VMware Horizon with View Optimization Guide for Windows 7 and Windows 8

WHITE PAPER
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About This Guide

This guide provides guidelines for configuring a standard Windows image for use in a VMware® Horizon™ with View™ infrastructure. It gives administrators the information necessary to create a standard Windows image, whether by leveraging the Microsoft Deployment Toolkit (MDT) or by utilizing a script-based approach to optimize traditionally installed Windows virtual machines. The recommended configuration settings optimize the operating system to enhance overall scalability and performance in a View implementation.

The procedures described in this guide apply to the Windows 7 and Windows 8 operating systems. Scripts and task sequences to optimize both operating systems are included.

View 5.2 supports Microsoft Windows 8 and the Metro style user interface. Windows 8 offers more options for security and personalization as well as new built-in desktop virtualization capabilities. The new Group Policy templates for Windows 8 enable more control and consistency for desktop users and greatly enhance the View virtual desktop experience.

View also supports basic gestures in a Horizon Client running on Intel-based Surface tablets. In Windows 8 there is now a services state change where only the necessary services are running at system startup, with most services marked as Manual (Triggered Start). In this scenario, services are started only when the user accesses a component that requires the triggered service to be started. This improves Windows performance.

Organization

This guide is organized into distinct sections:

About This Guide discusses the overall process of optimization and the optimization aids provided.

Creating an Optimized Windows Image gives step-by-step procedural guidance for both methods of optimization, MDT and script-based.

Windows 7 and Windows 8 OS Customizations provides background information on the specific optimizations and techniques used by the optimization aids.

Managing View Desktops offers guidance and considerations for optimizing the environmental aspects on an ongoing basis.

Additional reference material, files, and other useful items are located in the Appendixes, and two especially useful scripts are attached to the PDF file.
Process Overview

You can accomplish the goal of building your standard image and applying desired customizations in a number of ways. This guide provides two methods for IT organizations to utilize, each requiring a different level of effort and yielding different benefits. Figure 1 illustrates the workflow of both methods.

![Windows 7 and 8 Build Process for View Using a Traditional or MBT-Based Approach](image)

**Figure 1:** View Virtual Machine Workflow Using Traditional and MDT Build Process

**Traditional Install Method**

You can optimize a traditional install with a minimum set of tools. It takes very little effort to create a standardized and optimized process for customizing a Windows 7 or Windows 8 virtual machine. Administrators create the virtual machine with the specified parameters, load the operating system from media, and then use a command script for the appropriate operating system to apply optimizations. The `Commands.bat` script, attached to this guide, is distributed as a choice of `CommandsPersonaManagement.txt` or `CommandsNoPersonaManagement.txt` (see Appendix B).

**Microsoft Deployment Toolkit Method**

The Microsoft Deployment Toolkit (MDT) provides a framework for building and maintaining a defined process that is modular and applicable to both physical and virtual desktops. The benefits of this solution are derived from the prescriptive guidance and repeatable processes included in the tool for building and maintaining standardized images. While you may invest more time up front when using this method, there are long-term advantages. In many cases, an IT organization may already use some of the tools and processes described. This method involves leveraging the MDT and Windows Automated Installation Kit (WAIK) to create a standard image-build and customization process that leverages a robust task sequence engine. You can use the MDT approach to automate application installation, manage driver injection into different operating system versions, and use a GUI to create system builds and customize events.
Optimization Aids

This guide provides two ways to optimize the Windows image. As shown in Figure 1, you can leverage a script file or the MDT to implement the customizations. While these optimization aids contain recommended configurations, each IT organization should investigate and evaluate the benefits—there is sometimes a trade-off between productivity and optimization. Appendix A lists all the optimizations, using an asterisk (**) to highlight discretionary changes. You should review these for applicability to your organization’s specific use cases.

Commands.bat
Commands.bat is a script file that can be executed manually or by using an automated scripting mechanism. The script utilizes standard operating system mechanisms to manipulate the registry using Registration Entry (REG) syntax; adjust services using PowerShell; and optimize other miscellaneous items, such as Scheduled Tasks (see Appendix B.) The script is distributed as a choice of CommandsPersonaManagement.txt or CommandsNoPersonaManagement.txt, included as attachments to this guide for both Windows 7 and Windows 8.

To save the commands text file, go to the Adobe Reader View menu, select Show/Hide > Navigation Panes > Attachments, and then Save. After saving, rename the file to Commands.bat.

If you are implementing View Persona Management, or plan to use VMware Mirage™ to manage the desktop image, use the CommandsPersonaManagement.txt file. If you are not implementing Persona Management, use the CommandsNoPersonaManagement.txt file included for both operating systems.

Caution: Open the script on a Windows machine. Use a script editor or WordPad to avoid possible line-break issues with Notepad.

If you have already optimized an image designed for use without Persona Management, and you want to deploy Persona Management or Mirage image management on that desktop image, create a BAT file on your virtual machine template from the supplied CommandsDesktopsReadyForPersonaManagement.txt files. Run this script as an administrator (right-click Run as Administrator). Reboot the computer when the BAT file completes (See Appendix C).

Microsoft Deployment Toolkit and TS.xml
The TS.xml file is used by the MDT task sequence engine to provide a sequence of tasks to execute when deploying the Windows image. You can use the TS.xml file to perform tasks such as joining a domain, stopping or disabling a service, and installing applications or packages. Replacing the default TS.xml file with the one provided with this guide provides a GUI interface for viewing and editing the recommended customizations. The customizations included in the provided TS.xml file are equivalent to the Commands.bat script file described in Commands.bat.

The TS.xml file is referenced in Appendix D and included in this guide as an attachment called MDT 2012 Task Sequences Files.zip.txt. This ZIP file contains a set of customized TS.xml files. To save this set of TS.xml files, go to the Adobe Reader View menu, select Show/Hide > Navigation Panes > Attachments, select the file, and click Save. After the MDT 2012 Task Sequence Files.zip.txt file is saved to the machine, change the extension to .zip. Then unzip the file and use the appropriate ts.xml file.

Note: If you are using Windows and have file extensions turned off, the .txt suffix does not appear in the downloaded file. Open a command window and navigate to the directory where you saved the .zip.txt file from Adobe Reader. Type

move “MDT 2012 Task Sequence Files.zip.txt” “MDT 2012 Task Sequence Files.zip”
Creating an Optimized Windows Image

The procedures for creating an optimized Windows image are described in the following sections.

Administrative Rights for Users

The methods and optimization aids provided in this guide customize the parent virtual machine that end users’ desktops are based on. End users can undo these optimizations if they have administrative rights to start services and modify the registry.

Note: It is important to use Group Policy Objects (GPOs) to reinforce these settings and control desktops where end users have administrative rights.

Image Version Tracking and Managing Windows Updates

Optimizing the operating system configuration is an iterative process. As images progress through the normal life cycle, it can become difficult to determine which image configuration and subsequent optimizations a particular View guest virtual machine is leveraging. As the VMware View Composer™ Recompose and Refresh updates View desktops, the virtual machines are linked to parent virtual machines and snapshots. Careful management of snapshot names enables some tracking ability; but you can also use an identifier in the operating system for identification, using the script or system management processes. For this reason, you should add an additional registry setting to track the version of an image, as well as any other helpful information your organization may find useful, such as date, type, and author. The modifications provided in the TS.xml and Commands.bat files include a marker key for this purpose in HKEY_Local_Machine\Software\Image.

Applying Windows updates is an important step in the process to verify that your parent virtual machine always stays as up to date as possible; however, the Windows Update service should be set to Disabled by default to avoid pulling updates down to virtual machines in your View environment after they are deployed. The custom task sequence provided with this document applies all applicable Windows updates that are available at the time the target virtual machine is built. It subsequently disables the Windows Update Service to prevent your View virtual machines from downloading updates from Microsoft. It is considered a best practice to manage your updates for your virtual machines on the parent virtual machine and recompose that virtual machine to update all linked clones. To apply updates manually to your parent virtual machine, re-enable the Windows Update Service, then run Windows updates or apply updates leveraging your enterprise patch-management process.
Creating the Target Virtual Machine

The initial virtual machine parameters create a virtual hardware profile, which is used for subsequent virtual machines. You can convert an existing physical or virtual machine using VMware Converter, but it is best to create a new virtual machine using the VMware vSphere® Client. Administrators can use the built-in VMware vCenter™ wizard to create a new virtual machine or select the parameters on their own. Specific recommendations are listed in Table 1 and described in the paragraphs that follow.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest Operating System</td>
<td>Microsoft Windows 7 (32-bit or 64-bit)</td>
</tr>
<tr>
<td>SCSI Controller</td>
<td>LSI Logic SAS</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Disks for templates or parent virtual machines can utilize Thin Provisioning.</td>
</tr>
<tr>
<td>Video Card</td>
<td>No need to specify as settings are provided by VMware View Manager™.</td>
</tr>
<tr>
<td>Floppy</td>
<td>Remove the floppy drive</td>
</tr>
<tr>
<td>CD/DVD</td>
<td>Set to client device used for VMware Tools install, Windows 7 ISO, or Windows PE boot ISO with MDT.</td>
</tr>
<tr>
<td>NIC Adapter Type</td>
<td>VMXNET 3. Apply the Microsoft hotfix patch (see View Administration).</td>
</tr>
<tr>
<td>Memory Specifications</td>
<td>32-bit, 1 – 3GB (no more than 3GB)</td>
</tr>
<tr>
<td></td>
<td>64-bit, 1 – 4GB (depends on use case, such as Kiosk, Task Worker, or Knowledge Worker)</td>
</tr>
<tr>
<td>BIOS – Disable Ports</td>
<td>Go to the Options tab of Virtual Machine Properties and select force entry into BIOS to disable unnecessary LPT and COM ports.</td>
</tr>
</tbody>
</table>

Table 1: Virtual Machine Parameters

Virtual Machine Parameters

The parameters are explained in further detail in the following paragraphs:

**Disk Controller**

VMware recommends using the LSI Logic SAS controller for Windows 7 and Windows 8 virtual machines.

**NIC Adapter Type**

The Network Interface Card (NIC) needs to be VMXNET 3. Failure to set the proper NIC type prevents Windows Preinstallation Environment (Windows PE) from correctly acquiring an IP address and gaining access to the network for resources required during imaging. The traditional install method uses the VMXNET 3 virtual network adapter to provide the most efficient networking stack for Windows 7 and Windows 8. Apply the Windows hotfix (see View Administration).
Video Parameters
Setting specific video parameters of the video card is not necessary in the virtual machine properties. Leave the video card settings at Auto-detect video settings. The values used for video memory are set and managed by VMware View Manager.

Memory Specifications
For x86 Windows 7 and 8 operating systems, no more than 3GB of memory should ever be allocated. Memory specifications are dependent upon the supporting virtualization infrastructure. However, you should provide at least 1GB of memory to the standard virtual machine template leveraged for Windows 7 and 8. An ideal allocation is 2GB of memory, providing for more bursting of memory when needed for heavier end-user applications. This setting is completely dependent upon the environment and use case scenarios. Sufficient use case mappings should be done to determine the optimum memory settings for your organization.

Disable HotAdd/HotPlug
If HotAdd/HotPlug is enabled for the base image virtual machine (the default), the end user can eject critical components, such as the NIC and SCSI controller. To prevent this from happening, disable HotAdd/HotPlug for the base image virtual machine by setting the `devices.hotplug` parameter for that virtual machine to `false`, either through the vSphere Client or by directly editing the virtual machine’s `.vmx` file. For details on using either of these two methods, see the VMware Knowledge Base article, Disabling the HotAdd/HotPlug capability in ESX/ESXi 4.x and ESXi 5.0 virtual machines (KB 1012225).

Choosing Your Windows Installation Method
At this point, you should determine whether to do a traditional installation of Windows by mounting the media to the virtual machine (see Traditional Install Method) or to utilize the MDT (see Using the Microsoft Deployment Toolkit to Optimize Windows) to install Windows into the target virtual machine.

Why Use the Microsoft Deployment Toolkit 2012 Update 1?
The Microsoft Deployment Kit (MDT) can best be described as a collection of scripts and processes that supports a defined framework to create a standard, repeatable, and flexible image for an organization. This approach creates a prescriptive, standardized build process that is:

- **Flexible** – You can enable, disable, or build on logic when certain commands are executed, depending upon existing scenarios.
- **Easy** – The Task Sequencer provides pre-built components for adding reboots, partitioning, command lines, and other logic in an intuitive GUI interface.
- **Updatable** – As drivers, applications, and other updates are needed within the standard build process, you can update the Task Sequencer in a point-and-click configuration for all new image builds in one interface.
- **Cross-platform** – You can leverage the same MDT framework for both virtual and physical machine builds.

**Note:** For details on how to use the MDT, see Using the Microsoft Deployment Toolkit to Optimize Windows.

Traditional Install of Windows Operating Systems
The following section outlines the process for a traditional install of Windows using an ISO image mounted on a datastore accessible by the target virtual machine. After the installation of the operating system is complete, `Commands.bat` is used to optimize the configuration. Installation of applications and the View Agent can be performed either automatically or manually.

Install Guest OS from Media
1. Verify that the CD/ROM device is set to Connect at Power on and directed to the Windows ISO image.
2. Connect to the virtual machine console and answer the prompts for the operating system Setup Wizard.
3. Restart as necessary.
4. Remove any unnecessary components, such as Tablet PC components, from the operating system.
Update Windows and Install VMware Tools
1. Once the operating system installation is complete, perform Windows Update as necessary.
2. From the virtual machine console menu or from VMware vCenter, initiate and complete the installation of VMware Tools.
3. Restart as necessary.
4. Execute the optimization file from the desktop after the installation of the operating system has been completed.

Install Applications and VMware View Agent
1. Install applications as needed in the base image.
2. You can either join the Active Directory domain or not to install applications. If you do not join the domain, mount the application installers on a protected share outside the domain so that you can load them while not in the domain.
3. Install the VMware View Agent manually or utilize a silent installation command as provided, substituting the appropriate values, such as the following:
   
   ```
   VMware-viewagent.exe /s /v"/qn VDM_VC_MANAGED_AGENT=1 ADDLOCAL=ALL"
   ```

4. Restart as necessary.
5. In vCenter, edit the properties of the virtual machine to disconnect the installation media and remove the CD/DVD drive from the virtual machine.

For more information on how to install the VMware View Agent, see Install View Agent Silently in View Administration.

Optimize the Image with Commands.bat
1. Use the Adobe attachment panel to save and copy the appropriate script to the Commands.bat file.
   a. Use the CommandsNoPersonaManagement.txt file for pools not using Persona Management.
   b. Use the CommandsPersonaManagement.txt file for pools using Persona Management.
   c. Use the CommandsDesktopsReadyForPersonaManagement.txt file to modify a base image already optimized for no Persona Management so it can be used with Persona Management.

   **Caution:** Open the script on a Windows machine. Use a script editor or WordPad to avoid possible line-break issues with Notepad.

2. Open a command prompt window with administrative privileges, execute the Commands.bat file, and monitor for errors.

3. Restart to affect the changes in Windows services.

4. Go to Using the Target Virtual Machine to Create View Desktops.

Using the Microsoft Deployment Toolkit to Optimize Windows
The MDT 2012 Update 1 is a free toolkit provided by Microsoft to organizations wanting to build and deploy a standard image in a Lite-Touch process. The toolkit enables organizations to standardize and automate the process of creating golden master images.

Using Windows System Image Manager with the MDT
Some organizations may already be leveraging the Windows System Image Manager to customize their Windows images with the unattend.xml file. This is most often done through the MDT framework and can be integrated into this process. Some of the settings referenced in this document can be accommodated through that tool and applied directly to unattend.xml if desired. For more information on the features and capabilities of WSIM, see the Windows System Image Manager Technical Reference.
Prepare the Microsoft Deployment Toolkit 2012 Update 1 Environment

Preparation of an MDT environment may require the creation of a separate virtual machine that utilizes the MDT, Windows Deployment Services (WDS), Windows Automated Installation Kit (WAIK), and the set of customized TS.xml files included with this guide. This section covers the MDT installation, creating the Deployment Share, staging the OS media, and injecting drivers from VMware Tools into the image. The deployment share is used for storing all the standard configurations and customizations leveraged for building a Windows 7 or Windows 8 image. This process was tested on both MDT 2010 and MDT 2012 with Update 1.

1. Create a separate virtual machine for the MDT, unless an MDT environment already exists.
2. Review the system requirements, and verify that the system being leveraged meets the minimum. See the Microsoft Download Center for Microsoft Deployment Toolkit (MDT) 2012 Update 1.

Note: Check the Solution Accelerators site for the latest links and information on MDT.

Download and install the Windows Automated Installation Kit, latest PowerShell version, and the appropriate version of the MDT for your operating system (x86, x64) from the link above.

Note: Pay close attention to the installation directory for MDT during the install. Verify that it is on a drive with sufficient space to hold images, source media, and any line of business applications needed for your standard image.

3. Once the installation for MDT is complete, launch the Workbench by going to the Start Menu and navigating to Start > All Programs > Microsoft Deployment Toolkit and selecting Deployment Workbench.
4. Validate that all required components are installed by navigating to Information Center > Components in the Deployment Workbench and ensuring that any item marked with Required in the Status column is showing under the Installed section.

Note: You can download and install components from inside the Workbench if not already installed.

5. Navigate to the node Deployment Shares in the Deployment Workbench, right-click and select New Deployment Share.
6. Name the Deployment Share, for example, MDS1.
7. You can leverage defaults for this wizard, but pay close attention to Deployment Share Path to verify that you are placing your source files in a location with sufficient space. If you selected an OS drive for the installation of the MDT, select a data volume (non-boot partition) during this step to store deployment data.
8. Select the Deployment Share you just created, and click Properties. On the Rules tab, add or edit the following lines, and click Apply.

These settings streamline the process of building the target virtual machine.

SkipCapture=Yes
SkipUserData=Yes
SkipBitLocker=Yes
DoNotCreateExtraPartition=Yes

This line prevents adding the 100–300MB system partition for BitLocker.
Staging OS Media
This section describes the process of importing Volume License source media for Windows. In order to build the initial Windows image, source media needs to be obtained and imported into the Deployment Workbench.

1. To import Volume License media for Windows 7 or Windows 8, navigate to Deployment Shares > MDT Deployment Share > Operating Systems, right-click Operating Systems, and select Import Operating System.

2. Select Full set of source files, and click Next.

3. Mount the Windows 7 or Windows 8 ISO to the MDT virtual machine, or point to a network location that houses the extracted Windows source files.

4. The media are validated on import to verify that files at the root directory represent an install source for the Windows operating system files.

5. You can select Move the files to the deployment share instead of copying them.

   This is useful if you are leveraging a virtual machine for your MDT server and want to avoid copying data, because moves are instantaneous, while copying can take several minutes. Select Next to continue.

6. The destination directory is the directory to be created under the Deployment Share\Operating Systems directory.

7. Name the directory, for instance OS-Win8forView or OS-Win7forView, and select Next on the remaining screens to finish the import.

Importing Drivers into the Workbench to Support VMware Virtual Machines
To successfully connect to the network and see storage when booting to Windows PE, you may need to import NIC and storage drivers into the workbench. After drivers are imported, they are injected into the Windows PE boot media when the Deployment Share is updated (discussed in step 12 of Create a Custom Task Sequence with TS.xml below).

1. For vSphere 5.0 and later versions, locate the drivers by browsing to the C:\Windows\System32\DriverStore\FileRepository directory on an existing Windows 7 or Server 2008 virtual machine installed with VMware Tools.

2. From the File Repository directory, locate and copy the vm... driver directories (especially the network directories, vmxnet3\ndis6.inf _x86 or x64...) to a location that can be accessed from the virtual machine running MDT.

3. In the Deployment Workbench, navigate to Deployment Shares > MDT Deployment Share > Out-of-Box Drivers. Right-click Out-of-Box Drivers, and select Import Drivers.

4. Point to the directory containing the VMware drivers, and select Next to import the drivers into the Deployment Workbench.

Note: This process automatically interrogates the .inf and .cab files to locate and import the appropriate driver files.
Create a Custom Task Sequence with TS.xml

This section discusses leveraging the MDT to create a task sequence. A task sequence is a series of commands combined to create an automated process, directly from the Deployment Workbench interface, that is easy to update as the environment changes. A task sequence also removes much of the manual effort required to generate a customized image for a View environment. The following steps guide you through the process of creating a task sequence for a Windows operating system image. They utilize the set of customized TS.xml files included in this document to import a customized task sequence that optimizes this operating system image for View environments.

The process described below is identical for Windows 7 and Windows 8 operating system images.

1. In the Deployment Workbench, navigate to Deployment Shares > MDT Deployment Share > Task Sequences.

2. Right-click Task Sequences, and select New Task Sequence.

3. Enter a task sequence ID. This ID must be unique. It determines the directory name that is created with customizations in the \MDT\MDS1\control folder. For example, using Win8forView as the task sequence ID creates the \MDT\MDS1\control\Win8forView directory.

4. Enter a task sequence name, then click Next.
   
   This name must be unique. It is the name that shows up in a list of task sequences to choose from when you build the golden image. For example, use Win8forView as the task sequence name.

5. Select Standard Client Task Sequence, and click Next.

6. Select the operating system that you imported, as described in Staging OS Media, then click Next.

7. Answer the remaining questions, and complete the task sequence definition.

8. Replace the default TS.xml (created in the Win8forView custom task sequence directory) with the customized TS.xml attached to this guide.

   The TS.xml file is referenced in Appendix D and included in this guide as an attachment called MDT 2012 Task Sequences Files.zip.txt. This ZIP file contains a set of customized TS.xml files. To save this set of TS.xml files, go to the Adobe Reader View menu, select Show/Hide > Navigation Panes > Attachments, select the file, and click Save. After the MDT 2012 Task Sequence Files.zip.txt file is saved to the machine, change the extension to .zip. Then unzip the file and use the appropriate ts.xml file.

   Note: If you are using Windows and have file extensions turned off, the .txt suffix does not appear in the downloaded file. Open a command window and navigate to the directory where you saved the .zip.txt file from Adobe Reader. Type

   ```
   move “MDT 2012 Task Sequence Files.zip.txt” “MDT 2012 Task Sequence Files.zip”
   ```

   Move the customized TS.xml to the correct location, such as \MDT\MDS1\control\Win8forView.

9. Return to the Deployment Workbench, select the Task Sequence, and right-click to see the properties.

10. Select the Task Sequence tab (this generates an error). Click OK, then navigate to Install > Install Operating System, and set Operating System to Install to the imported OS media referenced in Staging OS Media.

11. Verify that the Deployment Share is updated.

   This step generates the boot image to be used for booting to Windows PE and initiating the OS build. To update the Deployment Share, navigate to Deployment Shares > MDT Deployment Share, right-click Deployment Share, and select Update Deployment Share.

12. Click Next twice to start the process of updating the Deployment Share.
Customize the Win8forView Task Sequence (Optional)
This section discusses the optional process of implementing your own configuration changes directly in the MDT Task Sequencer. It lets you apply customizations to the registry, services, and applications programmatically to a Windows 7 or Windows 8 image.

The Task Sequencer also lets you apply changes to configurations that customize HKEY Current User (HKCU) and HKEY Local Machine (HKLM) settings and those service states that need to be disabled. The set of TS.xml files provided with this guide creates a starting point for customizations.

1. In the Deployment Workbench, navigate to Deployment Shares > MDT Deployment Share > Task Sequences, right-click Task Sequences, and select Win8ForView.
2. Right-click Task Sequence to modify in the right-hand pane, and select Properties.
3. Select any of the recommended customizations, and enable, disable, or change the settings by editing the Properties tab. You can also add tasks or settings that are particular to your environment to the appropriate phase.

   These changes are written to the TS.xml file and become part of the standardized build process.
4. You can add a custom task, using the Task Sequence editor to navigate to the State Restore > Custom Tasks section. Highlight Custom Tasks, click Add, and navigate to Add > General > Run Command Line.

   This option provides the ability to run command lines during OS installation.

Installing Applications with the Microsoft Deployment Toolkit
Whether to include software packages into a standard image depends upon the organizational need and strategy for application deployment and management. It may be beneficial to create a custom image with the packages already installed into the image. The MDT can accommodate existing packages that have been created within your organization and enable them to be deployed, using a task sequence, to a standard image. Ideally, these packages are silently deployable and created leveraging Microsoft Installer Package (MSI) technology in cases where HKCU application-specific settings need to be included.

The MDT provides the ability to deploy software to a target system during OS deployment as long the installation supports silent switches. The process detailed below adds VMware Tools and VMware View Agent as applications to be used later by a task sequence for automated installation.

The order in which you add applications is important—the task sequence installs them in that order by default. VMware Tools must be added first in order for the View Agent to be installed correctly.

Installing a New Application
1. In the Deployment Workbench, navigate to Deployment Shares > MDT Deployment Share > Applications. Right-click Applications, and select New Application.
2. Select Application with source files, and click Next.
3. Provide details about the VMware Tools, and click Next.

   Publisher: VMware
   Application Name: VMware Tools
   Version: v9.0.0 (Use the current version number)
   Language: English
4. Select your source directory by mounting the Windows.ISO image to the MDT virtual machine.
5. Mount the Windows.ISO image by browsing the Datastores to `\vmimages\tools-isoimages`, and click Connected.

6. Select the root of the drive where Windows.ISO is mounted.

7. Specify the name of the directory, such as **VMwareTools**, to create in your Deployment Share.

8. Specify the command line, and click **Next**.
   
   For vSphere versions before 5.0, use the following command:
   ```
   msiexec /i “VMware Tools.msi” /qn /norestart
   ```

   For vSphere 5.0 and later versions, use this command instead:
   ```
   Setup.exe /S /v”/qn REBOOT=R ADDLOCAL=ALL REMOVE=Hgfs”
   ```

9. Check **Reboot the computer** after installing this application.

10. Click **Next**, and **Finish** to complete the process.

11. Select the **VMware View Tools** application, right-click to view **Properties**, select the **Details** tab, and place a check on **Reboot the computer after installing this application**.

### Adding the VMware View Agent

Follow a similar process to add the VMware View Agent application.

1. In the Deployment Workbench, navigate to **Deployment Shares > MDT Deployment Share > Applications**, right-click **Applications** and select **New Application**.

2. Select **Application with source files**, and click **Next**.

3. Provide details about the VMware View Agent application, and click **Next**.
   
   - **Publisher**: VMware
   - **Application Name**: View Agent
   - **Version**: (Current version number)
   - **Language**: English

4. Select your source directory, and click **Next**.

5. Browse to the location of the VMware View Agent application.

6. Specify the name of the directory, such as **VMwareViewAgent52**, to create in your Deployment Share.

7. Specify the command line, for instance:
   ```
   VMware-viewagent-BUILDXXXXX.exe /s /v”/qn VDM_VC_MANAGED_AGENT=1”
   ```

8. Click **Next** to complete the process.

9. Select the **VMware View Agent** application.

10. Right-click to view **Properties**, select the **Details** tab, and check **Reboot the computer after installing this application**.

For more information on how to install the VMware View Agent, see *Install View Agent Silently* in View Administration.
Deploying the Win8 for View OS Instance into the Target Virtual Machine

When the Deployment Share has been updated and the task sequence for the build has been prepared, deploy the OS instance into the target virtual machine and apply the optimizations.

1. From the MDT virtual machine, copy the appropriate Lite-Touch PE ISO (x86 or x64) from the deployment share (`D:\DeploymentShare\Boot`) to a datastore that can be utilized by the target virtual machine.
2. From the target virtual machine created in the Creating an Optimized Windows Image section, modify the CD/DVD properties to locate and connect at power on the appropriate platform Lite-Touch PE boot CD.
3. Boot your virtual machine from the bootable media selected above.
4. Select Run the Deployment Wizard, enter credentials to connect to the Microsoft Deployment Share, and then press Enter.
5. Select the Win8 for View task sequence, and click Next.
6. Enter Product Key information.
7. Specify a computer name, and click Next.
8. Select Join a Workgroup. VMware View Composer or vCenter customization will join the virtual machine to the domain at a later time.
9. Click Next on Language and other preferences.
   a. Select Time Zone, and click Next.
   b. Click to select the VMware Tools and View Agent applications from the Application Install window.
10. Enter Administrator Password to be used for login after restart.
11. Click Next to begin the process of installing the operating system.
   The virtual machine restarts as necessary and provides visual updates as it progresses through the various stages.
12. Right-click the target virtual machine in vCenter.
13. Under the Guest submenu, install VMware Tools, then shut down the virtual machine.
14. In vCenter, edit the properties of the virtual machine.
15. Disconnect the WinPE bootable ISO, and remove the CD/DVD drive from the virtual machine.

Using the Target Virtual Machine to Create View Desktops

At this point, the target virtual machine is an optimized Windows 7 or Windows 8 installation that is ready to be used in the View environment. When using this image for full- or linked-clone pools in View, you need to join the virtual machine to the target domain and customize the operating system to generate a unique instance for each user. You can use the Microsoft System Preparation Tool (Sysprep), VMware vCenter customizations settings, or the VMware View Manager QuickPrep tool.

Preparation of the Parent Virtual Machine

To use this virtual machine as a parent virtual machine for full clones, run `ipconfig/release`, power down the virtual machine, and convert it to a template. You can then use View Manager to select this virtual machine as the parent virtual machine for a full-clone desktop pool.

To use the target virtual machine as a parent virtual machine for linked clone pools, run `ipconfig/release`, power down the virtual machine, and create a snapshot. For linked clone-based pools, select the parent virtual machine and the specific snapshot to use for creating or recomposing desktop pools.

See View Administration for details on preparing the parent virtual machine for the creation of desktop pools.
Windows 7 and Windows 8 OS Customizations

The following modifications are provided as recommendations for how to optimize the configuration of the Windows 7 or Windows 8 operating systems in a View desktop infrastructure. Appendix A provides a complete reference of the recommended customizations and lists the methods available for implementation (GPO, registry, service, command line).

If you apply customizations to the master image, they are persistent only if users cannot change them. If individual users have administrative rights, they can override these customizations. To preserve your customizations, modify the desktops by GPO so that the customizations are enforced.

Windows 7 and Windows 8 Service Modifications

Table 2 outlines the recommended state of services for Windows 7 and Windows 8 virtual machines. Services are common to both operating systems except where noted. Beginning with Windows 8, most unneeded services are in a manual (Triggered Start) state. Even if a service is configured as manual by default, you should still disable the service to avoid any potential issues. You can disable all of these services in your initial image before capturing.

Analyze each service for applicability in your corporate environment. Some Windows 7 and Windows 8 services detailed below, such as Windows 7 Themes, may actually be desired and left at default values.

Discretionary changes are marked with an asterisk (“*”). Non-applicable services for Windows 8 are designated not applicable under Comments.

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>NAME</th>
<th>DEFAULT</th>
<th>STATE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Experience Lookup Service</td>
<td>AeLookupSvc</td>
<td>Manual Win8 Manual (Triggered Start)</td>
<td>Disable</td>
<td>Automatically applies software updates to programs to make sure that they run on newly released service packs.</td>
</tr>
<tr>
<td>*Background Intelligent Transfer Service</td>
<td>bits</td>
<td>Manual</td>
<td>Disable</td>
<td>Transfers files in the background using idle network bandwidth. If the service is disabled, Windows Update and MSN Explorer cannot automatically download programs and other information.</td>
</tr>
<tr>
<td>BitLocker Drive Encryption Service</td>
<td>dbesvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Not recommended to encrypt VDI virtual machines.</td>
</tr>
<tr>
<td>Block Level Backup Engine Service</td>
<td>wbengine</td>
<td>Manual</td>
<td>Disable</td>
<td>Leveraged for backing up data on a workstation.</td>
</tr>
<tr>
<td>BranchCache</td>
<td>PeerDistSvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Used for caching files on server in a branch office.</td>
</tr>
<tr>
<td>Computer Browser</td>
<td>Browser</td>
<td>Manual</td>
<td>Disable</td>
<td>Used for browsing computers on the same network.</td>
</tr>
<tr>
<td>SERVICE</td>
<td>NAME</td>
<td>DEFAULT</td>
<td>STATE</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------</td>
<td>---------</td>
<td>-------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Diagnostic Policy Service</td>
<td>DPS</td>
<td>Auto</td>
<td>Disable</td>
<td>Problem detection and troubleshooting resolution (disabled on Windows 8).</td>
</tr>
<tr>
<td>Diagnostic Service Host</td>
<td>WdiServiceHost</td>
<td>Manual</td>
<td>Disable</td>
<td>Problem detection and troubleshooting resolution.</td>
</tr>
<tr>
<td>Diagnostic System Host</td>
<td>WdiSystemHost</td>
<td>Manual</td>
<td>Disable</td>
<td>Problem detection and troubleshooting resolution.</td>
</tr>
<tr>
<td>Disk Defragmenter</td>
<td>Defragsvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Provides disk defragmenting services for hard drives and can impact performance if run on a virtual machine. Not applicable on Windows 8.</td>
</tr>
<tr>
<td>Function Discovery Provider Host</td>
<td>fdPHost</td>
<td>Manual</td>
<td>Disable</td>
<td>The FDPHOST service hosts the Function Discovery (FD) network discovery providers. These FD providers supply network discovery services for the Simple Services Discovery Protocol (SSDP) and Web Services – Discovery (WS-D) protocol.</td>
</tr>
<tr>
<td>Function Discovery Resource Publication</td>
<td>FDResPub</td>
<td>Manual</td>
<td>Disable</td>
<td>Publishes this computer and resources attached to this computer so they can be discovered over the network.</td>
</tr>
<tr>
<td>Group Policy Client</td>
<td>gpsvc</td>
<td>Auto</td>
<td>Manual/Triggered</td>
<td>Responsible for applying settings configured by administrator for the computer and users through the Group Policy component.</td>
</tr>
<tr>
<td>Hyper-V Data Exchange Service</td>
<td>vmickypexchange</td>
<td>Manual</td>
<td>Disable</td>
<td>Allows data exchange between virtual machine and operating system running on physical host machine. Windows 8 only.</td>
</tr>
<tr>
<td>SERVICE</td>
<td>NAME</td>
<td>DEFAULT</td>
<td>STATE</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------</td>
<td>---------</td>
<td>-------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hyper-V Guest Shutdown Service</td>
<td>vmicshutdown</td>
<td>Manual</td>
<td>Disable</td>
<td>Facilitates shutdown of the virtual machine from the management interface on the physical computer. Windows 8 only.</td>
</tr>
<tr>
<td>Hyper-V Heartbeat Service</td>
<td>vmicheartbeat</td>
<td>Manual</td>
<td>Disable</td>
<td>Monitors the state of the virtual machine by reporting a heartbeat at regular intervals. Windows 8 only.</td>
</tr>
<tr>
<td>Hyper-V Remote Desktop Virtualization Service</td>
<td>vmicrdv</td>
<td>Manual</td>
<td>Disable</td>
<td>Provides a platform for communication between the virtual machine and operating system running on the physical computer. Windows 8 only.</td>
</tr>
<tr>
<td>Hyper-V Time Synchronization Service</td>
<td>vmictimesync</td>
<td>Manual</td>
<td>Disable</td>
<td>Synchronizes system time of the virtual machine with the system time of the physical computer. Windows 8 only.</td>
</tr>
<tr>
<td>Hyper-V Volume Shadow Copy Requestor</td>
<td>vmicvss</td>
<td>Manual</td>
<td>Disable</td>
<td>Coordinates the communications that are required to use Volume Shadow Copy Service to back up applications and data on the virtual machine from the operating system on the physical computer. Windows 8 only.</td>
</tr>
<tr>
<td>Windows Biometric Service</td>
<td>wbiosrvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Gives client applications the ability to capture, compare, manipulate and store biometric data without gaining direct access to any biometric hardware or samples. Windows 8 only.</td>
</tr>
<tr>
<td>SERVICE</td>
<td>NAME</td>
<td>DEFAULT</td>
<td>STATE</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Windows Store Service</td>
<td>WSService</td>
<td>Manual (Triggered Start)</td>
<td>Disable</td>
<td>Provides infrastructure support for Windows Store. Started on demand and if disabled application bought using the Windows Store will not behave correctly. Windows 8 only.</td>
</tr>
<tr>
<td>Interactive Services Detection</td>
<td>UIODetect</td>
<td>Manual</td>
<td>Disable</td>
<td>Displays a dialog box when a service tries to send a message to the console.</td>
</tr>
<tr>
<td>*IP Helper</td>
<td>*IP Helper</td>
<td>Auto</td>
<td>Disable</td>
<td>Disable if IPv6 is not leveraged.</td>
</tr>
<tr>
<td>Media Center Extender</td>
<td>Mcx2Svc</td>
<td>Manual</td>
<td>Disable</td>
<td>Allows Media Center Extenders to locate and connect to the computer. Not applicable on Windows 8.</td>
</tr>
<tr>
<td>Microsoft iSCSI Initiator Service</td>
<td>MSiSCSI</td>
<td>Manual</td>
<td>Disable</td>
<td>Not needed for virtual machines.</td>
</tr>
<tr>
<td>Microsoft Software Shadow Copy Provider</td>
<td>swprv</td>
<td>Manual</td>
<td>Disable/Enable</td>
<td>Leveraged by the VSS for backups. Disable if you are not using System Restore and not using Horizon View Persona Management. Required for Persona Management, but must be enabled when using Persona Management.</td>
</tr>
<tr>
<td>*Offline Files</td>
<td>CscService</td>
<td>Manual</td>
<td>Disable</td>
<td>Used for maintenance of Offline Files cache. Should not be disabled for local mode desktops.</td>
</tr>
<tr>
<td>Parental Controls</td>
<td>wpcsvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Restricts usage of certain programs based on time of day and duration.</td>
</tr>
<tr>
<td>Reports and Solutions Control Panel Support</td>
<td>wercplsupport</td>
<td>Manual</td>
<td>Disable</td>
<td>Provides support for viewing, sending and deletion of system-level problem reports for the Problem Reports and Solutions control panel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>NAME</th>
<th>DEFAULT</th>
<th>STATE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure Socket Tunneling Protocol Service</td>
<td>SstpSvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Used to provide VPN capability.</td>
</tr>
<tr>
<td>Security Center</td>
<td>wscsvc</td>
<td>Auto</td>
<td>Disable</td>
<td>Monitors configuration of security-related services.</td>
</tr>
<tr>
<td>SSDP Discovery</td>
<td>SSDPSRV</td>
<td>Manual</td>
<td>Disable</td>
<td>Used to discover UPnP devices.</td>
</tr>
<tr>
<td>*Superfetch</td>
<td>SysMain</td>
<td>Auto</td>
<td>Disable</td>
<td>Loads applications into memory for faster reload over time. Non-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>persistent virtual machines will likely not benefit from this</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>setting being enabled.</td>
</tr>
<tr>
<td>*Themes</td>
<td>Themes</td>
<td>Auto</td>
<td>Disable</td>
<td>Only if you want to run as “Classic” interface (no “Orb” for start</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>button) on Windows 7.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not applicable on Windows 8.</td>
</tr>
<tr>
<td>UPnP Host Service</td>
<td>upnphost</td>
<td>Manual</td>
<td>Disable</td>
<td>Dependent on SSDP Service.</td>
</tr>
<tr>
<td>Volume Shadow Copy Service</td>
<td>VSS</td>
<td>Manual</td>
<td>Disable/Enable</td>
<td>Disable if you are not using System Restore and not using Horizon View Persona Management. Enable if using Persona Management.</td>
</tr>
<tr>
<td>Windows Backup</td>
<td>SDRSVC</td>
<td>Manual</td>
<td>Disable</td>
<td>Backs up workstation data.</td>
</tr>
<tr>
<td>*Windows Defender</td>
<td>WinDefend</td>
<td>Auto</td>
<td>Disable</td>
<td>Disable if Anti Spyware / Malware isn’t needed.</td>
</tr>
<tr>
<td>Windows Media Center Receiver Service</td>
<td>ehRecvr</td>
<td>Manual</td>
<td>Disable</td>
<td>Used by Media Center.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not applicable on Windows 8.</td>
</tr>
</tbody>
</table>
### VMware Horizon with View Optimization Guide
for Windows 7 and Windows 8

#### Table 2: Windows 8 and 7 Service Parameters

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>NAME</th>
<th>DEFAULT</th>
<th>STATE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows Search</td>
<td>WSearch</td>
<td>Auto</td>
<td>Disable</td>
<td>Disable if you are not doing a lot of searching on a virtual machine.</td>
</tr>
<tr>
<td>Windows Update</td>
<td>wuauserv</td>
<td>Auto</td>
<td>Disable</td>
<td>Disable unless needed for updates.</td>
</tr>
<tr>
<td>WWAN AutoConfig</td>
<td>WwanSvc</td>
<td>Manual</td>
<td>Disable</td>
<td>Used for Mobile Broadband Devices.</td>
</tr>
</tbody>
</table>

You can use a script to disable any of the services above programmatically before running `Sysprep` and capturing an image if you execute the following PowerShell syntax for each service:

```
Powershell Set-Service 'Service name' -startuptype "disabled"
```

For proper results, verify that you are using the Service Name, not the Display Name.

The `CommandsNoPersonaManagement` script disables all services listed in Table 2, and the `CommandsPersonaManagement` script disables all except the Microsoft Software Shadow Copy Provider service and Volume Shadow Copy service. Edit those scripts if you prefer not to disable some of these services.

In Windows 7 and Windows 8, the Remote Registry service is set to manual by default. To use the Perfmon of the VMware PCoIP Log Viewer tool to troubleshoot a desktop remotely, restart the Remote Registry service manually on that desktop.

### Windows Customizations Available Using Group Policy

Customizations can be dynamically applied post-build through the use of GPOs. Many organizations prefer to use GPOs because existing policies that manage physical machines can be leveraged for virtual desktops as well. GPOs provide many benefits for desktop management, but care should be taken in their design and implementation. The following sections describe recommended practices for utilizing GPOs for View desktops.

#### Dedicated OU

The recommended approach is to place virtual machines in a dedicated Organizational Unit (OU) within Active Directory, block inheritance, and enforce loopback processing for user-based GPOs, so that any user GPOs applied at your dedicated OU override any other user-based GPOs applied previously.
Blocking Inheritance on an OU

Blocking inheritance is a potentially important step if you want to manage virtual machines. In some cases, a Group Policy being applied for computer accounts in other OUs may have a direct conflict with a setting, such as a wallpaper policy, that you want to apply in your environment. For additional information describing inheritance for Group Policies, see Microsoft’s Group Policy Blog entry Tales from the Community: Enforced vs. Block Inheritance.

Loopback Policy Processing

Loopback policy processing is useful when you want to have Group Policies applied to users according to where the computer account is located in Active Directory. If a computer account is located in a special OU that has certain Group Policy settings applied for end users of those systems, leverage loopback policy processing to verify that Group Policies are applied in the expected and preferred fashion. For more information on implementing loopback policy processing, see the Loopback Processing section of the Microsoft TechNet Step-by-Step Guide to Understanding the Group Policy Feature Set.

<table>
<thead>
<tr>
<th>POLICY</th>
<th>POLICY LOCATION</th>
<th>SETTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action Center Icon Removal</td>
<td>User Configuration &gt; Administrative Templates &gt; Start Menu and Taskbar</td>
<td>Remove the Action Center icon = Enabled</td>
</tr>
<tr>
<td>Event Logs</td>
<td>Computer Configuration &gt; Administrative Templates &gt; Event Log Service &gt; Specific Event Log</td>
<td>Maximum application log size = 1024</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum security log size = 1024</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum system log size = 1024</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you are attempting to set the Security log size to 1024 with this Group Policy setting, you are restricted to 20480 unless you set this using the previous Group Policy Setting valid for Windows XP SP2 and Server 2003 and higher, located under Computer Configuration &gt; Windows Settings &gt; Security Settings &gt; Event Log.</td>
</tr>
<tr>
<td>*Firewall</td>
<td>Computer Configuration &gt; Windows Settings &gt; Security Settings &gt; Windows Firewall with Advanced Security &gt; Windows Firewall Properties</td>
<td>Firewall State = On (Recommended), or Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Do not disable the Firewall Service. Disable the firewall profiles as needed.</td>
</tr>
<tr>
<td>Internet Explorer Settings (cache)</td>
<td>User Configuration &gt; Administrative Templates &gt; Windows Components &gt; Internet Explorer &gt; Internet Control Panel &gt; Advanced Page</td>
<td>Empty Temporary Internet Files folder when browser is closed = Enabled.</td>
</tr>
<tr>
<td>POLICY</td>
<td>POLICY LOCATION</td>
<td>SETTINGS</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Recycle Bin</td>
<td>User Configuration &gt; Administrative Templates &gt; Windows Components &gt; Windows Explorer</td>
<td>Do not move deleted files to the recycle bin = Enable to eliminate user undelete capabilities to save on disk storage, or Disable to preserve user undelete from the recycling bin functionality. The attached batch file scripts disable this parameter which means they enable deleted files to be stored in the recycling bin.</td>
</tr>
<tr>
<td>*Screen Saver</td>
<td>User Configuration &gt; Administrative Templates &gt; Control Panel &gt; Personalization</td>
<td>Password protect the screen saver = Enabled. Screen saver timeout = 600. Force specific screen saver = %windir%\system32\scrnsave.scr.</td>
</tr>
<tr>
<td>System Restore</td>
<td>Computer Configuration &gt; Administrative Templates &gt; System &gt; System Restore</td>
<td>Turn off System Restore = Enabled.</td>
</tr>
</tbody>
</table>

*Screen Saver* refers to the screen saver policy, which includes options for password protection, screen saver timeout, and forcing a specific screen saver.
<table>
<thead>
<tr>
<th>POLICY</th>
<th>POLICY LOCATION</th>
<th>SETTINGS</th>
</tr>
</thead>
</table>
User Account Control: Detect application installations and prompt for elevation = Disabled.  
User Account Control: Only elevate UIAccess applications that are installed in secure locations = Disabled.  
User Account Control: Run all administrators in Admin Approval Mode = Disabled. |
| Wallpaper       | User Configuration > Administrative Templates > Desktop > Desktop               | Desktop Wallpaper = “ “.  
**Note:** A “space” is required to set the wallpaper to none in the above setting. Optionally, setting to a file that does not exist will actually prevent a user from setting wallpaper at all. |
| *Windows Update* | Computer Configuration > Administrative Templates > System > Internet Communication Management > Internet Communication Settings | Turn Off Access to All Windows Update Features = Enabled.  
Turn off Windows Update Device Driver Searching = Enabled.  
**Note:** If the Windows Update Service is disabled, this setting is not necessary. |

*Table 3: Windows 7 and Windows 8 Group Policies*
Windows 7 and Windows 8 Customizations Using the Registry

Many optimizations can be programmatically applied through modification of the registry. Most of the modifications that directly affect the operating system are contained in the HKEY Local Machine (HKLM) hive. Others can be made in the users’ registry to reduce repetitive tasks and improve visual desktop characteristics. The visual desktop settings, such as screensavers and backgrounds, can unnecessarily introduce significant bandwidth into the display stream, which is why they are included as recommended optimizations.

Creating and Modifying the Default User Profile

For years, administrators have been customizing the default profile for a standard image by customizing the profile of the local administrator, and then copying that profile to the default user profile directory, complete with all customizations required for each user who logs into a system. This process was problematic and not officially supported by Microsoft. There is one method, however, that can be leveraged to alter the default user profile using the attached command script files. The best method for an organization is determined by reviewing the available supported solutions and picking the one that is most suited for its needs.

Modify default user profile settings before running Sysprep and capturing the image.

Modifying the Default User Profile

The following methods for modifying the default user profile are supported:

Automated Profile Copy with Sysprep (CopyProfile)

http://support.microsoft.com/kb/973289

Scripted Approach

http://support.microsoft.com/?id=284193

The scripts attached to this document use the method recommended in the following blog post:


Group Policy Preferences

http://www.microsoft.com/downloads/details.aspx?FamilyID=42e30e3f-6f01-4610-9d6e-f6e0fb7a0790&displaylang=en

Scripted Approach for Modifying the Default User Profile

Commands.bat and TS.xml use the following approach to modify the default user profile.

This process is only intended to incorporate default user settings into a standard image.

1. Identify the HKCU settings that need to be included in the default user profile for a Windows 7 standard image. Keep these settings specific to Windows, such as those presented here (default screensaver settings, default wallpaper behavior, and so on).

Microsoft states that not all HKCU settings can be applied programmatically using registry inserts, so your results may vary. For consistent results, establish defaults for your View virtual machines, using Group Policy whenever possible.

2. Create a batch file, script, or PowerShell command that initiates loading the NTUser.DAT file for the default user profile into regedit in order to update.

   REG LOAD hku\Test “%USERPROFILE%\..\Default User\NTUSER.DAT”

   This example assumes the hive for default is loaded into Test under HKEY_Users in the registry. Execute the command exactly as it is shown, changing only the hku\Test to another location, such as hku\TEMP, if desired.
3. While the hive is open for editing, insert any registry updates required for the `Default User\NTUSER.DAT` file using either REG, PowerShell, or `regedit /S` commands. REG is used below to illustrate one way of inserting values.

    REG ADD "hku\Test\Software\Microsoft\Windows\CurrentVersion\Policies \ System" /v Wallpaper /d "" /f

4. Finally (very important), the registry hive needs to be unloaded to save the changes imported into the default user profile. Failure to do this holds the hive open by the currently logged-on user and prevents updates from being appended.

    REG unload "hku\Test"

The batch file should now resemble the following:

    REG LOAD "hku\Test" "%USERPROFILE%\..\Default User\NTUSER.DAT"

    REG ADD "hku\Test\Software\Microsoft\Windows\CurrentVersion\Policies \ System" /v Wallpaper /d "" /f

    REG unload "hku\Test"

Verify that there is no domain-wide default user hive in the `\domain.local\netlogon\Default User.v2\` directory, where `domain.local` is the local domain name for the desktop pool. If such a domain-wide default hive file exists, it will be used to apply user registry settings to new users, and the local `\Default Users\ntuser.dat` file will be ignored.
Managing View Desktops

The goal of optimizing Windows operating systems extends beyond the initial build and deployment of optimized virtual machines. This section reviews settings that are relevant to the ongoing management of View desktops and optional settings to modify the default behavior of the PCoIP display protocol.

View Manager Idle Settings

VMware View Manager provides settings that determine the length of time that idle or disconnected View desktops continue to consume system resources before going into suspended mode or powering down. These settings can be modified per desktop pool or managed by View policies. Determining an acceptable length of time can significantly reduce the load on the system hardware. However, putting machines into suspension or setting up users to constantly power on their desktops is counterproductive, so address these settings carefully.

Managing PCoIP Using GPOs

In some cases, part of optimization can include limiting or tuning the PCoIP protocol for certain network environments. The PCoIP.ADM file is provided with View and can be used to deploy these settings to Horizon Clients, using GPOs. For further details, see the Horizon View 5 with PCoIP Network Optimization Guide.

GPO PCoIPImagingMaximumInitialImageQuality

In a limited bandwidth scenario, this setting can be used to configure a preference between higher initial image quality, with larger peaks in bandwidth during large screen changes, or lower initial image quality, with smaller peaks in bandwidth during large screen changes.

If used, consider adjusting the maximum imaging quality before applying a bandwidth limit. Set to a value between 0 – 100 (default is 90). This value must be set lower than the PCoIPImagingMinimumInitialQuality value.

GPO PCoIPMaxLinkRate

The PCoIP protocol is designed to take advantage of available network bandwidth and share bandwidth fairly across active users on a link. You should not change this setting unless you have carefully determined the overall effect to be beneficial. Be careful not to set a maximum bandwidth limit so low that individual sessions cannot take advantage of additional link bandwidth when available.

If you use this setting, configure it for all users who share a particular network link.

Set PCoIPMaxLinkRate to the desired maximum PCoIP session bandwidth in kilobits per second (that is, 1000 = 1000Kbps = 1Mbps). The default is 1Gbps; 0 = no bandwidth constraints.
References

Configuring PCoIP for Use with View Manager, VMware Knowledge Base article
Group Policy Settings Reference for Windows and Windows Server
Group Policy Registry Table
Using REG to Update the Registry
Horizon View 5 with PCoIP Network Optimization Guide
Horizon View Persona Management Deployment Guide

About the Authors and Contributors

Kaipo Batoon, Senior Technical Marketing Manager in End-User Computing at VMware, made the following contributions to this document for View 5.2 and 5.3:

• Disabled the Address Space Layout Randomization (ASLR) to eliminate problems with IE and Adobe Acrobat.
• Streamlined the syntax in the scripts to enable them to run more efficiently.
• Updated the scripts to be compatible with View 5.3 Feature Pack 1, and fixed some character-translation / Unicode issues.
• Edited the scripts for View 5.2 and refined the specifications for the Volume Shadow Copy Service and Windows Firewall.

Tina de Benedictis, Senior Technical Marketing Manager in End-User Computing at VMware, updated this document to accommodate the Persona Management and 3D graphics features in View 5.0.

Jim Britt of Ensynch, Inc. wrote the original version of this paper with Aaron Black of VMware. Aaron Black is currently a Product Manager in End-User Computing at VMware.

The following VMware technical staff contributed content and tested the scripts: Matthew Mabias, Phillip Heimling, Todd Dayton, Jeff Birnbaum, Charles A. Windom Sr., John Dodge, Marilyn Basanta, Rory Clements, Aaron Black, Timothy Federwitz, Rasmus Jensen, Erik Haire, Linus Bourque, Jason Miles, and Warren Ponder.

To comment on this paper, contact the VMware End-User Computing Solutions Management and Technical Marketing team at twitter.com/vmwarehorizon.
Table 4 lists all recommended settings to optimize Windows 7 and Windows 8 operating systems for your View desktop infrastructure. The Method column represents the available mechanisms to apply these settings. The method chosen should be based upon organizational restrictions and preferences. Discretionary changes are marked with an asterisk (*).

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>METHOD</th>
<th>HIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customization</td>
<td>Action Center Icon</td>
<td>Disable</td>
<td>GPO, Registry</td>
<td>HKCU</td>
</tr>
<tr>
<td>Customization</td>
<td>Set Boot to &quot;No GUI&quot;</td>
<td>Disable</td>
<td>Command Line</td>
<td>HKLM</td>
</tr>
<tr>
<td>Customization</td>
<td>Crash Dump</td>
<td>Disable</td>
<td>Registry</td>
<td>HKLM</td>
</tr>
<tr>
<td>Customization</td>
<td>Automatically Reboot after crash</td>
<td>Enable</td>
<td>Registry</td>
<td>HKLM</td>
</tr>
<tr>
<td>Customization</td>
<td>Crash Dump</td>
<td>Disable</td>
<td>Registry</td>
<td>HKLM</td>
</tr>
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<td>Customization</td>
<td>Log crash event</td>
<td>Disable</td>
<td>Registry</td>
<td>HKLM</td>
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<td>Customization</td>
<td>Alert on crash event</td>
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<td>HKLM</td>
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<td>Registry</td>
<td>HKLM</td>
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<td>Event Logs</td>
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<td>HKLM</td>
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<td>Hibernation</td>
<td>Disable</td>
<td>Command Line</td>
<td>HKLM</td>
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<td>Customization</td>
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<td>Disable</td>
<td>GPO, Registry</td>
<td>HKCU</td>
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<td>Customization</td>
<td>IE First Run Wizard</td>
<td>Disable</td>
<td>GPO, Registry</td>
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<td>Disable</td>
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<td>Start_PowerButtonAction</td>
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<td>Registry</td>
<td>HKCU</td>
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<td>Visual Effects</td>
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<td>Menu Show Delay</td>
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<td>HKLM</td>
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<td>Customization</td>
<td>Terminal Server Client send interval</td>
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<td>Registry</td>
<td>HKLM</td>
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<td>Customization</td>
<td>FastSendDatagramThreshold</td>
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<td>HKLM</td>
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<td>Customization</td>
<td>Service Startup Timeout</td>
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<td>Registry</td>
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<td>View Agent debug</td>
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<td>Registry</td>
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<td>View Agent trace</td>
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<td>Registry</td>
<td>HKLM</td>
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<td>Background Layout Service</td>
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<td>Machine Account Password Changes</td>
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<td>Customization</td>
<td>TCP/IP Task Offload</td>
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<td>Customization</td>
<td>Hard Error Messages</td>
<td>Disable</td>
<td>Registry</td>
<td>HKLM</td>
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<td>Customization</td>
<td>CIFS Change Notifications</td>
<td>Disable</td>
<td>Registry</td>
<td>HKLM</td>
</tr>
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<td>Customization</td>
<td>Customer Experience Improvement Program</td>
<td>Disable</td>
<td>Registry, Command Line</td>
<td>HKLM</td>
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<td>Customization</td>
<td>Language Bar</td>
<td>Disable</td>
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<td>HKLM</td>
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<td>Customization</td>
<td>Windows Update Uninstall folders</td>
<td>Delete</td>
<td>Command Line</td>
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<td>Image Revision</td>
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<td>Registry</td>
<td>HKLM</td>
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<td>Customization</td>
<td>Last Access Timestamp</td>
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<td>Network Location Dialogue</td>
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<td>Registry</td>
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<td>Recycle Bin</td>
<td>Enable Delete File Retention</td>
<td>GPO, Registry</td>
<td>HKLM</td>
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<td>Registry Idle Backup</td>
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<td>Command Line</td>
<td>HKLM</td>
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<td>Screensaver</td>
<td>Enable and Configure</td>
<td>GPO, Registry</td>
<td>HKCU</td>
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<td>HKCU</td>
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<td>WinSAT (Windows System Assessment Tool)</td>
<td>Disable</td>
<td>Command Line</td>
<td>HKLM</td>
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<td>DESCRIPTION</td>
<td>STATUS</td>
<td>METHOD</td>
<td>Hive</td>
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<td>-------------------------------------</td>
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<td>Feature</td>
<td>User Access Control</td>
<td>Turn off or Configure</td>
<td>GPO, Registry HKLM</td>
<td>HKLM</td>
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<tr>
<td>Feature</td>
<td>Windows Sideshow</td>
<td>Disable</td>
<td>GPO, Registry HKLM</td>
<td>HKLM</td>
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<tr>
<td>Feature</td>
<td>IPv6</td>
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<td>Registry HKLM</td>
<td>HKLM</td>
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<td>Windows Service</td>
<td>*Desktop Window Manager</td>
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<td>Services HKLM</td>
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<tr>
<td>Windows Service</td>
<td>*IP Helper</td>
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<td>Windows Service</td>
<td>*Superfetch</td>
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<td>Windows Service</td>
<td>*Themes</td>
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<td>Windows Service</td>
<td>*Windows Defender</td>
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<td>HKLM</td>
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<td>Disable</td>
<td>Services HKLM</td>
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<td>Windows Service</td>
<td>*Windows Firewall</td>
<td>Configure/Disable GPO, Services, Command Line HKLM</td>
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<td>Windows Service</td>
<td>Application Experience Lookup</td>
<td>Disable</td>
<td>Services HKLM</td>
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<tr>
<td>Windows Service</td>
<td>BranchCache</td>
<td>Disable</td>
<td>Services HKLM</td>
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</tr>
<tr>
<td>Windows Service</td>
<td>Block Level Backup Engine Service</td>
<td>Disable</td>
<td>Services HKLM</td>
<td>HKLM</td>
</tr>
</tbody>
</table>

Table 4: Customization Reference Table
Appendix B (Commands.bat)

To optimize a Windows 8 or Windows 7 desktop template, you can create a `Commands.bat` file from one of two files attached to this guide: `CommandsPersonaManagement.txt` or `CommandsNoPersonaManagement.txt`. To save one of these text files, go to the Adobe Reader View menu, select Show/Hide > Navigation Panes > Attachments, then select the text file of your choice, and select Save. Choose the `CommandsPersonaManagement.txt` file if you plan to implement Persona Management. Choose `CommandsNoPersonaManagement.txt` if you do not plan to implement Persona Management. Rename to `Commands.bat` for batch file execution.

Caution: Open the script on a Windows machine. Use a script editor or WordPad to avoid possible line-break issues with Notepad.

Any HKEY user setting applied to the default user applies only to new profiles created. The administrator’s default profile is left untouched. To see the effects of modifications to the default user profile, log in to a different user account than the local administrator’s account.

If you are implementing Persona Management, the following two lines have been deleted from the `CommandsNoPersonaManagement.txt` file to create the `CommandsPersonaManagement.txt` file:

```
Powershell Set-Service ‘VSS’ -startuptype “disabled”
...
vssadmin delete shadows /All /Quiet
```

By deleting these lines, these desktops are ready for Persona Management enablement.

Appendix C (CommandsDesktopReadyForPersona Management.txt)

If you have an existing desktop image without Persona Management, and you want to deploy Persona Management on that desktop image, create a BAT file on your virtual machine template from the attached `CommandsDesktopsReadyForPersonaManagement.txt` file. From the Adobe Reader View menu, select Show/Hide > Navigation Panes > Attachments > Save, and save the TXT file as a BAT file. Run this script as an administrator (right-click and Run as Administrator). Reboot the computer when the BAT file completes.

Caution: Open the script on a Windows machine. Use a script editor or WordPad to avoid possible line-break issues with Notepad.
Appendix D (TS.xml)

The TS.xml file, which contains an example task sequence, is included in this guide as an attachment called MDT 2012 Task Sequences Files.zip.txt. This ZIP file contains a set of customized TS.xml files. To save this set of TS.xml files, go to the Adobe Reader View menu, select Show/Hide > Navigation Panes > Attachments, select the file, and click Save. After the MDT 2012 Task Sequence Files.zip.txt file is saved to the machine, change the extension to .zip. Then unzip the file and use the appropriate ts.xml file.

Note: If you are using Windows and have file extensions turned off, the .txt suffix does not appear in the downloaded file. Open a command window and navigate to the directory where you saved the .zip.txt file from Adobe Reader. Type

move “MDT 2012 Task Sequence Files.zip.txt” “MDT 2012 Task Sequence Files.zip”

For step-by-step guidance, see Using the Microsoft Deployment Toolkit to Optimize Windows.

Appendix E (Summary of Script Changes)

The following changes, as indicated by date, were made to the CommandsNoPersonaManagement.txt file and the CommandsPersonaManagement.txt file:

Removed on 03 June 2014

The following code was removed to fix issues with IE10, IE11, and Adobe Acrobat:

    rem reg ADD “HKLM\System\CurrentControlSet\Control\Session Manager\Memory Management” /v MoveImages /t REG_DWORD /d 0x0 /f

Removed on 11 February 2014

Rem Remove recycling bin

    reg ADD “HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\policies\Explorer” /v NoRecycleFiles /t REG_DWORD /d 0x1 /f

Added on 11 February 2014

Rem Enable recycling bin

    reg ADD “HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\policies\Explorer” /v NoRecycleFiles /t REG_DWORD /d 0x0 /f
    rem Set Windows Visual Effects to Optimized for best performance
    reg ADD “hku\temp\Software\Microsoft\Windows\CurrentVersion\Explorer\VisualEffects” /v VisualFXSetting /t REG_DWORD /d 0x2 /f
    rem Set the Start Power Button to Log off as the default
    reg ADD “hku\temp\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced” /v Start_PowerButtonAction /t REG_DWORD /d 0x1 /f
    rem Reduce Menu Show Delay
    reg Add “hku\temp\Control Panel\Desktop” /v MenuShowDelay /t REG_DWORD /d 120 /f
    Rem Lower Terminal Server Client send interval
Reg ADD "hku\temp\Software\Microsoft\Terminal Server Client" /v Min Send Interval /t reg_dword /d 1 /f
rem Making modifications to .DEFAULT
rem Disable Screen Saver at Logon/Welcome Screen
reg ADD "HKU\.DEFAULT\Control Panel\Desktop" /v ScreenSaveActive /d "0" /f
rem Set Wallpaper to blank at Logon/Welcome Screen
reg ADD "HKU\.DEFAULT\Control Panel\Desktop" /v Wallpaper /d " " /f
rem Disable Address space layout randomization
reg ADD "HKLM\System\CurrentControlSet\Control\Session Manager\Memory Management" /v MoveImages /t REG_DWORD /d 0x0 /f
rem Enable “Automatically Reboot”
reg ADD "HKLM\SYSTEM\CurrentControlSet\Control\CrashControl" /v AutoReboot /t REG_DWORD /d 0x1 /f
rem Disable “Write an event to the system log”
reg ADD "HKLM\SYSTEM\CurrentControlSet\Control\CrashControl" /v LogEvent /t REG_DWORD /d 0x0 /f
rem Disable “Send an alert”
reg ADD "HKLM\SYSTEM\CurrentControlSet\Control\CrashControl" /v SendAlert /t REG_DWORD /d 0x0 /f
rem Disable IPv6
reg Add "HKLM\SYSTEM\CurrentControlSet\Services\Tcpip6\Parameters" /v DisabledComponents /t REG_DWORD /d 0xffffffff /f
rem Increase Service Startup Timeout – Allows up to 120 seconds before timing out waiting for a service
reg Add "HKLM\System\CurrentControlSet\Control" /v ServicesPipeTimeout /t REG_DWORD /d 120000 /f
rem Don’t buffer UDP packets less than 1500 Bytes – improves high bandwidth video performance
reg Add "HKLM\System\CurrentControlSet\Services\Afd" /v FastSendDatagramThreshold /t REG_DWORD /d 1500 /f
rem Disable View agent debug
reg Add "HKLM\software\VMware, Inc.\VMware VDM\" /v DebugEnabled /t REG_SZ /d False /f
rem Disable View agent trace
reg Add "HKLM\software\VMware, Inc.\VMware VDM\" /v TraceEnabled /t REG_SZ /d False /f
rem Disable Background Layout Service
reg ADD "HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\OptimalLayout" /v EnableAutoLayout /t reg_dword /d 0 /f
rem Disable Machine Account Password Changes
reg ADD "HKLM\SYSTEM\CurrentControlSet\Services\Netlogon\Parameters" /v DisablePasswordChange /t reg_dword /d 0 /f
Rem Disable TCP/IP Task Offload
Reg ADD “HKLM\SYSTEM\CurrentControlSet\Services\TCPIP\Parameters” /v DisableTaskOffload /t REG_DWORD /d 1 /f

Rem Hide Hard Error Messages
Reg ADD “HKLM\SYSTEM\CurrentControlSet\Control\Windows” /v ErrorMode /t REG_DWORD /d 0 /f

Rem Disable CIFS Change Notifications
reg ADD “HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\Explorer” /v NoRemoterecursiveEvents /t Reg_dword /d 1 /f
rem Disable customer experience improvement program
Reg ADD “HKLM\Software\Microsoft\SQMClient\Windows” /v CEIPEnable /t REG_DWORD /d 0 /f
rem Application Experience Lookup Service
Powershell Set-Service ‘AeLookupSvc’ -startuptype “disabled”

Rem BranchCache
Powershell Set-Service ‘PeerDistSvc’ -startuptype “disabled”
rem Computer Browser
Powershell Set-Service ‘Browser’ -startuptype “disabled”
rem Diagnostic Service Host
Powershell Set-Service ‘WdiServiceHost’ -startuptype “disabled”
rem Diagnostic System Host
Powershell Set-Service ‘WdiSystemHost’ -startuptype “disabled”
rem Problem Reports and Solutions Control Panel Support
Powershell Set-Service ‘wercplsupport’ -startuptype “disabled”
rem Parental Controls
Powershell Set-Service ‘wpcs_svc’ -startuptype “disabled”
rem Windows Media Center Sharing Service
Powershell Set-Service ‘WMPNetworkSvc’ -startuptype “disabled”
rem Disable Interactive Services Detection
Powershell Set-Service ‘UI0Detect’ -startuptype “disabled”
rem Background Intelligent Transfer
Powershell Set-Service ‘bits’ -startuptype “disabled”
rem Function Discovery Resource Publication
Powershell Set-Service ‘FDResPub’ -startuptype “disabled”
rem Media Center Extender Service
Powershell Set-Service ‘Mcx2Svc’ -startuptype “disabled”
rem Disable the Language Bar
Regsvr32.exe /u /s msutb.dll
rem Delete hidden Windows Update uninstall folders
del /A:H /S /F /Q %WINDIR%\$Nt*
rem disable Customer Experience Improvement Program tasks
schtasks /change /tn “microsoft\windows\Application Experience\AitAgent”/disable
schtasks /change /tn “microsoft\windows\Application Experience\ProgramDataUpdater” /disable
schtasks /change /tn “microsoft\windows\Customer Experience Improvement Program\Consolidator” /disable
schtasks /change /tn “microsoft\windows\Customer Experience Improvement Program\KernelCeipTask” /disable
schtasks /change /tn “microsoft\windows\Customer Experience Improvement Program\UsbCeip” /disable

The Volume Shadow Copy Service (VSS) and the Windows Firewall require special treatment when optimizing Windows 7 and Windows 8 desktops.

Managing Volume Shadow Copy Service
In an environment where Persona Management is not being used, we recommend deleting shadow copies and disabling the VSS service. In the current version of the CommandsNoPersonaManagement.txt script, any existing shadow copies are deleted before the service is disabled.

In an environment where Persona Management is being used, we require the VSS services. In the CommandsPersonaManagement.txt script, the VSS service remains enabled.

Modifications (CommandsNoPersonaManagement.txt Script)
REM ****************************************************************
REM ******************  No Persona Management Start
rem ***
rem *** Delete shadows and Disable the Volume Shadow Copy Service and the Shadow Copy Protection Service if not using Persona Mgmt
vssadmin delete shadows /All /Quiet
Powershell Set-Service ‘swprv’ –startuptype “disabled”
Powershell Set-Service ‘vss’ –startuptype “disabled”
rem ***
rem ******************* No Persona Management End
REM ****************************************************************

Managing Windows Firewall
It is recommended that you enable Windows Firewall with the DomainProfile disabled. The remaining firewall
profiles, PrivateProfile and PublicProfile, can be enabled depending on your corporate security policy.

The following modifications were made to the CommandsNoPersonaManagement.txt and CommandsPersonaManagement.txt scripts since the previous version of this document.

Modifications (CommandsNoPersonaManagement.txt and CommandsPersonaManagement.txt Scripts)

rem ****************************************************************
rem *** Set Firewall Domain profile off
rem *** Set Firewall Private profile on
rem *** Set Firewall Public profile on
netsh advfirewall set publicprofile state on
netsh advfirewall set privateprofile state on
netsh advfirewall set domainprofile state off
rem ***
rem ****************************************************************
rem ************************************************************************