



Windows Vista Image Deployment

Step-By-Step Guide

This document provides instructions for implementing a basic image-based deployment of Microsoft® Windows Vista® operating system. We recommend that you first use the steps provided in this guide in a test lab environment as a means to become familiar with new and updated deployment features and technologies available in Windows Vista.

Migrating an Operating System is a major project that requires careful planning and guidance. To ease the process, Microsoft has provided a number of tools for automating Vista deployments including the Windows Automated Installation Kit (WAIK), the Microsoft Deployment Toolkit 2008 (MDT), Windows Deployment Services (WDS) and the new User State Migration Tool.

There are many guides available on the internet, but we felt they all miss some steps. Therefore we decided to **share our internal documentation**.

The process for our deployment scenario includes:

- **Prepare an USB stick** with “Windows PE Boot Disk”
- Prepare and **capture an image** (ImageX)
- Manually **deploy an image** on a single machine (ImageX)

This document does not cover automated deployment of images on multiple computers using tools as ADS.

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1. Introduction

1.1. Windows PE

Windows Preinstallation Environment (WinPE) is a lightweight version of Windows XP, Windows Server 2003 or Windows Vista that is used for the deployment of workstations and servers. It is intended as a 32-bit or 64-bit replacement for MS-DOS during the installation phase of Windows, and can be booted via PXE, CD-ROM, USB flash drive or hard disk. Traditionally used by large corporations and OEMs (to preinstall Windows client operating systems to PCs during manufacturing), it is now widely available free of charge via the Windows Automated Installation Kit (WAIK). The Windows Automated Installation Kit helps you to install, customize, and deploy the Microsoft Windows Vista™ family of operating systems.

1.2. Sysprep

Sysprep is the name of Microsoft's System Preparation Utility for Microsoft Windows operating system deployment. It has been used for years, but this tool has changed significantly for Windows Vista. In previous versions of Windows (Windows XP and 2000), Sysprep was made available in the Windows OPK, Windows CD Deploy.cab file, or, in the latest service pack. With Vista there is no longer a Deploy.cab file on the CD and no longer Setup Manager for creating answers files because Vista uses a new set of deployment tools (It's all available in the OS itself). Sysprep can be used to prepare an operating system for disk cloning and restoration via a disk image. If you don't use sysprep before you clone an OS you shall have problems with the unique SID (Security Identifier).

1.3. OS Licensing

It's very important to choose the right OS license (OEM, Volume License, MSDN, Action Pack,...) if you want to prepare an operating system for disk cloning. Once you made an image of an OEM OS, you can use only OEM keys to activate the OS!

2. Prepare a Windows PE Boot Disk

2.1. Requirements

Before you begin, you need to download Windows Automated Installation Kit (WAIK) from the Microsoft site (see below). You also need a disk to store the OS (an USB stick for example).

<http://www.microsoft.com/downloads/details.aspx?FamilyID=C7D4BC6D-15F3-4284-9123-679830D629F2&displaylang=en>



2.2. Step-by-step

- Install the WAIK (it is delivered as an .IMG file from the download site - either burn this to a CD or mount it using a tool such as VirtualClone CD)
- In the Start menu - navigate to "All Programs" > "Microsoft Windows AIK" and run the Windows PE Tools command prompt as an Administrator
 - Don't copy/paste the commands to the cmd, because word changes some characters like "!!!!"

- At the command prompt - run
 - **copy x86 c:\PEBuild**

(this copies the PE Source to a new directory that we will use for constructing our image- if you needed the AMD64 source then replace x86 with amd64).
You're now in **C:\Program Files\Windows AIK\Tools\PETools**

- At the command prompt (notice you are now in the **c:\PEBuild** directory) run
 - **imagex /mountrw winpe.wim 1 mount**

(this mounts the WinPE image file in the mount directory ready for us to add into, the number 1 is the index number of the image you want to work with.
The index number is required. Wim files can contain more than one image, and the index number indicates what image you want to work with.)

- Create an .ini-file called **wimscript.ini**. This file is used by ImageX to exclude unneeded files and folders when capturing an image of a Vista PC. ImageX will, by default, exclude certain files, but if it finds a wimscript.ini file in the same folder as ImageX, it will use this file for any additional exclusions.
 - **Open notepad and copy/paste the info below then save it in the directory "c:\Program Files\Windows AIK\Tools\x86\" and name it "wimscript.ini"**

```
[ExclusionList]
ntfs.log
hiberfil.sys
pagefile.sys
"System Volume Information"
RECYCLER
Windows\CSC

[CompressionExclusionList]
*.mp3
*.zip
*.cab
\WINDOWS\inf\*.pnf
```

➔ <http://technet.microsoft.com/en-us/library/cc749311.aspx>

- So that we have the imagex and deployment tools available in our PE Boot disk, run

- **xcopy "c:\Program Files\Windows AIK\Tools\x86*.*" mount\ /s**
- At this point you could add other files into the image (such as Ghost tools, PMenu, etc) by copying them into the mount directory - you can also use the peimg command at this point to install other support tools such as scripting and HTA support.
(If you don't want to add this go to the next step)
Run "**peimg /list mount**" to see the full list and then the following actions to install new support:
 - **peimg /install=WinPE-XML-Package /image=C:\PEBuild\mount\Windows**
peimg /install=WinPE-HTA-Package /image=C:\PEBuild\mount\Windows

WinPE-HTA-Package	HTML support for applications
WinPE-Scripting-Package	Support for Windows Scripting Host
WinPE-XML-Package	Support for an XML Parser
WinPE-SRT-Package	Windows Recovery Environment Component
WinPe-MDAC-Package	Support for Microsoft Data Access Component
- Once you are ready to seal the image up then run
 - **peimg /prep mount**
this will ensure that the WinPE image is optimised. You will need to agree to seal it
→Type "**yes**", otherwise it will not close the image
- After sealing the image you then need to unmount it
 - **imagex /unmount mount /commit**
- To place the newly created custom WinPE image into the correct folder that we can then call on to create the boot disk. Run
 - **copy /y winpe.wim iso\sources\boot.wim**
- To create a bootable ISO file that can then be used to boot into WinPE, change back to "c:\Program Files\Windows AIK\Tools\PETools" and then run the following command
 - **oscdimg.exe -n -h -b"c:\Program Files\Windows AIK\Tools\PETools\x86\boot\etfsboot.com" c:\PEbuild\iso c:\PEBuild\PE.iso**

(the -n option allows for long file names and the -b option makes it bootable, and -h says to write any hidden files or folders; no space between b" c, otherwise it will not work)

- → Just exit the cmd and go to c:\PEbuild => PE.iso is the file you could burn to a cd
- So, you now have an ISO file that you could burn to a CD or DVD. But the idea of doing all this was to get a bootable USB device. So here is the final step: Grab the USB disk and then use the following diskpart commands (be warned - check the disk that you are going to be using is disk 1 or if not then use the correct one for your circumstance - the clean command is a clean of the disk IT WILL DESTROY THE DATA ON THE DISK THAT YOU SELECT CHECK BEFORE PROCEEDING!):
 - **diskpart**
 - select disk 1**
 - clean**
 - create partition primary**
 - select partition 1**
 - active**
 - format fs=NTFS**
 - assign**
 - exit**
- After completing the disk clean and creating the format, copy the contents of "c:\PEBuild\ISO" directory to the USB Stick. If you are wanting to be able to do local deployments - then the final step is to add in the WIM file that you want to use (Vista, XP, 2003 etc). You are now ready to boot off your USB stick and capture or install WIM files!

2.3. Add drivers to an existing winPE boot disk

When you run winPE on a new computer it's possible that you get the following error when you view/renew the network settings:

"Windows IP Configuration"

"An error occurred while releasing interface Loopback Pseudo-Interface 1: The system cannot find the file specified."

"The operation failed as no adapter is in the state permissible for this operation."

This problem occurs when windows PE is missing a driver, in this case it's a nic driver. To solve this problem we need to create a new windows PE boot disk. Follow the steps below to create an up-to-date windows PE:

- Download the newest network card drivers
- Install the network drivers on your pc
- Go to "Windows PE Tools Command Prompt" and execute the following commands:
- **imagex /mountrw C:\PEBuild\winpe.wim 1 C:\PEBuild\Mount**
 - I dumped my new/extra drivers in the C:\PEBuild\extraNICdrivers folder.
- **peimg /inf=C:\PEBuild\extraNICdrivers*.inf /image=C:\PEBuild\Mount\Windows**
- **imagex /unmount /commit C:\PEBuild\Mount**
- **copy /y C:\PEBuild\winpe.wim C:\PEBuild\iso\sources\boot.wim**
- **oscdimg.exe -n -h -b"c:\Program Files\Windows AIK\Tools\PETools\x86\boot\etfsboot.com" C:\PEBuild\iso c:\PEBuild\PE.iso**
 - don't copy the last rule from word -> just type it, otherwise you will get the error below:
ERROR: Could not delete existing file "C:\PEBuild\iso"
Error 5: Access is denied.

3. Prepare a “master” installation

Before you are able to capture an image, you need to prepare a “master” installation. Install all the software and drivers you need. **Don’t activate the OS or applications, the activation shall be cleaned by sysprep!**

We advise to carefully select and plan the tools and applications that will be included in the image as well as the number of images you need in your organisation:

- Organize meetings with the people in the departments in your organisation. Discuss what tools they frequently use. Make sure to identify older or incompatible apps.
- Try to limit the number of “master images” you need in your organisation. This will make the maintenance more transparent.

Check your licensing options. Sometimes you can include an application in the image without the need for a license, as long as it’s not activated.

Example: there is a web-design team in your organisation with 8 people. 3 of them use Adobe Photoshop and Illustrator. The other make use of a free HTML editor or web-based content management systems. Your company owns 3 user licenses of Adobe Creative Suite CS3. Instead of having to create 2 images for this team, just create 1. Include CS3 in the image, but only activate it for the 3 people that need it. Now you have the flexibility to de-activate a license on one computer and activate it on another.

- Only install recent applications with their latest updates/service pack.
- Do NOT join the machine in a domain. This will be done after you deploy an image.
- Do NOT activate any licenses of Windows Vista or Microsoft Office, these will be removed by sysprep.
- Keep an inventory of everything that you installed or configured on the image (applications, service packs, drivers, updates, custom configurations, ...)
- When your image is ready, deploy and put it on one computer and have a user work on it for a few days. Ask for feedback:
 - Did you need to install any drivers or new applications?
 - Did you need to configure/customize certain things.
 - Did you need to install updates or service packs?
 - Did you experience any crash or hiccups?

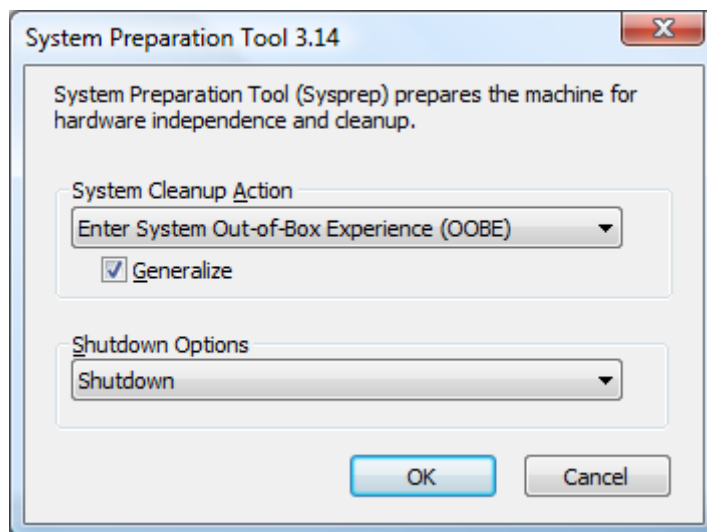
- Is the machine and applications running fast enough?
- Fine-tune your image until the test users are happy. This will greatly reduce your helpdesk calls when you deploy the new machines!
- Disable/Fine-tune the indexing and use the best performance (no aero glass look) If you want to increase Windows Vista

4. Creating an image

Once you have a good “master” installation, it’s time to capture it in an wim-file.

4.1. Capture images

- Run “sysprep” on your computer to clear the SID
- Choose OOBE (Generalize isn’t necessary, choose this when you want to keep some of the windows settings you made!! Choose for shutdown)
 - Choose for “Enter System Audit Mode” if you want to use an answer file. It’s possible to made an **unattended textfile/answer file in Vista, but we don’t use this at Orbit One** (you can use this for major deployments). if you want to made an answer file then you should use Windows System Image Manager, this is one of the deployment tools in Vista (you need to download the WAIK first). Windows SIM is the tool you use to manage an image file’s contents.



- Restart and put the Windows PE CDROM or USB stick in your computer
- Boot with Windows PE CDROM or USB Stick
 - Note that you may need to change the boot priority in the bios.*
- `X:\Imagex.exe /compress fast /capture C: C:\vista.wim "Vista install" /verify`
 - The system is now creating a compressed image file, this can take several minutes to hours, depending on the size of you OS and apps.*

- Connect to a network share where there is enough storage space to upload the image:
Net use y: [\\server\share\](#)
You may need to enter a username and password.
- Copy C:\vista.wim y:
The image is now copying to the network drive. This can take quite some time. We advise to use gigabit Ethernet.

4.2. Add stuff to your existing image

Use “Package Manager” to add software, drivers, or custom configs to an existing image.

Package Manager is new for Windows Vista. Package Manager is the cmd tool that is used to apply updates, language packs, and other updates that are provided by Microsoft.

More info on <http://technet.microsoft.com/en-us/library/cc749509.aspx>

5. Deploying Images

5.1. Install an image

Now we are going to use the Windows PE boot disk, that we made earlier in this document, and we follow the steps below:

- Boot using Windows PE (CDROM or USB stick)
 - Note that you may need to change the boot priority in the bios.*
- Use the diskpart command to format the hard drive
 - Diskpart
 - select disk 0
 - clean
 - create partition primary
 - select partition 1
 - active
 - format quick
 - exit
- Connect to a network share where there is enough storage space to upload the image:
 - Net use y: [\\server\share\](#)
 - You may need to enter a username and password.*
- X:\windows\system32\format c: /FS:NTFS /q -> It's not necessary, it's equal to step "b"
- X:\ImageX /apply y:\vistax86.wim 1 c:
 - The image will be applied on the local hard disk. This can take several minutes to hours, depending on your network speed and image size.*
- To resolve a boot problem, follow these three steps:
 - x:\windows\system32\bcdedit /set {default} device partition=c:
 - x:\windows\system32\bcdedit /set {default} osdevice partition=c:
 - x:\windows\system32\bcdedit /set {bootmgr} device partition=c:
- Remove the Windows PX bootdisk and reboot.

5.2. Complete the installation

- Follow the Windows Wizard
- Check for driver problems (e.g. different hardware than the one the image is based on)
- Join the computer to Active Directory domain
- Activate Windows, Office and other applications
- Fine-tune windows if this is necessary
- ...

6. Resources

- Windows Vista Deployment Step-by-Step Guide
<http://technet.microsoft.com/en-us/library/cc721929.aspx>
- Windows AIK
<http://technet.microsoft.com/en-us/library/cc748933.aspx>
- How to create Windows PE bootdisk
http://searchenterprisedesktop.techtarget.com/tip/0,289483,sid192_gci1297757,00.html
<http://www.svrops.com/svrops/articles/winvistape2.htm>
<http://www.vistapcguy.net/?p=71>
- General Information
http://en.wikipedia.org/wiki/Main_Page