Reliable, efficient server performance begins with deployment. How servers are deployed in an enterprise environment can affect the future operation of those servers. IT administrators should carefully plan what software to install and how it will be installed before introducing new servers into the IT environment.

Dell offers several methods for ordering and installing Microsoft® operating systems on Dell™ PowerEdge™ servers. For new servers, customers can purchase original equipment manufacturer (OEM) versions of Microsoft server software from Dell or they can purchase Microsoft software through various volume licensing programs. Installation methods include pre-installation through the Dell build-to-order process, installation at the customer's site through Dell OpenManage™ Server Assistant, or a manual installation from Microsoft media. This article discusses these installation options as well as the methods for ordering the Microsoft operating system (OS).

Build-to-order process: Pre-installing the OS
When a customer orders a Dell PowerEdge server with a Microsoft Windows® OS, that server undergoes the factory build-to-order process. In this process, Dell Factory Install engineers write unattended scripts to partition and format the server’s hard disk drives. They also install the OS using an unattended routine incorporating the latest Dell-qualified and Dell-supported service pack and device drivers.

Every driver, hot fix, and service pack undergoes extensive testing and validation before Dell incorporates it into factory loads. Dell verifies the quality and reliability of software in three separate stages before shipping the configured server to the customer. PowerEdge servers with a pre-installed Windows OS are delivered ready to run. Dell uses qualified and supported drivers for all devices, which helps reduce the downtime associated with an improperly configured server and other installation and management hassles, thereby saving system administrators time.
When a server OS is pre-installed, administrators use a mini-setup procedure to quickly connect the server to the network. This mini-setup offers several options for customization. The options include adding user and organization names, selecting licensing modes, creating an appropriate computer name and administrator password, and adjusting the date, time, and time zone. In addition, administrators can customize network settings, which include the options of joining a domain, adding another network client, or specifying a static IP address.

**Disk partitioning strategy offers flexibility**

Dell can disk partition PowerEdge servers during the pre-installation. The default partitioning strategy for Windows 2000 Server is a 32 MB utility partition, a 4 GB primary partition, and an extended partition for the remaining space on the drive. If Windows 2000 Advanced Server is chosen, the default primary partition size is 8 GB.

Dell partitions and formats the drives with the NT file system (NTFS). However, the utility partition is formatted as a file allocation table (FAT) file system so that it can be accessed in DOS. Customers can specify the primary partition size: reduce it to 2 GB or increase it up to 20 GB. All additional hard drives shipped with the server are partitioned and formatted in the factory.

**Additional software assists firmware setup and diagnostics**

During the pre-installation, Dell also installs additional software, such as the current diagnostics applicable for the specific server. The diagnostics are placed in the utility partition and can be accessed by pressing “F10” at boot time. These tools provide RAID setup and extensive hardware diagnostics, including memory and hard drive verification.

If RAID is purchased, Dell installs the current version of Dell OpenManage Array Manager. This tool replaces the Logical Disk Manager in Windows 2000 by providing all the features of that disk manager plus additional features. The main advantage of OpenManage Array Manager is its ability to manage local and network-based RAID devices from within the Windows OS.

**Subscription service: Installing with OpenManage**

Dell OpenManage Server Assistant is a bootable, stand-alone CD-ROM that provides the tools required to set up and configure new PowerEdge system components and software. Administrators can use Server Assistant to perform an unattended installation of the OS that includes the latest drivers provided by Dell. The CD-ROM ships with every PowerEdge server at no additional charge and can also be ordered through the Dell OpenManage Subscription Service. This service sends subscribers the most recent utilities, diagnostics, drivers, and system BIOS updates on the Dell OpenManage Server Assistant CD.

System administrators who subscribe to this service can also take advantage of the continual product improvements that Dell makes by installing the systems management instrumentation, agents, and console application programs provided on the Dell OpenManage Systems Management CD. Updates are mailed quarterly and can be delivered directly to the IT administrator’s office, alleviating the need to search online for product updates.

Like other options, the Dell OpenManage Subscription Service can be added to the order of Dell PowerEdge servers. Although customers can purchase multiple subscriptions, they do not need to purchase one for each server—one subscription can be used for multiple servers.

**Another option: Manually installing the OS**

To perform a manual installation of a Microsoft OS on a Dell PowerEdge server, an administrator must first gather the appropriate drivers for installation. These drivers are available at the Dell Support Web site (http://support.dell.com). After signing in to the site and selecting the type of server on which the OS will be installed, the administrator can view a list of all matching drivers and then choose the appropriate drivers to download. If the driver for the mass storage device is not native to the OS, then it must be stored on a floppy disk. The administrator must then use the floppy disk to install the driver during the initial phase of the installation. This process will ensure proper configuration of the boot device.

After gathering all the drivers and saving at least the mass storage device driver on a floppy disk, the administrator can begin the installation. However, a few factors should be kept in mind:

- If hardware RAID has been selected, the administrator must create the container and set the RAID level before installing the OS.
- If the SCSI or RAID driver is not native, the administrator must press “F6” to install it.

The tech sheets sent with the server will guide administrators through the installation process. After installing the OS, they can update the drivers and applications.
OEM Environment

PowerSolutions offered in these programs is identical to the standard Dell to three-year period (see Figure 2). The Microsoft software and commits to buy a certain amount of software over a two- in which the customer signs an agreement with Microsoft tion, migration, and deployment.

total cost of ownership, CFI offers on-site, customized installa-
tion took almost one hour.

Comparing installation methods

Figure 1 compares installation time using factory installation, OpenManage Server Assistant, and manual installation for the Dell PowerEdge 2500, PowerEdge 2650, and PowerEdge 8450 servers. When a Dell team measured the time required to set up Microsoft Windows 2000 Server, the overwhelming benefits of a factory installation became apparent. The server with a pre-installed OS Windows 2000 Server, the overwhelming benefits of a factory took an average of eight minutes to set up while the manual instal-

Figure 1. Comparison of different installation methods

Ordering Microsoft software for Dell servers

Because Dell can leverage some capabilities as an OEM, it can offer a wide range of software applications and licenses. Custom-
omers can order these OEM licenses and solutions through Custom Factory Integration (CFI) or through volume license contracts. The Dell CFI program custom-configures products with the hardware or software a business requires. To reduce total cost of ownership, CFI offers on-site, customized installa-
tion, migration, and deployment.

Dell also offers a variety of volume licensing programs, in which the customer signs an agreement with Microsoft and commits to buy a certain amount of software over a two-
to three-year period (see Figure 2). The Microsoft software offered in these programs is identical to the standard Dell

Open licensing

Microsoft Open License is a simple and flexible program that helps reduce up-front software payments and forecasting. The Open License program offers two programs for Microsoft business software: Open Business and Open Volume. Open Business suits companies that want to save money yet do not want to make a large, up-front volume commitment. For companies able to make a larger volume commitment, Open Volume includes three product pools from which customers can choose—Applications, Systems, and Servers. These product pools allow companies to combine similar Microsoft software licenses and achieve additional price discount levels.

Select licensing

Microsoft Select License is a cost-effective volume licensing program suitable for medium-size, large, or international

<table>
<thead>
<tr>
<th>Type of Microsoft licensing</th>
<th>Agreement terms</th>
<th>Proof of license</th>
<th>Technical support</th>
<th>Installation</th>
<th>Minimum order</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM license from Dell</td>
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<td>COA sticker affixed to server</td>
<td>Dell provides</td>
<td>Dell installs</td>
<td>None</td>
</tr>
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<td>Microsoft Open License</td>
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<td>Can be purchased</td>
<td>Dell or customer installs</td>
<td>Open Business: 5 licenses</td>
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<tr>
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<td>Can be purchased</td>
<td>Dell or customer installs</td>
<td>1,000–50,000 depending on products</td>
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<tr>
<td>Microsoft Enterprise Agreement</td>
<td>3 years</td>
<td>License confirmation document</td>
<td>Can be purchased</td>
<td>Dell or customer installs</td>
<td>1,000–50,000 depending on products</td>
</tr>
</tbody>
</table>

Figure 2. Volume license comparison
organizations. The organization signs a two-year agreement, in which it forecasts its own software needs and buys all products and services at an established discount level. Under this agreement, the organization can acquire and pay for software and version protection on an as-needed basis.

Microsoft bases the software forecast on the total amount the organization expects to acquire in each of three product pools (Applications, Systems, and Servers)—the higher the acquisition forecast, the lower the price. In addition, this program provides convenient product distribution through CD-ROM, thereby eliminating extra diskettes, documentation, and packaging.

**Enterprise licensing**

Enterprise customers can sign a three-year agreement in which they commit to a fixed configuration and fixed annual payments. This agreement, known as the Enterprise Agreement, provides access to all versions of Microsoft Office and software installation services when needed, including OS upgrades, applications installation, and Core Client Access Licenses (CALs). Additional components may also be added, such as Microsoft Exchange Server, Microsoft FrontPage®, and Microsoft Project.

The Enterprise Agreement program is designed for businesses that have at least 250 desktops and wish to enhance business productivity. Through this agreement, they license 100 percent of their qualified desktops over a three-year period, with a renewal option of one year or three years. Software licenses offered through the Enterprise Agreement program are in effect only for the term of the enrollment, but businesses can buy out software licenses for permanent-use rights.

**Installing the OS through hard drive imaging**

By imaging a hard drive, IT administrators can replicate that hard drive’s OS and software configuration onto new servers or onto the same server if the hard drive becomes corrupt or fails. This type of installation relies on the ability to make a high-quality, generic image of an existing server. Products such as Symantec™ Ghost™ software and PowerQuest® Drive Image® Pro software are frequently used to image hard drives.

Administrators should follow these precautions when using imaging:

1. Apply images to systems with similar mass-storage devices.
2. Include drivers for additional pieces of hardware in the image or at least have them available to install after the imaging is complete.
3. Modify the computer name and server ID (SID) on the target system.
4. Apply the image to the second partition and leave the Dell utility partition and its diagnostics intact because these tools can help to troubleshoot hardware errors.

**Flexible, customized deployment: Using Microsoft software on Dell servers**

Several options exist in choosing how to license Microsoft operating systems and how to install them on Dell PowerEdge servers. Dell can help IT administrators select the most cost-effective licensing plan and can help ensure that new servers are configured according to that plan during pre-installation or Dell CFI. Dell can pre-install operating systems or provide assistance for customers who prefer to install or re-install them on-site using Dell OpenManage Server Assistant or manual methods.

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