

# Deploying Dell OpenManage on VMware ESX Server

VMware® ESX Server™ software divides a physical server into a group of logical computing resources by creating multiple, independent partitions—or *virtual machines*—that can run different applications and operating systems on the same hardware platform. Dell™ OpenManage™ systems management software works with VMware ESX Server to help maximize uptime of physical servers running virtual machines.

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VMware® ESX Server™ software brings virtual computing to Intel® processor-based servers. Through logical partitioning, VMware ESX Server creates a group of logical computing resources by dividing one physical server into several independent partitions, or *virtual machines*. These virtual machines reside on the same physical hardware, but operate in isolation from one another. Each virtual machine runs its own separate operating system (OS) instance and one or more applications.

By consolidating applications onto fewer physical servers, administrators can simplify systems management and help lower maintenance and operating costs—increasing the utilization of physical servers to process additional workloads within existing data center facilities. However, the hardware failure of a server that is running multiple applications on multiple virtual machines can be costly and time-consuming. The larger the number of systems affected by a failure, the greater the potential for disruption to business. Proactive monitoring of system health and cyclic system maintenance can be instrumental in preventing unplanned downtime and increasing overall system availability.

The Dell™ OpenManage™ product suite offers administrators several systems management capabilities for Dell PowerEdge™ servers running ESX Server 2.0.1. IT departments can use Dell OpenManage, including Dell

OpenManage Server Administrator, to monitor, manage, and remotely control Dell servers—thereby helping to improve server uptime and lower hardware failure rates. Server Administrator enables IT organizations to track the health of physical servers and detect problematic components before hardware failures occur (see Figure 1).

During development of VMware ESX Server 2.0.1, Dell performed comprehensive testing of its Dell OpenManage products on PowerEdge 6650 servers to help ensure full compatibility of the Dell OpenManage product suite with ESX Server. Dell also provided prerelease versions of Dell OpenManage 3.6 tools and ESX Server 2.0.1 to beta test sites. The beta testing program assisted Dell customers in deploying ESX Server and provided feedback that helped Dell enhance the hardware-virtualization capabilities of its hardware and software products.

## Using ESX Server to achieve virtual partitioning

Hardware virtualization through the use of ESX Server software allows multiple OS instances to run simultaneously on the same physical server (see Figure 2). This capability enables administrators to consolidate heterogeneous workloads onto a single physical server by allowing applications that cannot coexist within one OS instance to run on separate OS instances. Note that not all applications are good candidates for virtualization; for example, systems that

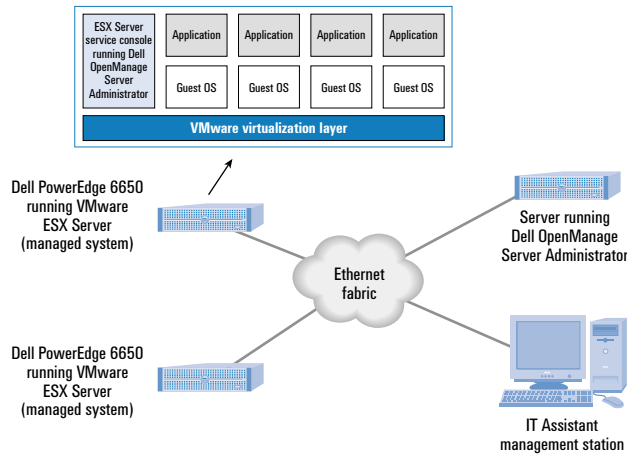


Figure 1. Dell OpenManage deployed on PowerEdge servers running VMware ESX Server

need direct access to physical hardware or those that fully utilize the computing power of the physical hardware should not be implemented on virtual machines. However, hardware virtualization can be a powerful tool for consolidating Web servers and offloading database servers, and for running applications that have moderate demands for memory and CPU resources. By consolidating applications onto fewer physical servers and managing multiple virtual machines through a single ESX Server service console, administrators can streamline operations and increase application availability.

ESX Server encapsulates each virtual machine in a discrete set of files and runs the machine in its own separate environment, thus providing the necessary isolation for running multiple, sometimes incompatible, applications on the same physical hardware. Acting as the *host OS*, ESX Server runs directly on the system hardware, providing powerful resource management features to enable efficient, high-performance server virtualization.

The OS running within a virtual machine is called the *guest OS*, and each virtual machine presents its OS with a consistent set of virtual hardware, regardless of the underlying physical hardware. This hardware independence ensures that only a particular OS instance is affected when an application running within a guest OS becomes unstable and causes that guest OS to crash.

Hardware independence also lets administrators easily relocate virtual machines onto various Intel processor-based servers, even if the physical servers use different underlying hardware. VMware VirtualCenter software can further simplify virtual machine migrations by enabling a *virtual infrastructure* approach to IT management, which allows administrators to move a virtual machine from one physical server to another physical server connected to the same storage area network (SAN) without incurring downtime. (See “Introducing VMware ESX Server, VirtualCenter, and VMotion on Dell PowerEdge Servers” in *Dell Power Solutions*, March 2004.)

## Running Dell OpenManage to enhance systems management capabilities

Dell OpenManage provides administrators with comprehensive, one-to-one systems management capabilities within the data center. Dell OpenManage features include proactive monitoring of server health, diagnostics for troubleshooting, alerts and notifications, and remote access. Each server managed by Dell OpenManage software is known as a managed system. Managed-system applications include Dell OpenManage Server Administrator and remote access controller software.

### Comprehensive monitoring using Server Administrator

Dell OpenManage Server Administrator provides a browser-based graphical user interface (GUI) that offers a consolidated and consistent way to monitor, configure, update, and manage individual Dell servers. Server Administrator provides the following features:

- Security management
- Command-line interface (CLI)
- Extensive logging
- Diagnostic tools to isolate hardware problems while a server is running
- Remote access to an inoperable server
- Remote administration of a monitored server, including BIOS setup, shutdown, startup, and Dell Remote Access Card III (DRAC III) security

### Enhanced availability using DRAC III

DRAC III, a physical card that includes software components, provides alert messages for system problems and also enables remote systems management. Remote management reduces the need for administrators to access servers physically and improves availability by enabling IT departments to manage servers more quickly and address problems proactively before they worsen.

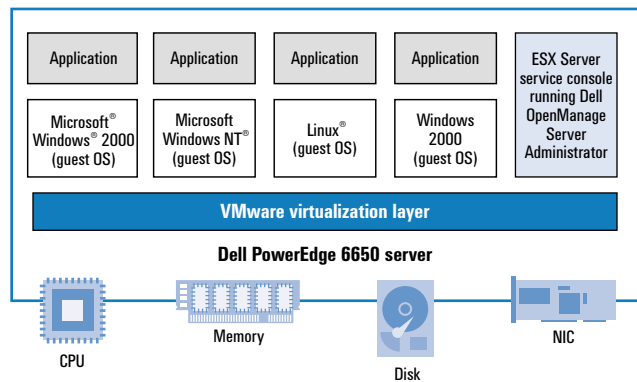


Figure 2. Hardware virtualization using ESX Server

### Effective monitoring of managed systems using IT Assistant

A management station can be used to remotely manage one or more servers from a central location. Dell OpenManage IT Assistant is a systems management console program that can be installed on one management station to collect information and provide a view of all managed systems. Server Administrator provides thorough Simple Network Management Protocol (SNMP) integration with IT Assistant as well as third-party management-station programs.

By installing IT Assistant on a management station, organizations can administer thousands of managed systems effectively. IT Assistant provides fault monitoring as well as inventory and asset reporting:

- **Fault monitoring:** Notifications through e-mail, paging, SNMP, or console alerts to keep administrators informed of events concerning disk, memory, voltage, fan, and thermal conditions
- **Inventory and asset reporting:** Service tag number; cost of ownership information; and specifics of the BIOS, micro-processor(s), and memory

### Deploying Server Administrator on the ESX Server service console

The ESX Server service console provides a Web-based GUI for managing and configuring virtual machines. Server Administrator, which runs on the service console, can be used to manage the physical server. Note that systems management applications such as Server Administrator and remote access controller software cannot be used within the virtual machines because the software would recognize only the virtualized hardware, not the physical hardware.

Currently, applications running in the service console can monitor only hardware that is either dedicated to the service console or shared with it. For example, Server Administrator can provide information about the physical server as well as subcomponents (such as network components or storage devices) that are assigned to or shared with the service console.

The step-by-step deployment process for Server Administrator on the ESX Server service console is as follows:

1. Install the ESX Server 2.0.1 kernel source from the ESX Server CD and run the Dell OpenManage setup script using the following commands:

```
$ cd /mnt/cdrom/Vmware/RPMS
$ rpm -Uvh kernel-source-2.4.9.-34.i386.rpm
$ /usr/sbin/dellomasetup.pl
```

2. Download ppp-2.4.1-3.i386.rpm from the URL <http://www.vmware.com/download/esx/esx201-openmanage.html>, and install the download using the following command:

```
$ rpm -Uvh ppp-2.4.1-2.i386.rpm
```

3. Configure the SNMP daemon (snmpd) for sending traps to the management station by adding the line:


```
$ trapsink management_station_IP_Address public
```

to the `/etc/snmp/snmpd.conf` file.

4. Install Dell OpenManage from the Dell Systems Management CD using the following command, and then reboot the system:

```
/mnt/cdrom/start.sh -license
```

### Obtaining maximum benefits from server virtualization

Now functioning on Intel processor-based systems, virtual servers can provide significant data center benefits: reduced costs for maintenance, power, and cooling; smaller footprint for server hardware; and simplified systems management processes. As enterprises of all sizes demand higher availability for business-critical applications, the server virtualization approach can help administrators achieve definable efficiencies and cost savings. The combination of industry-standard Dell PowerEdge servers, VMware ESX Server virtualization software, and powerful systems management tools such as the Dell OpenManage suite can enable data center administrators to maximize application availability efficiently and cost-effectively. 

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