Take Control with Dell Systems Management

The Dell™ OpenManage™ suite, a comprehensive set of industry standards–based tools included with Dell PowerEdge™ systems, is designed to automate server and client management functions—thereby helping to simplify IT operations throughout the complete system life cycle. In addition, this Dell tool set works with a wide variety of integrated, standards-based management solutions from key Dell partners such as Altiris and Microsoft. Working together, these solutions can enable administrators to respond quickly and flexibly to fast-changing IT requirements, freeing valuable resources to focus on strategic business initiatives.

BY PAUL RUBIN AND TERRY MYERS

Systems management—and change management in particular—is becoming an unwieldy process for enterprises of all sizes. In many organizations, the IT infrastructure is tightly interwoven with business-critical systems that have been developed on an ad hoc basis over the years. To survive, administrators must simplify systems management tasks and enable fast, flexible response to diverse—and fast-changing—business conditions. Some enterprises have turned to expensive proprietary systems as a “magic bullet,” while others have developed custom applications that meet immediate needs but can be difficult to scale as computing requirements grow.

In contrast, Dell’s strategy for enabling the scalable enterprise is to provide cost-effective, industry-standard data center components that can be upgraded incrementally whenever and wherever necessary. And Dell’s solution for the systems management dilemma is no different: to provide standards-based, interoperable systems management capabilities that enable administrators to choose tools that are tailored to their specific enterprise IT needs—and that scale easily to meet unpredictable growth requirements. Using a core set of tools offered by Dell, administrators can proactively manage basic functions of their servers and clients throughout the complete system life cycle. Augmenting the Dell tool set is a wide variety of integrated, industry-standard solutions that are designed to provide a comprehensive systems management framework.

This approach is designed to allow organizations to take charge of their IT infrastructure, laying the foundation for a standards-based IT environment in which system purchases no longer lock enterprises into specific management tools. The Dell systems management framework allows administrators the flexibility to use systems management capabilities that match their current IT requirements while enhancing the scalability of management environments to allow for growth and change. By implementing flexible, standards-based management solutions and enabling administrators to automate tasks and optimize IT resources, enterprises can free valuable resources to focus on strategic business initiatives. This article explains systems management challenges faced by today’s IT organizations, various Dell products that can help address these challenges, and benefits of using the Dell open standards model.
Challenges of managing a complex IT environment

As today’s IT infrastructures evolve and Intel® architecture-based systems perform much of the critical workload, a new set of management considerations is coming into play. As shown in Figure 1, a growing IT infrastructure presents major operational challenges: clients, servers, and storage systems must be deployed; changes and updates made; and systems regularly monitored for health and status. Emerging organizational needs must be supported through the reuse of existing IT resources, as well as the deployment of additional applications. Pressing concerns that administrators must contend with in today’s dynamic IT environment include accelerated rate of change, increased scale and complexity, heightened security risks, and proliferation of tools and processes.

Accelerated rate of change. In a typical IT infrastructure, the one constant is usually change. Not surprisingly, change management has become a pain point for many IT organizations today. The velocity of change that must be managed can be characterized as a function of the number of clients, servers, and storage devices multiplied by the number of product updates and changes introduced by hardware and software providers. Given innumerable updates to hardware, operating systems, and applications on a regular basis—plus patches necessitated by security threats—many organizations have had to budget change management as a full-time job.

Increased scale and complexity. Most IT infrastructures must accommodate continual growth in the amount of data stored and managed as well as in the number and types of clients, servers, and storage platforms, operating systems, and applications. All too often, as more individual data center components are added to the computing environment, more unique management tools and processes are required to support that environment.

Heightened security risks. Ensuring IT security has become a daunting task. With new security issues a daily concern in operating systems and applications, administrators are faced with applying security updates to many systems to prevent system failures and intrusions to their networks. Securing IT infrastructure will likely remain a high-priority challenge, requiring topflight technologies and procedures.

Proliferation of tools and processes. As they contend with an ever-increasing number of clients, servers, storage systems, operating systems, and applications, IT organizations face the prospect of skyrocketing investments in staffing and training to support multiple management tools. This growth often calls for complex, tool-specific management processes that need to be communicated and maintained. Moreover, many organizations have implemented management tools to address specific functions and challenges, and some of these tools have overlapping capabilities so they are not fully utilized when combined—which can be another contributor to high overhead.

Many IT vendors take a proprietary approach to systems management—an approach based on their own hardware, software, and professional services. This approach may be beneficial to providers, but IT organizations are often left with complex, expensive multivendor environments and a variety of systems management tools. Such a situation can limit organizational response by forcing choices among specific vendors that may not address important enterprise IT and business challenges. To help simplify operations and advance best practices for enterprise-wide systems management, Dell promotes open standards that are designed to enhance flexibility and enable products to interoperate across complex, heterogeneous IT environments.

Dell tools for managing the scalable enterprise

Dell has become a worldwide leader in high-volume, high-performance client, server, and storage systems through a consistent focus on industry standards. From active participation in standards-setting organizations to driving the development and integration of offerings from alliance partners, Dell has endorsed standards as the foundation of its scalable enterprise strategy. Industry-standard systems and software enable enterprises to respond quickly and flexibly to changing business requirements in cost-effective increments. In addition, industry standards can help maximize the IT investment by making it possible for older data center components to continue serving the infrastructure when new systems or upgrades are deployed. Dell leverages industry standards and the expertise of its leading systems management partners to provide a fully scalable framework for systems management solutions.

Systems management standards

To optimize existing resources and facilitate future growth, organizations need the capability to manage systems and processes efficiently and cost-effectively across a variety of hardware platforms, operating systems, and applications from multiple vendors. To that end, Dell’s systems management strategy focuses on three goals that are designed to simplify IT operations through industry standards:

- Enable management of Dell’s instrumented clients, servers, and storage platforms
- Champion systems management standards
- Support integrated, standards-based systems management solutions
Instrumented platforms can enable a complete life-cycle approach to managing systems and storage. Dell platforms are designed to provide the needed management information and control functions to support deployment, health status monitoring, fault recovery, and change management. Partnering with key systems management vendors such as Altiris and Microsoft, Dell can provide for an expanding range of solutions by offering toolkits designed to link Dell instrumentation with partner management software. This combination of Dell and partner technologies can lead to enhanced choices for systems management solutions.

Today’s emerging standards are laying the groundwork for future management systems to deploy, monitor, and upgrade heterogeneous clients, servers, and storage systems from a central point of control (see Figure 2). Dell is helping to advance the standardization of client, server, and storage management by participating in numerous organizations, including the following:

- **Unified Extended Firmware Interface (UEFI) Forum:** Standardizing system firmware interfaces for client and server BIOSs
- **Intelligent Platform Management Interface (IPMI) Forum:** Developing standards for core server monitoring and control
- **Organization for the Advancement of Structured Information Standards (OASIS):** Driving the development, convergence, and adoption of e-business standards, including Web services for systems management
- **Storage Networking Industry Association (SNIA):** Standardizing the management of storage subsystems
- **Distributed Management Task Force (DMTF):** Creating standards for systems management information and access, including emerging standards for server management that are being developed by the Server Management Working Group (SMWG)

Active involvement in the preceding initiatives helps Dell to enable maximum standardization of systems and storage instrumentation in Dell data center components and to make provisions for a far-reaching, standards-based systems management framework.

In addition, standardization is expected to lead to broader, more versatile choices in systems management solutions, which can lead to a pivotal benefit: enabling providers to cost-effectively customize hardware and software products that are designed to meet the specific management needs of individual IT organizations. Broad use and acceptance of management standards may further develop the power of choice because an increasing number and variety of products typically creates competition that in turn can help lower cost, drive innovation, and enhance quality.

**Dell OpenManage for Servers**

By offering integrated hardware and software management capabilities, Dell OpenManage helps support server management solutions that are designed to provide organizations of all sizes with an advanced, reliable, and easy-to-manage IT infrastructure (see Figure 3). Dell OpenManage for Servers can simplify operations and help keep overall management costs low by enabling standardization and automation of server deployment, monitoring, and change-management tasks. Standards-based instrumentation built into the PowerEdge server BIOS, board-level management controller (BMC), and remote access controller, as well as the Dell storage controllers, enables detailed inventorying, environmental monitoring, and server and storage health monitoring.

Dell PowerEdge servers are engineered for manageability, and Dell OpenManage uses PowerEdge server instrumentation that enables IT administrators to monitor and control server operations. The following sections describe Dell OpenManage components that address server deployment, day-to-day operations, and management of server change.

**Server deployment with Dell OpenManage**

Dell OpenManage facilitates automation of single-server deployment through Dell OpenManage Server Assistant, and automation of multi-server deployment through the Dell OpenManage Deployment Toolkit (DTK). The DTK is typically used in conjunction with deployment solutions provided by partners, including Microsoft and Altiris.

**Dell OpenManage Server Assistant**

Dell OpenManage Server Assistant (DSA) is a CD-based single-server deployment tool that is delivered with Dell PowerEdge servers on the Dell PowerEdge Installation and Server Management CD. DSA works in conjunction with OS media from Microsoft, Novell, and Red Hat to provide step-by-step guidance for server hardware configuration and OS installation. It includes tools and...
the latest drivers—including RAID and network interface card (NIC) drivers—to help speed the setup, configuration, and optimization of Dell PowerEdge systems.

**Dell OpenManage Deployment Toolkit**

The Dell OpenManage Deployment Toolkit is a set of utilities designed to configure, record, and replicate a pre-OS server configuration for the BIOS, BMC, and RAID storage controller. DTK utilities are booted from a floppy, CD, or the network at the start of a server installation. These utilities are often used in command scripting as part of an automated server deployment solution. DTK is designed to enable quick and easy configuration of multiple servers from a bare-metal state through OS and application setup. Servers typically can be up and running within 30 minutes.

In addition, Dell has partnered with Microsoft and Altiris to support automated multi-server deployments. DTK has been integrated with Microsoft® Advanced Deployment Services (ADS) and with Altiris® Server Provisioning and Altiris Blade Deployment Solution. These approaches use DTK to script the exact configuration of PowerEdge hardware before selected OS and application software is installed on the server.

**Server monitoring with Dell OpenManage**

Dell OpenManage supports ongoing monitoring of server status and enables server control to help administrators handle server failures and outages virtually anytime, from virtually anywhere. Dell OpenManage enables monitoring through a combination of hardware and software components that operate directly on the managed server and on a management console (see Figure 4).

**Baseboard management controller**

Dell PowerEdge servers—including the PowerEdge SC1425, PowerEdge 800, PowerEdge 1800, PowerEdge 1850, PowerEdge 1855, PowerEdge 2800, PowerEdge 2850, PowerEdge 6800, and PowerEdge 6850 systems—are equipped with a BMC that implements the IPMI standard. Connected to server sensors, the BMC is designed to proactively monitor server hardware, log server fault events, and alert administrators when server faults occur. The BMC also enables basic remote operations, independent of server state, with server text console redirection, power control, and reset control.

**Dell Remote Access Controller**

An optional feature for PowerEdge servers, the Dell Remote Access Controller (DRAC) is designed to provide high levels of remote control, enabling administrators to remotely operate the server through industry-standard protocols such as HTTP, Secure Sockets Layer (SSL), and Secure Shell (SSH). Working in conjunction with the BMC, the DRAC enables advanced remote management capabilities including a continuous video console, virtual media, text console connectivity, a dedicated network controller, and Microsoft Active Directory® user authentication and authorization.

The BMC and DRAC provide out-of-band management for PowerEdge servers—that is, they operate regardless of the state of the server or OS. The BMC and DRAC can power, control, and reset the server, making it possible for administrators to control a PowerEdge server across the network.

**Dell OpenManage Server Administrator**

Dell OpenManage Server Administrator (OMSA) is designed to simplify single-server management with a secure command-line interface...
interface (CLI) and Web-based graphical user interface (GUI). OMSA provides in-band management of PowerEdge servers, operating when the server OS is up and running normally. OMSA performs two major functions:

- **Standards-based instrumentation**: Monitors server subsystem health, reports inventory, enables server configuration, diagnoses the server, and alerts administrators about failures and warning conditions
- **Local server console**: Supports secure server operations via the CLI and GUI

OMSA subsystems include the Storage Management service for managing a server’s RAID storage and Online Diagnostic services for diagnosing server hardware without taking the server offline. OMSA instrumentation provides management information, fault alerts, server configuration, and control functions for applications running on the management console. These applications can include Dell OpenManage IT Assistant, group management consoles such as Microsoft Operations Manager, and enterprise management solutions such as Computer Associates (CA) Unicenter. Dell provides versions of OMSA for leading server operating systems, including Microsoft Windows® 2000 Server and Windows Server™ 2003, Red Hat® Enterprise Linux®, and Novell® NetWare® platforms. OMSA is delivered on the Dell PowerEdge Installation and Server Management CD.

**Dell OpenManage IT Assistant**
Dell OpenManage IT Assistant (ITA) provides an integrated view of the comprehensive suite of Dell client and server monitoring and reporting tools. ITA discovers Dell clients and servers, gathers inventory, monitors system health status, and alerts administrators about system failures via e-mail and paging.

ITA also supports group change management for PowerEdge servers as detailed in the “Server change management with Dell OpenManage” section in this article. ITA is installed on a client or server running Microsoft Windows XP, Windows 2000 Server, or Windows Server 2003. Beginning with version 7, the ITA user interface is accessible from clients running Microsoft Internet Explorer or the Mozilla Web browser. ITA is delivered on the Dell Systems Management Consoles CD.

**Integration with other management applications**
Dell works with industry leaders in systems management to enable group and enterprise management systems to inventory, monitor, and manage PowerEdge systems. Integrated support is available for the following applications: Microsoft Operations Manager, Altiris Server Management Suite™ software, CA Unicenter, HP OpenView, and IBM® Tivoli Enterprise Console.

**Server change management with Dell OpenManage**
One of the biggest challenges for today’s IT environments is change management: updating system, OS, and application software to keep it current and secure. The Dell OpenManage suite is designed to help maintain PowerEdge systems with single-server change management; multi-server change management; and integrated hardware, OS, and application change management. Components for server change management include the Dell Server Update Utility, ITA change-management services, and integrated change-management solutions from Altiris and Microsoft.

**Dell Server Update Utility**
To simplify the update of a single server, Dell provides a CD-based tool called the Server Update Utility (SUU). After SUU is loaded onto a server, it inventories the Dell firmware and drivers on that server; compares the installed firmware and drivers to the content of the SUU CD; and, if an update is required, automates the update process and any needed reboot of that server. SUU is designed to simplify single-server updates through features such as inventories, reports and recommendations, and checks for prerequisite conditions. SUU is delivered on the Dell PowerEdge Updates CD.

**Dell OpenManage IT Assistant multi-server updates**
For organizations that have deployed a significant number of PowerEdge servers, automation is essential to avoid performing the time-consuming task of single-server updates. To enable Dell firmware and driver updates for multiple servers, ITA 7 (or later) provides capabilities to inventory multiple Dell servers, identify servers that require updates, and update those servers from the ITA console. ITA uses the content of the Dell PowerEdge Updates CD to create a repository of firmware and drivers that it compares against the installed PowerEdge servers. ITA works in conjunction with OMSA to conduct the inventory and update the servers. Note: ITA change management focuses on managing only Dell firmware and drivers; change management of server operating systems and application software requires the use of an integrated change-management solution.

**Integrated change-management solutions**
To further standardization of the change-management process for server software, Dell provides a partner developer kit with features
that enable Dell server updates: interfaces for inventorying server firmware and drivers, comparisons between inventory results and the latest updates, and mechanisms to install updated server firmware and drivers.

Dell has worked directly with industry leaders Microsoft and Altiris to enable their change-management solutions not only to update Dell server OS and application software, but also to help manage change for Dell server firmware and drivers. Microsoft and Altiris are delivering integrated change-management solutions that are designed to manage all software on Dell servers—enabling organizations to simplify IT operations by using a single process to maintain Dell server firmware, drivers, OS software, and applications.

**Advanced systems management tools for the scalable enterprise**

As enterprises continue to grow in scale and complexity, administrators must simplify operations to take control of the IT infrastructure and meet fast-changing business requirements. By understanding how to use highly instrumented clients, servers, and storage systems together with integrated, standards-based systems management solutions, administrators can proactively manage servers and clients throughout the complete system life cycle. The core Dell tool set discussed in this article, together with integrated systems management solutions from Dell partners such as Altiris and Microsoft, can help administrators automate tasks and optimize IT investments—freeing valuable resources to focus on strategic business initiatives.

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- Dell scalable enterprise strategy: www.dell.com/enterprise
- Dell OpenManage systems management framework: www.dell.com/openmanage
- Dell standards-based solutions: www.dell.com/standards