

Hardware Independent Imaging of Windows 7 Using ZCM Lecture

ZEN02

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Hardware Independent Imaging of Window 7

Using ZENworks Configuration Management (ZCM)

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Welcome to ATT-Live 2012!

This session will provide you with:

- A solid understanding of the Imaged-based Setup technology of Windows 7
- The ability to create an unattended Sysprep Answer File
- Different methods that can be used for injecting drivers into a sysprepped Windows base image
- Hands-on experience in using Microsoft and ZENworks tools to create and deploy a hardware independent Windows 7 base image.

Objectives:

- Provide an Understanding of Microsoft's Image-based Setup (IBS) Technology:
 - Define IBS
 - Understanding Windows Setup Configuration Passes
- Defining Windows Activation & Rearming
 - What they are and how they impact deployment of images
- Understanding the SOS* Base Image Development Process
 - Setting up your lab environment
 - Understanding the overall process flow
 - * Standard Operating System

This class is designed to meet the objectives listed above. This class will be a combination of lecture and hands-on work with ZCM version 11.2 and Windows 7 SP1..

Objectives:

- Using the Microsoft Tools
 - Using Windows System Image Manager (WSIM)
 - Using the Systems Preparation Utility (Sysprep)
- Building Your “Fully Unattended” Sysprep Answer File
- Using ZCM's Image Explorer Utility
 - Understanding its use
 - Installing & Using Image Explorer
- Dealing with Drivers & the ZENworks Adaptive Agent
 - What they are and how they impact deployment of images
- Deploying your SOS Base Image and Add-ons

Understanding Microsoft's Image-based Setup (IBS) Process

Understanding IBS – Why bother?

- Before learning a method for deploying Windows 7 you should understand:
 - There is no “in-place” migration path from XP to Windows 7
 - Can't just run a setup.exe on top of XP to install Windows 7
 - Even using all Microsoft technologies its a “wipe-and-reload” process
 - Ultimately the Windows Mini-Setup process will install Windows 7 on the hardware
 - Windows Setup in Windows 7 has a completely different setup architecture from that of Windows XP
 - The tools and the process of using the tools described here, wrap around the Windows 7 Mini-Setup process
 - ZCM Imaging Techniques are used to deploy and stage the content that Mini-Setup will install

How IBS differs from XP's Setup

- In XP and previous versions, Windows Setup would:
 - Partitions and Formats the drive
 - Extract bunches of files and uncompress those files
 - Write each file to its appropriate place in the directory structure
- Beginning with Windows Vista, Microsoft introduced Image-based Setup (IBS)
 - Windows Setup applies an entire image to the drive
 - Can be a standard image from the Windows 7 Installation DVD
 - Or a customized version of that standard image.
 - Windows Setup deals with two types of images
 - Boot Image
 - Install Image
 - [boot.wim](#) & [install.wim](#) are located in **sources** directory on Install DVD

Understanding Configuration Passes

- From user's perspective Windows Setup appears to have three “phases” when installed on bare metal:
 - Windows PE Phase
 - Windows PE is booted up on hardware, the disk is partitioned
 - Obtain info on language, time format, and EULA acceptance, etc.
 - The install image (install.wim) is copied to the drive
 - When user sees “Installing Windows” the Windows PE Phase is complete.
 - Online Configuration Phase
 - Machine's SID and local user accounts are created
 - Machine reboots at the end of this phase
 - Windows Welcome Phase
 - Windows Welcome is launched (OOBE - Out-of Box Experience)
 - Computer Name, Desktop Background chosen
- But under the covers there are seven distinct “passes” that can occur across these three “phases”.

Understanding Configuration Passes

- windowsPE – (Occurs during Windows PE Phase of Setup)
 - Specify which Install Image (.wim) to use
 - Specify any boot-critical drivers needed for the WinPE environment to be able to access drive or network
 - Specify parameters to configure drive
- offlineServicing – (Occurs during Online Configuration Phase of Setup)
 - Can add hotfixes, language packs, and Feature packs
- generalize – (Occurs when running sysprep with the /generalize switch)
 - Removes SID and hardware specific settings

Understanding Configuration Passes

- specialize – (Second half of Online Configuration Phase of Setup)
 - Specialize Pass will be applied next time image is booted after sysprep
 - Is specific to the hardware to which the image is restored
 - SID is created
 - Network & International settings and domain membership configured
- oobeSystem – (Occurs during Windows Welcome Phase)
 - Windows shell environment is configured
 - Local user accounts created

Understanding Configuration Passes

- auditSystem & auditUser – (Occurs during Windows Welcome Phase)
 - Computer must be booted into Audit mode for these passes to run
 - Typically used by OEMs to customize Windows.
 - You will not typically need to use anything in these Configuration Passes
 - Not used in when deploying the hardware independent image using ZCM
- The techniques discussed here use the following configuration passes:
 - windowsPE
 - generalize
 - specialize
 - oobeSystem

Defining Windows Activation & Rearming

Understanding Windows Activation

- Understanding Activation and Rearming is important because it has an impact on how you deploy your SOS base image
- Windows 7 has this “*feature*” called Activation
 - Uses a signature similar to those in anti-virus software and updates itself every 90 days
- Activation is designed to ensure:
 - A given copy of Windows 7 is not installed on more machines than a given type of license permits
 - the copy of Windows is genuine
 - E.g. Doesn't have a “*Made in China*” stamp on the Install Media

Understanding Windows Activation

- If Windows 7 is not activated it will:
 - start showing Activation bubbles after three days and display these nag messages with increasing frequency until you receive them once an hour
 - go into **RFM** after 30 days
 - **Reduced Functionality Mode** – The box basically becomes “hosified” and is virtually unusable!
- Running Sysprep on a SOS base image on real hardware or on a VM does not get around the need to Activate if you want to deploy that image to multiple targets!

Understanding Windows Activation

- Methods of Activation:
 - Manually from the installed host OS
 - Assumes an Internet connection
 - **Right-click** on the **Computer icon** and select **Properties**
 - Activation status is displayed on the bottom of the screen
 - Click on **Activate Windows online**
 - Might need to do this in a case if a base OS is not properly sysprepped and you lay it down and it comes up in RFM
 - Automatically via the Windows Setup process itself
 - Assumes an Internet connection
 - Assumes you've created a SYSPREP XML Answer file with the properly configured parameters
 - You've run SYSPREP on the host OS specifying the SYSPREP XML Answer file as input

Understanding Windows Rearm

- What is Rearming and why does it Matter?
 - Microsoft's Definition for Single License Product Key:
 - When you install Windows with a [single license product key](#), you have 30 days during which you must activate that installation of Windows. If you do not activate Windows within the 30 day period and do not reset the activation clock, Windows will enter RFM (Reduced Functionality Mode). This mode prevents users from logging on to the computer until Windows is activated.
 - When the initial 30-day activation-free grace period going to expire, users can rearm Windows 7 for additional 30 more days of activation grace period, for up to 3 times, effectively allowing Windows 7 to run legally for 120 days without a legit or genuine product key to activate the system
 - Microsoft's Definition when Volume Licensing is used:
 - Activation can be reset an unlimited number of times for an activated [Key Management Service \(KMS\) clients](#). For [non-activated KMS clients](#), the activation clock can be reset only up to three times, the same as a single license.
 - For [Multiple Activation Keys \(MAK\) clients](#), the recommendation is to install the MAK immediately before running Sysprep the last time before delivering the computer to a customer.
 - Microsoft recommends that [KMS clients](#) use the [sysprep /generalize](#) command where the value of the [SkipRearm](#) setting is equal to **1**. After capturing this image, use the [sysprep /generalize](#) command where the value of the [SkipRearm](#) setting is equal to **0**.

Understanding Windows Rearm

- You can rearm a Windows 7 image three times by running sysprep
 - Controlled by the SkipRearm setting in a Sysprep XML Answer File
 - In the **generalize** Configuration Pass
 - Part of the **Microsoft-Windows-Security-SPP_neutral** Component
 - When **SkipRearm = 0** and sysprep is run on an image, that image is rearmed.
 - Trying to rearm the fourth time with SkipRearm = 0 will cause sysprep to fail and that image is now unusable!
 - When **SkipRearm = 1** you can run sysprep any number of times
 - However this is NOT a deployable image. This is for configuration testing only!

Understanding Activation & Rearm

- What does Activation and Rearm mean when deploying your SOS Base Image?
 - If an SOS base install will remain on a machine longer than 30 days *it must be properly activated*
 - Otherwise the machine will become unusable
 - If the machine receiving your SOS Base is going to be used for testing purposes for **less than 30 days** you don't have to activate if you don't mind the nag messages
 - If you're doing extended testing (> 30 days) with Windows 7 VMs you will initially want the VMs to use bridged or NAT'd NIC definitions so you can activate the VMs
- To properly deploy a Windows 7 installation you need:
 - A valid Product Key
 - The installation to be activate (Can be controlled via XML Answer File)
 - The SkipRearm value set to 0 (Base MUST be sysprepped)

Understanding the SOS Base Image Development Process

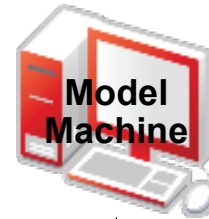
Setting up Your Lab Environment



- Running:**
- Any version of Windows 7
 - WAIK 3.0 or WAIK with SP1
 - install.wim and catalog files
 - ZCM Image Explorer
 - MS Driver Package Installer
 - Optional: Driver Extraction software like DriverMax

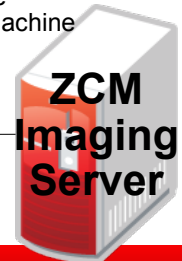
Running:

- Target version of Windows 7
- Sysprep
- XML Configuration File generated on Technician's machine
- Any other software you might need like VMware, Novell Client, etc.



Running:

- ZCM 11.x
- Stores images of:**
 - the "Model Machine"
 - your Technician's Machine
 - SOS Base (SR=1)
 - SOS Base (SR=0)



Setting up Your Lab Environment

- Configuration of the “Technician's Computer”:
 - Recommend that your Technician's Computer be a Windows 7 box
 - It could be an XP SP3 box but this requires that some extra software be installed on the machine
 - Windows Automated Installation (WAIK) Kit version 3.0 (or SP1)
 - Download [KB3AIK_EN.ISO](#)
 - <http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=696dd665-9f76-4177-a811-39c26d3b3b34>
 - WAIK 3.0 SP1 is **not required** to develop Sysprep Answer Files for Windows 7 SP1
 - Copy [install.wim](#) and the [.clg files](#) from the Windows 7 Installation DVD
 - System Preparation Tool (sysprep.exe)
 - Installed with every copy of Windows 7
 - ZCM's Image Explorer Utility

Setting up Your Lab Environment

- Configuration of the “Reference” Computer
 - This is your “model” whose image is applied to target computers
 - This machine's image serves as the basis for your desktop deployment
 - Install your selected version of Windows 7
 - Configure the machine according to your requirements and desktop standards
 - Run Windows Update to get latest patches
 - Update hardware drivers if necessary
 - Configure settings for Windows Explorer, IE, and the desktop according to your standards
 - Check System Settings: such as performance/power settings
 - Can configure a Default Profile for all local users if needed

Setting up Your Lab Environment

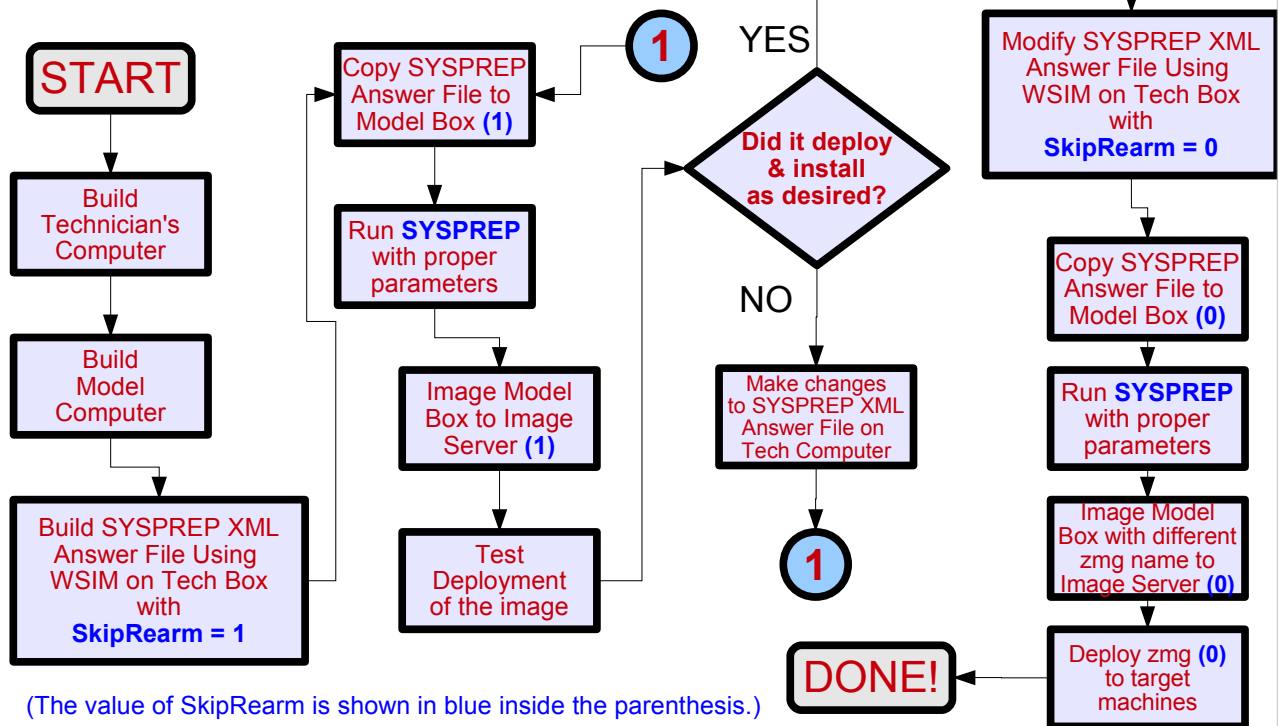
- “Reference” or “Model” Computer: SYSPREP
 - Will run **SYSPREP** on this machine
 - Installed as part of any version of Windows 7
 - In the c:\Windows\system32\sysprep directory
 - Generally used as a command-line utility
 - Serves the same purpose as sysprep used for Windows XP
 - Prepares the Windows 7 installation for deployment to target machines
 - Consumes as input the XML Answer File generated by WSIM
 - Command-line parameters tell sysprep how to prepare the Windows 7 installation on the Reference Computer
 - Will operate in GUI mode when started without command-line parameters.

Setting up Your Lab Environment

- Imaging the “Reference” or “Model” Computer:
 - You'll run sysprep with the `/shutdown` parameter on the Reference Computer
 - Then make an image of the Reference Computer
 - Can image using:
 - ZCM's **img** Image Engine to generate a .zmg image
 - Boot the Reference Computer using BOOTCD.ISO or PXE
 - From the Default Menu select **Start ZENworks Imaging Maintenance** to get to the base prompt
 - Use **img mp** to create a zmg image file of the Reference Computer
 - Or use img's menu to do the same thing.
 - **Never** make an image of an Activated Windows 7 machine and distribute that to anything other than the exact hardware on which it was activated.
 - Don't distribute a Windows 7 base that has been activated to other machines.

Understanding the Overall Process Flow

- Building your base is a reiterative process – results in 2 images of the same Model Machine with one VITAL difference:



Understanding the Overall Process Flow

- From the process flowchart you can see that:
 - you end up with 2 *synchronized* copies of your Host Base Image
 - the only difference between the two is the value of the *SkipRearm* parameter
- The purpose of having these two images:
 - Version of the image where *SkipRearm = 0* is the “deployment” version of the image
 - When you need to make changes to the Host Base Image
 - Restore the *SkipRearm = 1* version of the image
 - this is the “development” version of the image
 - make changes and test deployment using this version.
- Use a naming convention for the Image Files of the Base (.zmg files) that helps differentiate the two
 - *win7base-<ver>-sr0.zmg* and *win7base-<ver>-sr1.zmg*

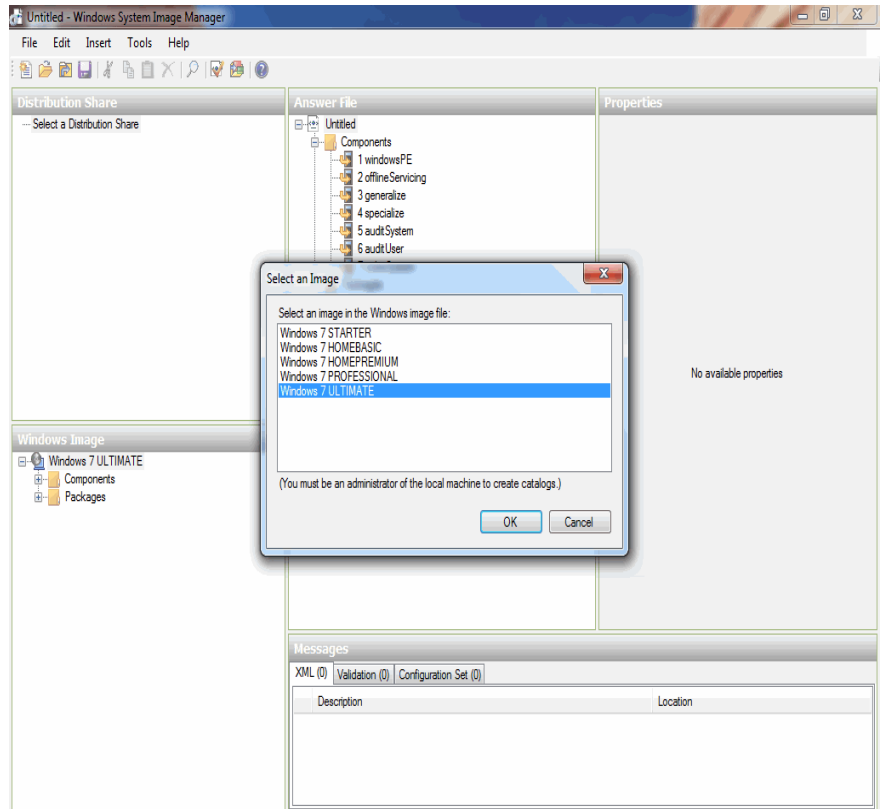
Using the Microsoft Tool Set

Using the Microsoft Tool Set

- Using Windows System Image Manager (WSIM)
 - Is part of WAIK - set of GUI-based and command-line tools and associated documentation. Designed to help network administrators:
 - Create, configure, and modify operating system images
 - Automate the installation of operating system images
 - WSIM is GUI-based tool installed as part of WAIK
 - Takes as input an Install Image (install.wim) and Catalog Files
 - Generates an XML Answer File
 - All configurable settings for an image file are exposed in WSIM
 - WSIM writes the settings and the values assigned to the selected settings to an XML. By default called [Unattend.xml](#)
 - Answer Files are used by Sysprep and Windows Setup
 - Comes in both 32-bit and 64-bit versions
 - The 32-bit version can generate Answer Files for 32 or 64-bit architectures

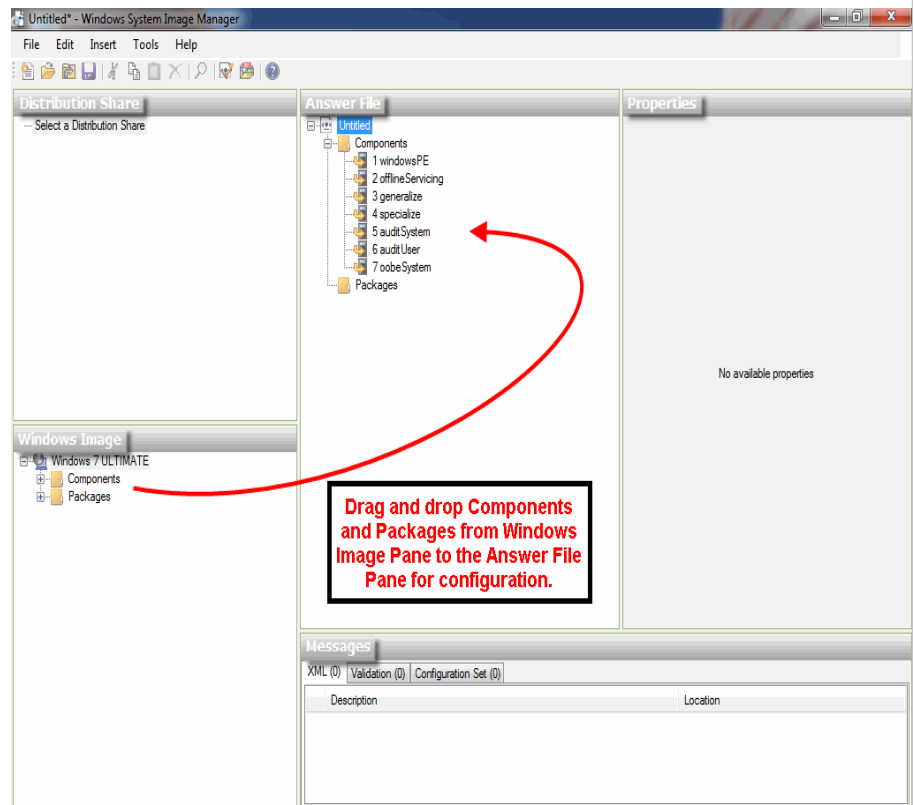
Using the Microsoft Tool Set

- Using Windows System Image Manager (WSIM)
- Start > All Programs > Microsoft Windows AIK > Windows System Image Manager
- File > Select Windows Image



Using the Microsoft Tool Set

- Using Windows System Image Manager (WSIM)
- Has 5 panes:
 - Distribution Share
 - Create & manage Distribution Share Points
 - Windows Image
 - Displays all components & packages for the selected install.wim file
 - Answer File
 - Each Windows Setup Configuration Pass and settings applied shown here
 - Properties
 - Assign values for selected components here
 - Messages
 - Validate Answer File here



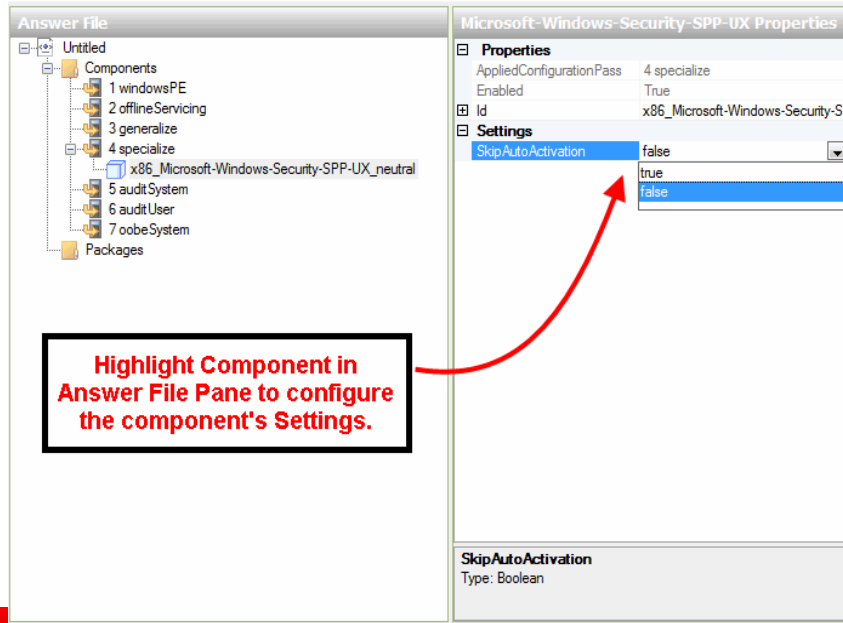
Using the Microsoft Tool Set

- Using WSIM – Assigning Components to Configuration Passes
 - Can right-click or drag-and-drop

The screenshot displays the WSIM (Windows System Image Manager) interface. It is divided into several panes: 'Distribution Share' (empty), 'Answer File' (showing a tree structure with 'Components' containing '1 windowsPE', '2 offlineServicing', '3 generalize', '4 specialize', '5 auditSystem', '6 auditUser', and '7 oobeSystem'), 'Windows Image' (a list of components with 'x86_Microsoft-Windows-Security-SPP-UX_6.1.7100.0_neutral' selected), and 'Microsoft-Windows-Security-SPP-UX Properties' (showing 'Enabled: True' and 'SkipAutoActivation: false'). A red arrow points from a text box to the selected component in the 'Windows Image' pane. The text box contains the instruction: 'Right-click the component under Windows Image Pane. Pick the Configuration Pass to which the component should be added.' A context menu is open over the selected component, listing options to 'Add Setting to Pass 1 windowsPE' through 'Pass 7 oobeSystem', along with 'Copy' and 'Help...'. A red box with the number '33' is located in the bottom-left corner of the screenshot area.

Using the Microsoft Tool Set

- Using WSIM – Assigning values to a Component's Settings
 - Some values are drop-down selections
 - Others are text you input



Using the Microsoft Tool Set

- Using WSIM – Assigning values to a Component's Settings
- Getting help on Component Properties and their possible values

Microsoft-Windows-Security-SPP-UX

The Microsoft-Windows-Security-Licensing-SPP-UX component handles the user experience for Windows® licensing.

This setting has no effect on Server Core installations of Windows Server 2008.

In This Section

[SkipAutoActivation](#) Specifies whether to skip auto-activation of the Microsoft Windows license.

Applies To

WSIM provides a nice help feature for each Component. Highlight and press F1

This component is available only in Windows® 7 and Windows Server® 2008 R2.

Windows edition	Windows for x86-based computers	Windows for x64-based computers	Windows for Itanium-based computers
Windows® 7 Enterprise	x86	amd64, wow64	Not available
Windows® 7 Home Basic	x86	amd64, wow64	Not available
Windows® 7 Home Premium	x86	amd64, wow64	Not available
Windows® 7 Professional	x86	amd64, wow64	Not available
Windows® 7 Starter	x86	Not available	Not available
Windows® 7 Ultimate	x86	amd64, wow64	Not available
Windows Server® 2008 R2 Datacenter	Not available	amd64, wow64	Not available

Using the Microsoft Tool Set

- Using the Systems Preparation Tool (sysprep.exe)
 - Located in %WINDIR%\system32\sysprep folder
 - Can be run as a command-line or GUI-based utility
 - Designed to prep a Windows 7 installation for imaging
 - Always run sysprep on Reference Computer before taking an image of it
 - Can't deploy an image even to exact hardware without running sysprep
 - The machine's "uniqueness" is removed
 - SID is removed
 - Out-of-Box drivers are removed
 - They will be rediscovered during the specialize pass
 - Removes machine from a domain makes it a member of "WORKGROUP"
 - Disables Administrator and deletes its profile

Using the Microsoft Tool Set

- Sysprep command-line parameters:
 - /generalize
 - Cleans up machine for imaging (unique stuff removed)
 - /oobe
 - Restarts machine into Windows Welcome Mode
 - Settings in oobeSystem Pass from Answer File are processed before Windows Welcome starts
 - /unattend:<XMLAnswerFile>
 - Specifies name and location of XML Answer File
 - Created with WSIM & copied from Technician's to Reference Computer
 - Answer file is cached to %WINDIR%\Panther as unattend.xml
 - Windows Setup reads the cached file at the start of any Configuration Pass
 - /shutdown
 - Tells sysprep to turn off machine after its done.
 - /audit (*Don't worry about this one though*)
 - Causes Windows Setup to process auditSystem & auditUser Passes of Answer File

Using the Microsoft Tool Set

- Once your Sysprep Answer File is built - run sysprep by:
 - Copy the XML File to your Model Computer
 - Click **Start > Right-click Command Prompt > Run as administrator >** At the User Account Control dialog click **Yes**
 - `cd \windows\system32\sysprep`
 - `sysprep /generalize /oobe /shutdown /unattend:<sysprepAnswerFile>`
- After shut down - image Model Computer up to your image server using ZCM

Using the Microsoft Tool Set

- sysprep.exe – Usage Tips:
 - Use version installed on Reference (Model) Computer
 - Always use **/generalize** option
 - Can run sysprep multiple times on Model Computer but can only rearm Activation three times
 - Setting **SkipRearm** to **1** in **Microsoft-Windows-Security-SPP_neutral** Component prevents resetting activation clock
 - If **SkipRearm** is **0** in a restored image, you **can only run sysprep against that machine 3 times** before the box becomes unusable.
 - If you don't use **ProductKey** in **Microsoft-Windows-Shell-Setup** in specialize Pass user is prompted on deployment
 - **Don't** make an image of an activated Windows 7 installation you won't be able to deploy it to multiple machines.

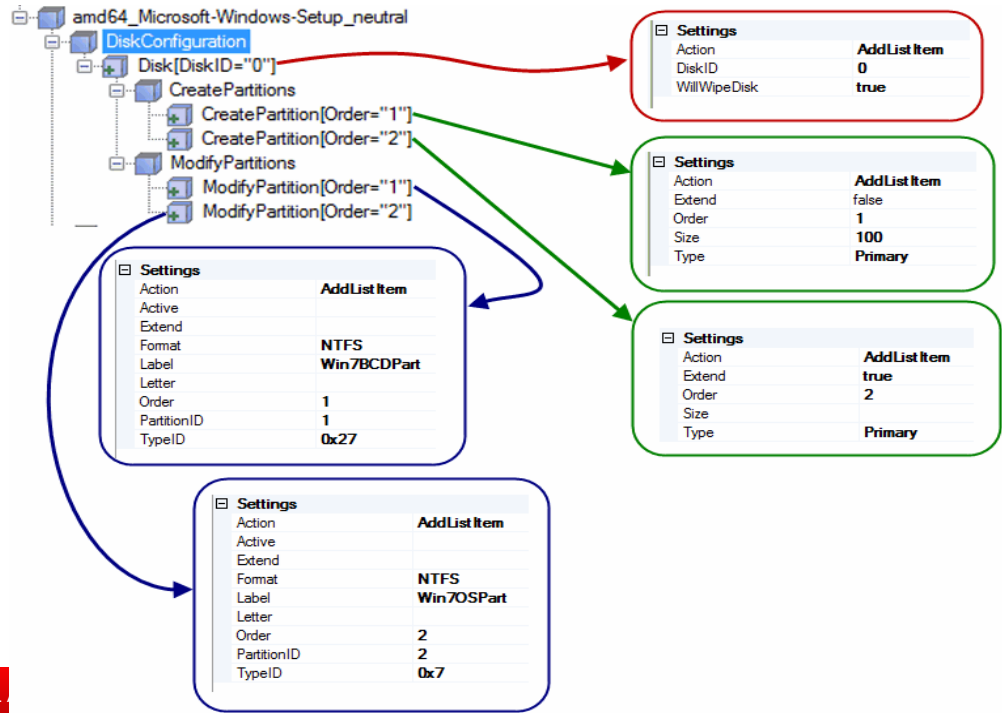
Building Your “Fully Unattended” Sysprep XML Answer File

Building your “Fully Unattended” Answer File

- Specifying the following Components, Properties, & Values in your Sysprep XML Answer File will ensure a hands-off installation of Windows 7
- Important Components & Properties for *windowsPE* Pass
 - Microsoft-Windows-Setup_neutral
 - UserData\AcceptEula {true | false} – Automate the acceptance of the Microsoft EULA
 - DiskConfiguration – Determines how the target machines drives & partitions are configured. Defined underneath DiskConfiguration subcategory:
 - `Disk[DiskID="n"]`
 - `CreatePartition[Order="n"]`
 - `ModifyPartition[Order="n"]` .

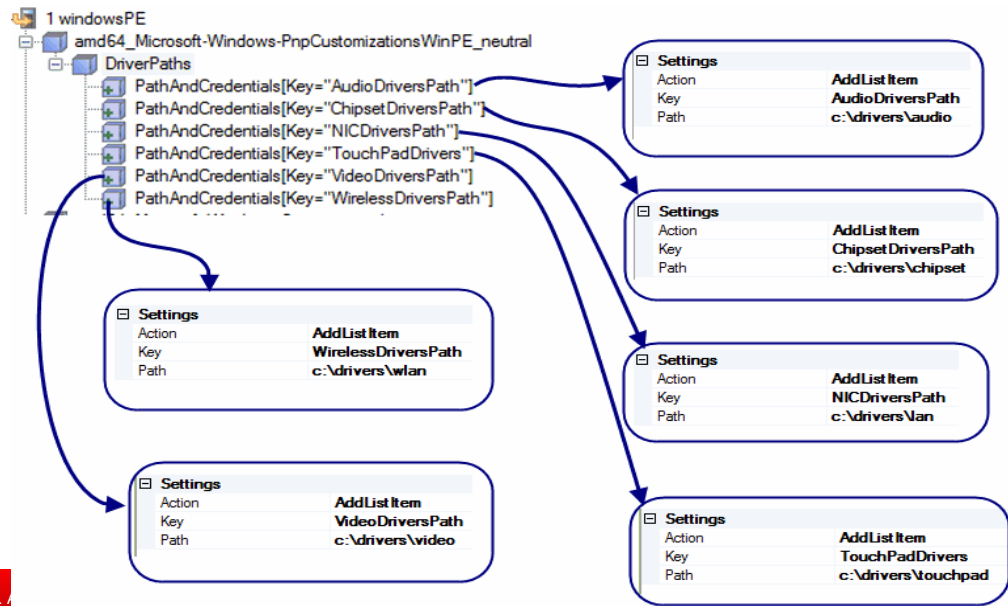
Building your “Fully Unattended” Answer File

- Microsoft-Windows-Setup_neutral > DiskConfiguration



Building your “Fully Unattended” Answer File

- Important Components & Properties for *windowsPE* Pass
- Microsoft-Windows-PnpCustomizationsWinPE_neutral
 - DriverPaths – Specify directories in the SOS base image where Windows Setup can find drivers to install
 - You won't use this Component if Windows contains all the boot-critical drivers the box needs



Building your “Fully Unattended” Answer File

- Important Components & Properties for *generalize* Pass
 - Microsoft-Windows-Security-SPP_neutral
 - SkipRearm {0 | 1}
 - Typically set to 1 when running sysprep on Reference (Model) Computer multiple times
 - When ready to deploy image set to 0 and run sysprep again.
 - All licensing and registry data related to activation is removed or reset
 - **30 grace period** starts when Windows Setup finishes and box boots the first time
 - The console command **slmgr /dlv** shows license status and rearm count.
 - This tends to be one of the most misunderstood Properties of all

◆ Important:

Typically while creating a deployment image, you will run the **Sysprep** command multiple times.

To ensure that an installation of an image receives the full Activation grace period:

1. Set the **SkipRearm** to **1** while **customizing your computer**.
2. Before running the **Sysprep** command the final time **before deploying an image**, rearm the computer by setting the **SkipRearm** setting to **0**. This resets the Activation grace-period timer.

Building your “Fully Unattended” Answer File

- Important Components & Properties for *specialize* Pass
 - Microsoft-Windows-Shell-Setup_neutral
 - ComputerName
 - An asterisk will generate a random computer name
 - If the <ComputerName>whatever</ComputerName> line is removed from the Answer File, the user will be prompted for a name during Mini-Setup
 - CopyProfile {true | false} (This is optional)
 - When sysprep /generalize run on Reference Machine the Profile of the locally logged in user is set as the default user profile.
 - ProductKey {xxxxx-xxxxx-xxxxx-xxxxx-xxxxx}
 - Specify a Product Key. If not used, Windows Welcome will prompt user
 - TimeZone {Eastern Standard Time | Central Standard Time | etc...}
 - Microsoft-Windows-International-Core (*also oobeSystem Pass* when used with the */oobe* Sysprep parameter)
 - InputLocal {en-US | de-DE | fr-FR | ...etc.} - Specifies keyboard layout
 - SystemLocale – Specifies default language for non-Unicode programs
 - UILanguage - Specifies the language of the machine's default user interface
 - UserLocale - Language settings for formatting dates, times, numbers, and currency

Building your “Fully Unattended” Answer File

- Important Components & Properties for *specialize* Pass
 - Microsoft-Windows-UnattendedJoin_neutral
 - OPTIONAL - Used to join machine to a Domain or Workgroup
 - Microsoft-Windows-Deployment_neutral\RunSynchronous
 - RunSynchronousCommand (This is optional)
 - Multiple commands must finish before executing the next command
 - Specify **net use administrator password /active:yes** to activate Administrator Account.
 - Microsoft-Windows-Deployment_neutral\RunAsynchronous
 - RunAsynchronousCommand (This is optional)
 - These always run after any RunSynchronous Commands
 - These do NOT wait for completion before moving to next command.
 - Microsoft-Security-SPP-UX_neutral
 - SkipAutoActivation {true | false}
 - Whether or not Windows Setup will automatically activate Windows
 - A valid Product Key is required to activate automatically
 - Microsoft-Windows-IE-InternetExplorer
 - (OPTIONAL) - AllowedSites | Home_Page | FavoritesList

Building your “Fully Unattended” Answer File

- Important Components & Properties for *oobeSystem* Pass
 - Microsoft-Windows-Shell-Setup_neutral
 - RegisteredOrganization | RegisteredOwner
 - OOBE
 - HideEULAPage {true | false}
 - NetworkLocation {Work | Home | Other}
 - ProtectYourPC {1 | 2 | 3}
 - Set to 3 if not using Windows Update to automatically patch the OS
 - UserAccounts
 - Can be used to create local accounts and assign their passwords
 - Maybe consider a local “installer” account or something similar
 - Need to create at least one user account or prompted during OOBE pass for one
 - AutoLogon – Can be used to specify a username / password of a user that should be logged into Windows during this pass. Can used with FirstLogonCommands if you need to run programs with a user that has administrative rights (This is optional)
 - FirstLogonCommands (This is optional)
 - SynchronousCommand - Specifies commands to run first time a user logs on to the computer

Building your “Fully Unattended” Answer File

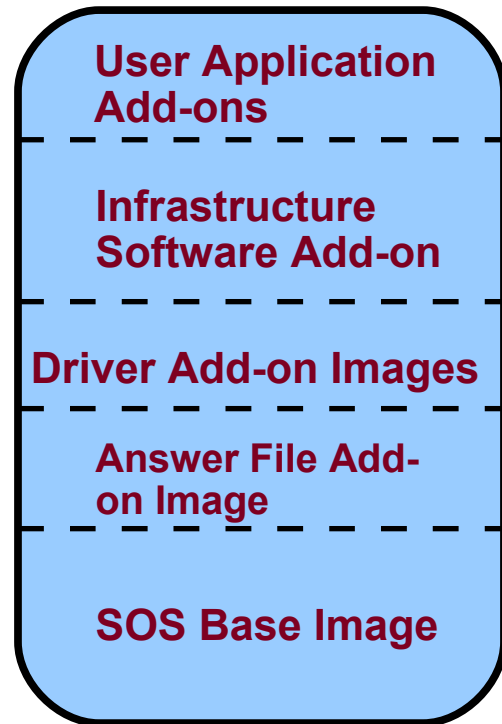
- Important Components & Properties for **oobeSystem** Pass
 - Microsoft-Windows-Shell-Setup_neutral (*continued*)
 - Display – can be used to set the following for the monitor
 - ColorDepth, DPI, HorizontalResolution, VerticalResolution, & RefreshRate
 - Microsoft-Windows-International-Core_neutral
 - Sets the language and locale settings for the machine and the user
 - Typically these settings are set here rather than the Specialize Pass. Requires the use of the **/oobe** parameter when running sysprep.
 - InputLocal {en-US | de-DE | fr-FR | ...etc.} - Specifies keyboard layout
 - SystemLocale – Specifies default language for non-Unicode programs
 - UILanguage - Specifies the language of the machine's default user interface
 - UserLocale - Language settings for formatting dates, times, numbers, and currency

Using ZCM's Image Explorer

Using ZCM's Image Explorer

- Why Use Image Explorer?

- Provides the ability to implement an “Imaging Stack” approach to deployment
- Segregates the SOS Base from other content
- Great for packaging up -
 - Machine specific hardware drivers
 - Applications (especially virtualized apps!)
 - Infrastructure software like ZAA and Novell Client
 - Even different Sysprep XML Answer Files can be packaged up and placed in the Windows cache locations for Mini-Setup to use!

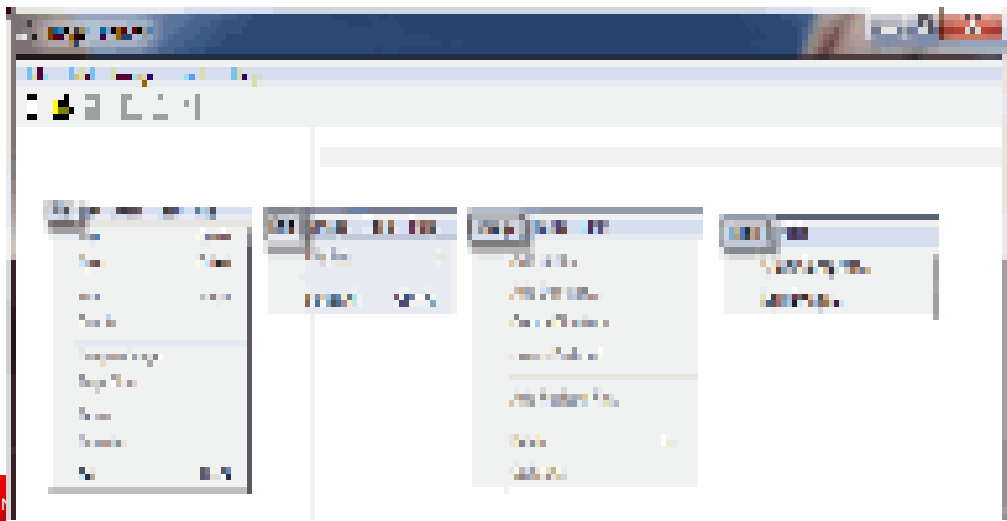


Using ZCM's Image Explorer

- Installing Image Explorer – for creating Add-ons:
 - On Technician's Computer install
 - novell-zenworks-jdk-1.6.0_xx.x86_64.msi
 - novell-zenworks-zmgexplorer-11.x.x.xxxx.msi
 - Can be found
 - at \common\msi\ directory on ZCM Installation Media
 - in the /opt/novell/zenworks/install/downloads/msi directory on your Linux ZCM Imaging Server
 - To launch:
 - Click **Start**
 - Right-click **Command Prompt** and select **Run as administrator**
 - At command prompt issue the commands:
 - **cd \Novell\ZENworks\bin\preboot**
 - **zmgexp.bat**

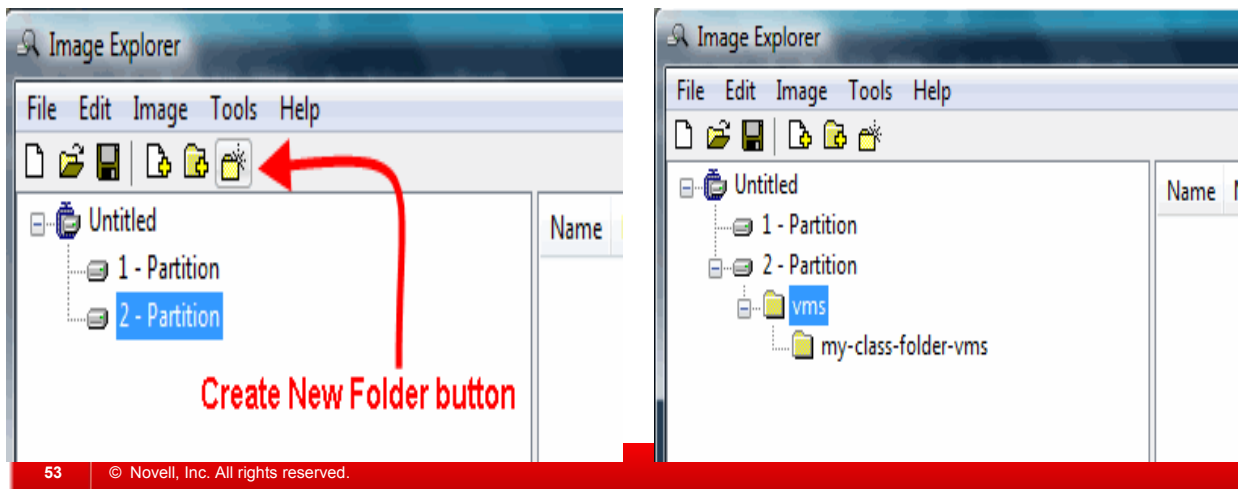
Using Image Explorer to Create Add-on Images

- Using Image Explorer
 - 1. Select **File > New**
 - This creates a “1-Partition” in the left pane
 - 2. Use **Image > Create Partition** to create a “2 – Partition”
 - Will create your directory/file structure under “2-Partition” for Windows 7

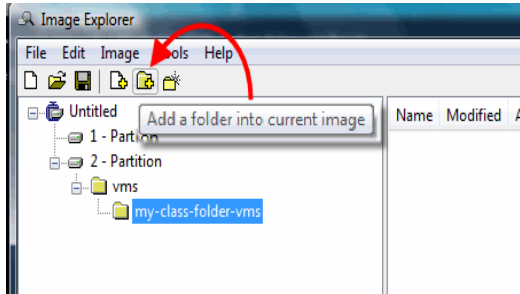


Using Image Explorer to Create Add-on Images

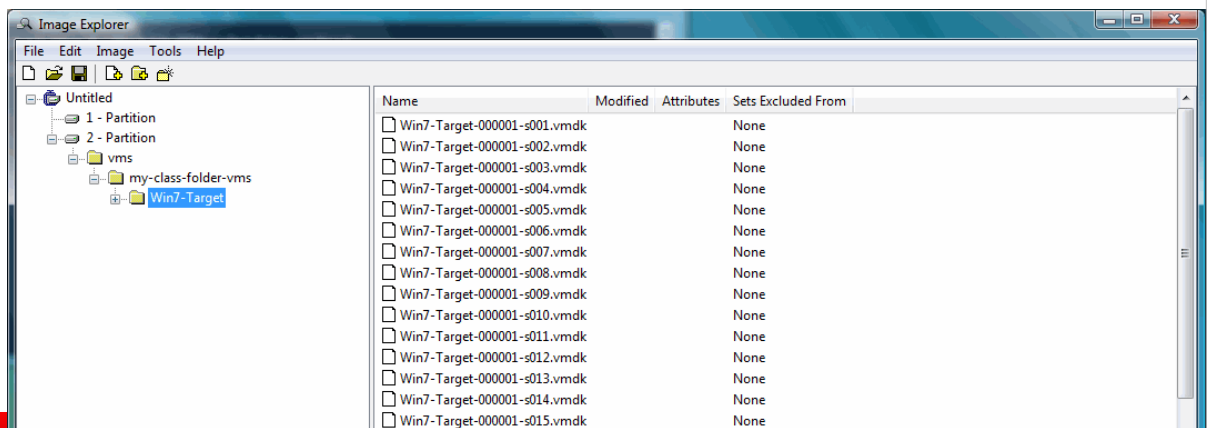
- Using Image Explorer (cont.)
 - 3. Click on **2 - Partition**
 - 4. Click the **Create New Folder** button to create the name for the folder that will contain the desired content
 - Expand the folder structure using the + sign to select the folder that contains the content you need (drivers, XML files, application setup programs, etc)



Using Image Explorer to Create Add-on Images



- Using Image Explorer (cont.)
- 5. Click the **Add Folder** button to browse and add an entire folder of content to the Add-on



Using Image Explorer to Create Add-on Images

- Using Image Explorer (cont.)
 - 6. In the left pane click on **Untitled**
 - 7. From the Image Explorer menu click **File > Save As**
 - 8. In the “File name” field type **filename.zmg** and click **Save**
 - 9. Copy the zmg file to **/var/opt/novell/zenworks/content-repo/images** directory on Image Server for Image Bundles

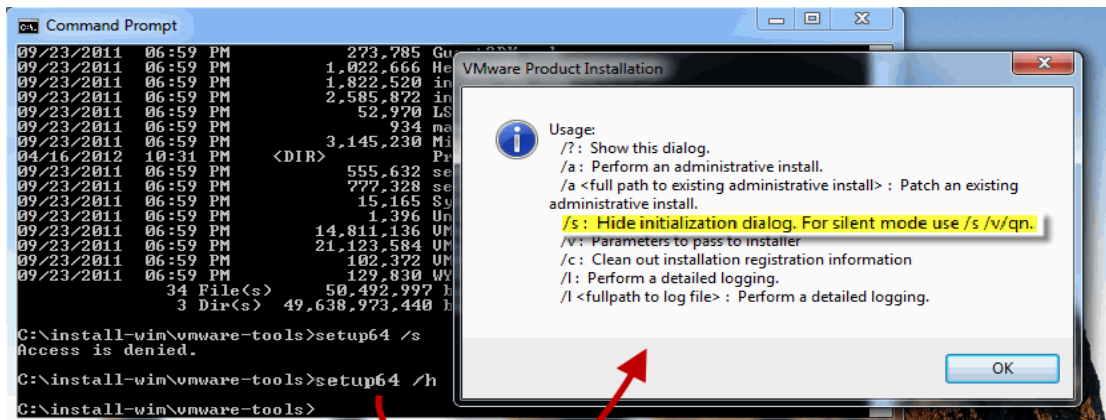
Dealing with Drivers and the ZENworks Adaptive Agent (ZAA)

Dealing with Drivers

- One of the big challenges - getting the drivers your machines need into your SOS base for Mini-Setup to find:
 - Fortunately Windows 7 SP1 does have a bunch of drivers in it. However...
 - You may have older hardware that requires driver support directly from the vendor of the hardware
 - May have real new hardware – same problem, need drivers directly from the hardware's vendor
 - Or the vendor's Windows Drivers aren't available in native .inf format
 - Requires a vendor supplied GUI install program
 - That install program may do proprietary things to install its drivers
 - May not have a command line switch to extract drivers from the vendor's installation package.

Dealing with Drivers

- What to do if the vendor supplies only a setup.exe or install.exe to install their drivers?
 - The setup program may have an “extraction” switch
 - Like a **/x** or **/a** to get drivers in their native .inf form
 - The setup program may have a “silent” switch
 - Runs the vendor's hardware driver install program without any UI.
 - Allows Mini-Setup to run the program to get the drivers installed



Dealing with Drivers

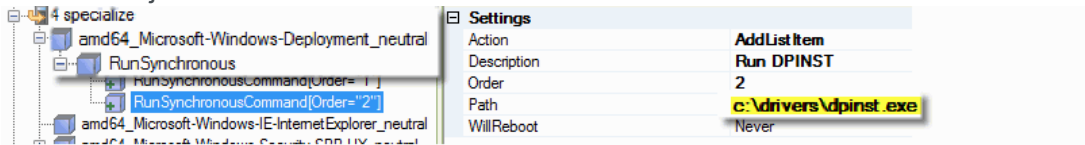
- What to do if the vendor supplies only a setup.exe or install.exe to install their drivers?
- The setup program can then be executed in Mini-Setup by coding either:
 - Specialize > Microsoft-Windows-Deployment_neutral > RunSynchronous
 - OobeSystem > Microsoft-Windows-Shell-Setup_neutral > FirstLogonCommands

The screenshot displays the Windows Answer File editor with two panes. The left pane, titled 'Answer File', shows a tree view of the configuration. The right pane, titled 'SynchronousCommand[Order="1"] Properties', shows the configuration details for a specific command.

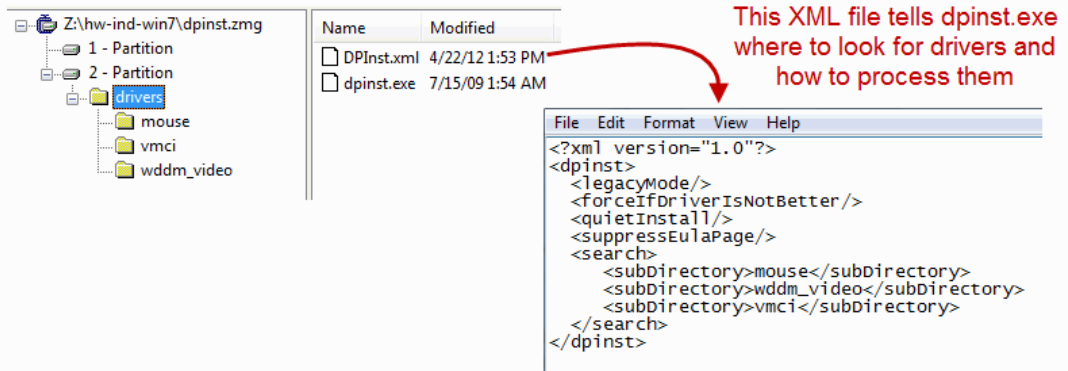
SynchronousCommand[Order="1"] Properties	
Properties	
AppliedConfigurationPass	7 oobeSystem
Component	Microsoft-Windows-Shell-Setup
KeyName	Order
Path	FirstLogonCommands/SynchronousCommand[Order="1"]
Settings	
Action	AddList Item
CommandLine	c:\vmware-tools\setup64.exe /s /v /qn
Description	Install All VMware Tools
Order	1
RequiresUserInput	false

Dealing with Drivers

- What if drivers are in .inf format?
 - Use Microsoft's DPINST.EXE
 - Part of the Windows Driver Kit (WDK)
 - Available from <http://msdn.microsoft.com/windows/hardware/hh852361>
 - Injects drivers that are in native .inf format into the Windows DriverStore.



Contents of the Driver Add-on Image



Dealing with Drivers

- What if drivers are in .inf format?
 - Use Microsoft's DPINST.EXE
 - If you don't have too many different machines requiring different drivers, you may want to persist all the drivers in the sysprepped SOS Base
 - In generalize > Microsoft-Windows-PnpSysprep_neutral:
 - DoNotCleanUpNonPresentDevices = true
 - Allows PnP Drivers for devices not detected on target machine during the specialize configuration pass to remain on the machine
 - PersistAllDeviceInstalls = true
 - Allows all PnP Drivers on the target machine to remain during the generalize configuration pass
 - This eliminates the need to reinstall drivers during the specialize configuration pass
 - For example: you support 8 different types of machines
 - If all drivers can be placed in Add-on Images in their native .inf format
 - Each target machine regardless of type would have the drivers for all of the 8 different types in its DriverStore throughout Mini-Setup

Dealing with the ZENworks Adaptive Agent

- Goal: After Mini-Setup completes and before user logs in, have ZAA installed and device registered in zone!
- Approach 1:
 - Install ZAA into SOS Base Image itself
 - Must use these commands before taking an image of Model machine
 - **zac unr**
 - **zac fsg -d**
 - Make sure your Registration Rules are set up.
 - Advantages:
 - No Add-on Image to build
 - Or pulling ZAA Install Package across the wire during Mini-Setup
 - Disadvantages:
 - If you forget to use the above zac commands and deploy the image – you have a big mess to clean up!
 - If you need to deploy a newer version of the ZAA, you must crack open your SOS Base to remove the old code and install the new

Dealing with the ZENworks Adaptive Agent

- Goal: After Mini-Setup completes and before user logs in, have ZAA installed and device registered in zone!
- Approach 2:
 - Build a Custom ZAA Installation Package that uses a Registration Key configured the way you need
 - Build an Add-on Image that contains this Custom ZAA Installation Package
 - Configure your Sysprep Answer File with RunSynchronous command in specialize pass or FirstLoginCommand in oobeSystem pass to run the ZAA Installation Package
 - Deploy the ZAA Add-on after your SOS Base Image goes down to a target
 - Advantages:
 - Makes your SOS Base Image smaller and more static in nature
 - Need to deploy a new version of ZAA, rebuild the Add-on only
 - Disadvantages:
 - Do have to remember to deploy the ZAA Add-on with your SOS Base Image

Dealing with the ZENworks Adaptive Agent

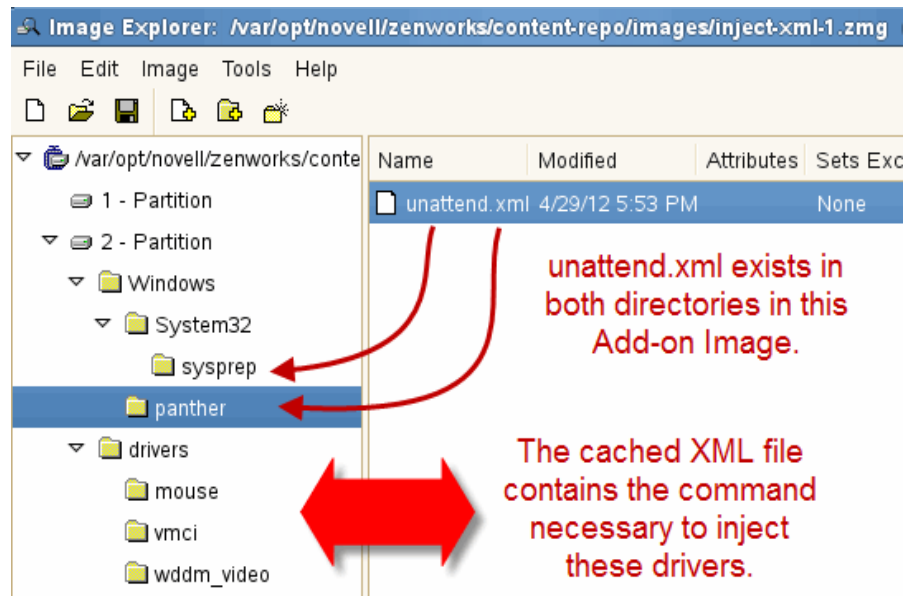
- Goal: After Mini-Setup completes and before user logs in, have ZAA installed and device registered in zone!
- Approach 3:
 - Leverage the [SetupComplete.cmd](#) script capability to install the ZAA
 - Script **must exist** in %WINDIR%\Setup\Scripts
 - Could be built into the SOS Base itself
 - Or brought down to target in an Add-on Image
 - The script runs in System Scope and after Mini-Setup completes
 - You can't have SetupComplete.cmd run some programs, reboot, and then pick up from where it left off in the script
 - Advantages:
 - Great way to do any post-build configs
 - Or run software installs that have silent or scripted capabilities in their installation programs
 - Disadvantages:
 - No error or exit codes of anything called in SetupComplete.cmd are reported back in any way

Using Add-ons to Cache Sysprep Answer Files

- Goal: Have SOS Base configured differently by Mini-Setup based on contents of the Sysprep XML Answer File
- When running Sysprep, regardless of what you name your answer file on the /unattend parameter -
 - Sysprep will rename it `unattend.xml`
 - Cache `unattend.xml` in `%WINDIR%\panther` and `%WINDIR%\System32\sysprep`
 - These cached copies are used by different Configuration Passes
- This gives you the ability to build a ZCM Add-on Image that places an `unattend.xml` on the target prior to the start of Mini-Setup
 - Just another technique for addressing different hardware configurations using the same SOS Base

Using Add-ons to Cache Sysprep Answer Files

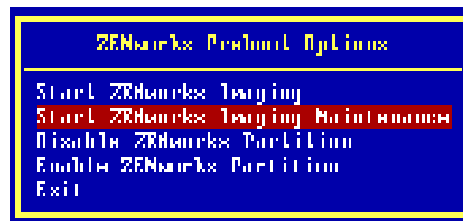
- Goal: Have SOS Base configured differently by Mini-Setup based on contents of the Sysprep XML Answer File - An Example:



Deploying your SOS Base and Add-On Images

Capturing an Image of Your Model Computer (SOS Base Image)

- Since the Model Computer is not registered, use the PXE menu to drive the image creation process:
 - Boot the Model Computer
 - The machine should have PXE enabled in the BIOS
 - Press Ctrl-Alt keys to get ZENworks PXE Menu



- Select Start ZENworks Imaging Maintenance
- At the bash prompt use the 'img' command to create the image. For instance:
 - **img -mp win7ref.zmg -ip=\$PROXYADDR -comp=1**

Multicasting Using Image Bundles

- Step-by-step - creating a Multicast Image Set Bundle used to deploy your SOS Base and Add-ons
 - 1. Launch the ZCC and authenticate into the zone.
 - 2. Click **Bundles** in upper-left pane
 - 3. Under “Bundles” header click **New > Bundle**
 - 4. In “New Bundle Type” pane select **Preboot Bundle**. Click **Next**.
 - 5. Under “New Bundle Category” select **Multicast Image Set**. Click **Next**.

Multicasting Using Image Bundles

- Step-by-step (cont.)

- 6. On the “Step 3: Define Details” screen enter a **name** for your bundle. Click **Next**.
 - > Good idea would be to document what the bundle is for in the **Description Field**.

The screenshot shows a web-based form titled "Step 3: Define Details". The form has several input fields and a checkbox. The "Name" field is filled with "Image Bundle". The "Description" field is filled with "This bundle is for...". Below the description field, there is a checkbox labeled "Use this bundle as the default for this device type" which is checked. At the bottom of the form, there are two buttons: "Previous" and "Next".



Multicasting Using Image Bundles

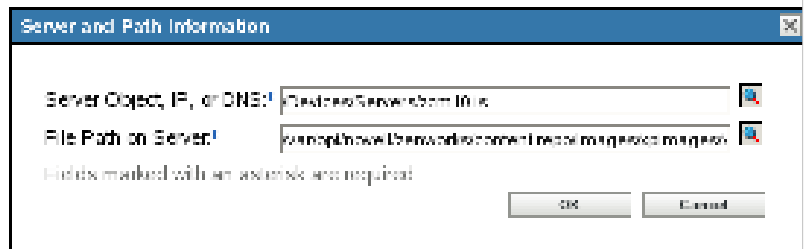
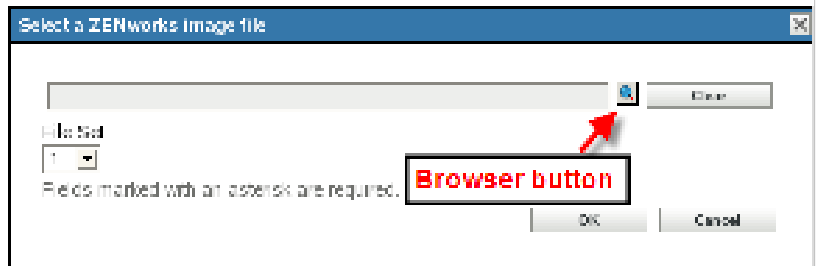
- Step-by-step (cont.)

- 7. On the “Step 4: Multicast Details” screen enter the **number of laptops** to be imaged in the “Number of clients needed...” field.
- 8. On the “Step 4: Multicast Details” screen enter the **number of minutes** to wait before kicking off the first multicast in the “Time to wait to start the multicast...” field.
- **IMPORTANT:** both these fields are trigger events for starting the multicast.
 - > So if “Number of clients” = 10 and “Time to wait” = 5, then if 5 minutes elapses since the last client joins the session, start the multicast without all 10 clients.

Multicasting Using Image Bundles

• Step-by-step (cont.)

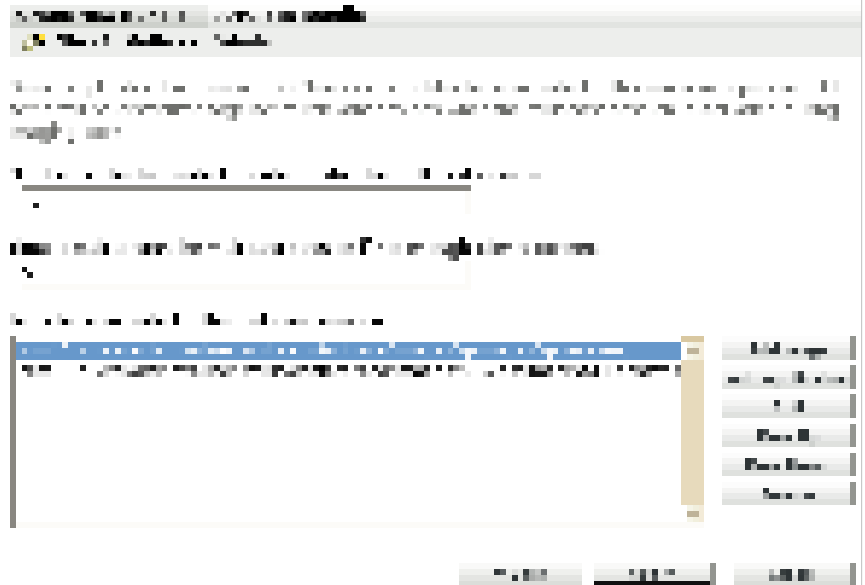
- 9. Click the **Add Image button**.
- 10. Click the **Magnifying Glass icon** to begin browsing for the base image for the host. 
- 11. Click the **Magnifying Glass icons** to select your Image Server and the ZMG file that contains the SOS Base image. 
- 12. Click **OK**. Click **OK** again.



Multicasting Using Image Bundles

- Step-by-step (cont.)

- 13. Repeat steps 9 – 12 inclusive for each additional Add-on ZMG file you want to multicast out. These ZMGs will contain the drivers, ZAA, XML Files, and other applications you want to lay down on the target machines.



- 14. Click **Next**.



Success: The Bundle has been created successfully

- 15. Click **Finish**.

The screenshot shows the 'Bundles' window with a table of image bundles. A red arrow points from the text in step 15 to the 'Finish' button in the screenshot above.

Status	Name	Type	Category	Enabled	Version
<input type="checkbox"/>	WinClassBundle	Imaging Bundle	Multicast Image Set	Yes	0
<input type="checkbox"/>	1-141				July 28, 2014

Multicasting Using Image Bundles

- Step-by-step (cont.)

- 16. Click the **Configuration Link** in the upper left pane.
- 17. Expand the **Device Management** snapshot.
- 18. Click the **Preboot Services Link**.
- 19. Expand the **Device Imaging Work Assignment** snapshot.
- 20. Under Hardware Rules, click the **Add button**.

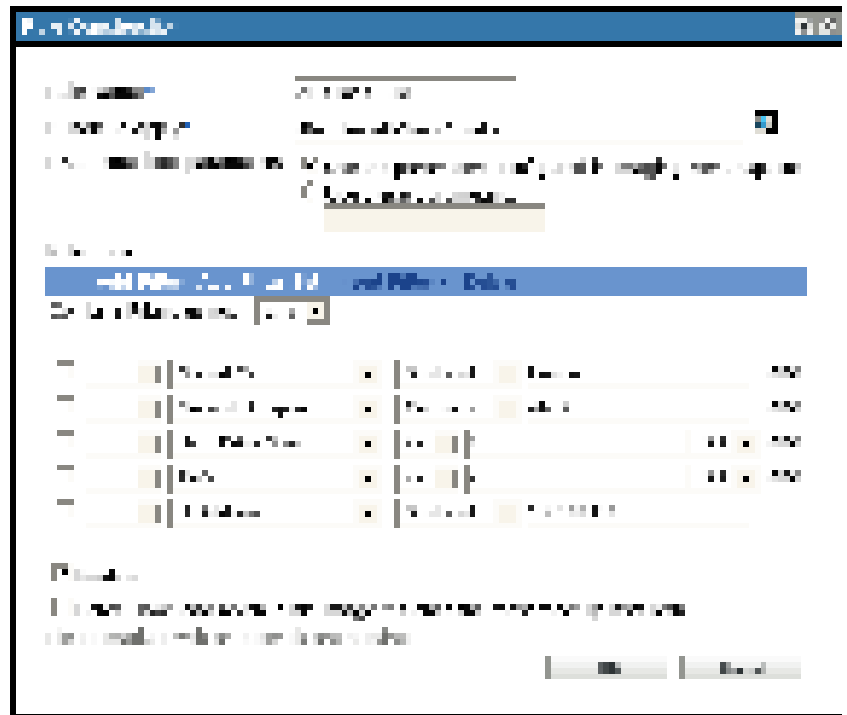
Multicasting Using Image Bundles

- Step-by-step (cont.)

- 21. Using the “Rule Construction” screen:

- > Name the Rule
 - > Select the bundle you created previously
 - > Add as many or as few filters to the Rule Logic as you need
 - > Click **OK**.

- 22. Click **OK**. Power up laptops to join the first multicast session.



Summary

- Developing a SOS Hardware Independent Base Image requires an understand of Microsoft's Setup Process
- Being able to leverage both Microsoft's WAIK and ZCM's Imaging features, and understanding the techniques outlined here, provides the Administrator:
 - the flexibility to get Windows 7 installed and configured on target machines as desired
 - without having base images for every type of machine you support!
- Practice makes perfect!
 - Set up the simple lab environment discussed here to develop your Windows 7 deployment techniques