USING THE MICROSOFT WINDOWS SERVER 2008 SERVER CORE INSTALLATION OPTION

The Microsoft® Windows Server® 2008 OS offers an alternative Server Core installation option that creates a minimal environment for specific server functionality. Although this installation option can present challenges when upgrading Dell™ PowerEdge™ servers, administrators can use native tools and the Dell OpenManage™ suite to help customize Server Core installations for optimum performance.

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T he number of network nodes continues to grow worldwide, creating complex IT environments that are increasingly challenging to manage efficiently while maintaining security. In an effort to meet these challenges, enterprises continue to look for simple, cost-effective ways to streamline IT infrastructures and optimize operations performed routinely on dedicated servers.

To help organizations meet these goals, Microsoft has developed a scaled-down, secure Server Core installation option in Windows Server 2008. This option helps increase efficiency by providing a minimal OS environment designed for running specific server roles and features. The reduced feature set available in Server Core installations helps lower the overhead typical of full OS installations and helps avoid the need to install or maintain extraneous OS components and services. By providing a streamlined OS installation footprint, Server Core installations can help free administrators' time to enable them to focus on more critical enterprise tasks than routine server administration.

Integrating systems running Server Core installations and the Dell OpenManage suite can give administrators an efficient way to deploy and manage server resources. In addition, by helping reduce the overhead associated with maintaining additional components in a full Windows Server 2008 installation, administrators can use a combination of OS-native tools and Dell OpenManage to deploy images quickly for Dell PowerEdge servers.

SERVER CORE INSTALLATION ADVANTAGES AND LIMITATIONS

In contrast to a full Windows Server 2008 installation, the Server Core option installs only the essential OS components required to manage specific server roles and features. Reducing the number of OS components not only helps minimize maintenance requirements, but can also help reduce the number of potential attack points typical of a full installation. Because administrators can configure Dell PowerEdge servers with only relevant components for dedicated roles, a Server Core installation typically requires only one-third of the disk space of a full Windows Server 2008 installation, and typically boots more quickly than a full installation.

However, Server Core installations can present challenges for administrators maintaining enterprise systems, including the intrinsic limitation that the installed OS supports only selected server roles and features. The Server Core installation option does not provide a traditional graphical user interface (GUI), which can diminish ease of use and require in-depth knowledge of command-line tools and scripting. However, when properly configured,

	Minimum	Recommended
Processor speed	1 GHz for x86 processors, or 1.4 GHz for x86-64 processors	2 GHz or faster
Memory	512 MB	2 GB or more*
Available disk space	10 GB	40 GB or more**

*On 32-bit systems, Windows Server 2008 Standard Edition supports a maximum of 4 GB of RAM, while Windows Server 2008 Enterprise Edition and Datacenter Edition support a maximum of 64 GB of RAM. On 64-bit systems, Windows Server 2008 Standard x64 Edition supports a maximum of 32 GB of RAM, while Windows Server 2008 Enterprise x64 Edition and Datacenter x64 Edition as well as Windows Server 2008 for Itanium-Based Systems support a maximum of 2 TB of RAM.

**Systems with more than 16 GB of RAM typically require additional disk space for paging, hibernation, and dump files.

Figure 1. *Microsoft Windows Server 2008 hardware requirements*

administrators can use a terminal server connection or the Microsoft Management Console (MMC) to remotely manage Server Core installations.

Server Core installations also do not support the Microsoft Windows® Explorer shell or Microsoft .NET Framework, and must be installed as a clean installation—administrators cannot upgrade a legacy OS or a full Windows Server 2008 installation to a Server Core installation, or vice versa. In addition, administrators cannot directly run the Microsoft Active Directory® Installation wizard (dcpromo.exe) to install or remove domain controllers. Administrators must run an unattend.xml file with the dcpromo.exe file to install, configure, or remove the domain controller role.

SERVER CORE INSTALLATION REQUIREMENTS AND PROCESS

Server Core installations provide a subset of roles and features available in full Windows Server 2008 installations, and the installation requirements for Server Core installations are the same as those for full Windows Server 2008 installations (see Figure 1). The setup.exe file enforces the RAM and disk space requirements during the installation process, but not the processor speed.

Both full Windows Server 2008 installations and Server Core installations support attended and unattended installation processes. Administrators performing attended installations must select "Windows Server 2008 (Server Core Installation)" on the

"Select the operating system you want to install" screen to begin the installation. The installation should proceed in the same manner as selecting the "Windows Server 2008 (Full Installation)" option. They can also use the Dell Systems Build and Update Utility to help simplify attended installations by installing nonnative drivers and setting up RAID volumes.

Administrators can perform unattended Server Core installations from the Windows Server 2008 media using an unattend.xml file stored on a floppy disk or USB drive. In addition, they can deploy a Server Core installation over a network using Microsoft Windows Deployment Services (WDS) with an unattend.xml file, or by browsing to a network share that contains a Windows Server 2008 installation disk and then running the command `setup.exe /unattend:unattend.xml`.

The Server Core installation option supports a minimal set of roles and features that is a subset of the roles and features available in full Windows Server 2008 installations. After installation with the default options is complete, administrators can install available server roles depending on their OS version, as shown in Figure 2. Server Core installations also support several optional Windows Server 2008

	Windows Server 2008 Standard Edition	Windows Server 2008 Enterprise Edition	Windows Server 2008 Datacenter Edition	Windows Server 2008 Web Edition	Windows Server 2008 for Itanium-Based Servers
Web services (Microsoft Internet Information Services)*	▲	▲	▲	▲	✖
Print services	■	■	■	✖	✖
Hyper-V	■	■	■	✖	✖
Active Directory domain services	■	■	■	✖	✖
Active Directory lightweight directory services	■	■	■	✖	✖
DHCP server	■	■	■	✖	✖
DNS server	■	■	■	✖	✖
File services	▲	■	■	✖	✖

*ASP.NET is not available with the Server Core installation option in any edition.

Source: www.microsoft.com/windowsserver2008/en/us/compare-core-installation.aspx.

■ = Full availability   ▲ = Partial/limited availability   ✖ = Not available

Figure 2. *Server roles available in different Microsoft Windows Server 2008 editions*

features, which administrators can install using either the command line or an unattend.xml file: failover clustering, Microsoft Network Load Balancing, subsystems for UNIX® OS–based applications, Windows Backup, Microsoft Multipath I/O (MPIO), Removable Storage Manager (RSM), Windows BitLocker™ Drive Encryption, Simple Network Management Protocol (SNMP), Windows Internet Naming Service (WINS), the Telnet client, and Quality of Service (QoS).

SERVER CORE INSTALLATION MANAGEMENT AND CONFIGURATION

After completing a Server Core installation, administrators can use local command-line tools or remote tools to manage and configure Dell PowerEdge servers. Server Core installations do not include GUI tools, but administrators can use command-line tools, the MMC, or Windows Remote Management (WinRM) for management and configuration.

Using command-line tools

To remotely manage and configure systems running Server Core installations, administrators can begin by logging in to the local console. From a command prompt, they can then enable Microsoft Remote Desktop for Administration using the following command:

```
cscript C:\Windows\System32\
    scregedit.wsf /ar 0
```

Figure 3 provides a list of commands that administrators can use for common setup and configuration tasks.

Using the Microsoft Management Console

Administrators also have the option of remotely managing and configuring servers set up with a Server Core installation through the MMC. To begin, administrators can use the following command to

configure the firewall, which must be completed first to allow the system to be administered remotely:

```
netsh advfirewall firewall set
    rule group="remote
    administration" new enable=yes
```

In addition, administrators can configure the firewall to allow connections to only specific MMC snap-ins by using the following command, where *rulegroup* corresponds to one of the options listed in Figure 4:

```
netsh advfirewall firewall set
    rule group="rulegroup" new
    enable=yes
```

After configuring the Windows Firewall to enable remote management, administrators

can use the MMC from another system to connect to a server running a Server Core installation.

Using Windows Remote Management

WinRM is the Microsoft implementation of the WS-Management protocol, a standard Simple Object Access Protocol (SOAP)–based protocol that allows hardware and operating systems from different vendors to interoperate and enables administrators to remotely execute command-line tools and scripts.[1] It is installed by default on Windows Server 2008, but no WinRM listener is configured. Administrators can configure the default listener on a system running a Server Core installation by executing the `winrm quickconfig` command from a command prompt.

In addition to the WinRM command-line tool, administrators can use WinRM

Command	Setup or configuration task
`netdom.exe`	Join a domain
`dcpromo.exe`	Promote server to domain controller
`netsh.exe`	Configure network settings and firewall
`sc.exe`	Manage services in the Microsoft service control manager
`oclist.exe`	List available optional components
`ocsetup.exe`	Install optional roles and features
`shutdown.exe`	Shut down or reboot the system
`scregedit.wsf`	Run a script for making changes to the registry

Figure 3. *Example commands for setting up and configuring systems running Microsoft Windows Server 2008 Server Core installations*

MMC snap-in	Rule group
Event Viewer	`remote event log management`
Services	`remote services management`
Shared Folders	`file and printer sharing`
Task Scheduler	`remote scheduled tasks management`
Disk Management	`remote volume management`
Windows Firewall with Advanced Security	`windows firewall remote management`

Figure 4. *Rule group options to configure a firewall for connections to MMC snap-ins*

[1] For more information on using WinRM, visit msdn2.microsoft.com/en-us/library/aa384372.aspx.

scripting objects and the Windows Remote Shell command-line tool (winrs.exe) to manage remote Server Core installations. On a remote system running a Windows OS, administrators can use the winrs.exe file to execute commands using the syntax `winrs -r:servername command`. Both the client system and the system running the Server Core installation must be members of the same domain when using this command syntax.

INTEGRATED MANAGEMENT USING DELL OPENMANAGE

The Dell OpenManage suite provides a comprehensive set of standards-based tools that can automate OS deployment, instrumentation, and management. Version 5.4 is the first Dell OpenManage version to support Windows Server 2008 deployment—version 5.3 supports management only—and its tools are combined onto a single bootable Dell Systems Management Tools and Documentation DVD. Dell OpenManage includes three components:

- The Dell Systems Build and Update Utility for installing and deploying an OS
- Managed System Node for installing Dell OpenManage Server Administrator (OMSA), the hardware instrumentation and Web-based console for local and remote one-to-one management of Dell PowerEdge servers
- Dell OpenManage Management Station for installing remote administration tools and consoles, including Dell OpenManage IT Assistant for one-to-many management of Dell PowerEdge servers

Deploying Windows Server 2008

After booting the Dell Systems Management Tools and Documentation DVD, the Dell Systems Build and Update Utility launches, which administrators can use to start the Server OS Installation wizard, set the system date and time, and select Windows Server 2008 for installation. This wizard also allows administrators to configure hard disks and RAID volumes.

The Server OS Installation wizard configures and formats the disks and begins copying files from the systems management tools and documentation media to the system volumes. The wizard can automatically determine the system's model, scan its devices, and copy updated drivers to the hard disk. Before completion, the wizard prompts for a reboot and requests that the Windows Server 2008 media be inserted to launch the native Windows Server 2008 setup and replace in-box drivers updated by running the wizard.

The key advantage of using the Dell Systems Management Tools and Documentation DVD when installing an OS on Dell PowerEdge servers is automatic injection of the updated drivers during installation. Administrators typically do not need to install additional drivers after the OS setup is complete.

Configuring the firewall

Additional configuration of the Windows Firewall is required to enable remote systems management using Dell OpenManage tools. The easiest method is typically to launch the MMC console on a client system, then add the Windows Firewall with Advanced Features snap-in, which allows administrators to set up rules to open the necessary ports. For a list of these ports, see Figure A in the supplemental online section of this article, available at DELL.COM/PowerSolutions.

Checking prerequisites

To install Dell OpenManage, administrators should first run a prerequisite check from the command prompt. The prerequisite checker program scans the system for drivers and services that Dell OpenManage requires, and writes the output to an omprereq.htm file in the %TEMP% folder. Administrators can copy the output file to another system for inspection. OMSA and Dell OpenManage Management Station on the Dell Systems Management Tools and Documentation media have separate prerequisite checkers. The OMSA prerequisite checker

program is in the SYSMGMT\srvadmin\windows\prereqchecker folder, and the Management Station prerequisite checker program is in the SYSMGMT\ManagementStation\windows\prereqchecker folder.

The command to launch the prerequisite check for both OMSA and Management Station is the same. Administrators can use the /s switch to force the prerequisite check to run in silent mode using the command `runprereqchecks.exe /s`.

Managing systems remotely

Installing OMSA installs the hardware instrumentation and the Web server on the managed server, which administrators can then remotely manage by either connecting to the Web server or using Dell OpenManage IT Assistant. On Dell PowerEdge servers running a full Windows Server 2008 installation, administrators can launch the OMSA console locally; however, because a Web browser is not available on PowerEdge servers running a Server Core installation, on those systems they must connect to OMSA remotely.

Administrators can install OMSA on PowerEdge servers running a Server Core installation by running the sysmgmt.msi package from the command line. This package is included on the Dell Systems Management Tools and Documentation DVD in its SYSMGMT\srvadmin\windows\SystemsManagement folder. After navigating to this folder, administrators can install OMSA using the command `msiexec /i sysmgmt.msi`.

After completing the installation, administrators can test it by using a Web browser on another system on the network to connect to the system by entering the URL https://*ipaddress*:1311. For this test to work, the Windows Firewall must be configured to allow incoming connections on port 1311.

Installing Dell OpenManage Management Station

Installing Dell OpenManage Management Station on a Dell PowerEdge server

running a Server Core installation installs the Dell Remote Access Controller (DRAC) and baseboard management controller (BMC) tools as well as the Microsoft Active Directory snap-in. Dell OpenManage IT Assistant is not supported on Server Core installations because a Web browser is not available; however, administrators can install Dell OpenManage IT Assistant on a remote system and use it to manage PowerEdge servers running a Server Core installation and using OMSA instrumentation.

Administrators can install Dell OpenManage Management Station on PowerEdge servers running a Server Core installation by running the mgmtst.msi package from the command line. This installation package is included on the Dell Systems Management Tools and Documentation DVD in the SYSMGMT\ManagementStation\windows\ ManagementStation folder. After navigating to this folder, administrators can install the software using the command `msiexec /i mgmtst.msi`.

STREAMLINED OS FOR DEDICATED SERVERS

Microsoft designed the Windows Server 2008 Server Core installation option to provide a minimal environment for running specific OS server roles and features. Using this option can be beneficial for enterprises using PowerEdge servers to perform dedicated tasks in a domain environment. In addition to administrators managing PowerEdge servers dedicated to Active Directory, Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), file and print services, and streaming media services, developers of network and file service infrastructures, developers of server management tools and utilities, and enterprise IT planners and designers may find the Server Core installation option useful. Using both native OS tools and Dell OpenManage to efficiently deploy and manage Server Core installations can help ease the management, configuration, and instrumentation of dedicated servers in medium and large enterprises. ⏻

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