



Global Knowledge®

Expert Reference Series of White Papers

Windows Server 2008: Release 2 Review Guide

Windows Server 2008: Release 2

Review Guide

Brad Werner, Werner Training and Consulting, Inc.

Introduction

Whenever a new model of automobile is about to hit the streets, drivers, mechanics, insurance companies, and law enforcement officers usually have some expectations. For example, unless the “StreetRod 2010” is fully automatic, we expect that it will have a steering wheel, dashboard, pedals, and seats – a typical user interface. We expect that even the most advanced modern land vehicles will have some kind of propulsion system that involves turning their wheels and friction against the pavement – a typical hardware platform.

So what do you expect when you start thinking about a new computer operating system for desktops or even for servers? We still talk about desktops, mobile platforms, and servers, right? Increased use of virtualization and clustering means that Windows Server and physical servers are less likely to have a one-to-one correspondence. Server Core installations of Windows Server 2008 mean that the primary local management interface could be a command line. Just what do you expect Microsoft has delivered with the latest release of Windows Server – Windows Server 2008 R2 (release 2)? A server with no tires and no steering wheel? How radically different do you think a “release 2” could be? Let’s take a look at how different and how similar Windows Server 2008 R2 could be for you.

What’s in a Name?

To begin our journey, let’s look at a touch of history and a sprinkle of name analysis. What was once referred to as Microsoft’s Windows “New Technology” (NT) has evolved from its beginnings, which seem truly humble in retrospect. Did you expect that Microsoft would release the successor to Windows NT 6.0, which was officially called Windows Server 2008, as something called Windows Server 2010? Following the pace set with Windows Server 2003 R2, we might expect that this R2 of Windows Server 2008 is a minor update release. And in such an assumption, we would be half right. Why only half right?

Version Number	Desktop / Notebook	Server
Windows NT 5.0	Windows 2000 Professional	Windows 2000 Server
Windows NT 5.1, 5.2	Windows XP	Windows Server 2003
Windows NT 6.0	Windows Vista	Windows Server 2008
Windows NT 6.1	Windows 7	Windows Server 2008 R2

Windows Server 2008 R2 is closely correlated to Windows 7 such that we could think of it as “Windows 7 Server” although Microsoft does not officially call it that. With respect to the desktop/notebook operating system, Windows 7 is in some ways a minor refinement of Windows Vista. Yet in other ways it is a radical departure from its predecessor. As shown in the table above, if you type **ver** at a Command Prompt or type:

```
(gwmi win32_operatingsystem).version
```

in Windows PowerShell, Windows Server 2008 R2 will reveal that under the hood, it is akin to Windows NT 6.1 Server. By similar fashion, Windows 7 also sports a version 6.1 property. If we believe the under-the-hood version number 6.1, then compared with Windows Server 2008, is R2 really all that different from what a .1 version increment would suggest? The quick answer is yes! Like Windows 7, this Windows Server 2008 R2 is a substantial upgrade from the version 6.0 predecessor, Windows Server 2008.

Note: Windows PowerShell version 2.0 is installed by default on Windows 7 and on Windows Server 2008 R2. As soon as you get an evaluation copy or full release of either one, you can start learning a few under-the-hood details by launching PowerShell and typing:

```
gwmi win32_operatingsystem | FL *
```

The Road Is Wide

Sixty-four bits only. Yes, that's right. Windows Server 2008 R2 does come in an Itanium edition, but the Foundation, Web, Standard, HPC, Enterprise, and Datacenter editions are x64 only. That old-fashioned x86 (32-bit) architecture is not supported in Windows Server 2008 R2, so you'd better plan on sticking with Windows Server 2008 or other operating systems for your x86-based servers. The newest Windows Server offerings from Microsoft include:

- Windows Server 2008 R2 Foundation
- Windows Web Server 2008 R2
- Windows Server 2008 R2 Standard
- Windows HPC Server 2008 (High-Performance Computing)
- Windows Server 2008 R2 Enterprise
- Windows Server 2008 R2 Datacenter
- Windows Server 2008 R2 for Itanium-Based Systems

The Names Have Been Changed...

In a sense, Windows Server 2008 R2 (W2K8R2 or just R2) is like an encore to Windows Server 2008 (W2K8); however, it's like getting a smorgasbord of additional features to choose from. When W2K8 debuted, a few people were surprised that Active Directory had been renamed as Active Directory Domain Services (AD DS). So when you realize that with R2, Microsoft has renamed Terminal Services to now be called Remote Desktop Services, don't think it's merely a case of a little mascara. It's not merely a cosmetic change.

To quote Microsoft's TechNet article *What's New in Remote Desktop Services*,

"Remote Desktop Services, formerly Terminal Services, provides technologies that enable users to access session-based desktops, virtual machine-based desktops, or applications in the data-center from both within a corporate network and from the Internet. Remote Desktop Services enables a rich-fidelity desktop or application experience, and helps to securely connect remote users from managed or unmanaged devices."

Truly speaking, the change in the role formerly known as Terminal Services from Windows Server 2003 to W2K8 was more radical than the change from W2K8 to W2K8R2; however, there have been some significant improvements that won't be addressed here.

The Heart of the Matter

Active Directory Domain Services, perhaps more than any other role that Windows Server hosts, is at the heart of most intranet deployments of Windows. Let's focus on significant changes Microsoft has included in Windows Server 2008 R2 for AD DS. There are three things I should mention before delving into any specific features:

- New Forest Functional Level: Windows Server 2008 R2
- New Domain Functional Level: Windows Server 2008 R2
- New Schema

Windows Server 2008 R2 Forest Functional Level (FFL) allows use of the new Recycle Bin feature, which allows use of the new built-in AD object undelete functionality without needing to resort to third-party products. Also, any new domains that are created in the forest will default to Windows Server 2008 R2 Domain Functional Level (DFL).

Windows Server 2008 R2 Domain Functional Level extends domain functionality available at the Windows Server 2008 DFL with Authentication Assurance. This extension includes additional authentication method information in Kerberos ticket granting tickets to indicate whether a user had used smart-card authentication, username+password authentication, and so on.

The Windows Server 2008 R2 Schema update takes the schema up to version 47. As with prior releases, the **adprep** command can be used from the installation media (use **support\adprep\adprep.exe**) to update your current AD DS infrastructure to the new schema version prior to installation of W2K8R2 domain controllers. The following table shows some representative Microsoft schema version numbers for AD DS.

OS Version Number	Server Product Name	Schema Version
Windows NT 5.0	Windows 2000 Server	13
Windows NT 5.1, 5.2	Windows Server 2003	31
Windows NT 6.0	Windows Server 2008	44
Windows NT 6.1	Windows Server 2008 R2	47

Taking the schema from 44 to 47 adds support for several object classes and attribute types. Some of these relate to the Recycle Bin functionality, while others include support for Remote Desktop Services virtualization, changes to Active Directory Certificate Services (AD CS) for improved Public Key Infrastructure (PKI) support, Distributed Scan Management (DSM) PostScan Process jobs, and Managed Service Accounts. Each of these schema changes reflects the addition of another service's relationship with AD DS, or some new functionality of AD DS itself.

Beside the functional level and schema changes, AD DS provides many new gems, several of which relate to management. The first one you should learn is the Active Directory Administrative Center. The classic tools, AD Users and Computers, AD Domains and Trusts, and AD Sites and Services, are still alive and well, but the Active Directory Administrative Center (ADAC) supports a very welcome task-oriented management modality. From the

moment you first launch ADAC, you are presented with a Reset Password tool and a Global Search tool – just two of many task-oriented capabilities.

What's different about ADAC's Reset Password tool when compared with ADUC's? Think about how you reset someone's user account password in ADUC: first, search for or navigate to their user account object. Then take action on that object. It's **object-oriented** – not from a software developer's point of view, but from an administrator's point of view. Select the object, then act on it. With ADAC, it's task-oriented. The task **Reset Password** is presented in a box in the window. The administrator just types in the user name, password, confirmation, and hits the **Apply** button (perhaps after choosing the **User must change password at next log on** or **Unlock account** options). It's very direct and to-the-point, if you're willing to type the username. By comparison, ADUC is very point-and-clicky. ADAC's search facilities are more integrated into the whole user interface along with common queries as quick check boxes – the ease of use can be an amazing relief compared with the search capabilities of ADUC. Without going into all of the features of ADAC, with a bit of practice, this tool could potentially speed up many help desk or administrator tasks.

Let's say you need to work with Active Directory, but you're not so much of a graphical user interface (GUI) person. If you're a command-line, or scripting, or automation kind of person, then just look a few doors down in the **Start, Administrative Tools** menu from ADAC, and you will find Active Directory Module for Windows PowerShell. Before you dash off, keep the Administrative Tools menu open a bit longer and notice Windows PowerShell Modules down toward the bottom, perhaps sandwiched between Windows Memory Diagnostic and Windows Server Backup. We'll come back to the PowerShell modules later, but for now simply note that these open up great new management possibilities for not only Active Directory, but other aspects of Windows Server 2008 R2 as well.

There are many other aspects of Active Directory that have been upgraded in W2K8R2, including many that are meant to address deficiencies or solve complexities in W2K8 and earlier version of Windows Server. Among these other components are:

- Managed Service Accounts
- Offline Domain Join
- Active Directory Best Practices Analyzer (AD BPA)
- Active Directory Management Pack
- Active Directory Web Services (AD WS)

For many years, security-conscious administrators have wrestled with effective techniques for hardening servers. One difficulty has been the management of service accounts to compartmentalize damage in the event of compromised services. The **Managed Service Accounts** functionality of W2K8R2 provides a way to wrangle unique service accounts into a manageable framework specific to the needs of service accounts, thereby lessening the need to resort to using user accounts with the same password policy as the rest of the domain.

In enterprises and large organizations, mass deployment of Windows presents a number of challenges, and Windows Deployment Services and additional frameworks are poised to meet such challenges. In conjunction with those deployment techniques, AD-based computer accounts can now be more fully pre-created using the **Offline Domain Join** additions to AD DS functionality.

Analysis of Active Directory environments can be accomplished using many third-party tools. With **Microsoft's Active Directory Best Practices Analyzer** in W2K8R2, some recommendations can be provided right in Server Manager. In addition, W2K8R2 also includes the **Active Directory Management Pack** for Microsoft System Center Operations Manager 2007, which provides a big-picture management perspective without the use of third-party tools.

Active Directory Web Services (AD WS) is the W2K8R2 version of the AD Management Gateway that is available for W2K8 and W2K3. AD WS provides a web-based management interface for the ADAC and the AD module for PowerShell via port 9389. On W2K8R2, AD WS is installed by default on AD DS domain controllers and on servers running Active Directory Lightweight Directory Services (AD LDS). By using web-based authentication techniques, AD WS can provide a more firewall-friendly alternative to managing AD DS and AD LDS without direct Kerberos and Lightweight Directory Access Protocol (LDAP) access from the management station to the AD server.

Much more could be said about Active Directory, but let's shift gears into the world of PowerShell.

A Shell for All Seasons

Windows PowerShell version 2.0 has finally released! After a long wait in Community Technology Preview stages, Windows 7 and Windows Server 2008 R2 come with Windows PowerShell version 2.0 not only included, but installed by default! If you have never used Windows PowerShell, you should really wake up and see what's been cooking in Windows for several years now. Exchange Server 2007 (and soon Exchange Server 2010), System Center, more Microsoft products, VMware systems, Citrix systems, and other products from many vendors can be managed with Windows PowerShell version 1.0. Now, we have the long-awaited upgrade.

So, you're not a command-line or scripting kind of person? You don't think you could possibly benefit from automation of systems administration within your organization? Please pay close attention, because PowerShell is the (recent) past, present, and future of Windows administration. What's so different about version 2.0? I'm so glad you asked.

`(get-command).count`

Let's say that you ran the above command on a stock installation of Windows PowerShell version 1.0, which comes as a feature of Windows Server 2008 (release 1) and Windows Vista, or the copy of PowerShell you downloaded and installed on Windows Server 2003, or Windows XP. How many **cmdlets** (think "little commands") are included in PowerShell version 1.0? The answer, without extensions, should be 129. Many scripts, functions, and even interactive administration and automation could be implemented using these few cmdlets, plus any regular Windows executables can be used in PowerShell. There are also many extensions to this set of cmdlets – for example Exchange Server 2007 includes several hundred more cmdlets tailored to management of the messaging platform.

What about Windows PowerShell version 2.0? How many cmdlets are built in? It depends. If you launch the stock version, which lives in the Windows Server 2008 R2 task bar, by default (look for the rounded blue parallelogram with a greater-than sign and underscore in it), the answer would be 236 cmdlets, 137 aliases, and 37 functions for a grand total of 410 commands. In other words, this version in W2K8R2 has more than two times the basic number of cmdlets than W2K8. But wait, there's more! The more roles and features you add to W2K8R2, the more PowerShell cmdlets you get.

Consider a domain controller running AD DS. By going to Start, Administrative Tools, and launching Active Directory Module for Windows PowerShell, the count of commands would be 486. The extra 76 cmdlets in the AD module provide management capability for user accounts, service accounts, computer accounts, groups, and much more. Prior to this version, many administrators utilized third-party tools or scripts and functions for AD management in PowerShell version 1.0. For example, the course **Automating Windows Server 2008 Administration with Windows PowerShell** features a course module that illustrates the basic techniques and useages of such scripts and functions. I happen to know because I was the primary subject matter expert in the development of that course.

A visit to Start, Administrative Tools, Windows PowerShell Modules reveals that even more cmdlets lurk beneath the surface. The command count? 546. In other words, W2K8R2 comes with 546 commands instead of the mere 129 of W2K8. Adding web services (IIS) and Windows backup could boost the count to 650 or higher. The more you install, the more you can manage with PowerShell. Yes, Microsoft is expected to release a downloadable package of Windows PowerShell version 2.0 for earlier version of Windows soon, but W2K8R2 comes with this built in.

`get-module`

`get-psprovider`

`get-command` | `group module`

If you have the Windows PowerShell Modules console open on W2K8R2, what would the preceding three commands reveal? The first, **get-module**, shows that this console includes extensions for managing the following aspects of Windows:

- ActiveDirectory
- AD RMS
- AppLocker
- BestPractices
- BitsTransfer
- GroupPolicy
- PSDiagnostics
- ServerManager
- TroubleshootingPack

The second command above, **get-psprovider**, would show the same PowerShell providers from version 1.0 – Alias, Environment, FileSystem, Function, Registry, Variable, and Certificate. In addition, version 2.0 also includes the following providers:

- WSMAN
- ActiveDirectory
- AD RMSInstall

But what does this mean? In brief, it means that Windows Remote Management (WinRM), Microsoft's implementation of the industry-standard Web Services Management framework (WS-Management) can be accessed

easily using the WSMAN provider in PowerShell. It means that ActiveDirectory can be navigated and managed using familiar commands like **cd** (a.k.a. change directory, actually an alias for the **set-location** cmdlet). Also, Active Directory Rights Management Services installation can be accessed via a provider. For more information on PowerShell snap-ins, providers, and drives, consider attending a PowerShell class.

What does the third command line shown above do? **get-command | group module** shows how many cmdlets are provided by each of the aforementioned modules.

```

Administrator: Windows PowerShell Modules
PS AD:\cn=users,DC=777,DC=uernerconsulting,DC=com> get-command | group module

Count Name                                     Group
-----
410
76 ActiveDirectory                          (<Add-ADComputerServiceAccount, Add-ADDomainControllerPasswordReplicationPolicy, Add-...
8 BitsTransfer                               (<Add-BitsFile, Complete-BitsTransfer, Get-BitsTransfer, Remove-BitsTransfer...)
3 ServerManager                             (<Add-WindowsFeature, Get-WindowsFeature, Remove-WindowsFeature)
25 GroupPolicy                               (<Backup-GPO, Copy-GPO, Get-GPInheritance, Get-GPO...>
18 PS.Diagnostics                           (<Disable-PSTrace, Disable-PSUSManCombinedTrace, Disable-USManTrace, Enable-PSTrace...>
5 AppLocker                                  (<Get-AppLockerFileInformation, Get-AppLockerPolicy, New-AppLockerPolicy, Set-AppLock...
4 BestPractices                             (<Get-BpaModel, Get-BpaResult, Invoke-BpaModel, Set-BpaResult)
2 TroubleshootingPack                       (<Get-TroubleshootingPack, Invoke-TroubleshootingPack)
3 AD RMS                                     (<Install-ADRMS, Uninstall-ADRMS, Update-ADRMS)

PS AD:\cn=users,DC=777,DC=uernerconsulting,DC=com> get-command -module GroupPolicy

CommandType Name                                     Definition
-----
Cmdlet      Backup-GPO                                Backup-GPO -Guid <Guid> -Path <String> [-Comment...
Cmdlet      Copy-GPO                                  Copy-GPO -SourceGuid <Guid> -TargetName <String>...
Cmdlet      Get-GPInheritance                         Get-GPInheritance [-Target] <String> [-Domain <S...
Cmdlet      Get-GPO                                   Get-GPO [-Guid] <Guid> [-Domain] <String> [-S...
Cmdlet      Get-GPOReport                             Get-GPOReport [-Guid] <Guid> [-ReportType] <Repo...
Cmdlet      Get-GPPermissions                         Get-GPPermissions -Guid <Guid> [-TargetName <Str...
Cmdlet      Get-GPPrefRegistryValue                  Get-GPPrefRegistryValue -Guid <Guid> -Context <G...
Cmdlet      Get-GPRegistryValue                      Get-GPRegistryValue -Guid <Guid> -Key <String> [-...
Cmdlet      Get-GPResultantSetOfPolicy               Get-GPResultantSetOfPolicy [-Computer <String>] -...
Cmdlet      Get-GPStarterGPO                         Get-GPStarterGPO -Guid <Guid> [-Domain <String>] -...
Cmdlet      Import-GPO                                Import-GPO -BackupId <Guid> -Path <String> [-Tar...
Cmdlet      New-GPLink                                New-GPLink -Guid <Guid> -Target <String> [-LinkE...
Cmdlet      New-GPO                                   New-GPO [-Name] <String> [-Comment <String>] [-D...
Cmdlet      New-GPStarterGPO                         New-GPStarterGPO [-Name] <String> [-Comment <Str...
Cmdlet      Remove-GPLink                             Remove-GPLink -Guid <Guid> -Target <String> [-Do...
Cmdlet      Remove-GPO                                Remove-GPO -Guid <Guid> [-Domain <String>] [-Ser...
Cmdlet      Remove-GPPrefRegistryValue               Remove-GPPrefRegistryValue [-Server] <String>] ...
Cmdlet      Remove-GPRegistryValue                   Remove-GPRegistryValue [-Guid] <Guid> [-Key] <St...
Cmdlet      Rename-GPO                                Rename-GPO -Guid <Guid> -TargetName <String> [-D...
Cmdlet      Restore-GPO                               Restore-GPO -BackupId <Guid> -Path <String> [-Do...
Cmdlet      Set-GPInheritance                         Set-GPInheritance [-Target] <String> [-IsBlocked ...
Cmdlet      Set-GPLink                                Set-GPLink -Guid <Guid> -Target <String> [-LinkE...
Cmdlet      Set-GPPermissions                        Set-GPPermissions -Guid <Guid> -PermissionLevel ...
Cmdlet      Set-GPPrefRegistryValue                  Set-GPPrefRegistryValue -Guid <Guid> -Context <G...
Cmdlet      Set-GPRegistryValue                      Set-GPRegistryValue -Guid <Guid> -Key <String> [-...
  
```

To be more specific, the 410 base commands actually include 236 cmdlets, 37 functions, and 137 aliases. Along with the 410 base cmdlets, functions, and aliases are the additional cmdlets and functions provided by the loaded modules. Most of these modules add cmdlets, yet the PS.Diagnostics module adds 10 functions. The counts from **get-command | group module** are shown in the figure above. To get an idea of what kind of capabilities these added cmdlets offer, let's take a look at the cmdlets from the GroupPolicy module.

get-command -module GroupPolicy

The list of cmdlets from this module (shown in the figure above) provide the ability to create, delete, report on, and edit Group Policy Objects. Consider the following example to navigate into an Active Directory domain, create an organizational unit (OU), create a group policy object (GPO), and link the new GPO to the new OU.

```

Administrator: Windows PowerShell Modules
PS G:\Users\Administrator> cd AD:\dc=777,dc=wernerconsulting,dc=com"
PS AD:\dc=777,dc=wernerconsulting,dc=com> New-ADOrganizationalUnit TestOU
PS AD:\dc=777,dc=wernerconsulting,dc=com> New-GPO TestGPO

DisplayName       : TestGPO
Description       :
CreationTime      : 9/1/2009 10:31:10 AM
ModificationTime : 9/1/2009 10:31:11 AM
UserVersion       : AD Version: 0, SysVol Version: 0
ComputerVersion  : AD Version: 0, SysVol Version: 0
GpoStatus         : AllSettingsEnabled
GpoFilter         :

PS AD:\dc=777,dc=wernerconsulting,dc=com> New-GPLink TestGPO -Target "ou=TestOU,dc=777,dc=wernerconsulting,dc=com"

GpoId             : b9693ae4-c9d6-4e5b-a8fa-1dbff41a3784
DisplayName       : TestGPO
Enabled           : True
Enforced          : False
Target            : OU=TestOU,DC=777,DC=wernerconsulting,DC=com
Order             : 1

PS AD:\dc=777,dc=wernerconsulting,dc=com>

```

cd AD:\dc=777,dc=wernerconsulting,dc=com"

New-ADOrganizationalUnit TestOU

New-GPO TestGPO

New-GPLink -Target "ou=TestOU,dc=777,dc=wernerconsulting,dc=com"

Back in the PowerShell version 1.0 era of Windows Server 2008, we would have to write or download scripts to make such work this easy. These commands come built-in with Windows Server 2008 R2, and most importantly, this brief example is just scratching the surface of possibilities for administering systems with these new cmdlets and providers.

One of the greatest advancements for PowerShell in Windows Server 2008 R2 is not that it is installed by default, but that we can use it directly on Windows Server Core installations. Yet one thing to remember about Windows PowerShell is that it is utilized for management tools beyond the command-line, at least on the full installation (not Server Core) deployments of Windows Server 2008 R2. Another amazing benefit of the latest version of PowerShell is the Integrated Scripting Environment (ISE). To quote from Server Manager's Add Features Wizard, the PowerShell ISE **"enables you to run interactive commands, and edit and debug scripts in a graphical environment."** Being able to change the sort order and filtering criteria graphically with the **Out-GridView** cmdlet, having support for debugging and tracing scripts, and more comes with this big evolutionary step for PowerShell.

The Good, the New, and the Upgraded

Windows Server 2008 R2 includes dozens of other changes are too numerous to detail here, but let me say a few words about certain key differences from Windows Server 2008 (R1). Here's a brief summary of some highlights.

Microsoft's hypervisor role, Hyper-V, can certainly be used to host virtual machines on the Standard Edition of Windows Server 2008 R2. Where Hyper-V really shines is in larger deployments that might be hosted on the Enterprise Edition or Datacenter Edition of W2K8R2. Greatly enhanced flexibility in the new Hyper-V implemen-

tation can also leverage off of the enhancements to clustering in the Enterprise and Datacenter editions. With this second release, Microsoft has refined Hyper-V so that many customers requiring virtualization may have a tougher time choosing between VMware and Microsoft offerings.

There are some server roles and features that are most effectively deployed with the synergistic combination of Windows 7 and Windows Server 2008 R2. However, there are also many features from Windows 7 that can also benefit administrators of servers running Windows Server 2008 R2 due to the commonalities in the two products. For instance, having enhancements in Biometric fingerprint readers and Smart-Card support might be just as important, or perhaps more important, for server management than for use on masses of client machines.

A number of features that debuted in Windows Server 2003 R2 have gone unnoticed by many administrators. Some of these features and role services were upgraded in Windows Server 2008, but now a vast number of them have been improved and extended substantially in Windows Server 2008 R2. One example of this is the File Server Resource Manager (FSRM), which previously supported Quota Management, File Screening Management, and Storage Reports Management. Now, in W2K8R2, these capabilities are joined by two new friends: **Classification Management** and **File Management Tasks**.

With the file classification features, you can configure a number of rules which can specify folder or content classification properties that use either folder path or regular expression patterns of content to determine advanced stratification of distinct sets of files. Unlike the basic quota and file screening, your classification rules can use other criteria, such as string patterns, within the file contents. While the quota and file screening rules still can either allow or prevent storage of a file in a particular folder to which these rules apply, the file management tasks offer more options. These tasks can use access times or custom classifications to choose which files on which to act, and the task can be delayed by a specified number of days. These capabilities allow for script or flexible management of the content stored in Windows file systems, whether the server is a file server or is performing other roles.

The Distributed File System (DFS) still provides many great capabilities for file sharing, one of these is being able to carefully choose which folders are replicated to which servers, there are some organizations for whom caching of file share content is still a desirable feature. Instead of just using Offline Files features that have been in Windows for years, one of which allows each individual machine to maintain its own cache of recently used files, W2K8R2 now provides a feature called BranchCache. This server-based BranchCache is geared toward small branch offices to cache recently used files for the benefit of their local clients. Not only does BranchCache support regular file-sharing caching via the server message block (SMB) protocol, it also caches web traffic (HTTP) as well.

Some features provide what at first seems like yet another way to do something. Consider this – we still have many virtual private network (VPN) technologies available in W2K8R2, including the new Fast-VPN-Reconnect feature. A new alternative is DirectAccess, which allows domain members running Windows 7 Enterprise, Windows 7 Ultimate, and Windows Server 2008 R2 to connect to the enterprise network transparently without explicitly connecting to a VPN. Again, DirectAccess requires that the DirectAccess server and all of its client computers be joined to the Active Directory environment as members, leaving room for classic VPN and Remote Desktop Services to still handle non-domain members. DirectAccess works with the updated implementation of the Internet Protocol version 6 (IPv6) in Windows 7 and W2K8R2 and the Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) and the related IPsec and PKI frameworks in your networks to provide full domain membership, including group policy functionality in a hybrid IPv4+IPv6 environment.

A feature that had functionality removed and then restored is Windows Backup. Prior to Windows Server 2008, selective backup was possible, but in W2K8 only full -volume backup was supported. With W2K8R2, selective backup functionality has returned to the built-in Windows Backup. The Windows Backup MMC and Windows backup administration (**Wbadmin**) command-line tool are available in the basic installation of the Windows Backup feature. Including the **Command-line Tools** subfeature adds the newer PowerShell snap-in, updated from its W2K8 roots, that provides 30 Windows Backup cmdlets for detailed control over backup policies, file specifications, and many other options.

Internet Information Services 7.5 in W2K8R2 extends the capabilities of W2K8's IIS7. Building on the IIS7 framework, even greater extensibility is offered by more modules, greater module customization, and new administrative tools. Server Core deployments can now support ASP.NET in the same way that the .NET-based PowerShell is now supported on Server Core.

```

Administrator: Windows PowerShell Modules
IISM Registry HKKEY_LOCAL_MACHINE
IIS WebAdminis... \SYSTEM
Variable Variable
WSMan WSMan

PS C:\brochures> iis:
PS IIS:\> dir

Name
----
AppPools
Sites
SslBindings

PS IIS:\> cd sites
PS IIS:\sites> dir

Name ID State Physical Path Bindings
---- -- --
Default Web Site 1 Started %SystemDrive%\inetpub\wwwroot http *:80:

PS IIS:\sites> New-Website "Data Sheet Distribution" -HostHeader "brochure.vernonconsulting.com" `
>> -PhysicalPath "C:\brochures"
>>

Name ID State Physical Path Bindings
---- -- --
Data Sheet Distr 2 Started C:\brochures http *:80:brochure.vernonconsulting.com
ibution

PS IIS:\sites> dir

Name ID State Physical Path Bindings
---- -- --
Data Sheet Distr 2 Started C:\brochures http *:80:brochure.vernonconsulting.com
ibution
Default Web Site 1 Started %SystemDrive%\inetpub\wwwroot http *:80:

PS IIS:\sites>

```

As a part of the extended management interfaces for IIS7.5, the long-awaited IIS management cmdlets and provider for Windows PowerShell have arrived with W2K8R2. As shown in the figure above, the IIS provider allows easy access to application pool, application, site, virtual directory, and SSL/TLS bindings. Along with the provider, the WebAdministration module for PowerShell adds one alias, two functions, and 71 cmdlets tailored to managing IIS7.5. With these new capabilities, administrators needn't depend on scripting PowerShell to perform management with the WebAdministration .NET and WMI interfaces directly.

Improved WebDAV and FTP security, logging, and stability can aid in getting changes to web sites made as soon as possible. Web sites and Windows Communication Foundation (WCF)-based application can benefit from the ability to host web services in any application (called **Hostable Web Core**), Managed Service Accounts (mentioned earlier with respect to Active Directory) can ease the management of secured application pools, and PHP

applications and sites that use the FastCGI module can be more easily be debugged by developers. In summary, IIS7.5 is a significantly improved, yet not radically different web site and web application platform than IIS7.

Summary

I recommend that anyone running earlier versions of Windows Server quickly take a serious look at Windows Server 2008 R2. In my opinion, if you run Windows, you should be running it on at least one evaluation or test machine within a week of reading this paper. Why not wait? Even if your Windows Servers are already running on 64-bit hardware, and even if you're satisfied with your current server operating system, you should become familiar with the changes in requirements now even if you don't plan to upgrade to Windows Server 2008 R2 until the year 2012. Just one test server. Give it a try.

Learn More

Learn more about how you can improve productivity, enhance efficiency, and sharpen your competitive edge. Check out the following Global Knowledge courses:

[Configuring, Managing, and Maintaining Server 2008 \(M6419\)](#)

For more information or to register, visit www.globalknowledge.com or call **1-800-COURSES** to speak with a sales representative.

Our courses and enhanced, hands-on labs and exercises offer practical skills and tips that you can immediately put to use. Our expert instructors draw upon their experiences to help you understand key concepts and how to apply them to your specific work situation. Choose from our more than 1,200 courses, delivered through Classrooms, e-Learning, and On-site sessions, to meet your IT and business training needs.

About the Author

Bradford S. Werner is a software engineer, IT consultant, technical trainer, and president of Werner Training and Consulting, Inc. in Phoenix, AZ. Brad has been teaching and developing Microsoft courses for Global Knowledge for 15 years. He's a best-selling author whose software, books, and award-winning course materials have been used worldwide. Brad holds a B.S. in Computer Science, completed half of a Masters in Telecommunications, and holds a Doctorate in Metaphysics, as well as other certifications.