Monitoring Dell Hardware with HP Systems Insight Manager

This Dell Technical White Paper provides an insight into monitoring Dell hardware using HP Systems Insight Manager. The white paper also covers how Dell tools and Dell Smart Plug-in for HP Operations Manager for Windows can be used to effectively monitor Dell Servers in HP Systems Insight Manager monitored environment.

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Executive summary

HP Systems Insight Manager is a platform monitoring solution that helps IT organizations proactively manage system faults, assets, and hardware configurations on servers and other hardware devices, all from a single application. Dell hardware can be effectively monitored in HP Systems Insight Manager leveraging existing monitoring infrastructure. This enables IT administrators to reduce complexity and use a single solution to manage their heterogeneous environments.

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Introduction

HP Systems Insight Manager (HP SIM), also called Central Management Server (CMS), is a management solution from HP that can effectively manage servers, storage, clients, printers, and other networked devices.

HP SIM is able to manage Dell servers using industry standard interfaces of Simple Network Management Protocol (SNMP), Web-Based Enterprise Management (WBEM), and secure Hypertext Transport Protocol (HTTPS). In some cases, Dell hardware can be detected and managed from the default HP SIM installation without any further customization. However, the built-in third-party device support in HP SIM may not be comprehensive. In this whitepaper, you will learn how to enable Dell hardware monitoring through HP SIM and the tasks you can perform to effectively manage Dell assets in a data center.

Key areas covered in this white paper are:

- Discovery and Identification - Configure System Type Manager rules so that HP SIM is able to correctly identify and discover inventory for Dell equipment.
- Fault management - Integrate MIBs into HP SIM so that all Dell events generated by Dell equipment are recognized and processed correctly.
- Tools integration - Integrate Dell tools in HP SIM so that the tools are accessible to IT administrators for advanced systems management functions
- Customize Reports for Dell hardware
- Integration with HP Operations Manager and Dell Smart Plug-in

Configuring HP SIM for Monitoring Dell Hardware

HP SIM can discover and identify systems using SNMP, WBEM and WSMAN protocols. Using management agents, HP SIM can also retrieve asset inventory details. When SNMP MIBs are compiled into HP SIM, events from managed systems are received and displayed properly with corresponding severity and message details. This section details the steps required to configure Dell hardware and HP SIM for monitoring Dell hardware through HP SIM.
“In order to monitor Dell hardware through HP SIM, you need to enable SNMP, WSMAN and WBEM capabilities on the Dell equipment”

Preparing Dell hardware for Monitoring in HP SIM

In order to monitor Dell hardware through HP SIM, you need to enable SNMP, WSMAN and WBEM capabilities on the Dell equipment.

You can enable Dell hardware for monitoring in HP SIM as follows:

- Install Dell provided monitoring agents on the Dell equipment
  - On Dell PowerEdge Servers and PowerVault Network Attached Storage systems, install the latest supported version of OpenManage Server Administrator.
  - On Dell Laptops and Desktops, install the latest supported version of OpenManage Client Instrumentation
  - All other Dell equipment comes with inbuilt monitoring agents. Ensure that latest firmware is installed on the Dell equipment

- Enable Simple Network Management Protocol (SNMP) and configure the SNMP Community on the Dell equipment.

- Configure the HP SIM server as the trap destination on the Dell equipment.
On Servers, Laptops and Desktops, ensure Windows Management Instrumentation is enabled and running.

The actual configuration steps are detailed in the corresponding Dell equipment User guides, downloadable from Dell Support Site. For Dell Printers, you can use OpenManage Printer Manager to configure SNMP parameters on the Printer (Refer to OpenManage Printer Manager V2.0 User Guide at support.dell.com/support/edocs/software/omprintermanager/en/UG/ug_en.pdf for details.)

In addition to the above, follow HP SIM documentation to configure firewall settings on Dell Servers and Clients such that communication is enabled between HP SIM and the managed assets.

**Loading MIBs in HP SIM**

You need to now compile and register Dell SNMP MIBs into HP SIM. You can use the mxcompile and mxmib tools to compile and register the MIBs into HP SIM. By registering the MIBs, HP SIM is able to process SNMP Traps from the device and display them as Events to the user. In the table below, locate the Dell equipment and their corresponding MIBs that need to be loaded into HP SIM to enable effective monitoring:

<table>
<thead>
<tr>
<th>Device</th>
<th>MIBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell PowerEdge Servers and Dell PowerVault NAS</td>
<td>You can find the latest MIBs under the mibs folders with the latest Dell OpenManage Server Administrator (OMSA) installation. Refer to latest OMSA SNMP Reference Guide for latest information on the MIBs.</td>
</tr>
<tr>
<td>Following are Dell MIBs:</td>
<td></td>
</tr>
<tr>
<td>- MIB-Dell-10892 (10892.mib)</td>
<td></td>
</tr>
<tr>
<td>- StorageManagement-MIB (dcsstorag.mib)</td>
<td></td>
</tr>
<tr>
<td>- DCS3FRU-MIB (dcs3fru.mib)</td>
<td></td>
</tr>
<tr>
<td>- MIB-Dell-CM (dellcm.mib)</td>
<td></td>
</tr>
<tr>
<td>- DCS3RMT-MIB (dcs3rmt.mib)</td>
<td></td>
</tr>
<tr>
<td>Following are Broadcom and Intel MIBs:</td>
<td></td>
</tr>
<tr>
<td>- adptinfo.mib</td>
<td></td>
</tr>
<tr>
<td>- baspCfg.mib</td>
<td></td>
</tr>
<tr>
<td>- baspStat.mib</td>
<td></td>
</tr>
</tbody>
</table>

“The `mxmib` tool has the capability to list all registered MIBs, to display the list of traps in the registered MIBs and to unregister the MIBs”
| DRAC 5, iDRAC6 | You can find the latest MIBs under the mibs folders with the latest Dell OpenManage Server Administrator (OMSA) installation. Refer to latest OMSA SNMP Reference Guide for latest information on the MIBs.  
DELL-RAC-MIB (rac_host.mib)  
DELL-ASF-MIB (DcAsfSrv.mib) |
|---|---|
| iDRAC7 (also Agent-free monitoring of servers) | You can find the latest MIBs under the mibs folders with the latest Dell OpenManage Server Administrator (OMSA) installation. Refer to latest OMSA SNMP Reference Guide for latest information on the MIBs.  
IDRAC-MIB (iDRAC-MIB.txt) |
| CMC | You can find the latest MIBs under the mibs folders with the latest Dell OpenManage Server Administrator (OMSA) installation. Refer to latest OMSA SNMP Reference Guide for latest information on the MIBs.  
DELL-RAC-MIB (rac_host.mib) |
| EqualLogic Storage | MIBs can be downloaded from Dell EqualLogic site or from the latest firmware on the EqualLogic device. |
| PowerConnect Switches | MIBs supported by PowerConnect switches are available as part of the firmware archive (ZIP) file at ftp://ftp.dell.com/network FTP site. |
| Force 10 Switches | MIBs supported by Force 10 switches are listed in the Dell Force 10 FTOS Spec Sheet. You can find the latest MIBs with the latest firmware version of the FTOS. |
| Dell Clients | Download the MIBs from Dell MIBs for PowerEdge  
Following are Dell MIBs:  
MIB-Dell-10892 (10892.mib)  
Refer to Managing Dell Client Systems using SNMP with Dell OMCI whitepaper from Dell for details. |
Dell MIbs are published with different file extensions - “.mib”, “.txt” and “.my”. Since HP SIM recognizes only the extension “.mib”, you need to rename all the MIbs with the “.mib” extension. Refer to Integrating Dell Power Edge Servers in HP Systems Insight Manager 7.1 whitepaper en.community.dell.com/techcenter/extras/m/white_papers/20172558.aspx for compiling and registering Dell Server MIbs.

Configuring SNMP Traps

HP SIM supports few MIB extensions which enable you to customize the severity and message format for the Dell Events. MIbs that use the supported MIB extensions will report the correct severity level associated with each SNMP trap supported by that MIB. Dell Server, Chassis and DRAC MIbs use HP SIM supported MIB extensions; hence, they will report the correct severity after compiling and registering the MIbs. EqualLogic and PowerConnect MIbs however do not use those MIB extensions and hence when they are loaded into HP SIM - will have the default severity of Unknown associated with all traps from those MIbs.

You can refer to the Dell Smart Plug-in v3.0 for HP Operations Manager User Guide for the recommended severity mappings for EqualLogic SNMP Traps and use the HP SIM MIB extensions to configure the severity of the EqualLogic SNMP Traps. You can also manually configure the severity levels of SNMP Traps from HP SIM console by referring to HP SIM User documentation to configure SNMP Traps.

“HP SIM already ships some of the Dell MIbs. It is always recommended to compile the latest MIB from Dell support into HP SIM to leverage the latest changes of the supported products.”
When registering Dell MIBs, you may find HP SIM may already be shipping a version of Dell MIBs. It is recommended to obtain the latest MIB from Dell Support site, compile and load them into HP SIM to leverage the latest changes of the supported products.

Once the SNMP MIBs are compiled in HP SIM, events will be properly received and important data fields (variable bindings) will be displayed for each event.

Configuring System Manager Types

When a new managed system is discovered by HP SIM, System Type Manager (STM) enables identifying the type of device. You can create SNMP-based STM rules to enable HP SIM to properly identify the device:

- Rules purely based on System Object Identifiers
- Rules based on a combination of a System Object Identifier and a custom Object Identifier.

When creating a rule, all Dell hardware must be associated with System subtype “Dell”, which is a predefined enumeration in STM. Specific classes of Dell hardware must be associated with relevant system types given below (again, these are enumerations for System Type predefined in the STM)
Data collection process collects inventory like product name, serial number, model, system type, OS details and Virtual Machine details through SNMP, WBEM/WMI and WSMAN interfaces.

Table 2 STM Rules for identifying Dell hardware

<table>
<thead>
<tr>
<th>Device</th>
<th>System Type</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRAC 5, iDRAC6</td>
<td>MgmtProc</td>
<td>sysObjectID.0 is 1.3.6.1.4.1.674.10892.2 and value of custom oid 1.3.6.1.4.1.674.10892.2.1.1.5.0 &lt;&gt; 8</td>
</tr>
<tr>
<td>iDRAC7</td>
<td>MgmtProc</td>
<td>sysObjectID.0 is 1.3.6.1.4.1.674.10892.5 and value of custom oid 1.3.6.1.4.1.674.10892.5.1.1.7.0 == 16</td>
</tr>
<tr>
<td>CMC</td>
<td>Enclosure</td>
<td>sysObjectID.0 is 1.3.6.1.4.1.674.10892.2 and value of custom oid 1.3.6.1.4.1.674.10892.2.1.1.5.0 == 8</td>
</tr>
<tr>
<td>EqualLogic</td>
<td>Storage</td>
<td>sysObjectID.0 starts with 1.3.6.1.4.1.12740</td>
</tr>
<tr>
<td>PowerConnect</td>
<td>Switch</td>
<td>sysObjectID.0 starts with 1.3.6.1.4.1.674.10895</td>
</tr>
<tr>
<td>Switches</td>
<td>Switch</td>
<td>sysObjectID.0 starts with 1.3.6.1.4.1.6027</td>
</tr>
<tr>
<td>Dell Printers</td>
<td>Printer</td>
<td>sysObjectID.0 starts with 1.3.6.1.4.1.674.100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sysObjectID.0 starts with 1.3.6.1.4.1.674.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sysObjectID.0 starts with 1.3.6.1.4.1.674.10898</td>
</tr>
</tbody>
</table>

HP SIM automatically classifies Servers, Clients and Virtual Machines using built-in STM rules into Workstation, Desktop, Portable, Handheld and Server. HP SIM detects the model and classifies the Dell hardware with the System Sub Type value “Dell”.

Discovering Dell Hardware

Discovery Tasks

Discovery is the process of finding systems and managing them in HP SIM.

Discovery Tasks can be scheduled or triggered manually. The user needs to provide required credentials (SNMP, WBEM/WMI and WSMAN) either as part of the Discovery Task or through Global Settings page.
Once a managed system is discovered, HP SIM starts the identification process. Discovery Task first identifies the managed system by resolving the hostname through DNS name resolution and starts the data collection process, collecting various inventory data like product name, serial number, model, system type, OS information and Virtual Machine details through SNMP, WBEM/WMI and WSMAN interfaces. Data collection is automatically run during discovery. However, you can also schedule data collection to run independently of the discovery process.
“The identification process also discovers all possible management ports (HTTP, HTTPS, Telnet ports) and shows them as part of the Tools and Links page associated with the managed system. In addition, HP SIM also detects any Virtual Machines and associates them with the Server which hosts those Virtual Machines. However, HP SIM cannot associate Dell Modular Blades with Dell Chassis nor associate the Dell Servers with its corresponding DRACs. In order to view the associations, you can use Dell Smart Plug-in for HP Operations Manager, which is detailed in a later section.

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Managed Systems Property Page

When a managed system is configured with Web-Based Enterprise Management (WBEM) credentials, HP SIM collects various properties from the remote target system. You can view the Properties page from the System Tab.

Figure 6 Managed System Properties Page

Properties: rashma-dev

<table>
<thead>
<tr>
<th>Identity</th>
<th>Status</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>RASHMA-DEV</td>
<td></td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>PowerEdge 2970</td>
<td></td>
</tr>
<tr>
<td><strong>OEM Product ID</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Type</strong></td>
<td>x64-based PC</td>
<td></td>
</tr>
<tr>
<td><strong>Owner</strong></td>
<td>Windows User</td>
<td></td>
</tr>
<tr>
<td><strong>Registered User</strong></td>
<td>Windows User</td>
<td></td>
</tr>
<tr>
<td><strong>Role</strong></td>
<td>Hypervisor Host</td>
<td></td>
</tr>
<tr>
<td><strong>UUID</strong></td>
<td>4C4C4544-0042-3110-8033-B3C04F553153</td>
<td></td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>Quad-Core AMD Opteron(tm) Processor 2350, Quad-Core AMD Opteron(tm) Processor 2350</td>
<td></td>
</tr>
<tr>
<td><strong>Network Address</strong></td>
<td>[10.94.146.125, fe80::6005:38a2:fa4a:497e]</td>
<td></td>
</tr>
<tr>
<td><strong>MAC Address</strong></td>
<td>00:1E:C9:B8:40:A9, 00:1E:C9:B8:40:AB, 00:1E:C9:B8:40:A9</td>
<td></td>
</tr>
<tr>
<td><strong>Domain</strong></td>
<td>dellscm.com</td>
<td></td>
</tr>
<tr>
<td><strong>OS</strong></td>
<td>Microsoft Windows Server 2008 R2 Datacenter</td>
<td></td>
</tr>
<tr>
<td><strong>OS Version</strong></td>
<td>6.1.7601</td>
<td></td>
</tr>
</tbody>
</table>

The Properties page opens in a new window and includes three tabs:

- **Identity**: Displays WBEM properties that help describe the target system on the network. These properties can include location, operating system characteristics, processor characteristics and owner information.

- **Status**: Displays WBEM properties that help determine the status of the system. You can determine the disk, memory, drivers and process status.
- **Configuration**: Displays inventory of the Dell systems based on WBEM properties. The inventory includes information about BIOS, physical memory, processor information, disk drives, mother boards and network ports.

**System and Event Lists**

Systems and events can be grouped into collections based on information from the HP SIM database.

You can create Dell system lists by searching through the list of discovered Dell systems either through the system name or filtering through various attributes. For example, if you create a system list with the criteria “System Sub Type == Dell”, it would create a list that shows all Dell hardware as a collection. You could also create a system list with the criteria “System Type == Printer and System Sub Type == Dell” to categorize all Dell Printers into one collection.

![Figure 7 Dell Sample Systems List View](image)

Similarly, you can create event lists, by filtering on the System Sub Type (“Dell”).

**Advanced Monitoring Tasks**

With HP SIM, you can do advanced monitoring tasks like creating reports, integrating and invoking custom tools.

**Reports**

HP SIM provides a variety of canned reports which you can run against the Dell Systems or Event Lists you have created above.
“Dell Tools can be integrated with HP SIM so that you can leverage capabilities of Dell value added solutions.”

Custom Tool Integration

Dell Tools can be integrated with HP SIM so that you can leverage capabilities of Dell value added solutions. You can integrate Dell tools in following ways:

- **Web Launch Aware tools**: You can integrate Dell Web based tools against a single managed system or a collection. Tools that can be launched this way are:
  - OpenManage Essentials - monitoring and managing various aspects of Dell hardware (https://<ome_host>:2607/web/default.aspx)
  - OpenManage Printer Manager - managing Dell Printers (http://<opmp_address>/OMPM/OMPM.html)
  - OpenManage PowerCenter - monitoring and managing power policies on Dell equipment (https://<ompc_host>:8643/powercenter/)
  - OpenManage Network Manager - monitoring and managing Dell PowerConnect switches (http://<omnm_host>:8080)

- **Single System Aware tools**: These tools are executed on a managed system. Sample scenarios where these tools can be used for systems management functions are:
  - Configuring or turning Power Caps on Dell Servers using OpenManage Server Administrator command line interface
Generating Dell System E-Support Tool (DSET) reports from all servers. DSET should have already been installed on the managed system.

- **Multiple System Aware tools**: These tools are executed on a CMS, and can handle a list of managed systems. Sample scenarios where these tools are useful include:
  - Configure SNMP Trap destination on Dell hardware using Dell DRAC Tools installed on the CMS

**Figure 9 Dell Tools Integration**

You can use the mxtool command from HP SIM to integrate Dell tools.

**Dell Smart Plug-in for HP Operations Manager**

Dell Smart-Plug in v3.0 for HP Operations Manager for Windows extends HP Operations Manager capabilities to support Dell hardware devices. Dell Smart Plug-in v3.0 provides the following capabilities:

- Classification and Grouping of Dell Servers, Chassis, DRAC and Storage devices

- Hierarchical views of Dell Chassis and EqualLogic Groups and correlated views of Servers and their Management Processors (DRACs)

- Link and context based launch of 1x1 Consoles (DRAC, CMC, OMSA, Equallogic Group consoles) for in depth troubleshooting.

- Integration with value added Dell tools - OpenManage Essentials, OpenManage PowerCenter, MD Storage Manager

- Support for Instantaneous health through both polling and trap-triggered health status updates.
- Support for Manual Acknowledged Alert policies and Automatic Event Correlation with full support of Knowledge Articles for event analysis and resolution.

**HP Operations Integration for HP SIM**

HP SIM Integration provides integration between HP SIM, Insight Management Agents and HP Operations Manager for Windows. With HP SIM Integration, you can forward events and event acknowledgements from HP SIM to HP Operations Manager.

With the HP SIM Integration, you can augment the monitoring capabilities of HP SIM hardware monitoring with the Dell Smart Plugin for HP Operations Manager capabilities, providing a holistic management experience. For example:

- HP SIM does not provide hierarchical views of Chassis-Servers and associated views of Server-Management Process for Dell hardware. However, Dell Smart Plugin has such capabilities. With HP SIM Integration, you can bring in Dell nodes monitored by HP SIM into HP Operations Manager. Dell Smart Plug-in Auto Grouping policies classify the imported Dell hardware into hierarchical Chassis-Server and associated view of Server-DRAC in HP Operations Manager console.

- Dell Smart Plug-in for HP Operations Manager provides both Manual Acknowledgement and Automatic Alert Correlation capabilities with context sensitive Knowledge Articles for detailed Alert troubleshooting, analysis and resolution. Dell Smart Plugin also provides advanced troubleshooting by enabling you to launch the native 1-1 console from the alert context.

- HP Operations Manager does not support inventory data collection. HP SIM collects inventory and also provides inventory-related features like reports, historical comparison of inventory data, multi-device inventory comparison etc.

- HP SIM provides strong custom tool integration capabilities which enable you to build significant automation capabilities. For example, with XML coding you could build simple tool integrations to configure Power Cap across all supported Dell Servers being monitored by HP SIM.

With HP SIM integration, you can complement the HP SIM capabilities with Dell Smart Plug-in and HP Operations Manager capabilities, thereby having comprehensive management of Dell hardware in a heterogeneous datacenter. You can have hierarchical and associated views of Dell hardware, advanced event management and troubleshooting in HP Operations Manager with inventory, reporting, virtualization hierarchical views and tool integration capabilities in HP SIM.
Summary

HP SIM provides significant systems management capabilities with fault management, inventory data collection, custom tool integration, report building and integration with HP Insight and HP Operations Manager. Datacenters which have invested in HP SIM can leverage the management software investment to manage Dell hardware as effectively as any other products in their datacenter. Dell tools can be integrated seamless into HP SIM thereby providing all the advanced systems management capabilities from a single console.

Learn more

Visit Dell.com for more information on Dell’s enterprise-class servers, storage, networking, Business Clients, Printers.

Visit h18004.www1.hp.com/products/servers/management/unified/infolibraryfm.html for whitepapers and documentation on HP Insight Manager

About the author

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