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UNIFIED MONITORING AND PROACTIVE MANAGEMENT OF DELL HARDWARE WITH MICROSOFT SYSTEM CENTER

Dell™ Management Packs developed for Microsoft® System Center enable monitoring and management of supported Dell devices and systems using Microsoft System Center Operations Manager and System Center Essentials—helping to automate routine tasks and create an efficient, unified framework for simplified systems management.

Monitoring and managing hardware devices can be complex, time-consuming, and costly in data center environments. The Dell OpenManage™ Integration Suite for Microsoft System Center is designed to simplify and streamline time-consuming IT management using System Center Operations Manager (SCOM), System Center Essentials (SCE), and System Center Configuration Manager. The SCOM management solution is well suited for enterprise-class environments, and is capable of providing a comprehensive, dynamic view of the health of thousands of servers, business client systems, network devices, and software applications through a single console. SCE, designed specifically for small and midsize IT environments with up to 30 servers and 500 PCs, provides monitoring and alert resolution for servers, business clients, network devices, and software applications; software distribution; hardware management; and hardware and software inventory. It also incorporates update management capabilities that enable administrators to view, download, and deploy software updates for managed systems.

The Dell OpenManage Integration Suite includes Dell Management Packs (MPs) and related utilities that provide monitoring and proactive management capabilities for supported Dell servers, blades, Dell Remote Access Controllers (DRACs), Integrated DRACs (iDRACs), Chassis Management Controllers

(CMCs), storage arrays, business clients, and networked printers in environments using SCOM 2007 with Service Pack 1 (SP1), SCOM 2007 R2, or SCE 2007 with SP1; in this article, *Operations Manager* is used to refer generically to both SCOM and SCE. These MPs—available as software downloads from the Dell Web site at no additional cost—bring multiple advantages to IT environments:

- **Seamless management of heterogeneous systems:** Organizations already using Operations Manager can leverage their existing investment while adding seamless management of Dell hardware.
- **Centralized administration:** Administrators can manage a variety of Dell devices through a single unified console, helping to simplify ongoing management tasks.
- **Flexible deployment:** Administrators can choose to deploy only the MPs relevant to managing specific Dell hardware in their IT environment.
- **Proactive management:** Critical, warning, and informational alerts from Dell MPs enable administrators to respond to impending failures and help prevent those failures before they actually occur.

By taking advantage of these Dell integration tools, IT administrators can create an efficient, unified framework for simplified systems management.

INTEGRATION ARCHITECTURE FOR MICROSOFT SYSTEM CENTER

Figure 1 shows a best-practices configuration for managing a variety of Dell devices in a large-scale data center environment. This example infrastructure comprises a root management server, multiple management servers, a database server, and a data warehouse server; multiple management servers are required for managing specific Dell devices in this type of large environment. The communication channels can include Dell instrumentation components such as Common Information Model (CIM) providers, in-band agents, the out-of-band Intelligent Platform Management Interface (IPMI), command-line interfaces (CLIs), and Dell system event logs (SELs).

Figure 2 summarizes the Dell MPs and utilities that can integrate with Operations Manager. In addition to the listed management requirements, administrators should ensure that they have deployed supported instrumentation and firmware

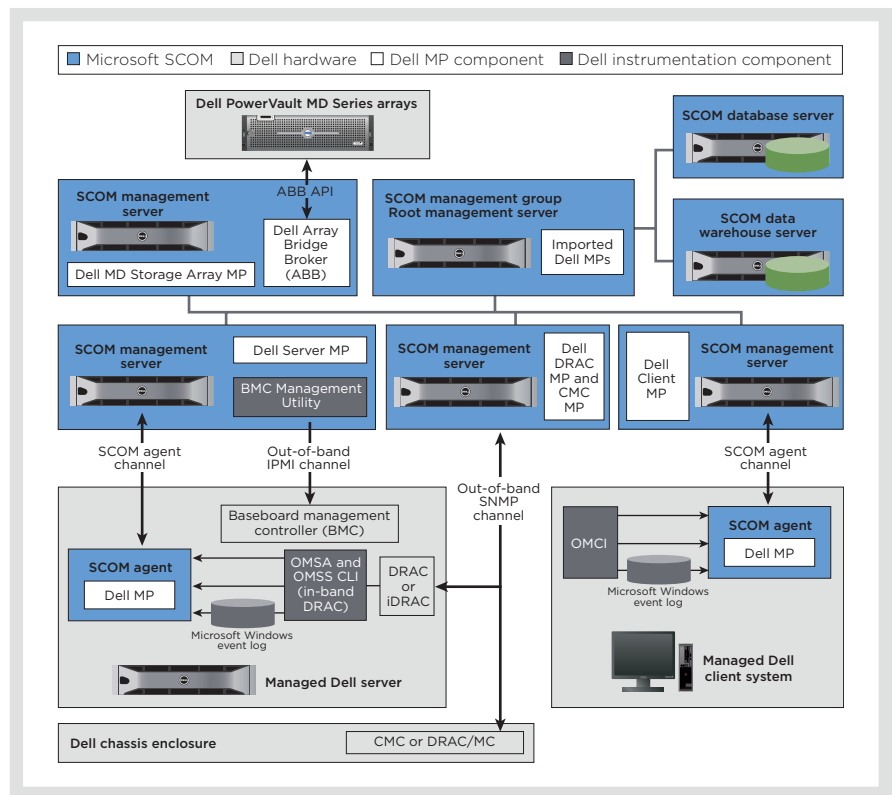


Figure 1. Best-practices architecture for managing Dell devices using Microsoft System Center Operations Manager

	Devices and monitoring	Management requirements	Typical usage
Dell Server Management Pack Suite			
Scalable Server MP	In-band management for PowerEdge servers (including both monolithic servers and modular blade servers) and PowerVault servers running supported Microsoft Windows Server® operating systems	OMSA, including Dell OpenManage Storage Services (OMSS)	Large and very large enterprise environments
Detailed Server MP	In-band management for PowerEdge servers (including both monolithic servers and modular blade servers) and PowerVault servers running supported Microsoft Windows Server operating systems, including storage controller components	OMSA, including OMSS	Small and medium business and enterprise environments
DRAC MP	Out-of-band management for DRAC 4, DRAC 5, modular iDRAC 6 (Enterprise), and monolithic iDRAC 6 (Enterprise and Express) controllers in PowerEdge servers (including both monolithic servers and modular blade servers) and PowerVault servers	Embedded SNMP and supported firmware	Environments of all sizes
CMC MP	Out-of-band management for CMC and DRAC/MC controllers in PowerEdge modular blade enclosures	Embedded SNMP and supported firmware	Enterprise and large enterprise environments
Information-Alerts-On Utility	Dell OpenManage events from Microsoft Windows® event logs for PowerEdge servers (including both monolithic servers and modular blade servers) and PowerVault servers	OMSA, including OMSS	Environments of all sizes
Dell Client Management Pack			
Client MP	In-band management for supported Dell OptiPlex, Dell Latitude, and Dell Precision business client computers running supported Microsoft Windows operating systems (including discovery and classification support for Dell Vostro desktops and laptops)	OMCI	Environments of all sizes
Dell Printer Management Pack			
Printer MP	Out-of-band management for Dell networked printers	Embedded SNMP	Environments of all sizes
Dell PowerVault MD Storage Arrays Management Pack Suite			
MD Storage Array MP	In-band and out-of-band management for PowerVault MD3000 and PowerVault MD3000i storage arrays	Embedded SNMP and supported firmware	Environments of all sizes
Discovery Utility	In-band and out-of-band discovery for PowerVault MD3000 and PowerVault MD3000i storage arrays	Embedded SNMP and supported firmware	Environments of all sizes

Figure 2. Dell Management Pack components in the Dell OpenManage Integration Suite for Microsoft System Center

versions for monitoring and managing specific devices.

Dell Server Management Pack Suite

The Dell Server Management Pack Suite comprises the Dell Hardware Library Grouping Utility, the Information-Alerts-On Utility, and four MPs:

- **Scalable Server MP:** This MP models system components at a high level, and is designed primarily for use in large environments with more than 300 managed systems. For instance-level instrumentation details for a specific system, administrators using the Scalable Server MP can launch the Dell OpenManage Server Administrator (OMSA) console.
- **Detailed Server MP:** This MP is an extension of the Scalable Server MP, and models additional instance-level information for BIOS, processor, memory, storage, and sensor components.
- **DRAC MP and CMC MP:** The DRAC MP supports a variety of DRAC and iDRAC controllers, classified into subgroups for specific models under the Dell Remote Access group; the CMC MP supports CMC and DRAC/Modular Chassis (DRAC/MC) controllers, classified into the Dell Modular Chassis group. Both

MPs provide additional alert views for Simple Network Management Protocol (SNMP) traps and Platform Event Traps (PETs) along with their corresponding knowledge base information.

Dell MPs categorize agent-installed Dell systems and other devices into Dell Hardware or Dell Windows Server groups (for Dell PowerEdge™ and PowerVault™ systems), and further groups them into Dell Modular, Dell Monolithic, or (when the instrumentation is either not present or unresponsive) Dell Unknown systems. Status monitoring for these systems includes Dell-specific and pre-failure alerts. Administrators can also launch Dell instrumentation consoles from Operations Manager to perform granular problem-solving analysis. Dell-specific views in the Operations Manager console include alert views embedded with related knowledge base information, diagram views that classify devices into logical groups (see Figure 3), state views based on event and status poll information, and a performance and power monitoring view that provides power and temperature data.

Dell Client Management Pack

The Dell Client MP discovers and classifies Dell business client computers using Dell

OpenManage Client Instrumentation (OMCI) into Dell Hardware, Dell Windows Client (for Dell OptiPlex™, Dell Latitude™, and Dell Precision™ systems), or Dell Unmanaged (for systems where the instrumentation is either not present or unresponsive) groups, providing advanced monitoring capabilities for Dell business client systems through Operations Manager.¹ This MP models the components on a high level in addition to providing component details such as memory unit instances. Administrators can use it to reboot or power down managed clients and generate reports for specified systems.

Dell Printer Management Pack

The Dell Printer MP combined with SNMP-based Operations Manager network device discovery classifies Dell printers into specific views and supports inventory, health monitoring, and SNMP traps as well as launching the printer console.

Dell PowerVault MD Storage Arrays Management Pack Suite

The Dell PowerVault MD Storage Arrays Management Pack Suite, comprising the Dell MD Storage Array MP and the Dell Discovery Utility, provides basic discovery, monitoring, and alert management for PowerVault MD3000 and PowerVault MD3000i storage arrays as well as PowerVault MD1000 arrays daisy-chained to one of those two array models. It supports IP version 4 (IPv4) and IPv6 and both in-band and out-of-band management.

The MP diagram view includes specific representative icons for individual components. The alert view provides alert-specific recovery information for individual alerts along with information on causes, resolutions, important notes, recovery information, and so on, which administrators can use as a point of reference when troubleshooting storage arrays. The Dell Discovery Utility is designed to automatically discover supported storage arrays with both IPv4 and IPv6 addresses over a network and then update the IP listing file used by Operations Manager.

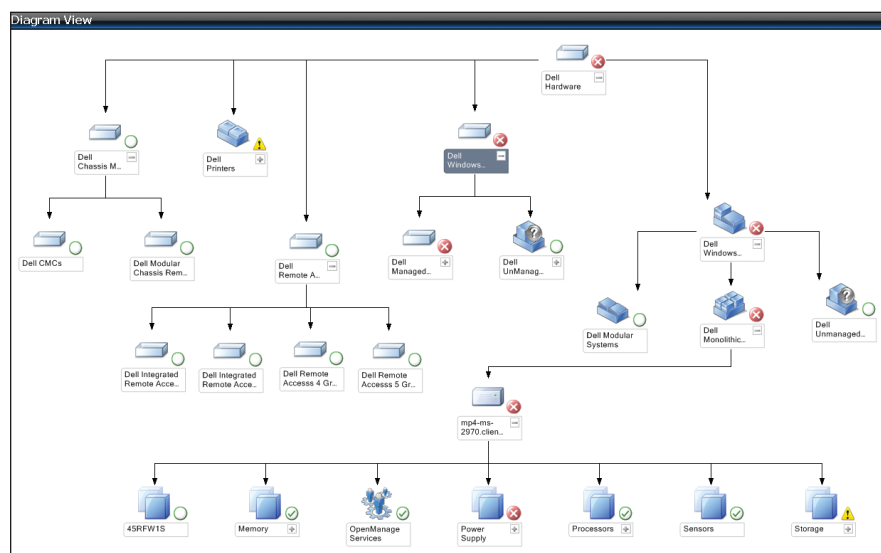


Figure 3. Complete Diagram View for Dell devices in Microsoft System Center Operations Manager 2007 R2

¹ The Dell Client MP also supports basic discovery and classification of Dell Vostro™ desktops and laptops, with no additional monitoring or management capabilities.

ENHANCED ENERGY MONITORING

Combining the OMSA instrumentation's energy monitoring capabilities with SCOM through the Scalable Server MP or Detailed Server MP can provide significant benefits in data center environments. IT administrators can leverage the alerts from Dell hardware that has exceeded defined performance and power consumption thresholds to derive load-balancing decisions. Threshold monitoring for the various counters are disabled by default in these MPs, and can be enabled for a defined set of values depending on specific needs. Administrators can take advantage of historical energy consumption data presented through the intuitive Operations Manager console to help them make future purchasing and deployment decisions. Administrators can also view key power monitoring data—such as ambient temperature, amperage, energy consumption, power amperage, system peak power, and power consumption in watts and BTU/hour—corresponding to a monitored server.

SCALABILITY IN LARGE ENTERPRISE ENVIRONMENTS

Even with careful planning, systems management frameworks can cause traffic bottlenecks in data center environments. These bottlenecks can further lead to processor, memory, I/O, and other types of bottlenecks.

Dell MPs have been developed for monitoring and managing a large number of servers and clients and are designed with the scalability and management patterns of large environments in mind. For example, the MPs have been optimized to ignore less critical status updates from monitored hardware (including informational alerts) to enhance scalability, while still offering administrators the flexibility to override these optimizations if the immediate priority is more detailed management. Figure 4 shows an example data center environment scaled to monitor more than a thousand Dell PowerEdge servers in SCOM 2007 R2.

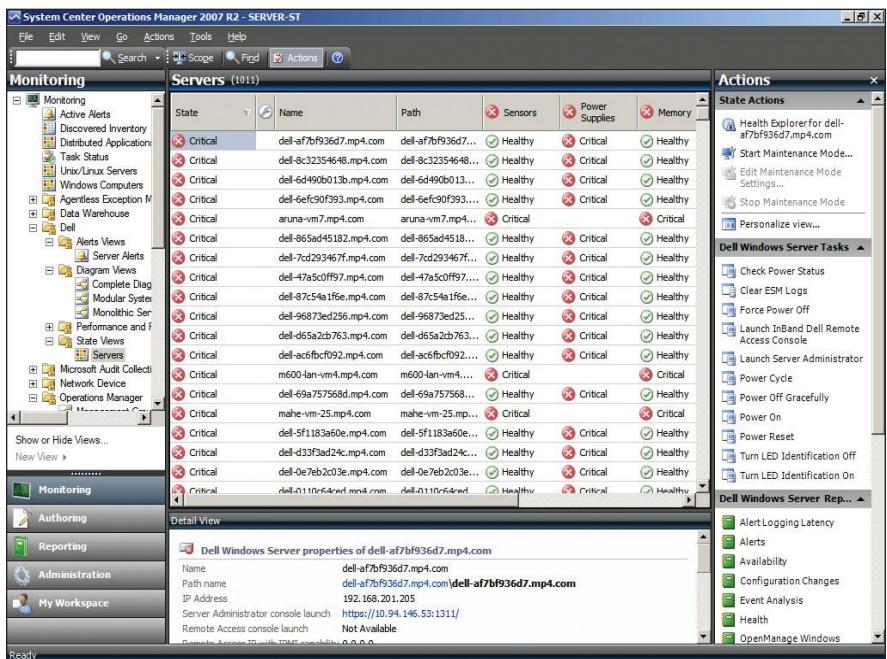


Figure 4. Example large data center environment in Microsoft System Center Operations Manager 2007 R2

COMPREHENSIVE SYSTEMS MANAGEMENT

Microsoft System Center provides the foundation for comprehensive systems management through a unified console. As part of the Dell OpenManage Integration Suite for Microsoft System Center, the enhancements provided by Dell MPs and related software utilities enable organizations using SCOM or SCE to incorporate extensive management capabilities for Dell hardware into their existing management infrastructure—helping to simplify and centralize administration, enable proactive systems management, and support robust energy monitoring and scalability. Dell and Microsoft are committed to further simplifying systems management for Dell devices in future generations of the systems management solution stack.

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