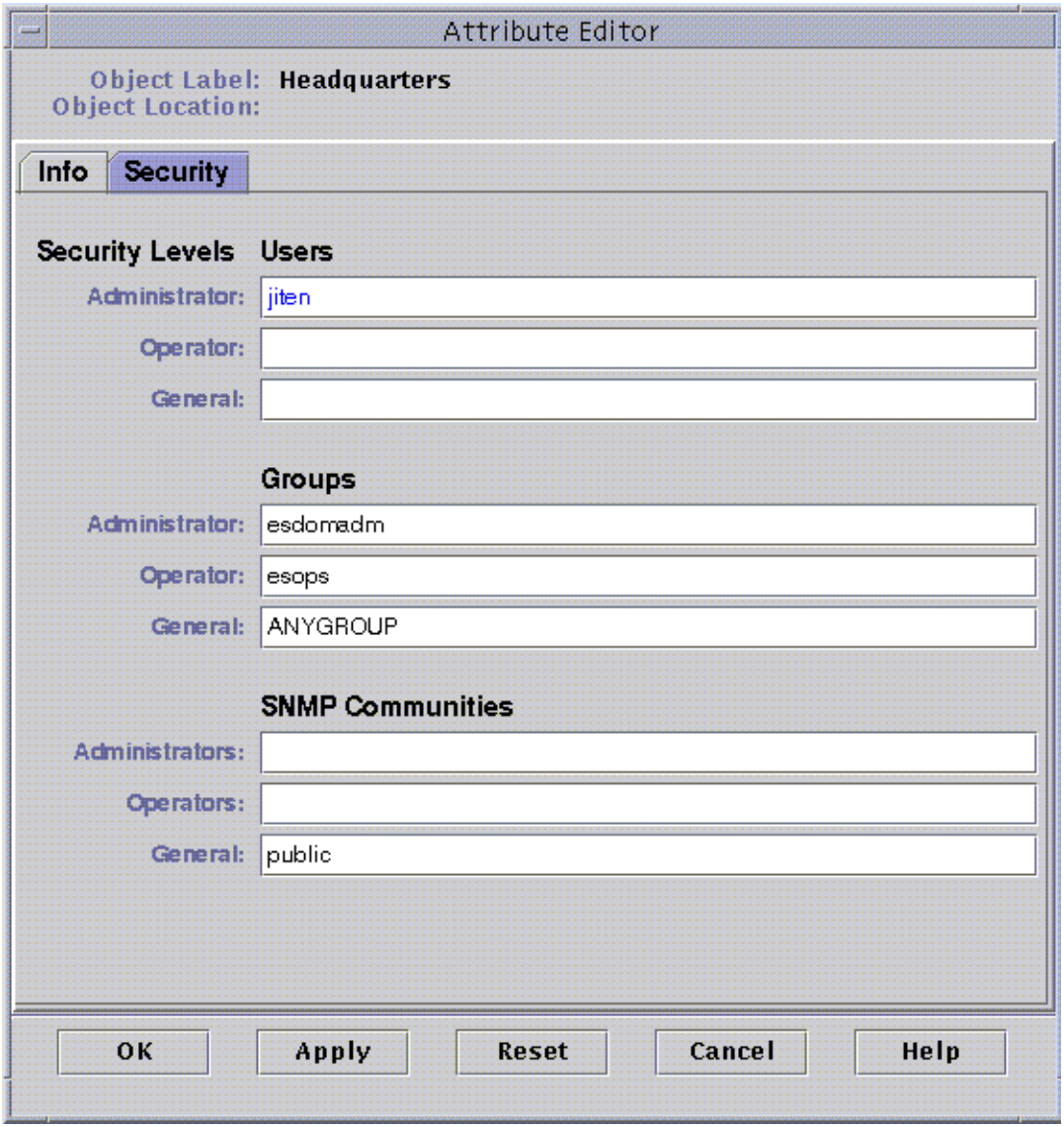

FIGURE 3-13 Attribute Editor for a Domain

CHAPTER 4

Objects

This chapter describes how to create and monitor objects.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This chapter discusses how:

- To Create a Group
- To Create a Node
- To Create a Module 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 Enterprise SyMON 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.

To monitor or manage an object, you create a node to represent it in a SyMON 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 domains containing nodes for multiple objects (such as the workstations and other devices connected to the server). For information about domains, see Chapter 3.

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 – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Create a Group

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

   Select (by clicking) a location in the 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 a domain, then click the building icon in the domain.

2. **In the SyMON main console window, select Edit ➤ Create an Object (**FIGURE 4-1**).**

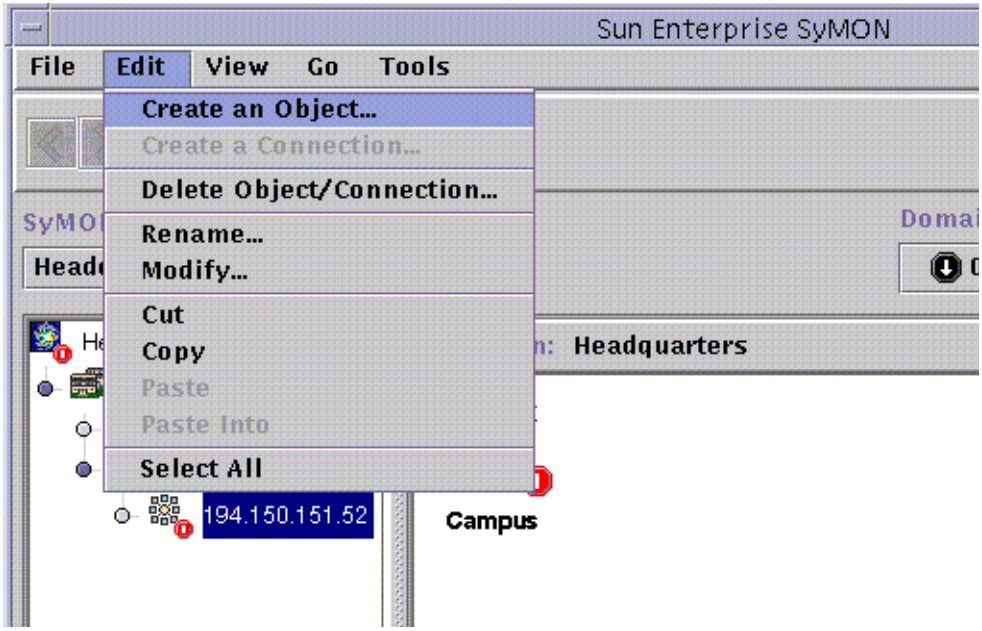

FIGURE 4-1 Creating an Object

The Create Topology Object window is displayed (FIGURE 4-2).

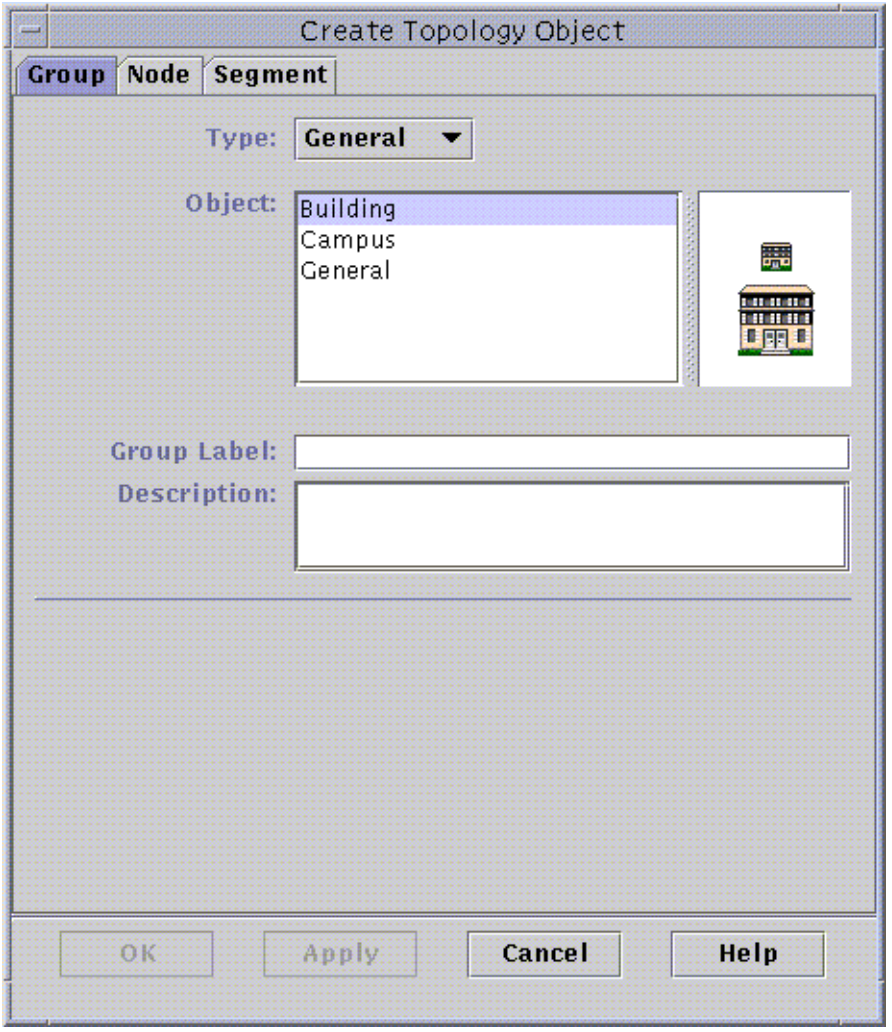

FIGURE 4-2 Creating a Group in the Create Topology Object Window

3. **In the Create Topology Object window:**

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

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

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

   c. **Create a new group Label.**

   d. **(Optional) Type a description in the optional Description field.**

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

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 SyMON 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 67.

5. **Add components to your group:**
   - Use the Create Topology Object window. See "To Create a Node" on page 54.
   - Copy and paste objects from other groups into the new group. See "Copying Objects" on page 65.

Creating a Node

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

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Create a Node

Note – A domain must exist before you can create a node. To create a domain, see "To Create Domains" on page 40.

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

   Select the lowest level group of the 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 domain, then select the building in the domain as the lowest level group.

2. **In the SyMON main console window, select Edit ➤ Create an Object (**FIGURE 4-1**).**

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

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

   The window changes to display settings available for nodes (FIGURE 4-3).

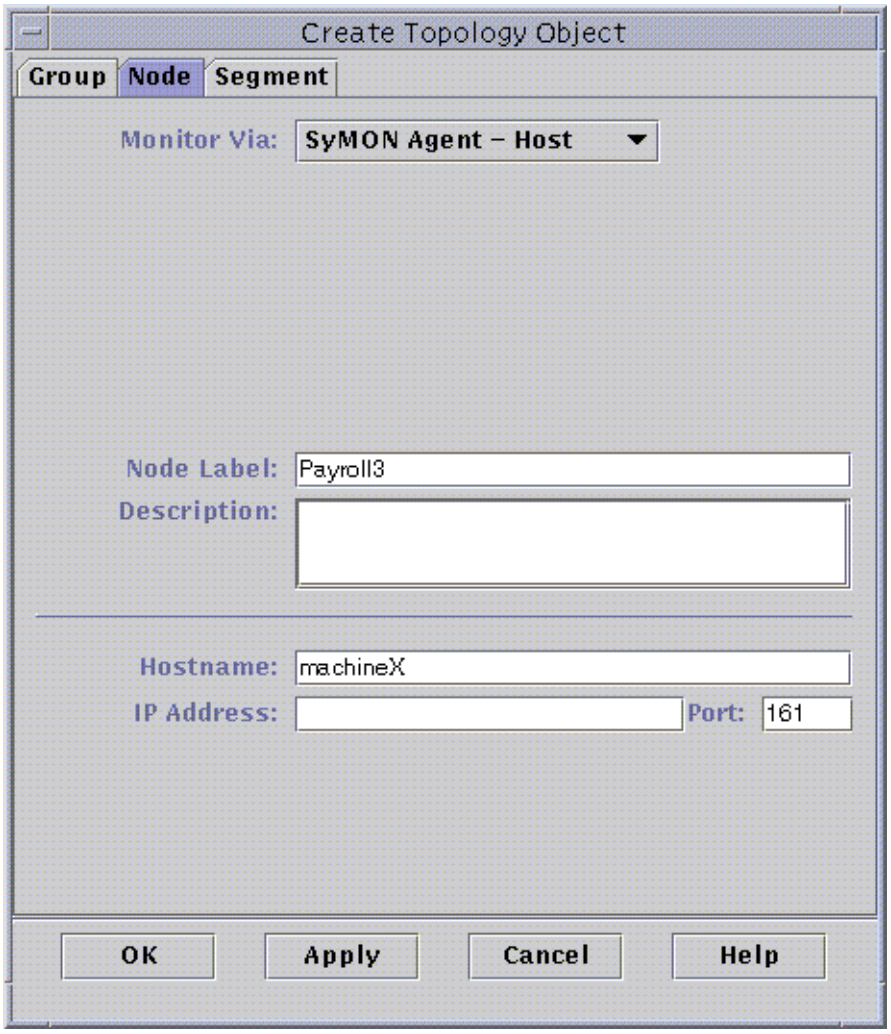

FIGURE 4-3 Create Topology Object Window—Node Tab

4. **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 six categories of agents and monitors (TABLE 4-1). 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 4-1 Types of SyMON Monitoring

Type	Description	Effect
SyMON Agent – Host	Monitor and manage a host that has an active SyMON agent that is installed and running.	The status of the SyMON Agent on the host can be monitored. The Details window of the SyMON Agent Host contains tabs such as Info, Browser, Alarms, and so forth. The Entity Polling Type in the Info tab is `ahost`.
SyMON Agent – Module	Monitor and manage a module that has an active SyMON agent that is installed and running.	The status of the SyMON 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 SyMON agent that is running a SyMON proxy module for that device. (The proxy module must have been previously loaded into the SyMON agent by using the Load Module dialog. See Chapter 8.) Communication between the SyMON Topology manager and the SyMON agent is SNMPv2 usec. Communication between the SyMON 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 4-1 Types of SyMON Monitoring *(Continued)*

Type	Description	Effect
SNMP Ping	Monitor the device by using SNMP `ping` command. The SyMON 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 `snmp`.
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 `ping`.
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 `dummy`.

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

The list of choices varies widely according to the type of monitoring you selected in the previous step.

TABLE 4-2 Choices Available in the Type Pull-Down Menu

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

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 SyMON main console window when the node is created.

d. Create a unique new name in the Node Label field.

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

5. **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 a, 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:

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

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 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 SyMON 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 the right permission to create this node, or that you must start a SyMON agent on the node.

Note – If you are connected to one SyMON server context and create a node on another SyMON 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 SyMON server contexts. For more information, see Chapter 11.

If you want to make any changes to the new node, see “Modifying Objects” on page 67.

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

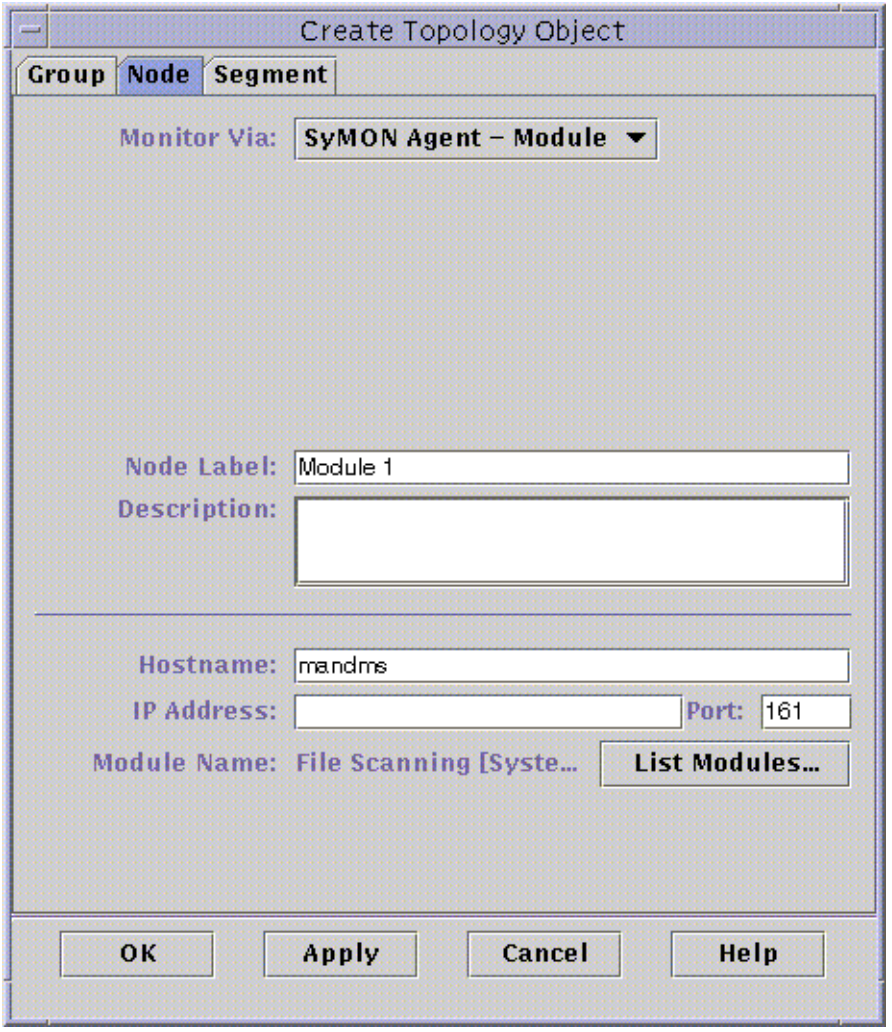

FIGURE 4-4 Create Topology Object Window for SyMON Agent – Module

5. **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 184. If the module that you want to use is not enabled, see “To Enable a Module” on page 195.

   The module list is displayed (FIGURE 4-5).

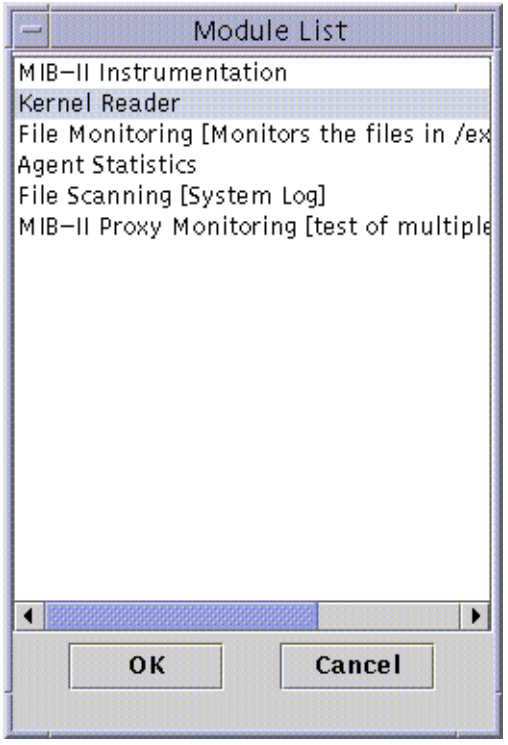

FIGURE 4-5 Module List

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 Cancel to cancel your request.

Creating Segments

To complete your view of a domain, you can include segments of the networks linking the nodes in the domain.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Create a Segment

1. **In the SyMON main console window:**

   a. **In the left window, select a location in the 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 a domain, then select the building in the domain.

   b. **In the SyMON main console window, select Edit ➤ Create an Object (**FIGURE 4-1**).**

      The Create Topology Object window is displayed (FIGURE 4-2).

2. **In the Create Topology Object window:**

   a. **Click the Segment Tab (**FIGURE 4-6**).**

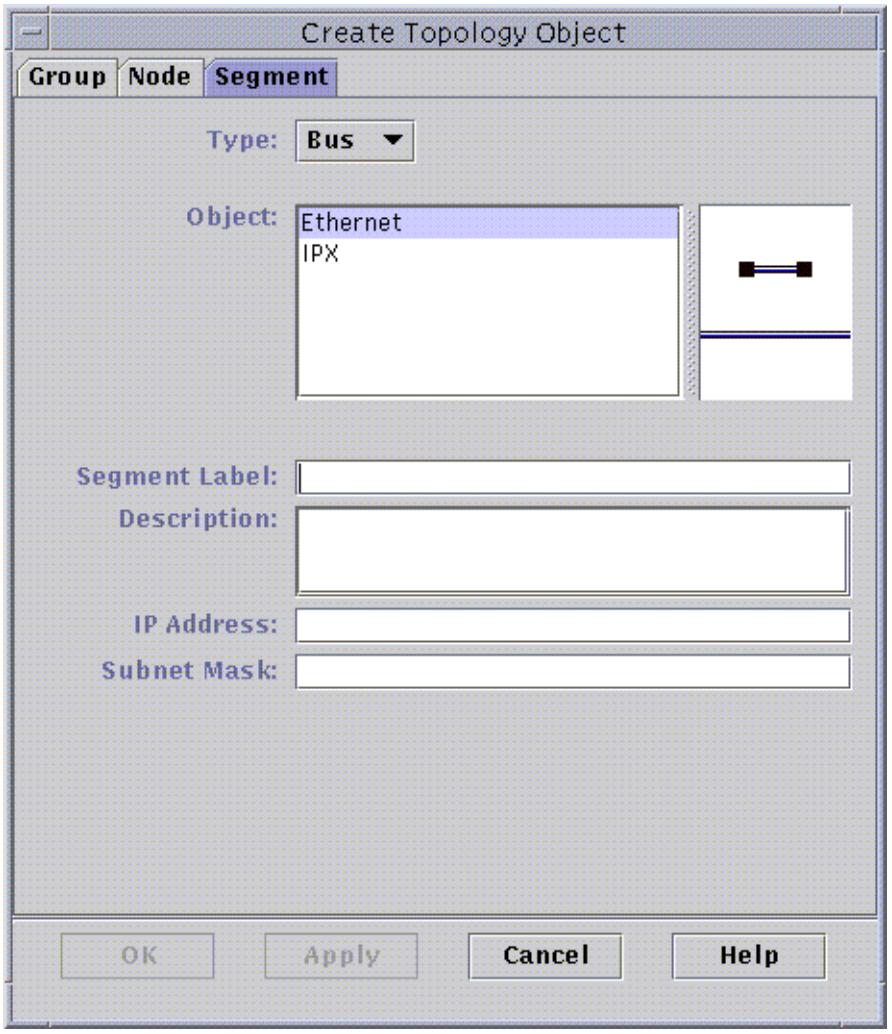

FIGURE 4-6 Segment Tab in the Create Topology Object Window

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

c. Select the object type.

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

At the right in the Create Topology Object window is a window which displays large and small icons corresponding to the type of object you have selected. The icons are displayed in the topology view in the SyMON 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 SyMON 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 67.

Connecting Objects

You can connect objects in the topology view.

▼ To Connect Objects

1. **Select two objects in the topology view.**
2. **Select Edit ➤ Create a Connection.**

   A link is displayed between the objects.

Copying Objects

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

To move an object from one location in the topology view to another, use the Edit commands, `Cut` and `Paste`.[1] 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 a domain that contains some of the objects that already exist in another domain. To do this, create a new domain (see Chapter 3), then copy existing objects into the new domain as described in the following procedure.

You can also copy a group (an object that contains other objects). In this case, the Sun Enterprise SyMON 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.

For more information on the SyMON main console window, see Chapter 6.

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 with 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 66.

1. **In the SyMON main console window, select the existing object in the topology view.**

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

1. SyMON 2.0 does not support drag and release as an operation for moving objects.

2. **At the top of the SyMON main console window, select Edit ➤ Copy in the pull-down menu.**

   This message is displayed at the bottom of the SyMON main console window:

```
Copy successful
```

3. **Open the destination group or domain.**

   The destination group is displayed in the topology view.

4. **At the top of the SyMON main console window, select Edit ➤ Paste.**

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

```
Copy Successful
```

3. **In the hierarchy view, select (highlight) the new group or 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 left mouse button on the destination 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.

Note – When you copy a group in the SyMON 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

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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

▼ To Modify an Object

1. **Select the object in the SyMON main console window.**

2. **Select Edit ➤ Modify in the SyMON main console window.**

   The Modify Object window is displayed (FIGURE 4-7). (The appearance of the window varies widely, depending on whether the object is a group, node, or segment.)

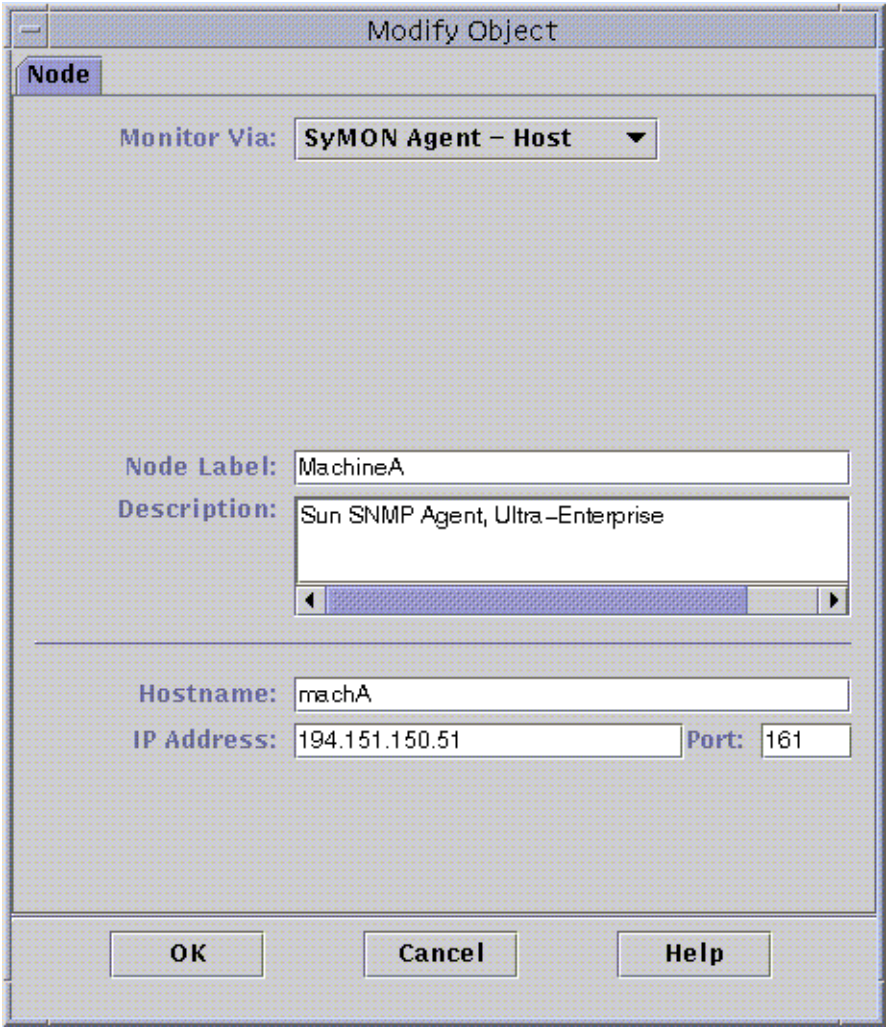

FIGURE 4-7 Modify Object Window—Example

3. **Edit the attributes as needed.**

   For a group object the available attributes 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 attributes are:

- Monitor Via: SyMON Agent - Host, SyMON Agent - Module, SNMP Proxy, SNMP Ping, ICMP Ping, or Non-Monitored
- Type: Printer, Workstation, Router, Concentrator, Server, PC, or As Is
- Object: (varies according to Type, above)
- Node Label
- Description
- (Additional attributes may be listed, depending on the type of node.)

For a segment the available attributes are:

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

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

Cutting and Pasting Objects

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Objects can be cut (to be moved) or deleted (permanently) from the topology view in the Sun Enterprise SyMON main console window. An object that is cut is temporarily saved in memory and can be immediately pasted into one or more areas[1]. An object that is deleted cannot be recalled. For instructions on deleting objects, see "Deleting Objects" on page 72. For more information about the SyMON main console window, see Chapter 6.

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 SyMON main console window. See "Deleting Objects" on page 72.

▼ 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 (**FIGURE 4-8**) in the SyMON 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.

1. SyMON 2.0 does not support drag and release as an operation for moving objects.

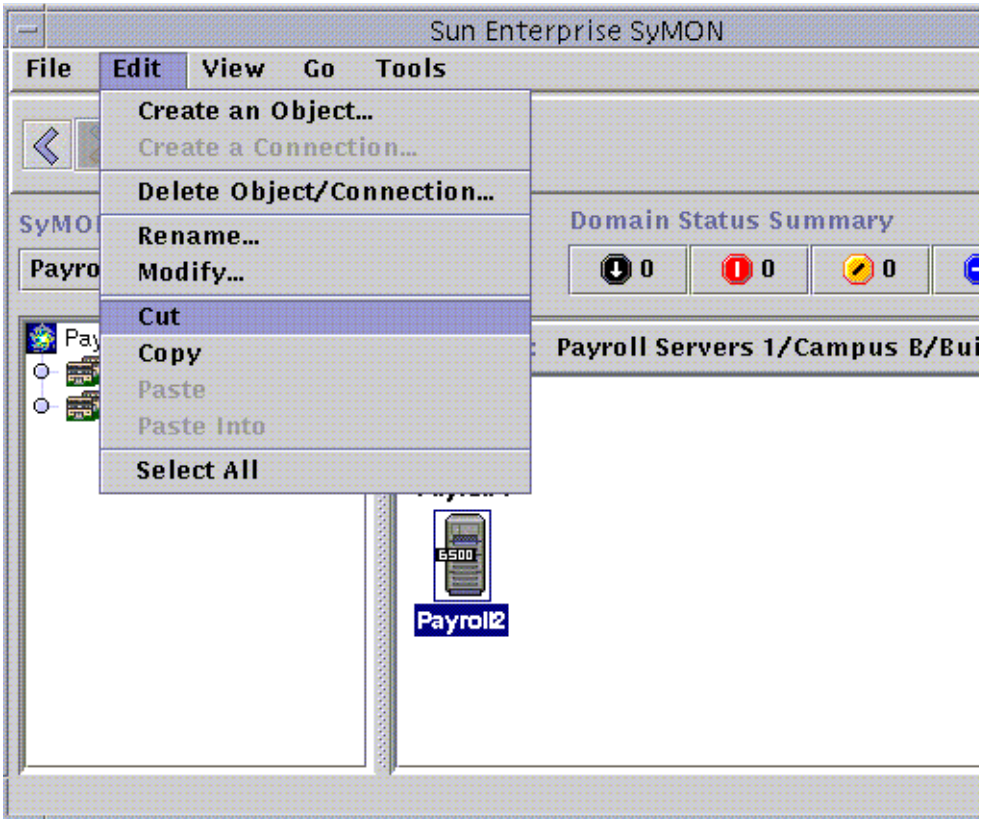

FIGURE 4-8 Cut, Copy, and Paste Options

If the Cut operation succeeds, the object is removed, and this message is displayed at the bottom of the SyMON 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

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The Edit ➤ Delete command removes an object completely. To move an object to another location, see “To Copy an Object” on page 65 or “To Cut and Paste Objects” on page 70.

For more information on the SyMON main console window, see Chapter 6.

▼ To Delete Objects

Note – To delete a domain, use the delete command in the Domain Manager window; see “Deleting Domains” on page 42.

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 SyMON main console window (**FIGURE 4-9**).**

   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 SyMON main console window:

```
Delete successful
```

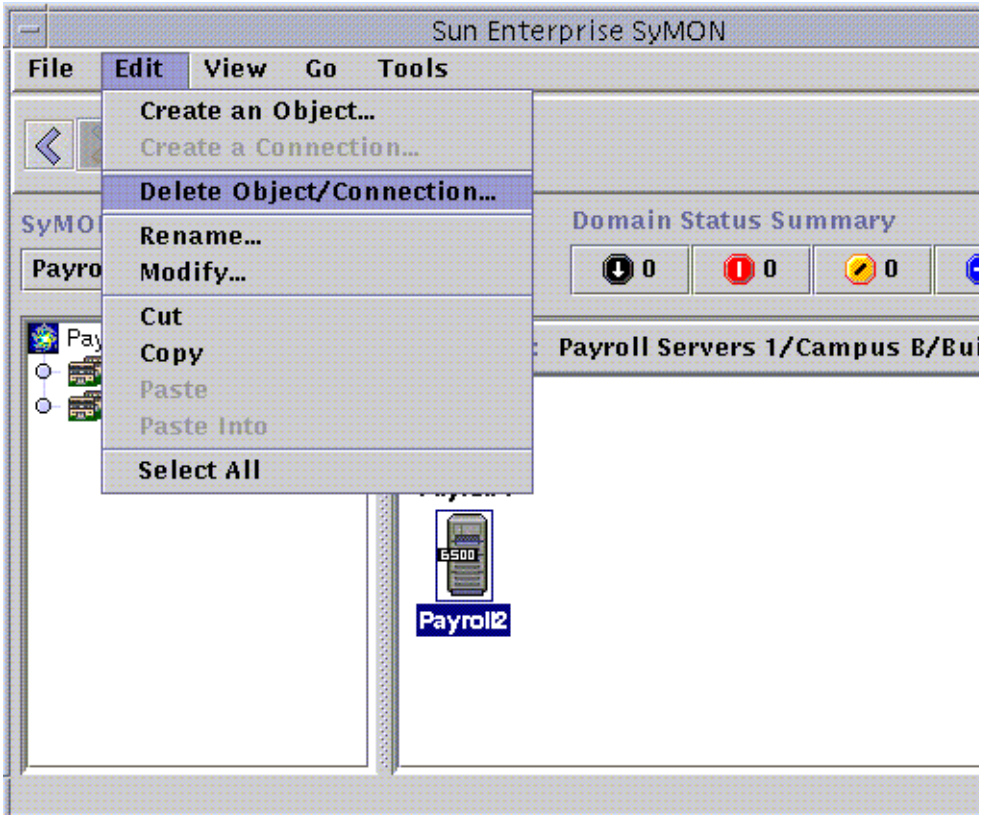

FIGURE 4-9 Delete Option

CHAPTER 5

Discovery Manager

You can use the Discovery Manager to populate automatically domains that you have created. For example, automatically populating domains is very useful if you have a large network. To add members manually with the Create Topology Object window, see Chapter 4.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following topics are covered 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 “IP Routing” on page 351) in a local server context. The Discovery Manager cannot discover objects where a SyMON agent is configured to a different server context (see “SyMON Server Context” on page 256).

You can create one or more discovery requests. Each request runs as a separate process and populates the 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

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Start the Discovery Requests Window

Start the Discovery Requests window in one of three ways:

- When you create a domain in the Create Domain dialog (FIGURE 3-7) 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 domains, see Chapter 3.

- Select the domain in the SyMON Administrative Domains pull-down menu.
- Select Tools ➤ Discover in the SyMON main console window (FIGURE 5-1).

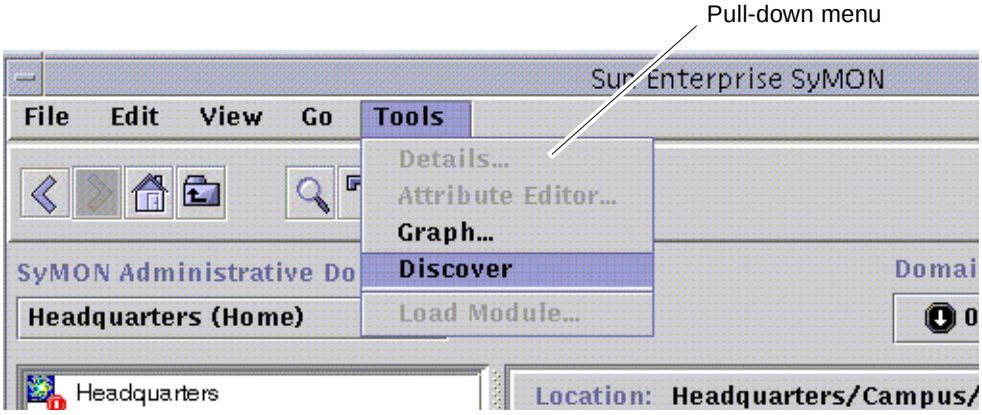

FIGURE 5-1 Tools Pull-down Menu

The Discovery Requests window is displayed (FIGURE 5-2).

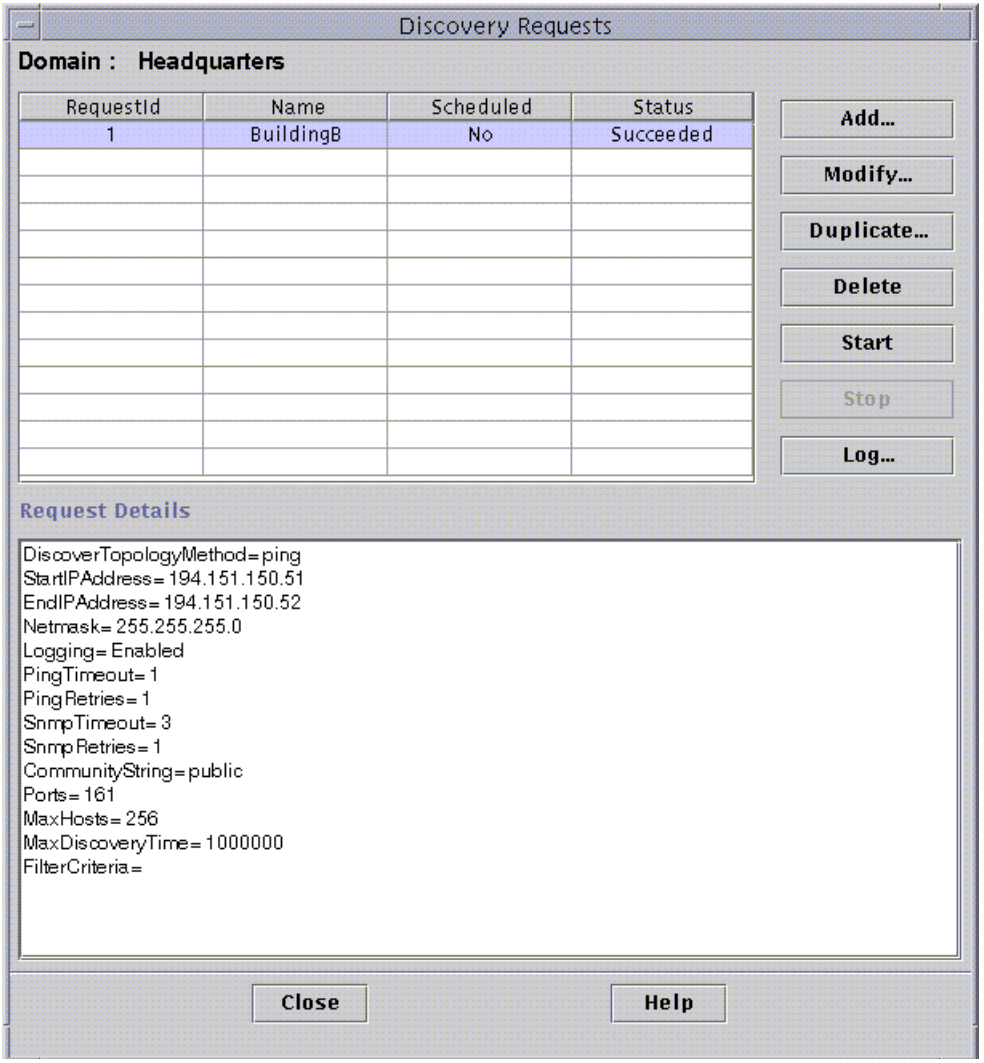

FIGURE 5-2 Discovery Requests Window

The Discovery Requests Window displays information containing the fields in TABLE 5-1.

TABLE 5-1 Discovery Requests Window Fields

Field	Description
RequestId	A number assigned by SyMON to the discovery request for tracking purposes
Name	A unique name which you create for the request
Scheduled	"Yes" if the request is scheduled, "No" if not scheduled
Status	Reflects the current state of the discovery request. The states may be: 1. New. A new request was added but has never been processed. 2. Queued. A request has been sent to the SyMON 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 5-2.

TABLE 5-2 Discovery Requests Window Buttons

Button	Description
Add	Click this button to create a new Discovery Request through the New Discover Request window (FIGURE 5-2).
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 using the `ping` command or by using routing tables.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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

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

▼ To Initiate a Discovery Request

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

   The New Discover Request window is displayed (FIGURE 5-3). 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 89.

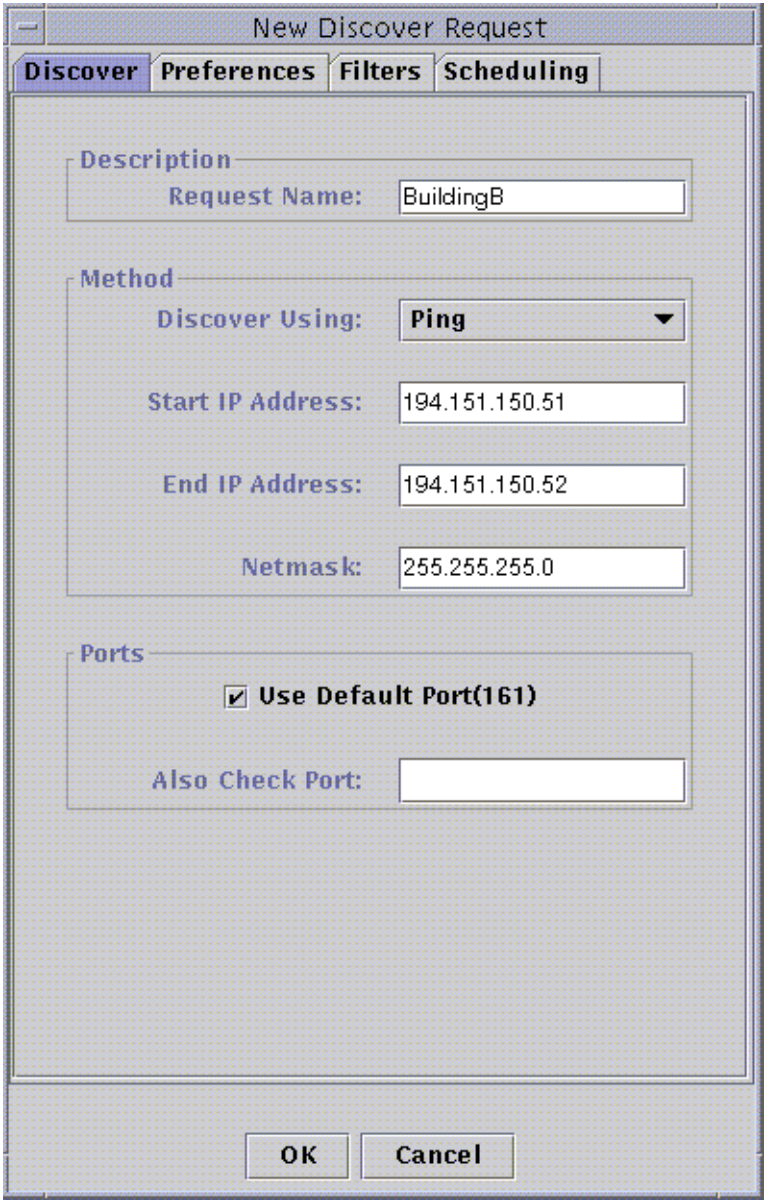

FIGURE 5-3 New Discover Request Window

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 5-3).

     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 / SyMON 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 SyMON server is running.

Note – Routing Table discovery requests require that you run an SNMP agent at port 161. This can be a SyMON agent, `snmpdx`, or any SNMP agent provided by your network management package.

For more information on routing tables, see Appendix E.

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 82.**

   When you start the discovery process:

   - The discover process discovers all nodes that are running the SyMON 2.0 agent, when the nodes are all located in the same SyMON server context. The discovery process does not include SyMON agent nodes that belong to another SyMON server context. That is, nodes that running SyMON agents in a remote SyMON server context are ignored.
   - Nodes that are not running a SyMON agent are listed as ping hosts.
   - The discover process discovers all nodes running an SNMP agent, where the nodes are not connected to any SyMON server. The information gathered for SNMP agents is very limited.

Note – Each discovery request is assigned a Request ID. This ID is an unique SyMON internal identifier of the request. Therefore, the Request IDs are not in sequential order.

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 which is a SyMON agent, the host is reported incorrectly as a ping host.

---

5. **If a SyMON server or agent is incorrectly reported to be a ping host:**

   a. **Delete the icon with the Edit ➤ Delete Object/Connection function in the SyMON main console window.**

   b. **Create a new icon, by one of two methods:**

   - Re-run discovery with larger timeout and retry values.
   - Add the icon manually by creating a node. See "Creating a Node" on page 53.

Customizing Your Discovery Request

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

You can customize your new discovery request by clicking on one of the four tabs on the Discover Requests window. The tabs are labelled Discover, Preferences, Filters, and Scheduling. TABLE 5-3 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 89).

TABLE 5-3 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 Start IP Address and End IP Address. Alternatively, you can supply the value of the netmask and let the Discovery Manager calculate the end address, using Start IP Address and End IP Address. Routing Table: Discovery Manager consults the routing table of the SyMON 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.

TABLE 5-3 Summary of Discovery Variables *(Continued)*

Variable	Definition
Netmask	This parameter applies to `ping` discovery requests. It is used to segment networks into subnets. If you supply the netmask but not the end IP address, the subnet address is calculated, and the end address is set to the last address within that subnet. To find out if your network is subnetted and the value of the netmask, check the `/etc/netmasks` 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 SyMON 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 SyMON agent.
Preferences	
Logging	
Log discover request progress?	Setting this flag enables logging for that request. The discovery process places the log files in the `/var/opt/SUNWsymon/cfg/discover` directory. There is one log file per user-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.
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 5-3 Summary of Discovery Variables *(Continued)*

Variable	Definition
Filters	
Criteria	
Select Filter Criteria Host Names Operating System Platform Type	Filter by host name, operating system, or platform type. Filtering uses the `grep` command to search for the supplied value.
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 either 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	
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..31)	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 Discover Request to run periodically through the Scheduling tab.

1. **Click the Preferences tab.**

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

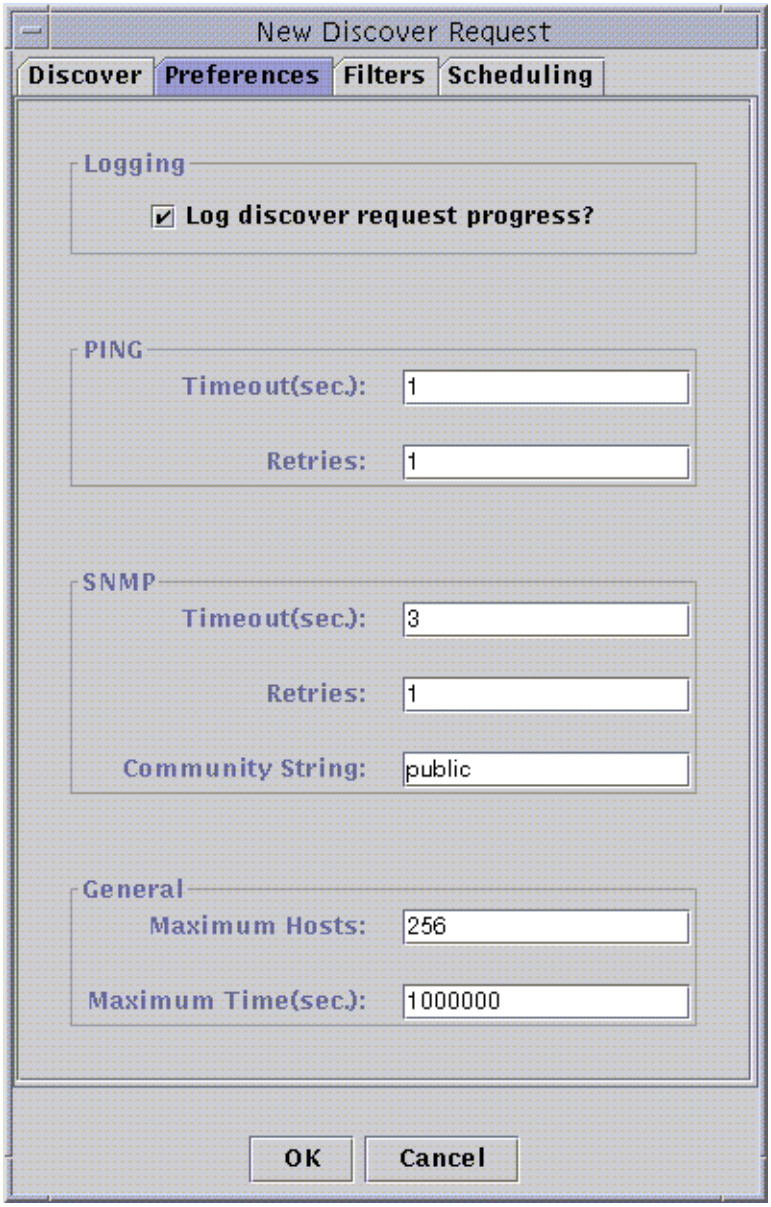

FIGURE 5-4 New Discover Request Preferences Window

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

   TABLE 5-3 lists the variables in the New Discover Preferences window.

3. **Click the Filters tab.**

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

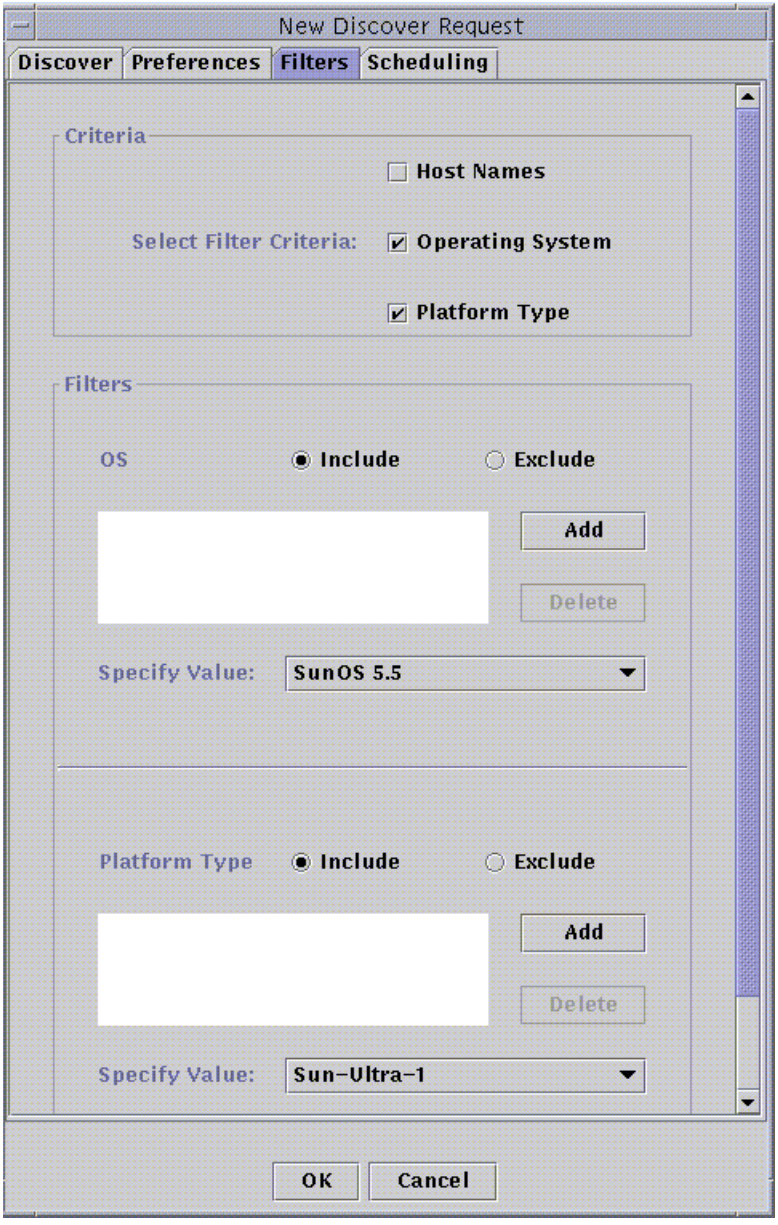

FIGURE 5-5 New Discover Request Filters Window

4. **Click one or more boxes for host names, operating system, or platform type.**

   By default, the Filters area is blank. As you select each box, the Filters area adds new fields. These fields enable you to include or exclude items in the discover search, and to specify the host names, operating systems, and platform types to be included or excluded.

5. **Click the Scheduling tab.**

   The New Discover Request Scheduling window is displayed (FIGURE 5-6).

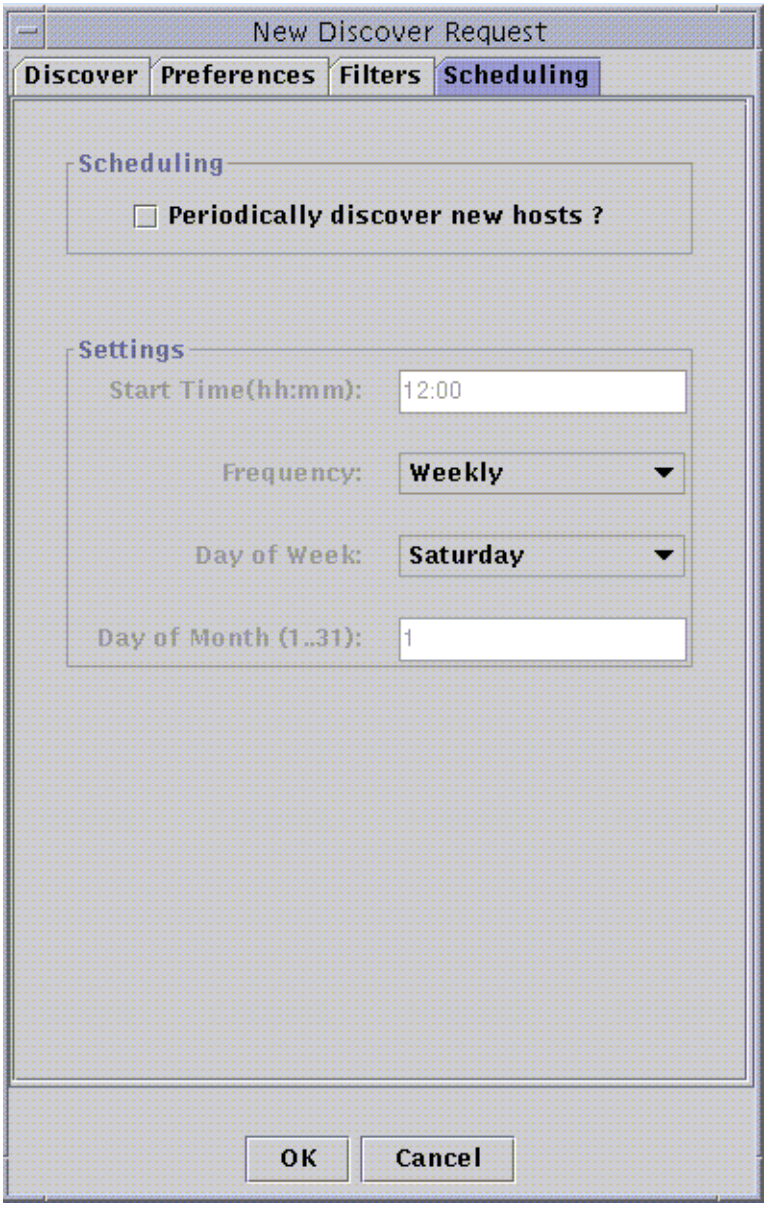

FIGURE 5-6 New Discover Request Scheduling Window

6. **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.**

Note – If you select 30 or 31 for day of the month, the Discovery Manager will not perform a search in February.

7. **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.
   - To save the discovery request, but not schedule it to run, click No.
   - To cancel the new discovery request without saving it, click Cancel.

8. **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 5-2).

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Modify a Discovery Request

1. **Select Tools ➤ Discover in the SyMON main console window (**FIGURE 5-1**).**

   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 new 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 5-2).

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Start, Stop, or Delete a Discovery Request

1. **Select Tools ➤ Discover in the SyMON main console window (**FIGURE 5-1**).**

   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.**

CHAPTER 6

SyMON Main Console Window

The SyMON main console window (FIGURE 6-1) has the following regions:

- Main Console Window
- Domain View
  - Hierarchy View
  - Topology View
- Menu Bar
- Navigation Buttons
- SyMON Administrative Domains Pull-Down Menu
- Help Button
- Domain Status Summary

Main Console Window

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON main console window (FIGURE 6-1) 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 6-1 are described in this chapter.

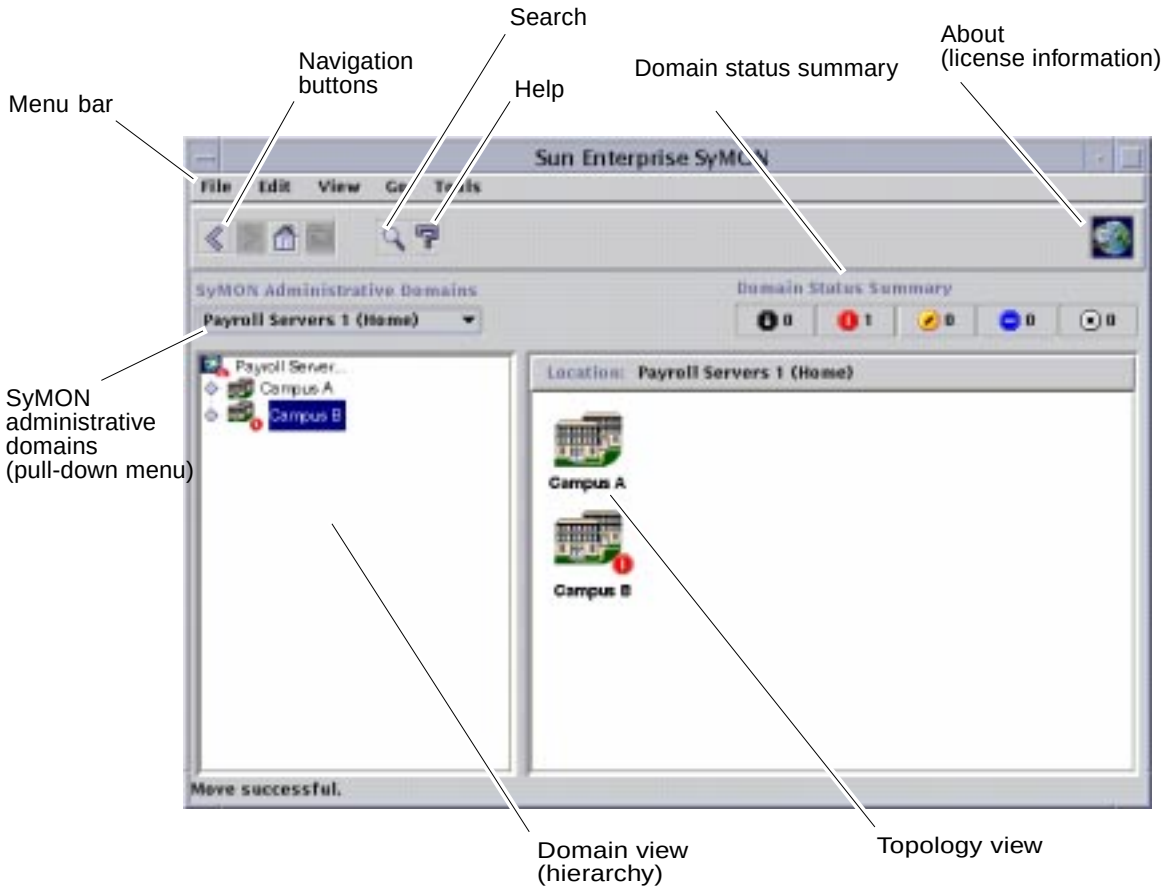

FIGURE 6-1 SyMON Main Console Window

Domain View

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Once you have created a domain and have populated it with objects (groups and hosts, and so forth), you can see the domain and its objects in the hierarchy (tree) view and the topology (regional) view of this domain.

The 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 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 a domain; the domain itself, and any groups and hosts contained in that domain.

FIGURE 6-2 illustrates an example of a domain. In this example, Headquarters represents a domain that consists of all the host machines in the headquarters office. The host machines are found in one geographic (campus) site. The campus has two buildings, and each building contains a network, subnet, two groups, and host machines.

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

For more information on domains, see Chapter 3.

The SyMON main console window (FIGURE 6-2) displays two views of a domain and its members. The left side of the 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 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 6-2, Building B is an object contained in the 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 94.

- Topology view

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

  In FIGURE 6-2, the selected object in the hierarchy tree is MachineA.

  For more information, see “Topology View” on page 96.

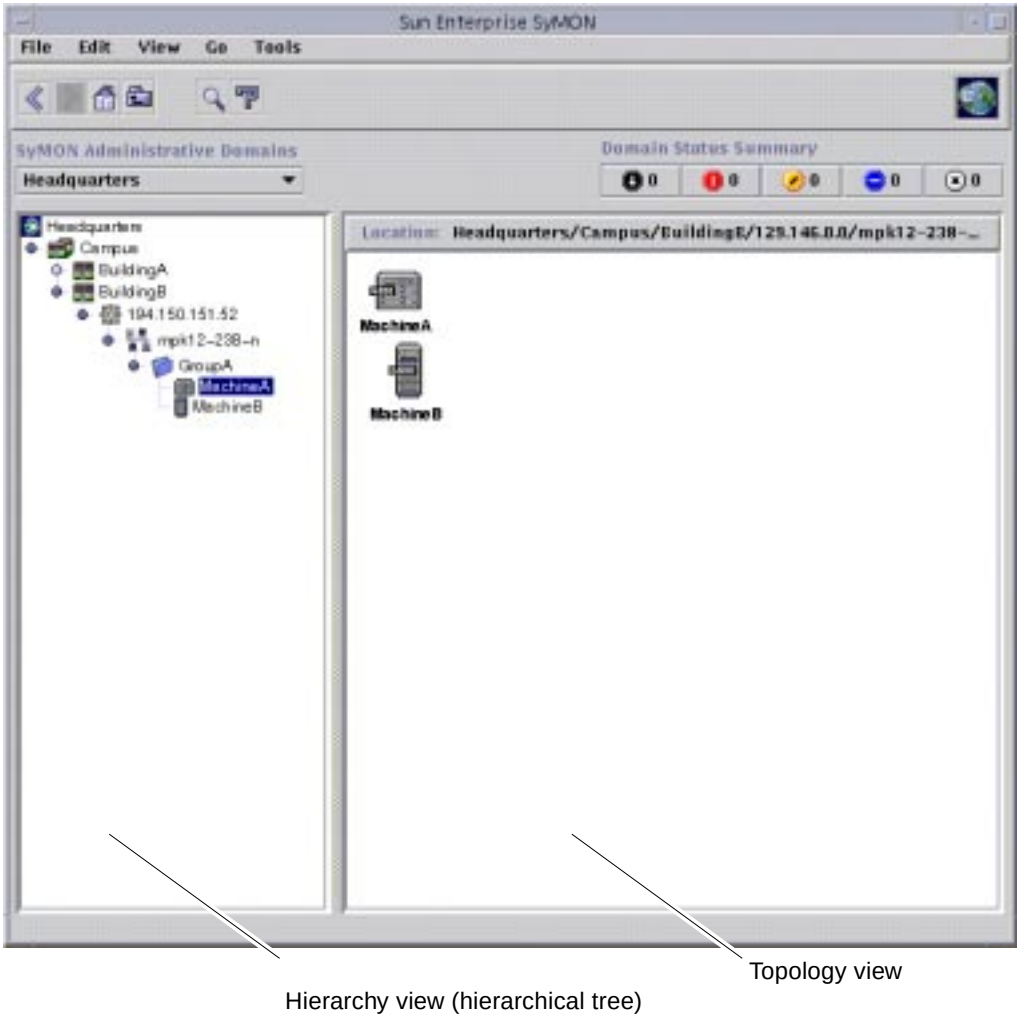

FIGURE 6-2 SyMON Main Console Window With Hierarchy and Topology Views

Hierarchy View

Two types of windows contain hierarchy views:

- Domain view in the SyMON main console window (FIGURE 6-1)
- Browser view in the Details window (FIGURE 10-2)

The domain hierarchy view displays the domain and its members.

The host hierarchy view displays the host and its modules. This view is part of the Browser Details window (Chapter 7).

Both the domain hierarchy view and the host 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 6-1.

TABLE 6-1 Mouse Actions in the Hierarchy View

Mouse Action	Result
Click with left or right mouse button on the circle next to the object	"Unrolls" (opens) details or "rolls" (closes) details of the selected object.
Double-click with the left mouse button on object icon	For a host object, starts the Details window or moves the Details window to the foreground if it is already open. For a 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 97 for more information.

▼ To Obtain Specific Information About the Hierarchy View

If an object has a light-colored circle 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 circle next to the object to "unroll" the tree branch.**

  The circle 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 dark-colored circle 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 circle next to the object to "roll up" the tree branch.**

  The circle changes to a lighter color, and 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 SyMON main console window (FIGURE 6-1).
- Browser contents view in the Details window (Chapter 7).

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

The mouse actions in the topology view are summarized in TABLE 6-2.

TABLE 6-2 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 97 for more information.

Tool Tip Balloon

As you move the mouse over various areas in the main console window, *tool tip* balloons 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. Property tables provide information about the monitored property and are described in Appendix C.

▼ To See a Tool Tip Balloon

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

  After a brief delay, a tool tip is displayed that provides a short description of that object (FIGURE 6-3).

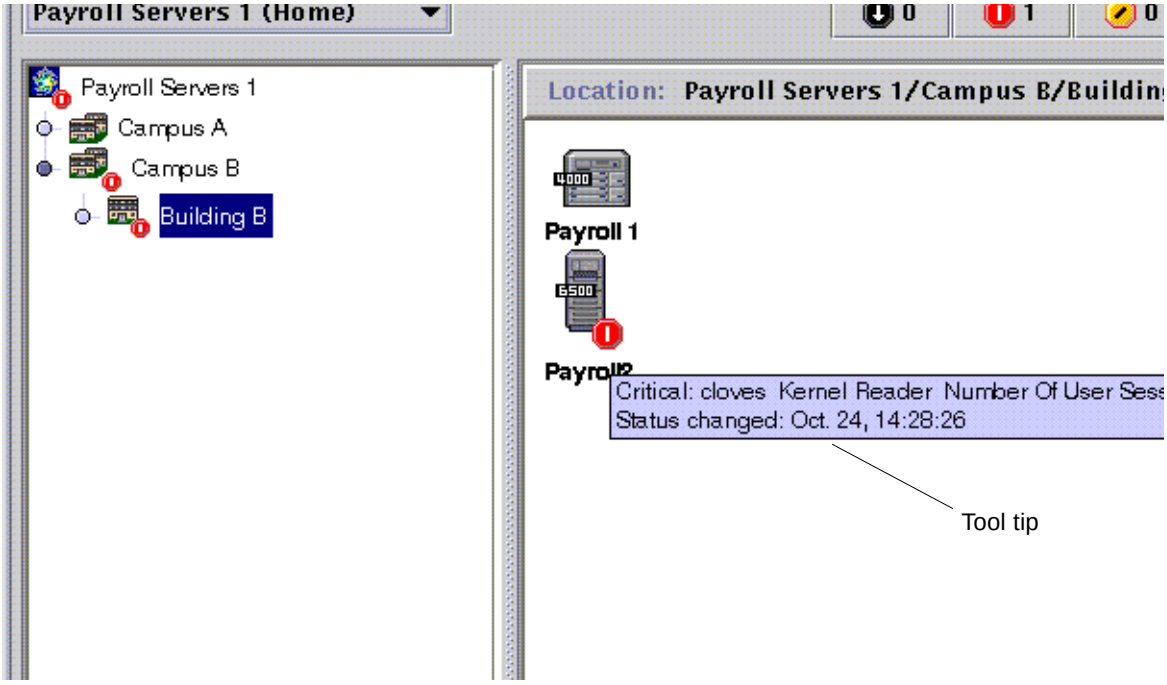

FIGURE 6-3 SyMON Tool Tip Balloon

Pop-up Menu

Pop-up menus are available for all objects in the hierarchy and topology views. The contents of a menu varies 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 6-3**).**

   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 6-3 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 a domain, see Chapter 3. For information about editing a host, see Chapter 7. For information about editing a module, see Chapter 8. For information about editing security, see Chapter 11.
Load Module	Displays the Load Module dialog. For more information on the Load Module dialog, see “To Load a Module” on page 184.
Details	Displays the Details window. For more information on the Details window, see Chapter 10.

Note – Depending on the object you selected, all the pop-up menu items listed in TABLE 6-3 may not be displayed.

Menu Bar

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The menu bar is at the top of the SyMON main console window (FIGURE 6-4).

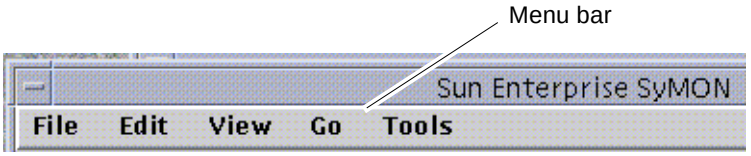

FIGURE 6-4 SyMON Menu Bar

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 SyMON 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 6-4 Options for the File Menu

Option	Description
Domain Manager	The Domain manager enables you to create your domain(s). For more information on Domain manager, see Chapter 3.
Remote Domain Manager	For more information on Remote Domain manager, see Chapter 3.
Set Home Domain	Sets your home domain.
SyMON-Console Messages	Opens the SyMON-Console Messages window. The window displays messages generated by the Sun Enterprise SyMON program, but does not include general UNIX messages.
Exit	Exits the current console session and all related SyMON windows. A pop-up dialog asks you to confirm the exit request.

Edit Menu Options

TABLE 6-5 Options for the Edit Menu

Option	Description
Create an Object	Creates a group, a node, or a network segment in the domain that is currently highlighted in the console window. See Chapter 4.
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 67.
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 6-5 Options for the Edit Menu *(Continued)*

Option	Description
Paste	Pastes the cut or copied object into the 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 domain or group.
Select All	Selects all objects in the topology view.

View Menu Options

TABLE 6-6 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 6-7 Go Menu Items

Menu Item	Action
Back	Takes you to the previous console view.
Forward	Takes you to the next console view (if applicable).
Home	Takes you to the top of your home domain in the hierarchy view.
Up	Takes you up one level in the hierarchy view.
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.

Tools Menu Options

TABLE 6-8 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 7. For more information about the Details Alarm window, see Chapter 9. For more information about the remaining categories in the Details window, see Chapter 10.
Attribute Editor	Displays the Attribute Editor. For information about editing a domain, see Chapter 3. For information about editing a host, see Chapter 7. For information about editing a module, see Chapter 8. For information about editing security, see Chapter 11.
Graph	Displays the Open Graph window. You can select from a list of saved graphs. For information on the graphing function, see Chapter 7.
Discover	Enables you to search for objects in a geographical location. For information about the Discovery Requests window, see Chapter 5.
Load Module	Enables you to load a SyMON module for a selected object. For information about the Load Module window, see Chapter 8.

Navigation Buttons

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

As you move through different domains and through different levels within the domains, the domain views are stored in memory. The Navigation buttons (FIGURE 6-5) in the main console window help you move back and forth between these views.

FIGURE 6-5 SyMON Navigation Buttons

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

TABLE 6-9 Navigation Buttons

Button	Description
Forward Button	The forward button is represented by an arrow facing right (FIGURE 6-5). Clicking this button displays the next screen.
Back Button	The back button is represented by an arrow facing left (FIGURE 6-5). Clicking this button displays the previous screen.
Home Button	The home button is represented by a house (FIGURE 6-5). Clicking on this button returns you to the highest level of the domain.

SyMON Administrative Domains Pull-Down Menu

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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

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

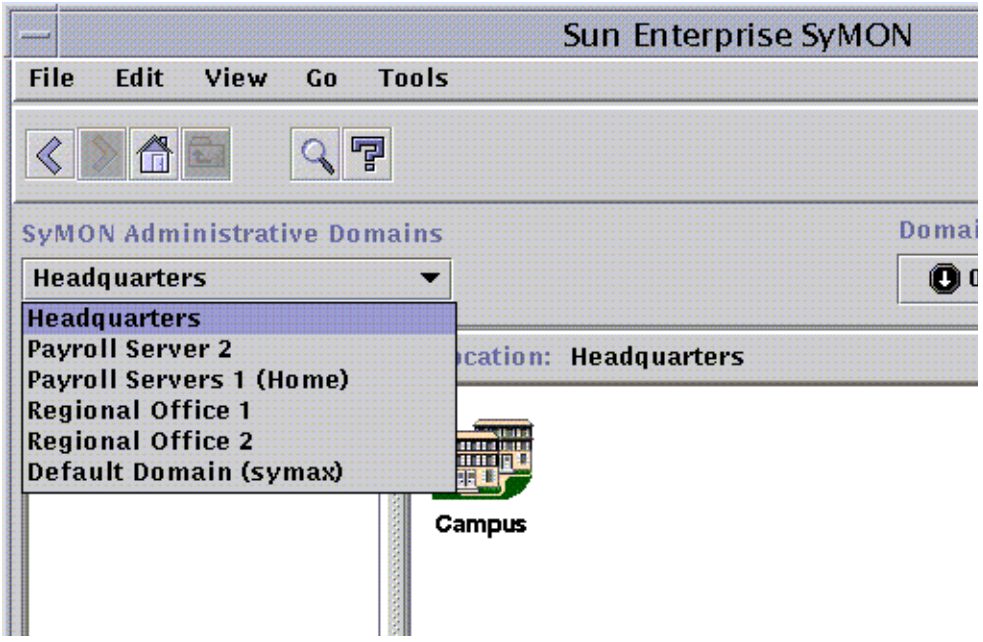

FIGURE 6-6 SyMON Administrative Domains Pull-Down Menu

▼ To View the Current List of Domains

1. **In the SyMON main console window, click the SyMON Administrative Domains button.**

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

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

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

Help Button

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Clicking the Help button (FIGURE 6-7) displays the online SyMON user's guide.

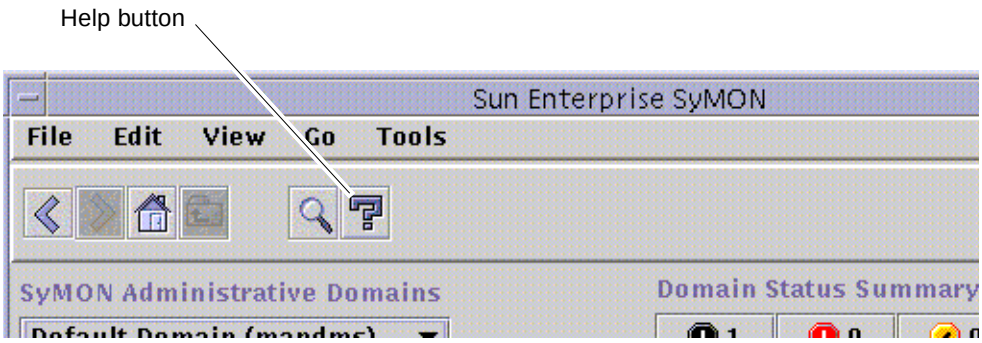

FIGURE 6-7 Help Button

Domain Status Summary

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The domain status summary displays the number of managed objects that have at least one *unacknowledged* open alarm of that severity in the selected SyMON Administrative Domain (FIGURE 6-8).

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 domain status summary, see “Seeing Alarms in Domain Status Summary” on page 209.

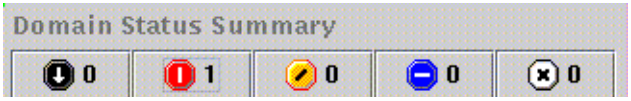

FIGURE 6-8 Domain Status Summary

CHAPTER 7

Browser

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This chapter covers the following topics:

- To Start the Details Window
- To Set Security for a Host or Module
- To Display a Data Property
- To Add a Row
- To Refresh Displayed Data
- To Probe a Property
- To Graph A Monitored Data Property
- To Graph Two Data Properties
- To Save Graphing Parameters
- To Open a Graph
- To Apply a Graph Template
- To Open the Attribute Editor
- To Create an Alarm
- To Send an Email
- To Set a Refresh Interval
- To Set a History Interval
- To Create a Timex Expression Using the Cyclic and Comparison Tabs
- To Create a Timex Expression Using the Absolute and Cron Tabs
- To Create an Alarm Schedule Using the Comparison Tab

Details View

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The details view is a subset of the Domain view. The highest hierarchical object in a details view is the host machine or module (if you have created a module object). For more information, see “To Create a Module Object” on page 59. Unlike the domain view, the details view enables you to see modules and the various monitored properties and statistics contained in the modules.

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

SyMON 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.

FIGURE 7-1 is an example of the host view for `MachineB`. 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 and the Kernel Reader modules.

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

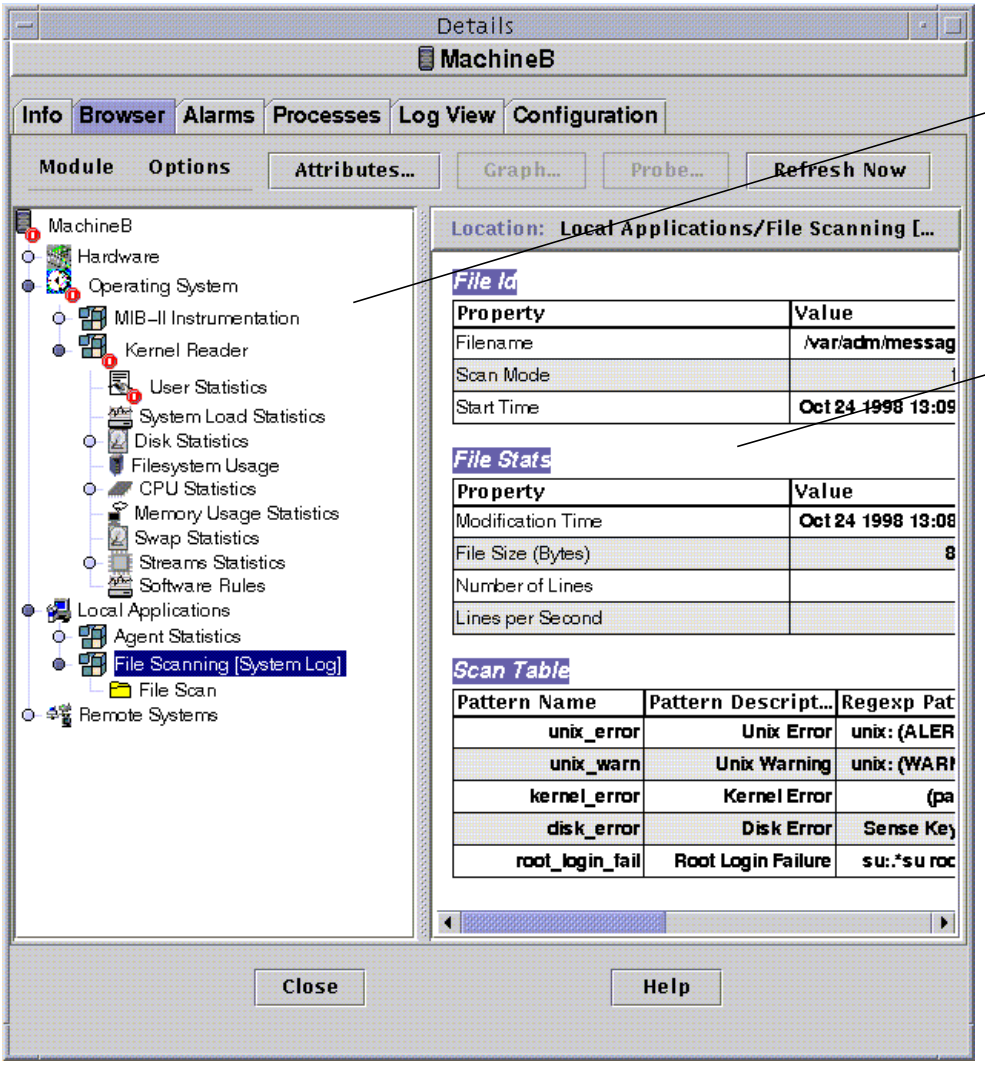

FIGURE 7-1 Browser Details Window

Using the Details Window

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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

The Details window provides you with detailed information about that individual host. This window has several tab buttons:

- Info
- Browser
- Alarms
- Processes
- Logview
- Configuration

Note – The tab buttons that are displayed in the Details window are dependent on the type of object selected. In addition, the Configuration tab is missing if the Config-Reader module is not supported on your system.

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 7-1 Details Window 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.
Processes	Displays the processes running on the host. (You must load the Solaris Process Details module to see the processes.)
Log View	Displays informational messages, including error messages, about your host. Enables you to search, monitor, and examine system and Sun VTS log messages.
Configuration	Displays 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 10.

▼ 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 7-2) 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 SyMON main console window, select the object then select Tools ➤ Details (FIGURE 7-3).

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

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

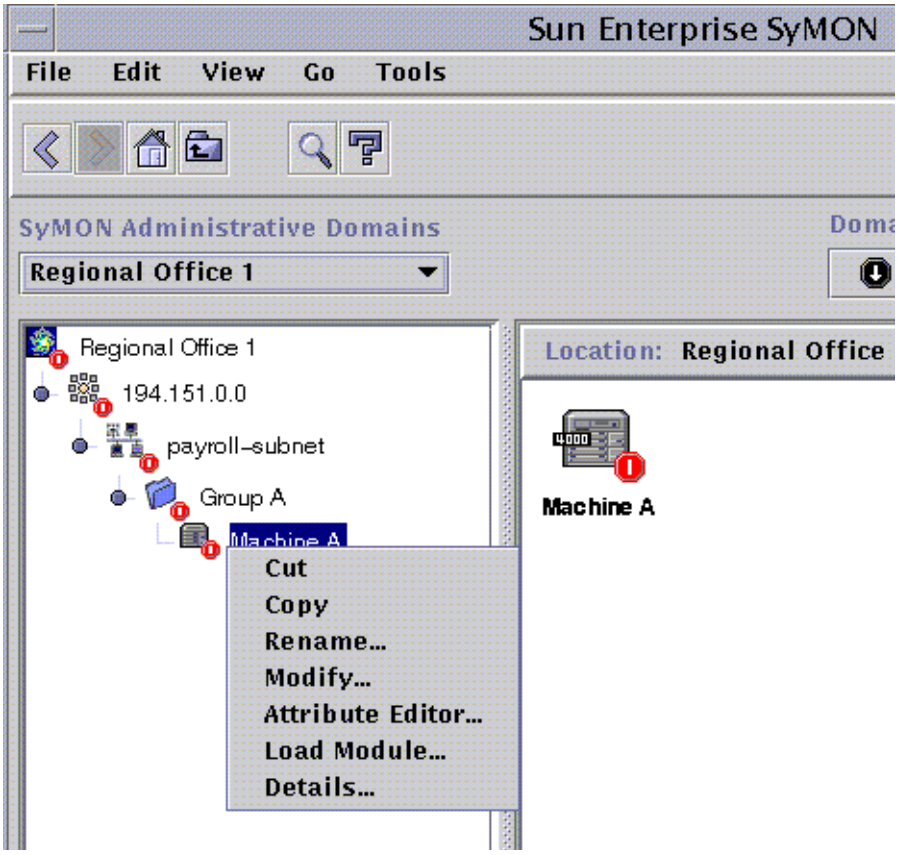

FIGURE 7-2 Opening the Details Window from the Pop-Up Menu

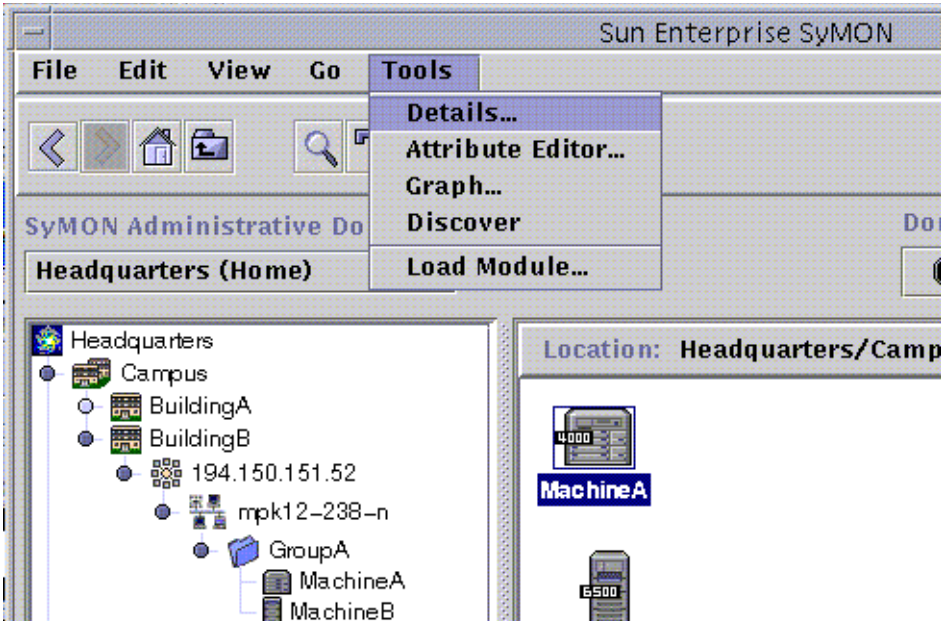

FIGURE 7-3 Opening the Details Window from the Tools Menu

▼ To Exit the Details Window

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

Browser Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The Browser tab (FIGURE 7-4) contains the hierarchy and contents views for a host.

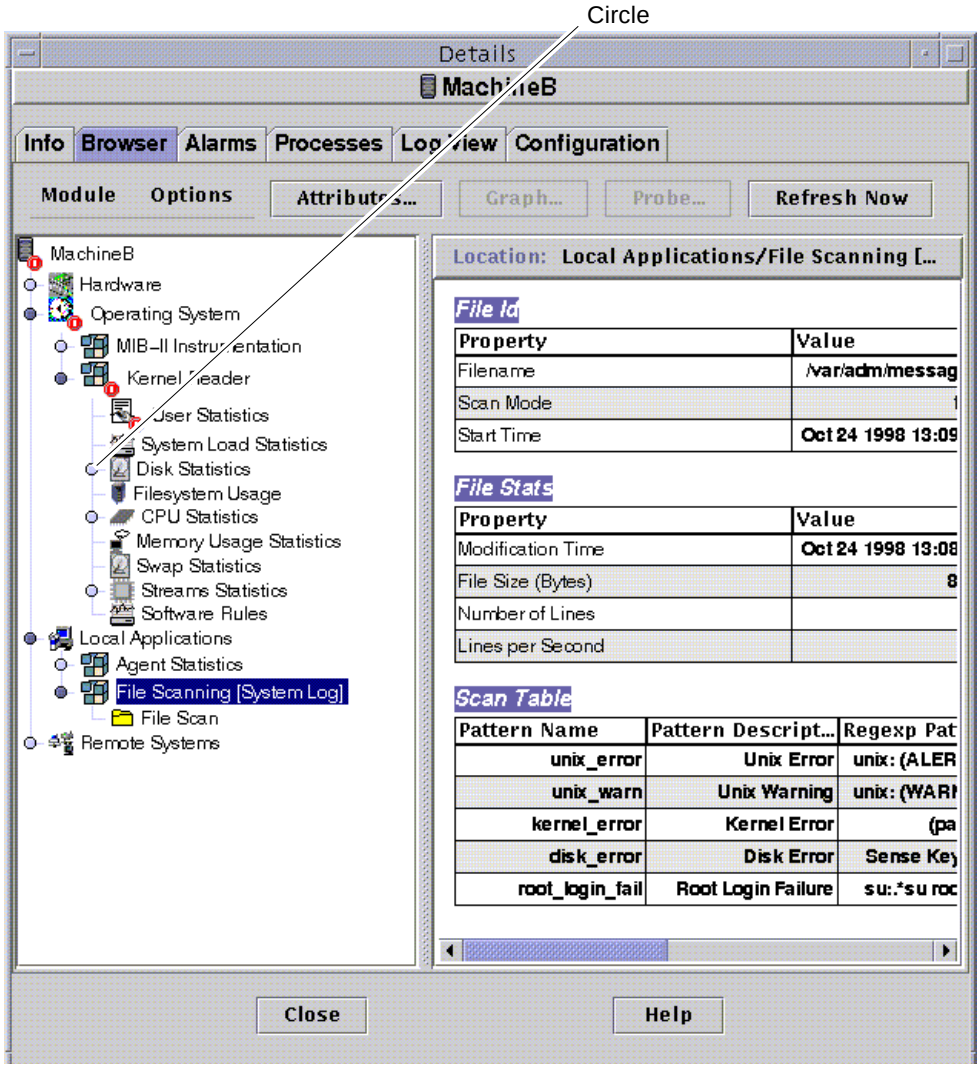

FIGURE 7-4 Light-Colored Circles “Unroll” to Provide Additional Levels of Detail

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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 – If the hierarchy view has a light-colored circle (FIGURE 7-4), you can click the circle or double-click the icon next to the circle to "unroll" and display more levels of detail.

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

Hardware

The Hardware category consists of the Config-Reader module, which 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.

Operating System

The Operating System category includes modules that monitor the operating environment of the host:

- Directory Size Monitoring
- File Monitoring
- Kernel Reader
- MIB-II Instrumentation
- NFS File Systems
- NFS Statistics
- 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)

Browser Buttons

The Browser Details window includes a row of buttons at the top of the panel.

TABLE 7-2 Browser Buttons

Menu Item	Definition
Module	FIGURE 7-5
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 184.
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 193.
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 195.
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 195.
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 196.
Options	FIGURE 7-6
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 59.
Copy To Graph	Enables you to add a variable to a graph. See “To Graph Two Data Properties” on page 132.

TABLE 7-2 Browser Buttons *(Continued)*

Menu Item	Definition
Add Row	Adds a row to a data property table. See “To Add a Row” on page 125.
Enable Row	Enables a row (that has been disabled) in a data property table.
Disable Row	Disables a row in a data property table.
Edit Row	Enables you to edit information for a row in a data property table.
Delete Row	Deletes a row in a data property table.
Attributes	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.
Graph	Graphs the selected monitored data property.
Probe	Enables you to run selected commands on the monitored data property.
Refresh Now	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.

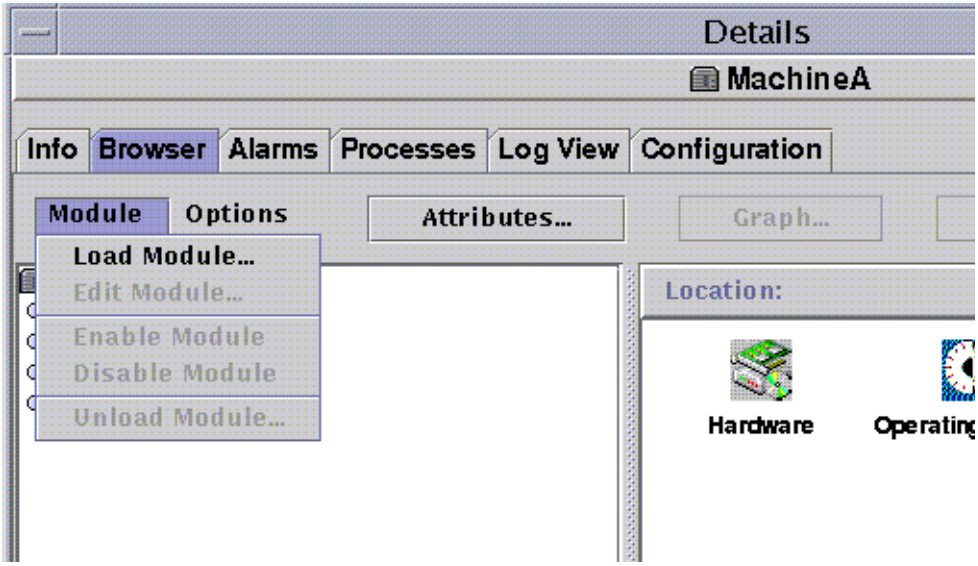

FIGURE 7-5 Module Menu Options in Details Window

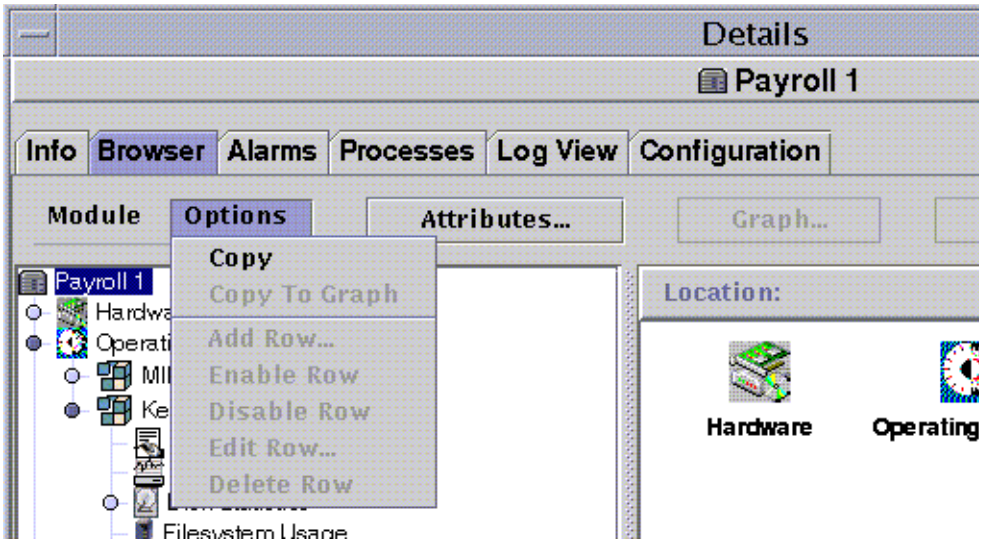

FIGURE 7-6 Options Menu Options in Details Window

Host Security

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

In the Details window, SyMON offers security at two levels: the host itself and at the module level. If you want, you may set security at the host level only. In this case, anyone with the appropriate security can load modules, set alarm thresholds, acknowledge alarms, and so on.

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

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

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 11.

FIGURE 7-7 Attribute Editor for a Host or Module

▼ 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 7-7**).**
3. **Type the name(s) of user and administrator groups in the appropriate fields.**

   For more information on the security fields, see Chapter 11.
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.

Monitoring Data Properties

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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. SyMON software provides both tabular and graphical information about a monitored property.

Once the data has been displayed, you can refresh the data. In addition, you can graph up to five data properties simultaneously. 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 light-colored circle 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 7-8**).**

   The monitored properties are displayed in a property table.

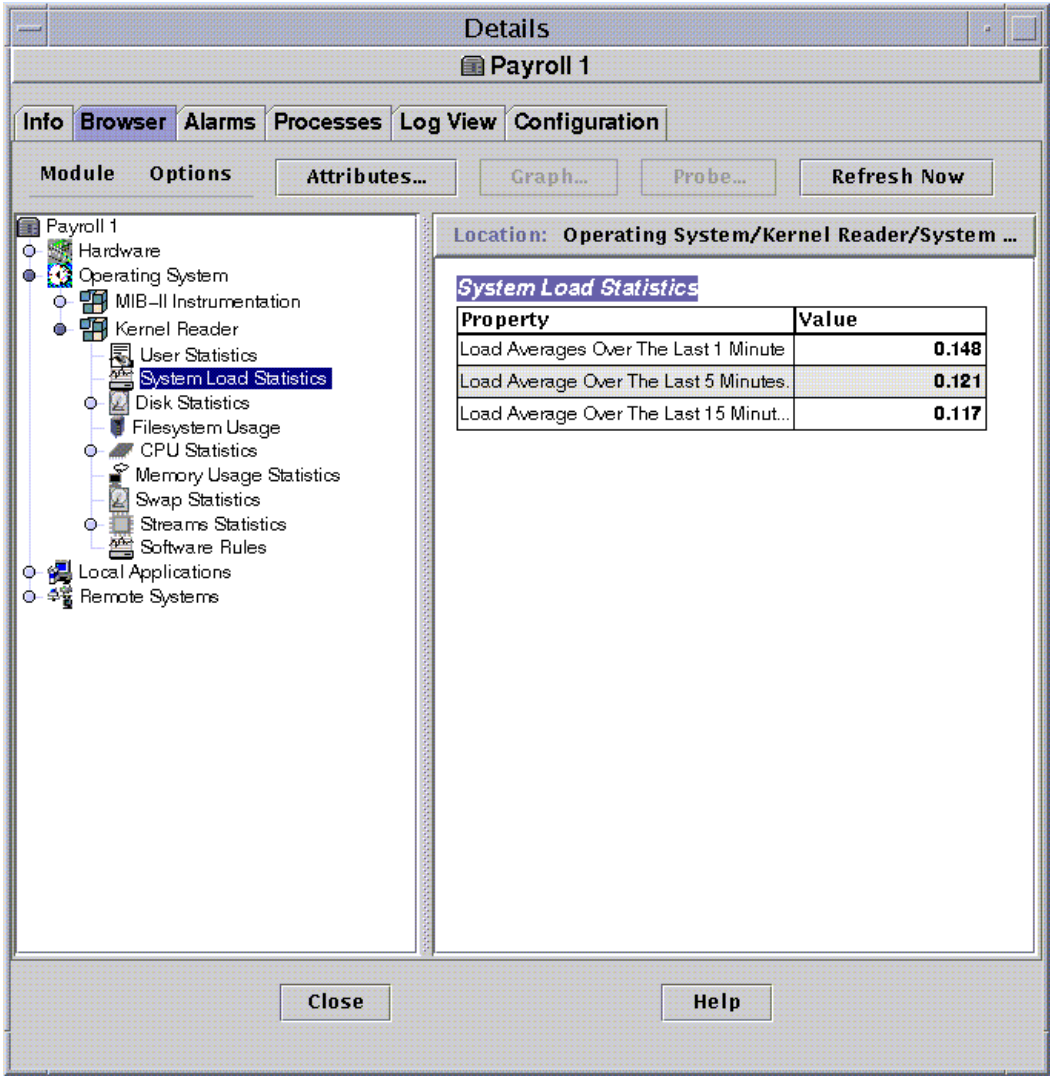

FIGURE 7-8 System Load Statistics

Working with Rows

For selected modules, SyMON software enables you to add, delete, enable, or disable rows for the data property tables (TABLE 7-3). When these modules are initially loaded, the data property tables are empty. You must “add a row” to monitor the data property.

TABLE 7-3 SyMON Modules That Require You to Add Rows

Module Name	Description
File Monitoring	Each added row defines the monitored “file”.
File Scanning	Each added row defines the “pattern” which must be matched within the monitored file. This row is added to the “Scan Table.”
Process Monitoring	Each added row defines the “pattern” which must be matched from all the processes that are running on the agent object.

▼ To Add a Row

The following example procedure uses the File Monitoring module. If this module is not loaded, see “To Load a Module” on page 184.

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 light-colored circle 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.

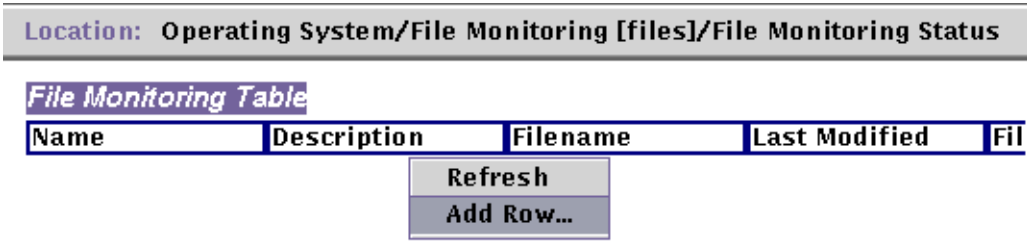

FIGURE 7-9 File Monitoring Table

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.**

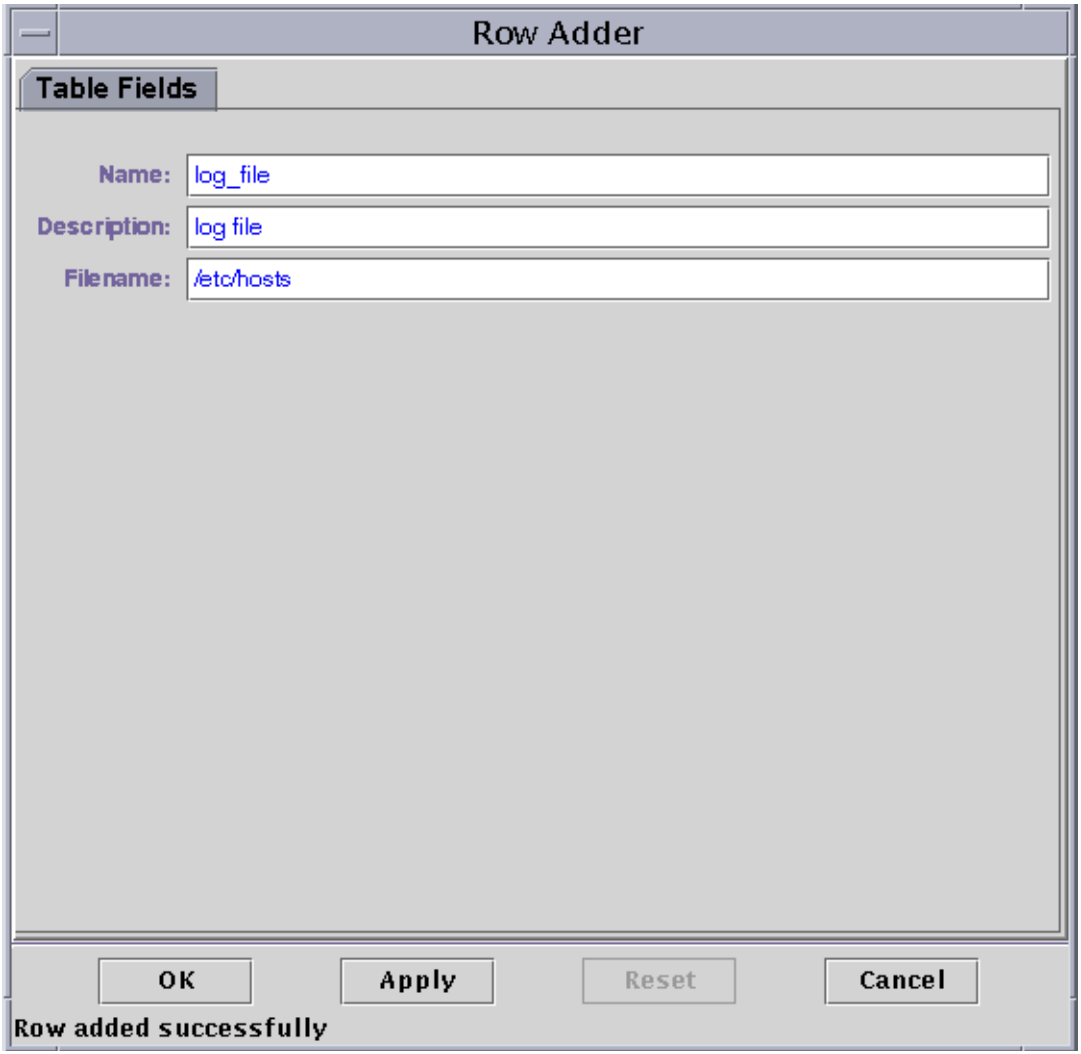

FIGURE 7-10 Row Adder Window

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).

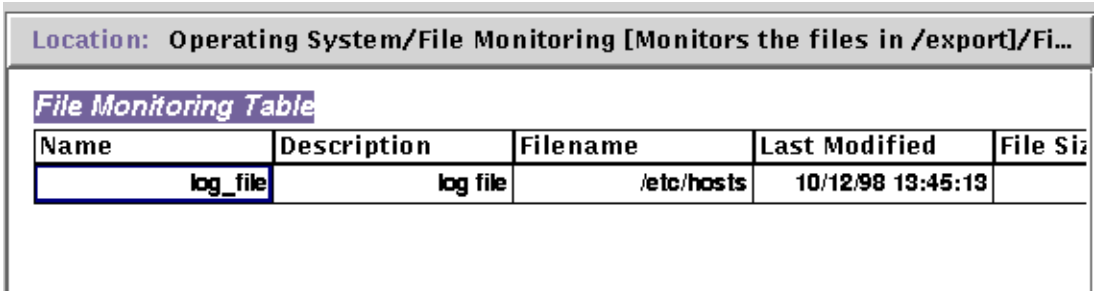

FIGURE 7-11 Updated File Monitoring Table

▼ 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 7-12).
  - 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 SyMON 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 154.

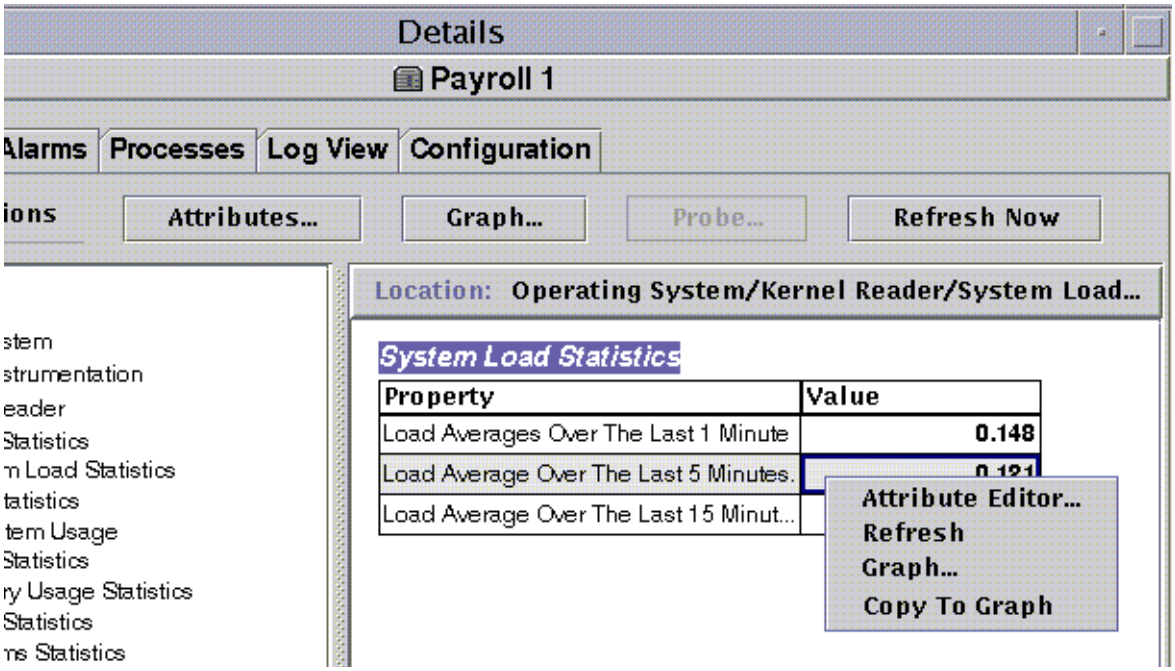

FIGURE 7-12 Monitored Data Property Pop-up Menu

Probing Properties

On selected properties, SyMON software enables you to run 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.

The following 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 184.

▼ 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 light-colored circle 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 7-13).
   - Click the Probe button (FIGURE 7-14), select the appropriate command, and click the OK or Cancel button.

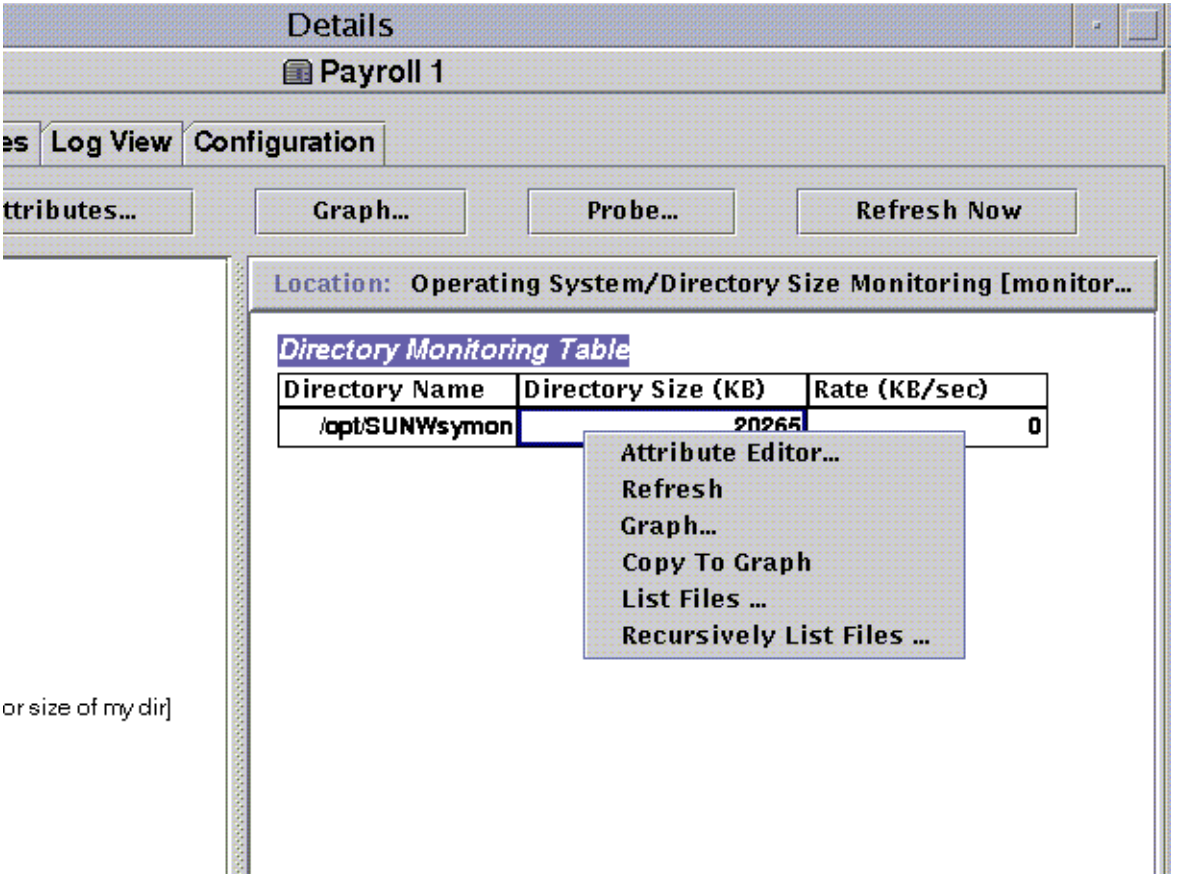

FIGURE 7-13 Probe Commands in the Pop-up Menu

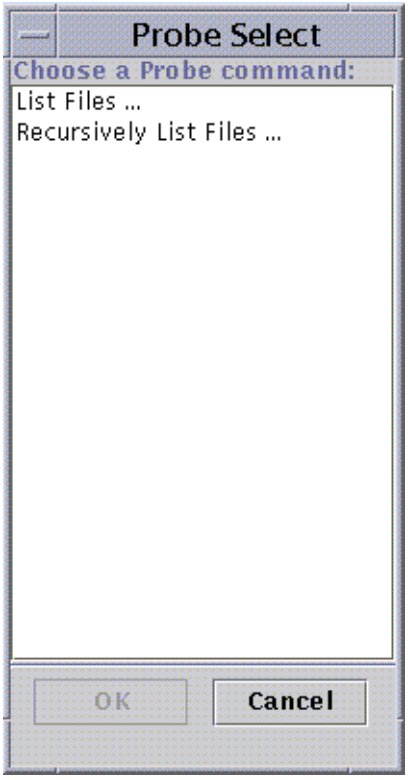

FIGURE 7-14 Probe Select Dialog

Graphing Properties

SyMON software enables you to graph most monitored data properties (FIGURE 7-15).

▼ 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 7-12).

- Select (highlight) the desired data property, and then click the Graph button at the top of the Details window.

The SyMON 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.

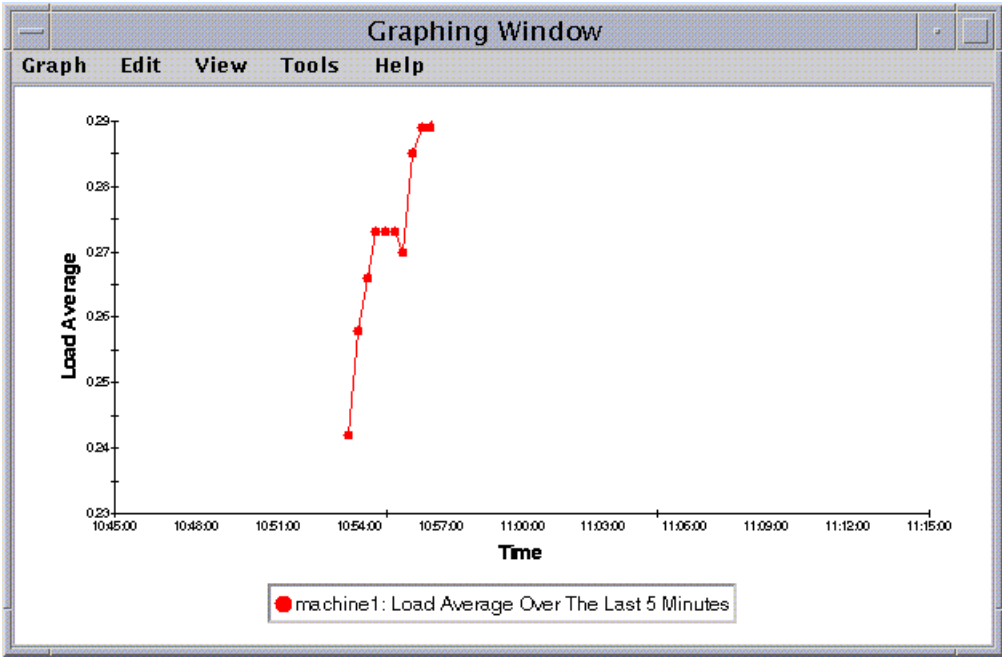

FIGURE 7-15 Graph of System Load Statistics Average Over the Last Five Minutes

▼ 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 command from the pop-up menu (FIGURE 7-16).

- In the Details window, select Options ➤ Copy to Graph.

3. **Go to the graphing window in which you want the additional property to be plotted. Select Graph ➤ Add to Graph (**FIGURE 7-17**).**

   The second data property is added (FIGURE 7-18).

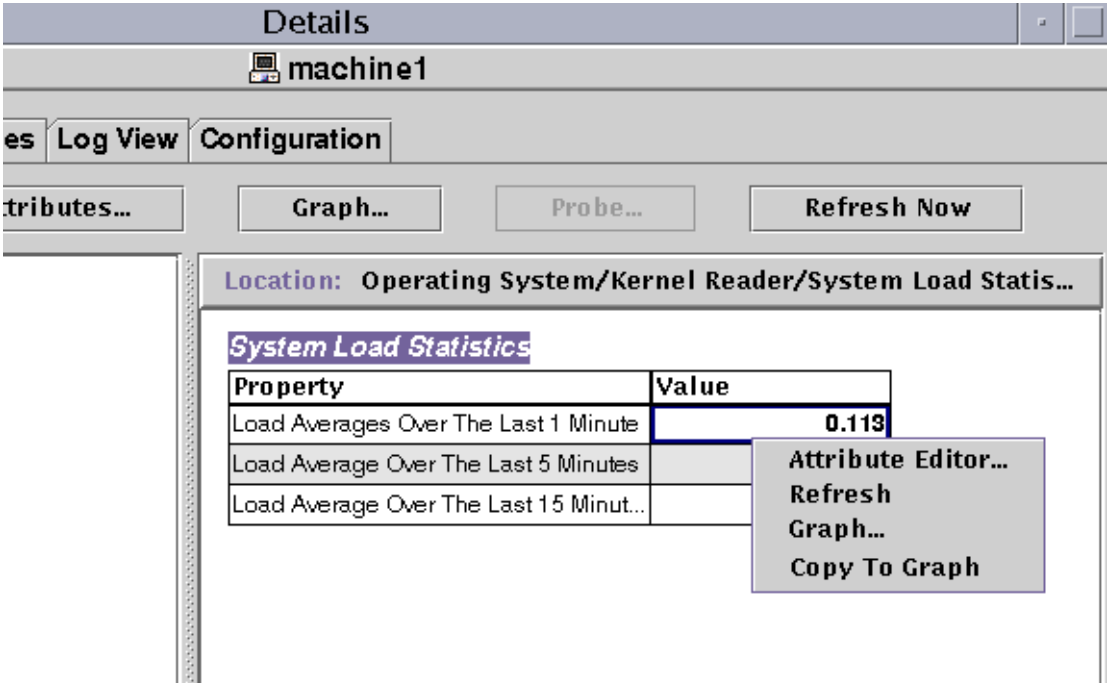

FIGURE 7-16 Copying Load Averages Over the Last One Minute to the Graph

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

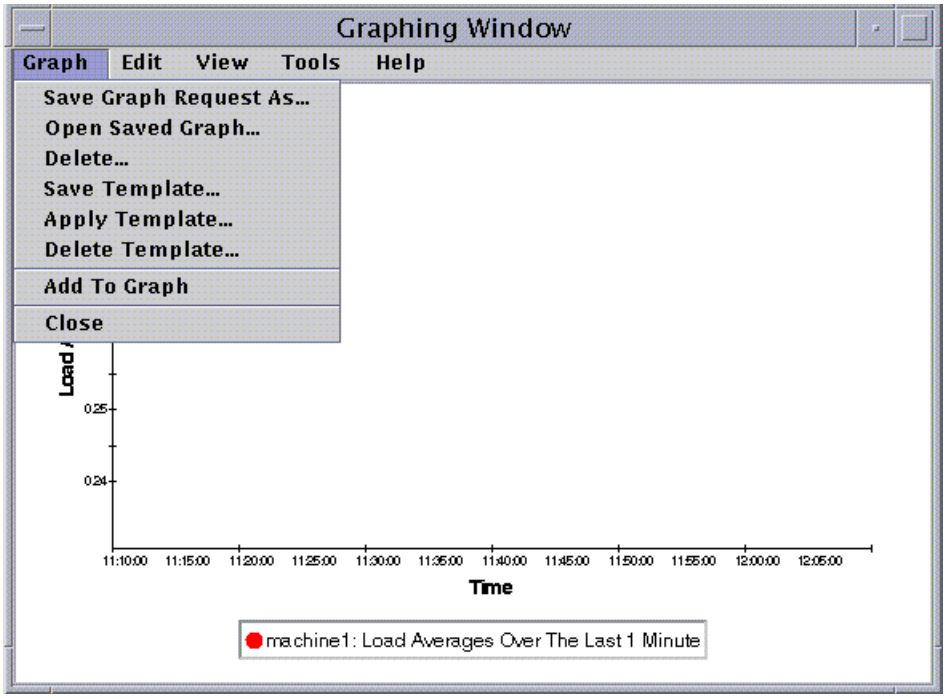

FIGURE 7-17 Adding Load Averages Over the Last One Minute to the Graph

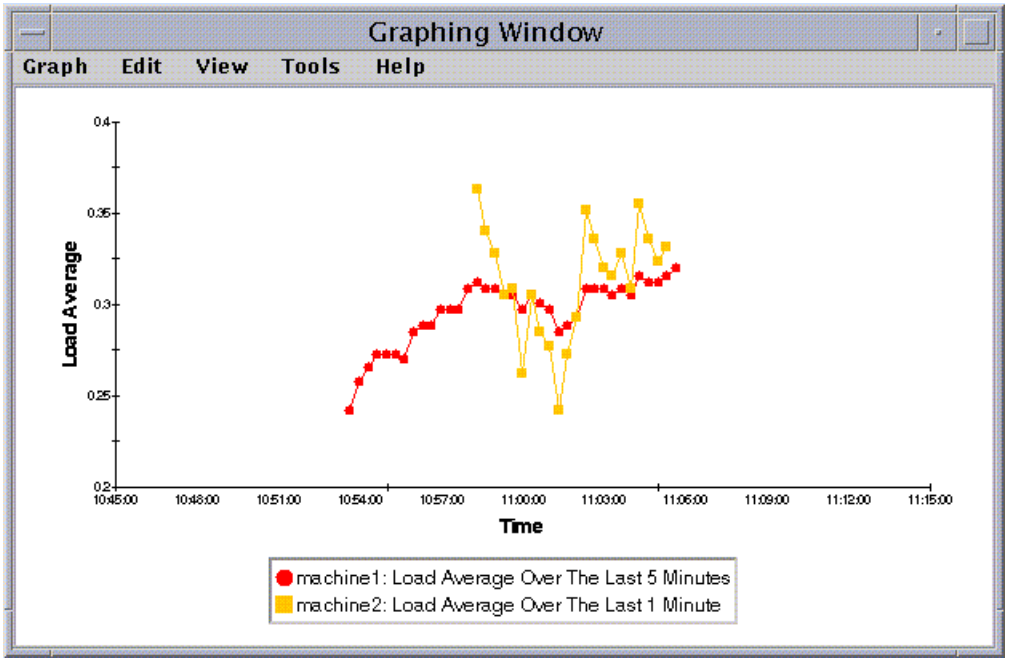

FIGURE 7-18 Load Averages Over the Last One and Five Minutes

▼ 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 (FIGURE 7-19) 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 (FIGURE 7-20) 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 138.)

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.**

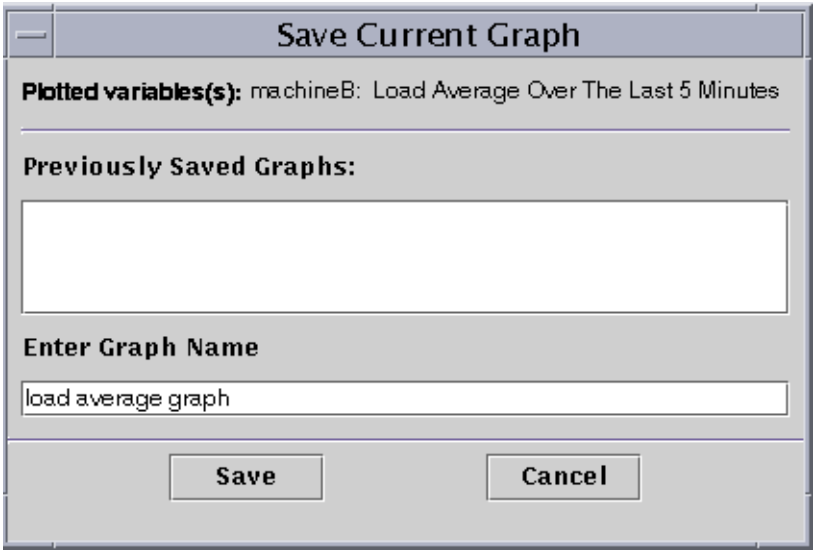

FIGURE 7-19 Save Graph Request Dialog

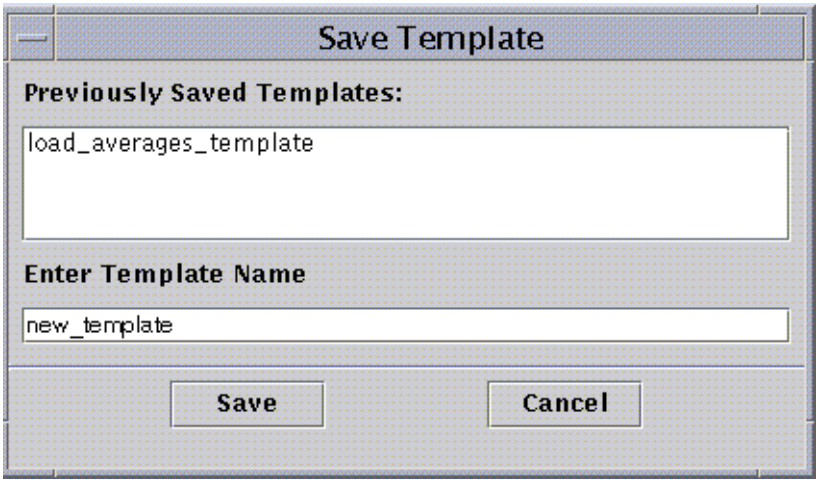

FIGURE 7-20 Save Template Dialog

▼ To Open a Graph

1. **Select Graph ➤ Open Saved Graph in the Graphing window.**
   The Open Graph dialog is displayed (FIGURE 7-21).

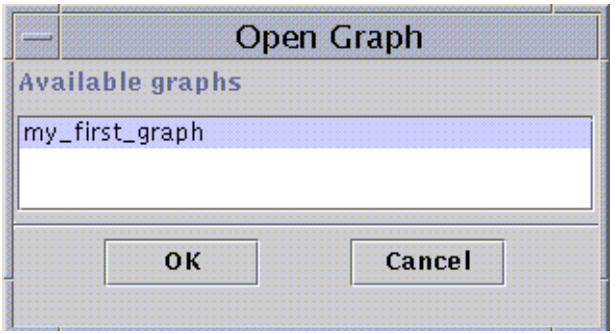

FIGURE 7-21 Open Graph Dialog

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 (FIGURE 7-22). This dialog enables you to apply saved custom features to the current graph.

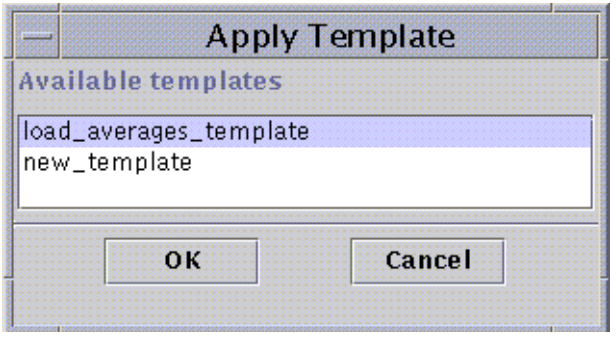

FIGURE 7-22 Apply Template Dialog

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 7-4 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.
Delete Template	Deletes a previously saved graph template.
Add To Graph	Adds an additional dataset to an existing graph. Choose this menu item after selecting a property to “copy to graph.”
Close	Closes the graphing window.

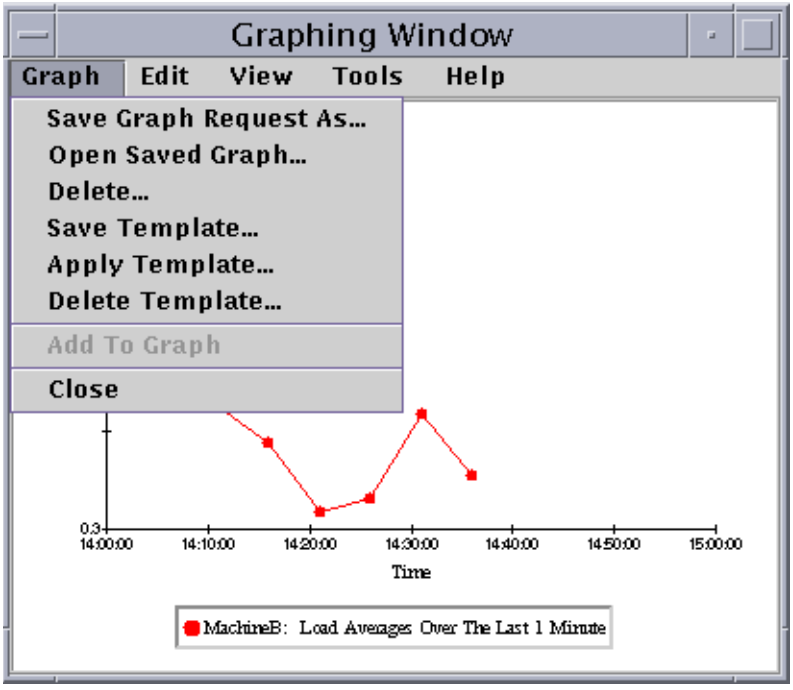

FIGURE 7-23 Graph Menu Items

The SyMON graph utility enables you to customize the look and feel of your graphs through the edit menu items (TABLE 7-5).

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 7-6).

Edit Menu Items

TABLE 7-5 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 7-25 and FIGURE 7-26).
Border	Determines the border type (including a no border option).

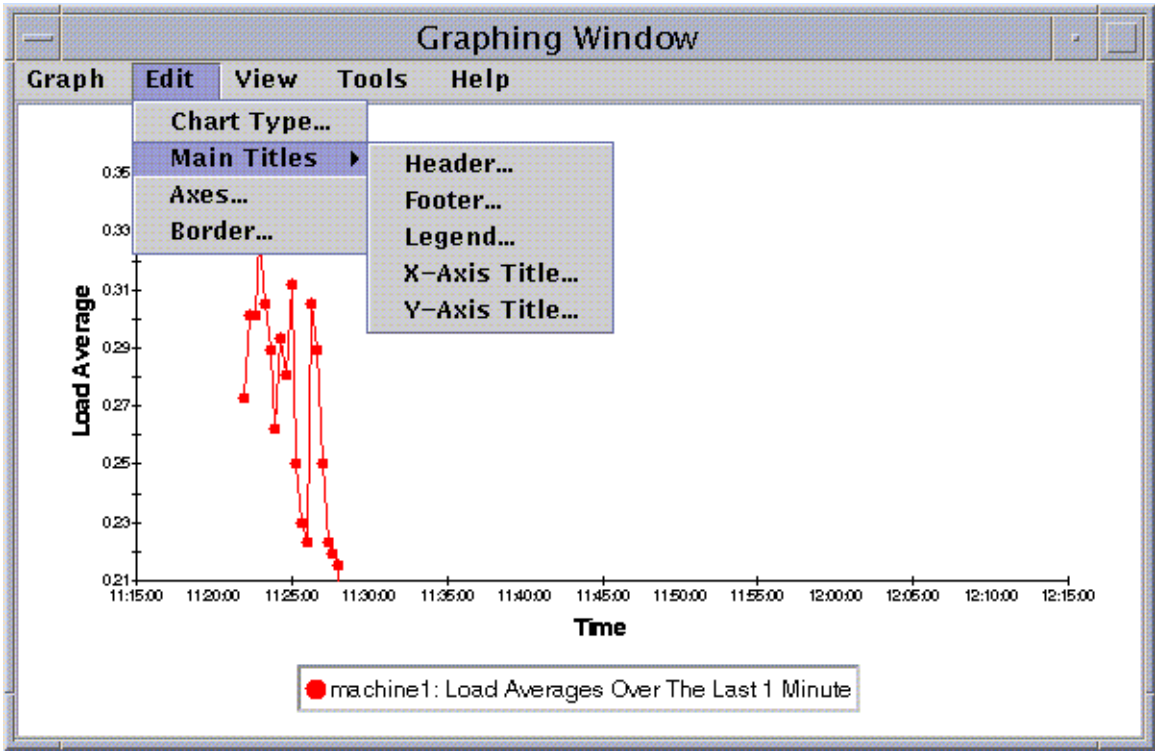

FIGURE 7-24 Edit Menu Items

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 7-25 and FIGURE 7-26 show the axes dialog for the x-axis and y-axis, respectively.

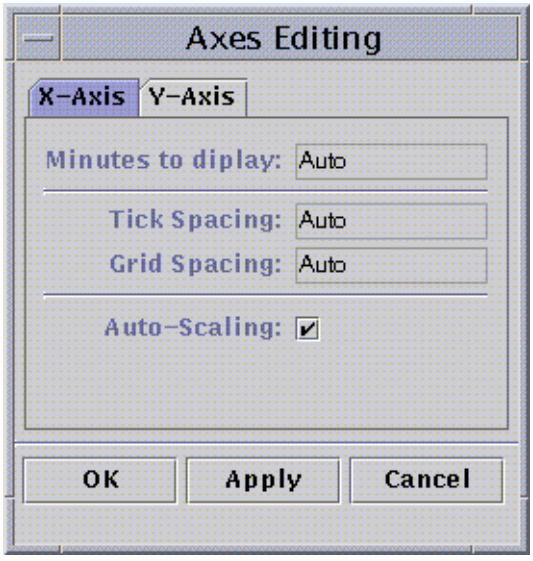

FIGURE 7-25 X-Axis Editing Dialog

The SyMON software chooses appropriate default x-axis values using "Autoscaling". If you want to change the values, then you must turn off autoscaling by unchecking the checkbox.

You may then change:

- Number of minutes to be plotted
- Positioning of ticks
- Positioning of grid lines

Note – Ticks are the small lines that mark off intervals on an axis.

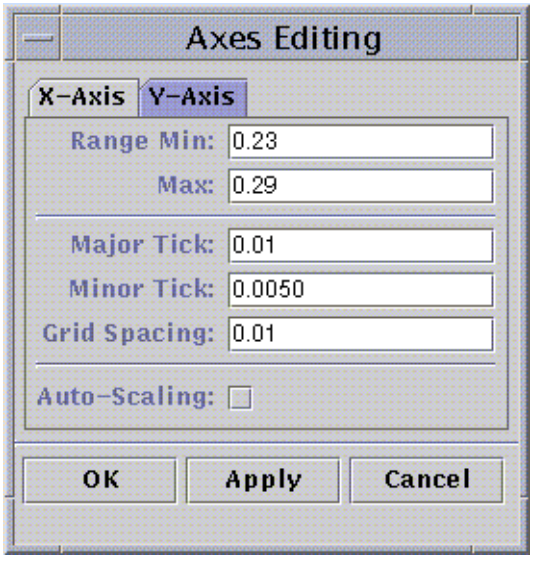

FIGURE 7-26 Y-Axis Editing Dialog

The SyMON software chooses appropriate default y-axis values using "Autoscaling". If you want to change the values, then you must turn off autoscaling by unchecking the checkbox.

You may then change:

- Minimum and maximum values shown on the y-axis
- Major tick positions (the interval at which numerical labels are shown)
- Minor tick positions (showing smaller intervals)
- Grid spacing

View Menu Items

TABLE 7-6 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.

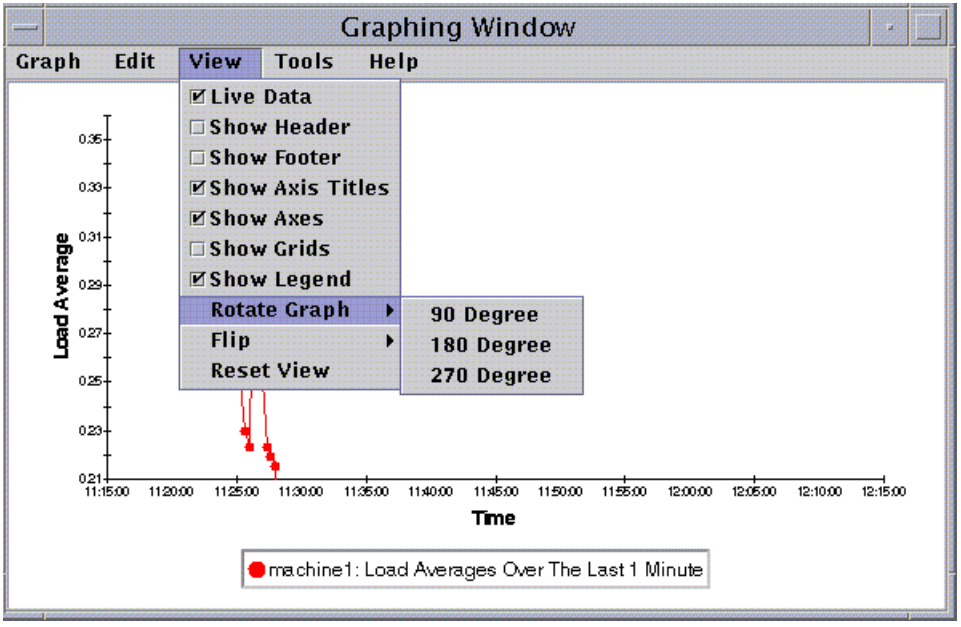

FIGURE 7-27 View Menu Items

Tools Menu Items

TABLE 7-7 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.

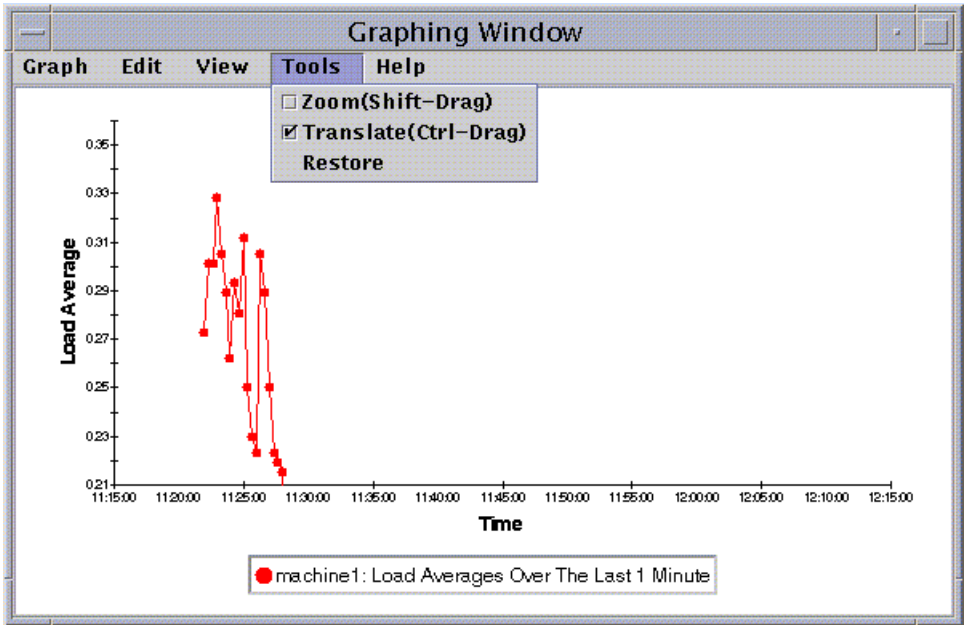

FIGURE 7-28 Tools Menu Items

Attribute Editor for a Data Property

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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 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 tab buttons for the System Load Statistics data property are:

- Info
- Alarms
- Actions
- Refresh
- History

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

▼ To Open the Attribute Editor

1. **Click the right mouse button and select a data property table cell (**FIGURE 7-29**).**
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 button.

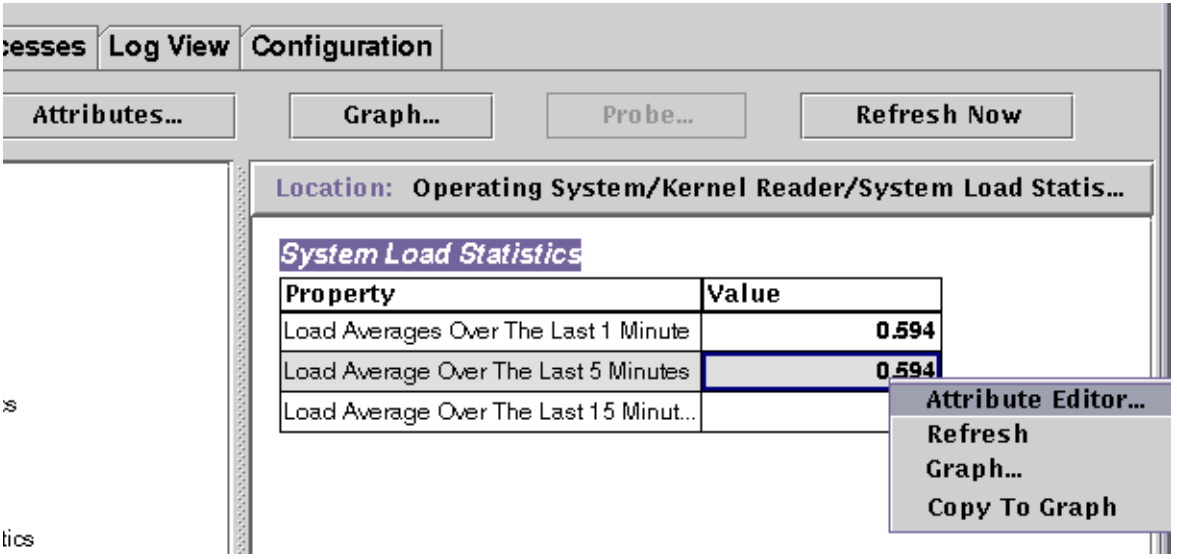

FIGURE 7-29 Selected Data Property

Information Tab in the Attribute Editor

The Information panel (FIGURE 7-30) provides you with additional information about the selected object.

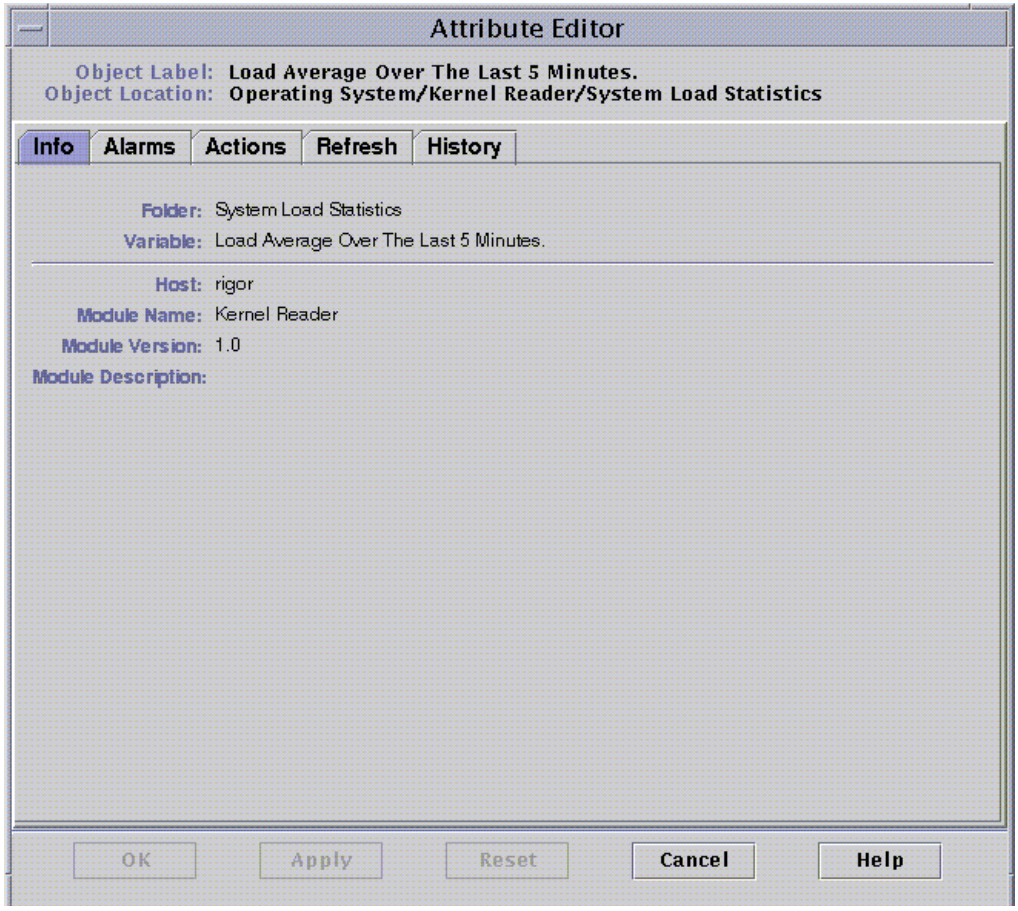

FIGURE 7-30 Attribute Editor Info Tab for a Monitored Property

Alarms Tab in the Attribute Editor

The Alarms panel (FIGURE 7-31) enables you to set alarm thresholds (TABLE 7-8) 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 D.

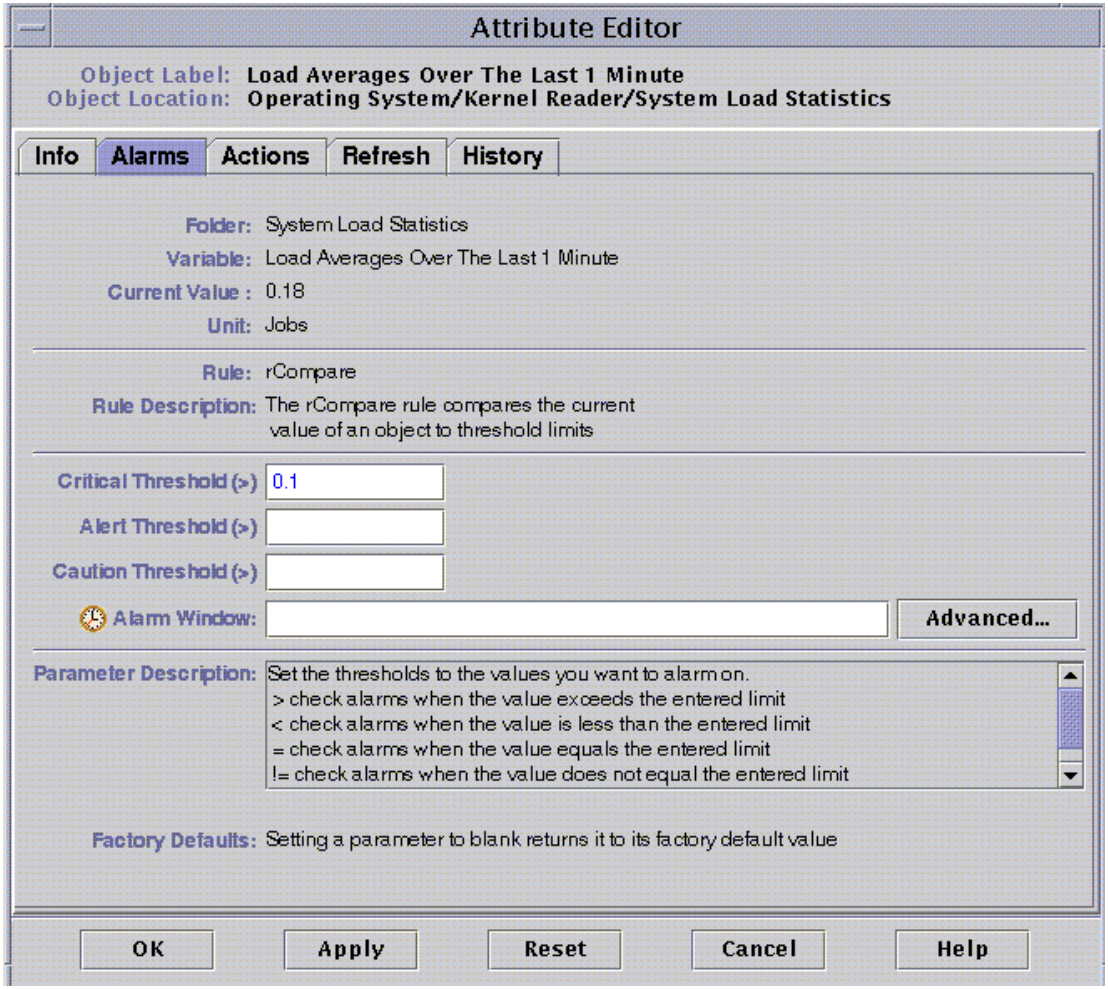

FIGURE 7-31 Attribute Editor Alarms Tab for a Monitored Property

TABLE 7-8 shows common simple alarm limits for monitored properties. The alarm limits are also displayed in the Parameter Description field (FIGURE 7-31). You may set thresholds for one or more of these alarm limits for selected data properties.

TABLE 7-8 Common Simple Alarm Limits in SyMON 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 `day_of_week=fri`, an alarm occurs only if the alarm condition exists on a Friday. If an alarm condition exists on Tuesday, no alarm is registered.

SyMON 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 11 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 light-colored circle next to the Operating System icon in the hierarchy tree view.**

   The Operating System modules are displayed.
3. **Click the light-colored circle 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 1 Minute.**
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.**

   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 9 for more information on this subject.
11. **Acknowledge this alarm.**

    For more information, see “To Acknowledge and Delete Alarms” on page 217.

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 SyMON user cannot change your alarm thresholds. For more information on security, see Chapter 11.

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 7-8 lists other common alarm limits in the SyMON software.

Actions Tab in the Attribute Editor

The actions tab in the Attribute Editor (FIGURE 7-32) enables you to instruct SyMON software to perform a predetermined action if an alarm occurs. Acceptable actions include scripts that are stored in the `/var/opt/SUNWsymon/bin` directory.

Note – 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.

In FIGURE 7-32, you can set separate actions for different alarm conditions or one for any alarm condition (action on any change).

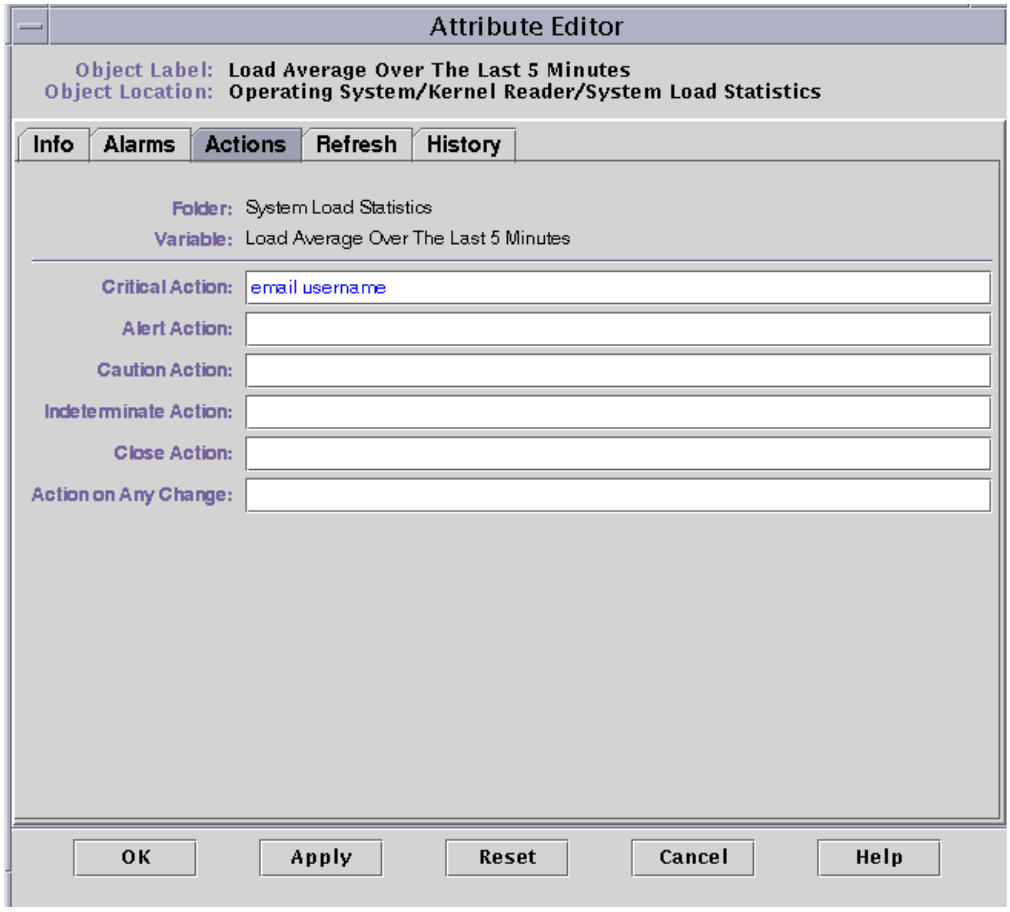

FIGURE 7-32 Attribute Editor Actions Tab for a Monitored Property

▼ To Send an Email

The following example procedure describes 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 light-colored circle next to the Operating System icon in the hierarchy tree view.**

   The Operating System modules are displayed.
3. **Click the light-colored circle 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 button.**

   The action rows are displayed.
8. **Type** `email` *username* **in the Critical Action field.**
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.

   The following email is sent to the user whenever a critical alarm occurs.

```
Date: Wed, 28 Oct 1998 15:25:39 -0800
From: root@MachineB (0000-Admin(0000))
Mime-Version: 1.0

SyMON alarm action notification ... {Critical: System Load
Average> 0.1}
```

Refresh Tab in the Attribute Editor

The Refresh panel (FIGURE 7-33) enables you to set the refresh interval for this object. The refresh interval is the interval between the times when the SyMON agent samples the monitored property.

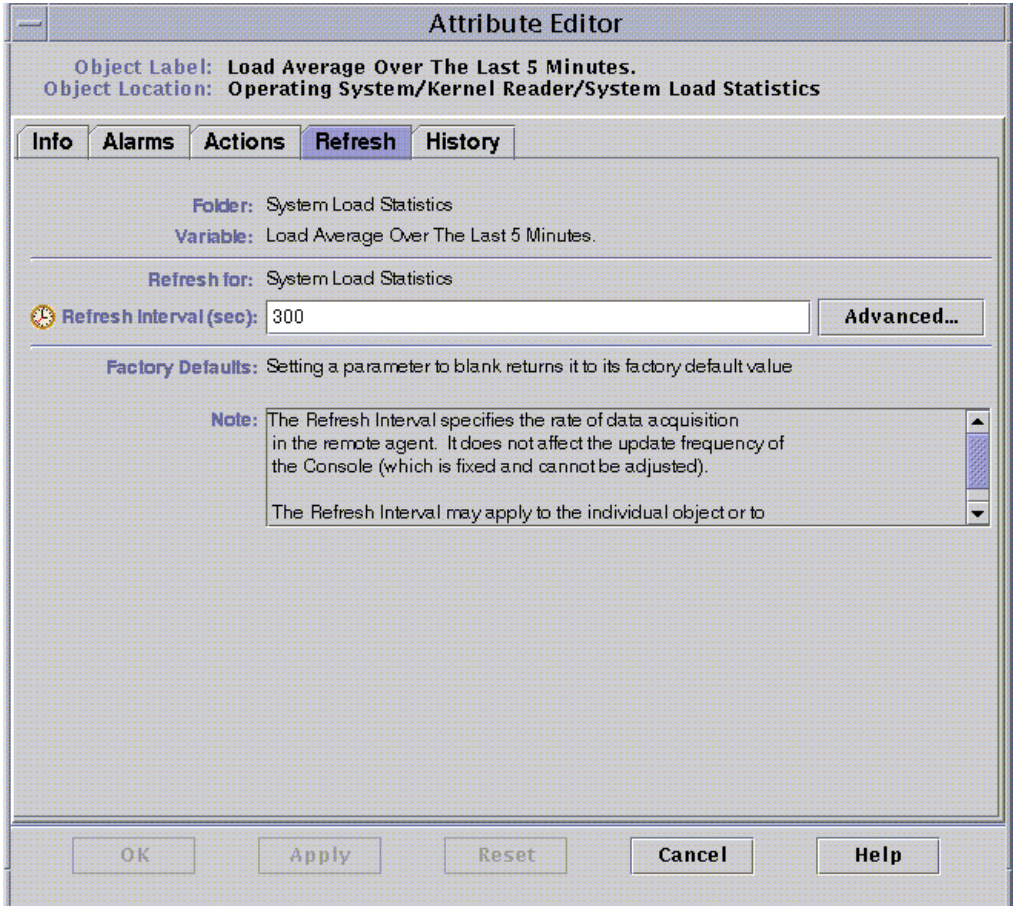

FIGURE 7-33 Attribute Editor Refresh Tab for a Monitored Property

▼ 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 light-colored circle next to the Operating System icon in the hierarchy tree view.**

   The Operating System modules are displayed.
3. **Click the light-colored circle 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 “Timex Editor” on page 159.
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.

History Tab in the Attribute Editor

The history tab in the Attribute Editor enables you to save older data for a monitored property. In FIGURE 7-34, a history of data points is recorded every 120 seconds (sample interval). This information may either 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 may 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.

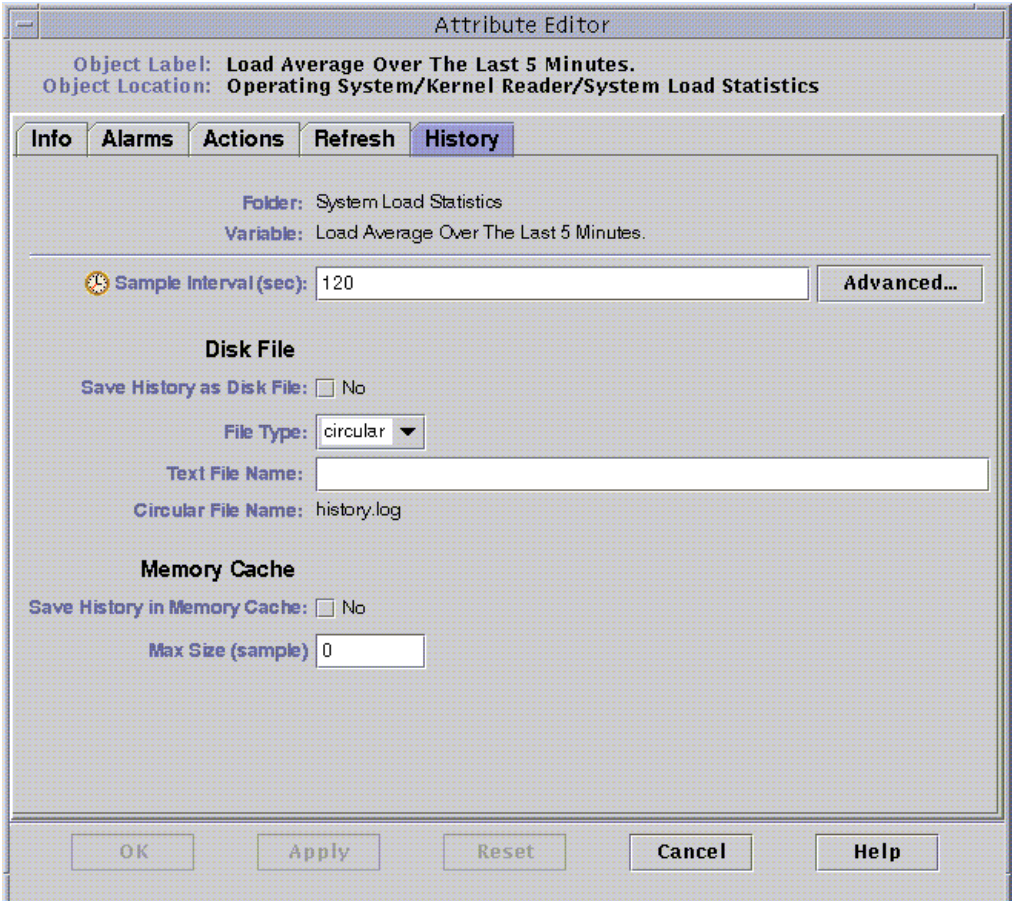

FIGURE 7-34 Attribute Editor History Tab for a Monitored Property

▼ To Set a History Interval

1. **Click the Browser tab button in the Details window.**
2. **Click the light-colored circle next to the Operating System icon in the hierarchy tree view.**

   The Operating System modules are displayed.
3. **Click the light-colored circle 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 “Timex Editor” on page 159.
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`.
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 131 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.

Timex Editor

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Use the Timex Editor (FIGURE 7-35) 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 Timex 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 Timex 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.

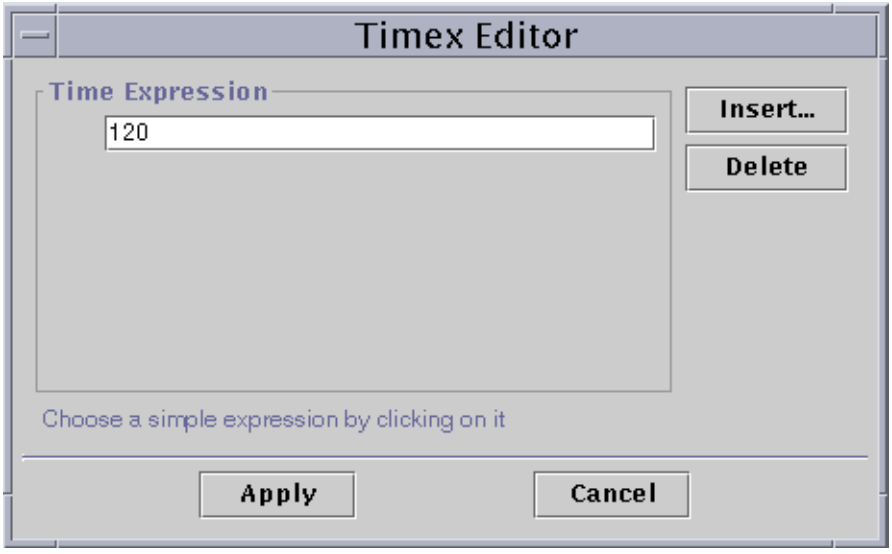

FIGURE 7-35 Timex Editor

There are four basic types of Timex 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 Timex expressions can be used separately or in combination.

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

Combining Timex Expressions

The following examples illustrate combining Timex 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 Timex 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 158 for more information.

   The Timex Editor is displayed (FIGURE 7-35).

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 Timex window is displayed with the Cyclic tab selected.

4. **Determine the frequency for the history interval (**FIGURE 7-36**).**

   In this example, the history interval is set for every hour. That is, SyMON 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.**

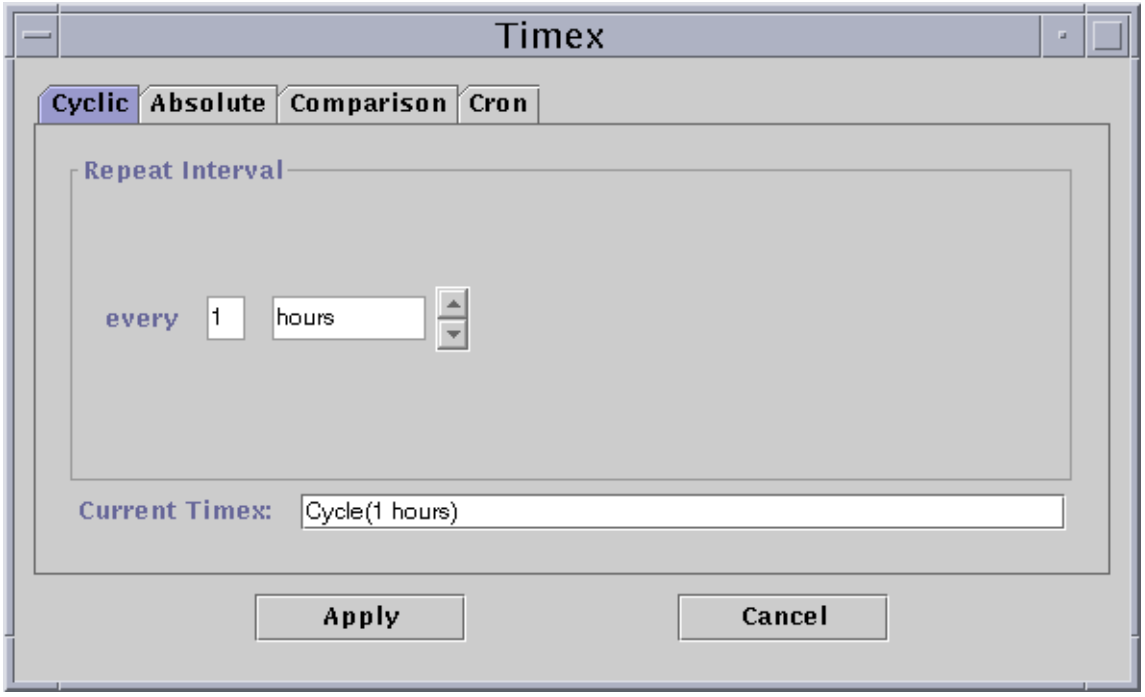

FIGURE 7-36 Setting a Cyclic Time of One Hour

5. **Click the Apply button.**

   Cycle(1 hours) is displayed in the Timex Editor (FIGURE 7-37).

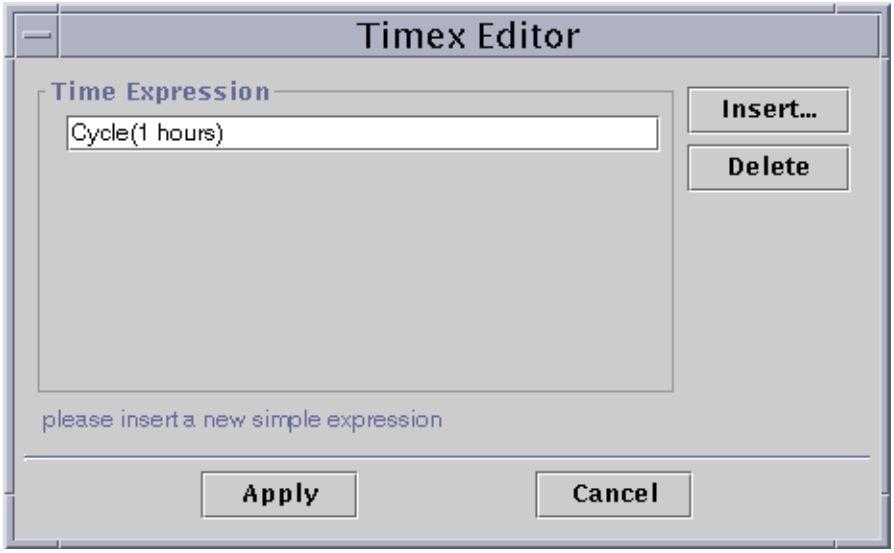

FIGURE 7-37 Timex Editor With Cyclic Time of One Hour

6. **Click the Insert button.**

   The Timex window is displayed with the Cyclic tab selected.

7. **Click the Comparison tab.**

   The Timex 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 SyMON software checks the system load average every hour. SyMON 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 Greater than or Equal from the middle pull-down menu.**

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

      The Timex expression is displayed in the Current Timex field (FIGURE 7-38).

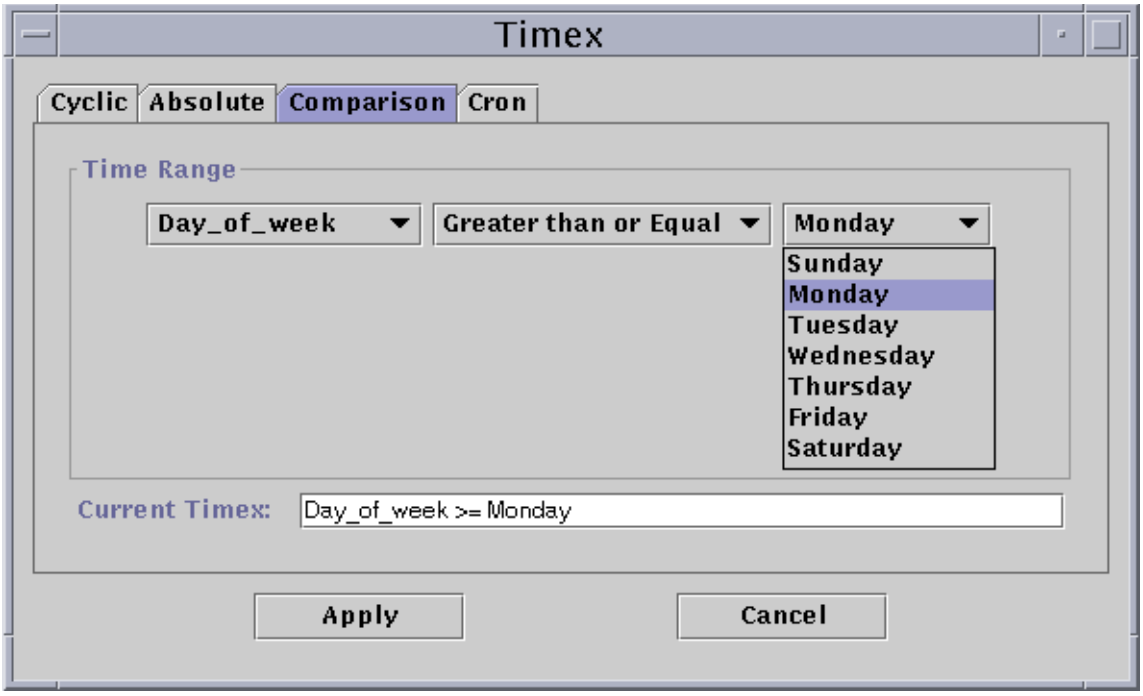

FIGURE 7-38 Setting the Start Range to Monday

9. **Click the Apply button.**

   The Timex Editor is updated. The Timex Expression now reads Cycle(1 hours) And Day_of_week>=Monday. However, the Timex Editor also enables you to select the Or expression (FIGURE 7-39).

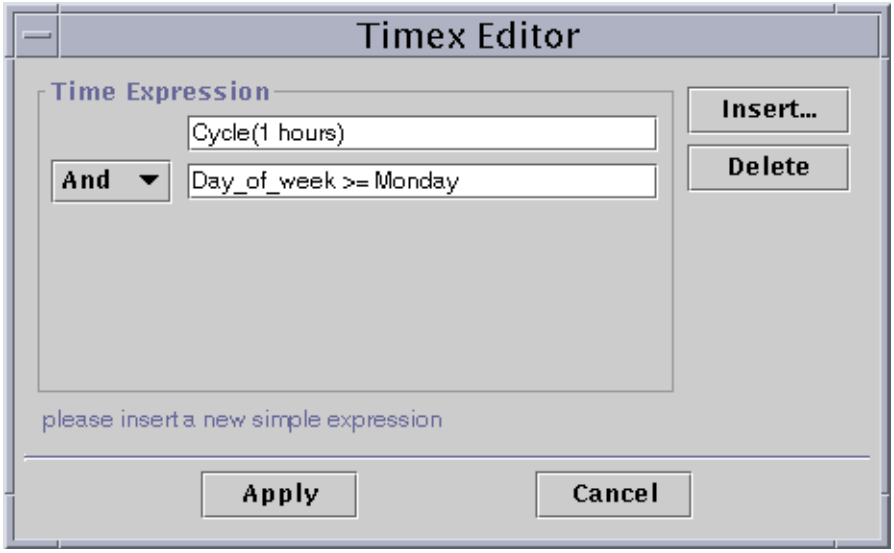

FIGURE 7-39 Timex Editor Is Updated With a Start Range of Monday

10. **Determine the end of the Time Range by clicking the Insert button.**
11. **Click on the Comparison tab of the Timex window.**

    The Timex 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 Less than or Equal from the middle pull-down menu.**

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

    The Timex expression is displayed in the Current Timex field (FIGURE 7-40).

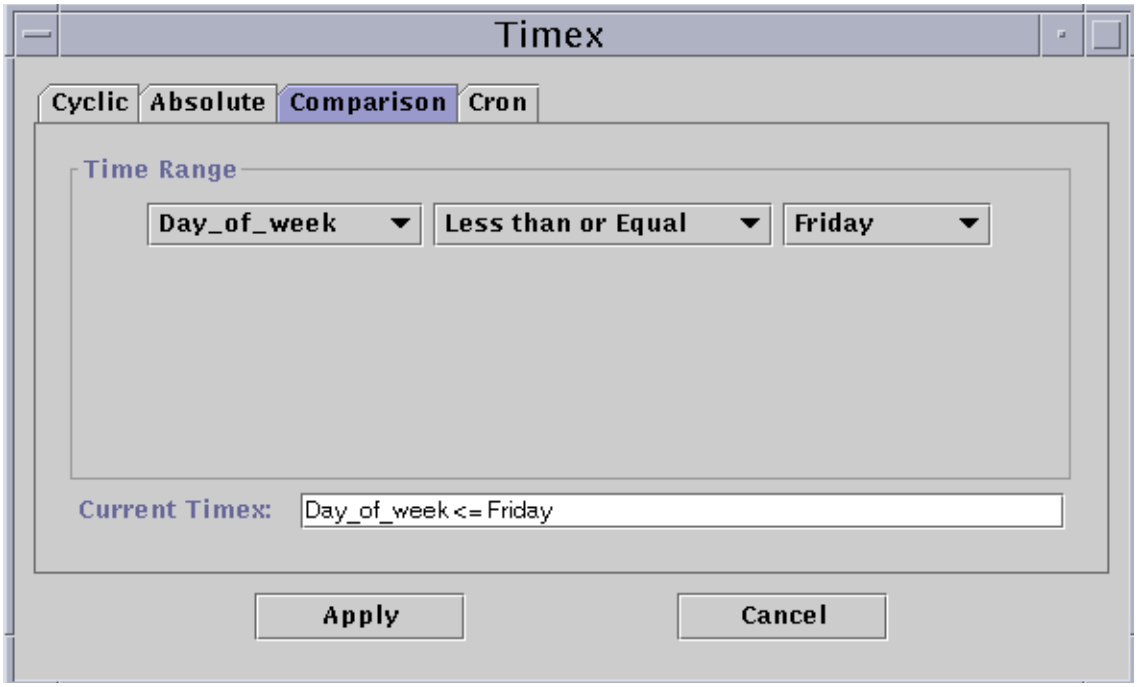

FIGURE 7-40 Setting the End Range to Friday

13. **Click the Apply button.**

    The Timex Editor is updated. The Timex Expression now reads Cycle(1 hours) And Day_of_week>=Monday And Day_of_week<=Friday (FIGURE 7-41).

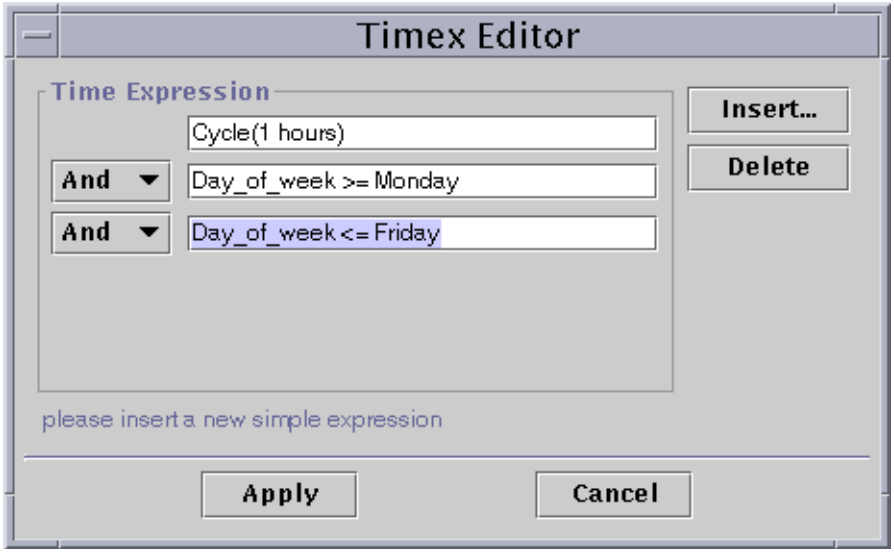

FIGURE 7-41 Timex Editor Showing a Cycle Time of One Hour From Monday to Friday

14. Click the Apply button.

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

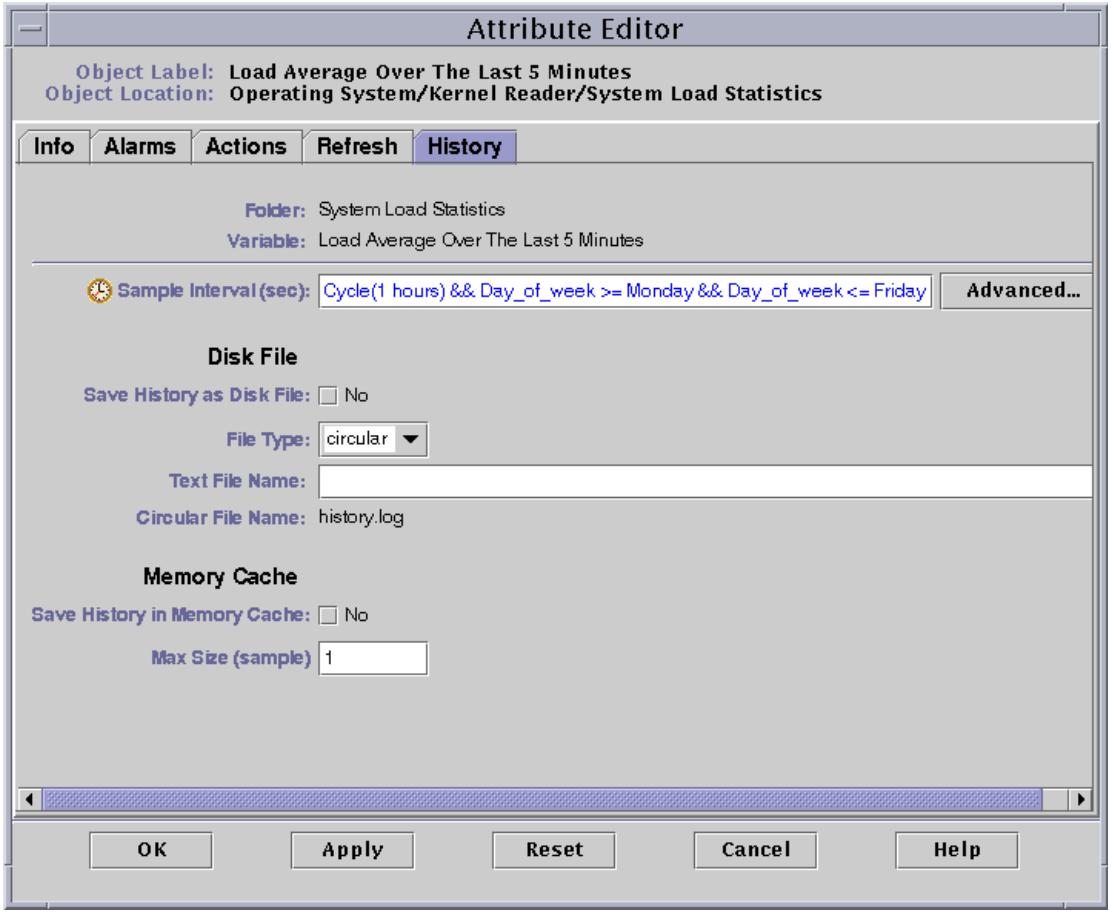

FIGURE 7-42 Updated History Attribute Editor Showing a Cycle Time of One Hour From Monday to Friday

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

---

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

---

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

   See "To Set a Refresh Interval" on page 155 for more information.

   The Timex Editor is displayed (FIGURE 7-35).

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 Timex window is displayed with the Cyclic tab selected.

4. **Click the Absolute tab.**

   The Timex window is displayed with the Absolute tab selected.

5. **Determine the start time (**FIGURE 7-43**).**

   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 AM or PM field and click the up or down arrow to display your choice.**

6. **Determine the start date. 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 Timex field.

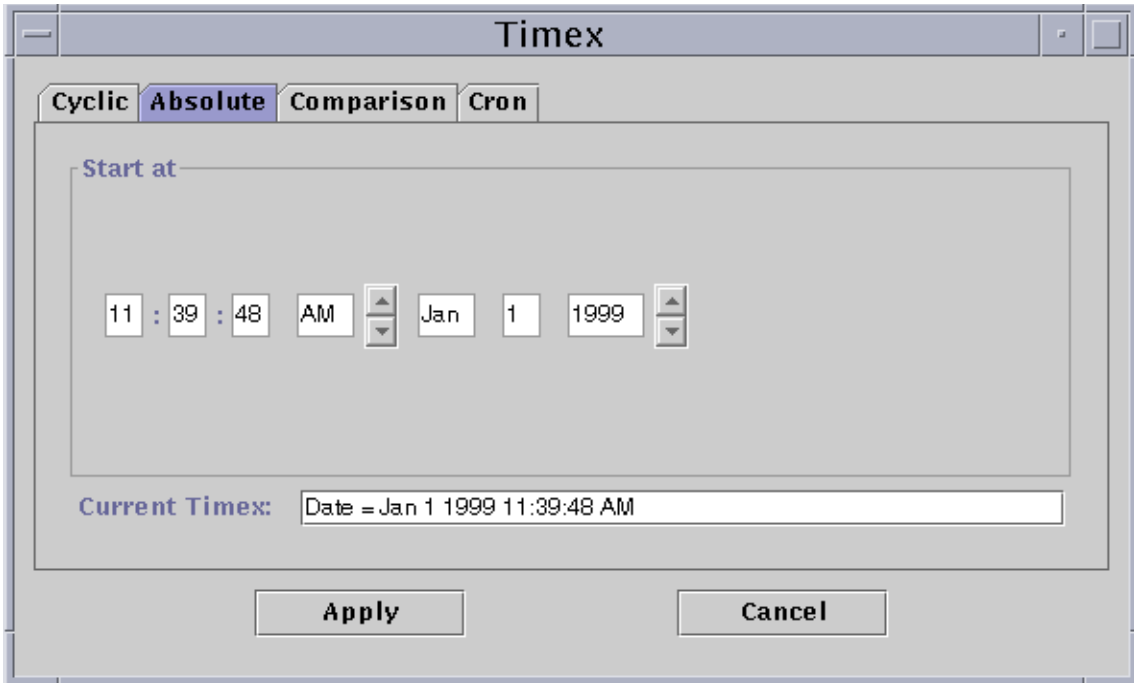

FIGURE 7-43 Starting Time of 11:39:48 AM on January 1, 1999

7. **Click the Apply button.**

   The starting date and time are displayed in the Timex Editor (FIGURE 7-44).

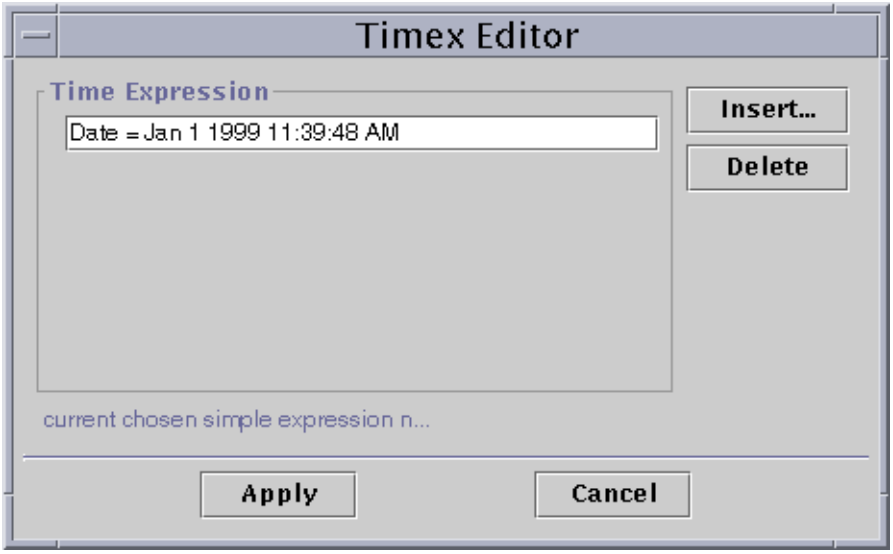

FIGURE 7-44 Timex Editor With Starting Time of 11:39:48 AM January 1, 1999

8. **Click the Insert button.**
9. **Click the Cron tab.**

   The Timex window is displayed with the Cron tab selected.
10. **Select the time when the refresh interval is active.**

    SyMON software does not check the system load average outside the time specified by this window. In this example, the condition is at 3 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 Timex field reads Cron(03**1). This expression states that the refresh window is only active at 3 AM every Monday (FIGURE 7-45).

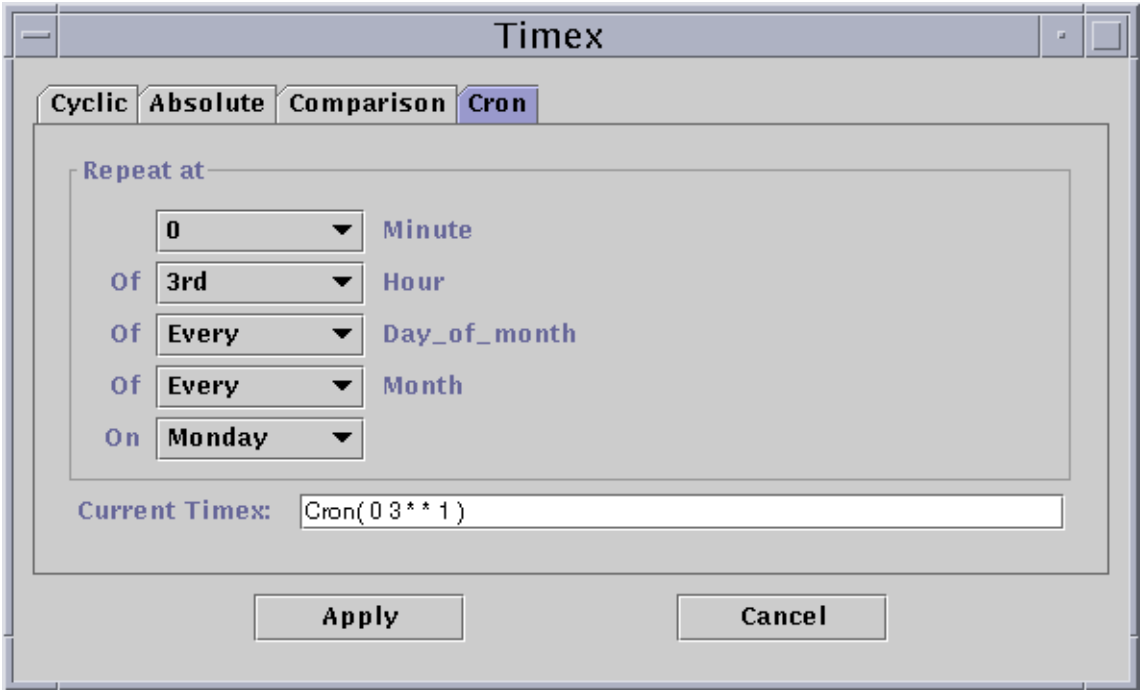

FIGURE 7-45 Cron Tab Selected With 3 AM Every Monday

11. **Type -5 in the Current Timex field so that it reads Cron(03**1-5).**

    This expression states that the refresh interval is only active at 3 AM every Monday through Friday (FIGURE 7-46).

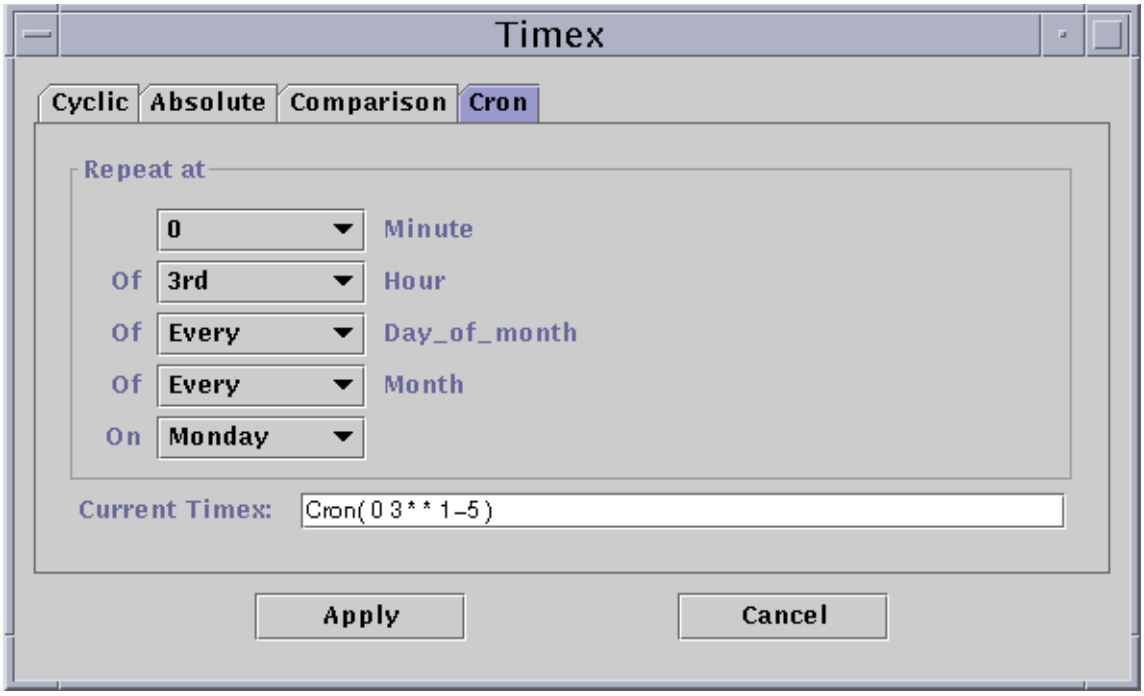

FIGURE 7-46 Cron Tab Selected With 3 AM Every Monday Through Friday

12. **Click the Apply button.**

    The Timex Editor is updated. The Timex Expression now states the starting date and time And Cron(03**1-5) (FIGURE 7-47).

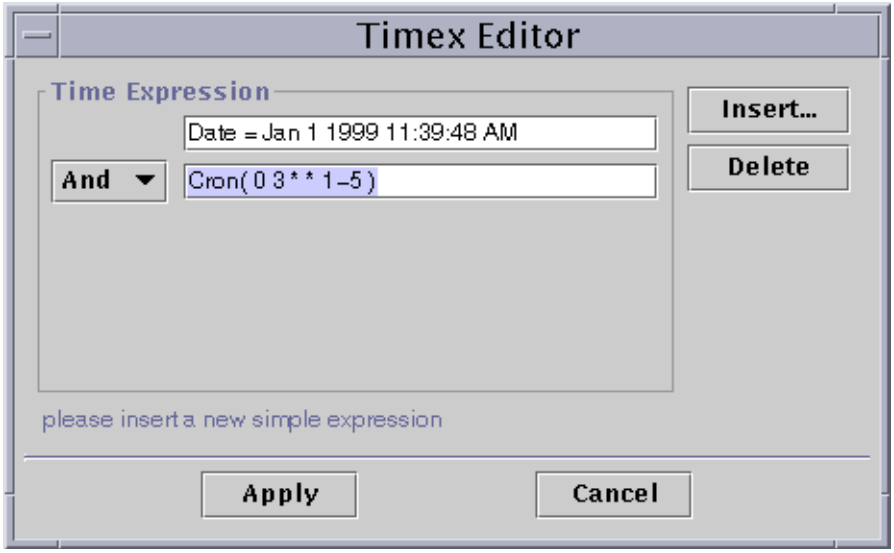

FIGURE 7-47 Timex Editor With Starting Time of 11:39:48 AM January 1, 1999 and 3 AM Every Monday Through Friday

13. Click the Apply button.

The refresh interval field in the Attribute Editor is updated. In this example, the refresh window is active 3 AM every Monday through Friday after the starting date and time (FIGURE 7-48).

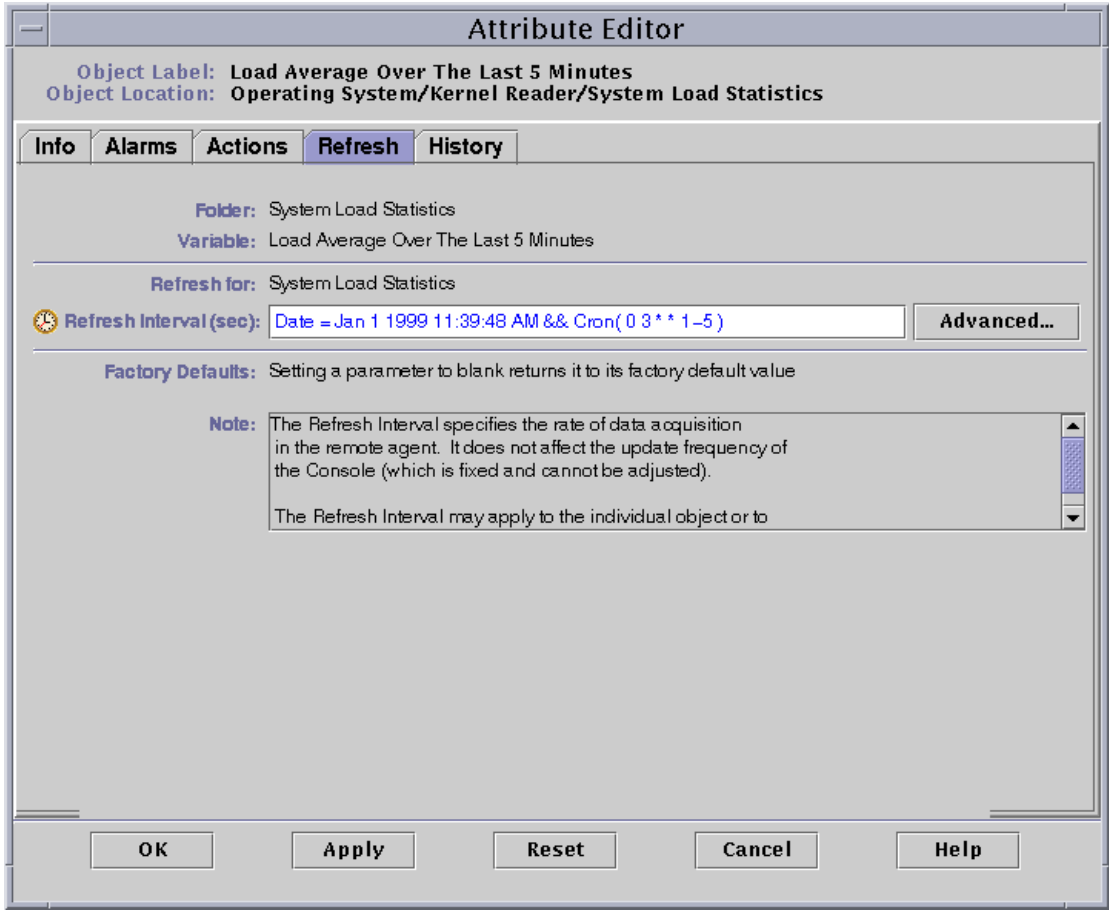

FIGURE 7-48 Refresh Interval With Starting Time of 11:39:48 AM January 1, 1999 and 3 AM Every Monday Through Friday

▼ 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 150 for more information.

   The Timex Editor is displayed (FIGURE 7-35).

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 Timex window is displayed with the Cyclic tab selected.

4. **Click the Comparison tab.**

   The Timex window is displayed with the Comparison tab selected.

5. **Determine the start of the Time Range (9 AM).**

   The time range determines the time period when the SyMON software checks the system load average. The SyMON 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 AM to 5 PM every day.

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

   b. **Select Greater than or Equal from the middle pull-down menu.**

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

      The Timex expression Hour>=9 is displayed in the Current Timex field (FIGURE 7-49).

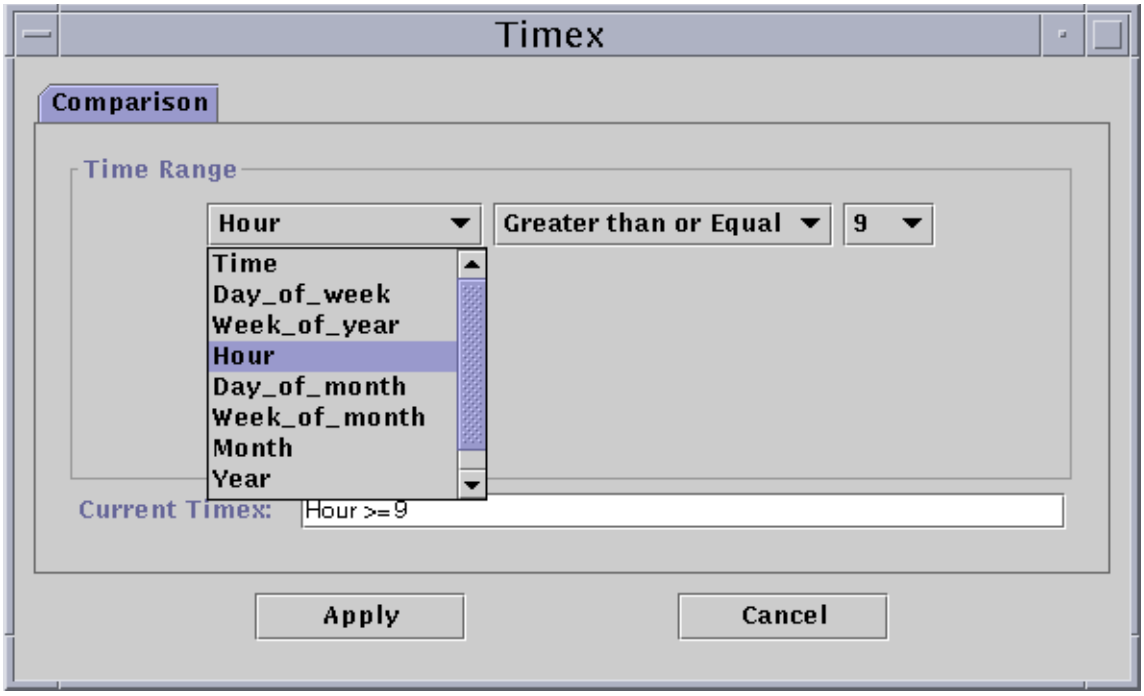

FIGURE 7-49 Comparison Tab With Greater Than or Equal to 9 AM

6. **Click the Apply button.**

   The Timex Editor is updated. The Timex Expression now reads Hour>=9. In this example, both conditions should occur in the alarm window time range. However, the Timex Editor also enables you to select the Or expression (FIGURE 7-50).

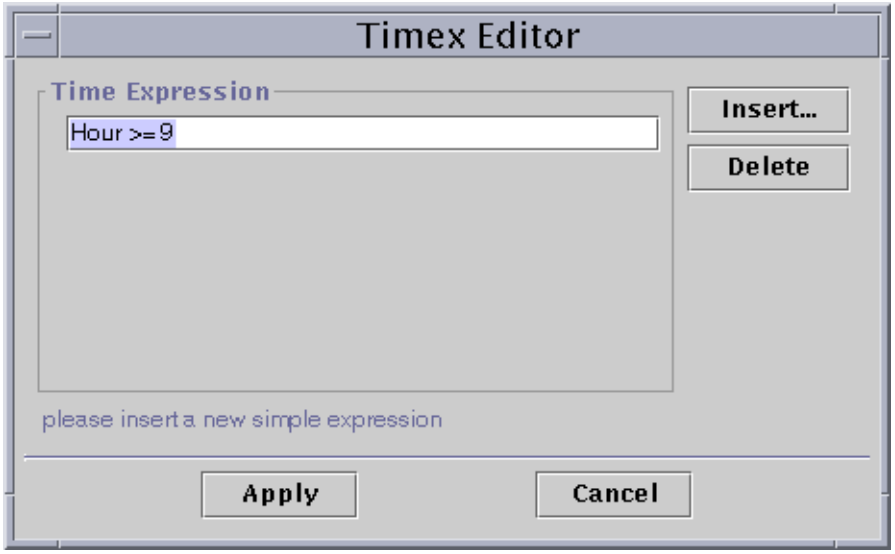

FIGURE 7-50 Timex Editor With Greater Than or Equal to 9 AM

7. **Determine the end of the Time Range by clicking the Insert button.**
8. **Click on the Comparison tab of the Timex window.**

   The Timex window is displayed with the Comparison tab selected.
9. **Determine the end of the Time Range (Friday).**

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

   b. **Select Less than or Equal from the middle pull-down menu.**

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

      The Timex expression Hour<=17 is displayed in the Current Timex field (FIGURE 7-51).

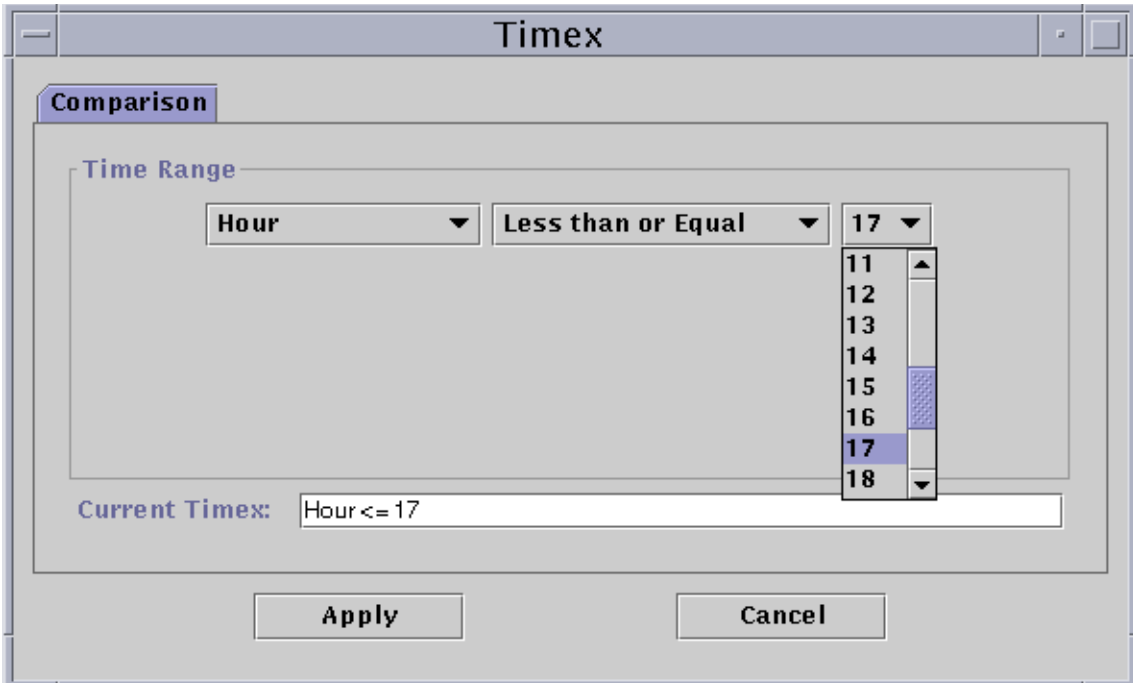

FIGURE 7-51 Comparison Tab With Less Than or Equal to 5 PM

10. **Click the Apply button.**

    The Timex Editor is updated. The Timex expression now reads Hour>=9 And Hour<=17 (FIGURE 7-52).

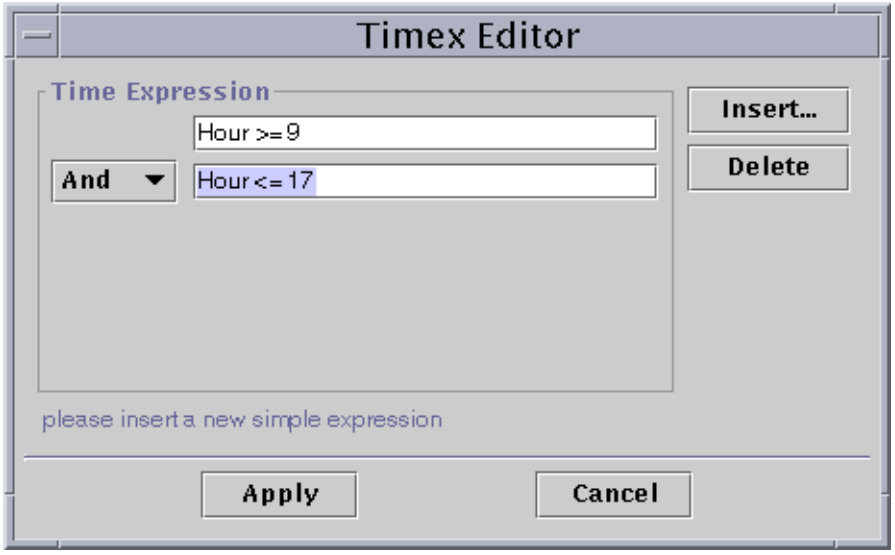

FIGURE 7-52 Timex Editor With Time Interval Between 9 AM and 5 PM

11. Click the Apply button.

The alarm window field in the Attribute Editor is updated. The SyMON software will check the system load average (over five minutes) from 9:00 AM Monday to 5 PM Friday (FIGURE 7-53).

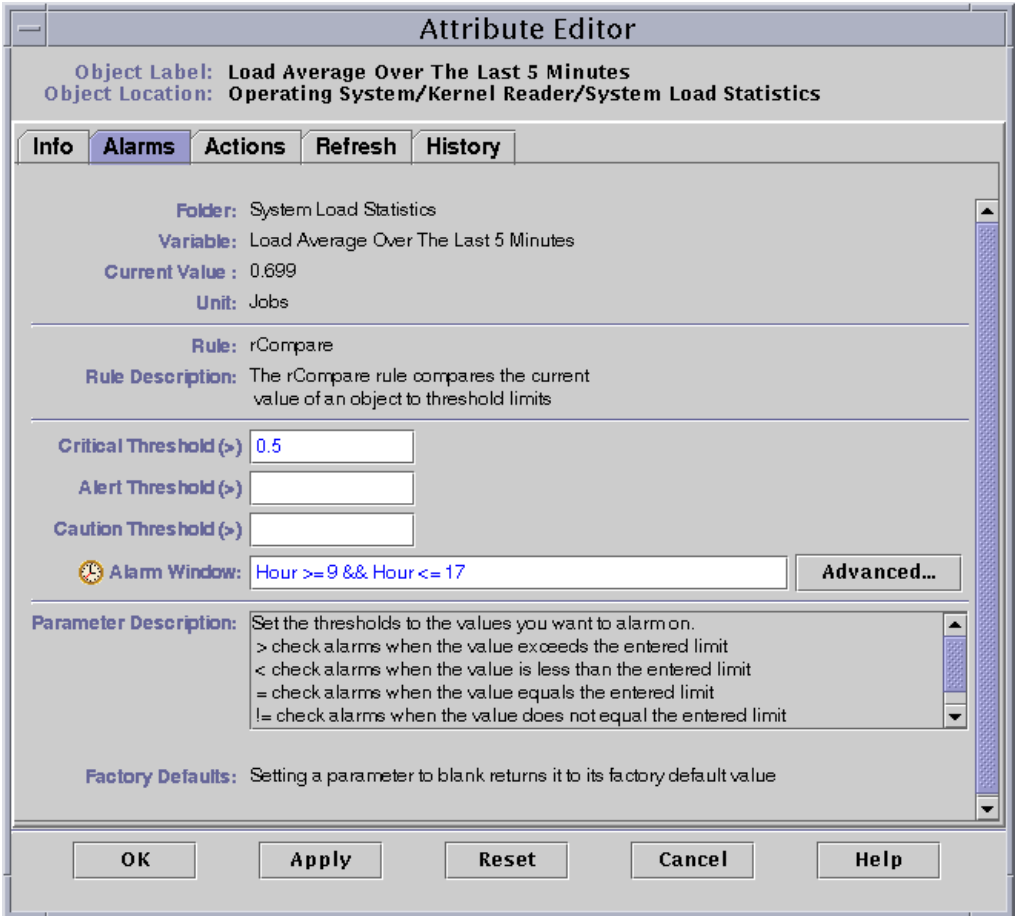

FIGURE 7-53 Alarms Attribute Editor With Alarm Window From 9 AM to 5 PM Every Day

CHAPTER 8

Managing Modules

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This chapter briefly describes the SyMON modules and explains how to manage them.

The following topics are covered:

- Default Modules
- 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

SyMON Modules

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Sun Enterprise SyMON modules are responsible for collecting data from specific monitored resources. These modules can be dynamically loaded, enabled, disabled, and unloaded into a SyMON 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.
- 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 SyMON software.

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

Module List

TABLE 8-1 lists SyMON modules that you can load and use.

TABLE 8-1 SyMON Modules

Module	Description
Agent Statistics	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	Provides the hardware configuration of the host. Both the physical view and the logical view require that this module be loaded.
Data Logging Registry	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.

TABLE 8-1 SyMON Modules *(Continued)*

Module	Description
Directory Size Monitoring	Enables you to isolate and monitor the size of any directory and its subdirectories on a host where a SyMON agent is installed. Multiple copies of this module can be loaded.
Dynamic Reconfiguration	Enables SyMON users to perform dynamic configuration operations on DR-enabled monitored hosts.
File Monitoring	Monitors selected files on a host. Monitored parameters include file size and timestamps. Multiple copies of this module can be loaded.
File Scanning	Scans files on a host for specified patterns. Multiple copies of this module can be loaded.
HP JetDirect	Monitors the status of HP printers equipped with a JetDirect card. Multiple copies of this module can be loaded.
Health Monitor	Enables you to monitor various resources usage in your host such as CPU, disk, NFS, and SMNP.
Kernel Reader	Provides kernel statistics, such as CPU details, system call, faults, streams, disk information, and page information.
MIB-II Instrumentation	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	Provides proxy management of hosts that are running non-SyMON MIB-II SNMP agents. Multiple copies of this module can be loaded.
NFS File Systems	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	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	Monitors the status of the printer daemon and print queue on the monitored host as well as the printer devices installed on it. Multiple copies of this module can be loaded.
Process Monitoring	Monitors one or more processes on the host. Specifies monitored processes by matching patterns. Multiple copies of this module can be loaded.
Solaris Process Details	Displays detailed information of Solaris processes running on a host where the SyMON agent has been installed. The Process Details window requires that this module be loaded.

For more information on modules, see Appendix C.

Note – The Config-Reader and Dynamic Reconfiguration modules are supported only on specific hardware platforms. For more information, refer to the SyMON web site: `http://www.sun.com/symon`.

Note – Depending on your system hardware, additional modules may be supported. For more information, refer to the SyMON web site: `http://www.sun.com/symon`.

Loading Modules

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

▼ To Load a Module

1. **Select the module.**
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 (FIGURE 8-1) or the topology view (FIGURE 8-2).
   - In the SyMON main console window, select Tools ➤ Load Module (FIGURE 8-3).
   - In the Details window, select Module ➤ Load Module (FIGURE 8-4).

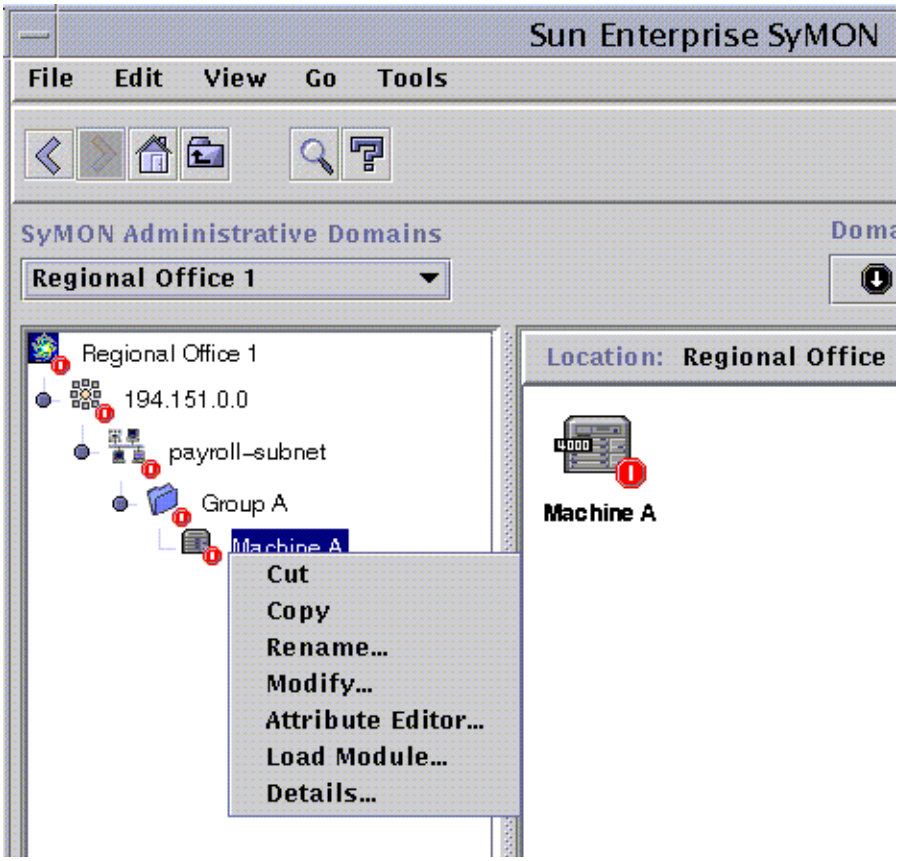

FIGURE 8-1 Load Module Pop-Up Menu in Hierarchy View

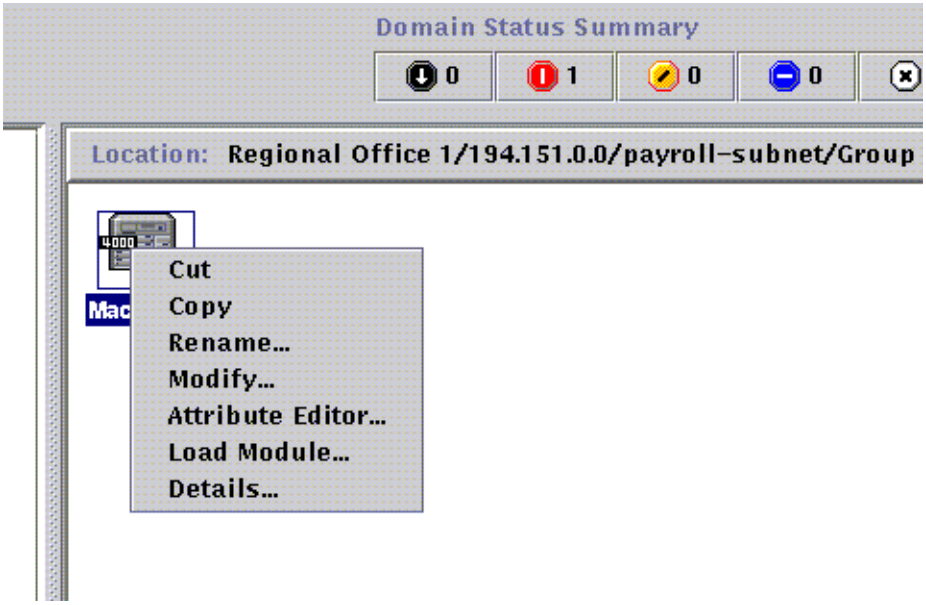

FIGURE 8-2 Load Module Pop-Up Menu in Topology View

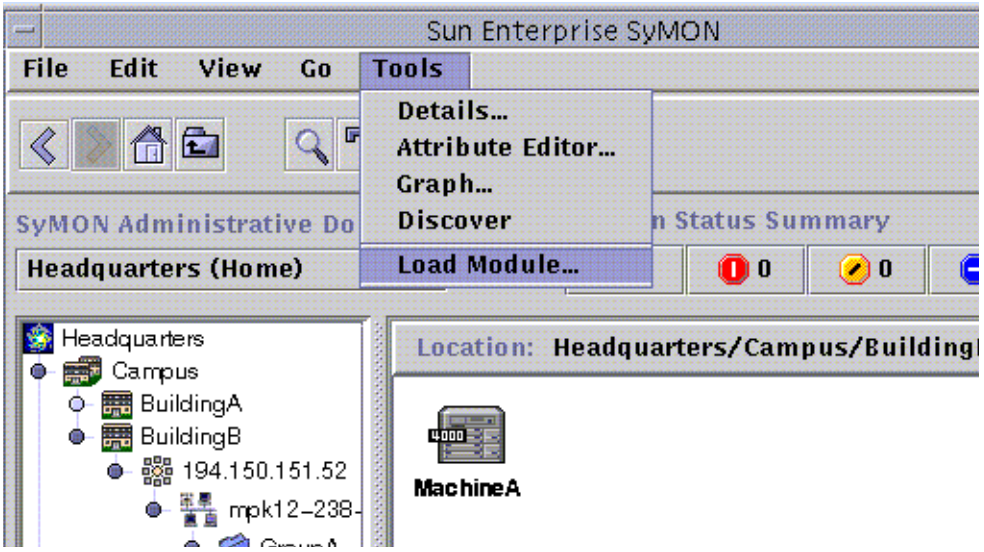

FIGURE 8-3 Load Module Menu in SyMON Main Console Window

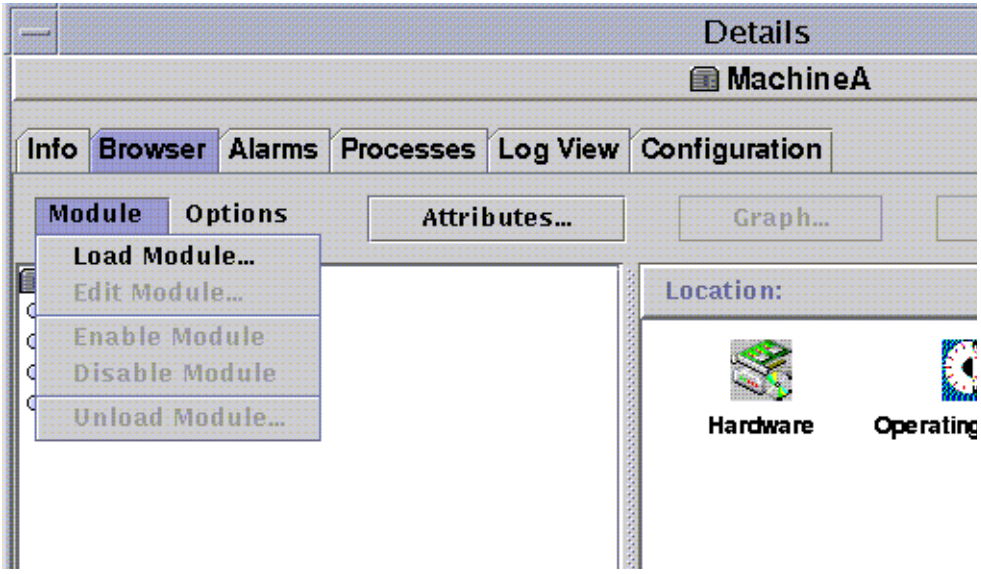

FIGURE 8-4 Load Module Menu in Details Window

The Load Module dialog is displayed (FIGURE 8-5).

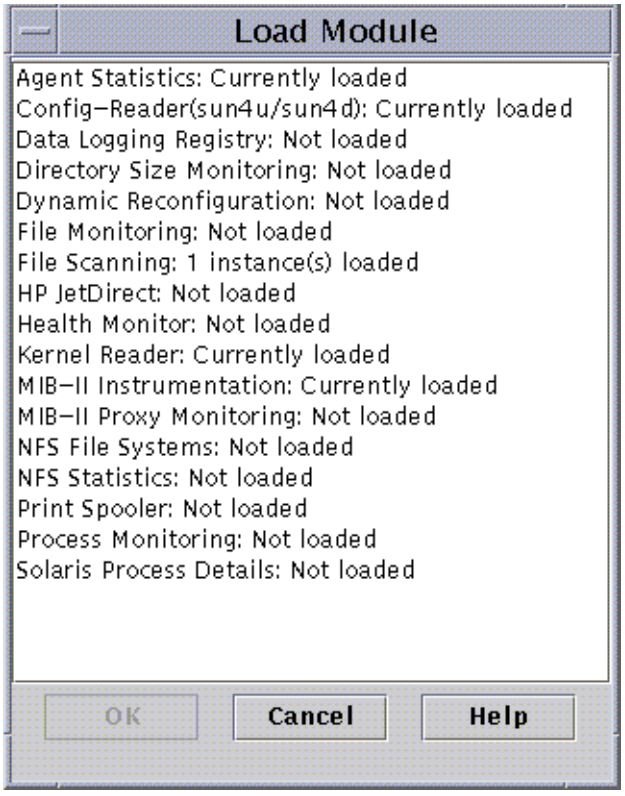

FIGURE 8-5 Load Module Dialog

The Load Module dialog lists all SyMON modules. The number next to the module name indicates the number of existing instances of that module on your host.

For example, a number 2 next to a module in the Load Module dialog means that two instances of this module are loaded on your host.

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 8-6 shows a possible example of the dialog.

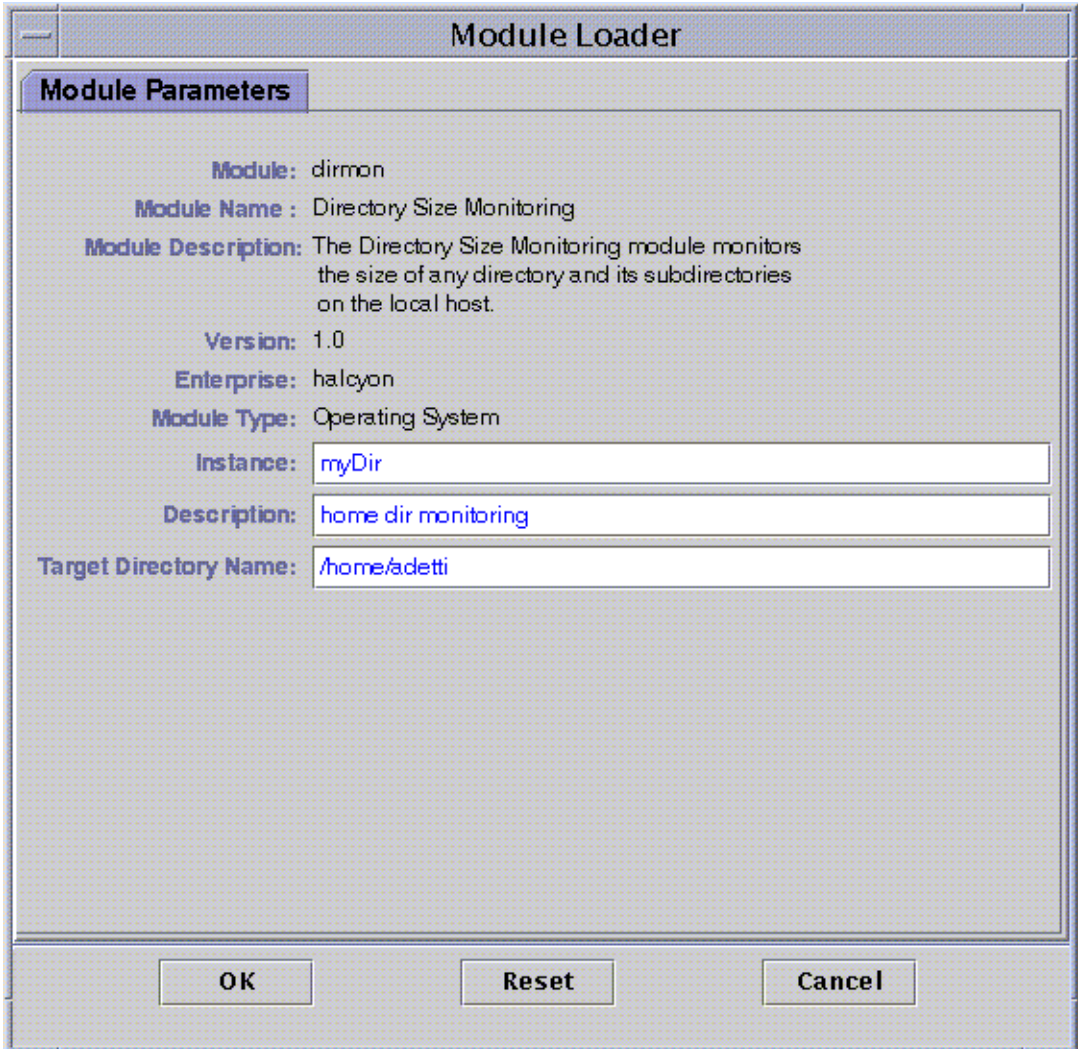

FIGURE 8-6 Module Loader Dialog

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, a description, and the target directory name.

   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

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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

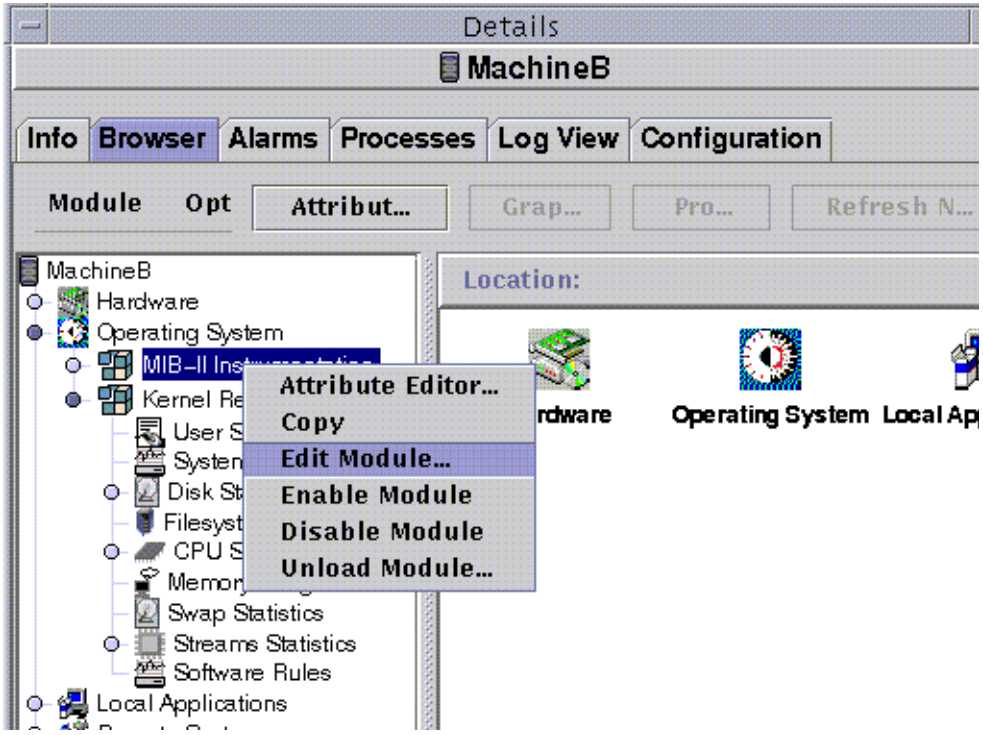

FIGURE 8-7 Edit Module Pop-Up Menu in Hierarchy View

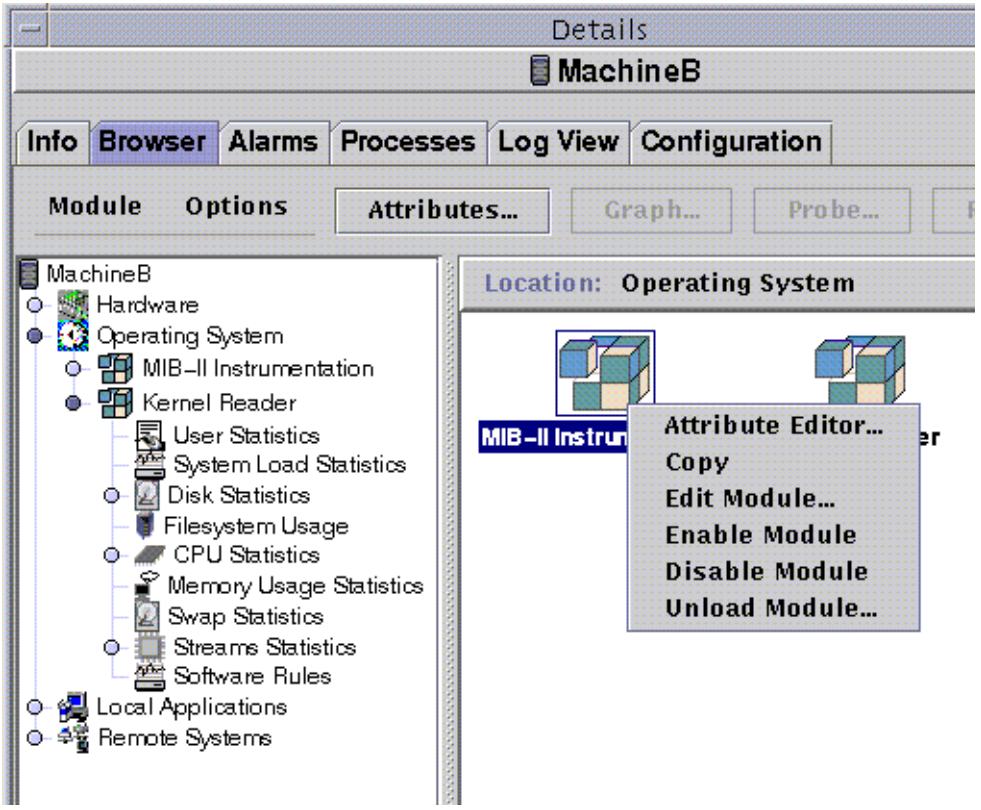

FIGURE 8-8 Edit Module Pop-Up Menu in Contents View

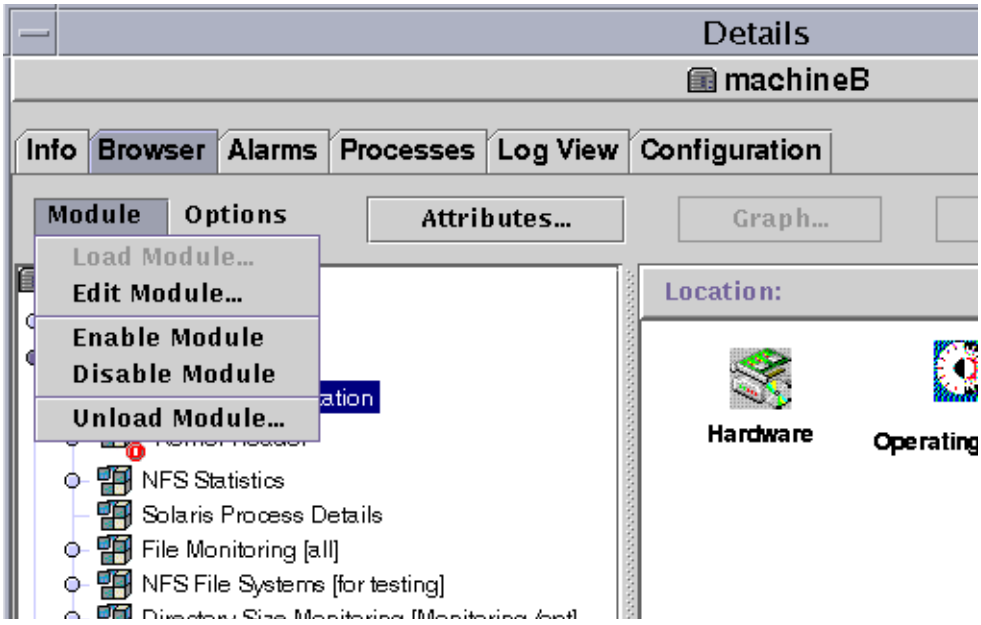

FIGURE 8-9 Edit Module Menu in Details Window

▼ To Edit Module Parameters

1. **Select the selected module.**
2. **Proceed with one of the following:**
   - Click the right mouse button and highlight Edit Module from the pop-up menu in the hierarchy view (FIGURE 8-7) or the Contents view (FIGURE 8-8).
   - In the Details window, select Module ➤ Edit Module (FIGURE 8-9).

   The Module Parameters Editor is displayed.
3. **Type the relevant information into the editable fields.**

   FIGURE 8-10 shows an example. The actual display varies with the module that is selected.

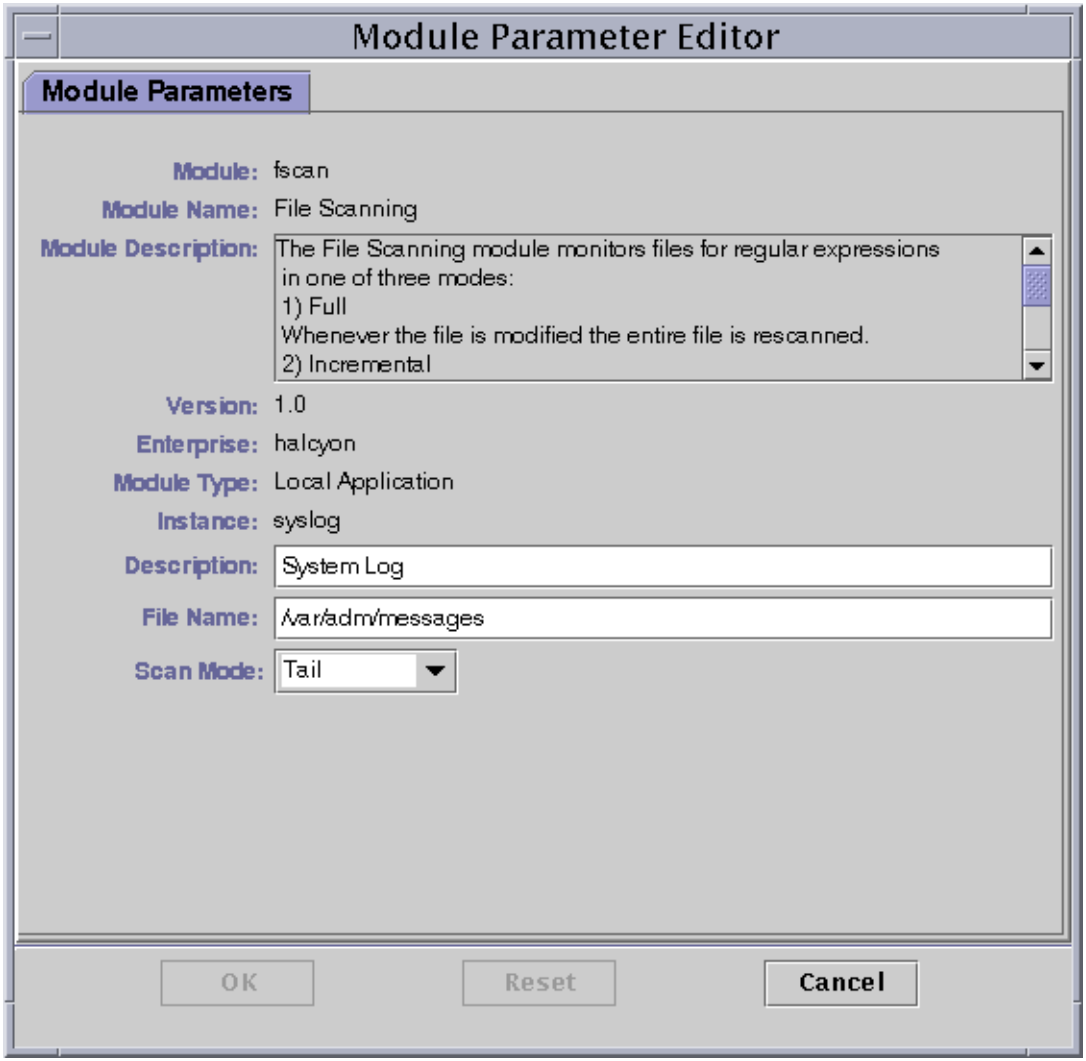

FIGURE 8-10 Module Parameter Editor

4. **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 (**FIGURE 8-7**) or Contents view (**FIGURE 8-8**).**

  OR

- **In the Details window, select Module ➤ Disable Module (**FIGURE 8-9**).**

  When the module has been disabled (turned off), the following message is displayed at the bottom of the Details window (FIGURE 8-11).

```
Module successfully disabled.
```

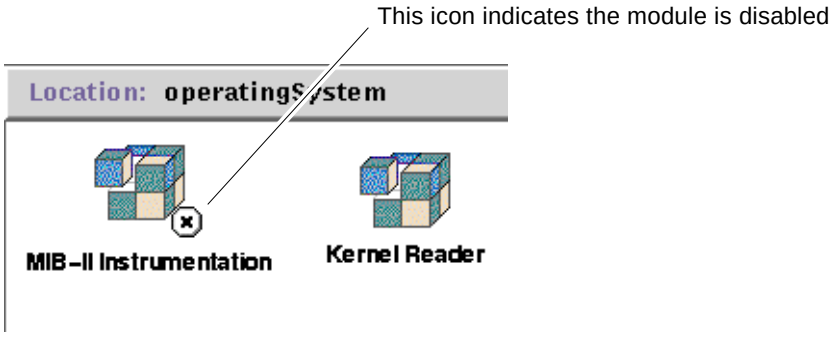

FIGURE 8-11 MIB-II Instrumentation Module Is Disabled

▼ 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 (**FIGURE 8-7**) or Contents view (**FIGURE 8-8**).**

  OR

- **In the Details window, select Module ➤ Enable Module (**FIGURE 8-9**).**

  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 (FIGURE 8-7) or the contents view (FIGURE 8-8).
   - In the Details window, select Module ➤ Unload Module (FIGURE 8-9).

   The Confirm Module Unload dialog is displayed (FIGURE 8-12).

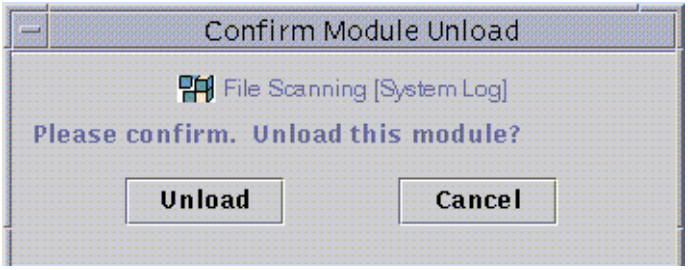

FIGURE 8-12 Unload Module Dialog

2. **Click the Unload button to remove the module or the Cancel button to cancel this request.**

Monitoring Modules

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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 domain). To create a module, see “To Create a Module Object” on page 59.

Attribute Editor for a Module

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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 AM and 5 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 8-1) or the topology view (FIGURE 8-2).
   - In the Details window, click the Attributes button.
2. **Click the Schedule tab (**FIGURE 8-13**).**
3. **Click the Advanced button and set the module schedule.**

   See “Timex Editor” on page 159 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.

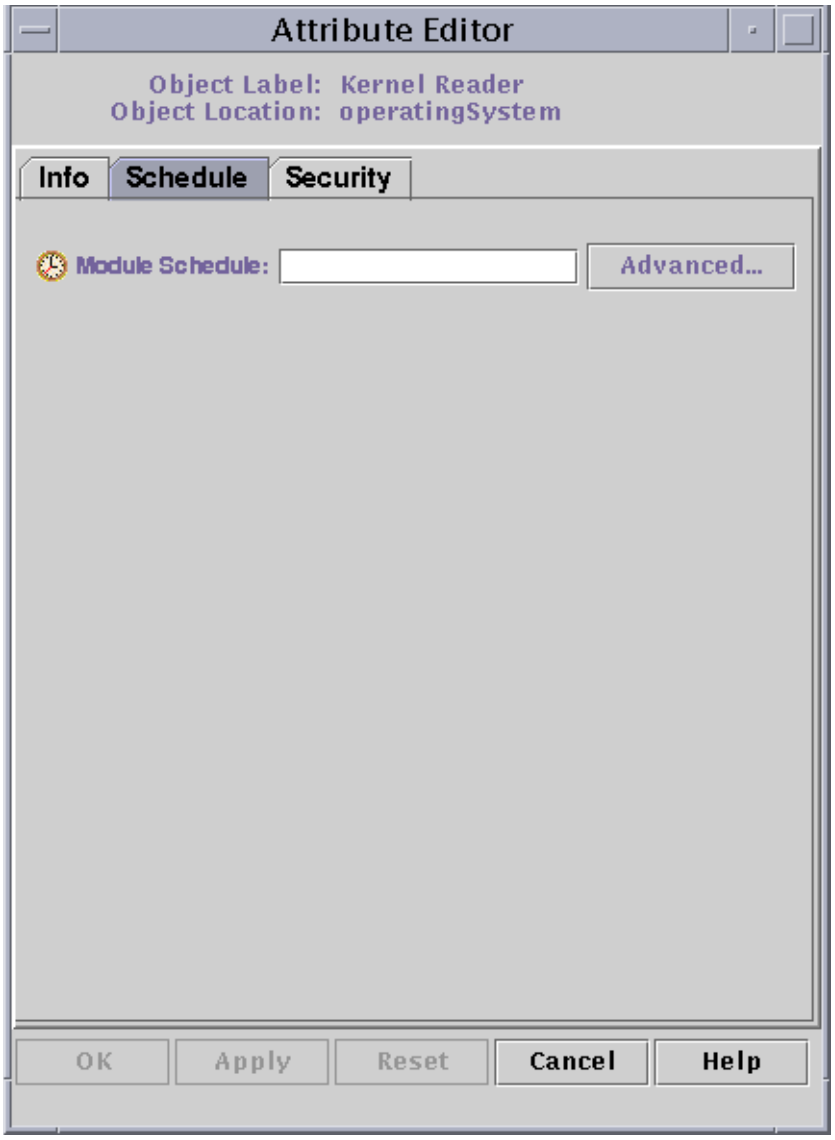

FIGURE 8-13 Setting a Module Schedule

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 11.

▼ 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 8-1) or the topology view (FIGURE 8-2).
   - In the Details window, click the Attributes button.
2. **Click the Security tab (**FIGURE 8-14**).**
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.

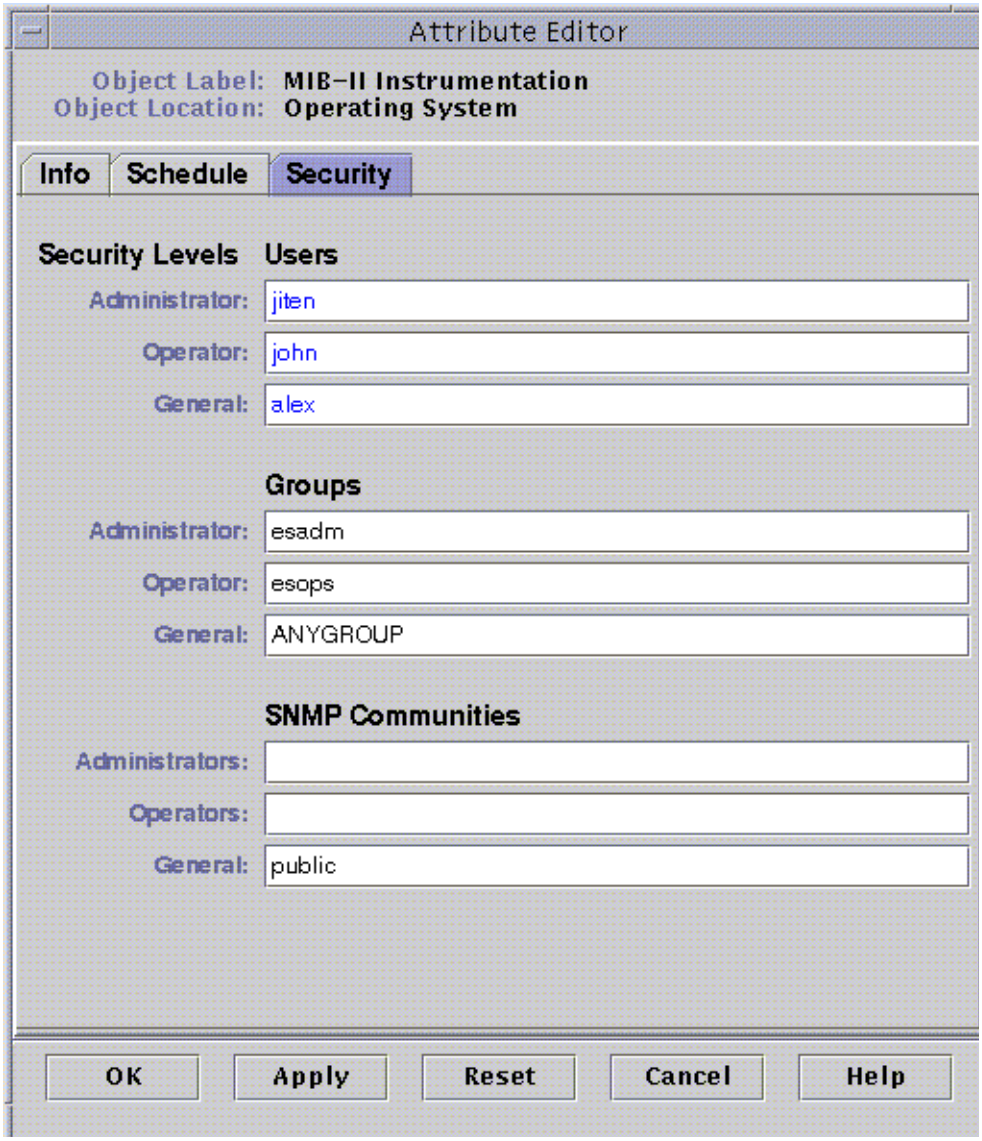

FIGURE 8-14 Setting Module Security in the Attribute Editor

CHAPTER 9

Alarms

This chapter provides details on alarms as they relate to the Sun Enterprise SyMON version 2.0 product.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON software monitors your hardware and software and notifies you, through alarms, when abnormal conditions occur. These alarms are triggered by conditions falling outside of predetermined ranges, or by SyMON rules. Default alarm conditions and rules are included in the SyMON modules. In addition, you may also set up your own alarm thresholds. For a list of SyMON rules, see Appendix D.

This chapter explains SyMON alarms with the following topics:

Note – The messages displayed in the Alarms tab of the Details window are always in English. They are not translated in other languages.

SyMON Alarms

Sun Enterprise SyMON software displays alarm information for managed objects. To access information on alarms for an object, access the Alarms Details window. This window displays alarms for a particular object.

Note – The SyMON agent is configured so that only one server receives alarm information from that agent.

You can acknowledge, delete, and manage the alarms on an object in a domain by using the Alarms Details window. For more information, see "To Access Alarms from the Alarms Tab in the Details Window" on page 212.

Types of Alarms

Managed object status is displayed in the Domain Status Summary from the SyMON main console window (FIGURE 9-1).

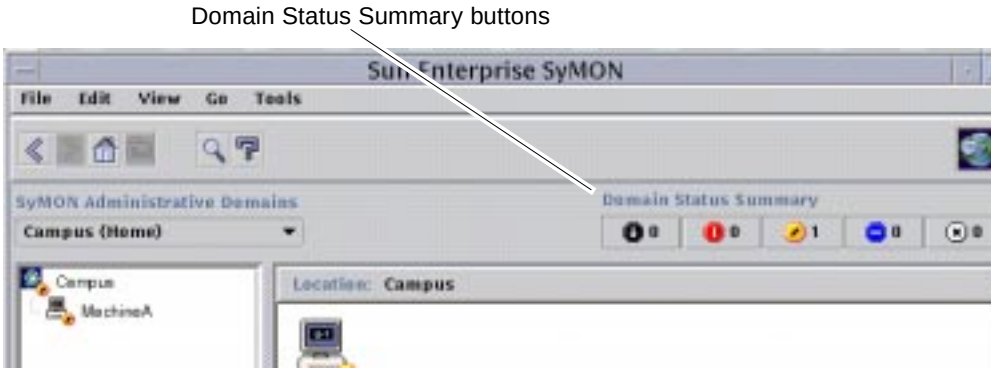

FIGURE 9-1 Domain Status Summary in the Main Console Window

The numbers next to the alarm icons indicate the number of managed objects whose highest severity open, unacknowledged alarm is represented by the icon. For example, the number 1 next to the yellow alarm icon indicates that there is a managed object whose highest severity alarm is yellow (alert). The severity of alarms are designated by icons. The different icons represent different severities (FIGURE 9-2).

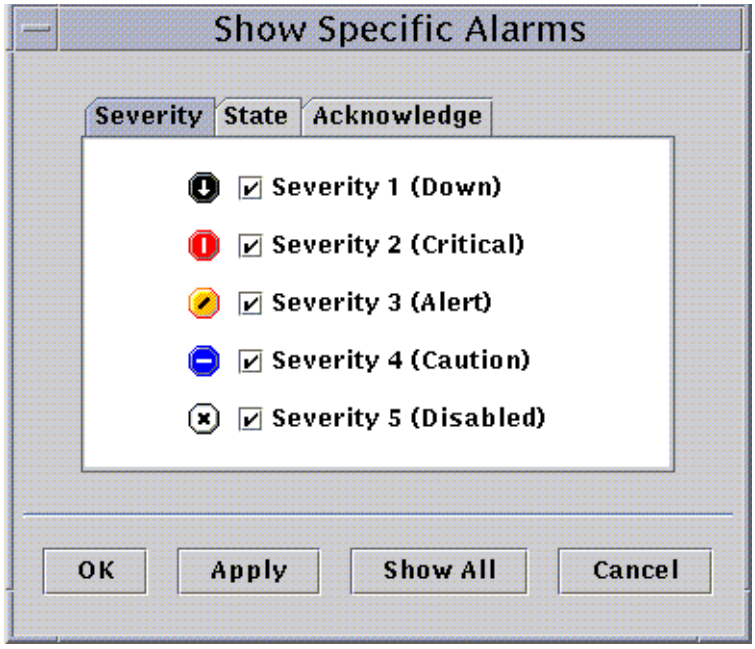

FIGURE 9-2 Alarm Severities

Down Alarms

A down alarm (severity 1 in FIGURE 9-2) 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).

Down alarms are represented by black alarm icons with a down arrow.

Critical Alarms

A critical alarm (severity 2 in FIGURE 9-2) 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.

Critical alarms are represented by red alarm icons.

Alert Alarms

An alert alarm (severity 3 in FIGURE 9-2) indicates that a non-service-affecting condition has developed and a corrective action should be taken in order to prevent a more serious fault.

Alert alarms are represented by yellow alarm icons.

Caution Alarms

A caution alarm (severity 4 in FIGURE 9-2) indicates the detection of a potential or an impending service-affecting fault, before any significant effects have occurred. Action should be taken to further diagnose (if necessary) and correct the problem in order to prevent it from becoming a more serious service-affecting fault.

Caution alarms are represented by blue alarm icons.

Off / Disabled Alarms

A disabled alarm (severity 5 in FIGURE 9-2) indicates that a resource for a managed object has been disabled; for example, a module is disabled.

Disabled alarms are represented by white alarm icons with an ‘X’.

Note – Objects with black star icons, that may look like a “splat” on your screen, are objects with irrational states, not to be confused with alarms, where the status of the object is unknown or undetermined.

If the black star or splat icon shows up in the main console window, it indicates that the object is in an irrational state. This means that there has been a data acquisition failure on that object. The failure does not come out of a rule so there is no alarm associated with it.

An example of this is presented in FIGURE 9-3.

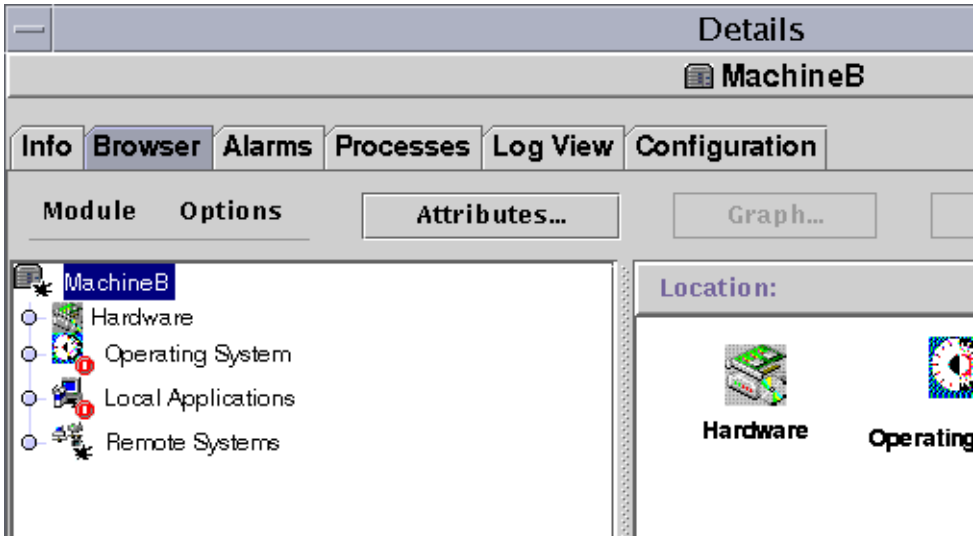

FIGURE 9-3 Objects with Irrational States Identified by Black Star or “Splat” Icon

Creating Alarms

SyMON software offers 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)

For more information on creating alarms, see “To Create an Alarm” on page 150.

Viewing Alarm Information

SyMON uses four methods (FIGURE 9-4) to alert you that an *unacknowledged open* alarm condition exists:

- Relevant row or column is colored in the property table (contents view)
- Colored icons in the hierarchy (tree) view
- Colored icons in the topology view
- Alarms in Domain Status Summary

Colored Alarm Icons

The type of alarm icon determines the severity of the alarm. For example, a red alarm icon indicates a critical condition has developed and corrective action is required right away. By contrast, a blue alarm icon indicates a potential or an impending service-affecting fault.

In FIGURE 9-4, there is an unacknowledged, open critical alarm in the Swap Statistics properties table, in the Used KB row. The row is shaded red, which corresponds to the color of a critical alarm.

The following illustration presents alarms in the Details window.

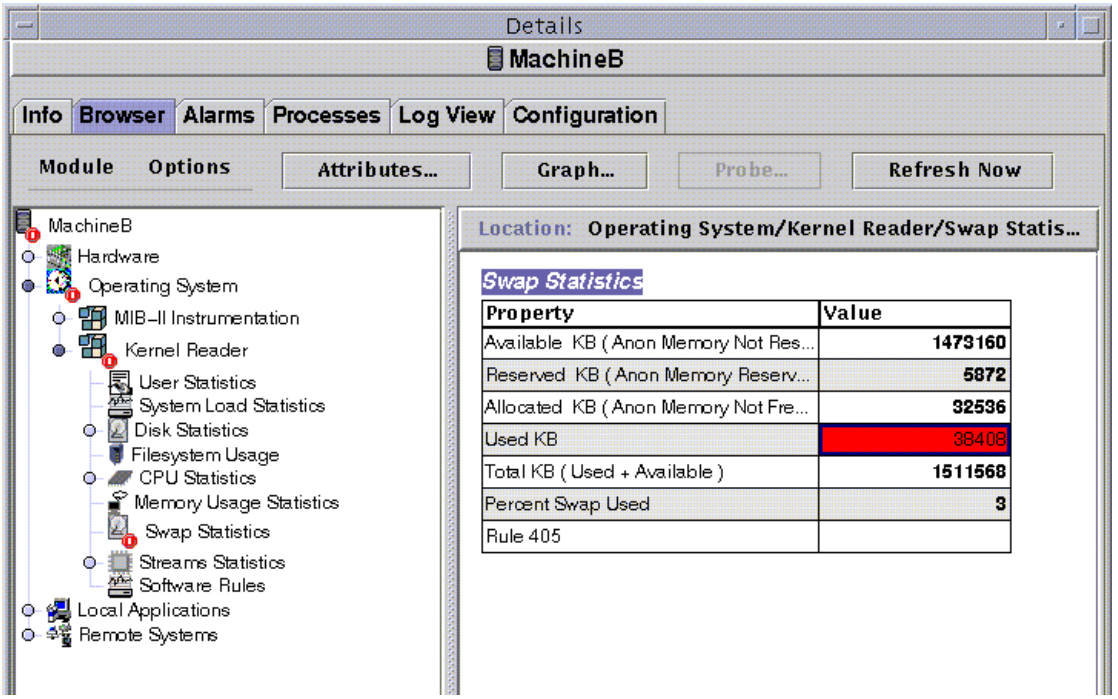

FIGURE 9-4 Alarms in the Details Window

The colored alarm icons are propagated up the hierarchy tree view, from the individual module up to the host. For example, in FIGURE 9-4, there is 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 domain in the SyMON main console window unless an unacknowledged open black alarm (of higher severity) exists.

Note – Unacknowledged alarms take precedence over acknowledged alarms. If there are two or more types of alarms in the hierarchy, 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 colored 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 colored alarm icon is propagated.

FIGURE 9-5 Alarms in the Contents View

Seeing Alarms in Domain Status Summary

The Domain Status Summary button panel displays the number of managed objects in the domain that have at least one *unacknowledged open* alarm of that severity.

Note – If there are two or more types of alarms 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), then you see the number 1 next to both the red-colored alarm icon and the yellow-colored alarm icon.

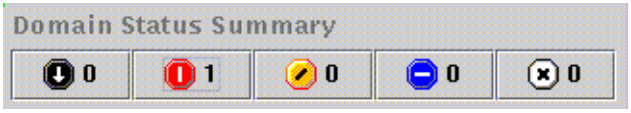

FIGURE 9-6 Domain Status Summary Buttons

▼ To Access Alarms from the Main Console Window

1. **Click on one of the Domain Status Summary buttons in the main console window. (**FIGURE 9-6**).**

   A list of objects which have at least one open, unacknowledged alarm, whose highest severity is that of the icon on the button, is displayed in the Domain Status Details window (FIGURE 9-7).

   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 whose 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 row in the table.
   - Single click on the row to select it, and then click the Details button.

   The Alarms Details window is displayed (FIGURE 9-8).

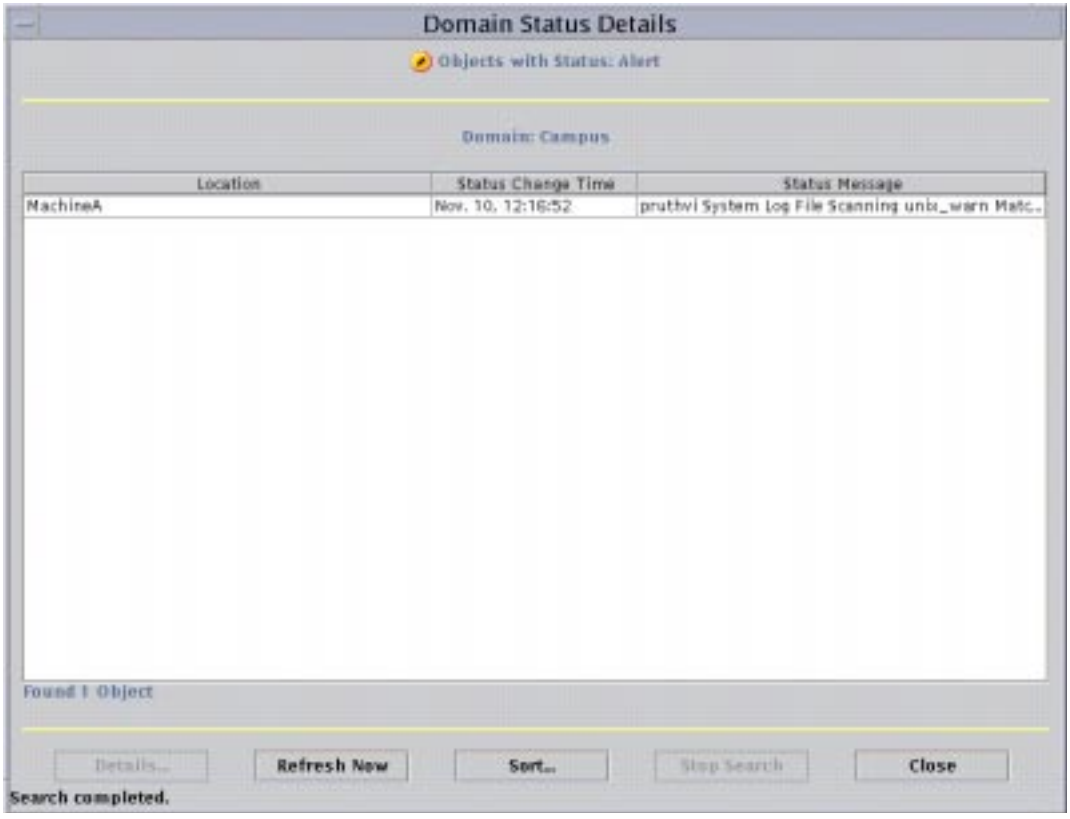

FIGURE 9-7 Domain Status Details Window

Information on Alarms

The Alarms tab in the Details window presents a table that contains the statistical summary of all alarm data for a given managed object.

▼ To Access Alarms from the Alarms Tab in the Details Window

1. **Click with your right mouse button on the selected host icon in the SyMON main console window and highlight Details from the pop-up menu.**

   The Details window is displayed.

2. **Click on the Alarms tab button.**

   The Alarms Details window is displayed (FIGURE 9-8).

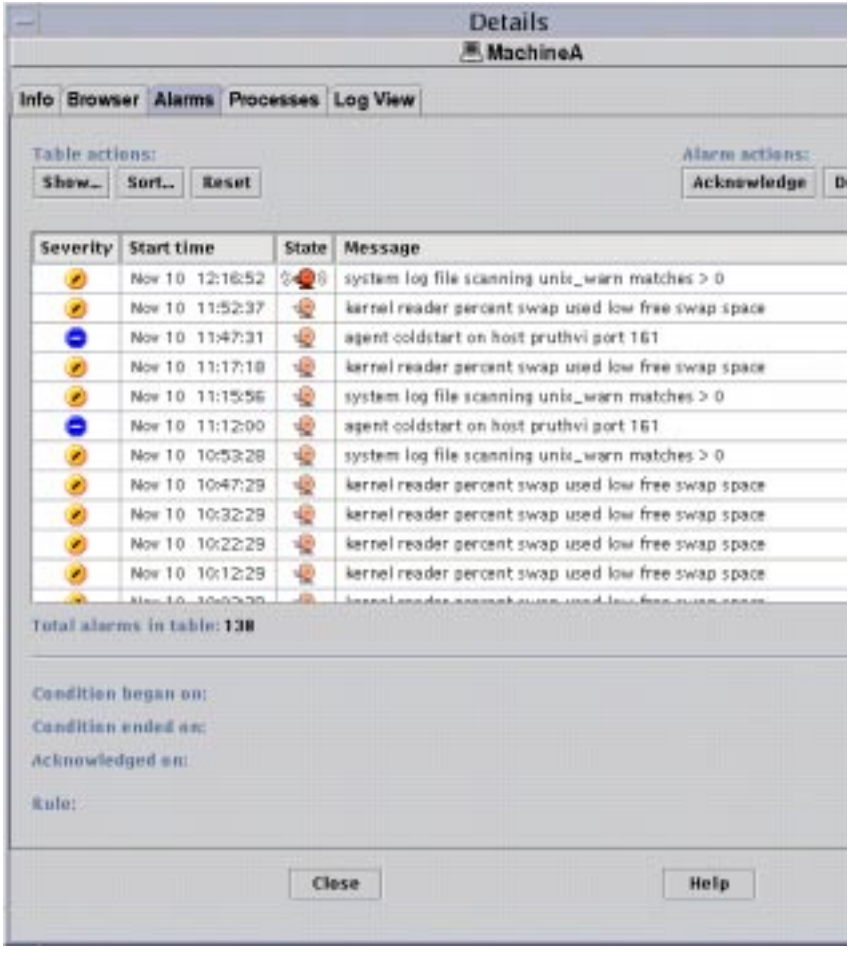

FIGURE 9-8 Alarms Tab Data from the Details Window

Alarm Categories

The Alarms tab presents different categories of detailed alarm information. Some of this information is always displayed in the alarms table (TABLE 9-1) while additional information is displayed when an alarm row is highlighted (TABLE 9-2).

TABLE 9-1 Alarm Categories Displayed in Table

Category	Description
Severity	Graphic indicator whose color indicates the severity of the alarm; black is most severe and white is least severe
Start time	Time the alarm first occurred
State	Open or closed
Message	Abbreviated message that indicates the type of alarm

Note – Acknowledged alarms are indicated with a green check in the Severity column.

TABLE 9-2 Alarm Categories Displayed When a Row is Selected

Category	Description
Condition began on	Date/Time the alarm condition has started
Condition ended on	Date/Time the alarm condition has been fixed
Acknowledged on	Date/Time the alarm was acknowledged by a particular user
Rule	Name that identifies the rule file which caused the alarm (for example, a rule number). For non-rule based alarms, the name `rCompare` is used.

Alarm States

There are also two different alarm states:

- Open
- Closed

An Open alarm is one in which the condition which caused the alarm still exists. A Closed alarm means the condition no longer exists. Open alarms are “ringing” while closed alarms are “silent” (FIGURE 9-9).

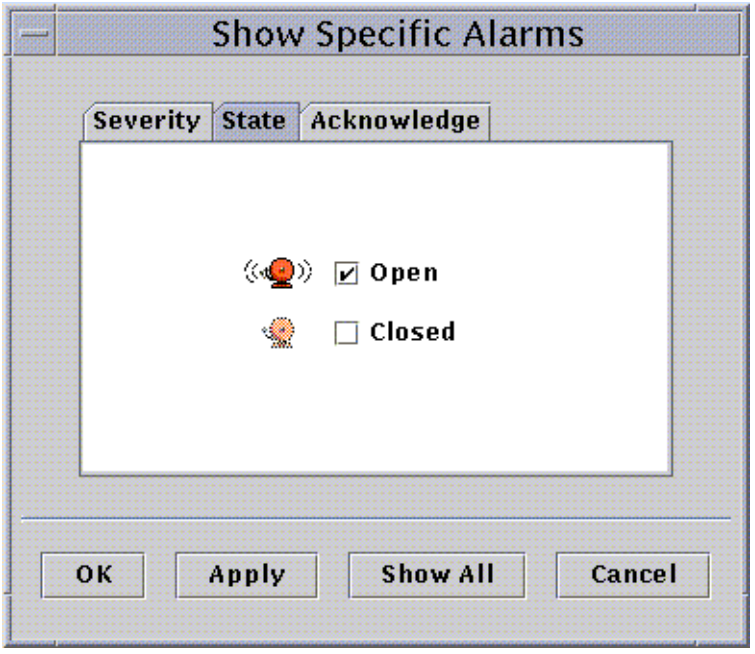

FIGURE 9-9 Open and Closed Alarms

▼ To View Alarm Categories

The Alarm Details window has an option that enables you to filter a selected alarm category and show a subset of the alarms.

1. **Click on the Show button below the Table actions field.**

   The Show Specific Alarms window (FIGURE 9-9) is displayed.

2. **Click on the appropriate tab to filter your alarm request.**

   The selected tab is darkened.

Note – If you want to see all the alarms in the alarms table, simply click the Show All button.

---

3. **Click on the Severity tab (**FIGURE 9-2**).**

   The Severity tab enables you to show alarms of the selected severity.

4. **Click on the check box next to a severity to show alarms of that severity.**

   The selected severity has a check in the check box next to its name.

Note – You may select one or more types of severity to show in the alarms table.

5. **Click on the State tab (**FIGURE 9-9**).**

   The State tab enables you to show open and closed alarms.

6. **Click on Open or Closed to show these types of alarms.**

   The selected state has a check in the check box next to its name.

Note – You may select open, closed, or both to show in the alarms table.

7. **Click on the Acknowledge tab.**

   The Acknowledge tab enables you to show acknowledged and unacknowledged alarms.

8. **Click on Acknowledged or Unacknowledged to show these types of alarms.**

   The selected state has a check in the check box next to its name.

Note – You may select acknowledged, unacknowledged, or both to show in the alarms table.

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 Cancel to cancel your request.

▼ To Sort Alarms

You can sort the alarm rows in the table (FIGURE 9-10).

FIGURE 9-10 Sort Alarm Table

1. **Click on the Sort button below the Table actions field.**

   The Sort Alarm Table window is displayed.

2. **Select your sort feature by clicking in the circle next to your selection.**

   You may sort by starting time (from the newest alarm to the oldest alarm), by severity (from the most severe to the least severe), or by state (with open alarms listed first, followed by closed alarms).

   The selected sort feature has a darkened circle next to its name.

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.

▼ To Reset the Alarm Table

- **Click the Reset button.**

  The alarm table is dynamically updated as new alarms are displayed and some existing ones close. These changes are part of the alarm data accessed from the Alarms tab in the Details window, regardless of what is selected as the Show button viewing options. As these conditions occur over time, the table may no longer reflect the current Show settings. Clicking the Reset button will update the table to reflect the current Show settings once again.

Acknowledging and Deleting Alarms

You may update information about alarms in the Alarms Details window.

▼ To Acknowledge and Delete Alarms

1. **Select the alarms you want to update by clicking the selected row(s) in the table.**

   Clicking the selected row(s) displays additional information associated with that alarm. The additional information consists of the starting time of the alarm, the ending time of the alarm, the acknowledgment time and the user who acknowledged the alarm, and the rule.

Note – You may select several rows at once by holding down your mouse button and moving the mouse over the selected rows. If, after you selected several rows, you want to skip a few rows and select other rows, simply hold down the Control key and select the additional rows.

---

2. **Click the appropriate button under the Alarm actions field.**

   You may perform the actions listed in TABLE 9-3.

TABLE 9-3 User Actions That Can Be Performed on Alarms

User Action	Description
Acknowledge	User and time of acknowledgment is registered. When an alarm is acknowledged, the alarm icon in the Severity column has a green check mark beside it.
Delete	Deletes all the selected alarms from the table. The deleted alarm(s) is saved into an archive file on the server.
Delete all	Deletes all the closed alarms from the table. The deleted alarm(s) is saved into an archive file on the server.

Note – You can delete open alarms, but the potential exists for alarm information in the Alarms windows to differ from alarm information in the hierarchy view and the topology view. That is, the alarms are deleted from the alarms table, but the alarm icons may still be present in the hierarchy and topology views. For example, in the case of an unloaded module, orphaned alarms may remain in view and need to be manually deleted.

Caution – You should only delete open alarms when there is no other method to remove these alarms.

Creating Alarm Conditions

SyMON enables you to create alarm conditions that help you to monitor the hosts in your domain. The main purpose of this section is to help you create alarm conditions and familiarize yourself with their operation. This will help you control alarm conditions.

▼ To Create Alarm Conditions To Monitor Hosts

1. **Navigate through the Operating System modules until you see the User Statistics icon (part of the Kernel Reader module).**
2. **Select Attribute Editor from the pop-up menu.**

   The Attribute Editor enables you to edit information about this property.
3. **Create an alarm condition by following the procedure in "To Create an Alarm" on page 150.**
4. **Click on the Alarms tab button in the Details window.**

   The alarm you created should be reflected in the Alarms table.
5. **Acknowledge, then delete this alarm if the alarm is closed.**
6. **Create additional alarm conditions and familiarize yourself with their operation.**

   Once you have created these alarms, you can set up security permissions so that another SyMON user cannot change your alarms. For information on accomplishing this task, see Chapter 11.

CHAPTER 10

Details

The Sun Enterprise SyMON Details window provides detailed information about a selected object.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following topics are covered in this chapter unless noted otherwise:

- Starting the Details Window
- Info Tab
- Browser Tab (covered in Chapter 7)
- Alarms Tab (covered in Chapter 9)
- Processes Tab
  - Configuring the Process Display
  - Process Statistics Window
  - Process Summary Field
- Log View Tab
  - Filtering Your Messages
  - Finding Specific Log Messages
- Configuration Tab
  - Resources
  - Physical View
  - Dynamic Reconfiguration
  - Logical View

The Details window displays up to six tab buttons (TABLE 10-1). Clicking a tab button updates the window with a new panel.

Note – If a feature (such as configuration details) is not supported for a specific object, the corresponding tab is not displayed.

TABLE 10-1 Details Window Tab Buttons

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). (The Browser is covered separately in Chapter 7.)
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 9.)
Process	Displays information about processes running in the host.
Logview	Displays entries from host log files (such as system message logs).
Configuration	Displays configuration information (resources, physical view, logical view, and dynamic reconfiguration status and controls), if available, for a host.

Starting the Details Window

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

You can start the Details window from the Sun Enterprise SyMON main console 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 a domain, as the Details window is not available for domains.

   The Details window is displayed (FIGURE 10-1).

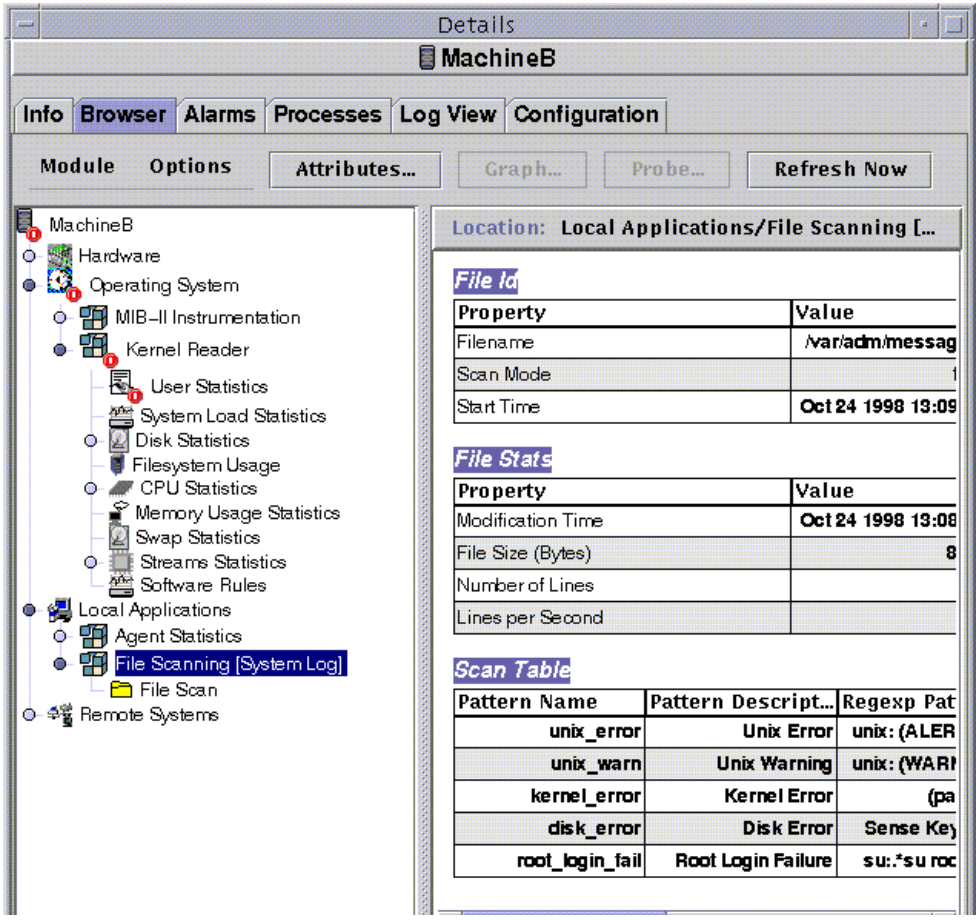

FIGURE 10-1 Details Window for a Selected Object

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 – If the hierarchy view has a light-colored circle next to an icon (FIGURE 10-2), you can click the circle or double-click the icon next to the circle to expand the hierarchy view ("unroll" and display more levels of detail).

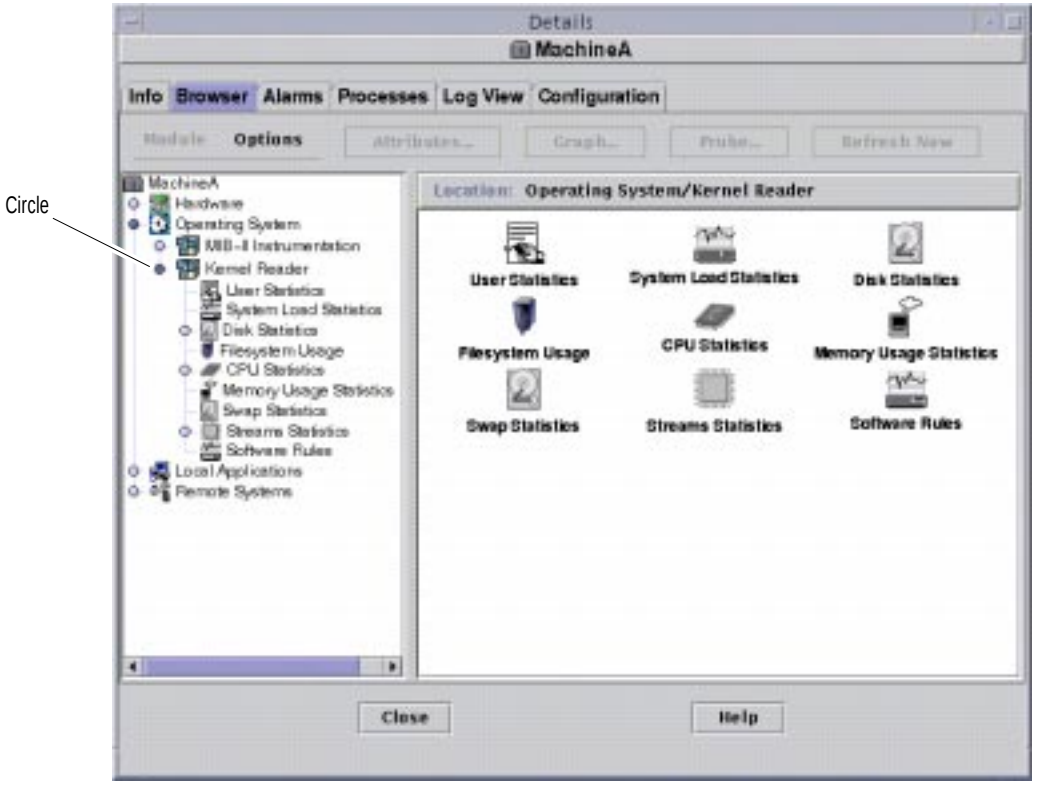

FIGURE 10-2 Light-Colored Circles "Unroll" to Provide Additional Levels of Detail

▼ To Close the Details Window.

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

Info Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Clicking the Info tab displays the Properties table.

The general properties are listed in the following table.

TABLE 10-2 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.
IP Address	IP address.
Netmask	Netmask associated with the host.
Operating System	Operating system type and version.
Entity Family	Hardware architecture.
Entity Trap Destination	Host IP address of SyMON server which receives this host's trap information.
Entity Event Destination	Host IP address of SyMON server which receives this host's events information.
Entry IsPolling Indicator	True or false.
Entry Polling Type	Agent or SNMP.
Target Hostname	Host name of the target.
Target IP Address	IP address of the target.

Browser Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The Browser tab displays hierarchy and contents views of the hardware, operating system, local applications, and remote systems.

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

Alarms Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The Alarms Details window displays the alarms for the host.

See Chapter 9 for detailed information on using SyMON alarms.

Processes Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The Processes tab process viewer (FIGURE 10-3) enables you to view and select detailed information about processes running on the selected host or node. The displays are continually updated.

Note – The Solaris Process Details module must be loaded to use the process viewer. For instructions, see “To Load a Module” on page 184.

Note – If the Solaris process module is not loaded when you first click the Process tab, then you must load the module, and close 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.

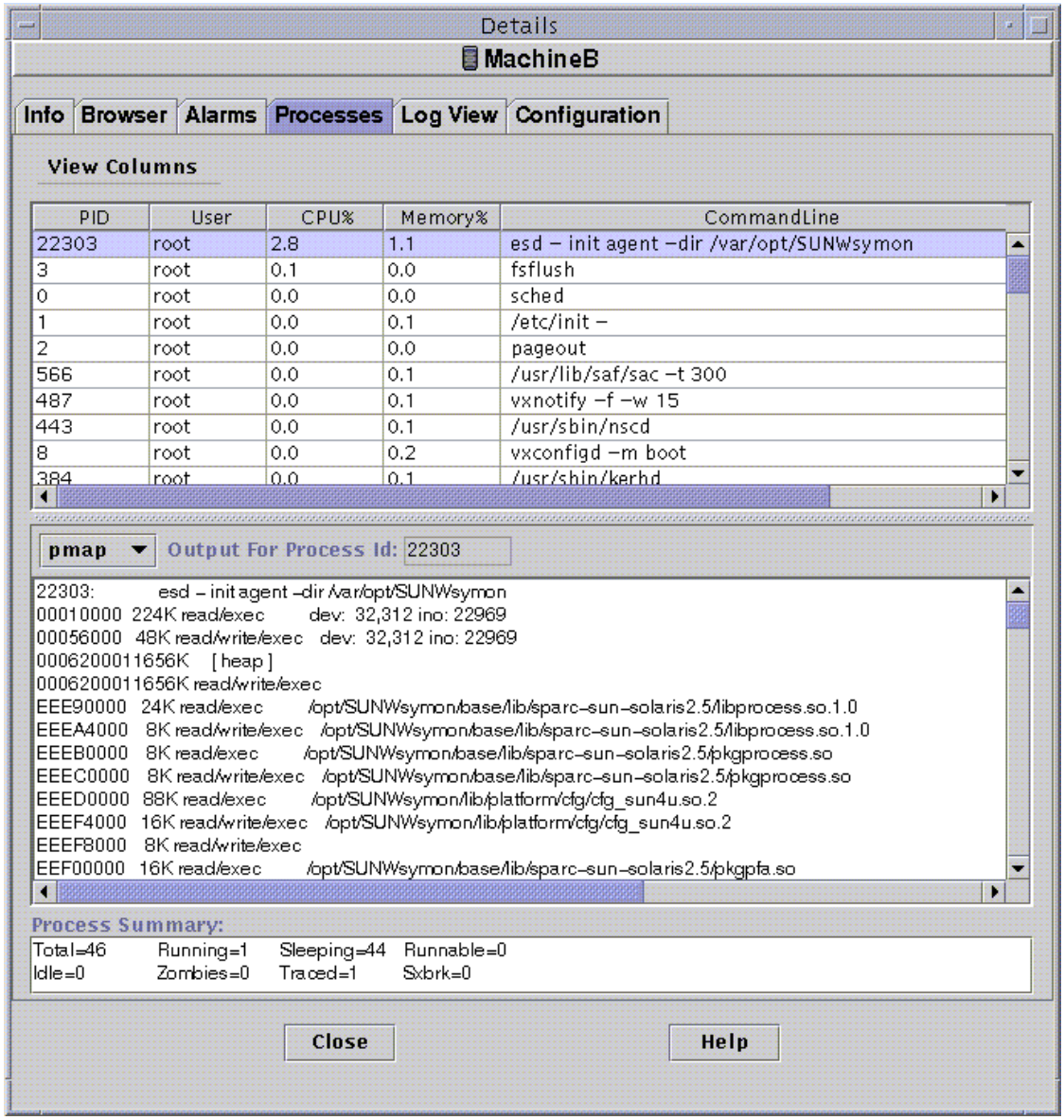

FIGURE 10-3 Processes Tab

▼ 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 10-4) that enables you to add or remove columns from the table.

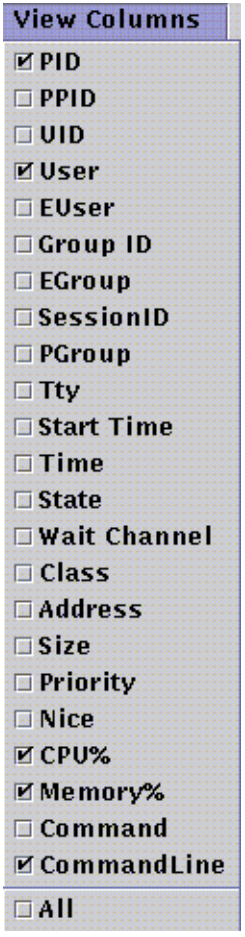

FIGURE 10-4 View Columns Menu

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 10-4) 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 10-3 lists the properties that are available for the Processes view.

TABLE 10-3 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.
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.

TABLE 10-3 Process Viewer Properties *(Continued)*

Property	Description
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 I.D. window displays statistics for your choice of either pmap, pstack, pfiles, or pldd for any highlighted process in the Process View window.

TABLE 10-4 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 `fstat(2)` and `fcntl(2)` 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.

Log View Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The log viewer (FIGURE 10-5) enables you to view system log messages and logged error messages from SunVTS.

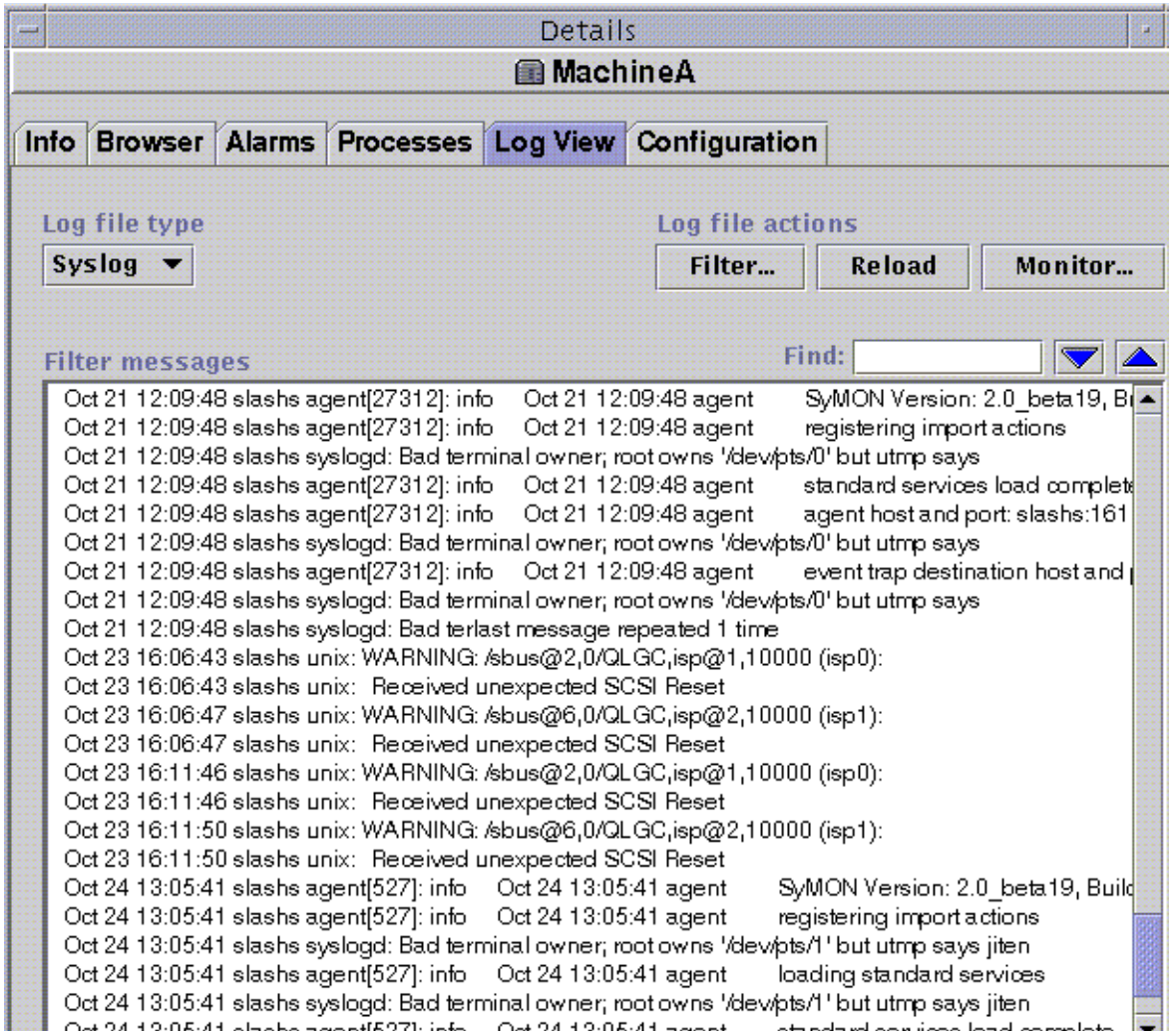

FIGURE 10-5 Logview Tab

Log File Type Button

You can view two types of messages:

- System log messages stored in the `/var/adm` directory
- SunVTS error messages

File names in the `/var/adm` directory start with the word “messages”. If Sun VTS is installed, it writes by default to the `/var/opt/SUNvts/logs/Sunvts.err` file.

▼ To View the Log File Messages

- **Click the down arrow under the Log file type field and highlight either Syslog or SunVTS.**

  The selected type of messages is displayed in the log viewer table.

Note – Click the Reload button to refresh the display and add the latest log messages.

Filtering Your Messages

You can apply filters to display only those messages that match the date range and text pattern that you specify.

▼ To Filter Your Log Request

1. **Click the Filter button in the log viewer (**FIGURE 10-5**).**

   The Message Filter Options dialog is displayed (FIGURE 10-6).

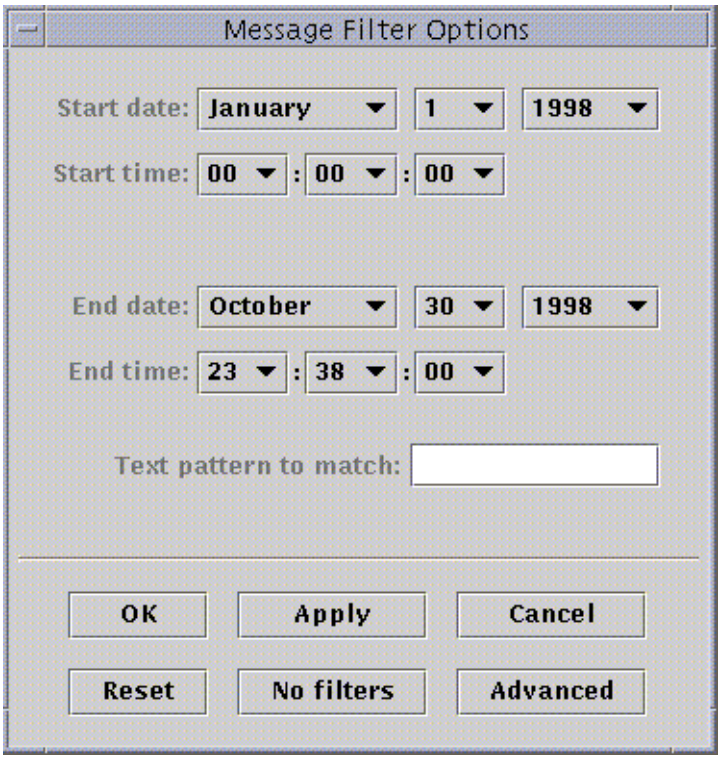

FIGURE 10-6 Message Filter Options Dialog

Note – If you do not want any filters applied to your log messages, click the "No Filters" button.

---

2. **Using the down arrows, select the starting date by highlighting 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 field marked "Text pattern to match."**

Note – Select a text pattern that is unique to the type of message in which you are interested.

7. **Click the Advanced button if you want to further refine your filter request. Otherwise, skip to Step 10.**

   The advanced Message Filter Options dialog is displayed (FIGURE 10-7).

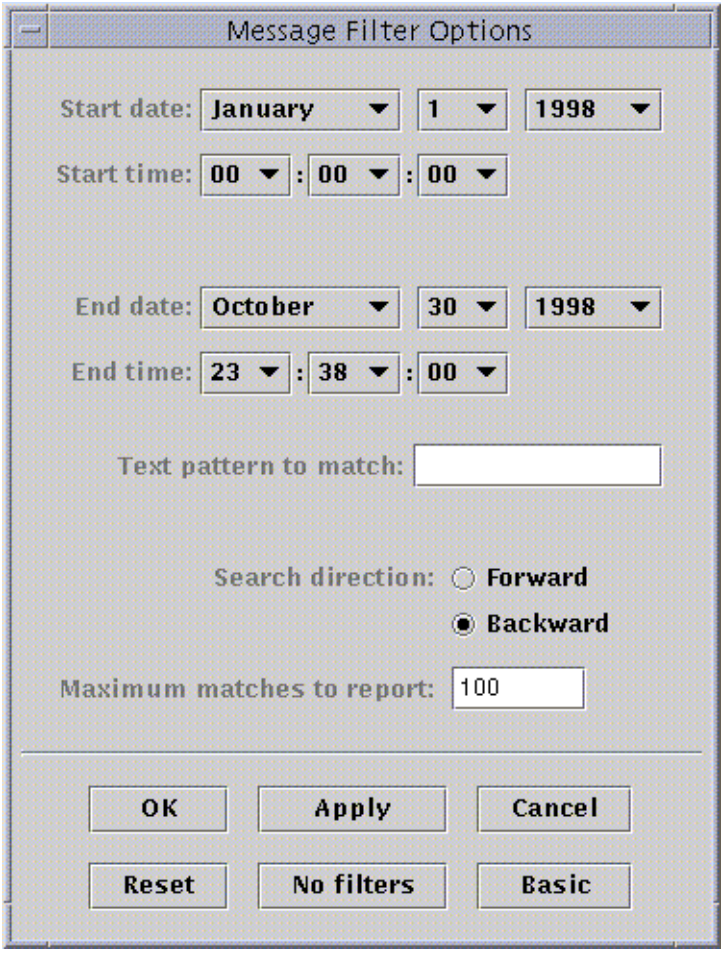

FIGURE 10-7 Advanced Message Filter Options Dialog

8. **To display filtered messages in ascending or descending order click the circle next to Forward or Backward.**

9. **(Optional) Type the maximum number of log messages that should be matched in the field marked Maximum matches to report.**

   If you leave the field empty or if you enter zero (0), all matching messages are reported.

10. **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 Reset to reset to the default parameters.
    - Click Cancel to cancel your request.

Reload Button

Click the Reload button to refresh and reload filtered messages.

Monitor Button

Monitoring enables you to view new log messages as they occur. The new messages are displayed in the lower half of the split pane window. With your mouse button, you can adjust the dividing bar between the upper half and the lower half of the split pane window to view more of one half than the other. Each new message that arrives is highlighted.

▼ To Monitor Log Messages

1. **Click the Monitor button in the log viewer (**FIGURE 10-5**).**

   The Monitor Filter Options dialog is displayed (FIGURE 10-8).

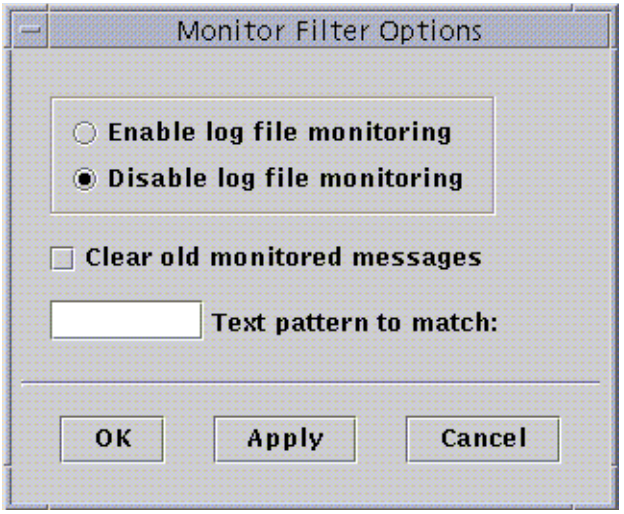

FIGURE 10-8 Monitor Filter Options Dialog

2. **Click the appropriate circle to enable or disable log file monitoring.**

   The darkened circle indicates your choice.

3. **To display only currently monitored log messages, click the check box to clear old monitored messages.**

   The check box is displayed with a check mark.

4. **Type the text pattern to be matched in the field marked Text pattern to match.**

   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

Once a set of filter messages has been loaded into the upper half of the split pane window, you can search for a specific character sequence within that set of messages.

Note – No meta characters, including the wildcard asterisk (*) character, are supported in the log view find feature.

▼ To Find a Log Message

1. **Type the specific character sequence (part of the log message) in the Find field (**FIGURE 10-5**).**
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 Return or the down or up arrow to continue your search and find additional occurrences of the matching sequence.**

Configuration Tab

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Note – The Configuration tab is grayed out if this feature is not supported on your system.

The Configuration Details window (FIGURE 10-9) provides three choices for system information:

- Resources (default view)
- Physical View
- Logical View

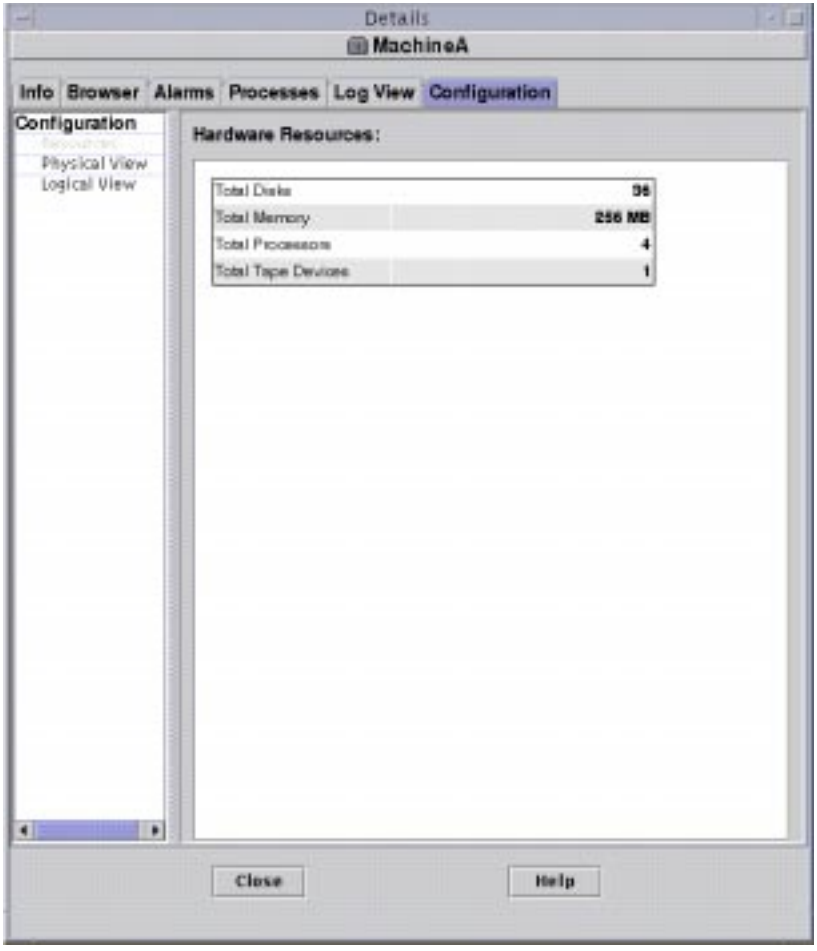

FIGURE 10-9 Configuration Details Window

▼ To View a Configuration

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

- **Click once to highlight the configuration in which you are interested.**

  The right side of the window is updated and the selected feature is displayed.

Resources

The SyMON software displays a table of hardware resources of the selected host (FIGURE 10-9).

TABLE 10-5 Resources

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

Physical View

When you select the Physical view, SyMON software displays a photo-realistic picture of the selected host (FIGURE 10-10), if available. Pictures are not available for some system types.

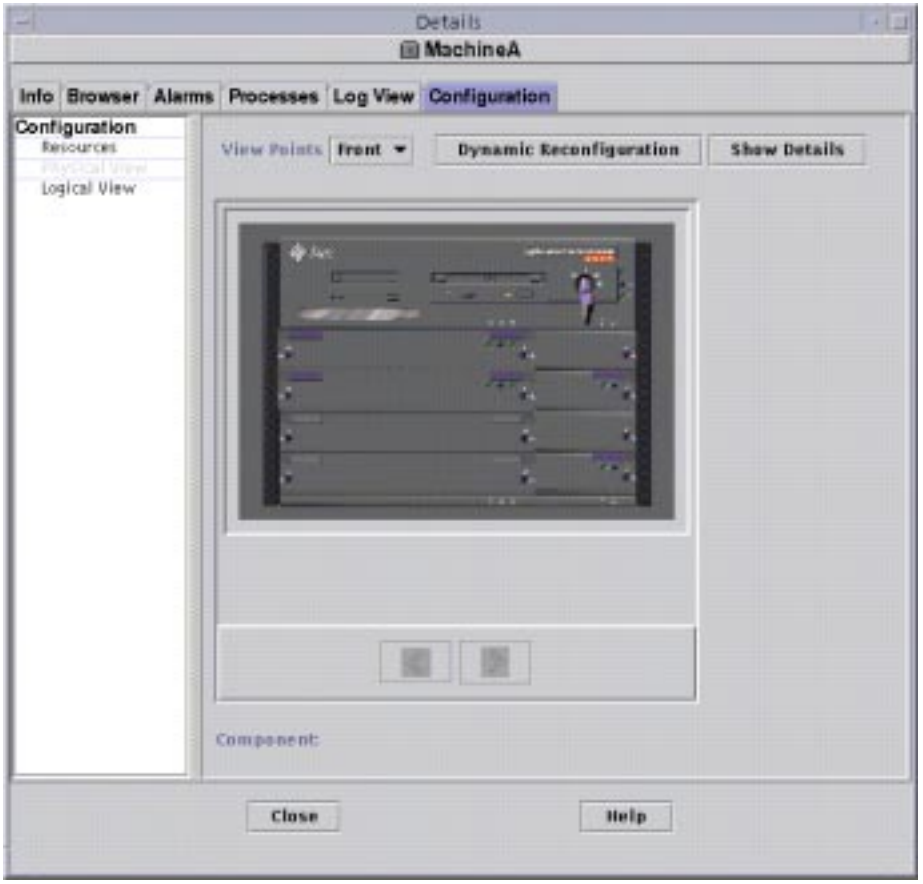

FIGURE 10-10 Configuration Physical View

View Points

If a picture of the system is available, it is displayed. For some systems, you can select alternate front, rear, and side views by selecting entries in the View Points 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. At such times, the individual component is highlighted, and the path name of the component is displayed in the Component field at the bottom of the window. You can click a highlighted component to display the detailed picture of the component (FIGURE 10-11).

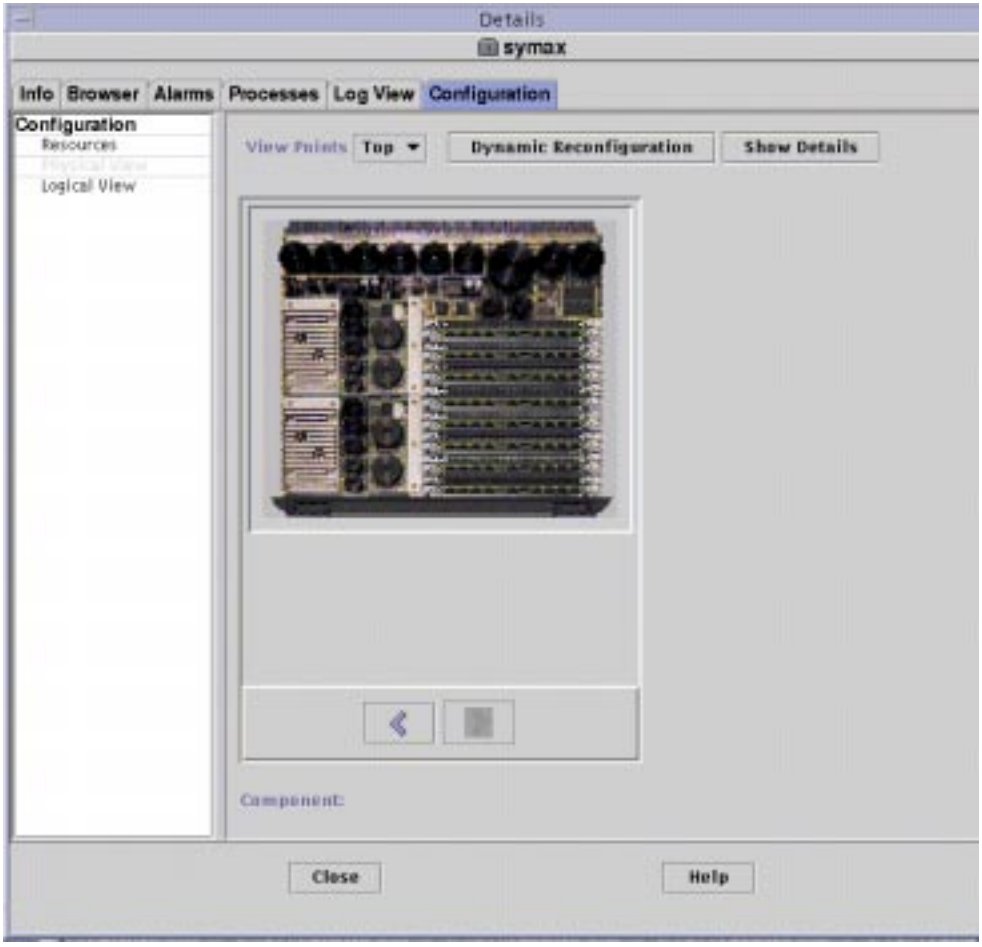

FIGURE 10-11 Component Physical View

The arrow buttons below the picture enable you to switch between system and component views.

Dynamic Reconfiguration

Where available, Dynamic Reconfiguration enables service personnel to add, remove, or replace hardware units such as system boards while the system is powered up and running. Dynamic Reconfiguration also enables boards to be reserved in a powered-up and inactive state for immediate use as spare units. This feature is only available on systems that have boards and slots designed for hot-plugging.

If the Dynamic Reconfiguration feature is supported on your system, and if the SyMON Dynamic Reconfiguration module is loaded, you can click the Dynamic Reconfiguration button to display the Dynamic Reconfiguration window (FIGURE 10-12).

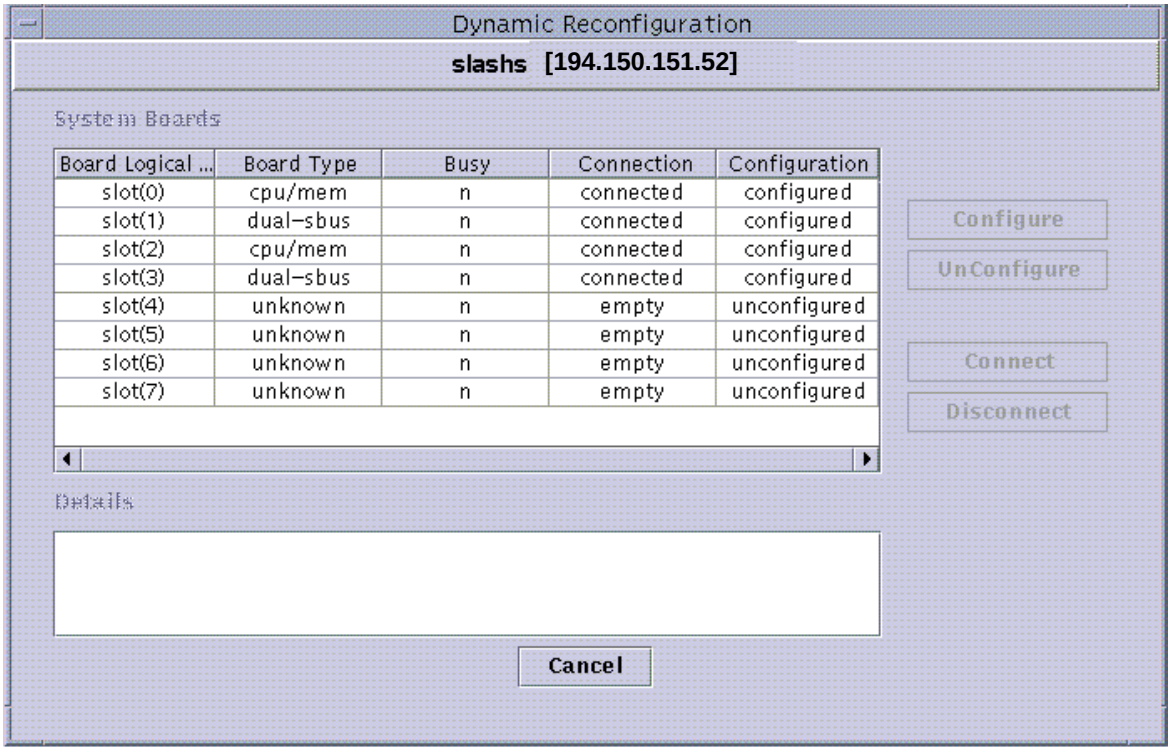

FIGURE 10-12 Dynamic Reconfiguration Window

Where applicable, the System Boards field lists all slots in the card cage and shows the status of all slots and their occupants.

The Details field shows the state of a selected slot and its occupant (if any). The Condition field shows the status of the board occupying that slot. The Information field shows when the board was installed in the slot. The Board Physical ID field shows the system designation for the board.

The Configure, Unconfigure, Connect, and Disconnect buttons are grayed out as required by the condition of the board and slot. For information on the proper use of these functions, refer to the Dynamic Reconfiguration user's guide for your system.

Show Details

Clicking the Show Details button (see FIGURE 10-10) displays the Property / Value view (FIGURE 10-13), which displays text describing the node that is selected in the View Points view. The button toggles between Show Details and Hide Details. Clicking the Hide Details button turns off the Property / Value view.

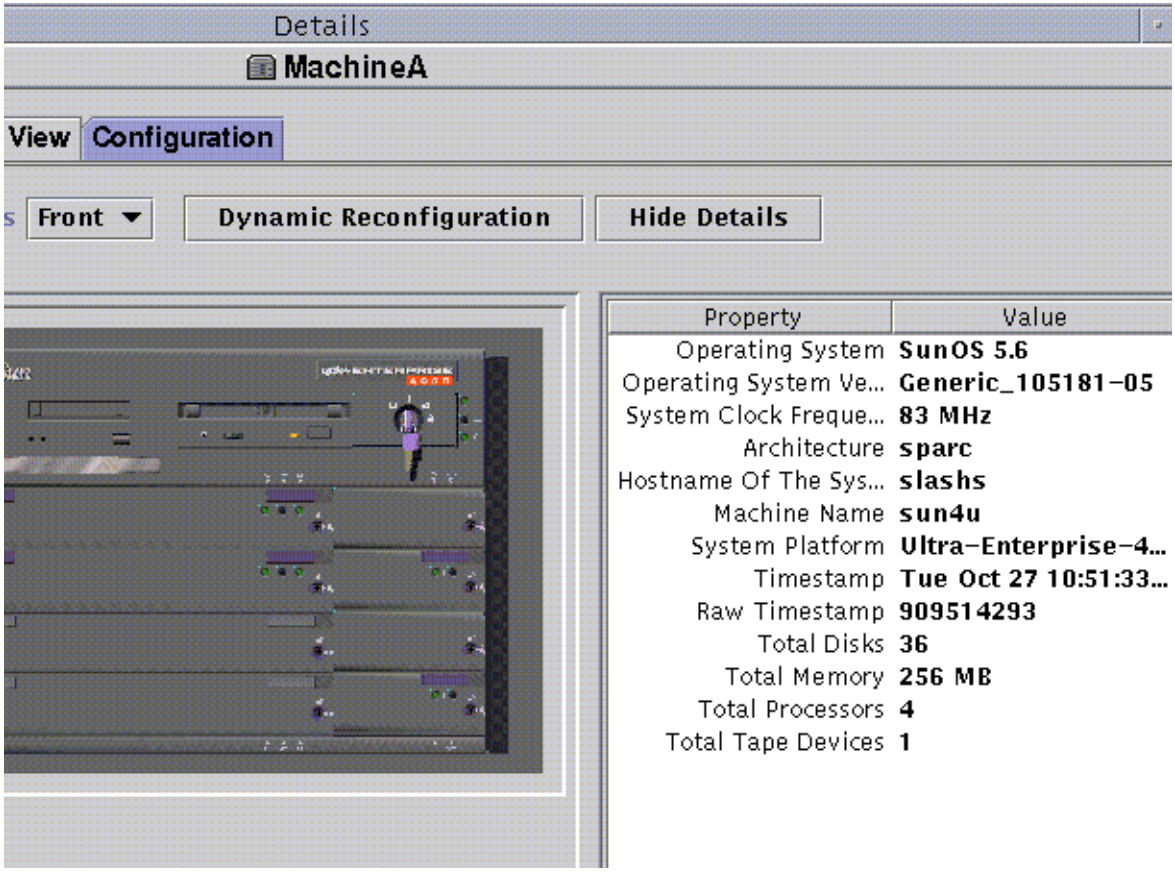

FIGURE 10-13 Property / Value View

Note – Views of external storage devices are not fully supported by the Physical view at this time. Some devices such as a disk array may be shown as individual disks.

Logical View

The SyMON software displays a Logical view configuration of a host (FIGURE 10-14) if the host is monitored by a SyMON agent. (Logical views are not available for ping hosts.)

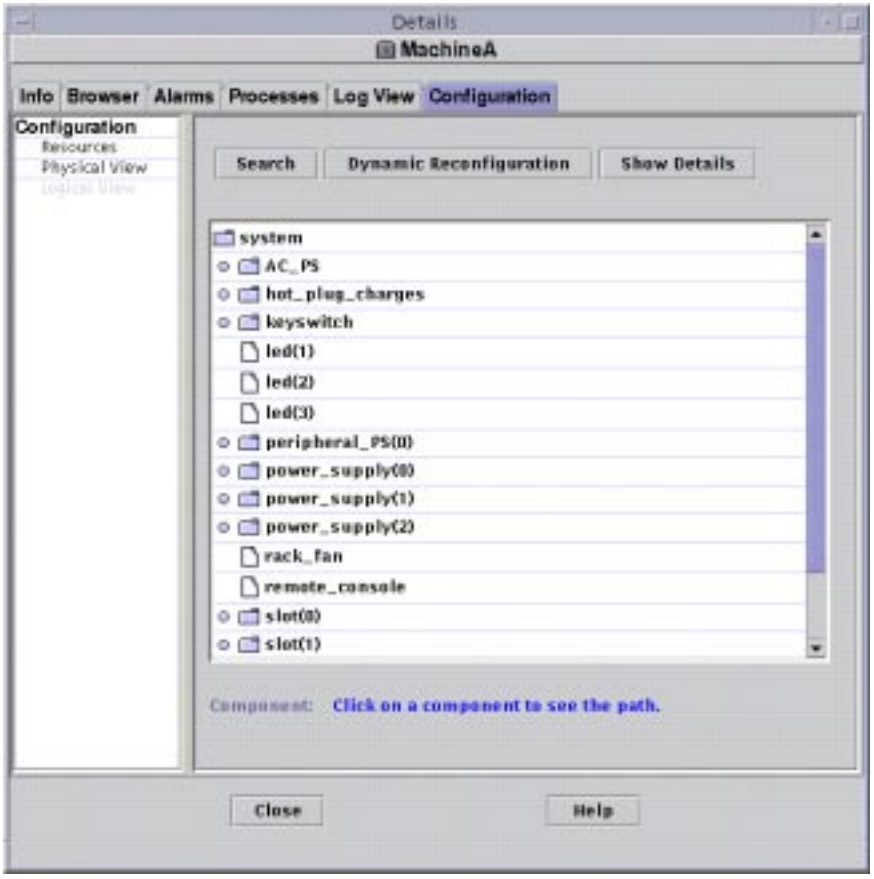

FIGURE 10-14 Configuration Logical View

Search

Clicking the Search button displays the Search window (FIGURE 10-15). Use the Search window to search for components in the Logical View window.

FIGURE 10-15 Search Window

Tip – The Search function is case-sensitive and can find the term “board” but not “Board.” 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.

Dynamic Reconfiguration

The Dynamic Reconfiguration feature in the Logical View is the same as is described in the previous section, “Physical View” on page 242.

Show Details

The Show Details feature in the Logical View is the same as is described in the previous section, “Physical View” on page 242.

CHAPTER 11

SyMON Security

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Security in SyMON 2.0 software is based on Java security classes and SNMPv2 usec (SNMP version 2, user-based security model) security standards. This chapter discusses SyMON security features, users and groups, and their privileges.

SyMON software offers the following layers of security:

- Only valid SyMON users can use the SyMON software.
- SyMON software enables you to set security permissions or access control categories and provides control at the domain, group, host, and module levels.
- It authenticates user login and access control for individual managed properties.

This chapter contains the following information:

Access Control (ACL) Categories

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

SyMON software offers the following Access Control (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, we first need to understand SyMON users and groups. The following sections explain SyMON users and groups.

SyMON Users

SyMON 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 SyMON 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.)

Note – You need to clean up the `/etc/group` file if you have a previous version of the product.

Public and Private Users

During the SyMON 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 use SyMON "general" privileges. For example, when a user tries to access information from a session running in a different SyMON 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 SyMON software.

The administrator has to add the additional list of user IDs for all other users who need to log into SyMON. 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 (ACL)" on page 257.

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" SyMON user. SyMON general users can, by default, perform the following functions:

- Log into SyMON software
- View the domains, hosts, and modules that are created
- View the events
- Trigger manual refreshes
- Run ad hoc commands
- Graph data

SyMON Superuser

Implicitly, the SyMON superuser belongs to all the groups described in the following sections. SyMON superuser has "admin" privileges as described in "SyMON ADMinistrators or `esadm`" on page 252.

SyMON Groups

The following SyMON groups are created by default on the server host during the SyMON server setup:

- `esops`
- `esadm`
- `esdomadm`

In addition, all the SyMON users belong to a hypothetical group, called `ANYGROUP`.

The above groups must be defined on the machine where the SyMON 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 SyMON `esmaster` and `espublic` users are configured as members of the preceding groups, they are not explicitly mentioned in the `/etc/group` file.

SyMON OPeratorS or `esops`

SyMON 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 SyMON 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

SyMON ADMinistrators or `esadm`

SyMON 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 “SyMON OPeratorS or `esops`” on page 252. 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 domains, hosts, or modules

SyMON DOMain ADMinistrators or `esdomadm`

The SyMON users belonging to the group `esdomadm` can perform the following “domain administrator” operations:

- Create domains

- Create groups within domains
- Add objects to groups or domains
- View domains, hosts, or modules

Note – Other than the privileges listed above, a SyMON user belonging to "`esdomadm`" is just a "general" user, unless configured otherwise.

Admin, Operator, and General Functions

TABLE 11-1 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 11-1 Domain Admin, Admin, Operator, and General Functions

Function	Domain Admin	Admin	Operator	General
Load modules		x		
Unload modules		x		
Create domains	x			
Create groups within domains	x	x		
Add objects to groups or domains	x	x		
View 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

TABLE 11-1 Domain Admin, Admin, Operator, and General Functions *(Continued)*

Function	Domain Admin	Admin	Operator	General
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 SyMON 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 263.

Specifying Access Control (ACL)

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON administrators (`esadm` group) can specify ACL features for users and groups for the following:

- Domains
- Groups within 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.

SyMON Remote Server Access

SyMON users can access and view data from sessions running on remote SyMON 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 SyMON sessions running on different servers is defined in terms of each session's server context. See "SyMON Server Context" on page 256 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.

SyMON Server Context

In SyMON 2.0 software, a server context is defined as agents running on many hosts, all sharing a single set of the following central components:

- SyMON server
- Topology manager
- Event manager
- Trap handler
- Configuration manager

A server context is defined as a collection of SyMON 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 SyMON component or agent is configured at installation to know the location of its Trap handlers and Event managers. SyMON 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 SyMON agents and a particular server layer with which the remote SyMON agents are associated.

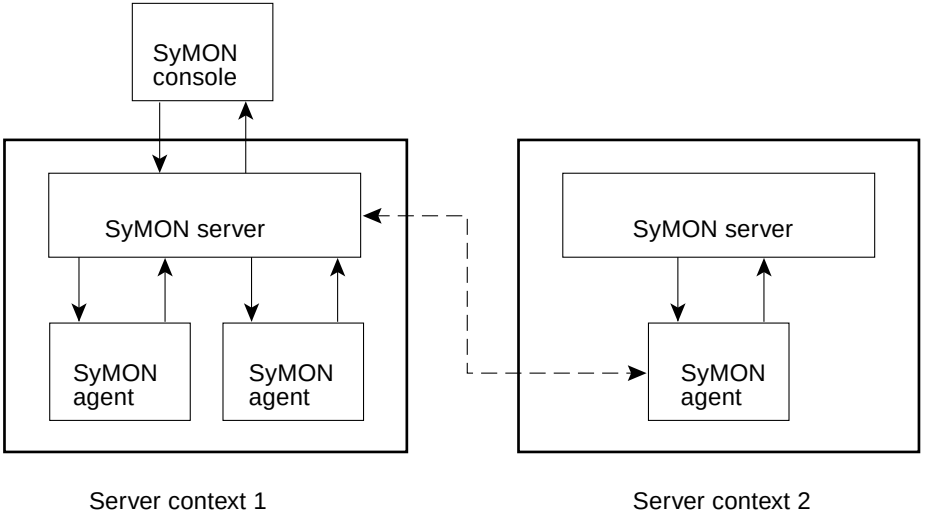

FIGURE 11-1 Remote Server Context

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 SyMON `espublic` user. This allows successful requests across servers, as long as SyMON sessions on both servers have the same password for user `espublic`.
- Each SyMON server maintains a list of agent IP or port address, to distinguish objects in its own context from objects on a different SyMON server.

Limitations While Crossing Servers

Some security restrictions apply when a user tries to communicate across server contexts.

In the current SyMON 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 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 (ACL)

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following sections describe how to perform the following key ACL functions:

- To Add SyMON 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 SyMON Users

▼ To Add SyMON Users

1. **Become superuser (on the SyMON 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 SyMON users list, the user has default privileges. See “Default Privileges” on page 262 and “Overriding the Default Privileges” on page 263 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 SyMON 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 11-2**).**
3. **Change the values as required.**

   For example, you may enter data as follows:

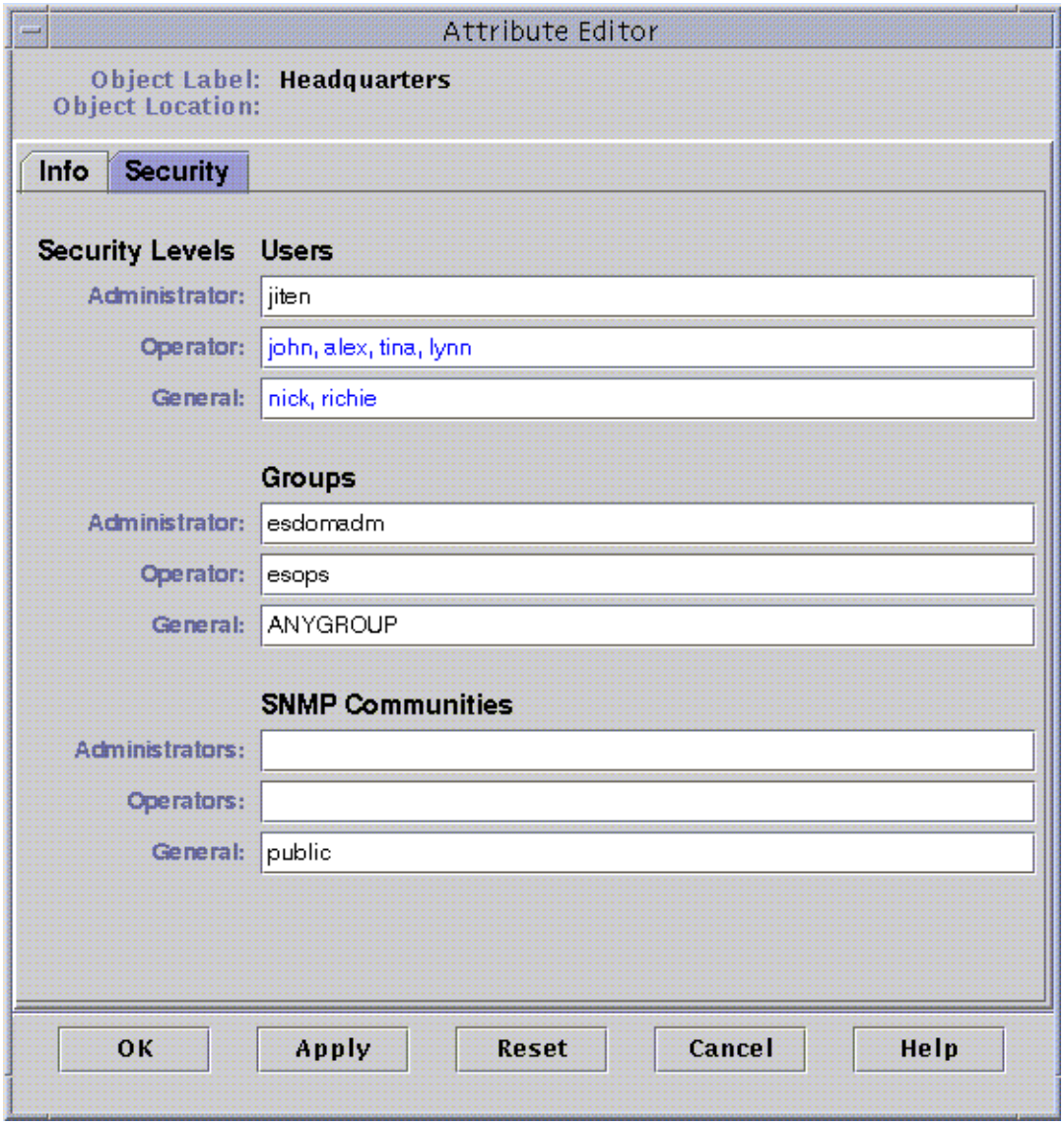

FIGURE 11-2 Example of Security Fields in the Attribute Editor

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Note – Use spaces between multiple entries as illustrated in the entries for "Operator" under "Users."

The preceeding example of the Attribute Editor with the Security tab selected contains the following field entries:

TABLE 11-2 Security Attributes

Attribute	Description
Administrator Users	A list of users. `jiten` is a SyMON user who can perform administrator operations
Operator Users	A list of operators. `john` and others are SyMON 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, `nick` and `richie` are SyMON users who can perform general operations
Administrator Groups	All the users belonging to `esadm` and administrators can perform administrator operations. By default, they are `esadm` or `esdomadm`, as applicable
Operator Groups	All users belonging to `esops` can perform operator operations
General User Groups	`ANYGROUP` is a hypothetical group that can perform general operations. All SyMON 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	`espublic` is an SNMP community that can perform general operations using the SNMP protocol

▼ 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 258 for more information.

▼ To Grant a User esadm, esops, or esdomadm Privileges

1. **Become superuser.**
2. **Make sure that the user is a valid SyMON 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 SyMON Users

1. **Become superuser on the SyMON 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 SyMON groups.**

   After a user is deleted from the list of SyMON users, the user can no longer log into the SyMON server. Make sure to delete that user from all the ACLs.

Default Privileges

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Domains are manipulated by the Topology manager. This section illustrates the default privileges for the Topology manager and for other SyMON agents and modules.

Topology Manager Default Privileges

The default privileges for Topology manager (where domains are maintained) are listed in the following table.

TABLE 11-3 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 SyMON Component and Module Default Privileges

The default privileges for all other SyMON components and modules are listed in the following table.

TABLE 11-4 SyMON Component and Module Default Privileges

SyMON 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 SyMON is given general access to the objects*."

Overriding the Default Privileges

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

In SyMON 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
```

APPENDIX **A**

Getting Started With SyMON

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

TABLE A-1 is an example of how you can use the SyMON software. This table includes a summary of some typical tasks and the order in which they should be done. Each task is referenced to another 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 SyMON Software

Task	For More Information, Go to
Create a domain.	"To Create Domains" on page 40
Populate the domain by creating objects.	Chapter 4
Populate the domain with the Discovery manager.	Chapter 5
Familiarize yourself with the console window.	Chapter 6
Navigate through SyMON using the hierarchy (tree view).	"Hierarchy View" on page 94
Navigate through SyMON using the topology view.	"Topology View" on page 96
Open the Details window.	"To Start the Details Window" on page 111
Load other modules.	"To Load a Module" on page 184
Disable some modules	"To Disable a Module" on page 195
Unload some modules.	"To Unload a Module" on page 196
Monitor your system using the modules.	Appendix C

TABLE A-1 Example Use of SyMON Software *(Continued)*

Task	For More Information, Go to
Explore the different modules.	"Browser Tab" on page 114
Explore the process viewer.	"Processes Tab" on page 225
Explore the log viewer.	"Log View Tab" on page 232
Explore the physical view.	"Configuration Tab" on page 239
Explore the logical view.	"Configuration Tab" on page 239
View a property table.	"Monitoring Data Properties" on page 122
View a graph of a property table.	"To Graph A Monitored Data Property" on page 131
Create an alarm.	"To Create an Alarm" on page 150
Watch the alarm go up the hierarchy (tree) view.	"To Create an Alarm" on page 150
View the alarm through the Details window.	"Viewing Alarm Information" on page 207
View the alarm through the domain status summary.	"To Access Alarms from the Main Console Window" on page 210
Sort the alarms and become familiar with the Alarms window.	"Information on Alarms" on page 211
Acknowledge the alarm.	"Acknowledging and Deleting Alarms" on page 217
Delete the alarm.	"Acknowledging and Deleting Alarms" on page 217
Create alarm conditions.	"To Create an Alarm" on page 150
Set the refresh interval.	"Refresh Tab in the Attribute Editor" on page 154
Set security.	Chapter 11

APPENDIX **B**

Miscellaneous SyMON Procedures

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This appendix documents the following procedures:

- To Regenerate the Security Keys
- To Configure a Legacy SNMP Agent as a Subagent of a SyMON Agent
- To Determine if a Port Is Used
- To Reconfigure SyMON to Use Nondefault Port Addresses
- To Reconfigure SyMON SNMP Port Addresses
- To Reconfigure SyMON 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 SyMON Log Files
- To Use `ctail` to Read SyMON Log Files

Regenerating Security Keys

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON setup generates the security keys for SyMON components using the following default settings:

- Valid SyMON users are `espublic` and `esmaster`
- SyMON superuser is `esmaster`

Note – The SyMON software uses an 8-character string as a seed to make the generated key unique. During setup, you have the option to use the default SyMON 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 11.

SyMON setup does not create UNIX accounts for the special SyMON users `espublic` and `esmaster`. You should not need to log into the SyMON 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 normal 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 SyMON administrator. This user ID is added to the `esadm` and `esdomadm` groups as well as the `esusers` file. For more information on SyMON security and the SyMON superuser, see Chapter 11.

The security keys for the SyMON components need to be regenerated if one or more of the following is true:

- UDP ports of any of the SyMON agents are changed.
- Host names or IP addresses of the SyMON agent host change.

Note – Changing the host name or the IP address of the SyMON server is not supported.

▼ To Regenerate the Security Keys

Note – In these examples, *shared_secret* stands for a secret string of up to eight 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 SyMON 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** `root`**.**
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 SyMON server.**

   See “To Start the SyMON Software” on page 26.

Configuring a Legacy SNMP Agent as a Subagent of a SyMON Agent

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

A legacy SNMP agent is a SNMP agent that is not part of the SyMON agent framework. In real world situations, you may need to configure one or more legacy agents as subagents of a SyMON agent.

Any legacy SNMP agent can be configured as a subagent of a SyMON 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 SyMON Agent

1. **Log in as** `root`**.**
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** CODE EXAMPLE B-1**.**

CODE EXAMPLE B-1 Before Editing Registry file

```
# sa2 = {
#    type             = legacy
#    persist          = false
#    snmpPort         = "20001"
#    errorAction      = restart
#    startCommand     = "/usr/lib/snmp/mibiisa -p %port"
```

CODE EXAMPLE B-1 Before Editing Registry file *(Continued)*

```
#    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 looks like** CODE EXAMPLE B-2**:**

CODE EXAMPLE B-2 After Removing the Comment Symbol in the Registry file

```
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**:

   a. **Change** `sa2` **to the unique subagent name for the agent.**

   b. `type` **is** `legacy`**.**

   c. `persist` **is** `false` **if the subagent is stopped when the SyMON agent exits. If this value is** `true`**, then the SyMON agent does not stop the subagent when the SyMON agent exits.**

   d. `snmpPort` **is the UDP port number on which you want to run the subagent.**

   e. `errorAction` **can be** `restart`**,** `ignore`**, or** `kill`**. If the** `restart` **option is used, then the SyMON agent tries to restart if it encounters an error when communicating with the subagent. The other options result in the respective behaviors.**

f. `startCommand` **is the mandatory command to start the subagent. This command should contain** `%port`**, which is replaced by the value given in** `snmpPort`**.**

g. `stopCommand` **is the command to stop the process.** `%pid` **can be used to represent the process ID (PID) of the subagent process.**

h. `pollInterval` **defines the time (in seconds) in which the SyMON agent polls the subagent.**

i. `pollHoldoff` **is the time (in seconds) after which the first poll is done on the subagent after the latter is started by the SyMON agent.**

j. `oidTrees` **gives the space-separated list of SNMP OIDs managed by the subagent.**

k. `snmpVersion` **can take values** `SNMPv1` **and** `SNMPv2`**.**

l. `securityLevel` **can be** `priv`**,** `auth`**, or** `noauth`.

m. `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/symon/sbin/es-stop -a
# /opt/symon/sbin/es-start -a
```

Configuring SyMON to Use Different Port Addresses

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This section describes how to configure SyMON when there is potential conflict for port addresses.

▼ To Determine if a Port Is Used

- **To determine if a specific port number is used in your system, type:**

```
# /bin/netstat -an|grep port_number
```

The SyMON server communicates with the SyMON agents and the other server components (Topology manager, Configuration manager, Event manager, and Trap handler) using SNMP. By contrast, the SyMON server communicates with the SyMON consoles using remote method invocation (RMI).

In SyMON 2.0 software, several components require the use of network ports, as shown in the following table.

TABLE B-1 SyMON Default Port Addresses

SyMON Layer	SyMON Component	Default Port Number
Agent	SyMON agent	161
Server	SyMON Trap handler	162
Server	SyMON Event manager	163
Server	SyMON Topology manager	164
Server	SyMON Configuration manager	165
Server	SyMON server	2099

Note – The SNMP port definitions for SyMON components are found in two files: the `/var/opt/SUNWsymon/cfg/domain-config.x` file, which exists in every machine running any SyMON component, and the `/var/opt/SUNWsymon/cfg/server-config.x` file, which exists on machines that have the SyMON server component installed.

In the `domain-config.x` file, there is one configuration block for each of the SNMP-based SyMON agents. In each configuration block there is (at least) one line which defines the port address for the corresponding SyMON agent. The default port definition for the SyMON server is in the `server-config.x` file.

SyMON setup scripts automatically configure the SyMON 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 SyMON 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 SyMON RMI Port Address" on page 275 for more information.

▼ To Reconfigure SyMON SNMP Port Addresses

1. **Log in as** `root`**.**
2. **Edit the** `domain-config.x` **file and change the address port to an unused port.**

   This example illustrates changing the SyMON agent default port address from `161` to `1161`.

   Before:

```
agent = {
      snmpPort = 161
```

   After:

```
agent = {
      snmpPort = 1161
```

3. **Save the file.**

Note – Hosts with SyMON agents using port addresses other than 161 can be added to the 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 4. For more information on how hosts are discovered automatically, see Chapter 5). 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 SyMON agent installations.

▼ To Reconfigure SyMON RMI Port Address

1. **Log in as** `root`**.**
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 SyMON server default port address from `2099` to `1199`.

6. **Save the file.**

Monitoring Topology Manager and Event Manager

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

There are five components in the SyMON server layer:

- SyMON server
- Topology manager
- Trap handler
- Configuration manager
- Event manager

With the exception of the SyMON server, the other four components are SyMON agents loaded with specialized modules.

You may want to monitor the Topology manager, Trap handler, Configuration manager, and Event manager to determine their status. See the next section for more information.

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 SyMON agents) is defined by the Agent Statistics module. See “Agent Statistics Module” on page 328 for more information about this module.

This module includes features that guard against errors that may bring down the host. The default action is for the SyMON software to terminate the Topology manager process if predefined thresholds are exceeded.

▼ To Create a Server Component as a Monitored Object

1. **In the SyMON 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 54.

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 SyMON 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 SyMON server in the Hostname field.**

7. **Type the port number for the server component in the Port field (**FIGURE B-1**).**

   See TABLE B-1 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.

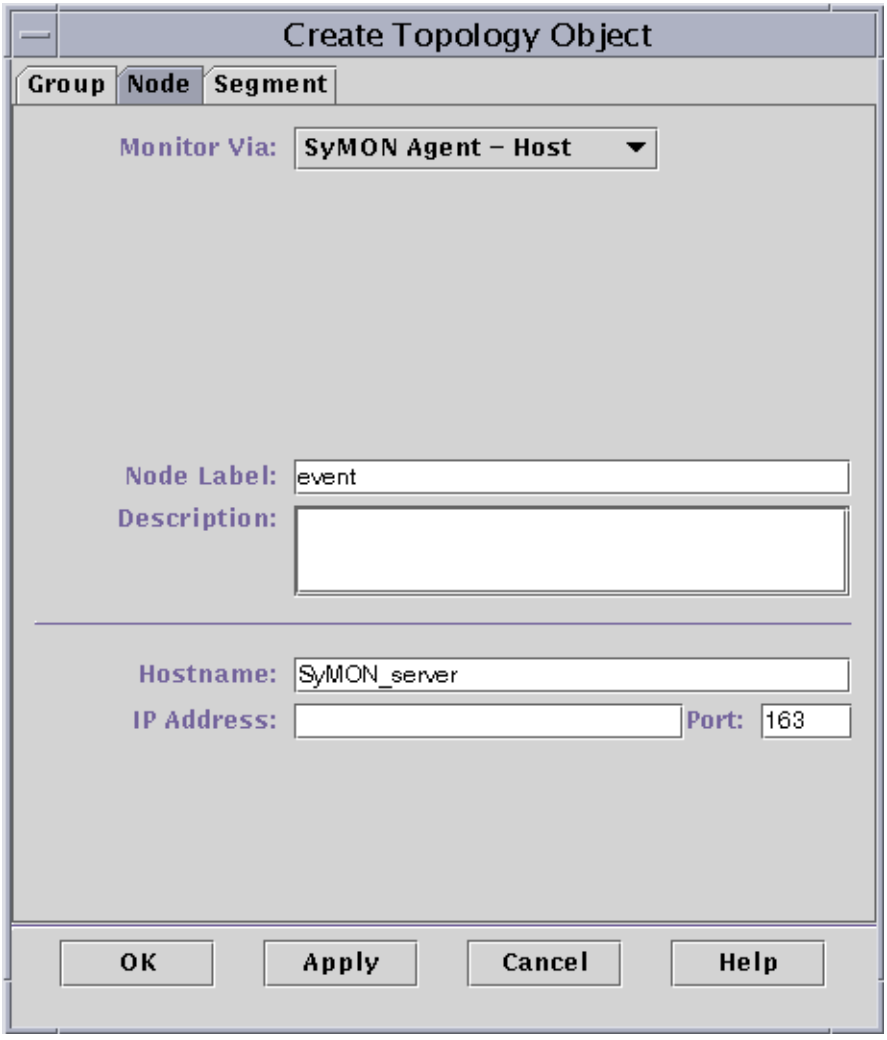

FIGURE B-1 Creating a Server Component as a Monitored Object

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 277.

2. **Open the Details window and proceed 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 SyMON 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 light-colored circle 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).

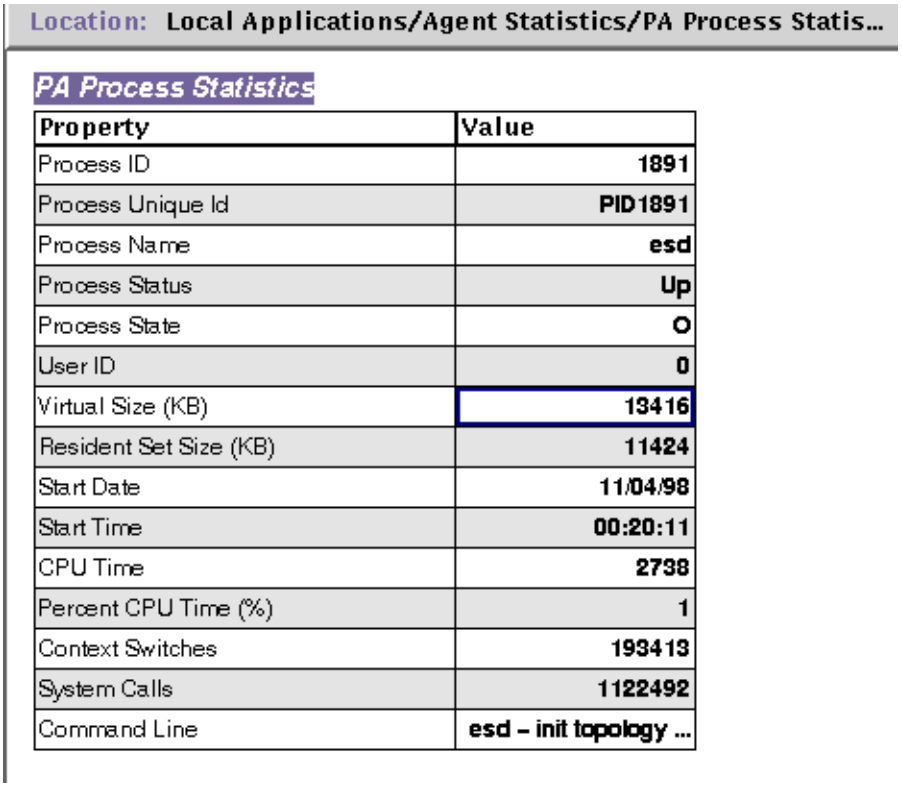

FIGURE B-2 PA Process Statistics Property Table

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.

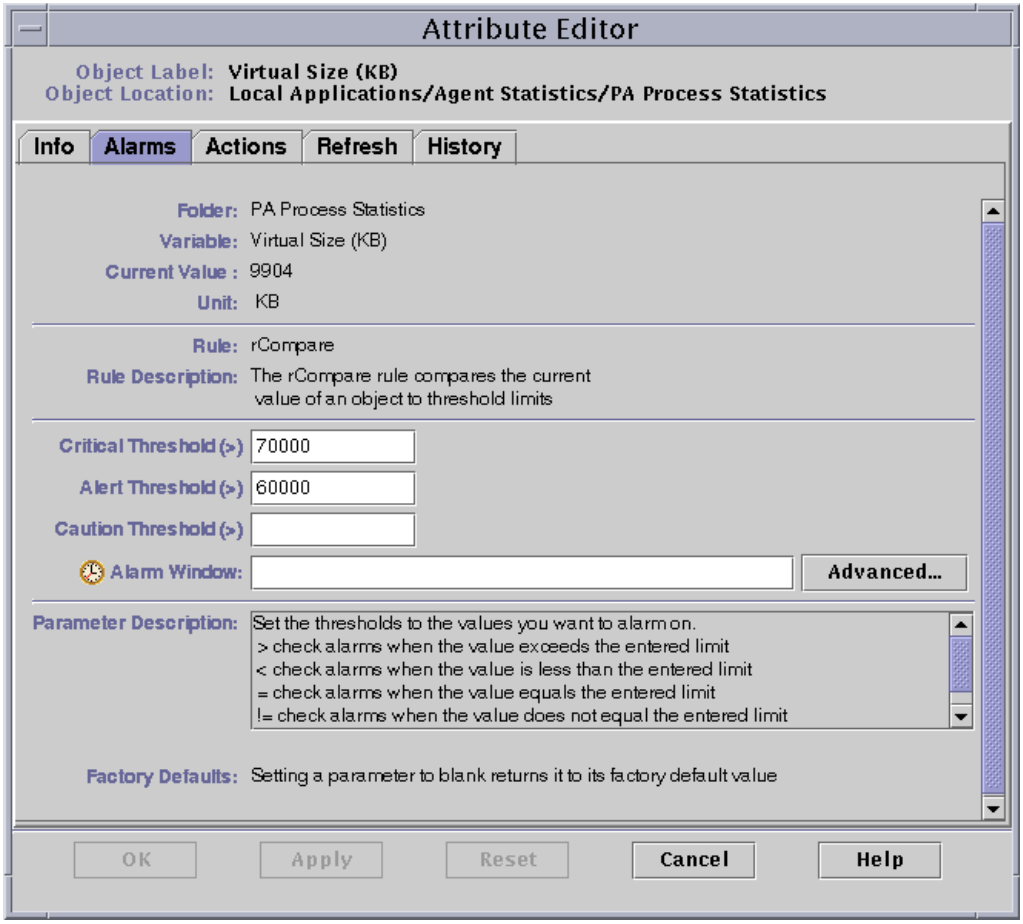

FIGURE B-3 Alarms Tab for the Virtual Size Property in the Topology Manager Object

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 which 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).

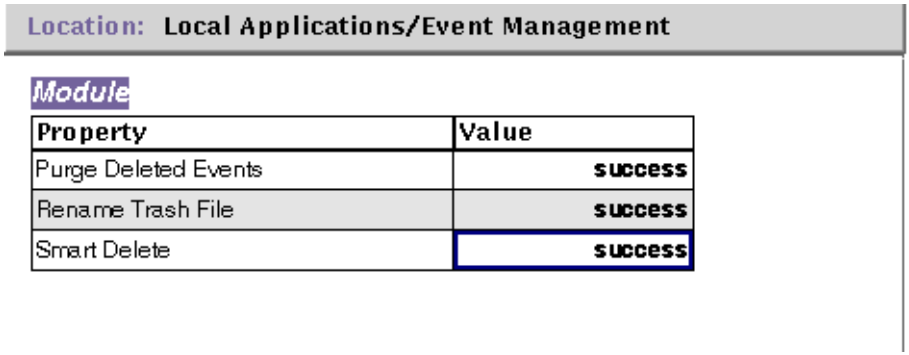

FIGURE B-4 Event Management Module Data Properties

Smart delete means that SyMON 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 277.

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 SyMON 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 193.
   - 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.

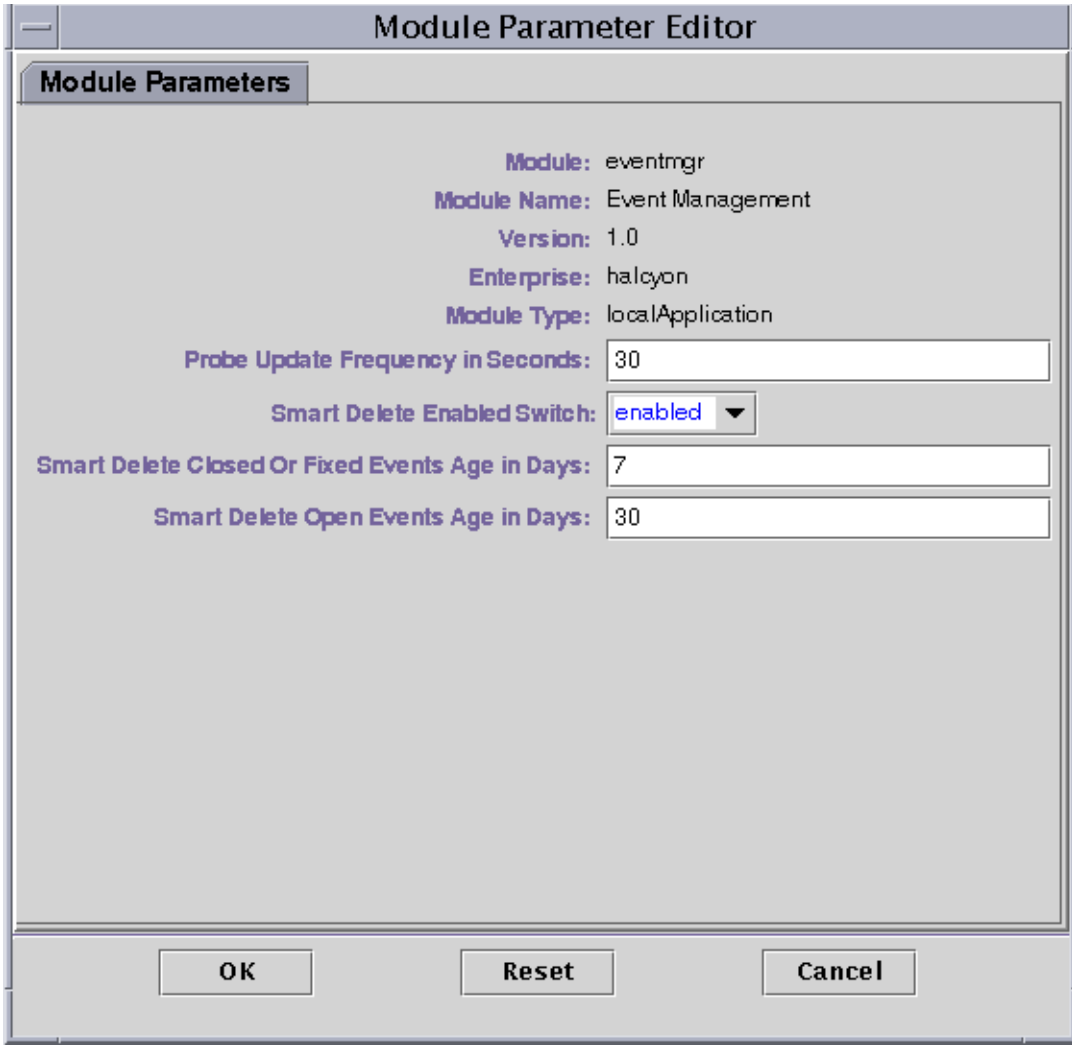

FIGURE B-5 Module Parameter Editor for the Event Management Module

Reading SyMON Log Files

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The SyMON 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 SyMON 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 SyMON circular log files.

▼ To Use `ccat` to Read SyMON 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 filename
```

▼ To Use `ctail` to Read SyMON 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] log_filename
```

APPENDIX **C**

SyMON Modules

The Sun Enterprise SyMON 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 SyMON modules described in Chapter 8 and presents them in their respective categories.

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This appendix describes the following modules. For more information on other modules that may be applicable to your particular system, go the SyMON web site: `http://www.sun.com/symon`.

- Hardware
  - Config-Reader Module
- Operating System
  - Directory Size Monitoring Module
  - File Monitoring Module
  - MIB-II Instrumentation Module
  - Kernel Reader Module
  - NFS Statistics Module
  - Solaris Process Details Module
- Local Applications
  - Agent Statistics Module
  - Data Logging Registry Module
  - Dynamic Reconfiguration Module
  - Health Monitor Module
  - MIB-II Instrumentation Module
  - Print Spooler Module
  - Process Monitoring Module
  - File Scanning (System Log) Module
- Remote Systems
  - HP JetDirect Module
  - MIB-II Proxy Monitoring Module

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 8.

Also, there are three 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 all modules 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.

TABLE C-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	X		
Config-Reader Module	X		
Data Logging Registry Module		X	
Directory Size Monitoring Module		X	
Dynamic Reconfiguration Module			
File Monitoring Module		X	X[1]
File Scanning (System Log) Module	X	X	X[2]
HP JetDirect Module		X	
Health Monitor Module			
Kernel Reader Module	X		
MIB-II Instrumentation Module	X		
MIB-II Proxy Monitoring Module		X	
NFS File Systems Module			
NFS Statistics Module			
Print Spooler Module		X	
Process Monitoring Module		X	X[3]
Solaris Process Details Module			

1. Each added row defines what file to monitor.
2. Each added row defines what pattern within the monitored file to match. The row needs to be added to the table, *Scan Table*.
3. Each row defines what pattern to match from all the processes that are running on the agent host.

Hardware

The following module, when loaded, is found under the hardware icon:

- Config-Reader Module (sun4u/sun4d)

This module obtains the physical view and logical view of your host. For more information on the physical and logical views, see Chapter 10.

Config-Reader Module

The Config-Reader (sun4u/sun4d) module monitors your hardware and alerts you whenever there is a problem. For example, this module checks for single in-line memory module (SIMM) errors, monitors board temperatures and power supply status, and so on.

This section includes the following:

- Config-Reader Top-Level Property Tables
- Config-Reader Managed Object Tables

Note – Currently, the Config-Reader module is supported on some Sun hardware platforms. For information on your particular system, go the SyMON web site at `http://www.sun.com/symon`.

Config-Reader Top-Level Property Tables

This section includes the top-level Config-Reader module property tables:

- Board Table
- CPU Unit Table
- SIMM Table
- Peripheral PS Table
- Power Supply Table
- FHC Table
- AC Table
- Fan Table
- Environment Table
- I/O Controllers Table
- I/O Devices Table
- Disk Devices Table
- Tape Devices Table

- Network Devices Table

Board Table

The following table provides a brief description of the properties for Boards:

TABLE C-2 Board Properties

Property	Description
Name	Name of the node
Board No	Number of the board
FRU	Field-replaceable unit
Hot Plugged	Whether it is hot-plugged
Hot Pluggable	Whether it is hot-pluggable
Memory size	Size of the memory
State	Status of the node
Temperature	Temperature of the board
Type	Whether it is in the CPU memory, Sbus, clock, and so on

CPU Unit Table

The following table provides a brief description of the properties for CPU Unit:

TABLE C-3 CPU Unit Properties

Property	Description
Name	Name of the node
Board No	Number of the board
Clock Frequency	Frequency of timer
Cpu Type	Type of system
Dcache Size	Size of Dchache in Kbytes
Ecache Size	Size of Ecache in Mbytes
Fru	Field-replaceable unit
Icache Size	Size of Ichache in Kbytes
Model	Name of model

TABLE C-3 CPU Unit Properties *(Continued)*

Property	Description
Processor ID	Identification number of the processor
Status	Online state of board
Unit	Identification of the unit

SIMM Table

The following table provides a brief description of the properties for SIMM:

TABLE C-4 SIMM Properties

Property	Description
Name	Name of the node
Board Reference Number	Number that references the board
Size	Size of SIMM in Mbytes
Slot	Number of the slot
Status	Status of the node

Peripheral PS Table

The following table provides a brief description of the properties for Peripheral PS:

TABLE C-5 Peripheral PS Properties

Property	Description
Name	Name of the node
Fru	Field replaceable unit
Hpu	Hot-pluggable unit
Status	Status of the node
Unit No.	Unit number

Power Supply Table

The following table provides a brief description of the properties for Power Supply:

TABLE C-6 Power Supply Properties

Property	Description
Name	Name of the node
Hpu	Hot pluggable unit
Status	Status of the node
Unit No.	Unit number

FHC Table

The following table provides a brief description of the properties for the FHC node, which is a node inside the I/O unit:

TABLE C-7 FHC Properties

Property	Description
Name	Name of the node
Board Num	Name of the board
Model	Model of the machine
Upa Mid	Number of the ultra port architecture unit
Version No.	Version number

AC Table

The following table provides a brief description of the properties for alternating current (AC):

TABLE C-8 AC Properties

Property	Description
Name	Name of the node
Bank0 Status	Bank0 status
Bank1 Status	Bank1 status

TABLE C-8 AC Properties *(Continued)*

Property	Description
Device Type	Device type of the node
Model	Model number of the node
Version No	Version number of the node

Fan Table

The following table provides a brief description of the properties for Rack Fan:

TABLE C-9 Fan Properties

Property	Description
Name	Name of the node, for example, `rack_fan`
Status	Status of the fan

Environment Table

The following table provides a brief description of the properties for Environment:

TABLE C-10 Environment Properties

Property	Description
Name	Name of the node
Reg	Registered property

I/O Controllers Table

The following table provides a brief description of the properties for I/O Controllers:

TABLE C-11 I/O Controllers Properties

Property	Description
Name	Node name
Board Number	Board number
Clock Frequency	Frequency of timer

TABLE C-11 I/O Controllers Properties *(Continued)*

Property	Description
Device Type	Device type of the node
Instance Number	Instance Number
Model	Model number
Reg	Reg property
UPA Mid	UPA M ID
UPA Portid	UPA Port ID
Version Number	Version number

I/O Devices Table

The following table provides a brief description of the properties for I/O Devices:

TABLE C-12 I/O Devices Properties

Property	Description
Name	Node name
Device Type	Device type of the node
Disk Count	Number of disks present on this device
Instance Number	Instance number
Model	Model number
Network Count	Number of network interface present on this device
Reg	Registered property
Tape Count	Number of tap device present on this device

Disk Devices Table

The following table provides a brief description of the properties for Disk Devices:

TABLE C-13 Disk Devices Properties

Property	Description
Name	Name of the node
Device Type	Device type
Disk Name	Name of the disk
Field Replaceable	Field replaceable unit
Instance Number	Instance number of the disk
Disk Target	Disk target number

Tape Devices Table

The following table provides a brief description of the properties for Tape Devices:

TABLE C-14 Tape Devices Properties

Property	Description
Name	Name of the node
Device Type	Device Type of the node
Field Replaceable	Field replaceable unit
Instance Number	Instance number of the tape
Model	Model number
Tape Name	Tape name
Status	Status of the tape device
Tape Target	Tape target number

Network Devices Table

The following table provides a brief description of the properties for Network Devices:

TABLE C-15 Network Devices Properties

Property	Description
Name	Name of the node
Device Type	Device type of this node
Ethernet Address	Ethernet address of the interface
Internet Address	Internet address of the interface
Interface Name	Name of the interface
Symbolic Name	Symbolic name of the interface

Config-Reader Managed Object Tables

This section includes the Config-Reader managed object property tables:

- System Table
- AC PS Table
- Hot-Plug Charges Table
- Auxiliary 5V Table
- Peripheral 5V, Peripheral 12V, System 3V, and System 5V Table
- Keyswitch Table
- Remote Console Table
- PFA Rules Table

The following table lists the properties monitored by this module:

TABLE C-16 Config-Reader Managed Objects

Property	Description
System	Machine name, operating environment, system clock frequency, architecture, host name, platform, time stamp, number of disks, processors, and tape devices, amount of memory
AC PS	Alternating current power supply
Hot Plug Charges	Output of system power supply that is used for hot-plugging and peripherals
Auxiliary 5v	Output of system power supply
Peripheral 5v	Output of system power supply
Peripheral 5v Precharge	Output of system power supply
Peripheral 12v	Output of system power supply
Peripheral 12v Precharge	Output of system power supply
System 3v	Output of system power supply
System 3v Precharge	Output of system power supply
System 5v	Output of system power supply
System 5v Precharge	Output of system power supply
Keyswitch	Position of the keyswitch (standby, on, diagnostics, or lock)
Rack Fan	Rack fan information
Remote Console	Remote console information
PFA Rules	PFA rule information

These managed objects and their properties are described in the following sections and tables.

System Table

The following table provides a brief description of the properties for System:

TABLE C-17 System Properties

Property	Description
Name	Name of the node
Operating System	Operating system running in the machine
Operating System Version	Operating system version
System Clock Frequency	Clock frequency
Architecture	Architecture of the machine
Host name Of The System	Host name of the system
Machine Name	Machine name
Serial Number	Serial number of the machine
Timestamp	Time stamp value
Raw Timestamp	Raw time stamp value
Total Disks	Total number of disks present in the system
Total Memory	Total memory present in the system
Total Processors	Total processors present in the system
Total Tape Devices	Total tape devices present in the system

AC PS Table

The following table provides a brief description of the properties for AC PS:

TABLE C-18 AC PS Properties

Property	Description
Name	Name of the node
Status	Status of the node

Hot-Plug Charges Table

The following table provides a brief description of the properties for Hot-Plug Charges:

TABLE C-19 Hot-Plug Properties

Property	Description
Name	Name of the node
Fru	Field-replaceable unit

Auxiliary 5V Table

The following table provides a brief description of the properties for Auxiliary 5V:

TABLE C-20 Auxiliary 5V Properties

Property	Description
Name	Name of the node
Fru	Field replaceable unit
Status	Status of the node

Peripheral 5V, Peripheral 12V, System 3V, and System 5V Table

The following table presents what you see when you load the following modules:

- Peripheral 5V
- Peripheral 5V Precharge
- Peripheral 12V
- Peripheral 12V Precharge
- System 3V
- System 3V Precharge
- System 5V
- System 5V Precharge

TABLE C-21 Common Peripheral and System Properties

Property	Description
Name	Name of the node
Fru	Field replaceable unit
Status	Status of the node

Keyswitch Table

The following table provides a brief description of the properties for Keyswitch:

TABLE C-22 Keyswitch Properties

Property	Description
Name	Name of the node

Remote Console Table

The following table provides a brief description of the properties for Remote Console:

TABLE C-23 Remote Console Properties

Property	Description
Name	Name of the node: for example, remote_console
Status	The status of the rack fan: enabled or disabled

PFA Rules Table

The following table provides a brief description of the properties for PFA Rules:

TABLE C-24 PFA Rules Properties

Property	Description
PFA SIMM Rule	SIMM rule value
PFA Disk Rule	Disk rule value
Smart/PFA Disk Rule	Smart PFA disk rule value

Operating System

The following modules, when loaded, are found under the operating system icon:

- Directory Size Monitoring Module
- File Monitoring Module
- File Scanning (System Log) Module
- Kernel Reader Module
- MIB-II Instrumentation Module
- NFS File Systems Module
- NFS Statistics Module
- Solaris Process Details Module

These modules monitor the operating system on your host.

Directory Size Monitoring Module

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.

Directory Monitoring Status Table

The following table provides a brief description of the properties for Directory Size Monitoring:

TABLE C-25 Directory Size Monitoring Properties

Property	Description
Directory Name	Name of the directory being monitored
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

This module enables you to monitor the files on a host. Any file or number of tiles may be isolated and monitored individually by loading multiple instances of the File Monitoring module.

File Monitoring Status Table

The following table lists the File Monitoring Status properties and their descriptions:

TABLE C-26 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

MIB-II Instrumentation Module

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 C-27 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 C-28 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 C-29 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 C-29 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 C-30 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 C-30 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 Routing Discards	Number of routing entries that were chosen to be discarded

IP Address Table

The following table provides a brief description of the properties for IP Addresses:

TABLE C-31 IP Addresses Properties

Property	Description
IP Address Table	IP Address Table
IPAT IP Address	IP Address to which this entry's addressing information pertains
IPAT IfIndex	Index in the interface table for the corresponding interface

TABLE C-31 IP Addresses Properties *(Continued)*

Property	Description
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 C-32 IP Route Properties

Property	Description
IP Route Table	Entity's IP routing table
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 C-33 IP NetToMedia Properties

Property	Description
IPN2M IfIndex	Index of the interface in the interface table on which this entry's equivalence is effective
IPN2M PhysAddress	Media-dependent physical address
IPN2M NetAddress	IP address corresponding to the physical address
IPN2M Type	Type of mapping

MIB-II ICMP Group Table

The following table provides a brief description of the properties for MIB-II ICMP Group:

TABLE C-34 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 Problmes	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 C-34 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 Quenchs	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 C-35 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 C-36 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 C-37 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 C-38 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

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:

- Disk Statistics Managed Objects Tables
- File System Usage Table
- System Load Statistics Table
- Filesystem Usage Table
- CPU Statistics Managed Object Tables
- Memory Usage Statistics Table
- 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 C-39 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

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 C-40 Disk Statistics Parameters

Property	Description
Disk Details	Details that pertain to the disk
Disk Service Time	Average time with relation to the processing of a transaction

Disk Details Table

The following table provides a brief description of the properties for Disk Details:

TABLE C-41 Disk Details Properties

Property	Description
Diskname	Name of the disk (sd0 and so on)
Diskalias	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)

TABLE C-41 Disk Details Properties *(Continued)*

Property	Description
Number Of Bytes Read	Number of bytes read
Number Of Bytes Written	Number of bytes written
Number Of Bytes Transferred (r+w)	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 C-42 Disk Service Time Properties

Property	Description
Diskname	Name of the disk (sd0 and so on)
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

Filesystem Usage Table

The following table provides a brief description of the properties for Filesystem Usage:

TABLE C-43 Filesystem Usage Properties

Property	Description
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 Solaris Process Details module is required for the process viewer.

User Statistics Table

The following table provides a brief description of the properties for Solaris Use Statistics:

TABLE C-44 Solaris 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

System Load Statistics Table

The following table provides a brief description of the properties for System Load Statistics:

TABLE C-45 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

CPU Statistics Managed Object Tables

The following tables provide a brief description of the properties for CPU Statistics managed objects:

- CPU Utilization Table
- CPU I/O Table
- CPU Interrupts Table
- CPU Systemcall 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 C-46 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

TABLE C-46 CPU Usage Properties

Property	Description
% 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

CPU I/O Table

The following table provides a brief description of the properties for CPU I/O:

TABLE C-47 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 C-48 CPU Interrupts Properties

Property	Description
CPU Number	CPU number
Context Switches	Number of context switches
Traps	Number of traps
Device Interrupts	Number of device interrupts
Interrupts As Threads	Number of interrupts as threads
Intrs Blkd / Prempted / Released	Number of interrupts blocked, pre-empted or released

CPU Systemcall Table

The following table provides a brief description of the properties for CPU Syscalls:

TABLE C-49 CPU Systemcall 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

TABLE C-49 CPU Systemcall Properties *(Continued)*

Property	Description
Indoes 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 C-50 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 C-51 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 C-52 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

TABLE C-52 CPU Pageinfo Properties *(Continued)*

Property	Description
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 C-53 CPU Faults Properties

Property	Description
CPU Number	CPU number
Minor Page Faults Via `hat_fault()`	Number of minor page faults through `hat_fault()`
Minor Page Faults Via `as_fault()`	Number of minor page faults through `as_fault()`
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
`as_fault()`s In Kernel `addr` Space	Number of in kernel `addr` space

Memory Usage Statistics Table

The following table provides a brief description of the properties for Memory Usage Statistics:

TABLE C-54 Memory Usage Statistics Properties

Property	Description
Physical Memory Available (MB)	Physical memory available in Mbytes
Physical Memory In Use (MB	Physical memory in use

TABLE C-54 Memory Usage Statistics Properties *(Continued)*

Property	Description
Percent Memory Used	Percentage of memory used
Physical Memory Free (MB)	Physical memory free
Percent Memory Free	Percentage of memory free

Swap Statistics Table

The following table provides a brief description of the properties for Swap Statistics:

TABLE C-55 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	Rule number 405

Streams Statistics Managed Objects Table

The following section provides the various Streams Statistics properties for the following managed objects:

- Streams Head Cache
- Queue Cache
- Streams Messages
- Linkinfo Cache
- Strevent Cache
- Synoq Cache
- Qband Cache

The following table briefly describes the managed objects:

TABLE C-56 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
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 C-57 Streams Statistics Table Properties

Property	Description
The Name Of The Cache	Name of the cache
Current Usage (total - avail)	Cache's current usage
Maximum Capacity	Maximum capacity of the cache
Cumulative Total Of Allocations	Number of total cache allocations
Number of Allocation Failures	Number of allocation failures
Percent Used	Percentage of cache used

Software Rules Table

The following table provides a brief description of the properties for Software Rules:

TABLE C-58 Software Rules Properties

Property	Description
Rule rknrd105	Software rule (refer to rule rknrd105 in Appendix D)
Rule rknrd106	Software rule (refer to rule rknrd106 in Appendix D)

NFS Statistics Module

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 C-59 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 C-60 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

Solaris Process Details Module

The Solaris Process Details module parameters are listed in the following table. This table is seen when you try to load the module.

TABLE C-61 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 C-62 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

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 C-63 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 Number	Entry number of the NFS filesystem

Local Applications

The following modules, when loaded, are found under the local applications icon:

- Agent Statistics Module
- Data Logging Registry Module
- Dynamic Reconfiguration Module
- File Scanning (System Log) Module
- Health Monitor Module

- Process Monitoring Module
- Print Spooler Module

Agent Statistics Module

This section presents the following information on Agent Statistics:

- Object Statistics Table
- Commands Executed Table
- Transactions Performed Table
- PA Process Statistics Table
- PA 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 C-64 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 C-65 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

TABLE C-65 Agent Statistics Section Properties *(Continued)*

Property	Description
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 C-66 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 on to the agent. The Status field displays the current status of the TOE and binary objects loaded into and used by the agent.

The following table provides a brief description of the properties for Object Statistics:

TABLE C-67 Object Statistics Properties

Property	Description
Total TOE Objects	Number of TOE objects loaded into the agent
Total Bobs	Number of binary object buffers used by the agent

Commands Executed Table

The following table provides a brief description of the properties for Commands Executed:

TABLE C-68 Executed Commands Properties

Property	Description
Total Commands	Total number of commands that have been executed by the agent
Rate (/sec)	Number of commands executed by the agent per second

Transactions Performed Table

The following table provides a brief description of the properties for Performed Transactions:

TABLE C-69 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

PA Process Statistics Table

SyMON software monitors the PA process statistics. The following table provides a brief description of the properties for PA Process Statistics:

TABLE C-70 PA 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
Elapsed Time	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

PA Total Process Statistics Table

SyMON software monitors the total PA process statistics.

The following table provides a brief description of the properties for Total PA Process Statistics:

TABLE C-71 Total PA 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

The SyMON 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 C-72 Data Logging Registry Properties

Property	Description
Log Destination State	State of the log file destination
Module Name	Module name for data value (data from this module is logged in the registry)
Instance Name	Name of the instance
Property Name	Property name for data value
Logging Interval	Logging interval for data value
File Logging	Name of the logged file
Data Cache	Cache data
Cache Size (samples)	Cache size samples

Dynamic Reconfiguration Module

SyMON monitors the dynamic reconfiguration (DR) properties.

Dynamic Reconfiguration Table

The following table provides a brief description of the properties for Dynamic Reconfiguration:

TABLE C-73 Dynamic Reconfiguration Properties

Property	Description
Unique Ap_Id	Unique attachment point ID
Receptacle	An attachment point defines two unique elements, which are distinct from the hardware resources that exist beyond the attachment point. One of the two elements of an attachment point is a receptacle. Configuration administration supports the physical insertion and removal operations as well as other configuration administration functions at an attachment point.
Occupant	The other element of the attachment is an occupant physical insertion or removal of hardware resources. This occurs at attachment points and results in a receptacle gaining or losing an occupant.
Condition	Condition or status
Information	Date of operation
Type	Type affected, for example, CPU, disk, memory, or other if known
Busy	State: whether busy or not
Phys_Id	Directory path or physical address

Health Monitor Module

The Health Monitor module monitors the health of your host. When alarm conditions occur, this module offers suggestions, if necessary, on how to improve the performance of the system.

For example, this module monitors the swap space that is available, reserved, allocated, and used. Sample alarm messages, from lowest to highest severity, include:

- No Worries: sufficient swap space available
- There is lots of unused swap space

- Not much swap left: perhaps add some more
- Swap space shortage: add some more now
- Dangerous swap space shortage: add more immediately

This section describes properties of the following Health Monitor module managed objects:

- Swap Table
- Kernel Contention Table
- NFS Table
- CPU Table
- Disk Table
- RAM Table
- Kernel Memory Table
- Directory Cache Table

The Health Monitor module tracks the system properties for the above as described in the following table:

TABLE C-74 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 IO information
RAM	Random Access Memory (RAM) information
Kernel Memory	Information on kernel memory
Directory Cache	Cache of the directory

Swap Table

The following table provides a brief description of the properties for Swap:

TABLE C-75 Swap Properties

Property	Description
Swap Available KB	Swap space value available
Swap Reserved KB	Swap space value reserved

TABLE C-75 Swap Properties

Property	Description
Swap Allocated KB	Swap space value allocated
Swap Used KB	Swap space value used
Swap Rule	Rule for swap

Kernel Contention Table

The following table provides a brief description of the properties for Kernel Contention (mutex):

TABLE C-76 Kernel Contention Properties

Property	Description
Spins On Mutexes	Spins on mutexes (lock not acquired on first try) - Sum for all CPUs
Number Of CPUs	Number of CPUs
Spins On Mutexes Rule	Spins on mutexes (lock not acquired on first try) - Sum for all CPUs

NFS Table

The following table provides a brief description of the properties for NFS client information:

TABLE C-77 NFS Client Information Properties

Property	Description
Calls	Total number of RPC calls received
Badcalls	Total number of calls rejected by the RPC layer
Retrans	Call retransmitted due to a timeout
Badxids	Reply from server not corresponding to any outside call
Timeouts	Call timed out while waiting for a reply from server
Newcreds	Number of times authentication information was refreshed
Badverfs	Calls failed due to a bad verifier in response
Timer	Call timed out while waiting for a reply from server

TABLE C-77 NFS Client Information Properties *(Continued)*

Property	Description
Nomem	Failure to allocate memory
Can't Send	Failure to send NFS/RPC rule
NFS/RPC Rule	Value of the NFS/RPC rule

CPU Table

The following table provides a brief description of the properties for the central processing unit (CPU):

TABLE C-78 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 runnable but swapped
CPU Power Rule	CPU power rule

Disk Table

The following table provides a brief description of the properties for Disk:

TABLE C-79 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
Percent Disk Busy	Percent of time disk is busy
Service Time (ms)	Average service time in milliseconds
Disk Rule	Disk rule

RAM Table

The following table provides a brief description of the properties for random access memory (RAM):

TABLE C-80 RAM Properties

Property	Description
Handspread	Value of hand spread (one of kernel parameters) pages
Scan rate	Page scan rate
Real Memory rule	Real memory rule

Kernel Memory Table

The following table provides a brief description of the properties for Kernel Memory:

TABLE C-81 Kernel Memory Properties

Property	Description
Total Kernel Allocation Fails	Value of kernel allocation failure
Physical Memory Free	Value of free physical memory
Kernel Memory Rule	Value of kernel memory rule

Directory Cache Table

The following table provides a brief description of the properties for Directory Cache:

TABLE C-82 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

Print Spooler Module

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 Table
- Printer Devices Table
- Printer Queues Table

The following table describes the print spooler managed objects:

TABLE C-83 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 Table

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 C-84 Printer LPsched Properties

Property	Description
LPsched state	Current status of the pinter.

Printer Devices Table

The Printer Devices table lists the network printers installed on a network printer server(s). The instance name or alias of the printer is displayed in the Name field followed by the name of the host on which it is installed, displayed in the Machine 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 following table provides a brief description of the properties for Printer Devices:

TABLE C-85 Printer Devices Properties

Property	Description
Printer name	Name of the printer device
Host name	Name of the host to which the device is attached
Device name	Alphanumeric device name

Printer Queues Table

The Print Queues table lists the print queues on the local host and displays the status of each queue.The following table provides a brief description of the properties for Printer Queues:

TABLE C-86 Printer Queues Properties

Property	Description
Queue Name	Name of the printer
Queue State	Current status of the printer queue
Total Number of Queue Jobs	Total number of jobs in the queue
Total Number of Current Printer Jobs	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

The following section describes the Process Monitoring module parameters and their property descriptions.

Process Statistics Table

The following table provides a brief description of the properties for Process Statistics:

TABLE C-87 Process Statistics Properties

Property	Description
Entry Name	Name of the entry
Name Pattern	Name regular expression pattern
Argv Pattern	Argv (argument to the program) regular expression pattern
User Specification	User specification
Entry Description	Description of the entry
Monitoring State	Monitoring state of the entry
Process Command	Process command name
% CPU Usage	Percentage CPU used by the processes
Virtual Size	Total size of the processes
Resident Set Size	Resident size of the processes
Process Count	Number of the processes

File Scanning (System Log) Module

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.

The File Scanning module has the following managed objects:

- File ID Table
- File Statistics Table
- Scan Table

The following table provides a brief description of the properties for File Scanning:

TABLE C-88 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 C-89 File ID Properties

Property	Description
Filename	Full pathname 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 C-90 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 C-91 Scan Table Properties

Property	Description
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
Regexp Pattern	Regular expression pattern to be used when scanning the file for entries

TABLE C-91 Scan Table Properties *(Continued)*

Property	Description
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 pattern matches found during the file scan
Total Matches	Total number of matches in current file

Remote Systems

SyMON 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
- HP JetDirect Module

MIB-II Proxy Monitoring Module

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 Section “MIB-II Instrumentation Module” on page C-302, 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

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 C-92 General Printer Status Properties

Property	Description
Printer Display	Printer's status

APPENDIX **D**

SyMON Rules

This appendix lists the Sun Enterprise SyMON rules for the following modules:

- Config-Reader
- Kernel Reader
- Health Monitor

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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 SyMON 1.*x* rules must be ported to the new environment before the rules can be used in SyMON 2.0.

Config-Reader

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

This section includes Config-Reader rules with detailed explanation of those rules that have critical alarms.

TABLE D-1 Config-Reader Rules

Rule ID	Description	Type of Alarm
rcr4u201	Precharge status rule This alarm is generated when the status of the Precharge voltages is not “OK.”	Critical
rcr4u203	Power supply status rule This alarm is generated when the status of the Power supply is not “OK.”	Critical
rcr4u205	Temperature rule This rule is triggered when the temperature on the system boards go beyond a threshold value. Depending on the board temperature, a critical or an alert alarm is generated.	Critical, Alert
rcr4u207	CPU unit status rule When the CPUs are not “online” this rule is generated.	Critical
rcr4u209	SIMM error rule	Alert alarm that is closed immediately
rcr4u210	Hardware error	Alert alarm that is closed immediately
rcr4u211	Fatal error	Alert alarm that is closed immediately
rcr4u212	CPU detects ECC error on SIMM	Alert alarm that is closed immediately
rcr4u213	Hot-plug removed	Alert alarm that is closed immediately
rcr4u214	Power failing	Alert alarm that is closed immediately
rcr4u215	Hot-plugged	Alert alarm that is closed immediately

TABLE D-1 Config-Reader Rules *(Continued)*

Rule ID	Description	Type of Alarm
rcr4u216	CPU panic	Alert alarm that is closed immediately
rcr4u217	SCSI tape error	Alert alarm that is closed immediately
rcr4u218	AC status rule This rule is generated when the AC status is not “OK.”	Critical
rcr4u219	Disk removed	Alert alarm that is closed immediately
rcr4u220	Disk inserted	Alert alarm that is closed immediately
rcr4u221	Redundant power	Alert alarm that is closed immediately
rcr4u222	Testing SunVTS messages rcr4u222 log	Alert alarm that is closed immediately
rcr4u223	Testing SunVTS messages rcr4u223 log	Alert alarm that is closed immediately
rcr4u224	Hot-plug installed	Alert alarm that is closed immediately
rcr4u225	ST status rule This rule is generated when the status of the tape drive is not “OK.”	Critical
rpfa300	Complex rule looks for SIMM memory errors in `syslog` and makes a predictive failure alarm entry for each error.	Critical
rpfa301	Complex rule looks for disk soft errors in `syslog` and makes a predictive failure alarm entry for each error.	Critical
rpfa302	Complex rule looks for disk soft errors in `syslog` that are spilled out by a SMART drive.	Critical

Kernel Reader

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

TABLE D-2 Kernel Reader Simple Rules

Property	Description
kpctused	Percent of disk space used
ipctused	Percent of inodes used

The following table lists the Kernel Reader complex rules.

TABLE D-3 Kernel Reader Complex Rules

Rule ID	Description	Type of Alarm
rhltm000	This rule checks whether there is enough swap space.	Critical
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
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
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
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
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

TABLE D-3 Kernel Reader Complex Rules *(Continued)*

Rule ID	Description	Type of Alarm
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
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
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
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
rknrd104	This rule covers a transitory event and generates an alert alarm if average CPU load is over 95% and the system run queue length is over 4 times the number of CPUs on the system. Alert alarm stays on until either the CPU load is less than 90%, or the system run queue length is less than 2 times the number of CPUs on the system.	Alert
rknrd105	File System Full error. This rule looks for a file system full error message in the syslog (`/var/adm/message`).	Alert
rknrd106	No swap space error. This rule looks for a no swap space error message in the `syslog (/var/adm/message).`	Alert
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 xxx

TABLE D-3 Kernel Reader Complex Rules *(Continued)*

Rule ID	Description	Type of Alarm
rknrd403	Test for Meta CPU events.	Informational
rknrd404	Test for Meta Disk events.	Informational
rknrd405	Test for Meta Swap events.	Informational

Health Monitor

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

The following table lists the Health Monitor complex rules.

TABLE D-4 Health Monitor Complex Rules

Rule ID	Description	Type of Alarm
rhltm000	Virtual Memory - Swap Space - Rule	Critical, Alert, Caution
rhltm001	CPU Mutex Rule	Critical, Alert, Caution
rhltm002	NFS RPC Client Rule	Critical, Alert, Caution
rhltm003	CPU Power Rule	Critical, Alert, Caution
rhltm004	Disk I/O Rule	Critical, Alert, Caution
rhltm005	RAM rule based on residency time for an unreferenced page	Critical, Alert, Caution
rhltm006	Kernel memory allocation rule	Critical, Alert, Caution
rhltm007	Directory Name Lookup Cache Rule	Critical, Alert, Caution

APPENDIX **E**

SyMON Discovery Principles

This appendix describes IP Routing.

IP Routing

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

Overview of IP Addressing

Internet protocol (IP) addresses are 32 bits long. Thus, there is a total possibility of approximately 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 domains. This need led to the definition of name 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 129.123.456.0 would own the 2^{8} addresses between 129.123.456.0 and 129.123.456.255.

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, we have 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, we have a machine with an IP address of 129.123.456.95 that is sending an e-mail to another machine whose IP address is 129.123.456.100. By ANDing both

IP addresses with a netmask (255.255.255.00), the result is 129.123.456.0 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 e-mail to external subnets.

On the other hand, if the destination address is 129.123.567.100, then the resulting subnet address is 129.123.567.0. The router forwards the e-mail to the external subnet (129.123.567.0).

Note – Although some of these examples apply to Ethernet links, the principles still apply regardless of the type of network.

Glossary

Note – The Sun Enterprise SyMON software version 2.0 is referred to as SyMON throughout this document.

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 SyMON agent. The SyMON agent passes information about the abnormal event to the SyMON server. The server passes this information on to the user as an alarm, when the abnormal event matches a predefined alarm threshold.

alarm acknowledgment SyMON 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 SyMON 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.

Console window A graphical user interface component of SyMON software based on Java technology that is used to view monitored hosts (and managed objects) information and status and to interact with SyMON agents.

Discovery A SyMON 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 SyMON server.

domain An arbitrary collection of hosts and networks that are monitored by SyMON software as a single hierarchal entity. Users may choose to divide their enterprise into several domains, each to be managed by different users.

dynamic loadable modules A SyMON agent module that can be loaded or unloaded at run time, enabling monitored properties to be displayed on the SyMON 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. SyMON 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 SyMON agent to identify uniquely a particular module or a row within a module.

manage In SyMON 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 SyMON 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 SyMON 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 workstationor server.

object A particular resource (computer host, network interface, software process, and so on) which is subject to monitoring or management by SyMON 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.

remote server context A remote server context refers to a collection of SyMON agents and a particular server layer with which the remote SyMON agents are associated.

request caching The SyMON 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.

seed The SNMPv2u password for the SyMON user group called `esmaster`. This is not necessarily a UNIX password.

server The collection of programs and processes (SNMP-based trap, event, topology, configuration, and Java server) that work on behalf of a SyMON user to help manage a particular set of networks, hosts and devices. Usually sends requests to SyMON agents, accepts collected data from them, and passes the data to the SyMON console 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.

SyMON superuser SyMON 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.

SyMON user SyMON users are the members of the `symon` group in the `/etc/group` 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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