



Windows Server 2012

Windows 8 Virtual Desktop Infrastructure image client tuning guide

Microsoft Corporation

Published: August 2013

Abstract

This guide describes important tuning parameters and settings that you can adjust to optimize the Windows 8 operating system image being deployed as part of a Windows Server 2012 Virtual Desktop Infrastructure (VDI) solution.

The guide is for IT pros and systems administrators who need to perform VDI image tuning. For the most current version of this guide, see [Performance Tuning Guidelines for Windows Server 2012](#) in the Windows Dev Center.

Copyright Information

This document supports a preliminary release of a software product that may be changed substantially prior to final commercial release, and is the confidential and proprietary information of Microsoft Corporation. It is disclosed pursuant to a non-disclosure agreement between the recipient and Microsoft. This document is provided for informational purposes only and Microsoft makes no warranties, either express or implied, in this document. Information in this document, including URL and other Internet Web site references, is subject to change without notice. The entire risk of the use or the results from the use of this document remains with the user. Unless otherwise noted, the companies, organizations, products, domain names, e-mail addresses, logos, people, places, and events depicted in examples herein are fictitious. No association with any real company, organization, product, domain name, e-mail address, logo, person, place, or event is intended or should be inferred. Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the express written permission of Microsoft Corporation.

Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Microsoft, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

© 2013 Microsoft Corporation. All rights reserved.

Microsoft, BitLocker, BranchCache, DirectX, Forefront, Hyper-V, RemoteFX, Visual Basic, Windows, Windows Media, Windows Server, and Windows Vista are trademarks of the Microsoft group of companies.

All other trademarks are property of their respective owners.

Contents

Windows 8 Virtual Desktop Infrastructure image client tuning guide	4
About this guide.....	4
Reviewing VDI concepts	4
Key decisions to consider	5
Choosing the right VDI deployment type	5
Choose a Windows bitwise edition for the guest operating system	8
Requirements to support RemoteFX.....	10
Hardware requirements	10
Software requirements.....	10
Enabling RemoteFX.....	10
Memory allocation	12
Disk size	13
Disk partitions.....	14
Antivirus software	15
Windows 8 service configuration.....	16
Windows 8 configurations	24
Conclusion.....	25
Resources	26
VDI Optimizer (AutoIT) by Jonathan Bennett	26
PFE Windows 8 VDI script.....	26
Windows Performance Recorder.....	27
Windows Performance Analyzer.....	28
Microsoft Assessment and Planning Toolkit v8	29
Recommended performance tools.....	29

Windows 8 Virtual Desktop Infrastructure image client tuning guide

About this guide

This guide describes how you can tune the client operating system image used in your Virtual Desktop Infrastructure (VDI) to obtain incremental client-side performance or energy efficiency gains, especially when the nature of the workload varies little over time.

To have the greatest impact, your tuning changes should consider the hardware, workload, power budgets, and performance goals of your VDI solution. This guide describes important tuning considerations and settings that can result in improved performance or energy efficiency as well as each setting and its potential effect to help you make an informed decision about its relevance to your system, workload, performance, and energy usage goals. The information in this guide helps to make images lean but supportable. With the proper tuning and testing, your applications will be quick and usable.

Reviewing VDI concepts

Use the following Step-by-Step Guides for more information about how VDI works and how to deploy Remote Desktop Services in a test environment see the RDS page on TechNet at <http://technet.microsoft.com/en-us/library/hh831447.aspx>.

Key decisions to consider

VDI is a server role in the Windows Server 2012 operating system that provides technologies that enable users to access data and applications from virtually anywhere on popular devices while helping to maintain security and compliance.

Choosing the right VDI deployment type

Windows Server 2012 supports three different ways to configure the VDI environment, all using the same platform (see Figure 1). They are, in order of required server space:

- Sessions
- Pooled virtual machines (VMs)
- Personal VMs

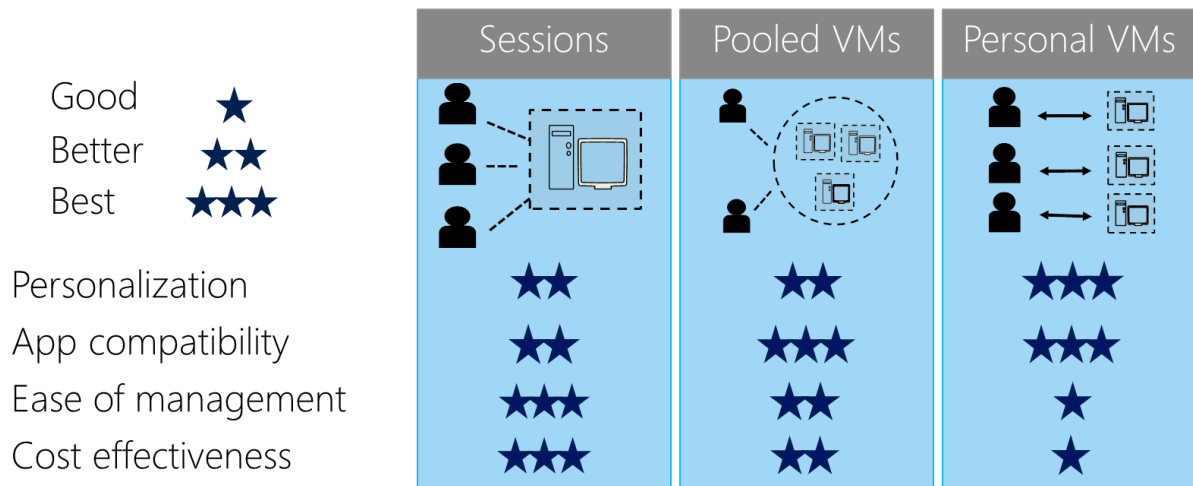


Figure 1. VDI deployment options

You cannot necessarily build a virtual desktop the same way you build a physical desktop, but the choices you make affect the image and its management costs:

- **Personalization.** Do your users need the ability to customize their desktops? If so, what level of customization do they need? With sessions and pooled VMs, users have limited personalization capability with user disks, such as the ability to persist their data across different logons. Although they cannot persist user-installed applications across logons, with a personal desktop (assuming, of course, that the user has administrative rights on the desktop), users can change any aspect of their desktop, including installing their own applications across multiple logons. Depending on the user, this could change the workload size and thus the memory requirements.
- **Application compatibility.** Session-based desktops share a common server operating system; therefore, any applications installed must be compatible with Windows Server 2012. In both pooled VM scenarios, the Windows client operating system runs within the VM, so application compatibility is always higher for VMs than sessions, but with personal VMs, users can install their own apps, as opposed to pooled VMs, where IT decides which

applications are presented to the user. As a result, personal VMs provide the highest level of application compatibility across all three deployment models. Again, you give up some control over the installation.

- **Images.** Single-image configurations are easier to manage and have lower costs than personal VMs, where each user gets their own individual image. They also allow you to tune to a consistent requirements set.
- **Cost.** Because sessions offer the highest densities and are single images, they are often easier to manage and offer the lowest cost. Pooled VMs get the single image and management benefits of sessions, but higher densities and management efforts mean that they are more expensive to deploy than sessions. Personal VMs have the lowest density and highest management efforts, making them the most expensive of the three deployment models, but bear in mind that Windows Server 2012 helps companies reduce overall VDI total cost of ownership (TCO), with support for lower-cost storage (such as Server Message Block [SMB] and direct attached storage [DAS]), application virtualization, dynamic memory, and user disks.

Choose a Windows edition for the guest operating system. Although the Windows 7 Enterprise operating system (with Remote Desktop Protocol [RDP] 8.0) supports many of the Microsoft RemoteFX features in Windows Server 2012, the Windows 8 operating system is recommended because of its significant improvements in:

- Touch
- Performance
- Modern apps
- User experience

The touch environment provides an interface for non-Microsoft products and supports a new focus on devices and services (see Figure 2).

Which Windows Edition for the Guest OS?

Windows 8 Professional or Enterprise?

Feature	Windows 8 Pro	Windows 8 Enterprise	Windows 7 Enterprise (with RDP 8.0)
Ability to use RemoteApp		✓	✓
RemoteFX Multi-Touch	✓	✓	
Advanced Device Redirection Features (RemoteFX USB & PnP redirection)		✓	✓
User Profile Disk		✓	✓
RemoteFX virtual Graphics Processing Unit (vGPU)		✓	✓

"Remote Computers running Windows 8 Enterprise provide the best user experience and support all management features. Therefore, Windows 8 Enterprise is the only supported edition for use with Windows Server 2012 virtual desktop collections (VDI)."

Source: <http://blogs.msdn.com/b/rds/archive/2012/11/26/remotefx-features-for-windows-8-and-windows-server-2012.aspx>

Figure 2. Windows edition comparison

The Windows 8 Enterprise operating system is the clear choice over the Windows 8 Pro operating system, because it supports the following Windows Server 2012 features, which enrich the VDI experience:

- RemoteApp.** RemoteApp makes it possible for administrators to deliver remote applications, including 3D graphics and video, across LANs and WANs to users. Specifically, RemoteApp enables a straightforward publishing process that allows you to provide apps on session or VDI hosts to users, allows RemoteApp programs to run side by side with local applications, and offers integration with the Start menu to make it simple for users to find and launch RemoteApp programs even with limited bandwidth and high latency by dynamically adjusting the fidelity of the user experience based on changing network conditions.
- RemoteFX USB redirection.** This feature allows you to redirect many devices to an RD Virtualization Host (RDVH) server at the USB level and gives access to them from virtual or session-based desktops. Advantages of this solution are that that no client computer means no device drivers and a universal interface is provided that works with any USB device on any platform on which RemoteFX USB redirection is supported. This solution redirects many types of devices, including audio devices, storage devices, human interface devices, all-in-one printers, and scanners. For more information about RemoteFX USB redirection, see the *Configuring USB Device Redirection with Microsoft RemoteFX Step-by-Step Guide* at <http://go.microsoft.com/fwlink/?LinkId=192431>.
- RemoteFX virtual graphical processing unit (vGPU).** GPU virtualization in RemoteFX enables users to run graphical applications on a VM. It also enables administrators to share physical graphics devices among multiple knowledge workers with VMs running on a Hyper-V server. Enterprise customers who have consolidated their desktops onto a Hyper-V server

can take advantage of this technology, which includes a CPU-based graphics accelerator that allows applications running in a VM to access GPU resources, even if the server has no GPU, to provide a desktop graphics experience. The feature also supports virtualizing a GPU in the host server in VMs, providing an accelerated Microsoft DirectX graphics experience for 3D or other graphics-intensive applications. RemoteFX vGPU provides the best:

- Performance for 3D graphics-intensive applications
- Experience, with full animations and transitions
- Application compatibility, running as a console session in a VM
- **Touch-enabled.** Windows 8 Enterprise fully supports touch-enabled devices and applications.

For a more detailed comparison, see the blog, “RemoteFX Features for Windows 8 and Windows Server 2012,” at <http://blogs.msdn.com/b/rds/archive/2012/11/26/remotefx-features-for-windows-8-and-windows-server-2012.aspx>, where author Shanmugam Kulandaivel, a senior program manager on the Remote Desktop Virtualization team, concludes: “Remote computers running Windows 8 Enterprise provide the best user experience and support all management features. Therefore, Windows 8 Enterprise is the only supported edition for use with Windows Server 2012 virtual desktop collections (VDI).”

Choose a Windows bitwise edition for the guest operating system

Finally, the question comes down to Windows 8 32 bit or 64 bit (see Figure 3):

- 32 bit has a smaller footprint on the disk but can only support 4 GB of RAM.
- 64 bit is a good fit if physical machines will use the 64-bit edition to avoid multiple application compatibility retesting.

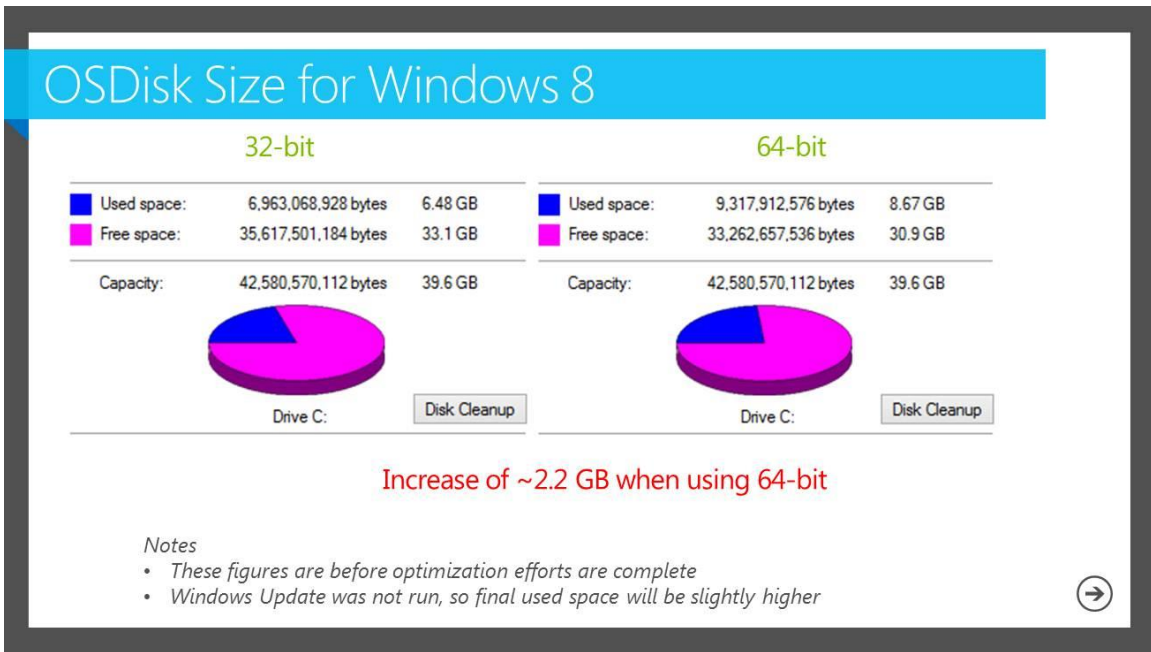


Figure 3. Memory usage comparison

As you can see, there is relatively no difference between the 32- and 64-bit memory footprint before tuning. The only key difference from the services perspective is the Windows on Windows service to allow 32-bit operating systems to run on a 64-bit platform, which adds approximately 2 GB. Microsoft recommends using 64-bit Windows as the default and 32-bit Windows as optional if technical or business requirements are identified, such as needing to run 32-bit applications.

Requirements to support RemoteFX vGPU

RemoteFX is a set of protocols that use Microsoft's Remote Desktop Protocol (RDP) to deliver virtual desktops remotely. The technology comes with numerous improvements in Windows Server 2012 but requires Windows upgrades for customers. One feature is RemoteFX vGPU. This gives the ability to use a physical graphic adapter (GPU) in the Hyper-V host to accelerate the host-side rendering of display content.

Hardware requirements

Note the following hardware requirements for RemoteFX:

- The GPU must support Microsoft DirectX 11:
 - A list of certified GPUs can be found on the Windows Server Catalog website at <http://server.windowsmarketplace.com>.
 - At present, six NVIDIA and two Intel embedded or dedicated cards on the server have been certified for RemoteFX support. You can find a list of AMD chips which support RemoteFX vGPU at <http://www.amd.com/US/PRODUCTS/WORKSTATION/GRAPHICS/SOFTWARE/Pages/remote-fx.aspx>, and a list of NVIDIA chips at <http://blogs.nvidia.com/blog/2012/06/13/best-virtual-desktop-nvidia-vgx-windows-remotefx/>.
- The RDVH or RD Session Host (RDSH) processor must support Second-Level Address Translation (SLAT):
 - Intel processors identify this with the term *extended page tables* (EPT).
 - AMD processors identify this with the term *nested page tables* (NPT).

Software requirements

Note the following software requirements for RemoteFX:

- VDI guest VMs must use the Windows 8 64-bit Windows Display Driver Model (WDDM) 1.20 driver to prevent rendering issues.
- The RDVH or RDSH role service must be enabled on the RemoteFX server to provide RemoteFX in client sessions and VMs.

Enabling RemoteFX

On the Hyper-V server, confirm that the WDDM 1.2 driver is selected from the **GPU** list. This setting lets you see WDDM as a configuration option in your VDI session. Then, select the **Use this GPU with RemoteFX** option (see Figure 4).

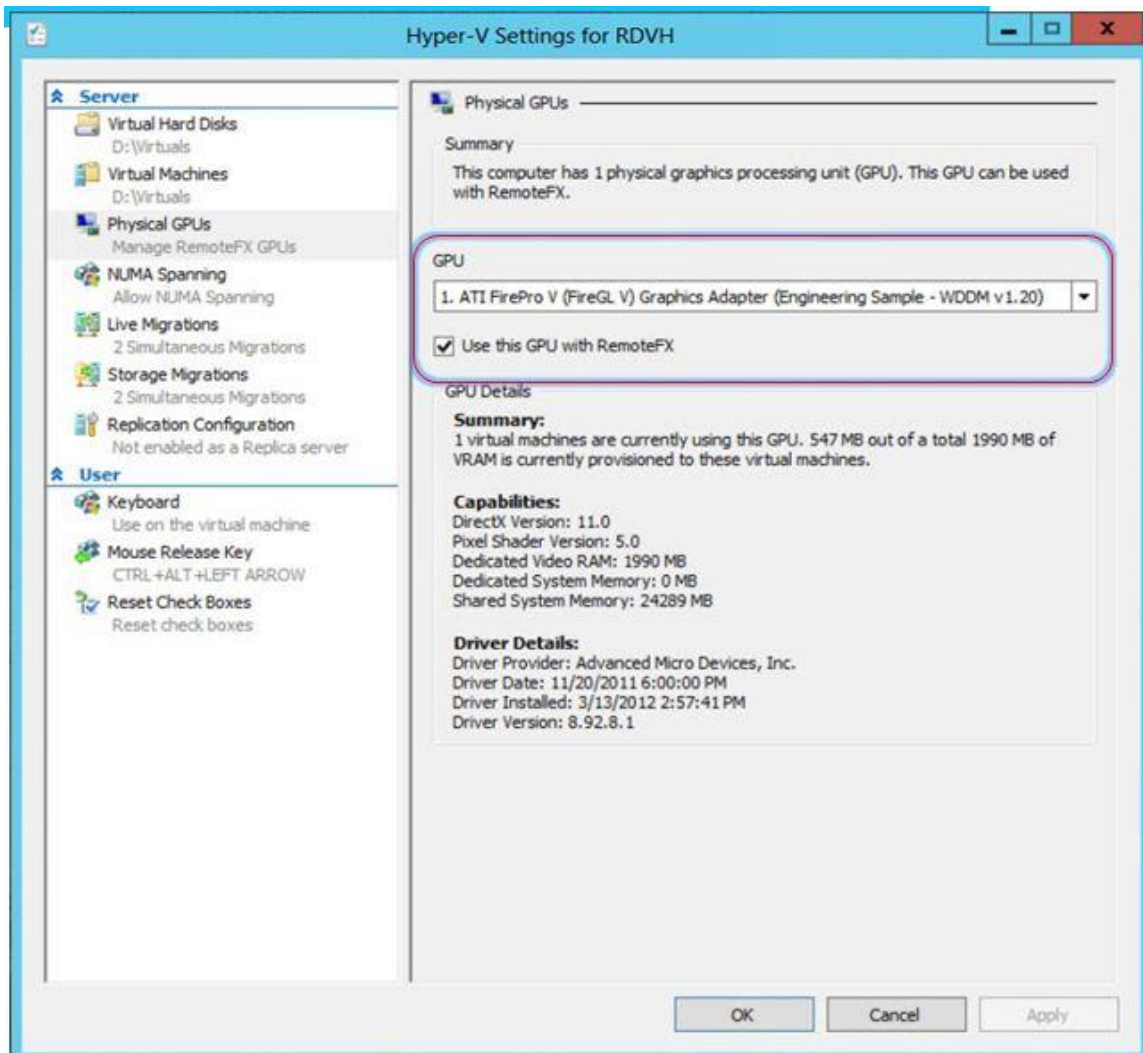


Figure 4. Configuring vGPU for RemoteFX

For more information on RemoteFX requirements and setup, see “Microsoft RemoteFX requirements in Windows Server 2012” at

<http://searchvirtualdesktop.techtarget.com/tip/Microsoft-RemoteFX-requirements-in-Windows-Server-2012>.

Memory allocation

Memory should be 1–4 GB per client. You can use tools such as LogIn VSI (see Resources, below) to model your workload requirements. The Login VSI workloads are:

- Small: 1.5–2 GB
- Medium: 2–3 GB
- Large: 2–4 GB (or more)

If you need more than that, you can get more dedicated RAM. Dynamic memory will handle fluctuating demands for memory within a specified range. For extra-large workloads, consider using blade servers.

Disk size

For tuning purposes, the deciding factors can be summarized based on your requirements. If your applications need to be inside of non-persistent (pooled) client sessions, it will change the disc size. The following factors affect the drive size of the virtual desktop:

- Pooled versus personal VDI:
 - Pooled configurations range from 22 GB to 40 GB.
 - Personal configurations range from 40 GB to 65 GB.
- Virtualization readiness of applications:
 - **Compatibility.** Can the application be virtualized by using RemoteApp or Microsoft Application Virtualization?
 - **Performance.** Are adverse performance hits associated with a virtualized application versus a traditionally installed Windows Installer package? If the application is not virtualized, will it be installed locally to the guest VM?

Disk partitions

Using the default installation routine creates a 350 MB system reserved drive for storing BitLocker Drive Encryption data, but there is no need for BitLocker on VMs. Removing BitLocker eliminates 350 MB of content. There are several methods to prevent creation of the BitLocker partition:

- During operating system installation, use Microsoft Deployment Toolkit (MDT) 2012 Update 1 to build the image.
- Use the **DoNotCreateExtraPartition=YES** rule.
- Use scripted **DISKPART** commands.

Antivirus software

Antivirus software presents several challenges as far as installed agents, latest updates, intrusion detection, and so on. These can all create large performance impacts on logon speed, I/O frequency, and storage area network (SAN) performance. You essentially have two options

- **Run agent live in clients.** This gives you a 10–12 percent increase in disc I/O depending on roles set and how often you update. Although this number may seem insignificant, it becomes a larger issue if you are running many machines.
- **Prescan a reference VM and create exceptions for operating system files.** Doing so makes more sense for a persistent environment, where if you get a virus notification you shut down, reload, and you are done. In a pooled environment, you are likely looking at a different sizing and capacity plan anyway.

For more details on antivirus software in VDI environments, see the BriForum 2012 session on antivirus from Jeroen van de Kamp at

<http://www.brianmadden.com/blogs/videos/archive/2012/08/01/briforum-2012-chicago-new-insights-a-virtual-reality-check-on-anti-virus-for-vdi-and-windows-8-2012-performance.aspx>,

where Microsoft Forefront Protection 2010 was identified as a “clear winner” based on his testing.

Windows 8 service configuration

Many tuning advantages come from properly configuring the Windows 8 services. This chart contains recommendations for optimal configuration.

Service name	Default	Recommended	Details
Application Layer Gateway Service	Manual	Disabled	This service manages mobile broadband (Global System for Mobiles [GSM] and Code Division Multiple Access [CDMA]) data card/embedded module adapters and connections by auto-configuring the networks. Microsoft strongly recommends that this service be kept running for the best user experience of mobile broadband devices.
Background Intelligent Transfer Service	Manual	Disabled	VDI infrastructure is usually connected to fast LAN or WAN links to infrastructure servers hosting data.
BitLocker Drive Encryption Service	Manual (TS)	Disabled	BitLocker is not available for use in a VMs.
Block-Level Backup Engine Service	Manual	Disabled	This service is used to back up data on the client computer; it is not used for VMs.
Bluetooth Support Service	Manual (TS)	Disabled	Bluetooth Wireless not supported from a VM.
Microsoft BranchCache	Manual	Consider	This service caches network content from peers on the local subnet.

Service name	Default	Recommended	Details
Computer Browser	Manual (TS)	Disabled	Maintains an updated list of computers on the network and supplies this list to computers designated as browsers.
Device Association Service	Manual (TS)	Disabled	Enables pairing between the system and wired or wireless devices.
Device Setup Manager	Manual (TS)	Disabled	Enables the detection, download, and installation of device-related software. If this service is disabled, devices may be configured with outdated software and may not work correctly.
Diagnostic Policy Service	Automatic	Disabled	This service enables problem detection, troubleshooting, and resolution for Windows components. If this service is stopped, diagnostics will no longer function.
Diagnostic Service Host	Manual	Disabled	The Diagnostic Policy Service uses the Diagnostic Service Host to host diagnostics that need to run in a Local Service context. If this service is stopped, no diagnostics that depend on it will function.
Diagnostic System Host	Manual	Disabled	The Diagnostic Policy Services uses the Diagnostic System Host to host diagnostics that need to run in a Local System context. If this service is stopped, no diagnostics that depend on it will function.
Distributed Link Tracking Client	Automatic	Consider	Tracks NTFS file system links locally and across the network (but only if the service is also running on the remote system).

Service name	Default	Recommended	Details
Encrypting File System	Manual (TS)	Consider	Provides the core file encryption technology used to store encrypted files on NTFS file system volumes. If this service is stopped or disabled, applications will be unable to access encrypted files.
Extensible Authentication Protocol (EAP)	Manual	Consider	The EAP service provides network authentication in such scenarios as 802.1x wired and wireless networks, virtual private network (VPN), and Network Access Protection (NAP).
Family Safety	Manual	Disabled	This service is a stub for Windows Parental Control functionality that existed in the Windows Vista operating system. It is provided for backward compatibility only.
Fax	Manual	Disabled	Enables you to send and receive faxes, using fax resources available on this computer or on the network.
Function Discovery Resource Publication	Manual	Disabled	Publishes this computer and resources attached to this computer so they can be discovered over the network. If this service is stopped, network resources will no longer be published and will not be discovered by other computers on the network.
File History Service	Manual (TS)	Consider	Protects user files from accidental loss by copying them to a backup location.
Home Group Listener	Manual	Disabled	Used to establish Home Groups; not used with VMs in a corporate environment.

Service name	Default	Recommended	Details
Home Group Provider	Manual (TS)	Disabled	Used to establish Home Groups; not used with VMs in a corporate environment.
Internet Connection Sharing	Disabled	Disabled	Provides network address translation (NAT), addressing, name resolution, and intrusion-prevention services for a home or small office network.
Microsoft Account Sign-In Assistant	Manual (TS)	Consider	Enables user sign-in through Microsoft account identity services. If this service is stopped, users will not be able to log on to the computer with their Microsoft account.
Microsoft iSCSI Initiator Service	Manual	Disabled	Internet SCSI (iSCSI) will not be used on virtual desktops.
Microsoft Software Shadow Copy Provider	Manual	Disabled	Manages software-based volume shadow copies taken by the Volume Shadow Copy service. If this service is stopped, software-based volume shadow copies cannot be managed. If this service is disabled, any services that explicitly depend on it will fail to start.
Network List Service	Manual	Automatic	Identifies the networks to which the computer has connected, collects and stores properties for these networks, and notifies applications when these properties change.
Offline Files	Manual (TS)	Disabled— Requires a Group	The Offline Files service performs maintenance activities on the Offline Files cache, responds to user logon and logoff events, implements the internals of the public application programming interface (API), and

Service name	Default	Recommended	Details
		Policy object (GPO)	dispatches interesting events to those interested in Offline Files activities and changes in cache state.
Optimize Drives	Manual	Disabled	Helps the computer run more efficiently by optimizing files on storage drives.
Sensor Monitoring Service	Manual (TS)	Consider	Monitors various sensors to expose data and adapt to system and user state. If this service is stopped or disabled, the display brightness will not adapt to lighting conditions. Stopping this service may affect other system functionality and features, as well.
Secure Socket Tunneling Protocol Service	Manual	Disabled	This service publishes a machine name using the Peer Name Resolution Protocol. Configuration is managed via the netsh context p2p pnrp peer .
Shell Hardware Detection	Automatic	Disabled	Provides notifications for AutoPlay hardware events.
SNMP Trap	Manual	Disabled	Receives trap messages generated by local or remote Simple Network Management Protocol (SNMP) agents and forwards the messages to SNMP management programs running on this computer. If this service is stopped, SNMP-based programs on this computer will not receive SNMP trap messages. If this service is disabled, any services that explicitly depend on it will fail to start.

Service name	Default	Recommended	Details
SSDP Discovery	Manual	Disabled	Discovers networked devices and services that use the Simple Service Discovery Protocol (SSDP), such as Universal Plug-and-Play (UPnP) devices. It also announces SSDP devices and services running on the local computer. If this service is stopped, SSDP-based devices will not be discovered. If this service is disabled, any services that explicitly depend on it will fail to start.
Telephony	Manual	Disabled	Provides Telephony API support for programs that control telephony devices on the local computer and, through the LAN, on servers that are also running the service.
Themes	Automatic	Consider	Provides user experience theme management.
UPnP Device Host	Manual	Disabled	Allows the computer to host UPnP devices. If this service is stopped, any hosted UPnP devices will stop functioning, and no additional hosted devices can be added. If this service is disabled, any services that explicitly depend on it will fail to start.
Volume Shadow Copy	Manual	Consider	Manages and implements volume shadow copies used for backup and other purposes. If this service is stopped, shadow copies will be unavailable for backup, and the backup may fail. If this service is disabled, any services that explicitly depend on it will fail to start.
Windows Backup	Manual	Disabled	Provides Windows Backup and Restore capabilities.

Service name	Default	Recommended	Details
Windows Color System	Manual	Disabled	The WcsPlugInService service hosts non-Microsoft Windows Color System color device model and gamut map model plug-in modules.
Windows Connect Now–Config Registrar	Manual	Disable	WCNCSVC hosts the Windows Connect Now Configuration, which is Microsoft’s Implementation of the Wi-Fi Protected Setup protocol.
Windows Defender	Automatic (TS)	Consider— Requires a GPO	Helps protect users from malware and other potentially unwanted software.
Windows Error Reporting Service	Manual (TS)	Disabled	Allows errors to be reported when programs stop working or responding and allows existing solutions to be delivered. Also allows logs to be generated for diagnostic and repair services.
Windows Media Player Network Sharing Service	Manual	Disabled	Shares Windows Media Player libraries to other networked players and media devices using UPnP.
Windows Search	Automatic (Delayed)	Consider	Provides content indexing, property caching, and search results for files, email, and other content.
WLAN AutoConfig	Manual	Disabled	The WLANSVC service provides the logic required to configure, discover, connect to, and disconnect from a wireless LAN (WLAN), as defined by Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards.

Service name	Default	Recommended	Details
WWAN AutoConfig	Manual	Disabled	This service manages mobile broadband (GSM and CDMA) data card/embedded module adapters and connections by auto-configuring the networks. Microsoft strongly recommends that this service be kept running for the best user experience of mobile broadband devices.

Windows 8 configurations

You can gain further improvement by configuring Windows 8 to reduce I/O and other overhead.

Task	Effect
Configure event log size and retention.	Set event log sizes to minimum size and configure retention to overwrite when needed, which reduces overhead for event logging (especially in pooled VM scenarios).
Disable hard disk timeouts, increase disk I/O timeout, disable NTFS file system last access timestamp, disable System Restore, disable hibernation, perform a disk cleanup.	Reduce I/O load when Write operations occur, allow longer Write operations, and clean up the disk before running the System Preparation Tool.
Disable unneeded scheduled tasks.	Thirty-six scheduled tasks are associated with disabled services or services not useful in a virtual environment.
Reconfigure boot (quiet boot/no animation), disable User Account Control (UAC) secure desktop prompt, set visuals to a minimum.	Reduce overhead on the vGPU or virtual CPU (vCPU).

Conclusion

The VDI implementation with Windows Server 2012 is a powerful tool for the workplace, allowing you to offer Software as a Service in an environment where people connect on a variety of devices. Although significant performance gains can be made on the server side, the recommendations in this guide allow you to tune the client image in a way that maximizes performance while preserving maintainability and scalability.

Resources

Several non-Microsoft tools can help you monitor and improve your images' performance. This is a partial list of recommended tools.

VDI Optimizer (AutoIT) by Jonathan Bennett

VDI Optimizer (see Figure 5) creates a Microsoft Visual Basic Scripting Edition (VBScript) script that can then be run on the computer to configure the settings as defined. The current script is focused on Windows 7. The last release date was August 2010, and there are no current plans to update to support Windows 8. However, there is a strong correlation to Windows 8, and it may be a good starting point for you to consider your own automation.



Figure 5. VDI Optimizer

For more information, see the Microsoft TechNet article, "List of Resources on Windows 7 Optimization for VDI," at <http://social.technet.microsoft.com/wiki/contents/articles/4495.list-of-resources-on-windows-7-optimization-for-vmi.aspx?wa=signin1.0>.

PFE Windows 8 VDI script

This script configures services, machine settings, and user settings to optimize the computer for Windows 8 VDI (see Figure 6).

```
' // =====
' // Original generated with VDIoptimizer - http://www.autoitscript.com/tools
' // (c)2010 Jonathan Bennett
' //
' // Version:          1.3-win8
' // Last Modified:    9th April 2013
' // Last Modified by: Carl Luberti (MSFT)
' // Contributions by: Jeff Stokes (MSFT)
' // =====
```

Figure 6. PFE Windows 8 VDI script

For more information, see the blog, “Hot off the presses, get it now, the Windows 8 VDI optimization script, courtesy of PFE!” at http://blogs.technet.com/b/jeff_stokes/archive/2013/04/09/hot-off-the-presses-get-it-now-the-windows-8-vdi-optimization-script-courtesy-of-pfe.aspx.

Windows Performance Recorder

You access Windows Performance Recorder from the command line by running the Windows Performance Toolkit (XPerf). The tool monitors Windows client performance for the following scenarios:

- Performance scenarios
- Steady-state performance tracking
- System boot tracing
- Fast startup
- Shutdown
- Reboot cycle
- Standby/resume
- Hibernate/resume

Figure 7 shows the available options.

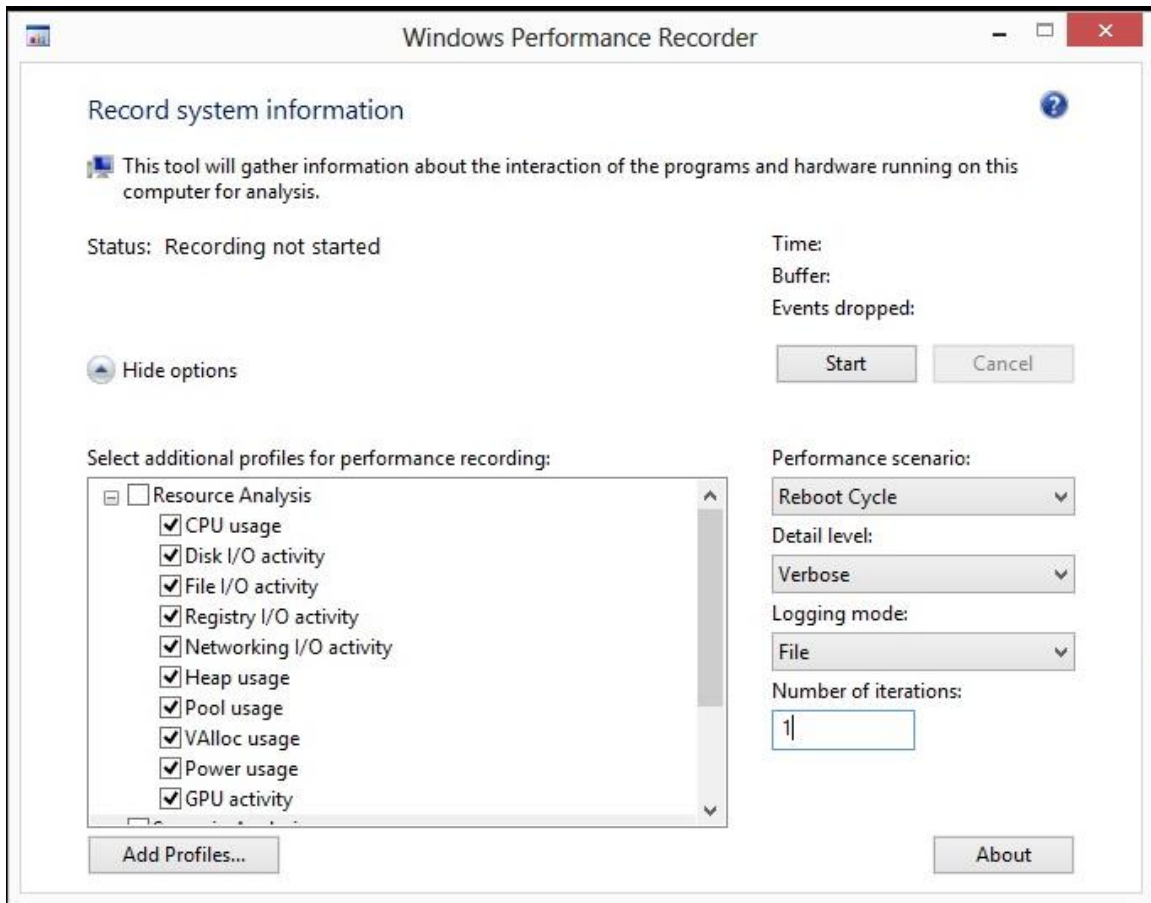


Figure 7. Windows Performance Recorder options

For more information, go to <http://msdn.microsoft.com/en-us/library/hh162977.aspx>. Also see the blog, “XPerf for the layman,” at http://blogs.technet.com/b/jeff_stokes/archive/2013/03/16/xperf-for-the-layman-performance-analysis-unchained-windows-assessment-toolkit-revealed.aspx.

Windows Performance Analyzer

Windows Performance Analyzer lets you review and analyze the performance logs that the Windows Performance Recorder collects. Figure 8 provides an example.

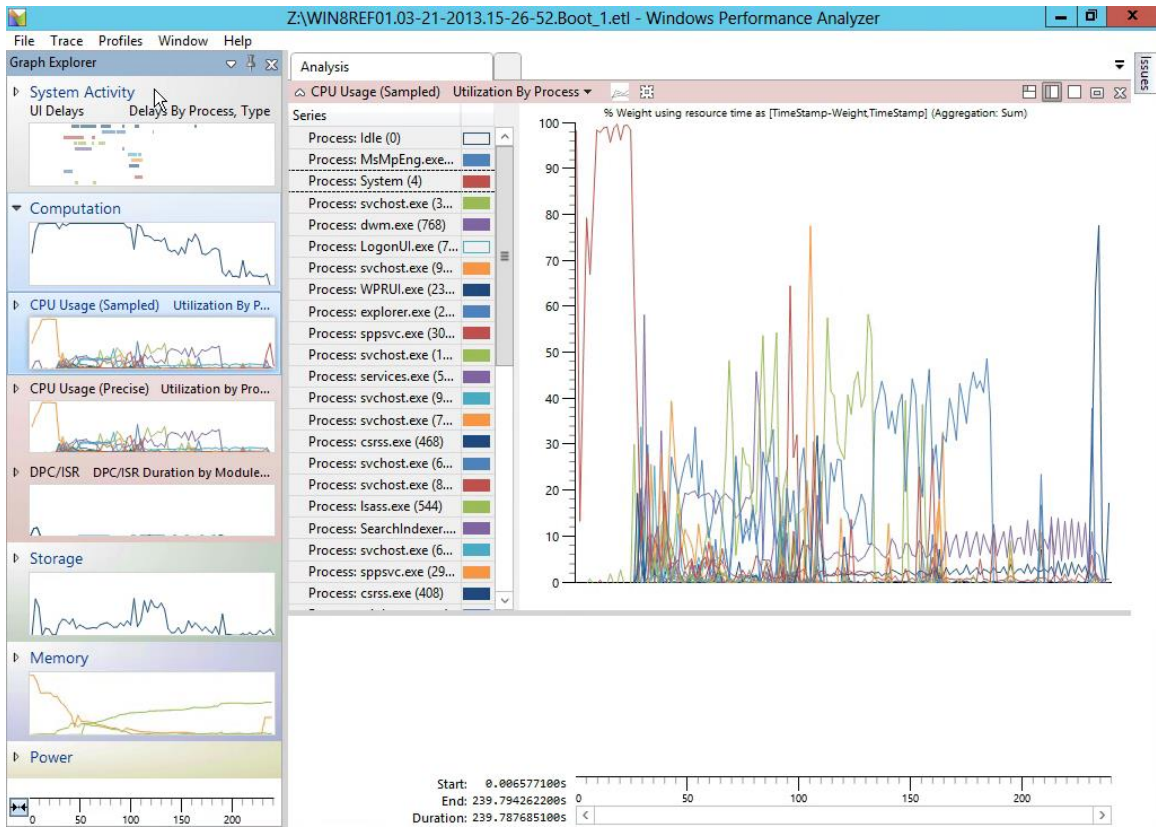


Figure 8. Windows Performance Analyzer results

Microsoft Assessment and Planning Toolkit v8

Although good for collecting data, the tool does not really help you determine which VDI solution is best for you. The toolkit performs the following tasks:

- Hardware and software inventory
- Some performance assessment
- Limited value for VDI planning

Recommended performance tools

Other tools that may help you fine-tune your implementation are provided here:

- **Login VSI.** Login VSI creates workloads to help you understand peak capacity and disk storms. After you have created an environment, you run the tool against it to test your design.
- **Liquidware Labs Stratusphere FIT.** Stratusphere FIT helps you determine good VDI candidates as well as good application virtualization candidates.
- **Lakeside Software SysTrack.** This tool manages and reports on virtualized desktop environments.