

How Windows Server 2008 Delivers Business Value

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# Table of Contents

[Table of Contents ii](#_Toc187167691)

[Introduction 1](#_Toc187167692)

[Make Your Infrastructure More Efficient with Virtualization 1](#_Toc187167693)

[Server Virtualization with Hyper-V 2](#_Toc187167694)

[Presentation Virtualization with TS RemoteApp 3](#_Toc187167695)

[Access Corporate Networks Remotely with Terminal Services 4](#_Toc187167696)

[Terminal Services Gateway 4](#_Toc187167697)

[Terminal Services Web Access 5](#_Toc187167698)

[Single Sign-On 5](#_Toc187167699)

[Hosting Secure Web Applications with Ease 6](#_Toc187167700)

[Introduction 6](#_Toc187167701)

[Built on a Proven and Trusted Platform 6](#_Toc187167702)

[An Industrial Strength Web Server 7](#_Toc187167703)

[Optimize by Running Only What You Need 7](#_Toc187167704)

[Spend Less Time Managing Web Applications 7](#_Toc187167705)

[Delegated Administration Saves IT Support Costs 8](#_Toc187167706)

[Resolve Support Problems More Efficiently 9](#_Toc187167707)

[Strong Web Application Support 9](#_Toc187167708)

[Security and Compliance 10](#_Toc187167709)

[Introduction 10](#_Toc187167710)

[Stop Viruses at the Door with Network Access Protection 11](#_Toc187167711)

[Secure Access with Identity and Access Management 12](#_Toc187167712)

[Protect Data While Providing More Secure Access 12](#_Toc187167713)

[A Solid Foundation for Business Enterprises 13](#_Toc187167714)

[Introduction 13](#_Toc187167715)

[Built to Manage Remote Infrastructures 14](#_Toc187167716)

[Security and Flexible Administration with the Read-Only Domain Controller 14](#_Toc187167717)

[Mitigating the Risk of Stolen Computers 15](#_Toc187167718)

[Faster and More Reliable Networking 15](#_Toc187167719)

[Streamlined Windows Server Administration 16](#_Toc187167720)

[Easier Windows Server Setup and Faster Deployment 16](#_Toc187167721)

[Powerful Automation of IT Administration Tasks 17](#_Toc187167722)

[Group Policy Preferences 18](#_Toc187167723)

[Enterprise Class Print Management 18](#_Toc187167724)

[Increased Infrastructure Reliability with Server Core 19](#_Toc187167725)

[High Availability for Business Continuity 20](#_Toc187167726)

[Ensuring High Availability Through the Use of Failover Clusters 20](#_Toc187167727)

[Ensuring High Availability with Hyper-V 21](#_Toc187167728)

[Improved Backup Technology 21](#_Toc187167729)

[Improved Power Savings 21](#_Toc187167730)

[Summary 21](#_Toc187167731)

# Introduction

Businesses today are under increasing pressure to be more productive and profitable with fewer resources. However, analysts report that most organizations use 70 percent of their IT budgets in maintaining and operating their existing IT infrastructure rather than on investments that add business value.[[1]](#footnote-2) A survey conducted by CIO Magazine in April 2006 found that 12 percent of the 51 Chief Information Officers (CIOs) they interviewed faced what they called "very high" pressure to cut costs, and another 28 percent had "significant" pressure. "In a lot of cases, all the business expects of IT are tactical decisions. It’s viewed as an order-taker, a big cost, just data processing," says Dennis Gaughan, research director for IT governance at AMR Research.”[[2]](#footnote-3)

Many new capabilities have been added to Microsoft® Windows Server® 2008 to help enterprises trim costs and optimize resources. Powerful new IT administration tools, such as Server virtualization with Hyper-V™, Internet Information Server (IIS) 7.0, Windows Server Manager, and Windows PowerShell make it possible for businesses of any size to create and maintain complex and flexible enterprise-wide computing infrastructures with a minimum of IT resources. The advanced security and reliability enhancements that Network Access Protection (NAP) and the Read-Only Domain Controller (RODC) provide harden the operating system and protect the corporate network without the additional expense of third-party solutions. With new Terminal Services functionality such as Presentation Virtualization with Terminal Services (TS) RemoteApp, organizations can extend network access to employees working in remote locations and optimize their investment in software applications. Windows Server 2008 can be used to optimize internal IT resources and eliminate the costs of external consultants by offering powerful administrative capabilities “right out of the box.”

# Make Your Infrastructure More Efficient with Virtualization

Two new virtualization technologies are included in Windows Server 2008—Server Virtualization with Hyper-V and Presentation Virtualization with TS RemoteApp. Hyper-V is a 64-bit hypervisor-based virtualization technology that runs several operating systems on one physical server, making it possible to consolidate multiple servers into one physical server running Hyper-V, increase business continuity, provide more flexible development and test development environments, and implement dynamic datacenters that can adapt as business needs change. Presentation Virtualization with TS RemoteApp detaches the application interface from the host operating system and allows remote applications to function as if they were located on a local computer. Terminal Services Gateway and Terminal Services RemoteApp work together to provide remote workers access to internal applications over firewall-friendly ports. Server virtualization and Presentation Virtualization are part of the virtualization vision from Microsoft—integrating virtualization into a cohesive, enterprise-wide IT strategy.

## Server Virtualization with Hyper-V

Many organizations own physical servers in which the storage capacity and computing speed are underutilized. An IDG research paper published in August 2006 studied the IT infrastructures of 126 companies and reported that companies are using only an average of 8 percent of the computing and storage resources of their physical servers.[[3]](#footnote-4) Over time, having many underutilized servers can result in a substantial cost to the organization as each new server purchased involves continuing electricity and office space costs in addition to the one-time capital and deployment costs.

Windows Server 2008 addresses this problem with Hyper-V, a powerful virtualization technology with strong management and security features. Hyper-V is built on 64-bit hypervisor technology, which enables increasing workloads to be effectively managed, including workloads that involve 32- and 64-bit processors. With Hyper-V, underutilized physical servers can be consolidated into virtual servers running on a single physical server, making a few optimized servers do the work of many underutilized servers. Kroll Factual Data consolidated its using a Microsoft Virtualization solution, and today its center runs 1,000 virtual machines on only 275 physical servers. Says Chris Steffan, Information Security and Compliance Manager of Kroll Factual Data, “Consider how much power we save every day by running 20 virtual servers on one machine, versus 20 stand-alone servers,” Steffen notes. “If we took every virtual machine and ran it on a stand-alone machine like we did before, our power costs would at least double—not to mention the other costs accrued in additional equipment, real estate, networking, and support[[4]](#footnote-5).” Because servers running as virtual machines on a Hyper-V host are managed the same way, using the same tools as their physical counterparts, there is no need to retrain administrative staff when consolidating with Hyper-V. RPC Group recently consolidated IT operations using a Microsoft Virtualization solution, says Technical Architect Koenraad Meuleman of when talking about how the familiar user interface of Microsoft applications smoothes management, “It’s something the staff already knows; there’s no additional learning curve. They know, for example, what to do in backup scenarios.”[[5]](#footnote-6)

Hyper-V makes the job of IT administration easier by making it possible for all of the virtual machines in an enterprise network to be centrally managed from one familiar management console. This console, called the Hyper-V Manager, includes functionality that allows IT managers to quickly and efficiently deploy and manage virtual servers on any networked physical server. RackForce is a hosting provider that extensively uses a Microsoft Virtualization solution, and relies on Microsoft tools to streamline server management. When speaking about the previous generation management tool, James Bothe RackForce Systems Administrator said, “Virtual Machine Manager is rich with features that make managing virtual environments much easier and highly efficient. In particular, it’s back-end PowerShell scripting capabilities are extremely powerful.[[6]](#footnote-7)”

Server virtualization with Hyper-V has several new features that improve business continuity and disaster recovery. The Quick Migration feature in Enterprise and Datacenter editions of Windows Server 2008 allows virtual servers to be moved from one physical server to another with little downtime and to be quickly brought back online in a disaster recovery scenario. The Hyper-V Snapshot feature can save the state of a virtual machine or all virtual machines on a server, periodically or as needed, to a secure location. During a server failure, snapshots can be installed and launched on another server, even one in another location, making the new server functionally identical to the source server at the time the snapshot was saved. These capabilities combined with other the disaster recovery capabilities in Hyper-V enables organizations to use Hyper-V in to host their mission critical applications with an assurance of business continuity, and may allow organizations to implement rapid disaster recovery processes that are location agnostic. Kroll Factual Data has used a Microsoft Virtualization solution to implement just such capability. Says Chris Steffan, Information Security and Compliance Manager, “We don’t even have to set up the environment in disaster recovery, because as long as we have it on tape, we can load the environment whenever we need it. And really, we can load the copy of the environment on any computer, anywhere on the planet, as long as it is running the operating system that the original environment was running. If there was a major disaster, all I need is a network connection, some power, and a trailer, and I could literally set up our data center in our parking lot in 24 hours—even if it meant buying all new hardware. The complexity of our disaster recovery operations has gone from requiring a staff of 20 to a staff of 1 with one hard drive[[7]](#footnote-8) (for more information about how Hyper-V enables high-availability, refer to ).” Hyper-V is a flexible, high-performance, cost effective and well-supported virtualization platform. It can reduce hardware costs and operating expenses while improving security and centralizing system administration.

Hyper-V also has several new High Availability features, which are covered in the portion of this paper.

## Presentation Virtualization with TS RemoteApp

Today’s information workers work from everywhere—from the office, from home, and while traveling. Organizations rely heavily upon their IT departments to provide the applications their users need, wherever they are located, in a secure and reliable manner. RemoteApp in Windows Server 2008 provides a robust and user friendly solution to this business need.

With RemoteApp, users can run applications hosted on a server on the corporate network through Terminal Services and the application will operate as if it were running on the user’s local computer. The user does not need to switch between the local desktop and a remote desktop—RemoteApp applications run in resizable windows on the user’s desktop, can access local drives, devices, and printers, and run side-by-side with applications running on the local computer. Although RemoteApp uses Terminal Services functionality, Terminal Services operates transparently to the user. This means that the user does not have to learn a dedicated Terminal Services interface, which increases productivity and saves time for him or her. The organization does not have to incur the cost of training users to use any part of Terminal Services functionality. Organizations can deploy applications rapidly and manage a single installation of an application rather than many copies on remote machines. This means that organizations can greatly reduce the costs of server application maintenance and support.

RemoteApp in Windows Server 2008 empowers the mobile workforce, unobtrusively allowing them to work the way they need in today’s highly distributed business environment. It also centralizes the delivery and maintenance of applications, allowing for rapid application deployment, easier maintenance, and reduced support costs.

### Access Corporate Networks Remotely with Terminal Services

In addition to RemoteApp, many new features have been added to the Terminal Services component of Windows Server 2008 that make accessing corporate networks from remote locations fast, safe, and reliable without the need for VPN connections and cumbersome logons. Vetter Health Services, a long-term healthcare service provider, looked at the enhanced features in Terminal Services available in the Windows Server 2008 operating system. Terminal Services features like RemoteAppT would integrate the Vetter Health Services application without the use of a Virtual Private Network (VPN). “Windows Server 2008 has all the features we needed built right into Terminal Services,” says Joe Sturgeon, Vetter Health Services Network Administrator. “The cost savings really caught our eye[[8]](#footnote-9).”

### Terminal Services Gateway

Terminal Services Gateway (TS Gateway) allows remote users to access selected servers and workstations on the corporate network over firewall-friendly ports from anywhere on the Internet. All of the data transferred is encrypted to prevent the security of the communication session from being compromised. Accessing corporate network resources is easy for remote users with no configuration required on their computer, and controlling remote access is easy for IT administrators because of the comprehensive security administration tools that TS Gateway provides. IT administrators only need to maintain the copies of the application residing server rather than many copies of that application installed on mobile laptops. This not only saves the time and cost of administration, but also simplifies management of the software licenses.

The Manteca Unified School District is currently implementing Terminal Services on Windows Server 2008 to provide easier remote access to remote applications. They will use the Window Server 2008 Terminal Services RemoteApp feature to provide access to any Windows-based program from any location. They will use the Terminal Services Gateway feature to enable remote users to connect to terminal servers on the district network from any Internet-connected device without establishing a VPN connection. Says Colby Clark, Systems Administrator Supervisor, “We’ll be able to eliminate the frustrating logon procedure and make it much easier for users to access remote applications[[9]](#footnote-10).”

TS Gateway improves the productivity of remote workers and IT personnel while protecting corporate network assets.

### Terminal Services Web Access

Terminal Services Web Access (TS Web Access) provides access to RemoteApp applications through a Web browser-based interface. After TS Web Access has been installed and configured, running a remote application is as easy as choosing a program from the menu. Users do not need to know which server hosts the application they need to run—TS Web Access tracks that information for them. The Manteca Unified School District is using the Terminal Services Web Access feature to allow users to log on to specific applications from a Web browser. Systems Administrator Supervisor Colby Clark says, “We hope to provide 100 percent of our families with easy remote access to 100 percent of our applications. We’ll be able to deliver classroom applications at home, over the Web, that look just like the applications the kids use at school[[10]](#footnote-11).”

TS Web Access enhances worker productivity and end-user experience by providing an easy-to-use, Web-based menu interface to locate and launch RemoteApp applications.

### Single Sign-On

When accessing resources located on more than one server in an enterprise network, it is often necessary to remember several user IDs and passwords. This is because administrators often establish additional security policies for servers with sensitive corporate data, requiring users to log on again to those servers. This adversely affects productivity and results in a poor user experience. It can also introduce security risks if users store their user ID and password information in locations where it can be seen by unauthorized people.

Windows Server 2008 includes Single Sign-On (SSO), which allows users with a domain account to log on to a Terminal Services session once, using a password or smart card, and to then gain access to remote servers within the domain without being asked for their credentials again.

Line of Business (LOB) application deployment and centralized application deployment are key scenarios for SSO. To reduce maintenance costs, many companies prefer to install their LOB applications in a Terminal Server environment and make those applications available through Terminal Services RemoteApp, Remote Desktop, or Terminal Services Web Access. LOB applications installed on a terminal server can take advantage of the time-saving benefits of SSO.

Vetter Health Services has replaced the cumbersome logon procedure for the hosted application, which required accessing a logon page through a Web browser, entering a user name and password, waiting more than a minute for the application to open, then logging on again with another user name and password. Now, using a Windows Server 2008 Terminal Services solution, users can simply click an icon on their desktop and enter a single user name and password to open the application[[11]](#footnote-12).

SSO enhances corporate network security while saving workers time, reducing their frustration, providing them a better user experience, and improving their productivity.

# Hosting Secure Web Applications with Ease

### Introduction

The number of Web sites that IT support staff must configure and manage has dramatically increased in recent years. Enterprises of all sizes routinely host Web sites to provide information and services to customers and partners, to facilitate business operations between corporate divisions, to publish marketing materials, and many other purposes. All of these Web sites must be efficiently managed, monitored, and supported with a minimum of cost to the organization. To meet this need, Windows Server 2008 includes Internet Information Server 7.0 (IIS 7.0). With IIS 7.0, enterprises can deploy, configure, and manage Web applications and services, even services with advanced capabilities such as streaming audio and video.

### Built on a Proven and Trusted Platform

Businesses can build their online presence with IIS 7.0, which builds on the solid and safe platform of IIS6. Its reputation as a Web server capable of meeting needs of even the largest online businesses as been established by the more than 55 percent of Fortune 1000 businesses that rely on IIS[[12]](#footnote-13), as well as popular sites like Match.com that get 30 million pages views daily. Other well-visited sites such as MySpace.com (that gets 23 billion page views each month) and MSN.com have already upgraded their Web servers to IIS 7.0. Since it was released, the IIS 6.0 platform has had fewer than three updates of a severity level of moderate or less. This is a substantial improvement on the performance of previous versions of IIS. Also, IIS has no unpatched security issues. This approach makes software more secure and less vulnerable, resulting in fewer Web site outages, decreased downtime and reduced support costs.

Businesses can see a greater return on investment (ROI) and reduced total cost of ownership (TCO) because of the IIS 7.0’s ability to support a large number of Web sites on one server while maintaining a high level of performance. Pipex, a provider of integrated telecommunications and Internet services, is an example of a company that has done this. According to Jarrod Robinson, Hosting Products and Development Director at Pipex, “In our internal environment, we push the product quite hard. I already have solutions where we have tens of thousands of sites running on the IIS 6 platform and hope to have 100,000 sites with IIS 7.0. From what we’ve seen so far, we think it will be possible to significantly reduce the amount of ‘tin’ in the data center. IIS 7.0 appears to offer a great TCO benefit.”[[13]](#footnote-14)

### An Industrial Strength Web Server

Windows Server 2008 includes a unified platform for Web publishing that integrates IIS 7.0, ASP.NET, Windows Communication Foundation, and .NET Framework 3.0. IIS 7.0 is a secure and easy-to-manage platform for developing and reliably hosting Web applications and services. It includes tools that simplify site management, increase site security, and improve the performance and extensibility of Web sites.

### Optimize by Running Only What You Need

IIS 7.0 has been redesigned from the ground up to incorporate a modular architecture that enables IT administrators to customize their Web servers by selectively installing or removing modules. These modules encapsulate standard and optional server functionality such as authentication, encryption methods, and application-specific functionality. This modular design offers many benefits to IT organizations. Administrators can install only the options they need while eliminating the administration costs, server performance reductions, and security risks that come with unused server functionality. Web servers are more flexible with IIS 7.0 as modules can be easily and quickly added or removed as business needs change. The servers are also more reliable as a modular design reduces the chance that problems in one module will affect the others.

DiscountASP.net is an online Web hosting service that has made use of the modular architecture of IIS 7.0. Says Takeshi Eto, Vice President of Marketing, “A key advantage we’ve seen is the ability to do customization with IIS 7.0, versus the older versions. IIS 7.0 is factored into more than 40 feature modules that can be independently installed on the box. It provides us with more control over the server environment which, in turn, allows us to provide our customers with even more control over their individual Website [sic] account configuration. We are extremely happy with what we have seen so far.”[[14]](#footnote-15)

The core server functionality of IIS 7.0 tools is extensible, enabling organizations to develop custom modules that add to the functionality of the web service or any of the IIS 7.0 maintenance tools. These modules can call native Win32 APIs or managed .NET Framework APIs. IIS 7.0 will also work with existing automation scripts, and is fully compatible with applications that work with earlier versions of IIS.

IIS 7.0 enables organizations to better meet the unique and changing needs of their Web presence and network by tailoring Web servers to provide only the required functionality, improving security, reducing administration and support costs, and making it easier to add custom capabilities.

### Spend Less Time Managing Web Applications

IIS 7.0 features a new suite of GUI-based and command-line management tools that provide an easy-to-use interface for managing Web servers and obtaining diagnostic information about Web applications and services. Other IIS 7.0 tools can be used to automate many maintenance tasks, resulting in more efficient IT administration and fewer errors. IT administrators can write their own custom modules that extend the functionality of these administration tools and can be accessed through the standard tool interface. IIS 7.0 also supports remote administration over firewall-friendly HTTPS protocols that allow Web servers to be easily managed from remote locations. Configuration settings for the Web server and the services it provides are now stored in a single folder in XML format. Because the XML format has become the industry standard for portable and extensible data representation, IT personnel can use many third-party utilities such as XCopy to further automate maintenance operations.

Web-hosting firm MaximumASP decided to offer its customers free pre-release test accounts for the Windows Server 2008 operating system with IIS 7.0. In August 2007, CyberTV started to move 25 development sites over to the new operating system, along with one high-volume production site. MaximumASPand CyberTV both are enjoying the operating system’s new user interface, which minimizes the steps necessary to complete tasks. “Over the course of a large project, needing only one-third the number of mouse clicks is a huge benefit for us,” says Cyber TV Chief Technology Officer Deke. That productivity enhancement extends to the amount of time that it takes to establish Web servers, set up new sites, and share configuration files. Adds Hooper, “We’ve noticed a dramatic decrease of about 80 percent in the total time that it takes to set up new sites and handle load balancing[[15]](#footnote-16).”

MaximumASP is also taking advantage of the command-line utility to save time on repeated tasks. “Before, we had to have a programmer to create batch files and automate processes,” says Lead Developer Chris Morrow. “But with IIS 7.0, anyone can do it, which makes management faster and easier.[[16]](#footnote-17)”

These new features in IIS 7.0 saves costs by reducing the workload of IT administrators and streamlining the deployment of new Web sites, while making Web services more reliable and robust. Reliable and robust Web services result in fewer costly helpdesk support calls, satisfied customers, and more revenue for the company.

### Delegated Administration Saves IT Support Costs

With IIS 7.0, IT administrators can delegate administrative capabilities to clients who host or administer Web sites and services. For example, an administrator may delegate the ability to maintain Web site properties, such as the default document to a content developer maintaining a Web site. The clients, who may be corporate customers, partners, developers, or other business units, can assume the responsibilities and costs of these new capabilities under the direction of the IT department. These capabilities can be easily granted, revoked, and transferred, while the IT department retains full control of critical server settings and security policies. Administrators can lock specific IIS 7.0 configuration settings to ensure that these security policies are not changed by clients who have been delegated administrative capabilities.

For the Web site owner, this removes the total reliance on the IT department to perform routine maintenance tasks such as changing the default home page. For the company, this reduces costs by reducing the workload of IT personnel.

### Resolve Support Problems More Efficiently

IIS 7.0 provides a set of troubleshooting and analysis tools that are powerful yet easy to use. They enable administrators to quickly address problems as they arise by monitoring real-time diagnostic information about all aspects of server operation. This information is presented to the administrator in an organized format that allows crucial data to be quickly accessed. New features in IIS 7.0 enable administrators to troubleshoot complex and intermittent problems by automatically monitoring the activity of Web applications for error conditions. When an error occurs, detailed information about the error is written to log files that aid administrators in the troubleshooting process. IIS 7.0 also simplifies troubleshooting by providing informative error messages instead of abstract error codes, as well as information on potential causes of the problem and suggestions for resolving the problem.

Southern Star Central Gas Pipeline is one of the largest natural gas transmission providers in the United States. Southern Star decided to deploy the Windows Server 2008 operating system with IIS 7.0 in its application server environment. With new troubleshooting features in IIS 7.0, Southern Star administrators and developers can identify and correct problems with applications more quickly, without having to write code or route log entries to try to diagnose errors. Administrators are saving up to an hour per event in locating and resolving application errors. “The improved diagnostics in IIS 7.0 are the biggest benefit for us,” says Systems Administrator B.J. Stigall. “It has been a huge help in tracking down application errors[[17]](#footnote-18).”

### Strong Web Application Support

The cost of Web application development and deployment has been increasing for organizations because of the vast number of software technologies and hardware platforms that applications must reliably operate with. Customers now expect robust and full-featured Web applications and services that rely on a variety of languages such as classic ASP, ASP.NET, and PHP. A Web hosting platform that supports all of these languages while offering powerful and easy-to-use management tools will enable organizations to consolidate all of their Web applications on one platform. This can reduce or even eliminate the need to run multiple host platforms, and lower support costs. Web hosting platforms that do not support all of these languages in an integrated way can add to the cost of development and maintenance, result in lost business, and reduce the ability of their applications and services to adapt to changing business needs.

IIS 7.0 provides a unified platform for Web hosting and publishing and provides application support that goes well beyond classic ASP. An important feature of IIS 7.0 is the FastCGI module. FastCGI is a high-performance version of the Common Gateway Interface (CGI), which is the standard Web interface used by many Web client applications to communicate with Web servers. FastCGI enables CGI-based Web applications to run faster while maintaining stability while providing reliable PHP support. This makes IIS 7.0 an excellent platform that organizations can use to host of all of their Web applications.

IIS 7.0 also operates with Microsoft .NET Framework version 3.0, which combines new technologies for building applications that deliver a visually compelling user experience, communication across technology boundaries, identity management, and support for a wide range of business processes. .NET Framework 3.0 reduces development complexity by providing a consistent and comprehensive development environment, enabling solutions that work with a wide variety of mobile devices, backend services, and applications.

Applied Innovations is a Microsoft Gold Certified Partner and is a leading provider of Web hosting. Starting in early 2007, Applied Innovations became an early adopter of IIS 7.0 and Windows Server 2008. The company upgraded its corporate and support servers, as well as selected servers used by its hosted customers, from Windows Server 2003 and IIS 6.0 to Windows Server 2008 and IIS 7.0. A big advantage of the company’s move to Windows Server 2008 with IIS 7.0 is the native PHP support available in IIS 7.0. “This means that both ASP.NET and PHP applications will run in the Windows environment with greater performance and stability than before,” says CTO Carlos Caneja. “This gives Applied Innovations and its customers the versatility to use whatever application—be it ASP, ASP.NET, or PHP—best fits their needs.[[18]](#footnote-19)”

By supporting classic ASP, ASP.NET, XML and PHP, IIS 7 provides organizations with the flexibility to write applications in the language they choose, and host applications on the platform they want.

# Security and Compliance

### Introduction

Business environments increasingly allow workers to connect to corporate networks remotely, and businesses routinely conduct transactions through the Internet. IT administrators are faced with the challenge of supporting these capabilities while protecting corporate data from viruses, malware, and unauthorized access. A 2007 study by the Ponemon Institute found that 73 percent of the companies they studied have reported loss or theft of data assets within the last two years.[[19]](#footnote-20) To ensure the integrity and security of their data assets, organizations are increasingly adopting technologies, such as Public Key Encryption (PKI) and smartcards—however, these technologies are often seen as difficult to deploy and administer.

Windows Server 2008 offers many security features that enable organizations to meet these challenges. It features policy-driven security functionality and simplified security policy management tools that enable administrators to enforce security policy consistently throughout the organization and easily deploy PKI and smartcard technologies in their IT infrastructure. The power of these tools reduce the time and effort necessary to enforce enterprise-wide security standards, reducing costs and making IT resources more efficient.

### Stop Viruses at the Door with Network Access Protection

The cost of sanitizing a network after a virus has gained access to a corporate network can be substantial. Windows Server 2008 offers Network Access Protection (NAP), a combination of technologies designed to stop viruses before they spread and ensure that all computers connecting to the network are compliant with corporate security policies.

NAP checks clients that connect to the network and enforces established client health policies by remediating noncompliant client computers before they can interact with other systems on the corporate network. These policies enforce software and security update requirements, required anti-virus solutions, and configuration settings.

The government of Fulton County Georgia serves a population of nearly one million. The IT department supports 5,000 employees within 400 buildings, dozens of agencies, airports, fire stations, police stations, courts, public-health clinics, and libraries. Its mixed IT infrastructure includes mainframes, clustered servers, workstations and desktop computers, multiple operating systems and database management systems, dozens of legacy vertical applications, and a sophisticated network encompassing multiple topologies and protocols. For Fulton County IT executives, such an infrastructure poses major challenges in terms of security and standards compliance, especially considering the sensitive nature of the data which included public-health and court documents. “Standards enforcement and policy compliance were practically impossible without a way to tie them into the larger administration of networks and systems,” explained Robert E Taylor, CIO for Fulton County. Viruses had brought the network down and resulted in both lost productivity and lawsuits[[20]](#footnote-21) against the county.

Fulton County chose to implement Windows Server 2008 and Network Access Protection with IPSec enforcement to address these issues and automate compliance. Results are being seen in the initial test deployment. Among test-bed client users, stability is noticeably higher, and there is less need of repair for problems caused by malware attacks. “We have reduced help-desk calls from an average of 20 per day for a user group of similar size down to just 5 per day—a 75 percent improvement[[21]](#footnote-22),” Fulton County CIO Robert E. Taylor points out. Moreover, instead of the cumbersome, paper-based policy of the past, Fulton County is using NAP to enforce standards, policy, and system-health compliance. As a result, the county has been able to reassign two full-time maintenance staff members to new technology initiatives, resulting in IT maintenance cost avoidance of U.S. $157,000 annually[[22]](#footnote-23).

With NAP, organizations can offer remote workers and partners access to the corporate network while maintaining the security of the corporate network. IT staff can spend less time enforcing security requirements on remote machines and more time on making the enterprise IT environment more efficient and productive.

### Secure Access with Identity and Access Management

The theft and accidental loss of corporate information is a growing concern for many organizations. The extent of the problem is reflected in the results of a U.S. Department of Justice (DOJ) study that estimated the cost of information theft during 2004 to be U.S. $250 billion dollars and the cost of identity fraud to be U.S. $56.2 billion annually.[[23]](#footnote-24) Research conducted by Jupiter Research found that two of the top three security breach concerns cited by business decision makers were the unintended forwarding of emails and loss of mobile devices. It also reported that helpdesk staff spend one-third of their workday resetting passwords, and that each password reset costs U.S. $57 to $147.[[24]](#footnote-25) In addition, Unite States Federal Financial Institutions Examination Council (FFIEC) regulations require that organizations provide two-factor authentication for all systems access as of the end of 2006. [[25]](#footnote-26)

Organizations that transact business through the Internet often do so through many user accounts, which are accessed by a variety of computing devices, such as desktop and mobile computers, and mobile devices such as smart phones. Managing these user accounts in a way that ensures that the enterprise computing network reliably supports these online business transactions, while enforcing network security policies, is a necessary part of IT administration. Protecting an organization’s data assets also includes persistent protection that remains with the data even after it leaves the corporate network. Failure to provide for these business needs can result in security breaches, regulatory compliance breakdowns, and an inability to effectively deploy new business initiatives or collaborate with partners. However, organizations often expend considerable resources in managing user accounts in an environment of many diverse platforms. Windows Server 2008 offers several features to manage identities, and to make data and collaboration more secure.

### Protect Data While Providing More Secure Access

Active Directory® Rights Management Services (AD RMS) provides persistent protection of corporate data throughout the life of the data and regardless of where it travels online. In Windows Server 2008, AD RMS is included as a server role, and is easier to deploy and administer due to self enrollment of AD RMS servers, a new Microsoft Management Console (MMC), and delegated administration through administrative roles. In Windows Server 2008, AD RMS is integrated with Active Directory Federation Services (AD FS). AD FS allows organizations to setup trust relationships between federation partners. The AD FS role only needs to be configured on one of the partners; it allows administrators to designate trusted accounts that can then gain access to resources on partner networks to which they’ve been granted permissions. This allows partners to log on once, using their local domain account, and to gain access to the resources to which they’ve been granted permissions. This eliminates the need to have separate accounts for users in each domain, making access more secure and reducing the workload of IT staff. Because AD FS is integrated with AD RMS, RMS permissions can be accessed and enforced over federated trusts. This provides the access that partners need to collaborate, and helps ensure that data is secure no matter where it travels, protecting the organization's intellectual property. Enhancements and features in Windows Server 2008 make AD RMS and AD FS easier to deploy, administer and use while reducing the burden on IT.

Windows Server 2008 Identity and Access Management features allow organizations to create a highly extensible, Internet-scalable, and secure identity access solution that can operate across multiple platforms, including both Windows and non-Windows environments. Identity and Access Management improves a company’s operational efficiency, empowers colleagues and trusted partners to share information, and provides for reliable cross-company collaboration while mitigating security risks while ensuring compliance with established security policies. This also allows organizations can better leverage their investment in Microsoft Office as AD RMS features are also built into these Microsoft productivity products.

# A Solid Foundation for Business Enterprises

### Introduction

Windows Server 2008 is the most reliable and manageable Windows Server operating system to date. With new technologies and features, such as Server Core, PowerShell, Windows Deployment Services (WDS), and enhanced networking and clustering technologies, Windows Server 2008 provides the most versatile and reliable Windows platform for all workloads and application requirements.

Windows Server 2008 simplifies and reduces the IT department’s workload. New tools and features streamline routine management chores, facilitate rapid deployment of desktop and server operating systems, and help IT Professionals automate common tasks. It provides a viable alternative to Linux, and its market performance relative to Linux supports this. The annual growth rate of Linux in the x86 server space has fallen from 53 percent in 2003 to negative 4 percent in 2006, while the annual growth rate of Windows Server was approximately 25 percent. Windows has continued to report positive annual growth, outpacing the total growth rate in the x86 server market by more than 4 percent in 2006, which indicates that Linux lost market share to Windows Server during this time.[[26]](#footnote-27) Bill Hilf, general manager of Windows Server marketing and platform strategy at Microsoft in Redmond says, "It appears that Linux server growth is moderating considerably and, while it's certainly still a player, it's not being considered across the broad range of workloads that Windows Server is, from ERP to CRM to messaging and collaboration to core infrastructure like file and print."[[27]](#footnote-28)

### Built to Manage Remote Infrastructures

It has long been a challenge for IT departments to make their enterprise computing environment operate effectively between corporate divisions and remote locations such as branch offices. In many cases remote locations do not have their own IT staff, making the deployment of software expensive and time-consuming and enforcing security policies difficult. Connections to remote locations are often slow, even for routine tasks such as logging on, reducing productivity. Supporting remote infrastructure often requires costly onsite visits or the outsourcing of IT support to external contractors. Windows Server 2008 address these issues with new remote management technologies which improve authentication and Active Directory Domain Services, improve security, make better use of available bandwidth, and simplify administration - including remote administration.

Molinos Modernos , a leading Latin American food-product manufacturer, operates more than a dozen facilities in six countries. The company needed to overcome inconsistent connectivity to efficiently and securely share information between its branch locations. Molinos Modernos is deploying Windows Server 2008, consolidating its IT environment, improving collaboration within and between its branch offices, and getting information to the people who need it. The company is reducing costs, improving efficiency, enhancing the security of its information and its IT resources, and streamlining its IT administration. Says Director of Information Technology Luis Vidal, , “With Windows Server 2008, our whole server environment is being simplified, and we can make sure information will be there when people need it, wherever they are.[[28]](#footnote-29)”

### Security and Flexible Administration with the Read-Only Domain Controller

Having no local domain controller at remote locations can delay logons and access to network services, while locating domain controllers in branch offices introduces security risks and administrative cost. The Read-Only Domain Controller (RODC) install option has been added to Windows Server 2008 as a means to mitigate the security risk of Domain Controllers installed in branch locations. IT personnel can also delegate administrative rights to remote workers to perform routine RODC tasks. These rights can be restricted to a single computer, protecting the rest of the servers in the enterprise network.

Holzer Clinic, a healthcare services provider in Ohio and West Virginia, was frustrated with the slow data authentication system that caused several minutes’ delay in accessing critical patient data. Also, without onsite IT staff or dedicated server rooms in several of its branch locations, the company needed a branch office solution that would be both secure and easy to manage. “In the clinics furthest away from the data center, employees would have to wait several minutes to authenticate and see their desktop, resulting in frustration and lost productivity,“ explains Holzer Clinic Systems Engineer Mark Oliver[[29]](#footnote-30).

To improve performance and increase data security, Holzer decided to implement Windows Server 2008 with read-only domain controllers instead of the writeable domain controllers used previously in locations where physical security might pose a problem. “In remote clinics where the company does not have dedicated server rooms, the RODC offers an added layer of protection and peace of mind,” says Oliver. In addition to improving the log-in efficiency for remote authentication, the new solution also helps to increase employee satisfaction. Waiting for several minutes to log in proved to be a source of frustration—one that is eliminated with quicker authentication. “It’s simple,” says Oliver, “users are a lot happier now[[30]](#footnote-31).”

RODCs minimize security vulnerabilities and improve user experience and productivity by providing remote workers faster logon times and more efficient access to domain resources.

### Mitigating the Risk of Stolen Computers

Windows BitLocker™ Drive Encryption is a new security feature in all editions of Windows Server 2008 and Windows Vista Enterprise and Ultimate editions that helps to protect servers, workstations, and mobile computers. Bitlocker can help protect data on servers in remote locations where physical security cannot be guaranteed. BitLocker protects the contents of a disk drive with robust 256-Bit AES Diffussed key encryption. The encryption is powerful enough to prevent unauthorized access from breaking the file and system protections or performing offline viewing of the stored files in the event a server or hard drive is stolen. By protecting the sensitive corporate data on servers in remote locations, BitLocker helps organizations be more secure, maintain compliance with Sarbanes-Oxley and HIPAA regulations, and safeguard the organization’s competitive standing in the market and the integrity of its business alliances.

### Faster and More Reliable Networking

With increased demand placed on corporate networks—such as geographically dispersed and mobile workers, expanding networks of partners and vendors, and a substantial rise in the number of branch offices—organizations need a high performing, more scalable and easy to secure networking foundation more than ever before. Historically, networking technologies have not kept pace with growing connectivity needs. Today, increasing latency issues, low throughput, and security concerns continue to be challenges for most organizations. Because of these high operational efficiency requirements, as well as the need for more people to access information and increasing numbers of network-based threats, company networks are constantly under strain. Windows Server 2008 addresses these issues with several new features designed to maximize throughput and utilization, optimize high-speed networking, and secure the network.

Windows Server 2008 maximizes throughput and bandwidth utilization with features such as TCP Receive Window Auto-Scaling, which tunes connections automatically for best performance. Compound TCP (CTCP) optimizes sender-side throughput to better utilize available bandwidth. Windows Server 2008 includes SMB 2.0, a new version of SMB designed for today’s networks that improves throughput and speeds data transfers, especially when combined with TCP Receive Window Auto-Scaling and CTCP.

Windows Server 2008 is optimized for high-speed networking. Features such as TCP Chimney Offload network acceleration. Receive-side scaling allows for more efficient processing of inbound network traffic on multi-processor/multi-core servers for increased server performance. With support for policy based Quality of Service (QoS), Windows Server 2008 allows IT administrators to prioritize network bandwidth to help ensure critical data has the bandwidth necessary.

Network performance tests show that throughput and time-to-completion improvements in Windows Server 2008 are 3.5 times faster than in Windows Server 2003. [[31]](#footnote-32) Even with pre-release versions of Windows Server 2008, Microsoft is already seeing substantial improvements in file transfer performance due to SMB 2.0 and the TCP/IP optimizations. For example, transferring 10 Gigabytes of Virtual Earth stitch files with Windows Server 2003 took six hours—with Windows Server 2008, the same data transfer takes eight minutes. [[32]](#footnote-33) This amounts to a 45-fold increase in data transfer rates.

Windows Server 2008 networking boosts security through seamlessly integrated network security features such as improvements to Windows Firewall, and Network Access Protection (NAP) to provide a solid foundation for business workloads for today and the future. When combined with the related capabilities in Windows Vista, Windows Server 2008 offers an even more enhanced networking experience helping IT administrators and business decision makers provide their organizations with an enhanced performance, scalable and secure networking experience, helping improve user access to network resources.

## Streamlined Windows Server Administration

With the ever-growing number of computers and workstations in a typical enterprise network, IT personnel spend a substantial amount of time installing, deploying, and maintaining variants of the Windows operating system on servers and workstations. It is crucial to the overall productivity of the business that a consistently high level of quality is maintained in these processes. Windows Server 2008 includes many new features and enhancements designed to reduce the cost and effort of deploying and managing all Windows servers within the corporate network.

### Easier Windows Server Setup and Faster Deployment

Installing operating systems has historically been a time-consuming process requiring the constant monitoring and hands-on interaction of IT administrators to ensure proper installation. Windows Server 2008 streamlines the setup process, freeing the administrator to perform other tasks. A redesigned installation interface guides administrators and users through the most common post-installation tasks, helping ensure that the server is configured correctly and securely. The improved installation process of Windows Server 2008 saves the time setting up the operating system, freeing administrators to perform more valuable tasks.

In addition to a streamlined setup, organizations can use Windows Deployment Services (WDS), a revised version of Remote Installation Services designed to be used with Windows Server 2008 and Window Vista, that provide a simplified, secure means of rapidly deploying Windows operating systems to computers over networks without requiring that administrators visit each computer or install directly from CD or DVD media. This reduces the time and work involved in deploying operating systems on servers and workstations and the costs associated with deploying new computers.

Microsoft has a published Microsoft Deployment, the next version of Business Desktop Deployment (BDD) 2007. It is the recommended process and toolset to automate desktop and server deployment. Microsoft Deployment provides detailed guidance and job aids for every organizational role involved with large-scale deployment projects. It unifies the tools and processes required for desktop and server deployment into a common deployment console and collection of guidance. Microsoft Deployment’s tools and end-to-end guidance reduce deployment time, standardize desktop and server images, limit service disruptions, reduce post-deployment help desk costs, and improve security and ongoing configuration management.

More information can be found at: <http://www.microsoft.com/deployment>

#### Simplified Administration

The Server Manager Console in Windows Server 2008 makes the task of managing and securing servers easier. The interface of the Server Manager Console is a single window that contains all of the information necessary for managing a server’s configuration and system information. It incorporates the functionality of several management tools, enabling administrators to go directly to consoles for managing specific roles, troubleshooting tools, or finding backup and disaster recovery options. Roles and features installed by using Server Manager are secure by default. Administrators don’t need to run the Security Configuration Wizard following role installation or removal unless they want to change the default settings.

Most common administration tasks in Windows Server 2008 can be performed with the assistance of wizards. Wizards in Server Manager streamline server deployment tasks in an enterprise by cutting deployment time. Most common configuration tasks, such as configuring or removing roles, defining multiple roles, and role services can now be completed in a single session using Server Manager Wizards. Dependency checks are performed as the user progresses through Server Manager wizards, ensuring that all of the prerequisite role services that a selected role needed are installed, and none are removed that remaining roles or role services might still require .

Server Manager consolidates a variety of management interfaces and tools into a unified management console, enabling administrators to complete common management tasks without having to navigate between multiple interfaces, tools, and dialog boxes reducing the time it takes to perform administration tasks, reducing configuration errors, and reducing server management costs.

### Powerful Automation of IT Administration Tasks

Microsoft Windows PowerShell is a new command-line shell and scripting language that helps IT Professionals achieve greater productivity and control system administration more easily. Windows PowerShell does not require that you to migrate your existing scripts, and it is ideally suited for automation of new Windows Server 2008 features.

Windows Powershell has more than 130 standard command-line tools, a new admin-focused scripting language, and consistent syntax and utilities. It allows administrators to efficiently complete server administration tasks that are common across all Windows Server 2008 roles, such as services, processes, and storage. Windows PowerShell also allows administrators to manage specific Windows Server 2008 roles, such as IIS 7.0 and Terminal Server, as well as Microsoft Exchange Server 2007 and Microsoft Operations Manager 2007. Also, a number of partners have provided Windows PowerShell commands that improve network management and provide rich charting and gauge capabilities.

Valero Energy Corporation is North America’s largest refiner of oil and gas products has started to deploy Windows Server 2008. One of the compelling reasons to deploy is scriptability. “On the refinery side, one of the big benefits of Windows Server 2008 is scriptability and ease of configuration,” says Scott Mock, Lead I/S Specialist. Valero plans to use Windows PowerShell to create configuration scripts that automate basic server management tasks. Using the configuration scripts, refinery administrators can simply run a script rather than trying to follow written instructions, reducing the time spent on installation, deployment, and maintenance as well as the potential for configuration errors.

Windows PowerShell is easy to adopt, learn, and use, because it does not require a background in programming, and it works with your existing IT infrastructure, existing scripts, and existing command-line tools. With PowerShell, organizations can more easily automate administration tasks, reducing effort and saving costs.

### Group Policy Preferences

While new tools like Powershell provide robust automation capabilities that save time, speed deployment and reduce costs by allowing organizations to automate complex and redundant tasks, scripting simpler tasks such as mapping drives and printers in logon scripts, can be unnecessarily burdensome on IT staff. These types of actions, as well as other user specific settings, are typically deployed as part of logon scripts. Logon scripts are often scattered, may vary widely from group to group in the same organization, are seldom documented, and are time consuming to troubleshoot, support and modify.

Windows Server 2008 includes Group Policy preferences built-in to the Group Policy Management Console (GPMC). Unlike Group Policy settings that are mandatory and cannot be changed by end-users, Group Policy Preferences are unmanaged settings that users can change. Group Policy preferences add to Group Policy a centralized system for deploying preferences such as system settings, mapped drives and mapped printers. By using Group Policy Preferences organizations can potentially reduce or eliminate logon scripts in their environment. Group Policy Preferences also reduce configuration errors and ease troubleshooting through precision targeting and easy to use interfaces. . Group Policy Preferences also helps organizations reduce effort and costs to support images and reducing image count by allowing organizations to deploy generic images and use Group Policy Preferences to update settings for groups of users and computers.

Group Policy Preferences simplifies deployment, and management of configuration settings to desktops. It reduces the need to track and maintain large numbers of logon scripts, and provides easy to use interfaces for configuring settings previously deployed through logon scripts, reducing configuration errors and IT costs.

### Enterprise Class Print Management

A substantial part of an organization’s IT resources is usually devoted to configuring and maintaining network attached printers that require constant maintenance and administration. The techniques for configuring one printer model usually do not translate to other models, so IT personnel must devote substantial time and effort in becoming familiar with many different printer configuration methods. In addition, on previous versions of Windows, printers had to be managed on a per-server basis -there was no centralized printer management tool. This resulted in high costs in time and resources for the organization.

Windows Server 2008 addresses these issues with Print Management, an MMC snap-in that enables administrators to manage, monitor, and troubleshoot all of the printers within the enterprise network from a single interface, even those printers that are remotely connected to the network. When responding to remote printer issues, IT personnel do not have to rely on users at the remote site to check the printer and provide diagnostic information; the administrator can use Print Management’s easy-to-use console interface to access this information directly. It can also send e-mail notifications and run maintenance scripts when a printer or print server needs attention. Print Management can also access the Web interfaces of printers that support them.

Print Management can be used with Group Policy to automatically one or many desktop computers to network printers. IT administrators do not have to install and configure printers on each desktop computer, and this optimizes IT resources and saves the organization time and money.

Print Management simplifies printer management duties, optimizing IT resources and reducing time and cost for the organization.

### Increased Infrastructure Reliability with Server Core

Infrastructure servers perform tasks critical to the day-to-day operation of Windows Server-based enterprise networks, such as supporting the Domain Name Service (DNS), Active Directory, and the Dynamic Host Configuration Protocol (DHCP) service. Enterprise networks depend on the stability and optimal performance of infrastructure servers.

To meet these needs, Windows Server 2008 includes a new installation option called Server Core. Server Core installations contain only the functionality needed for the server’s task in the enterprise network. Functionality that is not strictly required for the server task is not included. The Server Core installation option is available for the following roles:

* Hyper-V
* IIS 7.0
* Dynamic Host Configuration Protocol (DHCP) server
* Domain Name System (DNS) server
* File server
* Active Directory Domain Services (AD DS)
* Active Directory Lightweight Directory Services (AD LDS)
* Windows Media Services
* Print Server

Because Server Core runs with a minimal set of installed functionality, less maintenance, fewer software updates, and fewer restarts are needed. Server security is enhanced as running less code reduces the attack profile of the server.

Server Core’s minimal server implementations increase network security and performance, reducing an organization’s maintenance and support costs and allowing organizations to run critical infrastructure servers in their most reliable configuration.

Valero Energy Corporation is North America’s largest refiner of oil and gas products. By using the Server Core installation option, Valero is anticipating significantly reduced downtime for maintenance at the refineries. “Server Core goes a long way in reducing the amount of security updates we have to apply, by reducing the number of components that need updating on a regular basis,” says I/S Project Manager Shawn Crow[[33]](#footnote-34).

## High Availability for Business Continuity

Organizations are increasingly expected to provide continuous service to its customers with no unplanned downtime. The goal of high availability service is to ensure that mission-critical applications and the servers that host them are always available to employees, partners, and customers. If downtime occurs due to unforeseeable events, such as power outages or hardware failures, it is important that a fast and effective recovery mechanism be in place.

High availability is built into many of the enhancements of Windows Server 2008. Failover Clusters, Network Load Balancing, and new backup and restore features ensure that mission-critical applications, services, and company data are always available.

### Ensuring High Availability Through the Use of Failover Clusters

Failover clusters are a group of servers that work together to ensure high availability of mission-critical applications and services. If one server fails, another server in the cluster takes over its functions and services. Failover clusters are a key component in any high-availability scenario, but can be difficult and expensive to maintain.

Windows Server 2008 saves time and simplifies the deployment of failover clusters by making it easier to get the initial configuration right the first time. Cluster management tools with intuitive, task-based interfaces and administration wizards simplify complex administration tasks. One of these tools will verify whether an organization’s network environment is suitable for a failover cluster before any substantial investment is made in planning and implementing the cluster. If the network can support a failover cluster, another tool enables IT administrators to create one in one step. When the cluster has been created, administrators can make additional storage available for applications and services running on the cluster without shutting down the cluster or affecting the applications and services.

The latest technologies in network data encryption and authentication have been implemented in Windows Server 2008 clusters to protect the corporate data assets stored on the cluster servers. The Network Load Balancing (NLB) technology incorporated in Windows Server 2008 distributes the workload of client and server applications between servers in the failover cluster so that critical applications and services remain available for employees and customers, and run quickly and reliably.

Windows Server 2008 simplifies the deployment and management of failover clusters and improves their performance, security, and reliability. IT administrators can focus on managing applications and services rather than on managing the cluster.

### Ensuring High Availability with Hyper-V

Hyper-V brings new benefits to enterprises that rely on server clusters for high availability performance. In virtualization technology, the physical computer is called the host, and an operating system running on a host is called a guest. Using Hyper-V, several guest operating systems can run on a physical host as a cluster, providing all of the benefits of server clustering with fewer physical servers. Using System Center Virtual Machine Manager, IT administrators can quickly test and deploy virtual server clusters, and even perform maintenance and configuration tasks without disrupting service.

Hyper-V offers high availability for virtual machines through its Guest Clustering and Host Clustering capabilities. Host Clustering ensures that, if the host goes down, all guest operating systems running on that server are automatically restarted on another host. With Guest Clustering, if a guest operating system fails, another guest on the same host or on a different host will automatically take over its operations.

Enterprises can use Host and Guest Clustering to easily implement high availability in their network while reducing costs and optimizing the time of their IT personnel.

### Improved Backup Technology

Windows Server 2008 introduces new backup and recovery technology that includes new maintenance wizards, which make it easier and faster for IT personnel to schedule backups and restore data. Windows Server 2008 provides the backup and recovery solutions needed to complete a high-availability solution that protects both the organization’s data and the operating systems on the servers in the network. It also ensures that mission-critical data is accurately backed up and that recovery efforts are fast and error-free.

## Improved Power Savings

Newer processors include power management functionality that can help companies to achieve this goal if the operating system provides access to this functionality to users and IT managers. Windows Server 2008 includes power management features based on mature and reliable technology that offer considerable power savings with negligible impact to performance or responsiveness, significantly reducing overhead costs.

# Summary

Windows Server 2008 gives businesses comprehensive control over all aspects of their corporate network environment and protects and enhances security. With built-in virtualization technology, Windows Server 2008 enables organizations to reduce costs, optimize hardware utilization, and improve the availability of services and applications. It is also a powerful Web application and services platform that delivers rich, Web-based media content. Organizations that need to provide fast and secure remote connections are well served by the advanced Terminal Services technology that is an integral part of Windows Server 2008.

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