

Integrating Dell PowerEdge Servers into an Environment Managed by HP Systems Insight Manager 5.0

Dell OpenManage
Systems Management

Dell White Paper

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Contents

Introduction	4
Test Configuration	6
Typographical Conventions	6
Loading and Configuring Server Administrator	7
What SNMP configuration should I use?	7
Using the Dell Installation and Server Management CD to load the OS and SNMP	8
SNMP Configuration after OS installation	8
Loading Server Administrator	9
Testing	11
Loading the Dell MIBs	12
Uploading the Dell MIBs	13
Compiling the MIBs	13
Registering the MIBs	14
System Type Manager	15
Discovering New Dell Servers	20
Setting Global Protocol Settings	20
Manually Discovering a Dell Server	21
Testing for Events	22
Generate an Event	22
Results	24
Limitations and Caveats:	24
Appendix A – Dell MIBs	25
Essential Server MIBs	25
Network Interface Adapters	25
Other Adapters, Devices, and Software	26
Legacy MIBs	26

Figures

Figure 1: Architecture of the Tested Environment.....	6
Figure 2: Setting Traps and Security	9
Figure 3: Custom Setup Installation Options.....	10
Figure 4: Testing the PowerEdge Server with SNMPWALK	11
Figure 5: Dell MIBs on http://support.dell.com	12
Figure 6: Running mcompile and mxmib	14
Figure 7: Retrieve OID from system	16
Figure 8: Retrieve variable from MIB.....	17
Figure 9: Get response.....	18
Figure 10: Completed System Type Dialog.....	19
Figure 11: Global Protocol Settings	20
Figure 12: Manual Discovery	21
Figure 13: All Events	23

Introduction

In response to the pressure for increased productivity of system administrators, server vendors have responded with management tools. Dell's offering is the Dell™ OpenManage™ suite of products. While these products cover software deployment, hardware configuration, asset management, remote support, and system health monitoring, this paper is focused on monitoring system health on a collection of servers.

To do this using Dell's OpenManage tools, OpenManage Server Administrator instrumentation is installed on supported* Dell PowerEdge™ servers, and one instance of OpenManage IT Assistant is installed and configured for monitoring the instrumented PowerEdge servers. Errors detected by Server Administrator are then forwarded via Simple Network Management Protocol (SNMP) to IT Assistant, where they are logged and can generate email and paging notifications.

Since a Hewlett-Packard Systems Insight Manager™ 5.0 environment has the same architecture, it is possible to integrate instrumented Dell PowerEdge servers into HPSIM by taking advantage of the industry standard interfaces of SNMP and Hypertext Transport Protocol – Secure (HTTPS) in Server Administrator. This allows administrators to continue to use their existing HPSIM-based notification processes while fully benefiting from the use of Server Administrator on supported* Dell servers.

HPSIM 5.0 has some built-in third-party device support, including some Dell servers. In some cases the Dell server can be detected and managed from the default HPSIM installation without any further customization. However, the built-in third-party device support may not be comprehensive, especially for newer PowerEdge models, and it is recommended that the Dell-provided MIBs are used to monitor Dell servers.

This paper details the specific steps needed to add a Dell PowerEdge server running Microsoft® Windows® 2000 Server or 2003 Standard Server to an environment currently being managed by HPSIM 5.0. To add a server running NetWare® or Linux®, the HPSIM and OpenManage Server Administrator configuration would be the same, with the primary difference being how OpenManage is installed and SNMP is configured at each managed PowerEdge server.

At a high level, the steps for integrating Dell PowerEdge servers into an environment managed by HP Systems Insight Manager are:

1. Load and configure OpenManage Server Administrator on the Dell server so it can communicate with HPSIM.
2. Load Dell MIBS into HPSIM so it can properly communicate with Server Administrator.
3. Configure HPSIM to recognize Dell servers.
4. Generate some test events.

** The Compatibility Matrix for Server Administrator is available on <http://support.dell.com> under Server Administrator documentation. For example, to see the list of Server Administrator version 2.2 and earlier supported applications and systems, please see the compatibility matrix at <http://support.dell.com/support/edocs/software/svradmin/2.2/en/CompGD/4admnver.htm#1072727>.*

Test Configuration

To provide an example of how to integrate Dell PowerEdge servers into an environment managed by HP Systems Insight Manager 5.0, two Dell PowerEdge servers were configured to report to one instance of HPSIM. Windows Server 2003 was installed on a Dell PowerEdge 500SC, Windows 2000 Server was installed on a PowerEdge 2650, and Windows XP Professional was installed on a Dell Precision M70. The Dell Installation and Server Management CD 4.5, which includes Server Administrator 2.2 and Storage Management Service 1.2, was used to install the operating system and management software on both Dell PowerEdge servers. HP Systems Insight Manager 5.00.00.02 was installed on the Dell Precision M70 along with HPSIM's default installation of MSDE.

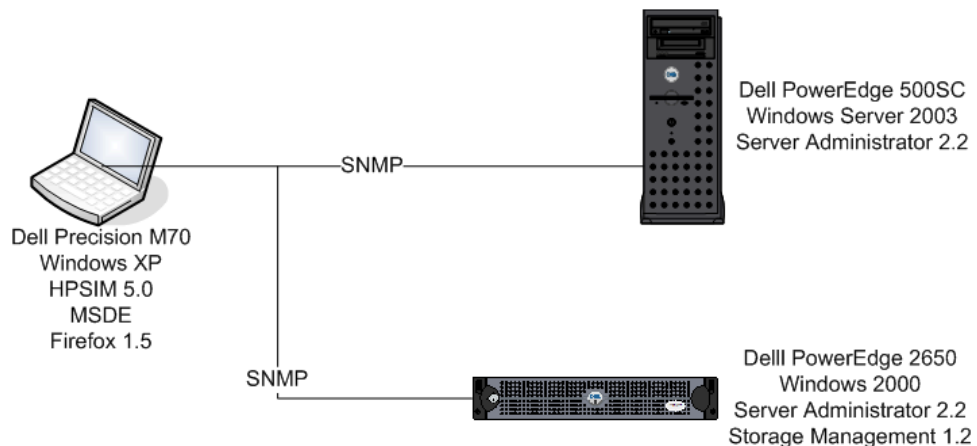


Figure 1: Architecture of the Tested Environment

Typographical Conventions

For clarity of navigation of this paper, the following conventions are used:

Bold is used to indicate the title of a window, button, or link.

Italics indicates notes

Underlined text indicates a URL.

Loading and Configuring Server Administrator

The first step is to properly load and configure the Dell server as the managed system to talk to HPSIM 5.0. If the operating system (OS) has not yet been loaded, then the easiest process is to use the Dell Installation and Server Management CD to both load Microsoft Windows and configure SNMP. If the OS has already been loaded, then only SNMP needs to be installed and configured. Once SNMP is configured, OpenManage Server Administrator can be installed.

What SNMP configuration should I use?

The default SNMP community name is “public”, but using that could allow a rogue management station to access your servers. The SNMP community name is like a password both HPSIM and Server Administrator need to communicate. To enhance security, access can be read-only. This prohibits using SNMP to make changes to the server, such as changing threshold settings or shutting it down, but allows Server Administrator to send alerts to a console when status changes. A Dell PowerEdge server can function in a read-only SNMP environment, but it is possible that other devices need SNMP set to read-write.

If the intent were for HPSIM and IT Assistant to coexist in the network to provide the full OpenManage capabilities, then it would be necessary to configure the Dell PowerEdge server with read-write SNMP permissions. In this way IT Assistant can perform configuration settings remotely on the managed Dell server. Note that Dell secures Read Write operations using SNMP only to come from Dell OpenManage IT Assistant.

SNMP trap destinations also need to be specified. These are the hostnames or IP addresses of one or more systems that are to receive notification of events.

For this paper, the community name of *showcase* with read-only rights was used with a single trap destination to the Precision M70 running HPSIM. These settings need to be made on each Dell server added to the environment.

Using the Dell Installation and Server Management CD to load the OS and SNMP

One of the CDs that ships with every Dell PowerEdge server is the “Dell Installation and Server Management CD”. This CD is bootable and is used to perform a complete operating system installation from local media. It copies the operating system installation files to the server and automatically integrates the appropriate Dell drivers and software in to the OS installation files.

The PowerEdge 2650 and 500SC in the configuration tested for this paper were booted from the Dell Installation and Server Management CD and the menus were followed until the **Enter Configuration Information for: Microsoft Windows 200x Server** screen was reached. On that screen, the **Advanced** button was clicked to show the additional settings that can be set by Server Assistant. **“Install SNMP”** is checked by default, but it is also necessary to enter a **Community Name** and **Trap Destination** and change the Accepted Community Names from “public:Read_Only” to “showcase:Read_Only”. The rest of the defaults can be left unchanged.

SNMP Configuration After OS installation

If the Server Assistant CD has not been used to load the OS and configure SNMP, then the following steps should be performed. The first is to ensure that the SNMP component is installed. After selecting the “Add/Remove Windows Components” in the left hand of the Add/Remove Programs dialog box of the Control Panel, the Windows Components are displayed. Highlighting “Management and Monitoring Tools” and then selecting “Details” brings up the option to check Simple Network Management Protocol (SNMP).

After the SNMP service is installed, its parameters can be set by right-clicking on the SNMP service in Service Manager to open the Properties panel. Here, the community name of *showcase* and trap destination can be set in the security and traps tabs. These are shown in Figure 2.

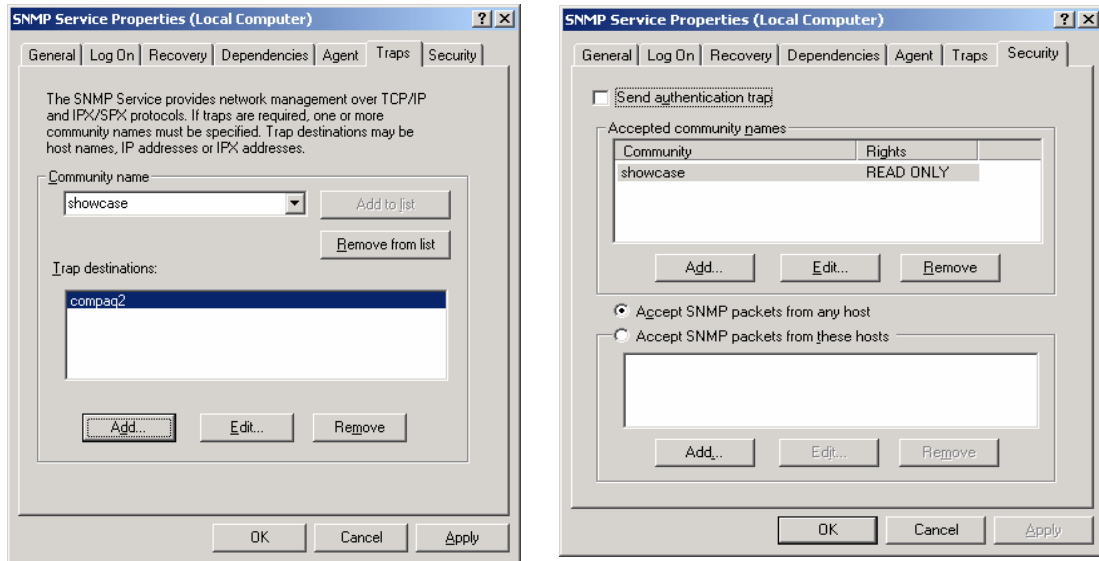


Figure 2: Setting Traps and Security

Loading Server Administrator

Server Administrator is distributed on the Dell Installation and Server Management CD. Documentation is available online at <http://docs.us.dell.com/support/edocs/Software/svradmin/> or on the Product Documentation CD. Note that the CD has a version that denotes the release of all OpenManage applications (such as version 4.5), but that the specific version of Server Administrator (such as 2.2) is on that CD.

Although manually loading Server Administrator on a single server is covered in this paper, it is possible to completely script and automate the install. For more information see

<http://support.dell.com/support/edocs/software/smsom/4.4/en/ug/index.htm>.

Double-clicking the “Install Server Administrator” icon on a system loaded with the Dell Installation and Server Management CD, or Inserting the Dell Installation and Server Management CD, will invoke the Server Administrator installation program. The user input is as follows:

1. At the Prerequisite screen check that there are no critical errors or warnings and click **Install, Modify, Repair, or Remove Server Administrator**.
2. At the welcome screen click **Next>**.
3. Read the License Agreement, then highlight **I Accept...** and click **Next>** if you agree with its terms.

4. Highlight **Custom** and click **Next>**. The Custom Setup window will appear.

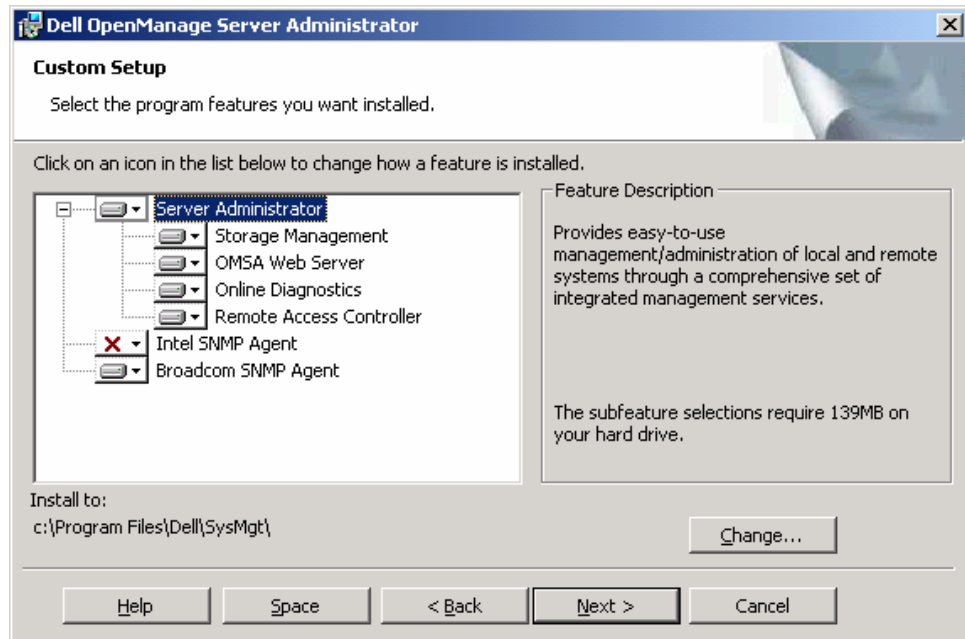


Figure 3: Custom Setup Installation Options

5. The Custom Setup window will display the components that will be installed. Click **Next>**.
6. Click **Install** to install the selected OpenManage components.
7. Click **Finish** and reboot if prompted to do so.

Testing

After the reboot, Server Administrator should be checked to see that it is operating correctly. This can be done in the following steps:

1. Login to the server as Administrator or other account with administrator membership.
2. Launch Server Administrator from the desktop icon or open a browser and enter https://IP_or_SystemName:1311 where IP_or_SystemName is the IP address or network name of the system.

The address https://IP_or_SystemName:1311 can be used from any system with network access to the server to access Server Administrator.

3. Log in to Server Administrator as Administrator or other account with administrative privileges.
4. Select **System** in the left-hand navigation tree. The status icons should all be green checks to indicate an error free status

At this point, everything should be working correctly on the Dell system. A further check would be to use snmpwalk, which is part of Win32tools available at <http://www.wtcs.org/snmp4tpc/redirect.htm>. As shown in Figure 4 below, the command saves all available SNMP information available via community string *showcase* on system 192.168.30.4 to the file dellserver.txt. Provided that DNS or WINS is properly configured for the new Dell Server system, its name can be used instead of the IP address.

```
Snmwalk 192.168.30.4 -c showcase > dellserver.txt
```

Figure 4: Testing the PowerEdge Server with SNMPWALK

When opening dellserver.txt with Notepad, there should be entries with 10892 in the OID that were returned from Server Administrator. Specifically, 1.3.6.1.4.1.674.10892.1.300.10.1.9.1 will contain the model of the server. Running this from the system hosting HPSIM tests network connectivity, that the community string is correct, and that Server Administrator is providing the expected information.

Loading the Dell MIBs

Dell MIB files can be found under downloads on <http://support.dell.com>. After selecting the system type and operating system, “Dell MIBs for PowerEdge” can be found under “Systems Management” as follows:



Figure 5: Dell MIBs on <http://support.dell.com>

After downloading and executing the package, the Dell MIBs for PowerEdge servers are expanded to `c:\DCMIBxx`, where `xx` represents the version of the downloaded package. In general the version of the MIB package matches that of the associated OpenManage release and these versions should match. For example, because OpenManage release 4.5 was used for server instrumentation for this paper, the DCMIB45 MIBs were also used.

The two essential MIBS are:

- 10892, which provides detailed information about the systems monitored by Server Administrator instrumentation software such as: system type, voltages, temps, etc. It is the primary MIB for PowerEdge systems. Detailed information can be found at <http://support.dell.com/support/edocs/software/svradmin/2.2/en/SNMP/index.htm>.

- `dcstorag`, which provides detailed information about the storage hardware components and RAID configurations monitored by Server Administrator's Storage Management Service. Detailed information can be found at <http://support.dell.com/support/edocs/software/svradmin/2.2/en/SNMP/snmpc25.htm#wp1194853>

A number of other MIBs are included on the DCMIBxx download package, but are beyond the scope of this paper. A description of all the MIBs and their use is documented in Appendix A.

Uploading the Dell MIBs

Uploading the MIBs is simply copying them from the DCMIBxx folder to the `\Program Files\HP\System Insight Manager\mibs` folder

1. Copy `10892.mib` and `dcstorag.mib` from the DCMIBxx folder to `\Program Files\HP\System Insight Manager\mibs`
2. Because HPSIM generates an error when a MIB has a filename that contains only numbers, rename `\Program Files\HP\System Insight Manager\mib\10892.mib` to `new10892.mib`, and for consistency also rename `dcstorag.mib` to `newdcstorag.mib`.

dell10892.mib and dellarymgr.mib (used with Dell's older Array Manager storage management tool) already exist in this folder because they come with the default installation of HPSIM. It is recommended that these names be avoided for the new files to avoid confusion with the HP- and Dell-provided MIBs.

Compiling the MIBs

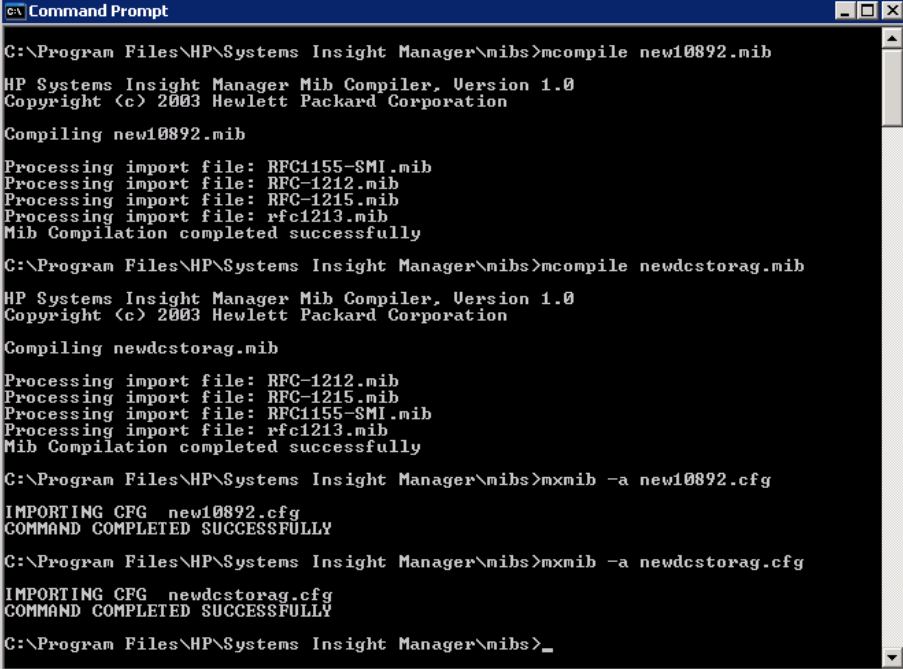
Compiling the MIBs creates an intermediate `.cfg` file that HPSIM can later register. To compile the Dell MIBs:

1. Open a command window (`cmd.exe`).
2. Using the `cd` command, change working directory to `\Program Files\HP\System Insight Manager\mibs`.
3. Enter the command `mcompile new10892.mib`. The MIB should compile and return the message "Mib Compilation completed successfully".
4. Enter the command `mcompile newdcstorag.mib`. The MIB should compile and return the message "Mib Compilation completed successfully".

Registering the MIBs

Registering MIBs to HPSIM is the process that maps the SNMP information received from the Dell server to numbers and character strings that can then be used for identification and notification messages. Register both essential MIBs as follows:

1. Enter the command **mxmib -a new10892.cfg**. The cfg file should register and return the message "COMMAND COMPLETED SUCESSFULLY!".
2. Enter the command **mxmib -a newdcstorag.mib**. The cfg file should register and return the message "COMMAND COMPLETED SUCESSFULLY!".



```
c:\ Command Prompt
C:\Program Files\HP\System Insight Manager\mibs>mcompile new10892.mib
HP Systems Insight Manager Mib Compiler, Version 1.0
Copyright (c) 2003 Hewlett Packard Corporation
Compiling new10892.mib
Processing import file: RFC1155-SMI.mib
Processing import file: RFC-1212.mib
Processing import file: RFC-1215.mib
Processing import file: rfc1213.mib
Mib Compilation completed successfully
C:\Program Files\HP\System Insight Manager\mibs>mcompile newdcstorag.mib
HP Systems Insight Manager Mib Compiler, Version 1.0
Copyright (c) 2003 Hewlett Packard Corporation
Compiling newdcstorag.mib
Processing import file: RFC-1212.mib
Processing import file: RFC-1215.mib
Processing import file: RFC1155-SMI.mib
Processing import file: rfc1213.mib
Mib Compilation completed successfully
C:\Program Files\HP\System Insight Manager\mibs>mxmib -a new10892.cfg
IMPORTING CFG new10892.cfg
COMMAND COMPLETED SUCESSFULLY
C:\Program Files\HP\System Insight Manager\mibs>mxmib -a newdcstorag.cfg
IMPORTING CFG newdcstorag.cfg
COMMAND COMPLETED SUCESSFULLY
C:\Program Files\HP\System Insight Manager\mibs>_
```

Figure 6: Running mcompile and mxmib

System Type Manager

When a new system is detected via a ping sweep or when receiving a SNMP Trap, it is added to the HPSIM database. The System Type Manager then does a sequence of queries to the new device to determine its identity. The steps below configure HPSIM to look for specific information in the Dell-provided MIBs to tell System Type Manager that the device found is a PowerEdge server. This only needs to be done once, as all Dell servers running Server Administrator appear the same way to HPSIM.

The steps used to configure the Device Type Manager to recognize a Dell Server are:

1. Start and log in to HPSIM.
2. Select **Options** -> **Manage System Types**.
3. On the **Product model identification rules** list, scroll down and select **Dell Server** with the **SNMP** protocol.
4. To prevent confusion and simplify administration, click the **Delete** button to delete the existing Dell Server entry, and click **OK** to confirm.
5. Click the **New...** button. The **New Rule** pane will open below.

While values may be manually entered in the dialog boxes presented in the New Rule window, querying a Dell server for these values prevents typographical errors and provides verification that SNMP communication is working properly. In this vane, the querying tools within the New Rule window will be used.

6. Beside **System object identifier** click the **Retrieve from system...** button. The Retrieve from system pane will appear below the current pane.
7. In the **Retrieve from system** pane change the **Community string** to **showcase**.
8. Enter the **hostname** or **IP address** of the target Dell system in the **Target hostname** or **IP address** text box.

9. Click **Get Response**. Note that the response value of 1.3.6.1.4.1.311.1.1.3.1.2 is displayed below. This is a generic Windows response value and indicates that SNMP communication is working properly.

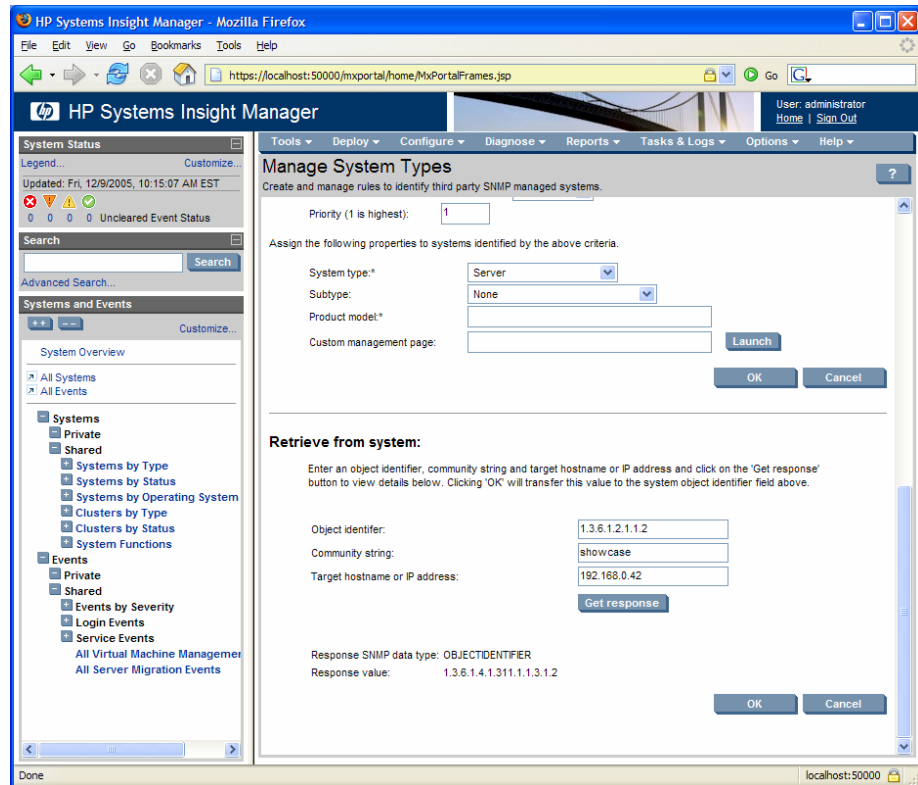


Figure 7: Retrieve OID from system

10. Click the **OK** button to accept this value and return to the New rule pane.
11. Beside **MIB variable object identifier** click the **Retrieve from MIB** button. The Retrieve from MIB pane will appear below the current pane.
12. Beside **MIB definition file name** choose **new10892.mib** from the list.

13. Beside **MIB variable name** choose **systemManagementSoftwareName**.

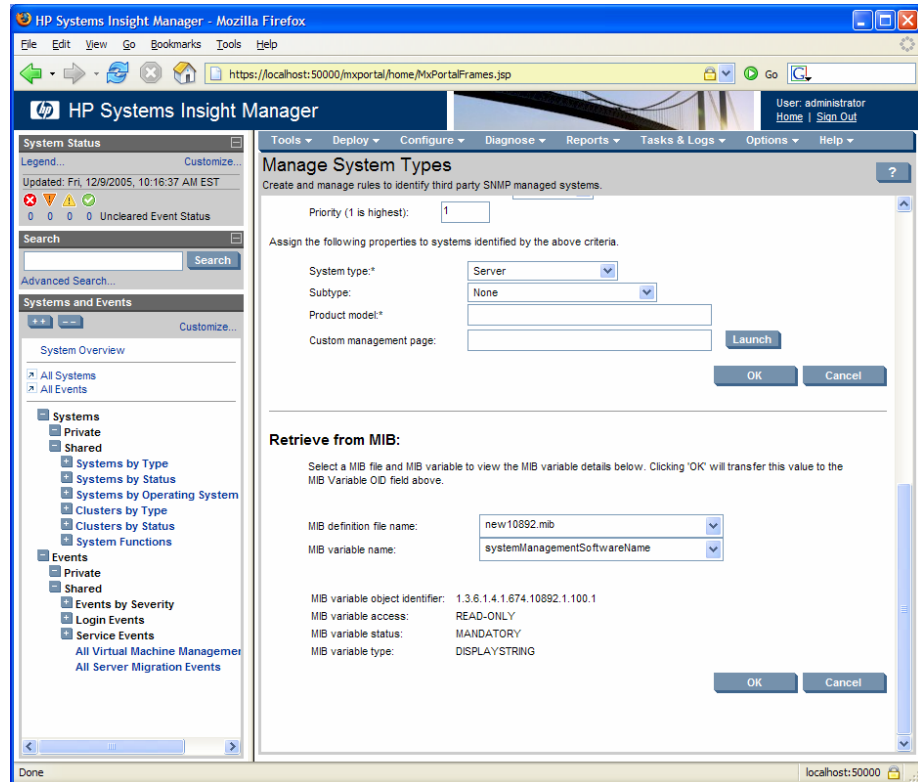


Figure 8: Retrieve variable from MIB

14. Click the **OK** button to accept this value and return to the New rule pane.
15. Beside **Object value** click the **Retrieve from System** button. The Retrieve from system pane will appear below the current pane.
16. Change the **Community string** to **showcase**.

17. Click the **Get response** button. Note that the response value is "Server Administrator".

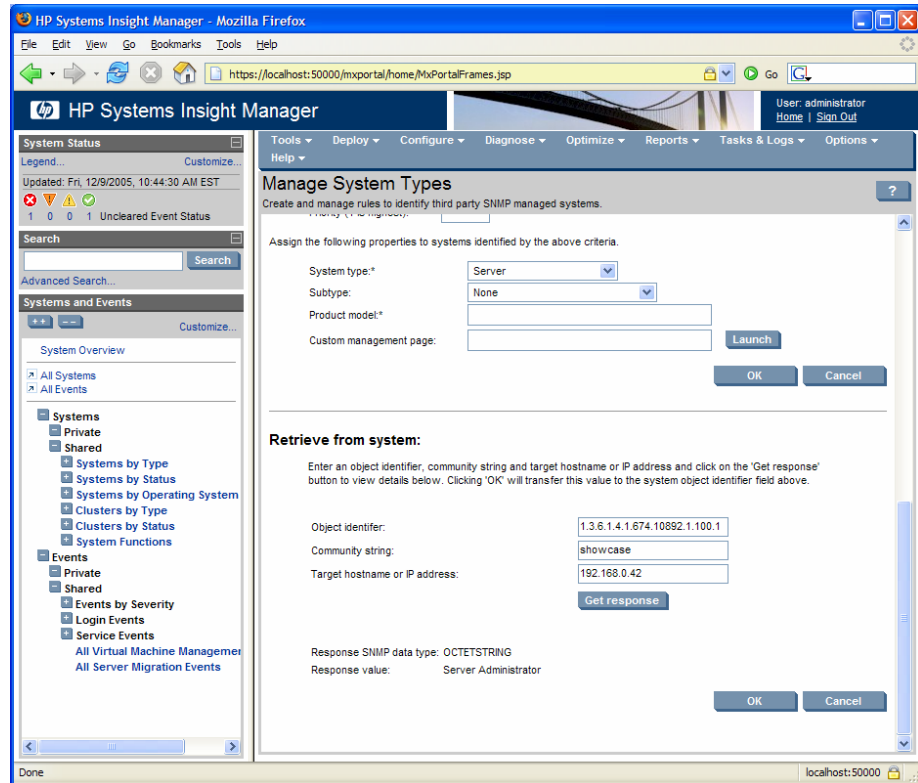


Figure 9: Get response

18. Click the **OK** button to accept this value and return to the New rule pane.
19. Beside **Compare rule** select **starts with**.
20. Beside **Product model** enter **Dell Server**.

21. Leave the **Custom management page** field blank and click the **OK** button. *HPSIM is already programmed to redirect users to Server Administrator for server administration on Dell servers.*

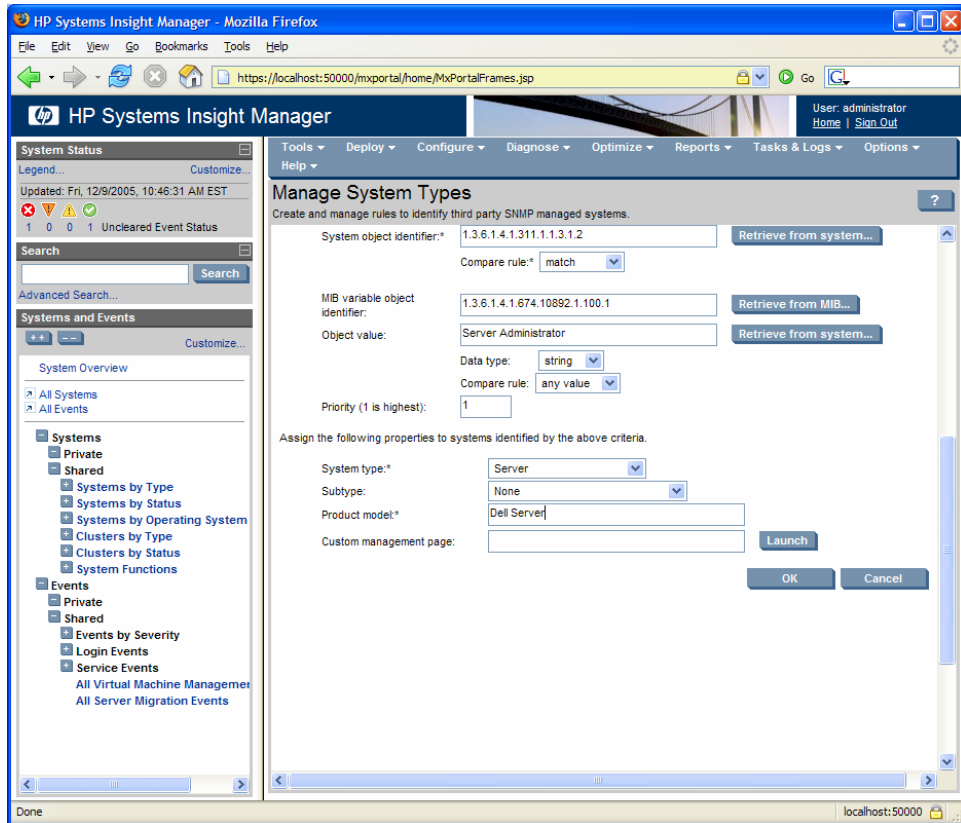


Figure 10: Completed System Type Dialog

Discovering New Dell Servers

Now that the new Dell Server device type has been added to the HPSIM database, HPSIM can properly discover and identify Dell PowerEdge servers. The following is an example of performing a manual discovery of the Dell server for the purpose of providing an example for this paper. In your environment the discovery settings will most likely be different.

Setting Global Protocol Settings

Even though the community string of **showcase** was set in SNMP setting previously, the appropriate default community string must be set in HPSIM's Global Protocol Settings. To change this setting:

1. Click **Options** -> **Protocol Settings** -> **Global Protocol Settings**. The Global Protocol Settings window will appear.
2. Scroll down to the **Default SNMP settings** section and enter **showcase** beside **Default 1**.

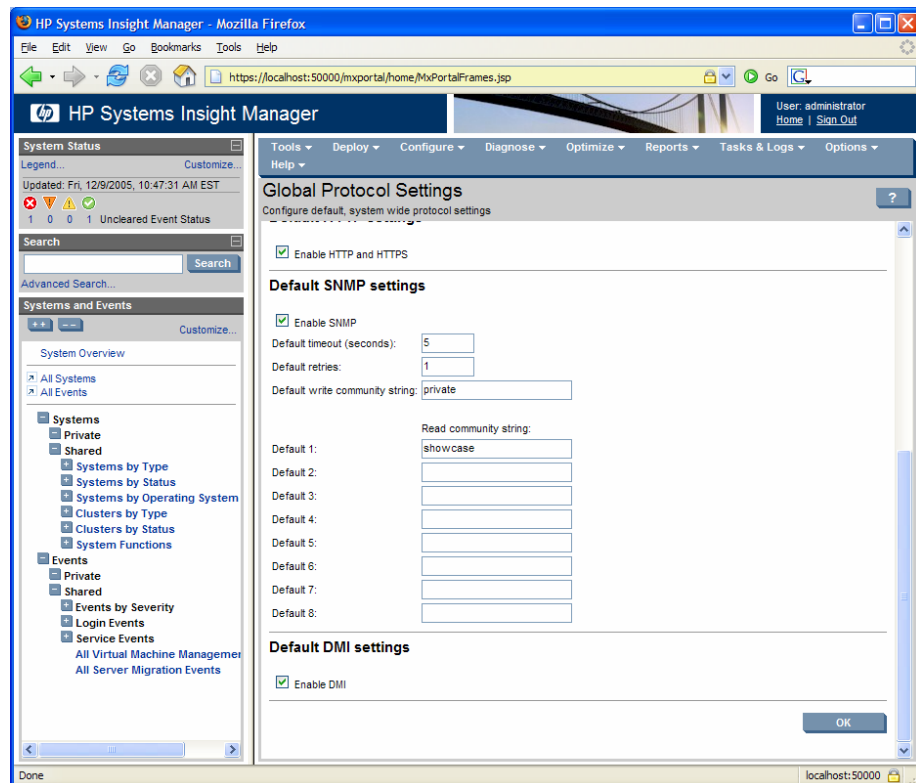


Figure 11: Global Protocol Settings

3. Click the **OK** button at the bottom of the window to accept this change.

Manually Discovering a Dell Server

1. Click **Options** -> **Discovery**. The Discovery - Automatic window will appear.
2. Click the **Manual** tab.
3. Enter the **System name** or **IP address** of the Dell server and click the **Add System** button.

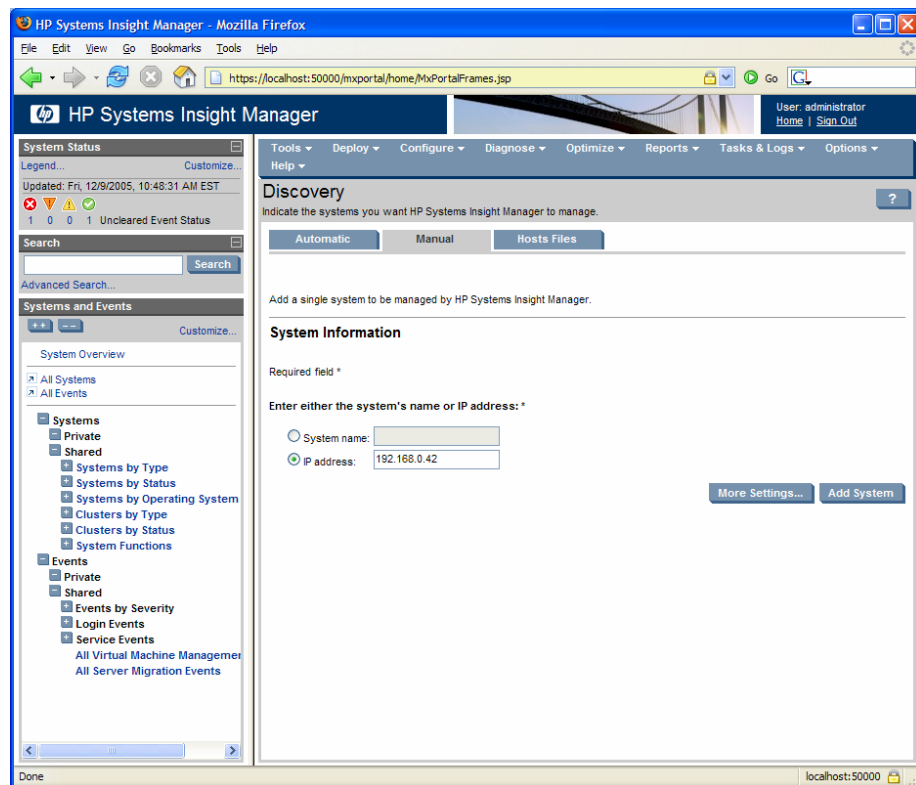


Figure 12: Manual Discovery

4. Click **OK** to confirm the dialog box.
5. In the **Systems and Events** frame on the left-hand side of the screen, click **All Systems**. The Dell server should now be listed in the **All Systems** frame on the right.

Testing for Events

Of all the information in the MIB files, the traps or error indications sent by Server Administrator are of primary interest to an administrator. These are the events that can be used to cause a notification such as an email or page. They have names like alertCoolingDeviceNormal with a text description, a severity, and a category.

The default notification tasks within HPSIM are based on severity with “informational” events being traps of informational severity and “important” events being those with critical, major, or minor severities.

Generate an Event

A complete end-to-end test can be performed by using OpenManage Server Administrator to change a threshold setting. Pulling a power cord or power supply can also generate an error event. Here are the steps used for this paper:

1. Log in to HP Systems Insight Manager and click on **All Systems** in the left-hand frame.
2. Click on the name of the server in the **System Name** column link of the Dell server in the All Systems frame.
3. Click the **Tools & Links** tab.
4. Click the **Server Administrator** link. Server Administrator will appear in a new window.
5. Log in to Server Administrator using an administrative account.
6. Expand **Main System Chassis** in the left-hand navigation tree.
7. Select **Voltages**.
8. Select **BP 3.3V** in the action pane.
9. Select **Set to Values** then enter a Minimum Warning Threshold value that is greater than the current “Reading”. For example, if the reading is currently 3.231 V, enter a value of 3.3.
10. Click **Apply Changes**.
11. The status for the probe should then change from green check to a yellow warning symbol. Server Administrator will now also generate a “warning” SNMP trap and forward it to the HPSIM server.

12. To set the voltage warnings back to their defaults, ensure that **Set to Default** is selected and click Apply Changes. Server Administrator will also generate a “normal” trap and forward it to the HPSIM server.

13. In HPSIM, select **All Events** from the left-hand frame and note the events that have been generated.

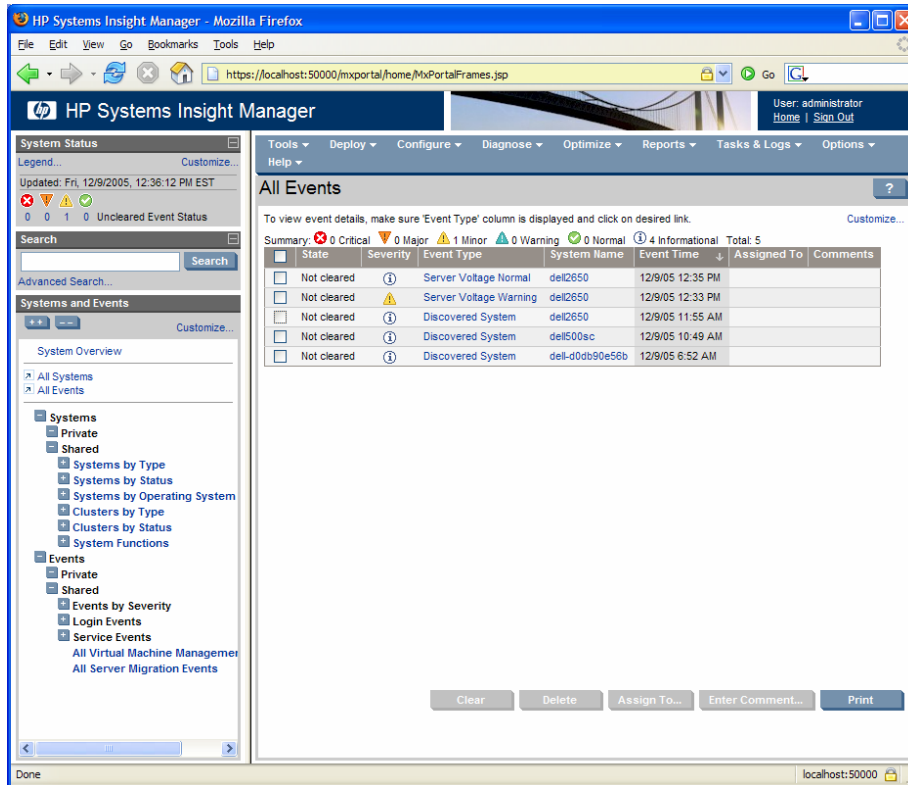


Figure 13: All Events

Results

This paper has shown how a Dell PowerEdge server can be integrated into an HP Systems Insight Manager environment following these basic steps:

- Loading and configuring the Dell PowerEdge Server
- Recognizing the Dell PowerEdge Server in HPSIM
- Discovering the Dell servers
- Testing the configuration.

As a result, an error such as a voltage warning or power failure can be received as an event that triggers an email or page action.

Notifications of specific drive and memory module pre-failure alerts are also recognized as an indication of impending device failure. The full terms of when this can be used for service parts dispatch can be found at http://www1.us.dell.com/content/topics/global.aspx/services/en/prefail_svc?c=us&cs=04&l=en&s=bsd.

Limitations and Caveats

Finally, it is worth mentioning that the HS (Health Status) in the All Systems query will continue to show green until HPSIM loses communication (no ping response), when it will go red, or critical. Also, as the PowerEdge server does not have the necessary software version agent, the MP and SW status will always be “unknown” or blank.

Dell’s IT Assistant console provides the best manageability for Dell servers, including detailed status, inventory information, and Remote Access (out of band remote) launch. But the method of integration to HPSIM shown here does provide an adequate solution by extending the notification and alerting to Dell servers and allowing the in-context launch of Server Administrator for full server management.

Dell MIBs

Essential Server MIBs

MIB file	Registration Results	Comments
10892.mib	OK	Provides detailed information about the systems monitored by Server Administrator instrumentation software. The 10892.mib is the primary MIB for PowerEdge systems.
dcstorag.mib	OK	Provides detailed information about the storage hardware components and RAID configurations monitored by Server Administrator.

Network Interface Adapters

MIB file	Registration Results	Comments
adptinfo.mib	Error defining object	Provides information about Broadcom Gigabit network adapters.
baspcfg, baspcstat, baspcTrap.mib	OK	Collectively provide detailed information about Broadcom Gigabit network adapters.
INTELLAN.mib	Error defining object	Provides detailed information about the Intel(TM) PRO 100S, PRO 1000xT, PRO 100+ Dual Port, and PRO 1000F NIC adapters.

Other Adapters, Devices, and Software

MIB file	Registration Results	Comments
DcAsfSrv.mib	OK	Specifies formatting for Dell server Platform Event Traps generated by the Baseboard Management Controller
ITassist.mib	OK	Provides definitions for traps sent by the IT Assistant management application.
rac_host.mib	OK	Provides detailed information about the components monitored by the remote access out-of-band software agent.

Legacy MIBs

The following MIBS are from earlier versions of OpenManage and would not be needed if the current version of Server Administrator is used throughout the environment.

MIB file	Registration Results	Comments
arymgr.mib	OK	Provides detailed information about storage hardware components and RAID configurations monitored by the Array Manager agent.
dcs3rmt.mib	OK	Provides detailed information about the remote access components monitored by the Server Administrator Remote Access Service.
dellcm.mib	OK	Provides detailed information about the change management data monitored by the Server Administrator Update Service.

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