Managing Windows Server 2008 R2
White Paper

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Introduction

Microsoft® Windows Server® 2008 R2 represents a significant milestone in Microsoft’s ongoing efforts to help customers streamline the management of their unique IT infrastructures. This white paper begins with a brief discussion of today’s IT management challenges. It discusses many new and improved management consoles that help centralize management tasks and enable IT pros work more efficiently. It introduces Windows Deployment Services and Windows Server Migration Guides, which can help ensure that organizations can respond quickly to their changing IT infrastructure needs. It covers the Best Practices Analyzer and Windows Reliability and Performance Monitor which can help identify and resolve problems resulting from configuration changes. And it introduces Windows PowerShell™ which can help standardize and automate all your management processes.
Today’s IT Management Challenges

In today’s environment, organizations are increasingly reliant on information technology (IT) for business-critical operations. More users, with increasingly diverse roles, are demanding high information availability. The demand for information availability is coupled with an expectation that the critical information is available anywhere and anytime. The availability of the right information at the right time enables organizations to quickly respond to challenges as they arise. The requirement of information coupled with increasing technological complexity, increases the IT managerial burden. Currently, most IT costs are related to managing existing systems. Current industrial trends such as a return to large scale data centers, an increase in the use of virtualization, the use of remote management, and an increase in outsourcing are helping to further increase the challenges that IT management faces.

Organizations see efficient IT resource administration as a necessity not a luxury. With smaller budgets and fewer IT staff, today’s IT departments are expected to manage a diverse set of resources and ensure information availability without compromise. To achieve this, IT departments require tools that reduce complexity, increase manageability, and extend the reach of administration from the physical data center to the virtual data center, and to the desktop. These tools need to work for a diverse set of organizations—small and large organizations, online services, and individuals. And these tools need to work on many layers, including hardware, operating systems, applications, and services. Management solutions are needed at every layer, with each layer relying on the stability and the management of the prior layer.

To address the need for streamlined management, Windows Server 2008 R2 seeks to deliver a powerful yet easy to use management experience which encompasses both strong tools and best practices. It sets out to deliver a rich and consistent management experience that enables administrators to complete tasks both locally and remotely with minimal differentiation and effort.
Overview of Windows Server 2008 R2 Management Features

Windows Server 2008 R2 is designed to provide a streamlined experience that uses standards, advanced automation, and consistent tools to enable IT pros of all skill levels to do their jobs efficiently whether they are working locally or remotely. The following sections provide brief overviews of major management feature areas, including management consoles, Windows Deployment Services, server migration tools, the new Best Practices Analyzer, Windows Reliability and Performance Monitor, Hyper-V™ virtualization management, power efficiency, and identity management.

New and Improved Consoles

Windows Server 2008 R2 introduces several new and improved consoles that increase server manageability. These consoles include:

- **Server Manager**: Provides support for remote management of computers and integrates the Best Practices Analyzer
- **Active Directory Administrative Center**: Provides a task-driven user interface to manage Active Directory®
- **IIS Manager**: Provides a task-driven user interface to manage Internet Information Services (IIS)
- **Hyper-V**: Windows Server 2008 R2 provides a new virtual machine (VM) management console

**Server Manager**

The Server Manager console eases the task of managing and securing multiple server roles in an enterprise. Server Manager guides administrators through the process of installing, configuring, and managing server roles and features. In Windows Server 2008 R2, a server role describes the primary function of the server. Server Manager replaces several features included with Windows Server 2003, including Manage Your Server, Configure Your Server, and Add or Remove Windows Components. Server Manager also eliminates the requirement that administrators run the Security Configuration Wizard before deploying servers—server roles are configured with recommended security settings by default and are ready to deploy as soon as they are installed and properly configured. Also, Server Manager is included with the Remote Server Administration Tool (RSAT) and can be used from a Microsoft® Windows® client.

Server Manager has been updated in a number of ways, including tight integration with other Windows Server core roles and Best Practices Analyzers. But one customer request that was most pervasive for Server Manager was the ability to install Server Manager on an administrator’s workstation and manage all the servers to which the admin has access from a remote console. We have answered that request in Windows Server 2008 R2 by including Server Manager in RSAT. We have also gone to great lengths to more tightly integrate Server Manager with specific workload management consoles.

**Active Directory Administrative Center**

The new Active Directory Administrative Center combines features that used to require administrators to use multiple tools into a single cohesive interface. It is also written on top of Windows PowerShell, which means all tasks can be performed automatically using Windows PowerShell or interactively using the Active Directory Administrative Center GUI. The Active Directory Administrative Center also provides new task-driven features, including a new Recycle Bin, offline domain joins, and more.
IIS Manager
The new IIS Manager is another example of tight integration between Windows Server 2008 R2 management consoles and Windows PowerShell. Thanks to this integration, IIS Manager not only eases Web management overall, but also enables remote management even across servers using the Server Core installation option.

Hyper-V Manager
Hyper-V Manager also includes new VM management tools, notably Live Migration. But much of its functionality is also mirrored in the upcoming System Center Virtual Machine Manager 2008 release, which will be the tool of choice for managing large virtualized installations.

Windows Deployment Services
Windows Deployment Services, the updated and redesigned version of Remote Installation Services (RIS), is a suite of components that work together on Windows Server 2008 R2 to enable the deployment of Windows operating systems, particularly Microsoft® Windows Vista® and Windows 7. Windows Deployment Services assists with the rapid adoption and deployment of Windows operating systems. You can use it to set up new computers or repurpose existing ones through a network-based installation. This means that you do not have to be physically present at each computer, and you do not have to install directly from a CD or DVD.

Windows Deployment Services in Windows Server 2008 R2 contains the following improvements over RIS:

Driver Provisioning
Driver provisioning provides the ability to add and configure driver packages on a server and then deploy them to client computers during installations based on their hardware. This is only supported when deploying install images for Windows Vista (SP1 or greater), Windows 7, Windows Server 2008, and Windows Server 2008 R2. Drive provisioning also provides the ability to add drivers to boot images. This feature is currently only available for boot images from the Windows 7 and Windows Server 2008 R2 installation DVDs.

Multicasting
Windows Server 2008 R2 enables you to transmit install images using multicasting. This includes the ability to automatically disconnect slow clients and the ability to transfer images using multiple streams of varying speeds.

Virtual Hard Disk Support
Virtual hard disk (VHD) support enables you to deploy a Windows Server 2008 R2 .vhd file as part of an unattended installation. This is only supported from the command line and is intended for advanced users who already have .vhd images.

IPv6
Windows Server 2008 R2 supports multicasting in environments that use IPv6. IPv6 is an Internet Protocol designed to solve many of the problems of the current version of IP (IPv4) such as address depletion, auto-configuration, and extensibility.

Extensible Firmware Interface
Extensible Firmware Interface (EFI) support provides support for network booting x64-based computers with EFI, including support for the Auto-Add policy and the ability to deploy boot images using multicasting.

Windows Server Migration Guides and Tools
Migration is the most common way of adding new servers to an existing environment, but the process has been typically time-consuming and error-prone. Available migration documentation and built-in tools ease migrating server roles, operating system settings, and
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data from an existing server that is running Windows Server 2003, Windows Server 2008, or Windows Server 2008 R2 to a computer that is running Windows Server 2008 R2. By using migration guides available on TechNet—and, where appropriate, Windows Server Migration Tools—to migrate roles, you can simplify deployment of new servers (including those that are running the Server Core installation option and virtual servers), reduce migration downtime, increase accuracy of the migration process, and help eliminate conflicts that could otherwise occur during the migration process.

Most of the migration documentation and tools featured on the Windows Server Migration Portal support cross-architecture migrations (x86-based to x64-based computing platforms), migrations between physical and virtual environments, and migrations between both the full and Server Core installation options of the Windows Server operating system, where available. Server roles covered by the migration guides include Domain Services, DNS, DHCP, File Services, and Print Services. Guides are also available for BranchCache migration as well as migrating IP configurations and local users and groups.

Windows Server Migration Tools are available for installation on computers that are running Windows Server 2008 R2 by using the Add Features Wizard in Server Manager. To migrate roles, features, and other data, you must also deploy Windows Server Migration Tools on the source servers. For more information see Windows Server Migration Tools Installation, Access, and Removal in the Windows Server TechCenter.

**Best Practices Analyzer**

In Windows management, best practices are guidelines that are considered the ideal way, under typical circumstances, to configure a server as defined by experts. Although best practice violations are not necessarily critical, they indicate server configurations that can result in poor performance, poor reliability, unexpected conflicts, increased security risks, or other potential problems. In Windows Server 2008 R2, the Best Practices Analyzer (BPA) can help administrators reduce best practice violations by scanning one or more installed roles and reporting best practice violations. Administrators can exclude results from BPA reports that they do not need to see. They can also perform BPA tasks by using either the Server Manager GUI or Windows PowerShell cmdlets.

Because the units analyzed by BPA are server roles, the GUI for BPA is located on the role home page in the Server Manager console. BPA can help administrators reduce best practice violations by scanning one or more roles that are installed on Windows Server 2008 R2, and reporting best practice violations to the administrator. When scans find aspects of a role that are not compliant with best practices, it provides step-by-step guidance on the corrective action required to bring resolve these issues. By using BPA scans and applying guidance as appropriate, you can help reduce configuration errors on all your servers, enhance infrastructure reliability.

**Windows Reliability and Performance Monitor**

Windows Reliability and Performance Monitor is a Microsoft Management Console (MMC) snap-in that enables IT professionals to monitor and assess system performance and reliability. This snap-in consolidates several stand-alone tools and includes: performance logs and alerts, a server performance advisor, system monitoring functionality, performance data collection and event trace session initiation, as well as the ability to track system stability and reliability. It provides an easy-to-use graphic interface for customizing performance data collection and Event Trace Sessions. It also tracks changes to the system and compares them to changes in system stability, providing a graphical view of their relationship.

An important new feature in Windows Reliability and Performance Monitor is Data Collector Sets, which group data collectors into reusable elements for use with different performance monitoring scenarios. After you store a group of data collectors as a Data Collector Set, you can apply operations such as scheduling to the entire set through a single property change.
Windows Reliability and Performance Monitor also includes Data Collector Set templates to help system administrators begin collecting performance data specific to a Server Role or monitoring scenario immediately.

Users familiar with the Server Performance Advisor in Windows Server 2003 can now find the same kinds of diagnostic reports in the Windows Reliability and Performance Monitor in Windows Server 2008. The time required to generate reports is also improved. Reports can be created from data collected by using any Data Collector Set. This enables system administrators to easily duplicate reports and assess how changes to a server have affected performance or review the report's recommendations.


**Resource View**
The home page of Windows Reliability and Performance Monitor is the new Resource View, which provides a real-time graphical display of CPU, disk, network, and memory usage. By expanding each of these monitored elements, system administrators can identify which processes are using which resources. In previous versions of Windows, this real-time, process-specific data was only available in limited form in Task Manager.

**Performance Monitor**
Performance Monitor displays built-in Windows performance counters, either in real-time or as historical data. You can add performance counters to Performance Monitor by dragging them from any Data Collector Set or Data Collector Set template and dropping them on the Performance Monitor icon. You can also create custom Data Collector Sets from a collection of counters already added to Performance Monitor. Performance Monitor features multiple graph views to allow you to visually review performance log data, and custom views created in Performance Monitor can be exported as Data Collector Sets for use with performance and logging features.

**Reliability Monitor**
Reliability Monitor calculates a System Stability Index that reflects whether unexpected problems reduced the reliability of the system. A graph of the Stability Index over time quickly identifies dates when problems began to occur. The accompanying System Stability Report provides details to help troubleshoot the root cause of reduced reliability. By viewing changes to the system (installation or removal of applications, updates to the operating system, or addition or modification of drivers) side by side with failures (application failures, operating system crashes, or hardware failures), a strategy for addressing the issues can be developed quickly.

Features include the following:

- **Unified property configuration for all data collection, including scheduling.** Whether creating a Data Collector Set for one time use or to log activity on an ongoing basis, the interface for creation, scheduling, and modification is the same. If a Data Collector Set proves to be useful for future performance monitoring, it does not need to be re-created. It can be reconfigured or copied as a template.

- **Wizards and templates for creating logs.** Adding counters to log files and scheduling their start, stop, and duration can now be performed through a wizard interface. In addition, saving a configuration as a template enables system administrators to collect the same log on subsequent computers without repeating the data collector selection and scheduling processes. Performance Logs and Alerts features have been incorporated into Windows Reliability and Performance Monitor for use with any Data Collector Set.

- **User-friendly diagnosis reports.** Users of Server Performance Advisor in Windows Server 2003 can now find the same kinds of diagnosis reports in Windows Reliability and Performance Monitor in Windows Server 2008. Report generation time is improved and reports can be created from data collected by using any Data Collector
Set. This allows system administrators to repeat reports and assess how changes have affected performance or the report's recommendations.

**Hyper-V Virtualization Management**

Even with all the efficiency gains that virtualization can provide, virtual machines still need to be managed. The number of virtual machines can tend to proliferate much faster than physical computers because machines typically do not require a hardware acquisition. So, management of virtual data centers is increasingly important. Windows Server 2008 R2 Hyper-V offers many features that enable easy virtualization management, whether you are using Hyper-V Management Console, Windows PowerShell, or System Center. The following sections provide brief descriptions of these features.

**Support for Open VHD**

Microsoft Virtual Server 2005, Microsoft Virtual PC, and Hyper-V utilize the common, open VHD format for storing the file content of virtual machines. This means that existing virtual machines created in Virtual Server 2005 can be migrated to a Hyper-V host. Administrators can create and manage virtualized workloads in Virtual Server 2005, and after deployment, move those virtual machines directly to Hyper-V without any need to recreate the virtual machines. This ensures that administrators can continue to use their existing investment in a virtualized infrastructure, and gradually move that infrastructure to Hyper-V.

**WMI Provider**

Hyper-V is managed through Windows Management Instrumentation (WMI). The Hyper-V WMI Provider exposes objects that control all aspects of Hyper-V, including managing server settings, creating and configuring virtual machines, creating and configuring virtual network switches, and controlling the state of running virtual machines. In addition, the Hyper-V WMI provider enables the use of external scripting and management tools such as Windows PowerShell, System Center Virtual Machine Manager.

**Performance Counters**

Hyper-V offers a detailed set of performance and resource utilization counters. These counters can report on resource usage on a global or per-virtual machine basis. They enable administrators to determine how host server resources are being used by virtual machines. This information can help administrators isolate performance problems in the Hyper-V environment and effectively allocate Hyper-V host server hardware to virtual machines. Hyper-V utilization counters can also provide source data for chargeback accounting.

**Critical Failure Notification**

Hyper-V incorporates critical failure notification to recognize and respond appropriately to critical conditions. For example, consider a Hyper-V host server that has been equipped with an Uninterruptible Power Supply (UPS). Should a power outage occur, the UPS will signal the parent partition that power has been lost and tell the parent partition how much battery life to expect. Hyper-V can respond to this critical failure notification in a variety of ways:

- Save State and power down virtual machines
- Shut down guest operating systems
- Power off virtual machines without saving state
- Initiate a Quick Migration (if the Hyper-V host is configured appropriately)

**Guest Operating System Support**

Each group or department in an organization relies on the data center to incorporate the most effective tools for their specific functions, even when those tools require unique hardware or software configurations. For example, a Linux-based vertical application tied to a manufacturing process should be able to coexist with Windows-based applications in other areas.
Hyper-V supports 64-bit and 32-bit VMs running Windows, compatible Linux distributions, and Xen-enabled Linux, as well as 32-bit VMs compatible with most major operating systems. Servers previously dedicated to single-application functions can be replaced with VMs incorporating advanced features, such as dynamic hardware management and failover clustering.

**Hot Backup of Running Virtual Machines**
Hyper-V interacts with the Volume Shadow Copy Service (VSS) in Windows Server 2008 R2 to permit backup of running virtual machines. This means that whole servers can be backed up, while running, in the time that it takes to copy their VHD file(s) to an alternate location.

**Hyper-V Online Backup**
Hyper-V has an integrated VSS Writer component. VSS Writers are software that is included in applications and services that help provide consistent shadow copies. When applications and services are running, the writer works with the Volume Shadow Copy Service (typically invoked through a backup program) to ensure that no writes occur on the volume while the shadow copy is being created. This allows backups to be created while VMs are online and running.

**Hyper-V Disaster Recovery Preparation**
With Hyper-V, more options are available for disaster recovery preparation compared to non-virtualized servers and compared to some other products. Because administrators can back up a running virtual machine, system backups of virtual servers can happen without downtime for the virtual server. This provides greater backup scheduling flexibility for administrators.

If a Hyper-V host server fails, all of the virtual machines on that host will be unavailable until the host server is repaired or replaced. If the administrator has backed up virtual machines from the host to an alternate location, the backed up VHD files contain all of the information needed to recover virtual machines to the point where they were backed up. If a Hyper-V server with unused hardware capacity is available, the backed up virtual machines can be restored to this alternate server, the virtual machines powered up, and service restored. Although this disaster recovery method should be tested to determine whether ancillary services are affected by this type of restore operation, it presents a compelling alternative for rapid recovery from disasters affecting a Hyper-V host.

**Virtual Machine Snapshots**
Another aspect of Hyper-V integration with the Volume Shadow Copy Service is the ability to create point-in-time snapshots of running virtual machines. This is useful in backup and disaster recovery scenarios. It is also useful when administrators want to implement complex or high risk configuration changes and have the option to roll back those changes should something go wrong. When the administrator creates snapshot of a virtual machine, Hyper-V ensures that the virtual machine is in a consistent state before the snapshot is taken.

**Streamlining Virtualization Management**
Virtual machines are not simply objects to manipulate, but actual computers with real workloads. Managing them just like you manage your physical systems is imperative. Windows Server 2008 R2 is ready to help you streamline virtualization using the built-in Hyper-V Management Console and Windows PowerShell as well as through strong integration with System Center Virtual Machine Manager 2008.

In addition to sharing most of the management needs of physical machines, virtual machines entail their own unique management challenges. The number of VMs tends to proliferate much faster than physical computers because VMs typically do not require a hardware acquisition. So, management of virtual data centers is even more imperative than ever before.

Windows Server 2008 R2 includes the following improvements that will help you manage your virtual data center:
• Management consoles that help reduce the effort of performing day-to-day Hyper-V administrative tasks.
• Enhanced command-line interface and automated management of day-to-day Hyper-V administrative tasks by using Windows PowerShell cmdlets.
• Windows PowerShell cmdlets that provide the ability to fully manage the virtual machines running on Hyper-V, augment the graphical management tools, and help automate repetitive management tasks.
• Improved management of multiple Hyper-V servers in a virtual data center environment by using System Center Virtual Machine Manager 2008.

Power Management

Energy-efficient computing is a strong priority for organizations seeking to control costs and reduce their impact on the environment. One way for an organization to reduce power usage is to implement an energy-efficient server infrastructure that facilitates management and allocation of power to computing resources as needed.

You can divide power management improvements in Windows Server 2008 R2 into two groups. The first group includes technologies that improve power efficiency automatically. Administrators do not need to take any additional steps to benefit from these features. The second set of improvements enables customers to measure and manage power consumption across their environments.

The power management improvements that work automatically include an entirely new processor power management engine with new, carefully-tuned defaults. Storage power improvements include optimized power links for SATA disks, ATA slumber, and features such as boot-from-SAN, which can indirectly improve power efficiency by keeping disks out of servers and in more power-efficient SANs. With tick skipping, one processor handles the periodic system timer tick; other processors are signaled only as necessary. This helps extends processor sleep states by not waking processors unnecessarily.

One of the challenges of virtualization is that as the number of guest VMs increases, the number of timer interrupts increases linearly, and all of these interrupts tend to prevent processors from remaining in lower power states or idle states. These interrupts also slightly increases CPU utilization – an additional overhead. Timer coalescing enables you to consolidate timer interrupts so you can handle them together. Each time the processor comes out of a low-power state, multiple timers are expired. This reduces the number of interrupts and helps reduce CPU utilization, which helps you keep processors idle and thus save power.

To help you improve your active power management, Windows Server 2008 R2 enables you to measure and manage power consumption. With Windows Server 2008 R2 running on appropriate hardware, Performance Monitor can display power consumption with a new set of counters. This information is also available via WMI, which means you can collect it with System Center, third-party tools, or custom Windows PowerShell scripts.

Power policy settings are also writeable via WMI, enabling remote management of power policies. On appropriate hardware, even power budgeting is possible. You can notify a server or client OS across the network about its power budget, and it communicates with its underlying hardware, helping maintain power consumption within the power budget.

Active Directory and Identity Management

Identity management has always been one of the critical management tasks for Windows-based networks. The implications of a poorly managed identity managed system are one of the largest security concerns for any organization.

Windows Server 2008 R2 includes identity management improvements in the Active Directory Domain Services and Active Directory Federated Services server roles.
Improvements for All Active Directory Server Roles
Windows Server 2008 R2 includes the following identity management improvements that affect all Active Directory server roles:

- **New forest functional level.** Windows Server 2008 R2 includes a new Active Directory forest functional level. Many of the new features in the Active Directory server roles require the Active Directory forest to be configured with this new functional level.
- **Enhanced command line and automated management.** Windows PowerShell cmdlets provide the ability to fully manage Active Directory server roles.
- **Improved automated monitoring and notification.** An updated System Center Manager 2007 Management Pack helps improve the monitoring and management of Active Directory server roles.

Improvements in Active Directory Domain Services
The Active Directory Domain Service server role in Windows Server 2008 R2 includes the following improvements:

- **Recovery of deleted objects.** Domains in Active Directory now have a Recycle Bin which helps to minimize directory service downtime by enhancing your ability to preserve and restore accidentally deleted Active Directory objects without the need to restore Active Directory data from backups, restarting the Active Directory DS, or rebooting domain controllers. By enabling the Active Directory Recycle Bin, a deleted Active Directory object’s link-value and non-link-value attributes are preserved in a state called logical deletion. This preservation enables you to use the Recycle Bin to restore a deleted active directory object and return it to the same consistent logical state that it was in prior to its deletion.
- **Improved process for joining domains.** Computers can now join a domain without being connected to the domain during the deployment process, also known as an offline domain join. This process enables you to fully automate the joining of a domain during deployment. Domain administrators create an XML file that can be included as a part of the automated deployment process. The file includes all the information necessary for the target computer to join the domain.
- **Improved management of user accounts used as identity for services.** One time-consuming management task is the maintenance of passwords for user accounts that are used as identities for services, also known as service accounts. When the password for a service account changes, the services using that identity also must be updated with the new password. To address this problem, Windows Server 2008 R2 includes a new feature known as managed service accounts. In Windows Server 2008 R2, when the password for a service account changes, the managed service account feature automatically updates the password for all services that use the service account.

Improvements in Active Directory Federated Services
Active Directory Federated Services in Windows Server 2008 R2 includes a new feature known as authentication assurance. This feature enables administrators to establish authentication policies for accounts that are authenticated in federated domains. This enables a variety of advanced authentication scenarios, such as smart cards, for example.

Improved Compliance with Established Standards and Best Practices
Windows Server 2008 R2 includes an integrated Best Practices Analyzer that can scan and assess the health of each of the server roles. The Best Practices Analyzer creates a checklist within Server Manager for the targeted role, and you can use that list to help perform all the configuration tasks.
A Closer Look at Windows PowerShell

Windows PowerShell is a new command-line shell, scripting language, and GUI that can help IT professionals achieve high productivity and control system administration easily regardless of their location. Windows PowerShell accelerates automation of system administration tasks through hundreds of built-in cmdlets. It can help improve your organization's ability to address the unique system-management problems of your server environment, and extends your ability to control execution commitment using transactions.

Windows PowerShell does not require a background in programming, and works with your existing IT infrastructure, existing scripts, and existing command-line tools. Unlike most shells that accept and return text, being built on top of the .NET common language runtime (CLR) and the .NET Framework, Windows PowerShell accepts and returns .NET objects. This fundamental change in the environment brings entirely new tools and methods to the management and configuration of Windows.

Windows PowerShell is a useful tool for managing specific Windows Server 2008 roles, such as Internet Information Services (IIS) 7.0 and Active Directory, as well as Microsoft® Exchange Server 2007, System Center Virtual Machine Manager, and Microsoft® Operations Manager 2007, in the following ways:

Remote Desktop Services Management

In Windows Server 2008 R2, Terminal Services (TS) has added new & improved features for traditional TS scenarios, as well as, expanded the TS role to provide an extensible platform for a Virtual Desktop Infrastructure (VDI). VDI provides a centralized desktop delivery architecture that enables Windows Vista Enterprise and other desktop environments to run and be managed on virtual machines within one centralized server. To better reflect the broader support of TS and VDI scenarios, the Terminal Services role has been renamed to Remote Desktop Services (RDS). RDS offers single set of infrastructure for presentation Virtualization & VDI scenarios and will include improvements such as true multi-monitor, audio input, multimedia redirection, improved management and more. And, because RDS uses Windows Management Instrumentation (WMI), administrators can automate RDS configuration changes by means of Windows PowerShell scripts, and examine configuration similarities and differences across a RDS farm.

In Windows Server 2008 R2, the Terminal Services role has been renamed to Remote Desktop Services (RDS) to better reflect the new and improved feature set and its expanded role which includes providing an extensible platform for a Virtual Desktop Infrastructure (VDI). A core part of these improvements is the Remote Desktop Services module, which administrators can use to complete a wide range of tasks, including viewing and editing configuration settings, publishing or removing RemoteApp programs, assigning personal virtual desktops to user accounts, and much more.

The advantage of using Windows PowerShell to manage Remote Desktop Services role services is that your IT staff can use scripts to automate complex, repetitive administrative tasks. Administrators can change settings and perform tasks directly from Windows PowerShell without having to write, save, and run a script.

Deploying and Configuring Internet Information Services 7.0

Windows PowerShell is ideally suited to managing Internet Information Services (IIS) 7.0, including deploying and configuring IIS 7.0 across a Web farm. The Windows PowerShell Snap-In for IIS 7.0 enables Web administrators and hosting providers to easily automate routine and complex IIS 7.0 administration tasks such as creating Web sites, and managing configuration and run-time data using Windows PowerShell. Administrators can further
increase productivity by using the many cmdlets included with the Windows PowerShell Snap-In for IIS 7.0.

- **Simplify the administration of your Web site by scripting administrative tasks.** Achieve greater control and productivity by using the included IIS 7.0 cmdlets to automate repetitive or complex tasks like creating websites, enabling request tracing or adding a handler.

- **Execute repetitive administrative tasks across servers with ease.** The seamless integration with Windows PowerShell means that you can use the familiar Windows PowerShell console to execute tasks across single or multiple Web sites and servers. Using the IIS7 PowerShell Snap-In you can easily navigate the IIS7 configuration hierarchy just as easily as you would navigate the file system on your hard drive.

- **Improve your decision making by consolidating metrics from your servers in real-time.** The Windows PowerShell Snap-In for IIS 7.0 gives you access to a rich set of attributes that lets you consolidate key metrics from your Web sites, such as attended requests per second, state of the Web sites or application pools. By aggregating various metrics, you are able to create score cards, business rules or other ad-hoc responses uniquely suited to your business needs.

### Managing Command-Line Services, Processes, Registry, and WMI Data

Windows PowerShell enables the use and easy creation of automated administration utilities that can invoke or manage command-line services, processes, the registry, or any Windows Management Instrumentation (WMI) data. Windows PowerShell was designed to reduce the cost and effort required to manage IT infrastructure by enabling applications built on Windows PowerShell to manage anything and everything, be it a server, client, distributed system, application, service, hardware, or other operating system. The intuitive interface, rich built-in help, and extensive online resources make Windows PowerShell easier to adopt, learn, and use than traditional scripting. In addition, Windows PowerShell can help standardize and automate all your management processes, improving administrator efficiency and reducing the opportunity for human error.

The simple admin utilities in Windows PowerShell help automate bulk system administration tasks through improved data and object manipulation. These utilities provide improved abilities to filter, sort, group, and compare multiple types of system data including the registry, WMI, services. Because Windows PowerShell can use WMI, IT professionals can write scripts that perform almost any management task that they want to automate. Windows PowerShell can even leverage the full .NET Framework providing access to thousands of powerful objects.

Unlike traditional program languages that were designed for the developer, Windows PowerShell is a scripting language that was designed for use by system administrators. It does not require IT pros to understand complex programming languages like Visual Basic or Visual C++ yet allows them to create scripts that can perform almost any management task. Using a new admin-focused scripting language, hundreds of standard command line tools, and consistent syntax and utilities, Windows PowerShell enables IT professionals to easily control system administration and accelerate automation.
Conclusion

Windows Server 2008 R2 represents a significant milestone in Microsoft’s ongoing efforts to help customers streamline the management of their unique IT infrastructures, thereby reducing work through increased IT efficiencies. Windows Server 2008 R2 provides new and improved management consoles helping you to centralize management tasks and enabling you to do more using familiar tools and processes while reducing your need for additional training. Enhancements to remote management can improve your efficiency and help you save time. Windows Deployment Services and Windows Server Migration Guides can help ensure that your organization is able to respond quickly to your changing IT infrastructure needs. The ability to fully recover deleted objects helps to prevent downtime and simplifies recovery due to administrative error. Using Best Practices Analyzer you can standardize your installations and help avoid potential downtime as well as other problems due to improper configuration. With Windows Reliability and Performance Monitor you can quickly identify and resolve system and network issues before they become noticeable problems. Windows PowerShell can help you standardize and automate all your management processes leading to a better automation experience whether you use it directly from the command line or via integration with management consoles such as Server Manager helping you to save both time and effort. The ability to manage both physical machines and virtual machines with only one set of tools provides a simpler management experience and helps reduce administrative demands. And with new and improved power management you can easily reduce system power consumption and save your organization money. Windows Server 2008 R2 provides a powerful and easy to use management experience that enables you to complete tasks quickly and easily whether locally and remote.
Resources
Best Practice Analyzer on MSDN
Windows PowerShell on MSDN
Server Manager
Active Directory Administrative Center
IIS Manager
Hyper-V