

Chapter 1

Making Windows Server 2008 Serve You

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Windows Server 2008 is the latest and greatest version of Microsoft's flagship server platform and the successor to the hugely popular Windows Server 2003. Prior to its debut, Windows Server 2008 was code-named Longhorn, a platform that shared common client features also found in Windows Vista, much like the relationship between Windows Server 2003 and Windows XP. In fact, Windows Server 2008 even shares a common code base with Windows Vista and therefore carries much of the same architecture and core functionality.

Both Windows Server 2008 and Windows Vista share common technical, security, management, and administrative features; an improved IPv6-capable networking stack; native wireless utilities; and a revamped image-based installation format (among many other exciting new features). However, Windows Server 2008 is a total departure from the desktop/workstation realm and offers enterprise and server-specific features and functionality above and beyond anything Windows Vista offers. In this chapter, we explore some of these features from a 10,000-foot view and then focus on specific topics in the chapters that follow.

Large-scale deployment options, improved self-diagnostic tools, advanced reliability and performance monitoring, and enhanced security features are just some of the benefits that inhere to the new Windows Server 2008 platform. First, we take a look at server hardware and make some important distinctions between workstation and server roles and responsibilities.

Any Server Must Do This

The term *server* speaks to a broad classification of computers that combine hardware components and software services to handle a variety of tasks maintained through network relationships. A server takes many shapes and sizes, covers a wide range of form-factors, and includes numerous components and services. Embedded server platforms are used in network attached storage (NAS) devices, included in network print servers, and scale all the way up to giant mainframes capable of handling millions of simultaneous transactions and resource-intensive processing.



The terms *form-factor* refers to a specific design, layout, size, and shape of component or device. A form-factor can refer to several mutually independent devices, from the power supply and its interface types to motherboards and their various dimensions, pinouts, and connection types.

In fact, if you take a good look around your office environment, or just about any other office IT infrastructure, you can probably identify several otherwise-overlooked servers and server applications that you use on a regular basis. Modern technology puts the power of servers and server applications in the hands of mere mortals, and nowhere is this more evident than in the consumer market, where multimedia home theater PCs (HTPCs) are part of daily life for many. But back to the business world. . . .

Essentially, any server must serve a network — either clients or other servers, or some combination of the two. The term *server* also includes the actual server operating system that makes the computer do its job. Commercial server software products such as Windows Server 2008 are designed to handle a greater frequency and variety of tasks than are typical in either the desktop or workstation realms. Server platforms are an entirely different breed of PC, as compared to their desktop and workstation brethren, which is why they perch atop the hierarchy and the marketplace when it comes to buying an operating system.

Specifically, a server is designed and intended to provide services and run server applications under heavy workloads, left unattended and self-managing most of the time. For the most part, servers are self-contained, self-regulated core network entities in an enterprise or business IT environment. Larger amounts of memory (upwards of 8GB or more), larger storage capacity (terabytes, petabytes, and beyond), special storage methods (mirroring, striping, and multiple disk aggregation), redundant power supplies, and server-specific form-factors all typically distinguish specialized server hardware components from other, more ordinary computer components. That said, plenty of servers use desktop and workstation hardware such as optical drives, disk drives, and peripheral or display devices.



See Appendix A for more details on server hardware components and check out the Bonus Chapter at dummies.com/go/winserver2008 for a more in-depth discussion of server technologies.

Choosing Windows Server 2008

The Windows Server 2008 platform is further subdivided into multiple packages designed specifically for particular forms and functions. Understanding the distinctions among these market offerings and then understanding how they do or don't meet your requirements will help you choose the right offering for your budget and your computing needs.

In this section, we give you a look at some of the different offerings available under the Windows Server 2008 umbrella.

Meeting the Windows Server 2008 family

Microsoft follows the usual format for marketing its server family offerings, which include both 32-bit and 64-bit varieties. Some of these editions remain functionally identical to the Windows Server 2003 family. These offerings include the following:

- ✓ **Windows Server 2008 Web Edition:** Designed as a basic Internet Information Services (IIS) server platform to build and host Web applications and pages and provide eXtensible Markup Language (XML) services including Active Server Pages (ASP) and the .NET framework.
- ✓ **Windows Server 2008 Standard Edition:** Designed for small to medium businesses, this version supports file and print sharing, works with up to four processors, and accommodates up to 4GB RAM.
- ✓ **Windows Server 2008 Datacenter Edition:** Designed for infrastructures that demand greater security and reliability features, supportive of up to 64 processors and 512GB for high-availability, high-demand processing applications and processes.
- ✓ **Windows Server 2008 Enterprise Edition:** Designed for medium- to large-size businesses as a fully-functional server platform capable of operating eight processors and 64GB RAM, with enterprise-class features including clustering and virtualization.
- ✓ **Windows Storage Server 2008:** Designed as a specialized platform for network attached storage (NAS) implementations and optimized for use with file- and print-sharing services in storage area network (SAN) scenarios.
- ✓ **Windows Server 2008 for Itanium-Based Systems:** 64-bit Intel Itanium-based computers require a special version of Windows Server 2008 entirely its own.

You might be thinking, “Wow, what a diverse group of systems! You can’t possibly get any better than that!” Well, that’s what Microsoft was aiming for: To expand and proliferate its new 2008 platform, Microsoft has reformulated many of its top products to encompass many diverse business computing environments. In the preceding list, the items up to and including Enterprise are listed by increasing cost and capability; we don’t yet have information about the cost for Storage Server and Itanium versions, so we left those for the end of the list.

Why use Windows Server 2008?

There are dozens of compelling reasons to explore Windows Server 2008 as a viable platform for any business. In the list that follows, we give you a look at some highlights and expand on features and functions provided in Microsoft’s latest flagship product:

- ✓ **More control:** Windows Server 2008 empowers IT professionals with greater control and management over servers and network infrastructure with enhanced scripting and task-automation capabilities. Improved self-diagnostics and remote control tools create field-serviceable platforms that also may be supported across the network or via the Internet. These features are described in some detail in the section entitled “Benefits of Windows Server 2008” in the Microsoft Product Overview at www.microsoft.com/windowsserver2008/evaluation/overview.aspx.

When we speak of *field-serviceable parts*, we mean those components and devices that can be operated and fixed onsite, or *in the field*. Many computer-related issues can be resolved onsite, but there are certain circumstances where a part must be sent to a well-equipped service department or parts distributor.

Role-based, image-driven platform installation streamlines large-scale deployment processes and includes new utilities to facilitate creation of custom installation images and custom recovery images, all under one umbrella. The new Server Manager console delivers a consolidated, centralized control center for managing server configurations and related system information. See Chapter 6 for more information on the all-new Server Manager console.

- ✓ **Greater flexibility:** Windows Server 2008 supports custom modifications to better adapt to ever-changing business needs. Enhanced flexibility for mobile users, *integrated virtualization* (which means that one server can look and act like a bunch of servers, as far as its users are concerned), centralized application access, and new deployment options create a workable platform to suit a variety of enterprise networking scenarios.



You can create a custom installation image, or several, based on a core set of necessary applications and configurations and then roll it out to an entire enterprise in a completely automated, unattended fashion to expedite upgrades and new installations.

- ✓ **Better tools and utilities:** The new Windows PowerShell command line interpreter and scripting language facilitates more administrative control and productivity and better monitoring and analysis of system performance with its new Reliability and Performance Monitor. Plus, you can manage and secure multiple server types using the new Server Manager console, which provides centralized access to common administrative tools. PowerShell functionality is beyond the scope of this book and remains in beta status at the time of this writing, so we don't include material on this subject. See www.microsoft.com/windowsserver2008/powershell.msp for more details on PowerShell.
- ✓ **Increased protection:** Windows Server 2008 delivers improved security features that increase platform protection, reduce attack surfaces, and provide a firm foundation on which to construct and operate a business. The very core, or *kernel*, of the operating system is now better protected against various forms of attack. Windows Service Hardening makes Internet-facing services more resilient to Internet attacks, and a variety of access protections and cryptography services strengthen the Windows system. See Chapter 14 for more information on security topics related to Windows Server 2008.
- ✓ **New and improved TCP/IP features:** Windows Server 2008 includes many changes and enhancements to the Next Generation TCP/IP stack, such as IPv6 enhancements and policy-based Quality of Service (QoS) for enterprise networks. The Next Generation TCP/IP stack is a total redesign of traditional network stack functionality for both IPv4 and IPv6 protocol versions. Receive window auto-tuning, neighbor reachability, dead gateway detection, black hole router detection, routing compartments, and explicit congestion notification are just a few of its newly added and updated capabilities. (See Chapter 2 for more on the Next Generation TCP/IP stack.)
- ✓ **Self-healing NT File System (NTFS):** In the past, file system errors often required that a disk volume be taken offline for service, which clearly impacted business flow. A new feature and added benefit of the Windows Server 2008 platform is its inclusion of a real-time recovery or self-healing process for the NTFS storage format. That way, businesses can remain operational even in the face of file-system-related issues.
- ✓ **Server Message Block version 2 (SMB2):** The de facto standard for network file systems in the Windows realm is SMB, now revamped to handle scalable increases in server workloads more expeditiously.

- ✓ **Windows Server virtualization:** Windows Server 2008 provides a built-in *virtualization capability* to enable multiple separate operating system instances operating at the same time, using the same hardware. Users see multiple servers, each with their own data sets, services, and access controls, but IT departments can manage multiple virtual servers on a single set of server hardware.
- ✓ **Server Core:** A new installation option for Windows Server 2008 includes a stripped-down, graphical interface-free server platform that contains only those components and subsystems necessary for a high-availability server that requires fewer updates and less servicing. Envision a cluster of low-overhead, virtualized, highly optimized server operating systems running stripped-down core roles like DHCP or DNS in protected environments, completely autonomous, managed only by a single terminal, and you've got the right idea.

These are just some of the exciting new things going on with Windows Server 2008. You'll find out about many of these capabilities in more detail in the chapters that follow.

Exploring Windows Server 2008 Networking Features

Generally speaking, from a networking perspective, it's safe to assume that Windows Server 2008 does everything that previous versions of Windows Server have done — including automatic client addressing (DHCP), directory services (Active Directory), network name resolution (DNS, WINS, and so forth), as well as a whole slew of networked applications such as e-mail, databases, transaction processing, and so forth. In fact, Windows Server 2008 does more for networking than previous versions have done, especially where advanced network performance (auto-tuning and optimization), network security, network-based offload and acceleration technologies, and simplified management and diagnostics are concerned. For the complete Microsoft version of this story, see “Windows Server 2008 Networking Features” at www.microsoft.com/windowsserver2008/platnetworking/default.mspx.

Providing services through your server

The client-server paradigm operates largely on client requests for server services. Such requests require both server and client hardware and compatible software, which are necessary to facilitate network functionality between the

two. At the most basic level, a client must have a network connection available to transmit a request for services. Likewise, the client must have the correct software installed to formulate an intelligible request and pass it to the network, where a server can notice and respond to such a request.

Servers respond to client requests through a *listener process* represented by application services such as File Transfer Protocol (FTP) and Telnet. This process runs continuously, dispatching inbound client connections as they arrive and managing transitional connection states through the native TCP/IP stack implementation.

On the software side, servers require the following elements to make services available across the network:

- ✔ **Network drivers** enable the server to communicate with its network interface. This software lurks in the background and exists only to tie the computer to the network interface.
- ✔ **Protocol stacks** send and receive messages across the network. This software also lurks in the background and provides a common language shared with clients used to ferry information across the network.
- ✔ **Service applications** respond to requests for service and formulate replies to those requests. This software runs in the foreground and does the useful work. The service application includes the listener process, the temporary execution threads, and some type of configuration or management console so that it can be installed, configured, and altered as necessary.

Most software that resides on a server is network aware because delivery of information via network is a server's primary function. Some application and protocol services that are performed on behalf of a server computer include Active Directory, SQL Server database engines, Exchange e-mail servers, and Quality of Service networking.

Three improvements to existing services and one additional service in Windows Server 2008 include:

- ✔ **Failover clustering:** Improvements to failover clusters (previously called *server clusters*) simplify setup and management and better secure cluster deployment and enhance operational stability. In addition, both networking and communication to storage devices are improved to increase availability of applications and services.



The concepts and terminologies known as *failover* and *clustering* aren't something you'll encounter with only casual computing experiences, so don't feel threatened if these are entirely foreign to you. A *cluster* is a set of servers running one or several applications and services. A *failover cluster* is one in which several server computers operate cohesively so that in the event that one fails, another takes over processing of applications and data in its place.

- ✓ **Network load-balancing:** Advances include support for IPv6 and Network Driver Interface Specification (NDIS) 6.0, Windows Management Instrumentation (WMI) enhancements, and improved functionality with Internet Security and Acceleration (ISA) Server. *Network load-balancing* redistributes the load for networked client/server application requests across a set of cluster servers.
- ✓ **802.1X authenticated wired and wireless access:** Authenticated access for both networking technologies relies on 802.1X-compatible Ethernet switches and access points (APs) to provide port-based network access control. This prevents unauthenticated or unauthorized accesses and packet transmission to user and computer resources.

Managing the user experience

Windows Server 2008 provides a single central source for managing server identities, system information, server status, configuration problem identification, and role management through the new Server Manager console. Server Manager is an expanded Microsoft Management Console (MMC) snap-in that enables you to view and manage virtually all information and tools affecting server productivity.

Server Manager replaces features included with Windows Server 2003, such as Manage Your Server, Configure Your Server, and Add or Remove Windows Components. It also eliminates the requirement for the Security Configuration Wizard to run prior to server deployment, because roles are configured with security settings by default and easily deployable once installed and configured. See Chapter 6 for more on Server Manager.

Keeping it all safe and secure

Windows Server 2008 includes an impressive array of new security applications and features that further enhance enterprise deployments, particularly within hostile environments or under potentially threatening scenarios. Today's Internet is a brightly illuminated world that casts shadows, and from those shadows arise criminal aspirations that seek to infiltrate, pilfer, and

undermine Internet-accessible businesses. Microsoft has stepped up its Windows Server 2008 defenses to better serve the computing public that can't always defend against unforeseen, persistent, or stealthy attack.

The following paragraphs briefly summarize some of the new and newly enhanced security features of the Windows Server 2008 family:

- ✔ **BitLocker Drive Encryption** is a security feature of both Windows Vista and Windows Server 2008 (again sharing a common base) to provide strong cryptographic protection over stored sensitive data within the operating system volume. BitLocker encrypts all data stored in the Windows volume and any relevant configured data volumes, which includes hibernation and paging files, applications, and application data. Furthermore, BitLocker works in conjunction with Trusted Platform Module (TPM) frameworks to ensure the integrity of protected volumes from tampering, even — and especially — while the operating system isn't operational (like when the system is turned off).
- ✔ **Windows Service Hardening** turns Internet-facing servers into bastions resistant to many forms of network-driven attack. This restricts critical Windows services from performing abnormal system activities within the file system, registry, network, or other resources that may be leveraged to install malware or launch further attacks on other computers.
- ✔ **Microsoft Forefront Security Technologies** is a comprehensive solution that provides protection for the client operating system, application servers, and the network edge. In the Forefront Client Security role, you may provide unified malware protection for business notebooks, workstations, and server platforms with easier management and control. Server security can fortify Microsoft Exchange messaging environments or protect Office SharePoint Server 2007 services against viruses, worms, and spam.
- ✔ **Internet Security and Acceleration (ISA) Server** provides enterprise-worthy firewall, virtual private network (VPN), and Web caching solutions to protect IT environments against Internet-based threats. Microsoft's Intelligent Application Gateway is a remote-access intermediary that provides secure socket layer (SSL) application access and protection with endpoint security management.
- ✔ **User Account Control (UAC)** enables cleaner separation of duties to allow non-administrative user accounts to occasionally perform administrative tasks without having to switch users, log off, or use the Run As command. UAC can also require administrators to specifically approve applications that make system-wide changes before allowing those applications to run. Admin Approval Mode (AAM) is a UAC configuration that creates a split user access token for administrators, to further separate administrative from non-administrative tasks and capabilities.

- ✔ **Windows Firewall and Advanced Security** is an MMC snap-in that handles both firewall and IP Security (IPSec) configurations in Windows Server 2008. This edition is the first to have the Windows Firewall enabled by default. It can create filters for IPv4 and IPv6 inbound or outbound traffic and protect information entering or exiting the computer through IPSec. This component replaces both the firewall applet and the IPSec and IPSec-related tool sets.
- ✔ **Network Access Protection (NAP)** is a policy enforcement platform built into Windows Server 2008 that maintains a social health order for the network environment by specifically requiring that connecting client computers meet certain criteria. Such requirements include having a current, functional firewall enabled with recent operating system updates already in place. NAP helps create custom health code requirements driven through policy enforcement to validate compliant computers before making any connections to the protected network.

Microsoft has also gone to great lengths to improve and expand upon many other security features, management and configuration applets, applications, and tools. We cover network security topics more in-depth in Chapter 14.

The Very Basics of Windows Server 2008

Windows Server 2008 is built with components that draw on the Windows Vista family of features and functionality, with added components and capabilities that extend platform coverage to encompass medium and large business computing needs. From NT's humble beginnings in the early 1990s to Windows Server 2003, Microsoft's premier network operating system server product has come a long way.

Today, Windows Server 2008 offers a reliable and scalable platform for deploying complex intranet solutions by integrating Internet and local network capabilities. In other words, this product will let you play multiplayer, first-person shooter games with people across the office or spread across the globe.

Most of the advantages and benefits you enjoy with Windows Server 2003 are contained in Windows Server 2008, along with some changes, additions, and enhancements to existing features and functionality. Most of these improvements are found under the hood, such as changes to how Active Directory works, an expansion of command line management and scripting tools, improvements to domain management, improved security mechanisms and services, greater accessibility and authentication, and some convenient new prepare and repair options in the way installations are handled.



A can't-miss interface change is the Windows Server Manager (formerly called Manage Your Server), which appears automatically when you log on. In the Server Manager window, you can manage server roles and features, and access Diagnostics, Configuration, and Storage utility categories and much more. It's up to you whether you want to use Windows Server Manager or start programs and utilities the old-fashioned way (by choosing Start). We chose to bypass the Windows Server Manager by selecting the Do Not Show Me This Console at Logon check box at the bottom of the Computer Information window pane.

The entire 2008 platform does offer some interesting promises that just might be realized. The most important of these is the reduced effort required to develop and deploy complex e-commerce Web sites, stand-alone server core application services, and large-scale simultaneous roll-outs. Windows Server 2008 (as well as the rest of the .NET OS family) is tuned to provide better Internet and network service support to clients. When used with the .NET editions of Microsoft programming languages and networking services, you can create an impressive online presence.

In the next chapter, we expand more on networking concepts, covering topics that range from multiple network interfaces to load-balancing and protocol offload processing, application services, client-based management, and wide-scale software deployment.

