PRIMECLUSTER™

SNMP
Reference Manual for Solaris

Edition May 2002
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1 Preface

This manual is for the PRIMECLUSTER SNMP product. This manual is intended for developers, system administrators, and support personnel.

1.1 Documentation

The documentation listed in this section contains information relevant to PRIMECLUSTER and can be ordered through your Fujitsu Siemens sales representative.

In addition to this manual, the following manuals are also available for PRIMECLUSTER:

- Installation Guide—Provides instructions for installing PRIMECLUSTER.
- Cluster Foundation Configuration and Administration—Provides instructions for configuring and administering the PRIMECLUSTER Cluster Foundation.
- RMS Configuration and Administration—Provides instructions for writing configuration files and scripts, writing custom (generic) files for special resources, and administering RMS.
- Scalable Internet Services Configuration and Administration—Provides information on configuring and administering SIS.
- Release Notice—Available on the PRIMECLUSTER CD-ROM by means of start.html. This document contains the latest information at the time of the product release.
- readme for Emanate—Available on the Control CD-ROM, which contains the Emanate product. This document contains the latest information at the time of release.
1.2  Conventions

To standardize the presentation of material, this manual uses a number of notational, typographical, and syntactical conventions.

1.2.1  Notation

This manual uses the following notational conventions.

1.2.1.1  Prompts

Command line examples that require system administrator (or root) rights to execute are preceded by the system administrator prompt, the hash sign (#). Entries that do not require system administrator rights are preceded by a dollar sign ($).

1.2.1.2  Manual page section numbers

References to the operating system commands are followed by their manual page section numbers in parentheses — for example, cp(1).

1.2.1.3  The keyboard

Keystrokes that represent nonprintable characters are displayed as key icons such as [Enter] or [F1]. For example, [Enter] means press the key labeled Enter; [Ctrl-b] means hold down the key labeled Ctrl or Control and then press the B key.

1.2.1.4  Typefaces

The following typefaces highlight specific elements in this manual.

<table>
<thead>
<tr>
<th>Typeface</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant Width</td>
<td>Computer output and program listings; commands, file names, manual page names and other literal programming elements in the main body of text.</td>
</tr>
<tr>
<td>Italic</td>
<td>Variables that you must replace with an actual value.</td>
</tr>
<tr>
<td>Bold</td>
<td>Items in a command line that you must type exactly as shown.</td>
</tr>
</tbody>
</table>
Typeface conventions are shown in the following examples.

1.2.1.5 Example 1

Several entries from an /etc/passwd file are shown below:

root:x:0:1:0000-Admin(0000):/
sysadm:x:0:0:System Admin./usr/admin:/usr/sbin/sysadm
setup:x:0:0:System Setup:/usr/admin:/usr/sbin/setup
daemon:x:1:1:0000-Admin(0000):/

1.2.1.6 Example 2

To use the cat(1) command to display the contents of a file, enter the following command line:

$cat file

1.2.2 Command syntax

The command syntax observes the following conventions.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Name</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[]</td>
<td>Brackets</td>
<td>Enclose an optional item.</td>
</tr>
<tr>
<td>{}</td>
<td>Braces</td>
<td>Enclose two or more items of which only one is used. The items are separated from each other by a vertical bar (</td>
</tr>
<tr>
<td></td>
<td>Vertical bar</td>
<td>When enclosed in braces, it separates items of which only one is used. When not enclosed in braces, it is a literal element indicating that the output of one program is piped to the input of another.</td>
</tr>
<tr>
<td>()</td>
<td>Parentheses</td>
<td>Enclose items that must be grouped together when repeated.</td>
</tr>
<tr>
<td>...</td>
<td>Ellipsis</td>
<td>Signifies an item that may be repeated. If a group of items can be repeated, the group is enclosed in parentheses.</td>
</tr>
</tbody>
</table>
1.3  **Important**

Material of particular interest is preceded by one of the following symbols in this manual:

- **i**  Contains important information about the subject at hand.

- **Caution**  Indicates a situation that can cause harm to data.
2 Overview

The PRIMECLUSTER SNMP product collects and reports information and statistics on the status and configuration of PRIMECLUSTER products. The information can be queried by any SNMP management station. The PRIMECLUSTER products that currently display information by means of SNMP are as follows:

- Cluster Foundation (CF)
- Scalable Internet Services (SIS)
- Reliant Monitor Services (RMS)

The PRIMECLUSTER SNMP product consists primarily of MIBs (Management Information Bases) and subagents. MIBs are files that define what information will be provided via SNMP. Subagents are programs that perform the following tasks:

- Query PRIMECLUSTER components
- Use the queried information to fill in the MIB structures
- Allow an SNMP management station to display the information

Normally a subagent collects information for one MIB; however, the fscHaCl MIB has some of its information collected by the RMS subagent and some collected by the ClusterView (CV) subagent.
3 Subagents

Subagents are processes that query and display information. Subagents usually collect information for one MIB. A notable exception is the fscHaCl MIB (described below), which has some of its information collected by the RMS subagent and some of its information collected by the ClusterView (CV) subagent. The subagents that come with the PRIMECLUSTER SNMP product are as follows:

- ClusterView subagent (cvagt)
- Cluster Foundation (CF) subagent (cfagt)
- Scalable Internet Services (SIS) subagent (sisagt)
- Reliant Monitor Services (RMS) subagent (rmsagt)

For diagnostic purposes, the subagents can be started with the following parameters:

-D Turns on debug mode (written to the log file).
-T Turns on trap debug mode (written to the log file).
-l logfile Specifies an alternate path and filename of the log file. By default the log file has the following path name:
/var/opt/SMAW/SMAWrcmib/log/subagent_name.log

Unexpected errors are written to the log file.

3.1 ClusterView subagent

The CV MIB and subagent provide information about the configuration and status of cluster-wide entities. This subagent runs on all nodes in the cluster. The information from the subagent on each node is essentially identical. The CV subagent generates an SNMP trap when a state change is detected on any node.
3.2 Cluster Foundation subagent

The CF MIB and subagent display detailed information about the CF status on each node in the cluster. This subagent displays the CF configuration, status, and statistical information about a node’s routes, interconnect devices, and message passing. SNMP traps are generated when a route or interconnect device has a state change (when a route goes down).

3.3 Scalable Internet Services subagent

The SIS MIB and subagent display information about the SIS configuration and status. This subagent generates an SNMP trap when a change in state of a SIS service is detected. The SIS subagent is only available on 64-bit platforms.

3.4 Reliant Monitor Services subagent

The RMS MIB and subagent display detailed information about the RMS configuration that is running on a system. This MIB and subagent provides details about the high-availability (HA) applications that are running under the control of RMS. An SNMP trap is generated when an HA application has a state change.
4 Installation

4.1 Prerequisites

Before running the SNMP product, ensure that PRIMECLUSTER is installed and running. Refer to the PRIMECLUSTER Installation Guide for more information on installing PRIMECLUSTER.

The subagents are built using the Emanate subagent development toolkit from SNMP Research; therefore, you need to run the Emanate master agent on each node in the cluster. The Emanate master SNMP agent can be found on the CD-SYS-SPARC CD-ROM. Refer to the Emanate master agent readme for more information.

The following packages must be installed:

- SMAWadapt—Starts Solaris SNMP on an alternate port
- SMAWsnmpm—Emanate master agent
- SMAWmngrs—Emanate tools
- SMAWcf—Cluster Foundation

4.2 Installing

The PRIMECLUSTER SNMP MIBs and subagents are shipped as part of the package file SMAWrcmib. To install the product, execute pkgadd on the SMAWrcmib package file.

The SMAWrcmib package is installed into the /opt/SMAW/SMAWrcmib directory. The default location for log files produced by each subagent is /var/opt/SMAW/SMAWrcmib/log.

4.2.1 Scripts

The script /etc/init.d/S99rcmib is used to start or stop the subagents. This script is linked to appropriate /etc/rc* directories so that the subagents are started or stopped when the system is booted or shut down. To manually start
(load) or stop (unload) the subagents, the script 
/opt/SMAW/SMAWrcmib/dep/S99rcmib can be executed with either the load or unload argument.

4.2.2 .dat files

When the PRIMECLUSTER SNMP package is installed, the subagent info.dat (for example, cvinfo.dat) files in /opt/SMAW/SMAWrcmib/conf are merged into the /etc/snmp/mgr/snmpinfo.dat file. The snmpinfo.dat is used by the Emanate master agent to cross-reference a MIB variable to its unique SNMP OID. The merging of these .dat files is done automatically when the package is installed. If for some reason the /etc/snmp/mgr/snmpinfo.dat file is destroyed, these files will need to be merged again (see the Emanate utility mergeinfo).
5 Examples

The following is an example snmp walk of the cvNodeTable of the CV MIB:

% getmany -v1 <host> public cvNodeTable
cvNodeName.1 = maxwell
cvNodeName.2 = newton
cvPersistentNodeName.1 = maxwell
cvPersistentNodeName.2 = newton
cvNodeState.1 = UP
cvNodeState.2 = UP
cvNodeOS.1 = Solaris
cvNodeOS.2 = Solaris
cvNodeCPU.1 = Sparc
cvNodeCPU.2 = Sparc

The following is an example snmp get of the cvClusterName variable of the CV MIB:

% getone -v1 $TARGET_HOST public cvClusterName.0
cvClusterName.0 = SNMP_TEST
6 MIBs

The following figures show the hierarchical details of the SNMP MIBs.

Figure 1: CV MIB hierarchical tree
Figure 2: CF MIB hierarchical tree
Figure 3: SIS MIB hierarchical tree
Figure 4: RMS MIB hierarchical tree
Figure 5: HA Cluster MIB Hierarchical tree
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