



Third Party System Management Integration Software

Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager

Servers supported:

- Sun Fire x64 Servers
- Sun SPARC Enterprise Servers

A complete, current list of supported Sun servers, service processors, and service processor firmware is available at the following web site:

<http://www.sun.com/systemmanagement/tools.jsp>

Please consult this web site before installing or configuring the Sun Integration Pack.

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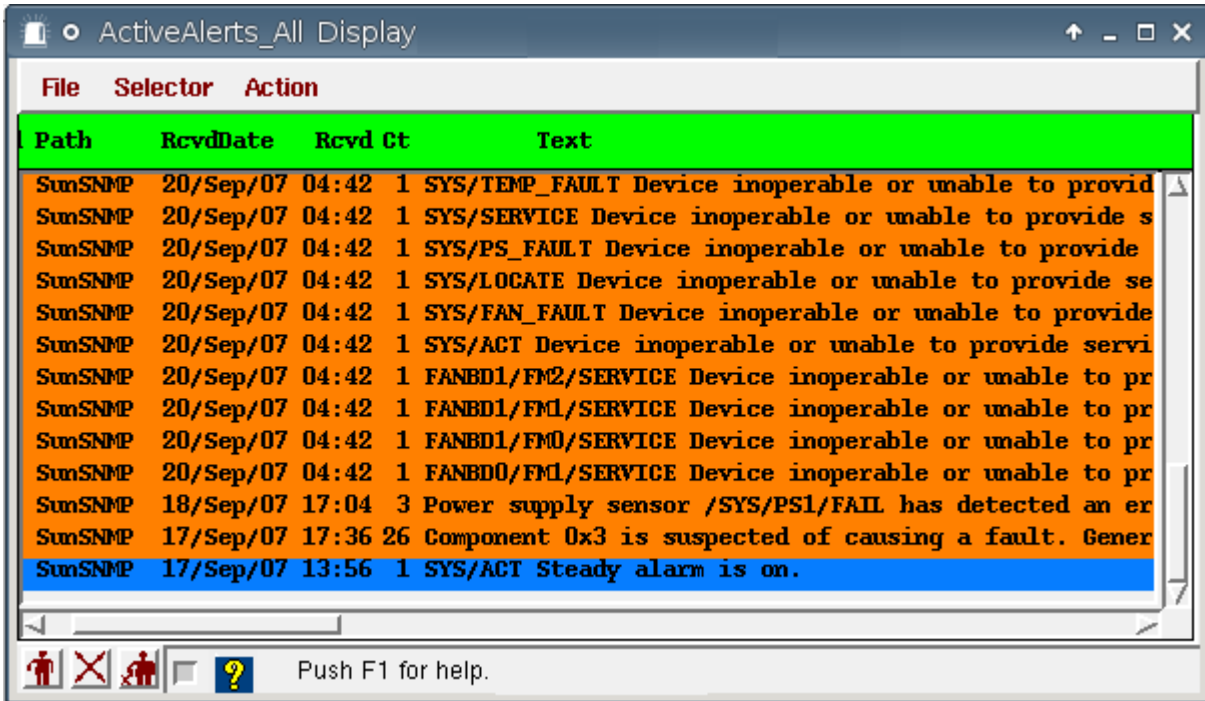
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Introduction

BMC® PATROL® (hereafter BMC PEM) is an enterprise management application that uses industry-standard protocols such as the Simple Network Management Protocol (SNMP) to discover, classify, monitor, and manage servers. Once you have installed and configured the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager (hereafter Sun Integration Pack), you will be able to take advantage of the following Sun-specific features in BMC PEM.

- Sun-specific SNMP traps displayed in the BMC PEM Console Active Alerts Display (AAD)
- No dependencies on other BMC PEM solutions
- SNMP trap data enrichment using SNMP GET calls to managed nodes
- SNMP trap data from the SUN-HW-TRAP-MIB reported through the Integrated Lights Out Manager (ILOM) 2.0 service processor (for x64/ILOM and SPARC/ILOM servers)
- Updated Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems (hereafter Hardware Management Agent) provides support for additional varbinds (variable binding pairs consisting of OIDs and values).
- A new SNMP Heartbeat Module that periodically checks all the nodes listed in the `nodes.conf` configuration file. If a monitored node fails to respond, the heartbeat module generates an alert.
- Windows-based browsing of Sun-specific traps via the BMC PATROL Explorer



The integration discussed in this paper has been tested with BMC PEM 4.4.0 with supported Sun servers.

Categories of Sun Servers

The Sun Integration Pack is one of several Sun ISV System Management solutions that provide Sun-specific resources for monitoring Sun servers in enterprise or workgroup data centers.

All the Sun servers supported by these integration packs fall into four categories differentiated by architecture (x64 or SPARC) and by service processor type (ALOM, ILOM, or Embedded LOM). The integration pack that you are installing or the configuration that you are implementing may not support all categories of servers, so consult the following website to verify that a particular server in one of these categories is supported by Sun Integration Pack:

<http://www.sun.com/systemmanagement/tools.jsp>

Category	Supported	Description	Examples
x64 Servers with ILOM	Yes	x64 servers and blade server modules with the Integrated Lights Out Manager (ILOM) service processor Hereafter referenced as x64/ILOM servers. These servers are monitored at the service processor level.	Sun Fire X4100 M2 Sun Fire X4600 M2 Sun Blade X6220 Server Module Sun Blade X8440 Server Module

Category	Supported	Description	Examples
SPARC Servers with ILOM	Yes	SPARC Solaris servers and blade server modules with the Integrated Lights Out Manager (ILOM) service processor Hereafter referenced as SPARC/ILOM servers. These servers can be monitored at either the service processor level or at the operating system level via the Sun SNMP Management Agent for Sun Fire and Netra Systems.	Sun SPARC Enterprise T5120 Sun SPARC Enterprise T5220 Sun Blade T6320 Server Module
x64 Servers with Embedded LOM	No	x64 servers and blade server modules with the Embedded Lights Out Manager (Embedded LOM) service processor Hereafter referenced as x64/EmbeddedLOM servers. These servers are monitored at the service processor level.	Sun Fire X2100 M2 Sun Fire X2200 M2 Sun Fire X4150 Sun Fire X4450 Sun Blade X6250 Server Module
SPARC Servers with ALOM	Yes	SPARC Solaris servers with the Advanced Lights Out Manager (ALOM) service processor Hereafter referenced as SPARC/ALOM servers. These servers are monitored at the operating system level via the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems.	Sun SPARC Enterprise T1000 Sun SPARC Enterprise T2000 Sun Blade T6300 Server Module

The matrix of servers and service processors supported by Sun integration packs is expanding dynamically. A complete, current list of supported Sun servers, service processors, and service processor firmware is available at the following web site:

<http://www.sun.com/systemmanagement/tools.jsp>

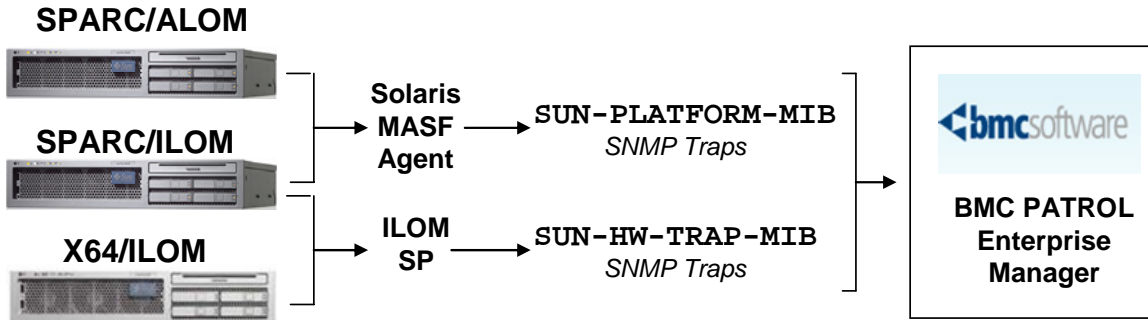
Please consult this web site before performing installation and/or configuration of the Sun Integration Pack.

Levels of Integration with BMC PEM

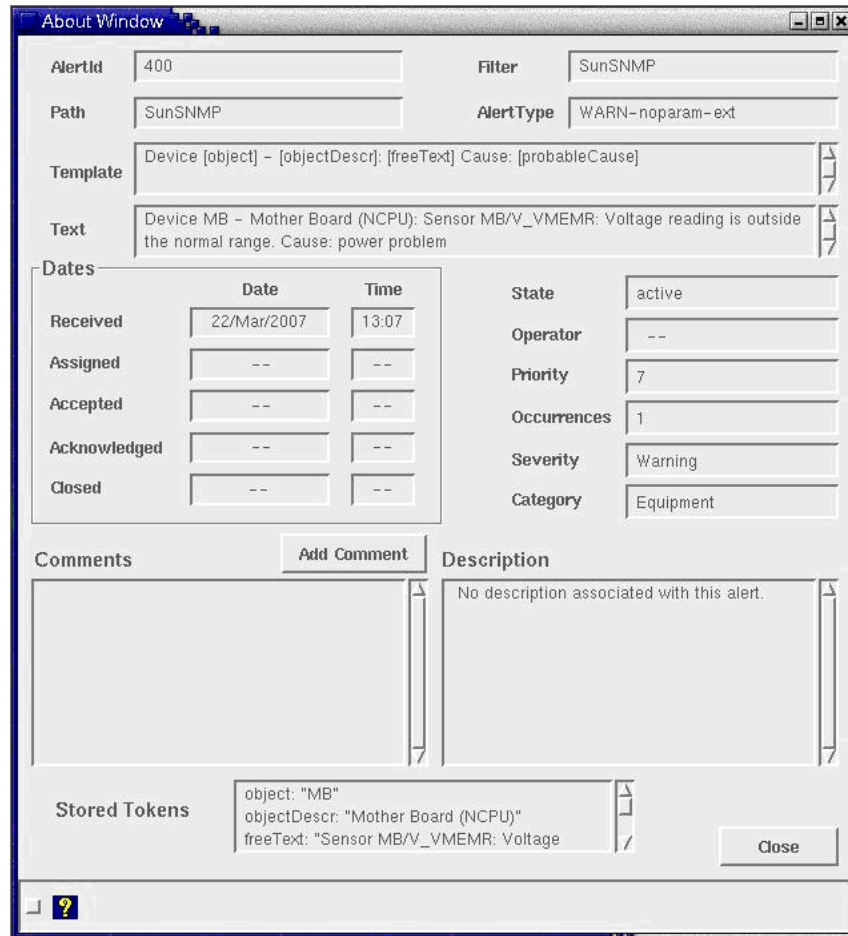
The Sun Integration Pack integrates supported Sun SPARC Enterprise servers with BMC PEM at the SNMP level through the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems (hereafter Hardware Management Agent) or the service processor SUN-HW-TRAP-MIB.

Server type	Integration level
SPARC/ALOM and SPARC/ILOM servers	SNMP: operating system level
x64/ILOM and SPARC/ILOM servers	SNMP: service processor level

Note: SPARC/ILOM servers can be monitored at either the OS level or at the SP level.



The following screen shot depicts some of the detailed information that BMC PEM has processed from a SPARC/ALOM server, specifically the Sun SPARC Enterprise T2000 server.



This Manual

This manual contains the following chapters:

- Chapter 1 “Introduction”
- Chapter 2 “Installing the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager”
- Chapter 3 “Configuring BMC PEM to Discover and Monitor Sun Devices”
- Chapter 4 “Configuring Sun Devices to be Monitored by BMC PEM”
- Chapter 5 “Monitoring Sun Devices in BMC PEM”
- Chapter 6 “Troubleshooting”
- Appendices:
 - Appendix A “BMC PEM Installation Log”
 - Appendix B “Sun-Specific BMC PEM Files”
 - Appendix C “Sample Global Configuration File (`global.conf`)”
 - Appendix D “Sample Filters Configuration File (`filter.conf`)”
 - Appendix E “Sample Nodes Configuration File (`nodes.conf`)”
 - Appendix F “Sample Hardware Management Agent (MASF) Configuration File (`snmpd.conf`)”
 - Appendix G “What’s New?”
 - Appendix H “Sun SNMP MIBs”
 - Appendix I “Release Notes”
 - Appendix J “Glossary”

This manual is intended for experienced BMC PEM administrators, field sales representatives, and support engineers.

Requirements

The managed devices (servers) and the BMC PEM server software have different software requirements.

SNMP Support

BMC PEM currently supports SNMP v1 and v2c. Although you can configure the Integrated Lights Out Manager (ILOM) firmware for SNMP v3, that configuration will not work with BMC PEM.

Managed Devices

Managed devices (servers) must have the following software installed and configured properly.

Device	Software Requirement
SPARC/ALOM and SPARC/ILOM servers	<i>Supported operating systems:</i> - Solaris 10 (see product documentation for versions)
	<i>OS-level SNMP integration:</i> - Sun SNMP Management Agent for Sun Fire and Netra Servers 1.5
x64/ILOM and SPARC/ILOM servers	<i>SP-level integration:</i> - Integrated Lights Out Manager (ILOM 2.0)

BMC PEM Management Server

Integration between BMC PEM and Sun servers has been tested with the following versions of the BMC PEM.

BMC PEM Server	Software Requirement
Sun Solaris SPARC Servers	<i>Supported operating systems:</i> - Solaris 9 (see product documentation for update versions) - Solaris 10 (see product documentation for update versions)
	<i>BMC PEM software:</i> - BMC PEM 4.4.0

The Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager has no additional requirements on BMC PEM packages or layered software, for example BMC PEM Connect SNMP.

Related Documentation

Consult the following manuals from Sun Microsystems Inc. and BMC for additional information about installing, configuring, and using BMC PEM and Sun solutions.

- *Sun™ SNMP Management Agent Administration Guide for Sun Fire™ and Netra™ Servers* (Part Number 819-7978-xx)
- *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188)
- *PATROL® Enterprise Manager Installation and Configuration Guide*
- *PATROL® Enterprise Manager Upgrade Guide*
- *PATROL® Enterprise Manager Administrator Guide*
- *PATROL® Enterprise Manager Automation Reference Manual*
- *PATROL® Enterprise Manager Customization Guide*
- *PATROL® Enterprise Manager User Guide*

Installing the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager

This chapter describes how to perform the following tasks:

- Downloading the Sun Integration Pack
 - Installing the Sun Integration Pack on your BMC PEM host server
 - Verifying successful installation of the Sun Integration Pack
 - Uninstalling the Sun Integration Pack from your BMC PEM host server
-

Pre-installation Checklist

Before you download and install the Sun Integration Pack, collect the following information.

- BMC PEM version:** Release 4.4.0 is currently supported. _____
- Target directory:** The directory on the BMC PEM host server into which you plan to install the Sun Integration Pack. Default = /usr/nc _____
- BMC PEM server host name:** The name of the host server onto which you plan to install the Sun Integration Pack. _____
- BMC PEM administrator login information:** User login and user password information for the BMC PEM administrator account. NetCmmnd _____
- BMC PEM server root password:** To perform some post-installation configuration, you will need to have root permissions. _____
- Management server IP address:** The IP address of the server hosting BMC PEM. _____

- Management port availability:** Verify the port number and that it is not being used by another management application.
Default = 162
-

Downloading the Sun Integration Pack

To install the most current version of the Sun Integration Pack, download it from the following URL:

<http://www.sun.com/systemmanagement/tools.jsp>

Note: As updated versions of the Sun Management Pack get posted to the web, the name of the compressed archive to download will change. For this release, download the following:

SunSNMP-Integration-2.0.tar.gz

Save the Sun Integration Pack to a working directory on the local system from which you plan to perform the installation and uncompress it.

Installing the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager

The Install Wizard for the Sun Integration Pack is a Solaris shell script that does the following:

- Collects information about your current BMC PEM host server installation.
- Builds a list of default installation settings based on your installation.
- Steps you through the installation process with those default settings.
- Installs the appropriate files for the Sun Integration Pack on the BMC PEM host server.
- Configures those files on the BMC PEM host server.

To install the Sun Integration Pack, do the following:

1. **Verify that the port on the BMC PEM host server that you plan to assign to listening for incoming SNMP traps is available and is not being used by a different process.**

If you are monitoring supported SPARC Enterprise servers at the operating system level and plan to assign port 162 (the default), verify that port 162 is available and not being used by another application. To determine which port is currently being used, enter the following command in a shell window on the BMC PEM host server:

```
% netstat -a | grep 162
```

If port 162 (or the one you specify) is already in use, specify a different port in the Install Wizard for the SNMP listener.

If you are monitoring x64/ILOM or SPARC/ILOM servers at the service processor level, you must use port 162, the default for the ILOM 2.0 service processor.

2. **Log in to the BMC PEM host server as user NetCmmnd.**
3. **Unpack the Sun Integration Pack that you downloaded in the previous section of this chapter.**

For example, if you downloaded `SunSNMP-Integration-2.0.tar.gz` (the integration package) to a local directory, you must `cd` to that local directory and enter the following command:

```
% gunzip -c SunSNMP-Integration-2.0.tar.gz | tar xf -
```

The `gunzip` utility creates a directory named `SunSNMP-Integration-1.0`.

4. **Verify that you have an X Windows display running on the BMC PEM host server.**

The Install Wizard requires that an X Windows display be running. To verify that an X Windows display is running on the BMC PEM host server, enter the following command:

```
% echo $DISPLAY
```

If Solaris returns a value on the format `host:number`, your X Windows display is set and will open a new `xterm` window if you enter the following command:

```
% xterm
```

5. **Set the DISPLAY environment variable to a valid display.**

Without having the `DISPLAY` variable set, the Install Wizard will not let you continue with the installation.

For example, to set the `DISPLAY` variable on a system named `myserver`, enter the following command:

```
% setenv DISPLAY myserver:disp
```

where

<code>myserver</code>	specifies the name (or IP address) of the target system to receive redirect display output.
<code>disp</code>	specifies the display number for that target system.

6. **cd to the local directory containing the unpacked Sun Integration Pack files.**

For example, if you unpacked the Sun Integration Pack files to the local directory named `/downloads`, enter the following command

```
% cd /downloads/SunSNMP-Integration-2.0
```

7. **Enter the following command to run the Install Wizard:**

```
% ./install
```

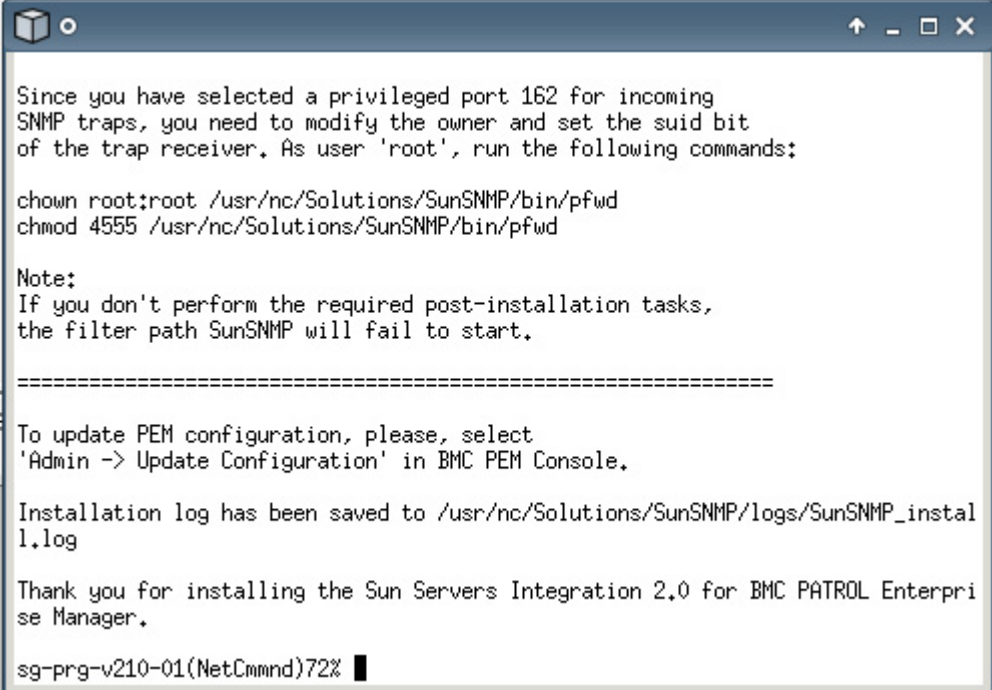

The Install Wizard interrogates your BMC PEM host server and builds a list of default or recommended installation options based upon your particular installation. The Install Wizard subsequently presents those default options inside square brackets ([]) and prompts you to accept them by pressing ENTER or to specify alternate values.

8. Step through the Install Wizard, specifying the following information:

- **Step 1:** Target BMC PEM installation directory
- **Step 2:** Target host name for the BMC PEM host server
- **Step 3:** Port number for the SNMP listener
- **Step 4:** Confirmation to begin copying files
- **Step 5:** Confirmation to begin component registration and to launch the BMC PEM GUI

If installation completes successfully, the Install Wizard displays the following message and exits

The installation is now complete.



```
Since you have selected a privileged port 162 for incoming
SNMP traps, you need to modify the owner and set the suid bit
of the trap receiver. As user 'root', run the following commands:

chown root:root /usr/nc/Solutions/SunSNMP/bin/pfwd
chmod 4555 /usr/nc/Solutions/SunSNMP/bin/pfwd

Note:
If you don't perform the required post-installation tasks,
the filter path SunSNMP will fail to start.

=====

To update PEM configuration, please, select
'Admin -> Update Configuration' in BMC PEM Console.

Installation log has been saved to /usr/nc/Solutions/SunSNMP/logs/SunSNMP_instal
l.log

Thank you for installing the Sun Servers Integration 2.0 for BMC PATROL Enterpri
se Manager.

sg-prg-v210-01(NetCmnd)72% █
```

Although the Sun Integration Pack has been installed on your BMC PEM host server, you must perform additional configuration on the host server. See the next chapter for these configuration tasks.

To review a log file generated during a sample installation, see Appendix A “BMC PEM Installation Log.”

Verifying Successful Installation

The most direct way to verify that the Sun Integration Pack has been successfully installed on your BMC PEM host server is to audit the files that have been installed by the Sun Install Wizard.

For a complete list of the files installed by the Install Wizard, see Appendix B “Sun-Specific BMC PEM Files.”

Uninstalling the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager

Uninstalling the Sun Integration Pack involves two procedures:

- Run the Sun Install Wizard (with `-u` parameter) or the Uninstall Script
- Remove the BMC PEM Filter Path definition for the Sun Integration Pack.

Choosing a Tool for Uninstallation

The Sun Integration Pack provides two tools with which you can uninstall the Sun Integration Pack:

- *Install Wizard*: The Install Wizard that you ran earlier in this chapter also performs uninstallation when you enter the `-u` parameter.
- *Uninstall Script*: When the Install Wizard completes the installation process, it creates a ready-to-execute shell script containing all the command and information necessary to uninstall the Sun Integration Pack.

```
<PEM_base>/Solutions/SunSNMP/bin/uninstall
```

<PEM_base> is the default installation directory into which you installed the Sun Integration Pack. For example, if <PEM_base> were /PEM440, you would enter the following command to run the Uninstall Script:

```
% /PEM440/Solutions/SunSNMP/bin/uninstall
```

The prompts and operation of the Uninstall Script are identical to those of the Install Wizard with the `-u` parameter.

Performing Uninstallation

To uninstall the Sun Integration Pack, do the following:

1. Change directory to the local directory containing the Install Wizard.

If you have unpacked the distribution package for the Sun Integration Pack to the local directory named `/downloads`, you would enter the following command:

```
% cd /downloads/SunSNMP-Integration-2.0
```

2. Run the Install Wizard or the Uninstall Script

- To run the Install Wizard from the current directory, enter the following command:

```
% ./install -u
```

- To run the Uninstall Script from the target installation directory on the BMC PEM host server, enter a fully qualified path to that directory and to the Uninstall Script. Enter

```
% <PEM_base>/Solutions/SunSNMP/bin/uninstall
```

where <PEM_base> is the fully qualified path to the base installation directory.

3. Respond to the following questions in the script:

- Use PEM directory /usr/nc (y/n) [y]: **y**
- Uninstall SunSNMP and remove directory usr/nc/Solutions/SunSNMP (y/n) [y]: **y**
- Remove filter path SunSNMP (y/n) [y]: **y**
- Use PEM directory /usr/nc (y/n) [y]: **y**

Note: If you choose not to remove this definition manually, you will not be able to reinstall the Sun Integration Pack until you remove the definition. If you choose to remove the definition, you can reinstall the Sun Integration Pack at any time.

The Install Wizard provides messages as it removes files and directories.

```
Deleting filter path SunSNMP
Deleting path prototype
Deleting port alias
Uninstallation has been completed.
Uninstallation log has been saved to
tmp/SunSNMP_uninstall.log
```

Once the Install Wizard completes processing, it displays the following message and exits:

```
Thank you for using the Sun Servers Integration 2.0 for BMC
PATROL Enterprise Manager.
```

Removing the BMC PEM Filter Path Definition Manually

If you chose not to remove the filter path definition for the Sun Integration Pack while running the Install Wizard, you can remove it manually.

To remove the filter path definition, do the following:

1. **Log in to the BMC PEM host server as user NetCmmnd.**
2. **In a terminal window, enter the following command to launch the BMC PEM Console:**

```
% st
```

3. **In the BMC PEM Console, choose Customization -> Path Definition.**

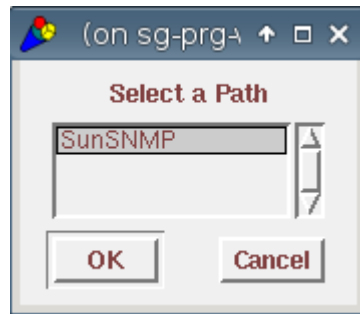
BMC PEM Console opens the Path Definition dialog box.

4. **Choose Path – Get from DB.**

BMC PEM Console displays the Path Selection dialog box.

5. **Select the 'SUN-SNMP' filter path and click the Confirm button.**

BMC PEM Console displays the Sun filter path definition.



6. **Choose Path – Delete from DB and click the Confirm button.**



The Sun-SNMP filter path is now deleted from the system.

Configuring BMC PEM to Discover and Monitor Sun Devices

This chapter describes how to configure BMC PEM to discover and monitor supported Sun SPARC Enterprise servers. It contains the following sections:

- Configuration Overview
- Configuring Global Settings
- Configuring the Hardware Management Agent
- Configuring Node-Specific Information for the Hardware Management Agent

Once you have installed the Sun Integration Pack and configured the BMC PEM host server, you must then configure each of the managed nodes. For more information on configuring managed nodes and verifying that the entire configuration is working properly, see the next chapter.

Configuration Overview

Configuring the Sun Integration Pack on your BMC PEM host server involves one or more cycles of editing configuration files and then restarting the integration filter path.

Editing Configuration Files

The Install Wizard installs a number of configuration files into the following host server directory:

```
<PEM_base>/Solutions/SunSNMP/conf
```

File	Function	Sample
global.conf	Specifies global settings for the Sun Integration Pack. These settings apply to all modules installed with the Sun Integration Pack.	Appendix C "Sample Global Configuration File"
filter.conf	Specifies traps that should not be passed for processing.	Appendix D "Sample Filters Configuration File"
nodes.cnf	Provides a list of monitored nodes that supports two functions:	Appendix E "Sample Nodes Configuration"

File	Function	Sample
	<ul style="list-style-type: none"> - node-specific SNMP settings that override the global SNMP defaults (if necessary) - target systems against which the BMC PEM and the Sun Integration Pack run the heartbeat script 	File"

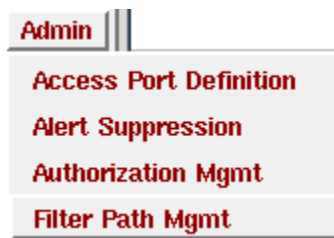
Each of these configuration files are plain text files that can be edited in any text editor.

Restarting the Integration Filter Path

Whenever you edit a configuration file on the BMC PEM host server, you must restart the integration filter path for the Sun Integration Pack before any configuration change takes effect.

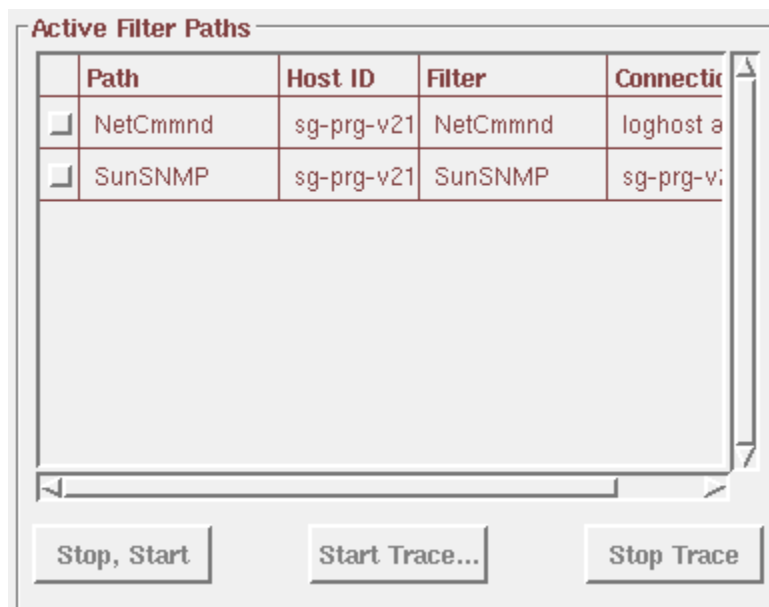
To restart the integration filter path for the Sun Integration Pack, do the following:

1. In the BMC PEM Console, choose **Admin - Filter Path Mgmt.**



The BMC PEM Console displays the Filter Path Management dialog box.

2. In the **Active Filter Paths** table, check the **SunSNMP** entry.



3. Click the **Stop, Start** button to restart the filter path and to apply any changes that you have made to configuration files.

If the filter path does not start or terminates unexpectedly shortly after it has been started, it is probably configured incorrectly.

See Chapter 6 “Troubleshooting” for possible solutions.

Configuring Global Settings

To configure global settings for the Sun Integration Pack installed on your BMC PEM host server, you must edit the following configuration file:

```
<PEM_base>/Solutions/SunSNMP/conf/global.conf
```

You can set the following parameters in this configuration file.

Configuration Entry	Values (default in bold)	Description
debug	0=disabled 1=enabled	Enables or disables log debug information.
logfile	logfile (no default)	Specifies the name of a logfile.
snmpget	0=disabled 1=enabled	Enables or disables SNMP GET functions to retrieve additional data from monitored nodes.
snmpversion	1=SNMP v1 2c=SNMP v2c	Specifies the SNMP version protocol for sending SNMP GET requests.
snmpagentport	161	Specifies the port number of the SNMP agent port to send SNMP GET requests to.
snmpcommunity	public	Specifies the SNMP community string to use for SNMP GET requests.
cache	0=disabled 1=enabled	Enables or disables the caching of required data from each host listed in <code>nodes.conf</code> if <code>snmpget=1</code> .
cacheinterval	600	Specifies the interval (in seconds) to poll for <code>entLastChangeTime</code> in order to refresh cached equipment tables (in seconds).
heartbeat	0=disabled 1=enabled	Enables or disables SNMP heartbeat checking.

Configuration Entry	Values (default in bold)	Description
heartbeatinterval	300	Specifies the interval (in seconds) to perform SNMP heartbeat checking.
hostresolve	0=disabled 1=enabled	Enables or disables IP-hostname resolution.
implicitfilter	0=false 1=true	Enables or disables implicit trap filtering of gratuitous informational messages.

For a sample global configuration file, see Appendix C “Sample Global Configuration File”.

Configuring Node-Specific Information for SNMP Agents

To configure node-specific overrides for global SNMP settings defined in the `global.conf` file, you must edit the following configuration file:

```
<PEM_base>/Solutions/SunSNMP/conf/nodes.conf
```

For each override that you want to set for each managed node, you must add an entry in `nodes.conf` that adheres to the following space-delimited or tab-delimited format:

```
<hostname_or_ip> <port> <community> <snmp_get_version>
```

For example, the following entry

```
t1000.mydomain.com 9061 public 2c
```

specifies four things for the Sun SNMP agent running on the BMC PEM host server:

- There is a managed node named `t1000.mydomain.com`.
- There is a Sun SNMP agent on port `9061` listening for SNMP GETs on that managed node.
- The community string is `public`.
- The communication protocol between the managed node and the Sun Integration Pack running on BMC PEM will be held using SNMP version `2c`.

Configuring Sun Devices to be Monitored by BMC PEM

This chapter describes how to configure your Sun devices to be discovered and monitored by BMC PEM.

BMC PEM communicates with Sun devices via SNMP at the operating system level (for SPARC/ALOM and SPARC/ILOM servers) or at the service processor level (for x64/ILOM and SPARC/ILOM servers).

Once you have installed the Sun Integration Pack and configured it on your BMC PEM host server, the last step in the overall installation and configuration process involves the installation and/or configuration of the appropriate SNMP resources on each managed host.

This chapter contains the following sections:

- Configuring SNMP on SPARC/ALOM and SPARC/ILOM Servers
- Configuring SNMP on x64/ILOM and SPARC/ILOM Service Processors
- Verifying Overall Configuration

Configuring SNMP on SPARC/ALOM and SPARC/ILOM Servers

All supported SPARC/ALOM and SPARC/ILOM servers process SNMP messages from the SUN-PLATFORM-MIB through the Hardware Management Agent on Solaris 10.

SPARC Solaris SNMP Configuration

If you want BMC PEM to use OS-based SNMP to monitor your SPARC Solaris servers, the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems (hereafter Hardware Management Agent) must be installed and configured on each of these SPARC Solaris nodes.

Installation

To evaluate SNMP system requirements for your SPARC Solaris server and to learn how to install the Hardware Management Agent on it, consult the following Sun manual:

- *Sun™ SNMP Management Agent Administration Guide for Sun Fire™ and Netra™ Servers* (Part Number 819-7978). You can download this manual from <http://docs.sun.com>.

Configuration

For integration between the Hardware Management Agent and BMC PEM to work correctly, you must verify that the Hardware Management Agent configuration file on your managed SPARC Solaris nodes contains the following entries. To update that configuration file, do the following:

1. **On the managed server, open the following configuration file in a text editor:**

```
/etc/opt/SUNWmasf/conf/snmpd.conf
```

2. **Configure (or verify) that the Read Only community string matches at least one of the community strings configured on the BMC PEM management server, for example `rocommunity public`.**
3. **Configure (or verify) that the Hardware Management Agent and BMC PEM are listening and sending on the appropriate port numbers.**

For example, suppose you set the Hardware Management Agent port to 161 by entering the following line in the `snmpd.conf` file:

```
agentaddress 161
```

You must configure BMC PEM to poll SPARC Solaris servers using that same port, in this case port 161.

4. **Add an entry to specify whether you want to send SNMP v1 or SNMP v2 traps.**

SNMP format	Entry
v1	<code>trapsink <destination_hostname></code>
v2c	<code>trap2sink <destination_hostname></code>

where `<destination_hostname>` specifies the name or IP address of the destination server receiving the SNMP v1 (`trapsink`) or v2c (`trap2sink`) traps from the Hardware Management Agent.

Note: Adding both lines will result in the Hardware Management Agent sending BMC PEM two traps for each alert and those redundant alerts appearing in the event console.

5. **(Optional and recommended) Uncomment (remove the # character) from the following line in the final section of the file.**

```
#####
# SECTION: Trap compatibility mode
. . .
SUNW_alwaysIncludeEntPhysName yes
```

Enabling this mode for the Hardware Management Agent adds more detailed sensor and device names to traps and eliminates the need for generic messages for some sensors such as “A device has been disabled.”

6. **Save the modified file.**

For these changes to take effect, you must force the Hardware Management Agent to re-read the configuration file.

7. Enter the following commands in a terminal window to force the Hardware Management Agent to re-read its configuration file.

```
# ps -ef | grep SUNWmasf | grep -v grep
```

This command returns the process ID of the Hardware Management Agent daemon running on your SPARC Solaris system.

```
# kill -HUP <snmpd_pid>
```

where <snmpd_pid> is the process ID of the Hardware Management Agent obtained in the previous sub-step.

The Hardware Management Agent re-reads its configuration file automatically when it restarts.

Your managed SPARC Solaris servers are now ready to forward traps to BMC PEM.

Configuring SNMP on x64/ILOM and SPARC/ILOM Service Processors

Sun x64/ILOM and SPARC/ILOM servers have a service processor that now supports Integrated Lights Out Manager (ILOM) 2.0 software. SPARC/ILOM servers can be monitored at the OS level with the Hardware Management Agent or at the SP level with ILOM 2.0. Sun x64/ILOM servers are monitored at the SP level only.

Configuring Sun ILOM 2.0 Service Processors to be Monitored by BMC PEM

To configure SNMP protocol settings on your Sun ILOM 2.0 service processor, do the following:

- 1. Launch the web GUI (ILOM) on the service processor to be configured and monitored.**
- 2. Log in to the ILOM graphical interface as root.**
- 3. Click Configuration – System Management Access – SNMP to display the SNMP configuration screen.**

Sun™ Microsystems, Inc

System Information	System Monitoring	Configuration	User Management	Remote Control	Maintenance
System Management Access	Alert Management	Network	Serial Port	Clock Settings	Syslog
Web Server	SNMP	SSL Certificate			

SNMP Settings

Manage SNMP users, communities, and access from this page. To permit access for Set Requests or v1, v2c, or v3 protocols from SNMP users, check the box next to the appropriate function.

Port:

- Set Requests: Set Requests
- v1 Protocol
- v2c Protocol
- v3 Protocol

4. Verify the following settings.

Setting	Value(s)
Port	161 (default)
Set Requests	Optional
v1 Protocol	<input checked="" type="checkbox"/> Checked (default).
v2c Protocol v3 Protocol	Optional. Enable v2c and/or v3 only if your management application supports it. Note: BMC PEM does not support the v3 protocol, so do not check it.

5. Click the Save button to submit the changes.
6. Click the Configuration - Alert Management tab to display the Alert Settings screen.

Sun™ Microsystems, Inc.

System Information	System Monitoring	Configuration	User Management	Remote Control	Maintenance
System Management Access	Alert Management	Network	Serial Port	Clock Settings	Syslog SMTP Client

Alert Settings

This shows the table of configured alerts. To send a test alert to each of the configured alert destinations, click the *Send Test Alerts* button. IPMI Platform Event Traps (PETs), Email Alerts and SNMP Traps are supported. Select a radio button, then select Edit from the Actions drop down list to configure an alert. You can configure up to 15 alerts.

Send Test Alerts

Alerts				
— Actions — ▾				
<input type="checkbox"/>	Alert ID	Level	Alert Type	Destination Summary
<input type="radio"/>	1	minor	snmptrap	129.157.18.81, snmp v1, community 'public'
<input type="radio"/>	2	minor	snmptrap	129.157.18.82, snmp v2c, community 'public'
<input type="radio"/>	3	disable	ipmipet	0.0.0.0

- Click one of checkboxes for an entry that has no value for the Destination Summary field.

Alerts				
— Actions — ▾				
<input type="checkbox"/>	Alert ID	Level	Alert Type	Destination Summary
<input type="radio"/>	1	minor	snmptrap	129.157.18.81, snmp v1, community 'public'
<input type="radio"/>	2	minor	snmptrap	129.157.18.82, snmp v2c, community 'public'
<input checked="" type="checkbox"/>	3	disable	ipmipet	0.0.0.0

- Click the Actions drop-down box and choose Edit.

Alerts				
— Actions — ▾				
— Actions — ▾				
<input type="checkbox"/>	Alert ID	Level	Alert Type	Destination Summary
<input type="radio"/>	1	minor	snmptrap	129.157.18.81, snmp v1, community 'public'
<input type="radio"/>	2	minor	snmptrap	129.157.18.82, snmp v2c, community 'public'
<input checked="" type="checkbox"/>	3	disable	ipmipet	0.0.0.0

ILOM 2.0 displays the following screen.

Sun™ Integrated Lights Out Manager

To create or modify an Alert, select the alert level and type, then fill in the destination information for the alert type selected.

Level:

Type:

Fill in the IP address of the PET destination. Click Save to complete your action.

IP Address:

9. Set (or verify) the following configuration settings.

Field	Value
Level:	Minor (to view the maximum number of traps at all severity levels)
Type:	SNMP Trap (for the SUN-HW-TRAP-MIB) Note: Although ILOM 2.0 continues to support the SUN-ILOM-PET-MIB MIB, Sun strongly recommends configuring your service processors to use the more robust SUN-HW-TRAP-MIB MIB.
IP Address:	<i>IP_address_of_destination_server</i>
SNMP Version:	v1, v2c, or v3 (if supported) for your management configuration Note: BMC PEM does not support the v3 protocol, so do not check it.
Community Name:	public Note: At least one of the community strings with at least read-only (ro) permissions must match one of the community strings configured in the Element Manager.

Sun™ Integrated Lights Out Manager

To create or modify an Alert, select the alert level and type, then fill in the destination information for the alert type selected.

Level: ▼

Type: ▼

Specify the SNMP trap destination IP address, version, and community or user name. Click Save to complete your action.

IP Address:

SNMP Version: ▼

Community Name:

Done 10.18.141.137

10. Click the Save button to submit the change.

Tip: Verify that the information that you just entered in the dialog box appears in the updated Alert Management table.

Your Sun ILOM 2.0 service processor is now configured to send SUN-HW-TRAP-MIB SNMP traps to all trap destinations.

Verifying Successful Configuration for BMC PEM

To the extent that the Sun Integration Pack employs a variety of system management technologies to monitor different types of Sun servers, there is no one procedure that exercises every interface on each monitored system in order to verify that the entire integration has been installed and configured properly. If you are physically located with your monitored systems, you could always manually remove and re-insert a non-critical component on one Sun server after another. See the section “Verifying Configuration Manually” below for more information on manual verification. This manual procedure becomes impractical at large installations and impossible at remote locations. Performing remote verification is more convenient, but requires different procedures for OS-level or SP-level integrations and for different types of Sun servers (x64 or SPARC).

To determine which remote procedures are appropriate for your test plan and for the types of Sun servers supported by your management application, consult the following table.

CPU Type	SP Type	OS-level Procedure(s)	SP-level Procedure(s)
x64	ILOM	Not supported	See “Verifying Configuration Remotely Using IPMItool”
SPARC	ILOM	See “Verifying Configuration Remotely Using <code>psradm</code> ”	See “Verifying Configuration Remotely Using IPMItool”
	ALOM	See “Verifying Configuration Remotely Using ALOM”	Not supported

The following sections describe how to perform each of these procedures.

Verifying Configuration Manually

If you are located physically near one or more of your Sun servers, you can always verify configuration by generating a physical event. The most reliable way to accomplish this is to remove and re-insert a non-critical component.

To test your configuration manually, do the following:

- 1. Locate the Sun server or blade module in your data center.**
- 2. Identify a component on that system that is non-critical and hot-pluggable (for example, a redundant power supply or fan tray).**

Note: Be certain that removal and re-insertion of this component will not affect the normal and routine operation of the server. Verify that the redundant component is, in fact, not critical to the current state of the system.

- 3. Remove that non-critical component.**

Note: Be certain to follow all required software and firmware procedures required for the safe removal of any hot-pluggable component. Consult the Sun manual or online information system that ships with your Sun server for specific procedures related to removing that hot-pluggable component.

4. **After an appropriate amount of time, re-insert the non-critical component.**
5. **In the message or event console of your management package, verify that removing/re-inserting the non-critical component has generated one or more traps with the appropriate event summary and severity.**

If you do not see these traps in the console, review this manual for required configuration steps or consult the troubleshooting section of this manual.

Verifying Configuration Remotely Using ALOM

To verify that a remote ALOM-based SPARC Solaris system is configured correctly, do the following:

1. **Identify the name and/or IP address of the ALOM-based SPARC Solaris server that you want to test.**
2. **Log in to the ALOM CMT command shell on that remote system via an Ethernet or serial connection.**
3. **Enter the following command to determine the current state of the system locator LED.**

```
sc> showlocator
```

ALOM returns one of the following messages:

- Locator led is ON
- Locator led is OFF

The following example assumes that the locator LED is currently OFF.

4. **Enter the following command to turn the locator LED on.**

```
sc> setlocator on
```
5. **In the message or event console of your management package, verify that it has received an event from ALOM indicating that the locator LED is on.**
6. **Enter the following command to restore the locator LED to off.**

```
sc> setlocator off
```
7. **(Optional) In the message or event console of your management package, verify that it has received an event from ALOM indicating that the locator LED is off.**

If you do not see these messages in the console, review this manual for required configuration steps or consult the troubleshooting section of this manual.

Verifying Configuration Remotely Using IPMItool

Recent Sun servers support the Integrated Lights Out Manager (ILOM) service processor. You can communicate with ILOM service processors via their IPMI interfaces to have them generate non-critical, simulated events. If BMC PEM receives these non-critical, simulated events from ILOM, it is configured properly for actual events.

IPMItool is an open-source utility for managing and configuring devices that support the Intelligent Platform Management Interface (IPMI) version 1.5 and version 2.0 specifications. Versions of IPMItool are available for the Solaris, Linux, and Windows operating systems.

Operating System	IPMItool Distribution(s)
Solaris	http://ipmitool.sourceforge.net/ Many software resource CDs distributed with Sun servers.
Linux	http://ipmitool.sourceforge.net/ Many software resource CDs distributed with Sun servers.
Windows	http://www.sun.com/systemmanagement/tools.jsp Many software resource CDs distributed with Sun servers.

To verify that your management program is configured to receive traps from a supported service processor, do the following:

1. **Collect the following information about the remote service processor that you want to test.**

Field	Description
<SPname>	The name or IP address of the service processor Example: 192.168.1.1
<SPadminname>	The administrator login name for the service processor Example: root
<SPadminpassword>	The administrator password for the service processor Example: changeme

2. **Open a command shell on the system that has IPMItool installed.**
3. **Enter the following IPMItool command to generate a list of all available sensors on that remote Sun server.**

```
# ipmitool -U <SPadminname> -P <SPadminpassword> \
-H <SPname> -v sdr list
```

For example, to get the list of available sensors on a Sun SPARC Enterprise T5120 server at IP address 192.168.1.1 with ILOM SP login/password root/changeme, you would enter the following command:

```
# ipmitool -U root -P changeme -H 192.168.1.1 -v sdr list
```

4. **In the output from IPMItool, identify the Sensor ID name of a sensor that has at least one entry in the Assertions Enabled or Deassertions Enabled fields.**

In the following example, IPMItool returns the following information about the sensor named /MB/T_AMB.

```

Sensor ID           : /MB/T_AMB (0x9)
Entity ID          : 7.0 (System Board)
Sensor Type (Analog) : Temperature
. . .
Upper critical     : 55.000
. . .
Assertions Enabled : lnc- lcr- lnr- unc+ ucr+ unr+
Deassertions Enabled : lnc- lcr- lnr- unc+ ucr+ unr+

```

This sensor monitors ambient temperature on the motherboard of servers.

Note: Exercise caution in choosing a sensor to use for a simulated event. Simulating unrecoverably high or low temperature for some sensors may cause the server to shut down.

5. Enter the following IPMI command to generate a simulated event

```
# ipmitool -U <SPadminname> -P <SPadminpassword> \
-H <SPname> event <sensorname> <option>
```

For example, to generate a simulated event for exceeding the upper critical (ucr) ambient temperature on a Sun SPARC Enterprise T5120 server at IP address 192.168.1.1 with ILOM SP login/password root/changeme, you would enter the following command:

```
# ipmitool -U root -P changeme -H 192.168.1.1 \
event /MB/T_AMB ucr assert
```

In the command shell, IPMItool returns information like the following:

```
Finding sensor /MB/T_AMB ... ok
0 | Pre-Init Time-stamp | Temperature /MB/T_AMB | \
Upper Critical going high | Reading 56 > Threshold \
55 degrees C
```

6. In the message or event console of your management package, verify that it has received an event from ILOM relevant to the sensor that you specified in your IPMItool command.

If you do not see these messages in the console, review this manual for required configuration steps or consult the troubleshooting section of this manual.

7. (Recommended) Clear the simulated event with the following syntax:

```
# ipmitool -U <SPadminname> -P <SPadminpassword> \
-H <SPname> event <sensorname> <option>
```

To clear (deassert) the simulated event in the previous example, enter the following command:

```
# ipmitool -U root -P changeme -H 192.168.1.1 \
event /MB/T_AMB ucr deassert
```

If you do not see these messages in the console, review this manual for required configuration steps or consult the troubleshooting section of this manual.

Verifying Configuration Remotely Using psradm

The Solaris utility `psradm(1M)` performs configuration on multiprocessor CPUs. When you use `psradm` to disable or to re-enable a CPU core, it generates a trap that should appear in the BMC PEM event console. This procedure is appropriate if you are verifying configuration for a Sun SPARC Enterprise server supporting the ILOM service processor such as the SPARC Enterprise T5120 or T5220 server.

To use `psradm` to generate a trap for one of these supported systems, do the following:

1. **Identify the name and/or IP address of the server that you want to test.**
2. **Log in to that server as root or with administrator privileges.**
3. **Enter the following command to disable a specific CPU core on that remote server.**

```
# psradm -f <CPU_Core_ID>
```

where <CPU_Core_ID> is the ID for one CPUcore. For example, to disable core 0 on a Sun SPARC Enterprise T5120, you would enter the following command:

```
# psradm -f 0
```

The trap generated by the T5120 should appear in the BMC PEM event console in a format like the following:

```
CH/MB/CMP0/P0/CPU Device has been removed
```

4. **(Recommended) Enter the following command to re-enable that same CPU core on that remote server.**

```
# psradm -n <CPU_Core_ID>
```

If you do not see these messages in the console, review this manual for required configuration steps or consult the troubleshooting section of this manual.

Monitoring Sun Devices in BMC PEM

The BMC PEM Console offers many useful views of the trap information that it extracts from the Sun devices that it has discovered.

This chapter contains the following sections:

- Overall Description
 - Product Features
 - Using BMC PATROL Explorer and the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager
-

Overall Description

The Sun Integration Pack provides an SNMP-based management solution for supported servers and service processors.

If an abnormal event occurs on the managed node, the SNMP agent located on the managed device generates an SNMP trap which is sent to the PATROL EM server. The Sun Integration Pack listens for incoming SNMP traps. Once received, the trap's type is classified and the trap is passed to an appropriate handler.

In case there is no suitable handler for the trap type, the trap is dropped.

The trap handler, which is a key component of the Sun Integration Pack, analyzes the trap, translates important data using provided set of MIBs and performs additional clarification of the data by performing subsequent SNMP GET calls to the agent. After gathering all necessary data, the solution sends the information along the pipeline to a filter engine which takes care of alert creation. If the information provided by the trap handler matches any of the alert criteria defined within the filter engine, an alert is created and displayed on the operator consoles (PATROL EM Active Alert Display or Patrol Explorer).

BMC Common Event Format (CEF) tokens are used to describe each alert, enabling further integration with various third party system management tools.

Note: Use the Sun Integration Pack only with supported SNMP agents. If you configure an unsupported agent to send data to the integration, traps sent by the agent will not be processed and you risk loss of important notifications!

Product Features

SNMP Heartbeat Module for Monitoring Nodes

The Sun Integration Pack now provides a module that periodically checks all the nodes listed in the `nodes.conf` configuration file. The module queries the `sysUptime` OID for each node to determine whether the agent on the monitored node is functioning. If the agent is not functioning, the module generates an alert. You enable, disable, and configure this module in the `global.conf` configuration file.

SNMP Protocol Support

The Sun Integration Pack currently supports SNMP version 1 and version 2c.

SNMP Trap Listener

The built-in SNMP trap listener can be configured to listen on any port. The listener port can be configured during the installation of the solution.

Note: In order to listen for traps on ports lower than 1024 (privileged ports), file permissions of the listener needs to be changed the following way:

Permissions parameter	Permissions value
owner	root
group	root
permission	4555 (sets the suid bit to allow the tool to run with root privileges)

The installer will instruct you how to perform the modifications in case it is necessary.

Multiple SNMP Listeners on One PATROL EM Server

It is possible to run many SNMP listeners on one BMC PEM server as long as each of them runs on a different port. If you have multiple SNMP listeners running on your server, configure each host agent to send traps to the port where an appropriate tool is listening.

For example, if you use the BMC ConnectSNMP solution for SNMP trap integration and you have configured it to use the default SNMP port 162, you can still use the Sun Integration Pack. The Sun Integration Pack then needs to be configured to listen on a different port, for example port 9162. Further, you must configure all SNMP agents which you want to bind to the Sun Integration Pack to send traps to the port on your BMC PEM server where the Sun Integration Pack will listen, for example to port 9162.

Data Enrichment Using SNMP GET

Since not all data contained in SNMP traps are in human-readable form or the traps do not contain all necessary data, it is important to perform additional SNMP GET

calls to SNMP agents in order to translate and enrich the information provided with the trap.

The SNMP GET enrichment functionality is provided with the Sun Integration Pack and can be turned on or off.

Note: If you disable the SNMP GET enrichment, several traps received from the Sun SNMP Management Agent for Sun Fire and Netra Servers may have little informational value. It is recommended to keep the SNMP GET enrichment enabled as documented in the installation chapter.

Entity Table Cache

In order to speed up data retrieval from remote SNMP agents, the Sun Integration Pack offers the possibility to cache common and often requested data from the agents upon startup of the solution. Entity table cache can be turned on or off.

Note: If you disable SNMP GET enrichment functionality, the entity table cache will not be performed, since it uses the SNMP GET method to retrieve the data from agents.

Trap Filtering

Trap filtering offers the user the possibility to control which traps will be handled or ignored. There are two types of filters available:

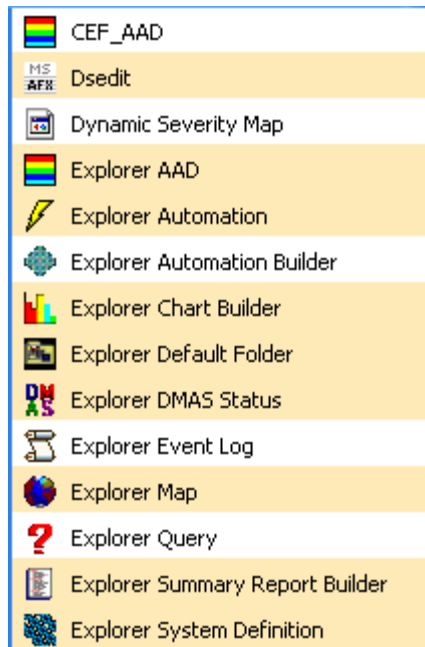
Trap filter	Explanation
Implicit	The implicit trap filter provides means to filter out messages of little or no informational value. You can enable or disable the implicit trap filter in the <code>global.conf</code> configuration file.
Custom	The custom trap filter provides users with the possibility to perform selective filtering of various trap types that are implemented by the supported SNMP agents. Custom trap filter can be enabled for each trap type in the trap handler module's configuration file. Note: For example, to see trap types for the Hardware Management Agent, see the manual <i>Sun™ SNMP Management Agent Administration Guide for Sun Fire™ and Netra™ Servers</i> (Part Number 819-7978).

Using BMC PATROL Explorer and the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager

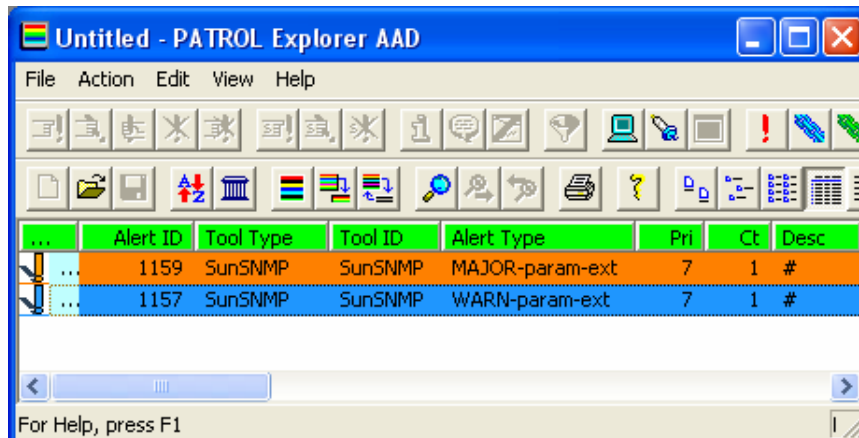
The Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager fully supports the Microsoft Windows client for BMC PEM named BMC PATROL Explorer. This client provides a range of additional views and features that enhance your management of Sun servers through the Sun Integration Pack.

Using BMC PEM Tools in BMC PATROL Explorer

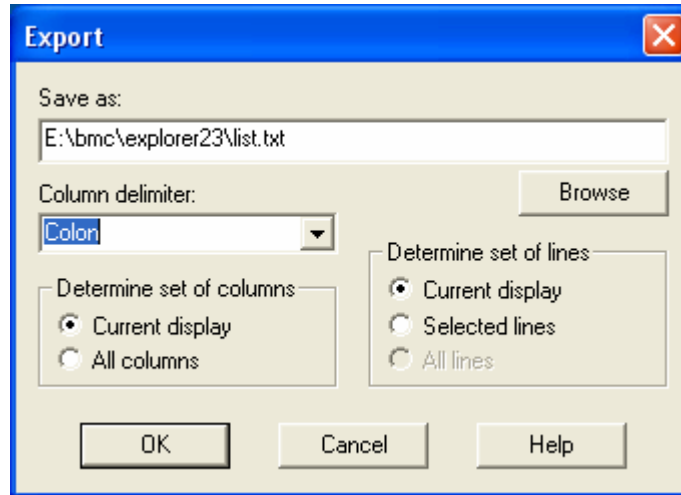
The same BMC PEM tools that are available on a UNIX-based host server are available through the PATROL Explorer client.



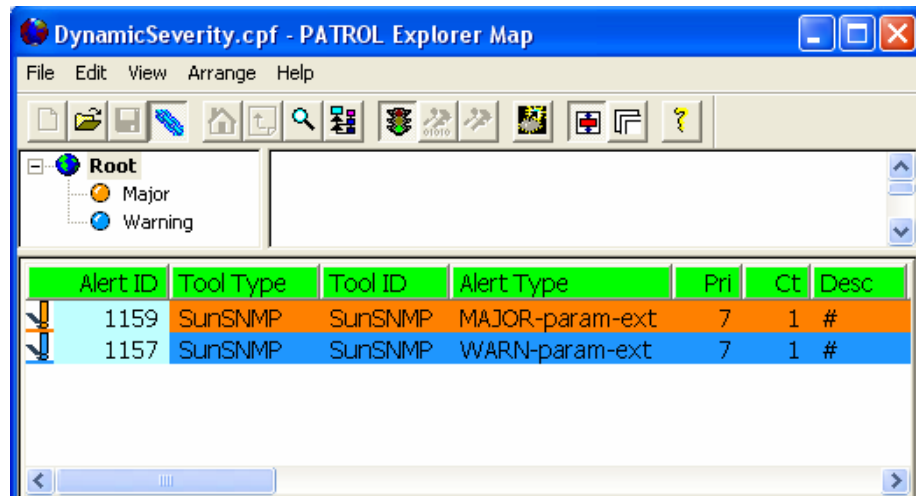
The same AAD messages and viewing options appear here.



The message data can even be exported to a structured text file for import into a Windows-based spreadsheet or DBMS for further analysis and reporting.



The Explorer Map tool is particularly useful when you need to get a hierarchical view of alerts being received from your Sun servers.



As with the UNIX-based tools, PATROL Explorer lets you drill down into these messages to view their detailed context. For example, if you double-clicked message 1157 in the screen shot above, BMC PATROL Explorer would display the following detail.

General			
Alert ID	1157	Tool Type	SunSNMP
Tool ID	SunSNMP	Alert Type	WARN-param-ext
Template	Device [object] - [objectDescr]: [freeText]		
Text	Device HDD3/HDD - Hard Disk Drive: Device has been disabled.		
Received	04/03/2007 4:40:11 PM	State	Active
Assigned		Operator	--
Accepted		Priority	7
Acknowledged		Occurrences	1
Closed		Severity	Warning
		Category	Equipment
Add Comment...			
Comments		Description	
<div style="border: 1px solid gray; height: 40px;"></div>		No description associated with this alert.	
Stored Tokens			
<pre>domainClass: "SPARC" origin: "MASF" originClass: "SUN" originSeverity: "warning"</pre>			

Configuring BMC PATROL Explorer for Sun-specific Tokens

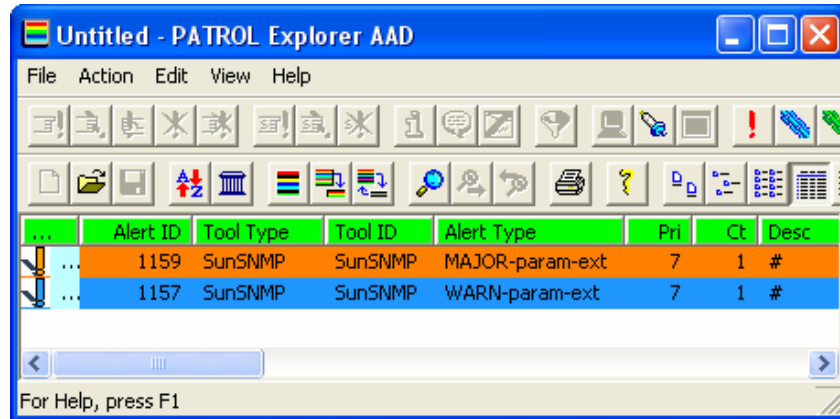
When BMC PATROL Explorer connects to a BMC PEM host server, it can perform two tasks:

- Display all the data available on the remote BMC PEM host server.
- Configure the presentation of that data locally.

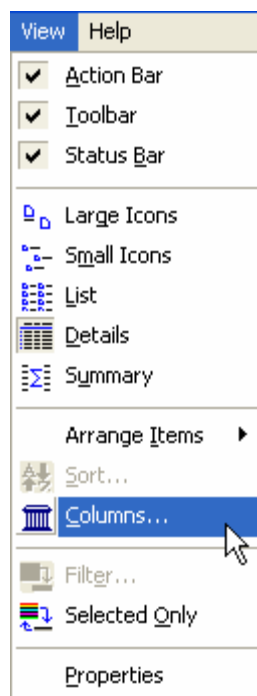
In BMC PEM, the types of data that can be configured and displayed are called tokens.

To configure your local BMC PATROL Explorer client to display Sun-specific tokens, do the following:

1. **Choose Start – Programs - PATROL Explorer – Explorer AAD to launch the Active Alerts Display.**

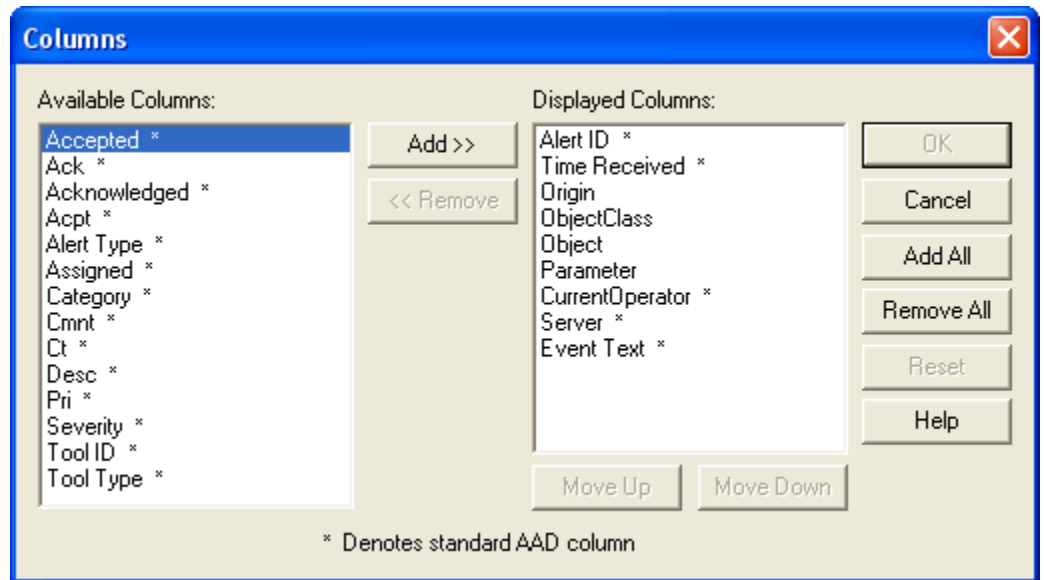


2. Choose View – Columns.



BMC PATROL Explorer displays a dialog box containing lists of available columns (tokens) and currently displayed columns (tokens).

3. As appropriate, select columns (tokens) in the Available Columns list that you want BMC PATROL Explorer to display in one of its tools.



4. Click Add to add the selected token to the list of columns (tokens) that BMC PATROL Explorer displays.
5. Click OK to accept the changes and apply them to your current BMC PATROL Explorer view.

BMC PATROL Explorer subsequently uses this configuration when it displays tokens.

See Appendix I “Release Notes” for a listing of Sun-specific tokens.

Troubleshooting

This chapter provides a guide how to diagnose common issues and specific problems that may arise while using the Sun Integration Pack. The chapter contains the following sections:

- Diagnostic Support
 - Common Issues and Solutions
 - Restarting the Integration Filter Path
-

Diagnostic Support

This section provides an overview of diagnostic support available to you in BMC PEM in general and in the Sun Integration Pack in particular.

Setting Debug Mode in the Sun Integration Pack

The Sun Integration Pack provides a debug mode to help you diagnose possible issues.

To enable debug mode, do the following:

- 1. Open the following configuration file in a text editor:**

```
/usr/nc/Solutions/SunSNMP/conf/global.conf
```

- 2. Edit the configuration entry for debug, setting it to the value 1.**

```
# Log debug information  
# Valid values: 0, 1  
# Default: 0  
debug=1
```

- 3. Save the configuration file.**

- 4. Restart the integration filter path.**

See the section “Restarting the Integration Filter Path.”

The Sun Integration Pack then prints debugging information to standard error output (`stderr`) on the system console.

Note: Refer to your system documentation for information about how to access system console in a headless environment.

Directing Debug Information to a Log file

Once you have turned debug mode on and directed debug information to stderr, you can direct that same output to a persistent log file. To redirect debug output, do the following:

1. **Open the following configuration file in a text editor:**

```
/usr/nc/Solutions/SunSNMP/conf/global.conf
```

2. **Edit the configuration entry for logfile, specifying a target file path and file name.**

```
# Log file
# If no file is listed, messages are printed to
# standard error output.
# Default: none
logfile=/tmp/SunSNMP.log
```

3. **Save the configuration file.**
4. **Restart the integration filter path.**

See the section “Restarting the Integration Filter Path.”

Activating the BMC PEM agcdx Daemon

The `agcdx` daemon is one of the essential BMC PEM components that monitors the execution of processes in the BMC PEM environment. The `agcdx` daemon process can be switched to a debug mode and can generate verbose output to stderr on the system console. Since `agcdx` starts processes on behalf of BMC PEM, the debug mode can be used to observe what processes are being started, which command-line arguments are being passed to the processes, and what messages the processes produce. This may be useful for diagnosing unexpected filter path crashes.

To activate `agcdx` debugging mode, do the following:

1. **On the BMC PEM host server, log in as root.**

```
% su -
```

2. **Enter the following command to determine the PID of the `agcdx` daemon:**

```
# ps -ef | grep agcdx
```

3. **Enter the following command to send the SIGUSR1 signal to the `agcdx` process:**

```
# kill -USR1 <pid>
```

The `agcdx` daemon automatically switches to debug mode and generates the following message:

```
agcdx: turning debugging on
```

Common Issues and Solutions

This section examines some of the common issues and solutions encountered with the Sun Integration Pack.

SunSNMP Filter Path Does Not Start Properly After Installation.

Problem: Whenever BMC PEM tries to start the path, it stops immediately.

Probable cause: The integration is configured to use a privileged port and the socket listener program does not have sufficient privileges.

Solution: Change the owner and group of the socket listener to root and set the suid bit. As root, run the following commands:

```
# chown root:root /usr/nc/Solutions/SunSNMP/bin/pfwd
# chmod 4555 /usr/nc/Solutions/SunSNMP/bin/pfwd
```

Restart the SunSNMP filter path. The path should start correctly.

SunSNMP Filter Path Does Not Start After a Change to One of the Configuration Files.

Probable cause: You have entered a non-valid value for one of the modified options.

Solution: Check the modified configuration files and verify that all configurable options have a valid value.

Re-specify the configuration file as described in Chapter 3.

Restart the filter path and check the output in the log. If there is no output in the log, use `agcdX` debug mode to diagnose the problem.

No Alerts Appear in the AAD

Probable causes	Solutions
The SNMP agents are not configured properly.	Check whether the SNMP trap destination of the agents match the host name and port where the integration is listening.
The SunSNMP filter path is not running.	Start the SunSNMP filter path.

The Alarms Contain Untranslated OIDs Instead of Textual Descriptions

Probable causes	Solutions
Both SNMP GET enrichment and Implicit trap filtering are disabled.	Enable SNMP GET enrichment and Implicit trap filtering in the <code>global.conf</code> configuration file.
If you are not using per-host setting as explained in section 4.2.2, your global SNMP credentials may be incorrect.	Check your global SNMP credentials used for communicating with remote SNMP agents (<code>snmpversion</code> , <code>snmpagentport</code> , <code>snmpcommunity</code>). These settings must match their respective counterparts in the configuration of each SNMP agent in the infrastructure managed by this integration. Global SNMP credentials can be configured in the <code>global.conf</code> file.
If you are using per-host	Check your per-host SNMP credentials used for

settings, several host-specific SNMP credentials may be incorrect.	communicating with remote SNMP agent on the specified host. These settings must match their respective counterparts in the configuration of the corresponding SNMP agent. Host-specific SNMP credentials can be configured in the <code>nodes.conf</code> file.
--	---

If a Fan is Removed From the Managed Server, Events Describing the Device Removal are Displayed Twice in the AAD.

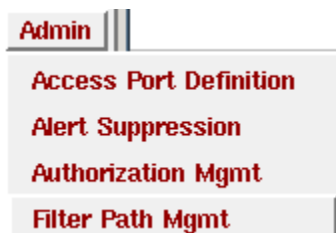
Solution: One group of events represents the removal of the respective fan module. The second group of events represents the removal of a speed sensor that is part of the fan module. The current version of the integration cannot handle this situation.

Restarting the Integration Filter Path

Whenever you edit a configuration file on the BMC PEM host server, you must restart the integration filter path for the Sun Integration Pack before any configuration change takes effect.

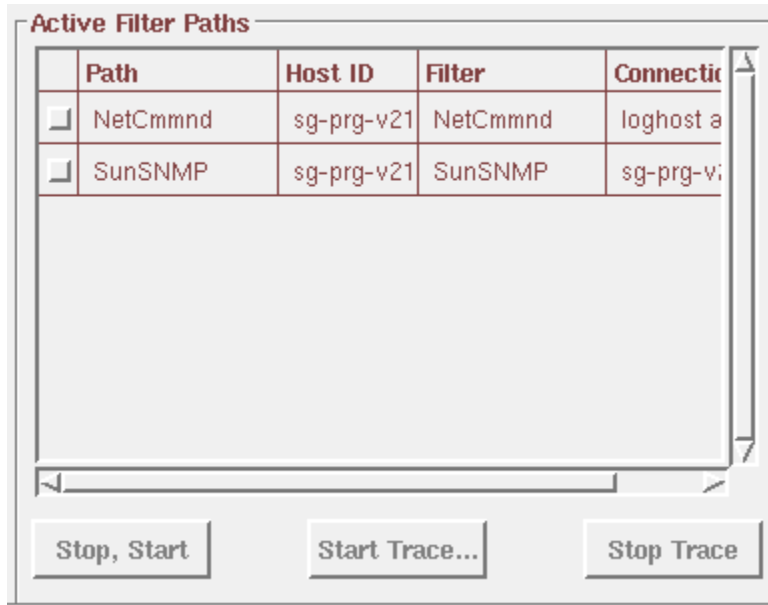
To restart the integration filter path for the Sun Integration Pack, do the following:

1. **In the BMC PEM Console, choose Admin - Filter Path Mgmt.**



The BMC PEM Console displays the Filter Path Management dialog box.

2. **In the Active Filter Paths table, check the SunSNMP entry.**



3. Click the Stop, Start button to restart the filter path and to apply any changes that you have made to configuration files.

If the filter path does not start or terminates unexpectedly shortly after it has been started, it is probably configured incorrectly.

BMC PEM Installation Log

This appendix provides a log file from a sample installation of the Sun Integration Pack.

```
Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager
Installation Utility
Copyright (C) 2007 Sun Microsystems, Inc. All rights Reserved.
```

```
-----
This wizard will guide you through the installation
and configuration of the SunSNMP systems monitoring solution.
```

```
----- STEP 1 -----
```

```
An existing BMC PEM installation has been found
in directory /usr/nc. Please, specify whether you wish
to integrate the SunSNMP solution into this
BMC PEM installation.
```

```
> Use PEM directory /usr/nc (y/n) [y]: y
```

```
----- STEP 2 -----
```

```
Specify the hostname where you plan to run the SunSNMP
filter path.
```

```
> Hostname to run the filter path [pem-server1]: pem-server1
```

```
----- STEP 3 -----
```

```
Specify the port where SunSNMP will listen for incoming
SNMP traps.
```

```
> Port for incoming SNMP traps [162]: 162
```

```
You have specified port 162, which is privileged.
```

```
You will need to perform several manual post-installation
tasks. You will be instructed accordingly once required.
```

```
----- STEP 4 -----
```

```
The system is now ready to copy the SunSNMP files
to the destination directory /usr/nc/Solutions/SunSNMP.
```

```
> Start copying files (y/n) [y]: y
```

```
Creating directory /usr/nc/Solutions/SunSNMP
```

```
Creating directory /usr/nc/Solutions/SunSNMP/bin
```

```
Creating file /usr/nc/Solutions/SunSNMP/bin/stl
```

```
Making /usr/nc/Solutions/SunSNMP/bin/stl Perl executable
```

```
Creating file /usr/nc/Solutions/SunSNMP/bin/pfwd
Making /usr/nc/Solutions/SunSNMP/bin/pfwd Perl executable
Creating file /usr/nc/Solutions/SunSNMP/bin/uninstall
Creating directory /usr/nc/Solutions/SunSNMP/conf
Creating file /usr/nc/Solutions/SunSNMP/conf/filter.conf
Creating file /usr/nc/Solutions/SunSNMP/conf/global.conf
Creating file /usr/nc/Solutions/SunSNMP/conf/nodes.conf
Creating directory /usr/nc/Solutions/SunSNMP/filter
Creating file /usr/nc/Solutions/SunSNMP/filter/SunSNMP.afltr
Creating directory /usr/nc/Solutions/SunSNMP/lib
Creating file /usr/nc/Solutions/SunSNMP/lib/BER.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/CEF.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/CommonConfig.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/Constants.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/Equipment.pm
Creating directory /usr/nc/Solutions/SunSNMP/lib/Getopt
Creating file /usr/nc/Solutions/SunSNMP/lib/Getopt/Long.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/MASF.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/NodeConfig.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/PEMFormatter.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/Schedule.pm
Creating directory /usr/nc/Solutions/SunSNMP/lib/SNMP
Creating directory /usr/nc/Solutions/SunSNMP/lib/SNMP/MIB
Creating file /usr/nc/Solutions/SunSNMP/lib/SNMP/MIB/Compiler.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/SnmpHeartbeat.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/SnmpHelper.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/SNMP_Session.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/SUN_HW_TRAP.pm
Creating file /usr/nc/Solutions/SunSNMP/lib/Utils.pm
Creating directory /usr/nc/Solutions/SunSNMP/logs
Creating directory /usr/nc/Solutions/SunSNMP/mibs
Creating file /usr/nc/Solutions/SunSNMP/mibs/ENTITY-MIB.txt
Creating file /usr/nc/Solutions/SunSNMP/mibs/SNMP-FRAMEWORK-MIB.txt
Creating file /usr/nc/Solutions/SunSNMP/mibs/SNMPv2-CONF.txt
Creating file /usr/nc/Solutions/SunSNMP/mibs/SNMPv2-SMI.txt
Creating file /usr/nc/Solutions/SunSNMP/mibs/SNMPv2-TC.txt
Creating file /usr/nc/Solutions/SunSNMP/mibs/SUN-HW-TRAP-MIB.mib
Creating file /usr/nc/Solutions/SunSNMP/mibs/SUN-PLATFORM-MIB.mib
Creating launcher scripts
```

----- STEP 5 -----

```
The system is now ready to register the SunSNMP solution
with BMC PEM. Since the process cannot be fully automated,
there are some manual actions needed. Please, watch the output
of this installer which will instruct you how to proceed.
> Start component registration (y/n) [y]: y
Checking whether PEM GUI is running
There is no PEM GUI running.
> Do you wish to start BMC PEM GUI (y/n) [y]: y
Starting PEM GUI
Wait until the PEM GUI starts. Then press return.
The installer may exit with an error if you choose to continue
before PEM GUI is fully initialized. If this occurs,
don't close the GUI and re-run the installer.
Converting filter to binary format
Waiting for the filter conversion to complete
Compiling filter engine
Waiting for the filter engine to compile
Defining port alias
Defining path prototype
Defining filter path
Updating database
The installation is now complete.
===== MANUAL POST-INSTALLATION TASKS PENDING =====
Since you have selected a privileged port 162 for incoming
SNMP traps, you need to modify the owner and set the suid bit
of the trap receiver. As user 'root', run the following commands:
chown root:root /usr/nc/Solutions/SunSNMP/bin/pfwd
chmod 4555 /usr/nc/Solutions/SunSNMP/bin/pfwd
Note:
If you don't perform the required post-installation tasks,
the filter path SunSNMP will fail to start.
=====
To update PEM configuration, please, select
'Admin -> Update Configuration' in BMC PEM Console.
Installation log has been saved to
/usr/nc/Solutions/SunSNMP/logs/SunSNMP_install.log
Thank you for installing the Sun Servers Integration 2.0 for BMC PATROL
Enterprise Manager.
```

Sun-Specific BMC PEM Files

This appendix catalogs the Sun-specific files that are installed to your BMC PEM host server by the Install Wizard.

```
/usr/nc/Solutions/SunSNMP/bin/pfwd
/usr/nc/Solutions/SunSNMP/bin/uninstall
/usr/nc/Solutions/SunSNMP/conf/filter.conf
/usr/nc/Solutions/SunSNMP/conf/global.conf
/usr/nc/Solutions/SunSNMP/conf/nodes.conf
/usr/nc/Solutions/SunSNMP/filter/SunSNMP.afltr
/usr/nc/Solutions/SunSNMP/filter/SunSNMP.fltr
/usr/nc/Solutions/SunSNMP/lib/BER.pm
/usr/nc/Solutions/SunSNMP/lib/CEF.pm
/usr/nc/Solutions/SunSNMP/lib/CommonConfig.pm
/usr/nc/Solutions/SunSNMP/lib/Constants.pm
/usr/nc/Solutions/SunSNMP/lib/Equipment.pm
/usr/nc/Solutions/SunSNMP/lib/Getopt/Long.pm
/usr/nc/Solutions/SunSNMP/lib/MASF.pm
/usr/nc/Solutions/SunSNMP/lib/NodeConfig.pm
/usr/nc/Solutions/SunSNMP/lib/PEMFormatter.pm
/usr/nc/Solutions/SunSNMP/lib/Schedule.pm
/usr/nc/Solutions/SunSNMP/lib/SNMP/MIB/Compiler.pm
/usr/nc/Solutions/SunSNMP/lib/SnmpHeartbeat.pm
/usr/nc/Solutions/SunSNMP/lib/SnmpHelper.pm
/usr/nc/Solutions/SunSNMP/lib/SNMP_Session.pm
/usr/nc/Solutions/SunSNMP/lib/SUN_HW_TRAP.pm
/usr/nc/Solutions/SunSNMP/lib/Utils.pm
/usr/nc/Solutions/SunSNMP/mibs/ENTITY-MIB.txt
/usr/nc/Solutions/SunSNMP/mibs/SNMP-FRAMEWORK-MIB.txt
/usr/nc/Solutions/SunSNMP/mibs/SNMPv2-CONF.txt
/usr/nc/Solutions/SunSNMP/mibs/SNMPv2-SMI.txt
/usr/nc/Solutions/SunSNMP/mibs/SNMPv2-TC.txt
/usr/nc/Solutions/SunSNMP/mibs/SUN-HW-TRAP-MIB.mib
/usr/nc/Solutions/SunSNMP/mibs/SUN-PLATFORM-MIB.mib
/usr/nc/bin/sun_stl
```

Sample Global Configuration File (global.conf)

The `global.conf` file sets options for how all Sun devices are monitored in BMC PEM.

```
#####  
# Sun Servers Integration 2.0 for BMC PATROL Enterprise  
# Manager  
# Global config file  
# Note: If any of the options are not listed in this file,  
# default values are used.  
#####  
# Log debug information  
# Valid values: 0 - disabled, 1 - enabled  
# Default: 0  
debug=0  
  
# Log file  
# If no file is listed, messages are printed to standard error  
# output.  
# No default value.  
logfile=  
  
# Enable or disable SNMP GET to retrieve additional data  
# from managed nodes.  
# Valid values: 0 - disabled, 1 - enabled  
# Default: 1  
snmpget=1  
  
# SNMP protocol version to use for sending SNMP GET requests.  
# Valid values: 1, 2c  
# Default: 1  
snmpversion=1  
  
# Default SNMP agent port to send SNMP GET requests to.  
# Default: 161  
snmpagentport=161  
  
# Default SNMP community to use for SNMP GET requests.  
# Default: public  
snmpcommunity=public  
  
# Cache SNMP tables. If enabled, required data from each host  
# listed in nodes.conf will be cached on startup of the  
# filter path.  
# This option is ignored when SNMP GET is disabled.  
# Valid values: 0 - disabled, 1 - enabled  
# Default: 1  
cache=1  
  
# Interval to poll for entLastChangeTime in order to refresh  
# cached equipment tables (in seconds).  
# Default: 600  
cacheinterval=600
```

```
# Enable or disable heartbeat checking. Once enabled, each
# SNMP agent defined in nodes.conf will be periodically
# checked for availability and an alert will be generated
# if the node does not respond.
# Valid values: 0 - disabled, 1 - enabled
heartbeat=1

# Heartbeat interval - specifies how often to perform
# heartbeat checking of remote SNMP agents (in seconds).
# Default: 300
heartbeatinterval=300

# Perform IP<->hostname resolution
# Valid values: 0 - disabled, 1 - enabled
# Default: 1
hostresolve=1

# Apply implicit trap filter - traps that don't contain useful
# information will be ignored.
# Valid values: 0 - false, 1 - true
# Default: 1
implicitfilter=1
```

Sample Filters Configuration File (`filter.conf`)

The `filter.conf` configuration file specifies trap OIDs for messages that should not be passed along for processing.

Configuration Options

The `filter.conf` configuration file provides the name and OID for all the Sun-specific messages in the templates installed with the Sun Integration Pack. To filter a message out before it gets processed by BMC PEM, uncomment the line beginning with `#ignore`.

Sample Configuration File

```
#####
# Sun Servers Integration 2.0 for BMC PATROL Enterprise
# Manager
# Trap Filter Configuration File
#####
# CUSTOM TRAP FILTER
# Uncomment the 'ignore' statements to filter out the
# specified trap types.
# With implicit filter enabled, custom ignore statements
# provide second level of trap filtering. Implicit
# filter will be applied first.
#-----
# SUN-PLATFORM-MIB TRAPS
#-----
# sunPlatObjectCreation
#ignore=1.3.6.1.4.1.42.2.70.101.2.0.1
. . .
#-----
# SUN-HW-TRAP-MIB-TRAPS
#-----
# sunHwTrapVoltageFatalThresholdExceeded
#ignore=1.3.6.1.4.1.42.2.175.103.2.0.1
. . .
```


Sample Nodes Configuration File (nodes.conf)

The `nodes.conf` configuration file lists monitored nodes and configuration information about each node. If you enable the SNMP Heartbeat Module in the `global.conf` configuration file, it reads this `nodes.conf` file when it tests monitored systems.

Configuration Options

Each entry in `nodes.conf` consists on one line. Each line contains the following tab-separated parameters.

Parameter name	Parameter Values
<hostname or ip>	The hostname or IP address of the server to be tested by the SNMP Heartbeat Module.
<agent_port>	The SNMP port setting for the server to be tested by the SNMP Heartbeat Module.
<community>	The name of the community string for the server to be tested by the SNMP Heartbeat Module.
<snmp_get_version>	The version of SNMP running on the server to be tested by the SNMP Heartbeat Module. Possible values are: 1 and 2c.

Sample Configuration File

```
#####
# Sun Servers Integration 2.0 for BMC PATROL Enterprise
# Manager
#
# Managed nodes configuration file
#
# This file holds information about SNMP agents running
# on remote managed nodes. There can be just one agent
# per node.
#####
# syntax:
# <hostname_or_ip> <agent_port> <community> <snmp_get_version>
# snmp_get_version valid values: 1, 2c
server1.mydomain.com    161    public    2c
```

server2.mydomain.com	9000	admins	2c
10.14.35.105	8888	public	1

Sample Hardware Management Agent (MASF) Configuration File (snmpd.conf)

This appendix provides a sample Hardware Management Agent (MASF) configuration file for managed nodes. The configuration file is /etc/opt/SUNWmasf/conf/snmpd.conf.

```
#####
# snmpd.conf
#####
# SECTION: Access Control Setup
#   This section defines who is allowed to talk to your running snmp agent.

# rwcommunity: a SNMPv1/SNMPv2c read-write access community name
#   arguments:  community [default|hostname|network/bits] [oid]
rocommunity public
#####
# SECTION: Agent Operating Mode
#   This section defines how the agent will operate when it is running.

# agentaddress: The IP address and port number that the agent will listen on.

#   This allows you to specify which address, interface, transport type
#   and port(s) that you want the agent to listen on. Multiple definitions
#   of this token are concatenated together (using ':'s).

#   arguments: port[@interface/address],...
agentaddress 9000

# agentuser: The user the agent should run as after it has opened the port.
agentuser daemon

# agentgroup: The group the agent should run as after it has opened the port.
agentgroup daemon
#####
# SECTION: Trap Destinations
#   Here we define who the agent will send traps to.

# trapsink: A SNMPv1 trap receiver

#   arguments: host [community] [portnum]
```

```
# trapsink machinename
# trap2sink: A SNMPv2 trap receiver
# arguments: host [community] [portnum]
trap2sink pemsrver.mydomain.com 1234

#####
# SECTION: Trap compatibility mode (Sun Microsystems RFE 6529451)
# Here we define if the agent will send MASF traps in old style mode
# for compatibility or in new style mode (which includes the varbind
# 'sunPlatNotificationAdditionalText' in all traps in the Sun Platform MIB.

# To maintain compatibility with releases snmp/masf 1.5.1 and earlier,
# leave this entry commented-out. To force the inclusion of this varbind
# in the snmp/masf traps, uncomment this line and this varbind will contain
# 'NAC names' which are object name paths (in ascii) that represent
# the object (entity) that is the cause of the trap event.

SUNW_alwaysIncludeEntPhysName yes

# (end of snmpd.conf for snmp/masf)
```

What's New?

There have been additions and improvements to the functionality of the Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager. These enhancements fall into three areas:

- Support for new Sun servers and software
- Improved SNMP sensor reporting
- Other Sun Integration Pack enhancements for BMC PEM

The following sections address each of these areas.

Support for New Sun Servers and Software

The Sun Integration Pack now supports the following new Sun servers and updated Sun system management software.

Category	Enhancements
New servers	x64/ILOM servers
Updated software	Integrated Lights Out Manager (ILOM) Version 2.0
Updated agents	Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems SUN-HW-TRAP-MIB (for ILOM 2.0)

A complete and current list of supported Sun servers, service processors, and service processor firmware is available at the following web site:

<http://www.sun.com/systemmanagement/tools.jsp>.

Please consult this web site before installing the Sun Integration Pack.

Improved SNMP Sensor Reporting

The Sun Integration Pack now supports two much-improved SNMP agents:

- *Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems*: The Hardware Management Agent now includes additional fields for many traps.

This additional information allows for better identification of device sensors and better handling of situations where the operating system of a server crashes and compromises sending SNMP information to BMC PEM.

- *SUN-HW-TRAP-MIB Mib*: For Sun servers supporting ILOM 2.0, the SUN-HW-TRAP-MIB supplants the PET MIB in generating SNMP traps. The SUN-HW-TRAP-MIB provides more consistent coverage of sensors and more detailed information about sensors.

Other Sun Integration Pack Enhancements for BMC PEM

SNMP Heartbeat Module for Monitoring Nodes

The Sun Integration Pack now provides a module that periodically checks all the nodes listed in the `nodes.conf` configuration file. The module queries the `sysUptime` OID for each node to determine whether the agent on the monitored node is functioning. If the agent is not functioning, the module generates an alert. You enable, disable, and configure this module in the `global.conf` configuration file.

Sun SNMP MIBs

Many Sun system management integration packages depend on the SNMP protocol and use one or more of the following Sun SNMP MIBs:

- **ENTITY-MIB:** This MIB is used by all SNMP agents to monitor and to describe the physical and logical elements of a managed system. The operation of this MIB is described in the Sun publication *Sun SNMP Management Agent Administration Guide for Sun Blade, Sun Fire and Netra Servers* (819-7978).

Filename: ENTITY-MIB.mib

Note: The ENTITY-MIB is not used with integrations based exclusively on SNMP traps.

- **SUN-PLATFORM-MIB:** This MIB is used by Solaris-based servers to extend the ENTITY-MIB Physical Entity Table to represent new classes of component and the Logical Entity Table to represent high value platform and server objects. This MIB supplies the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems with traps. The operation of this MIB is described in the Sun publication *Sun SNMP Management Agent Administration Guide for Sun Blade, Sun Fire and Netra Servers* (819-7978).

Filename: SUN-PLATFORM-MIB.mib

- **SUN-ILOM-PET-MIB:** This MIB enables management platforms that are not IPMI compliant to partly decode standard IPMI Platform Event Traps (PETS) generated by the ILOM v1.x and Embedded LOM service processors.

Filename: SUN-ILOM-PET-MIB.mib

- **SUN-HW-TRAP-MIB:** This MIB replaces and enhances the SUN-ILOM-PET MIB for ILOM 2.0 systems.

Filename: SUN-HW-TRAP-MIB.mib

To view a summary of the entries in these MIBs or to download them, consult the following Sun web site:

<http://www.sun.com/systemmanagement/tools.jsp>

Release Notes

Default Message Format for Sun Servers Integration 2.0 for BMC PATROL Enterprise Manager

The default message format for this release of the Sun Integration Pack is now CEF V2R1M0, that is Common Event Format, version 2, release 1, modification 0. The structure of the message looks as follows:

```

%%~ cefVersion %%~ eventType %%~ originDateTime %%~ originClass
%%~ origin %%~ originKey %%~ originEventClass %%~
originSeverity %%~ domainClass %%~ domain %%~ objectClass %%~
object %%~ objectLocation %%~ objectStaff %%~ itMgmtLayer %%~
service %%~ customer %%~ itMgmtProcess %%~ itMgmtProcessState
%%~ parameter %%~ parameterValue %%~ freeText %%~

```

The tokens comprising this message format take the following token values.

Token	Token Values
cefVersion	BMCCEFV2R1M0
eventType	ALARM
originDateTime	Date format: 10AUG2007_10:30:00_GMT+0
originClass	SUN
origin	OS_SNMP_AGENT or SERVICE_PROCESSOR
originKey	NA
originEventClass	NA
originSeverity	Single integer [0 .. 5]
domainClass	SOLARIS or ILOM
domain	Hostname or IP address of the monitored node
objectClass	HW/object: sensor or entity name
objectLocation	Value of the sysLocation object if set in the SNMP agent, NA otherwise

Token	Token Values
objectStaff	Value of the sysContact object if set in the SNMP agent, NA otherwise
itMgmtLayer	SERVER
service	NA
customer	NA
itMgmtProcess	AVAILABILITY or CONFIGURATION or SECURITY or NA
itMgmtProcessState	AVAILABLE or UNAVAILABLE or VIOLATION or ON or OFF or CHANGED or NA
parameter	CERTAINTY or HDD_STATE or HA_STATE or STATE
parameterValue	REACHABLE or UNREACHABLE or freeform text or NA
freeText	Event description

Glossary

This appendix provides terminology for both BMC PEM and Sun system management technologies.

BMC PEM Terminology

The following terminology references BMC PEM system management technologies.

Acronym	Term	Definition
AAD	Active Alert Display	AAD is the tool that displays multiple views of alerts.
	console	The console provides a graphical interface to its library of management tools.
	filter path	Filter paths are a pipeline of processes that read messages from the network, transform them (if necessary), recognize significant messages, and create PATROL EM events that in turn create alerts.
	token	A token represents a category of data that is extracted from managed devices via SNMP and displayed in a column in one of the BMC PEM tools.

Sun System Management Terminology

The following terminology references Sun-specific system management technologies.

Acronym	Term	Definition
ALOM	Advanced Lights Out Manager	Sun Advanced Lights Out Manager (ALOM) consists of service processor hardware and firmware that supports the remote monitoring of Sun SPARC servers.
ELOM	Embedded Lights Out Manager	Sun Embedded Lights Out Manager consists of service processor hardware and firmware that supports the remote monitoring and management of Sun servers through IPMI and SNMP interfaces.

Acronym	Term	Definition
ILOM	Integrated Lights Out Manager	Sun ILOM consists of service processor hardware and firmware that supports the remote monitoring and management of Sun servers through IPMI and SNMP interfaces.
MASF	Sun SNMP Management Agent for Sun Fire and Netra Systems	The Sun MASF agent provides SNMP integration between Sun SPARC-based servers and management hosts.

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