White Paper

OS Deployment on Standalone Cisco UCS C-Series Rack Servers with Microsoft Windows Deployment Services

What You Will Learn

This document discusses how to:

- Locate, extract, and prepare Cisco UCS® C-Series Rack Server drivers for use in Microsoft Windows Deployment Services (WDS) for Microsoft Windows 2008
- Locate, extract, and prepare Cisco UCS C-Series Server drivers for use in Microsoft WDS for Microsoft Windows 2008 R2
- Create driver packs in Microsoft WDS that contain all required Cisco UCS C-Series Server drivers for any supported OS
- Create install images (OS repository) for Microsoft Windows 2008 and 2008 R2
- Create a boot image in Microsoft WDS (Microsoft Windows Preexecution [PE] image)
- Add the driver packs to the boot image
- Configure Microsoft WDS to use the new boot image for server discovery
- Edit the unattend.xml file for each OS version available in the installed images

This document assumes that the Microsoft WDS role is installed and configured on a Microsoft Windows server (this process is not discussed in this document).

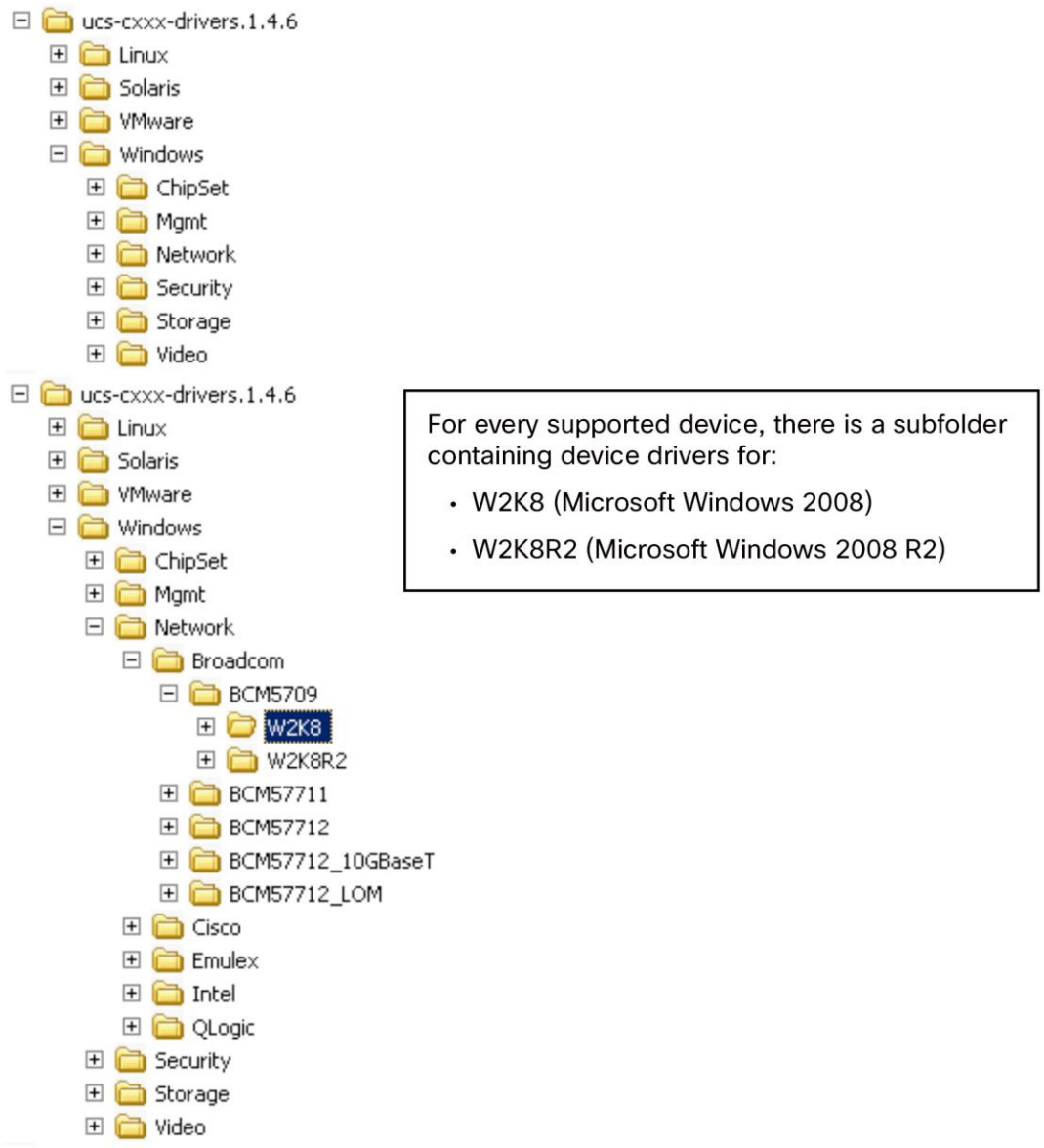
Locating and Preparing Drivers: Microsoft Windows 2008

Cisco unifies the OS drivers for Cisco UCS C-Series Servers, packaging certified drivers into a unified ISO image based on the firmware level with which they were certified. This document uses Microsoft Windows OS drivers based on Cisco UCS C-Series Servers Firmware Release 1.4.6.

Here is a direct link to the driver ISO image for Cisco UCS C-Series Servers Firmware Release 1.4.6: http://download.cisco.com/swc/esd/06/283860950/guest/ucs-cxxx-drivers.1.4.6.iso?

After the ISO image is extracted (for example, using WinZip, WinRAR, or 7-Zip), the drivers are placed into folders based on OS category: Linux, Solaris, Microsoft Windows, or VMware. Only the Microsoft Windows folder is discussed here (Figure 1).

Figure 1. Driver ISO Directory Listing: Microsoft Windows 2008



The next steps involve copying device driver folders from the driver ISO image. The goal is to create a folder structure containing all the Microsoft Windows 2008 device drivers that are required for the Microsoft WDS boot image and Microsoft WDS driver pack. You should copy and rename the subfolders so that you can easily identify the device vendor, device model, and OS and architecture to which the driver applies. For example, for the Intel ICH10 disk controller, you could use Cisco_Intel_ICH10_W2K8_x64.

The drivers in the ISO are not all in a consistent format. The best approach is to extract the drivers for a specific device into a single folder that includes all required device driver files (.cat, .inf, and .sys). Some drivers are simplified, but others require some manipulation (for example, you may need to extract drivers from an executable installation file or identify the specific driver folder that is required for Microsoft Windows plug-and-play support).

Note: If a small ISO file is included in the driver directory, this ISO contains the exact drivers needed for this exercise.

The drivers are divided into five categories: chip sets, disk controllers, network adapters, SAN host bus adapters (HBAs), and converged network adapters (CNAs).

Tables 1 through 5 provide matrices of the five categories of devices that are supported by the Cisco UCS C-Series Servers, including any special instructions required for extracting the drivers. Figure 2 provides an example of driver extraction using the WinRAR right-click context menu.

Table 1. Chip Set Drivers

Chip Sets	Driver Path	Special Instructions
Cisco UCS C22	\Windows\ChipSet\Intel\C22\W2K8\All	None
Cisco UCS C24	\Windows\ChipSet\Intel\C24\W2K8\All	None
Cisco UCS C200	\Windows\ChipSet\Intel\C200\W2K8\All	None
Cisco UCS C210	\Windows\ChipSet\Intel\C210\W2K8\All	None
Cisco UCS C220	\Windows\ChipSet\Intel\C220\W2K8\All	None
Cisco UCS C240	\Windows\ChipSet\Intel\C240\W2K8\All	None
Cisco UCS C250	\Windows\ChipSet\Intel\C250\W2K8\All	None
Cisco UCS C260	\Windows\ChipSet\Intel\C260\W2K8\All	None
Cisco UCS C460	\Windows\ChipSet\Intel\C460\W2K8\All	None

Table 2. Disk Controller Drivers

Disk Controllers	Driver Path	Special Instructions
Onboard ICH10	\Windows\Storage\Intel\ICH10R\W2K8R2\x64	Extract and use the contents of ICH10R_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
Intel C600	\Windows\Storage\Intel\C600\W2K8R2\x64	Extract and use the contents of C600_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 1064E	\Windows\Storage\LSI\106xE\W2K8R2\x64	Extract and use the contents of 106xE_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 1068E	\Windows\Storage\LSI\106xE\W2K8R2\x64	Extract and use the contents of 106xE_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9260-4i	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9260-8i	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9261-8i	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9280-4i4e	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS3081E-R	\Windows\Storage\LSI\3081E-R\W2K8R2\x64	Extract and use the contents of 3081E-R_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS 2008-8i	\Windows\Storage\LSI\2008M\W2K8R2\x64	Extract and use the contents of 2008M_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS 8708EM2	\Windows\Storage\LSI\8708EM2\W2K8R2\x64	Extract and use the contents of 8708EM2_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.

Disk Controllers	Driver Path	Special Instructions
LSI 9201 Mass Storage	\Windows\Storage\LSI\9201\W2K8R2\x64	Extract and use the contents of 9201_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.

Figure 2. Example of Driver Extraction (LSI 1064E Driver) Using WinRAR

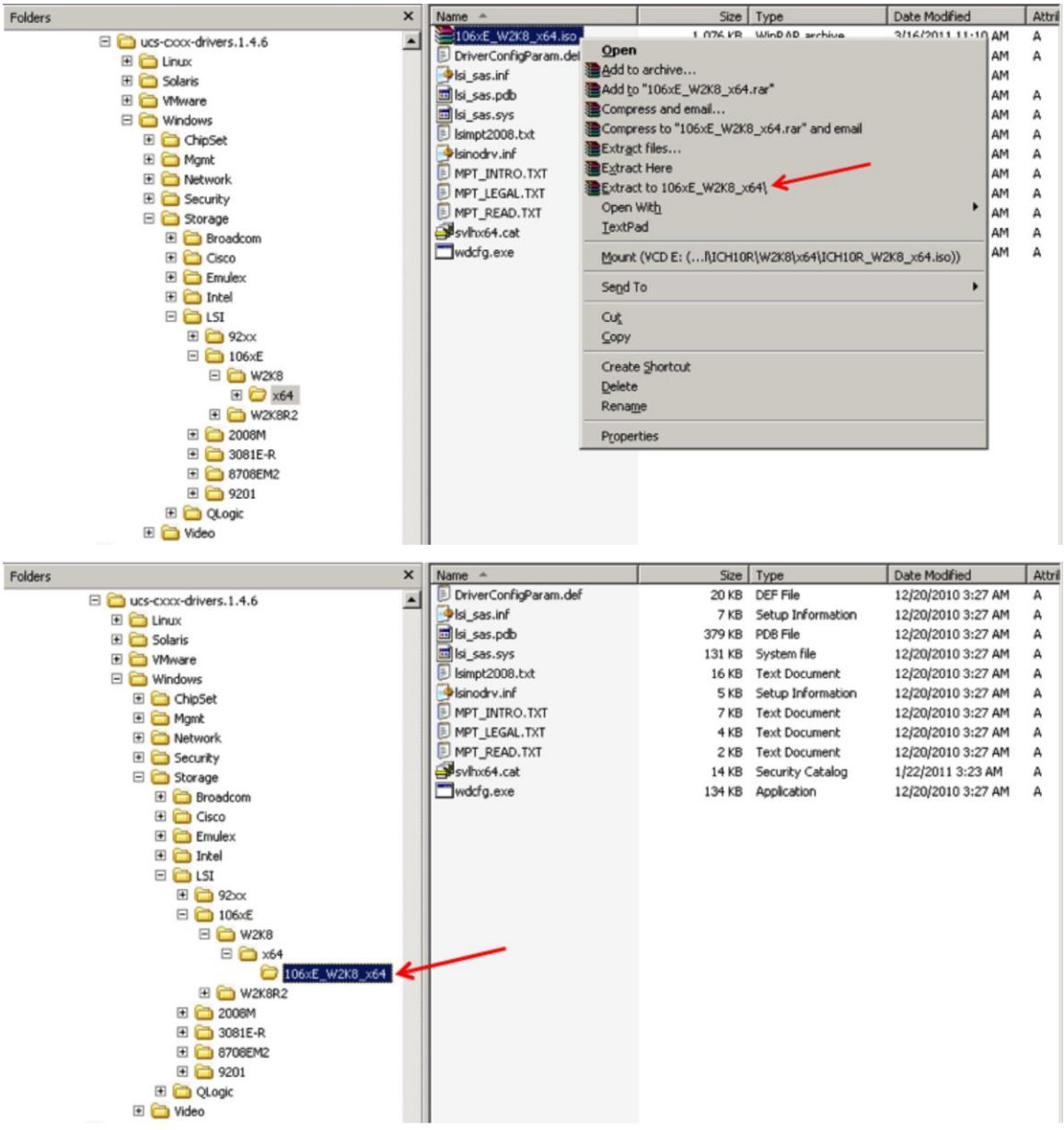


Table 3. Network Adapter Drivers

Network Adapters	Driver Path	Special Instructions
Intel 82576NS (LAN on Motherboard [LOM])	\Windows\Network\Intel\82576\W2K8\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PRO1000\Winx64\NDIS61\.
Intel Quad E1G44ETG1P20	\Windows\Network\Intel\82576\W2K8\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PRO1000\Winx64\NDIS61\.
Intel X520	\Windows\Network\Intel\X520\W2K8\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PROXGB\Winx64\NDIS61\.
Intel I350	\Windows\Network\Intel\I350\W2K8\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PRO1000\Winx64\NDIS61\.
Broadcom 5709 (Small Computer System Interface over IP [iSCSI])	\Windows\Network\Broadcom\ BCM5709\W2K8\x64\ois	None
Broadcom 5709 (Network Interface Card [NIC])	\Windows\Network\Broadcom\ BCM5709\W2K8\x64\nic	None
Broadcom 57711 (iSCSI)	\Windows\Network\Broadcom\ BCM57711\W2K8\x64\ois	None
Broadcom 57711 (NIC)	\Windows\Network\Broadcom\ BCM57711\W2K8\x64\nic	None
Broadcom 57712 (iSCSI)	\Windows\Network\Broadcom\ BCM57712\W2K8\x64\ois	None
Broadcom 57712 (NIC)	\Windows\Network\Broadcom\ BCM57712\W2K8\x64\nic	None
Broadcom 57712_10GBASE-T (iSCSI)	\Windows\Network\Broadcom\ BCM57712_10GBaseT\W2K8\x64\ois	None
Broadcom 57712_10GBASE-T (NIC)	\Windows\Network\Broadcom\ BCM57712_10GBaseT\W2K8\x64\nic	None
Broadcom 57712_LOM (iSCSI)	\Windows\Network\Broadcom\ BCM57712_LOM\W2K8\x64\ois	None
Broadcom 57712_LOM (NIC)	\Windows\Network\Broadcom\ BCM57712_LOM\W2K8\x64\nic	None
Mellanox ConnectX-2 EN	Not certified by Cisco for Microsoft Windows	—

Table 4. SAN HBA Drivers

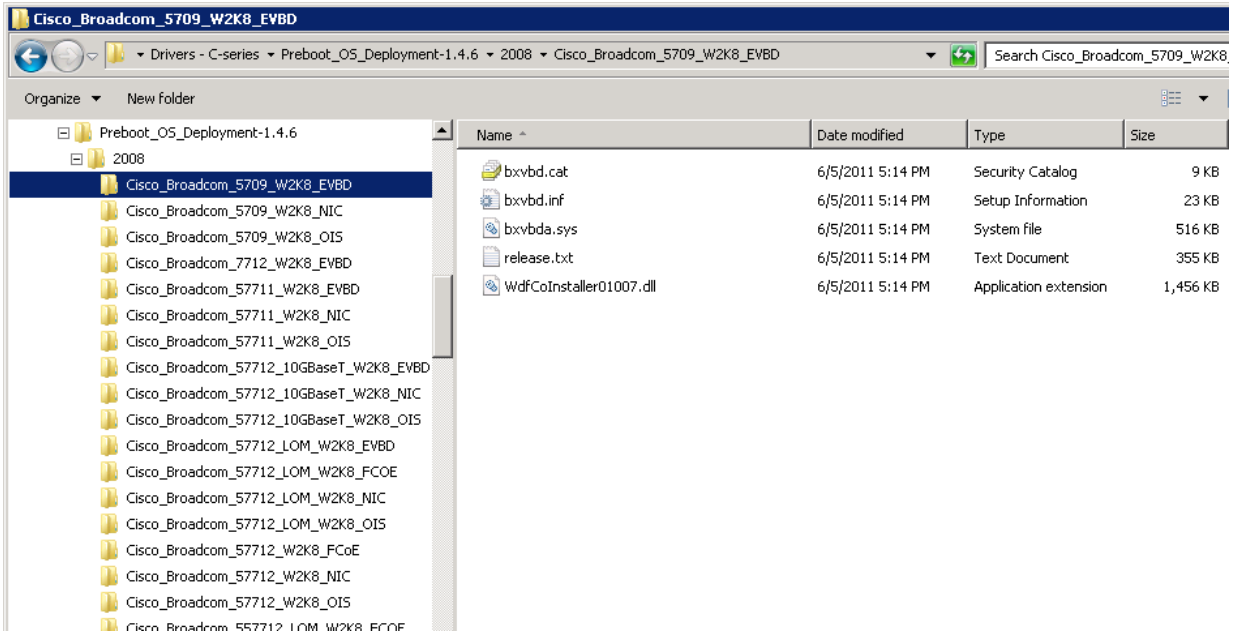
SAN HBAs	Driver Path	Special Instructions
Emulex LPe 11002 (4 Gb)	\Windows\Storage\Emulex\LPe1x002\W2K8\x64	None
Emulex LPe 12002 (8 Gb)	\Windows\Storage\Emulex\LPe1x002\W2K8\x64	None
QLogic QLE2462 (4 Gb)	\Windows\Storage\QLogic\QLE2x62\W2K8\x64	None
QLogic QLE2562 (8 Gb)	\Windows\Storage\QLogic\QLE2x62\W2K8\x64	None

Table 5. CNA Drivers

CNAs	Driver Path	Special Instructions
Cisco UCS P81E Virtual Interface Card (VIC) (Ethernet-enic)	\Windows\Network\Cisco\P81E\W2K8R2\x64	None
Cisco UCS P81E VIC (Fibre Channel over Ethernet [FCoE]–fnic)	\Windows\Storage\Cisco\P81E\W2K8R2\x64	None
Cisco USC VIC 1225 (Ethernet-enic)	\Windows\Network\Cisco\1225\W2K8R2\x64	None
Cisco UCS VIC 1225 (FCoE-fnic)	\Windows\Storage\Cisco\1225\W2K8R2\x64	None
Emulex OCe10102-F (Ethernet)	\Windows\Network\Emulex\OCe10102\W2K8R2\x64	None
Emulex OCe10102-F (FCoE)	\Windows\Storage\Emulex\OCe10102\W2K8R2\x64	None
Emulex OCe11102-F (Ethernet)	\Windows\Network\Emulex\OCe11102\W2K8R2\x64	None
Emulex OCe11102-F (FCoE)	\Windows\Storage\Emulex\OCe11102\W2K8R2\x64	None
QLogic QLE8152 (Ethernet)	\Windows\Network\QLogic\QLE8152\W2K8R2\x64	None
QLogic QLE8152 (FCoE)	\Windows\Storage\QLogic\QLE8152\W2K8R2\x64	None
QKogic QLE8242 (Ethernet)	\Windows\Network\QLogic\QLE8242\W2K8R2\x64	None
QLogic QLE8242 (FCoE)	\Windows\Storage\QLogic\QLE8242\W2K8R2\x64	None
Broadcom 57712 (FCoE)	\Windows\Storage\Broadcom\BCM57712\W2K8R2\x64\FCoE	None
Broadcom 57712_LOM (FCoE)	\Windows\Storage\Broadcom\BCM57712_LOM\W2K8R2\x64\FCoE	None

The end result of this exercise should be a folder structure containing all the drivers referenced in Tables 1 through 5 (Figure 3).

Figure 3. Folder Structure for All Drivers



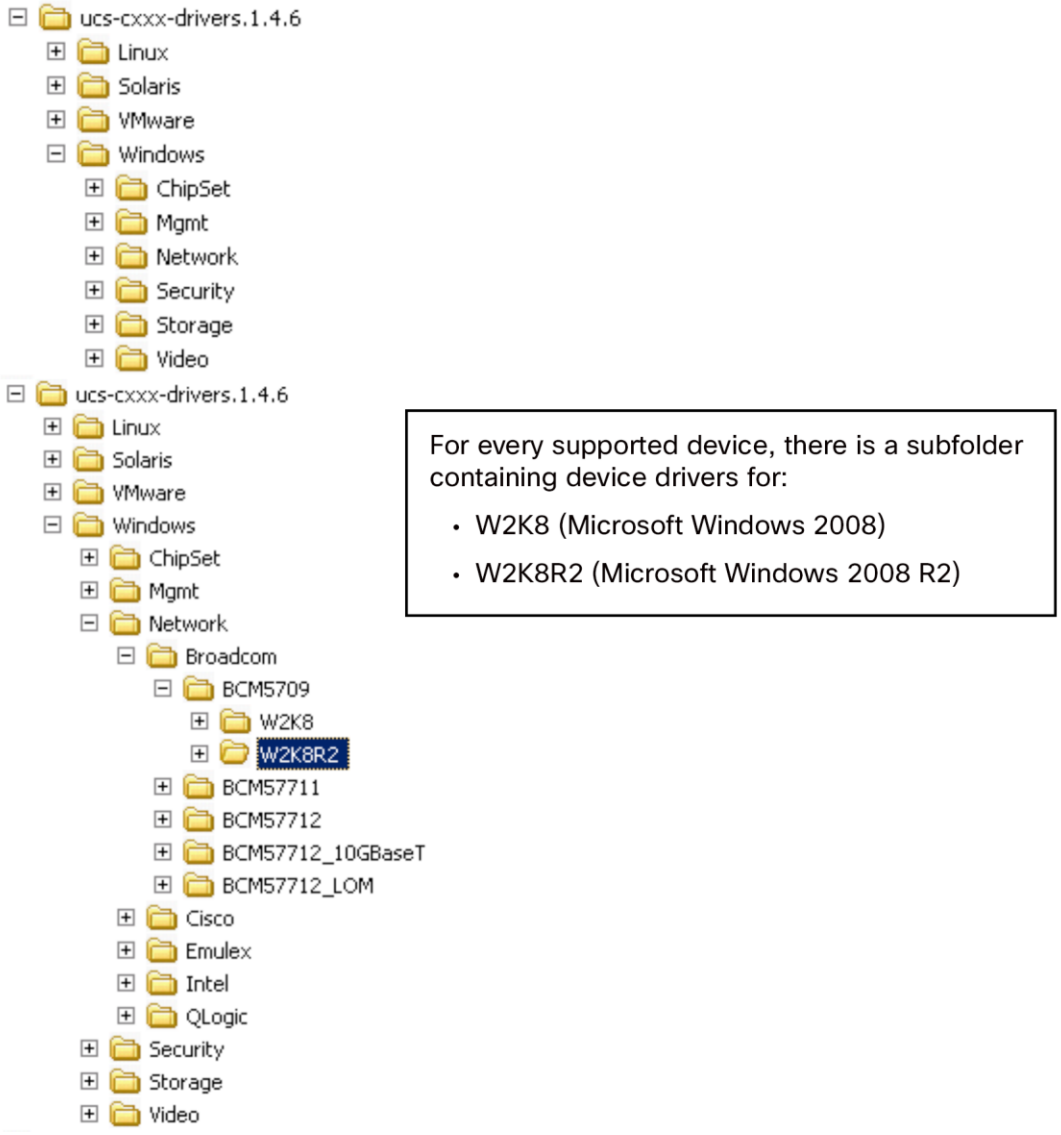
Locating and Preparing Drivers: Microsoft Windows 2008 R2

Cisco unifies the OS drivers for Cisco UCS C-Series Servers, packaging certified drivers into a unified ISO image based on the firmware level with which they were certified. This document uses Microsoft Windows OS drivers based on Cisco UCS C-Series Servers Firmware Release 1.4.6.

Here is a direct link to the driver ISO for Cisco UCS C-Series Servers Firmware Release 1.4.6: http://download.cisco.com/swc/esd/06/283860950/guest/ucs-cxxx-drivers.1.4.6.iso?

After the ISO is extracted (for example, using WinZip, WinRAR, or 7-Zip), the drivers are placed into folders based on OS category: Linux, Solaris, Microsoft Windows, or VMware. Only the Microsoft Windows folder is discussed here (Figure 4).

Figure 4. Driver ISO Directory Listing: Microsoft Windows 2008 R2



The next steps will involve copying device driver folders from the driver ISO. The goal is to create a folder structure containing all the Microsoft Windows 2008 R2 device drivers that are required for the Microsoft WDS boot image and Microsoft WDS driver pack. You should rename the subfolders so that you can easily identify the device vendor, device model, and OS and architecture to which the driver applies. For example, for the Intel ICH10 disk controller, you could use Cisco_Intel_ICH10_W2K8R2_x64.

The drivers in the ISO are not all in a consistent format. The best approach is to extract the drivers for a specific device into a single folder that includes all required device driver files (.cat, .inf, and .sys). Some drivers are simplified, but others require some manipulation (for example, you may need to extract drivers from an executable installation file or identify the specific driver folder that is required for Microsoft Windows plug-and-play support).

Note: If a small ISO file is included in the driver directory, this ISO contains the exact drivers needed for this exercise.

The drivers are divided into five categories: chip sets, disk controllers, network adapters, SAN host bus adapters (HBAs), and converged network adapters (CNAs).

Tables 6 through 10 provide matrices of the five categories of devices that are supported by the Cisco UCS C-Series Servers, including any special instructions required for extracting the drivers. Figure 5 provides an example of driver extraction using the WinRAR right-click context menu.

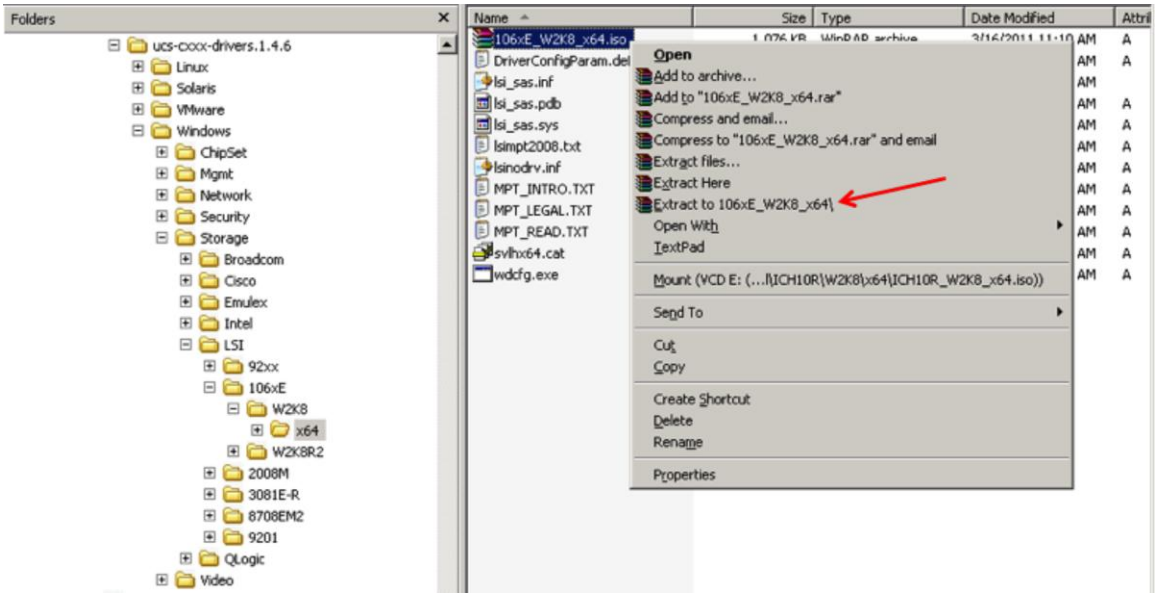
Table 6. Chip Set Drivers

Chip Sets	Driver Path	Special Instructions
Cisco UCS C22	\Windows\ChipSet\Intel\C22\W2K8R2\All	None
Cisco UCS C24	\Windows\ChipSet\Intel\C24\W2K8R2\All	None
Cisco UCS C200	\Windows\ChipSet\Intel\C200\W2K8R2\	Not required (Inbox driver)
Cisco UCS C210	\Windows\ChipSet\Intel\C210\W2K8R2\	Not required (Inbox driver)
Cisco UCS C220	\Windows\ChipSet\Intel\C220\W2K8R2\All	None
Cisco UCS C240	\Windows\ChipSet\Intel\C240\W2K8R2\All	None
Cisco UCS C250	\Windows\ChipSet\Intel\C250\W2K8R2\	Not required (Inbox driver)
Cisco UCS C260	\Windows\ChipSet\Intel\C260\W2K8R2\All	None
Cisco UCS C460	\Windows\ChipSet\Intel\C460\W2K8R2\All	None

Table 7. Disk Controller Drivers

Disk Controllers	Driver Path	Special Instructions
Onboard ICH10	\Windows\Storage\Intel\ICH10R\W2K8R2\x64	Extract and use the contents of ICH10R_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
Intel C600	\Windows\Storage\Intel\C600\W2K8R2\x64	Extract and use the contents of C600_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 1064E	\Windows\Storage\LSI\106xE\W2K8R2\x64	Extract and use the contents of 106xE_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 1068E (Mezzanine Card)	\Windows\Storage\LSI\106xE\W2K8R2\x64	Extract and use the contents of 106xE_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9260-4i	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9260-8i	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9261-8i	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9280-4i4e	\Windows\Storage\LSI\92xx\W2K8R2\x64	Extract and use the contents of 92xx_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS3081E-R	\Windows\Storage\LSI\3081E-R\W2K8R2\x64	Extract and use the contents of 3081E-R_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS 2008-8i	\Windows\Storage\LSI\2008M\W2K8R2\x64	Extract and use the contents of 2008M_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS 8708EM2	\Windows\Storage\LSI\8708EM2\W2K8R2\x64	Extract and use the contents of 708EM2_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9201 Mass Storage	\Windows\Storage\LSI\9201\W2K8R2\x64	Extract and use the contents of 9201_W2K8R2_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.

Figure 5. Example of Driver Extraction (LSI 1064E Driver) Using WinRAR



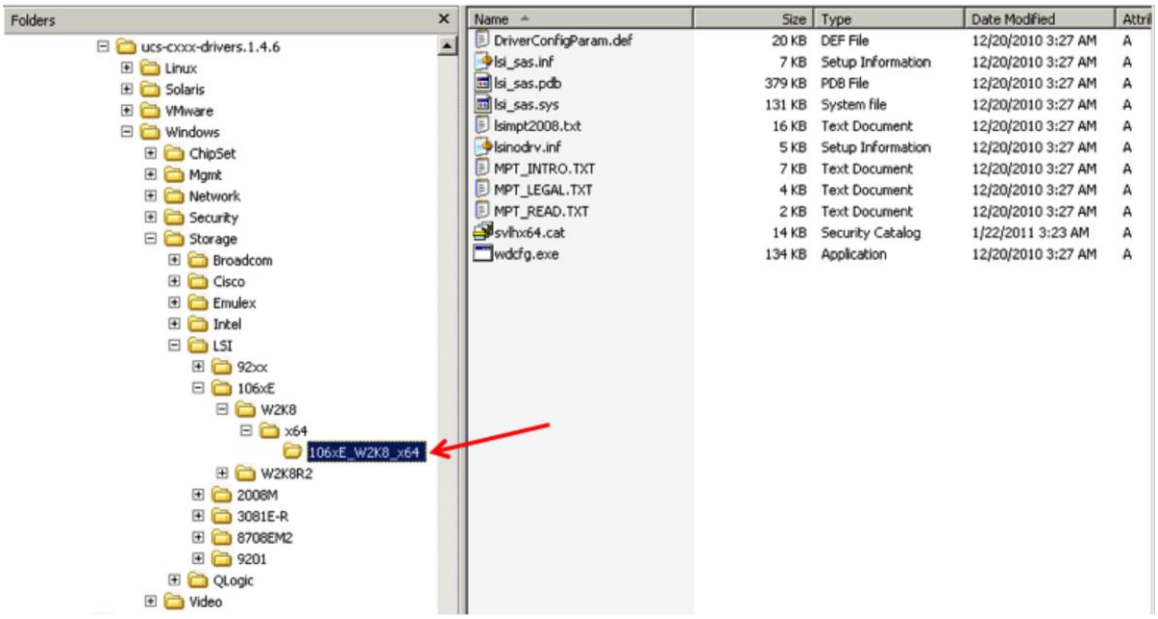


Table 8. Network Adapter Drivers

Network Adapters	Driver Path	Special Instructions
Intel 82576NS (LOM)	\Windows\Network\Intel\82576\W2K8R2\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PRO1000\Winx64\NDIS61\.
Intel Quad E1G44ETG1P20	\Windows\Network\Intel\82576\W2K8R2\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PRO1000\Winx64\NDIS61\.
Intel X520	\Windows\Network\Intel\X520\W2K8R2\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PROXGB\Winx64\NDIS61\.
Intel I350	\Windows\Network\Intel\I350\W2K8R2\x64	Extract PROWinx64.exe. Use the contents of \PROWinx64\PRO1000\Winx64\NDIS61\.
Broadcom 5709 (iSCSI)	\Windows\Network\Broadcom\ BCM5709\W2K8R2\x64\ois	None
Broadcom 5709 (NIC)	\Windows\Network\Broadcom\ BCM5709\W2K8R2\x64\nic	None
Broadcom 57711 (iSCSI)	\Windows\Network\Broadcom\ BCM57711\W2K8R2\x64\ois	None
Broadcom 57711 (NIC)	\Windows\Network\Broadcom\ BCM57711\W2K8R2\x64\nic	None
Broadcom 57712 (iSCSI)	\Windows\Network\Broadcom\ BCM57712\W2K8R2\x64\ois	None
Broadcom 57712 (NIC)	\Windows\Network\Broadcom\ BCM57712\W2K8R2\x64\nic	None
Broadcom 57712_10GBASE-T (iSCSI)	\Windows\Network\Broadcom\ BCM57712_10GBaseT\W2K8R2\x64\ois	None
Broadcom 57712_10GBASE-T (NIC)	\Windows\Network\Broadcom\ BCM57712_10GBaseT\W2K8R2\x64\nic	None
Broadcom 57712_LOM (iSCSI)	\Windows\Network\Broadcom\ BCM57712_LOM\W2K8R2\x64\ois	None
Broadcom 57712_LOM (NIC)	\Windows\Network\Broadcom\ BCM57712_LOM\W2K8R2\x64\nic	None
Mellanox ConnectX-2 EN	Not certified by Cisco for Microsoft Windows	—

Table 9. SAN HBA Drivers

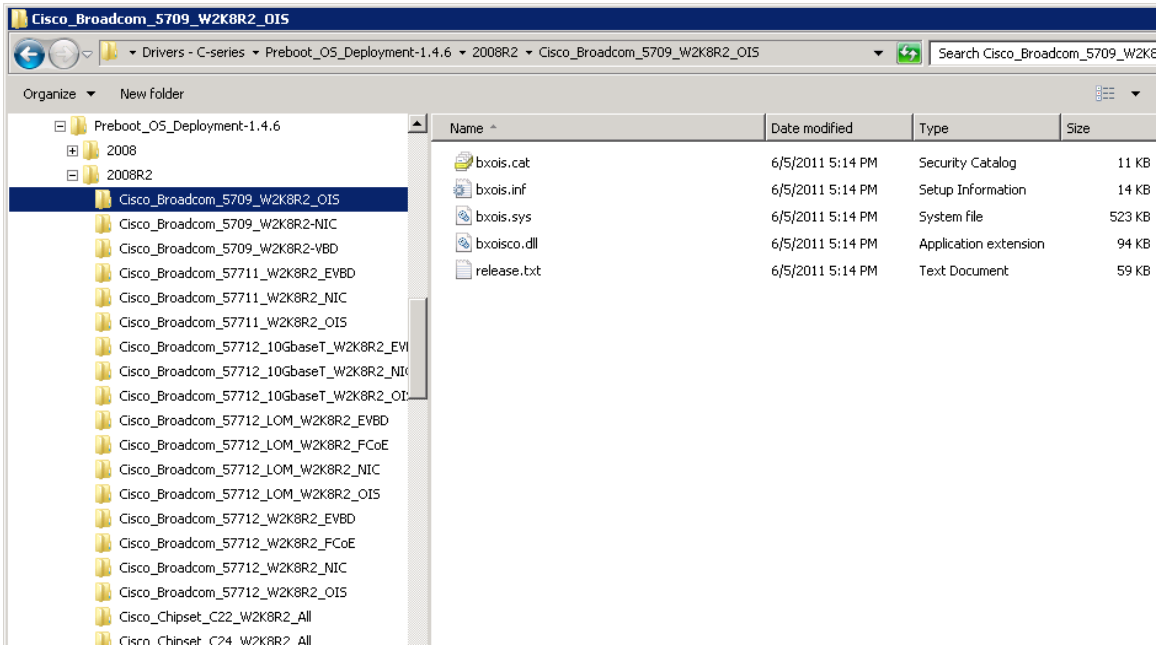
SAN HBAs	Driver Path	Special Instructions
Emulex LPe 11002 (4 Gb)	\Windows\Storage\Emulex\LPe1x002\W2K8R2\x64	None
Emulex LPe 12002 (8 Gb)	\Windows\Storage\Emulex\LPe1x002\W2K8R2\x64	None
QLogic QLE2462 (4 Gb)	\Windows\Storage\QLogic\QLE2x62\W2K8R2\x64	None
QLogic QLE2562 (8 Gb)	\Windows\Storage\QLogic\QLE2x62\W2K8R2\x64	None

Table 10. CNA Drivers

CNAs	Driver Path	Special Instructions
Cisco UCS P81E VIC (Ethernet-enic)	\Windows\Network\Cisco\P81E\W2K8R2\x64	None
Cisco UCS P81E VIC (FCoE- fnic)	\Windows\Storage\Cisco\P81E\W2K8R2\x64	None
Cisco UCS VIC 1225 VIC (Ethernet-enic)	\Windows\Network\Cisco\1225\W2K8R2\x64	None
Cisco UCS VIC 1225 (FCoE-fnic)	\Windows\Storage\Cisco\1225\W2K8R2\x64	None
Emulex OCe10102-F (Ethernet)	\Windows\Network\Emulex\OCe10102\W2K8R2\x64	None
Emulex OCe10102-F (FCoE)	\Windows\Storage\Emulex\OCe10102\W2K8R2\x64	None
Emulex OCe11102-F (Ethernet)	\Windows\Network\Emulex\OCe11102\W2K8R2\x64	None
Emulex OCe11102-F (FCoE)	\Windows\Storage\Emulex\OCe11102\W2K8R2\x64	None
QLogic QLE8152 (Ethernet)	\Windows\Network\QLogic\QLE8152\W2K8R2\x64	None
QLogic QLE8152 (FCoE)	\Windows\Storage\QLogic\QLE8152\W2K8R2\x64	None
QLogic QLE8242 (Ethernet)	\Windows\Network\QLogic\QLE8242\W2K8R2\x64	None
QLogic QLE8242 (FCoE)	\Windows\Storage\QLogic\QLE8242\W2K8R2\x64	None
Broadcom 57712 (FCoE)	\Windows\Storage\Broadcom\BCM57712\W2K8R2\x64\FCoE	None
Broadcom 57712_LOM (FCoE)	\Windows\Storage\Broadcom\BCM57712_LOM\W2K8R2\x64\FCoE	None

The end result of this exercise should be a folder structure containing all the drivers referenced Tables 6 through 10 (Figure 6).

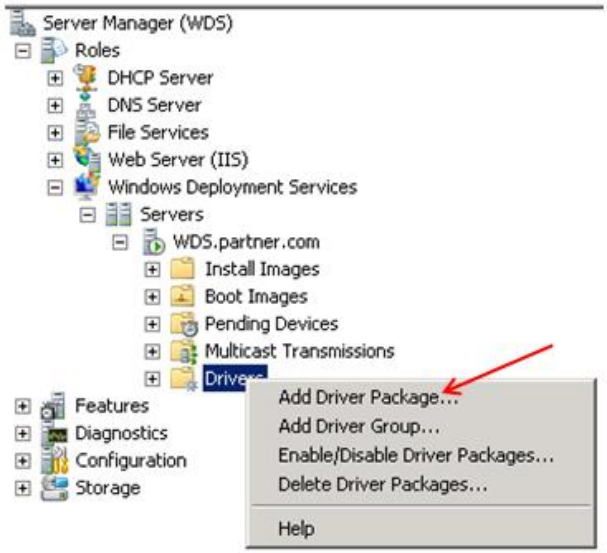
Figure 6. Folder Structure for All Drivers



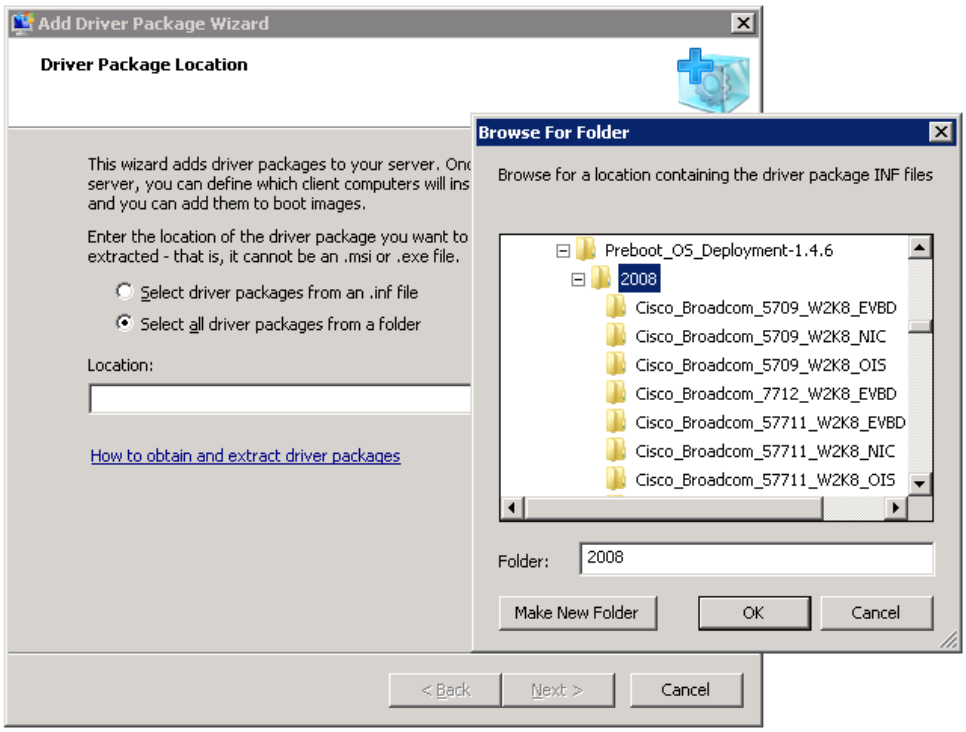
Creating Driver Packs in Microsoft WDS

This section describes the process for creating a driver pack that supports Microsoft Windows 2008. You will need to run this same process for each OS you plan to deploy (for example, for Microsoft Windows 2008 R2, you would substitute and use the newly created Microsoft Windows 2008 R2 folder structure).

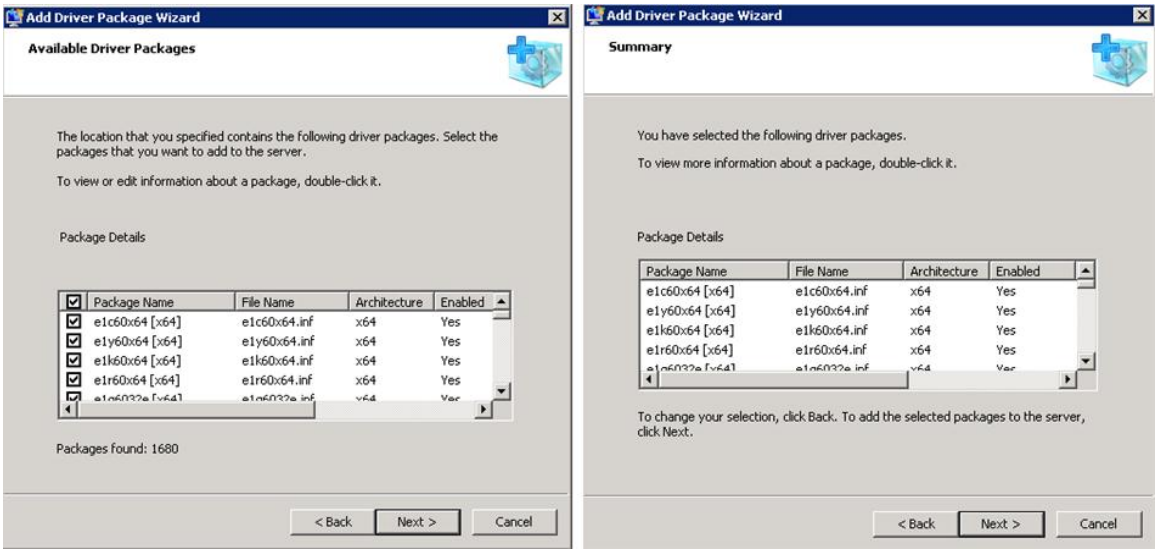
1. Right-click Drivers in Microsoft WDS and choose Add Driver Package.



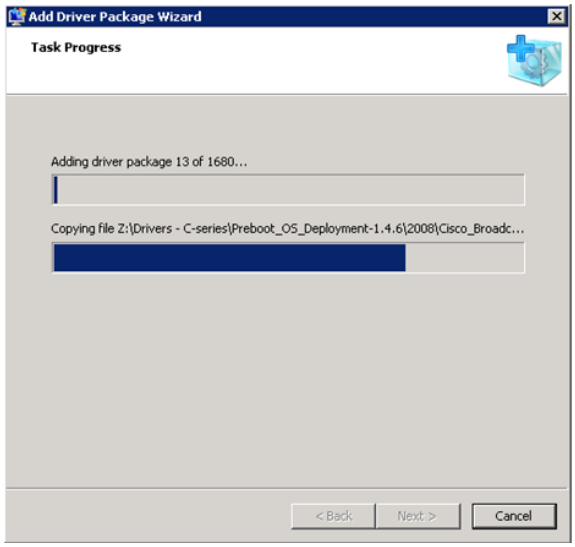
2. On the next screen, you will have the option of selecting drivers from a specific .inf file or browsing through folders. Here, you will select drivers from a folder, so browse to the set of folders you created earlier.

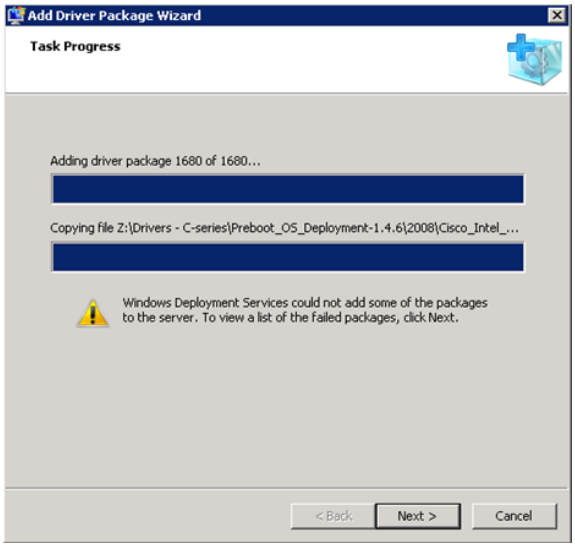


3. Click Next, and the wizard will search through all driver folders and subfolders. When the wizard is finished searching for driver packages, click Next to go to the Summary screen.

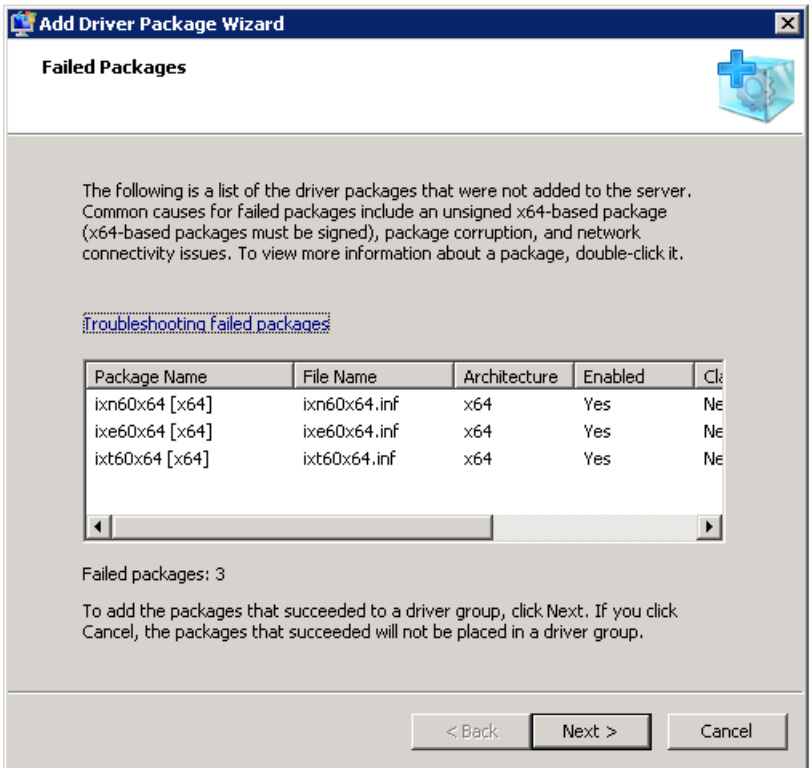


4. On the Summary screen, click Next, and the wizard will add all the drivers to the Microsoft WDS driver package. When you are finished, you will also see an error message (this is expected); click Next.

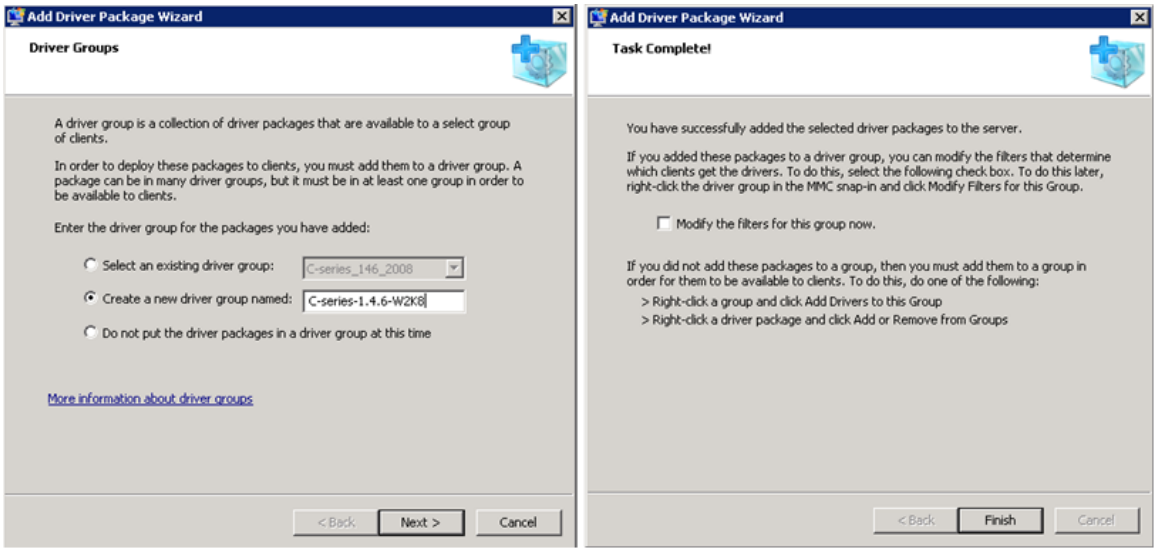




5. The next screen summarizes errors. You can safely ignore this information. Click Next.



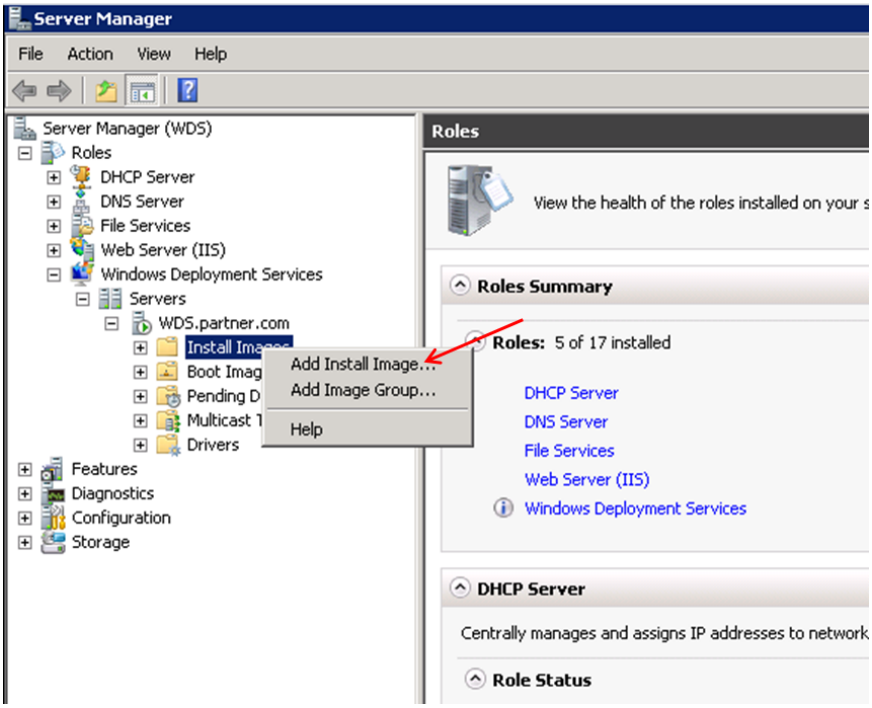
6. On the Driver Groups screen, select “Create a new driver group named” and name the group (for example, C-series-1.4.6-W2K8); then click Next. On the Task Complete screen, deselect the “Modify the filters for this group now” to remove the checkmark; then click Finish.



Creating Install Images (OS Repository) in Microsoft WDS for Microsoft Windows 2008 and 2008 R2

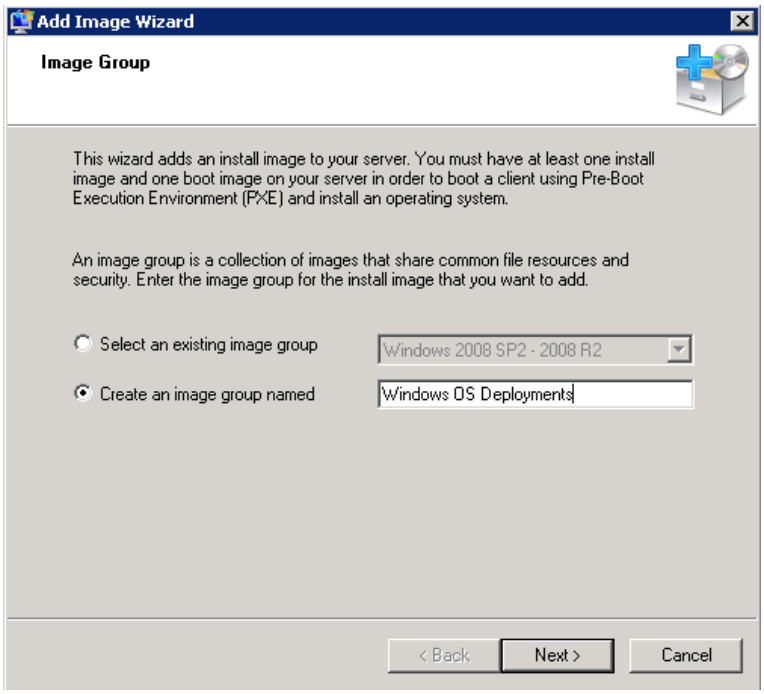
This section describes the process for creating an install image (OS repository) for Microsoft Windows 2008 R2. This process will need to be repeated for any supported Microsoft Windows OS you plan to install.

1. Right-click Install Images in the Microsoft WDS Server Manager and choose Add Install Image.

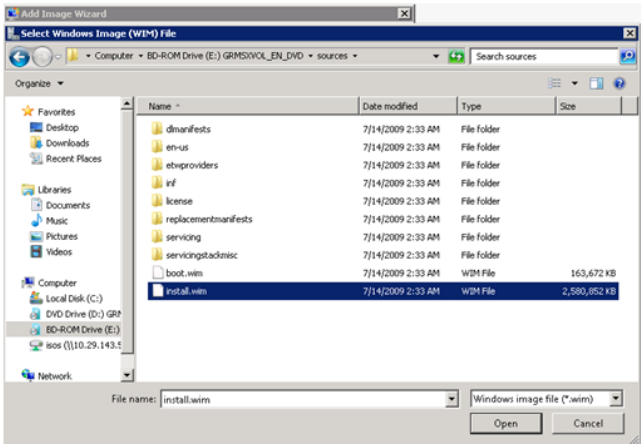


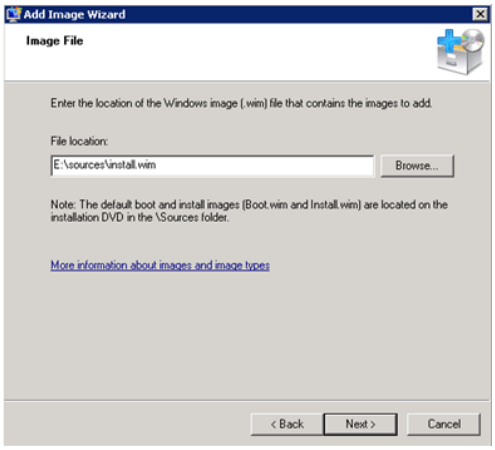
2. Select the radio button for creating an image group and enter a name for this group; then click Next.

Note: This group can be used for both Microsoft Windows 2008 x64 SP2 and Microsoft Windows 2008 R2 deployments.

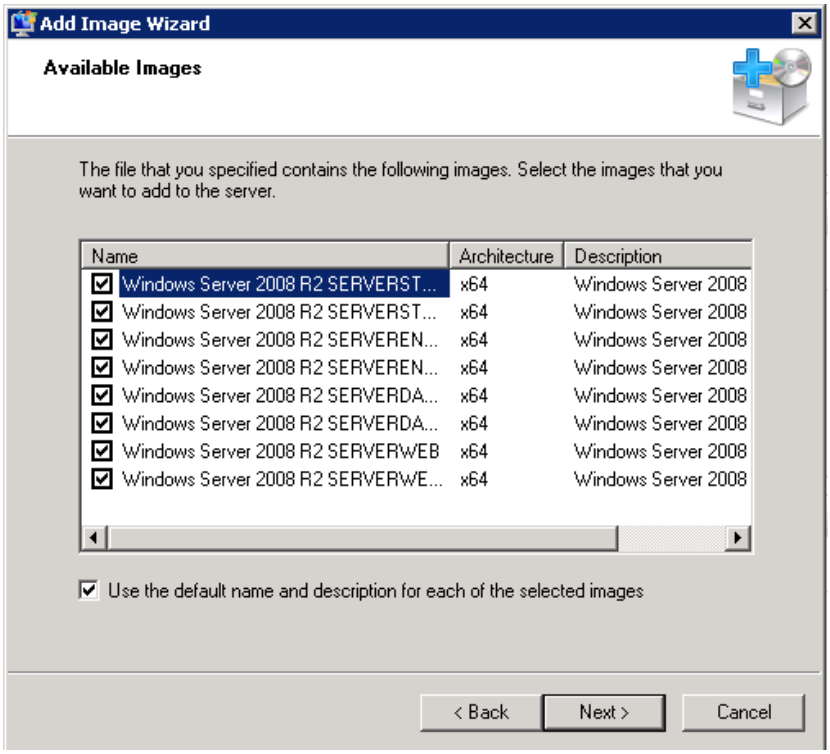


3. On the next screen, you will be asked to browse to the install.wim file on the Microsoft Windows installation media. Before browsing, mount the target Microsoft Windows OS media (Microsoft Windows 2008 R2 in this example) by inserting physical media or mount the ISO image using a virtual image tool such as Virtual CloneDrive. The install.wim file will be located under /sources on the installation media.

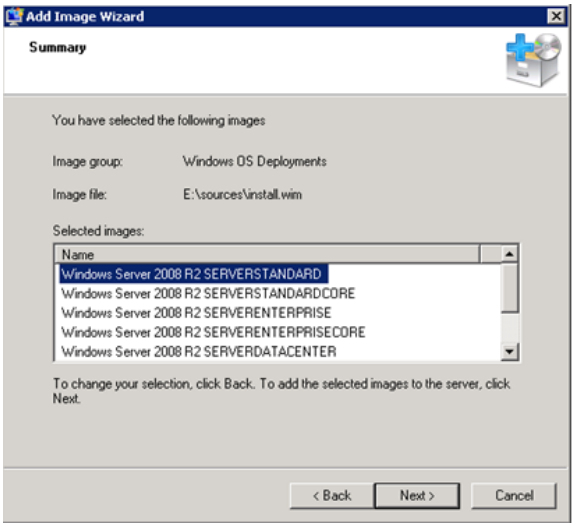


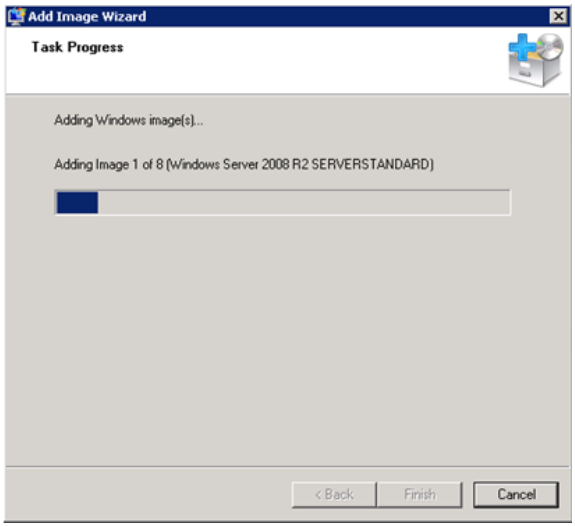


4. Click Next. You will see a list of images found on the installation media (for example, Standard, Enterprise, and Data Center versions of Microsoft Windows). You should deselect any images that will not be used.

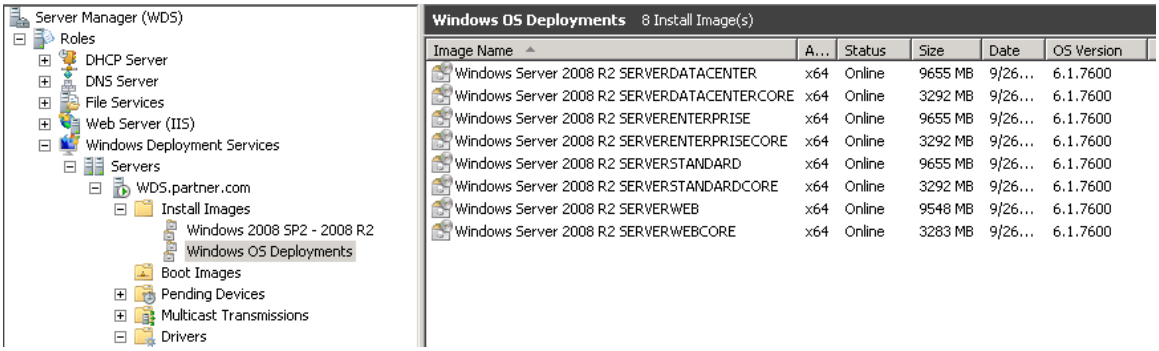


5. Click Next to confirm the list of the images that will now be installed. When the installation is complete, click Finish.





6. When the process is finished, you will see the install images listed in your install images group.



7. Repeat this same process to install additional supported Microsoft Windows OS versions. Note that you can use the same image group if you want.

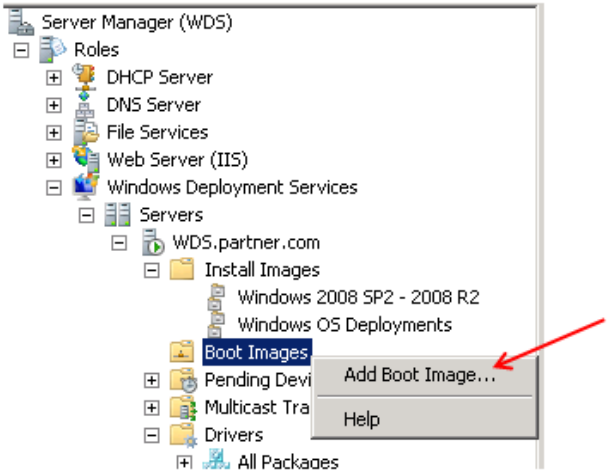
Creating a Microsoft Windows 2008 R2 Boot Image in Microsoft WDS

In this section, you create a Microsoft Windows 2008 R2 boot image (Microsoft Windows PE image).

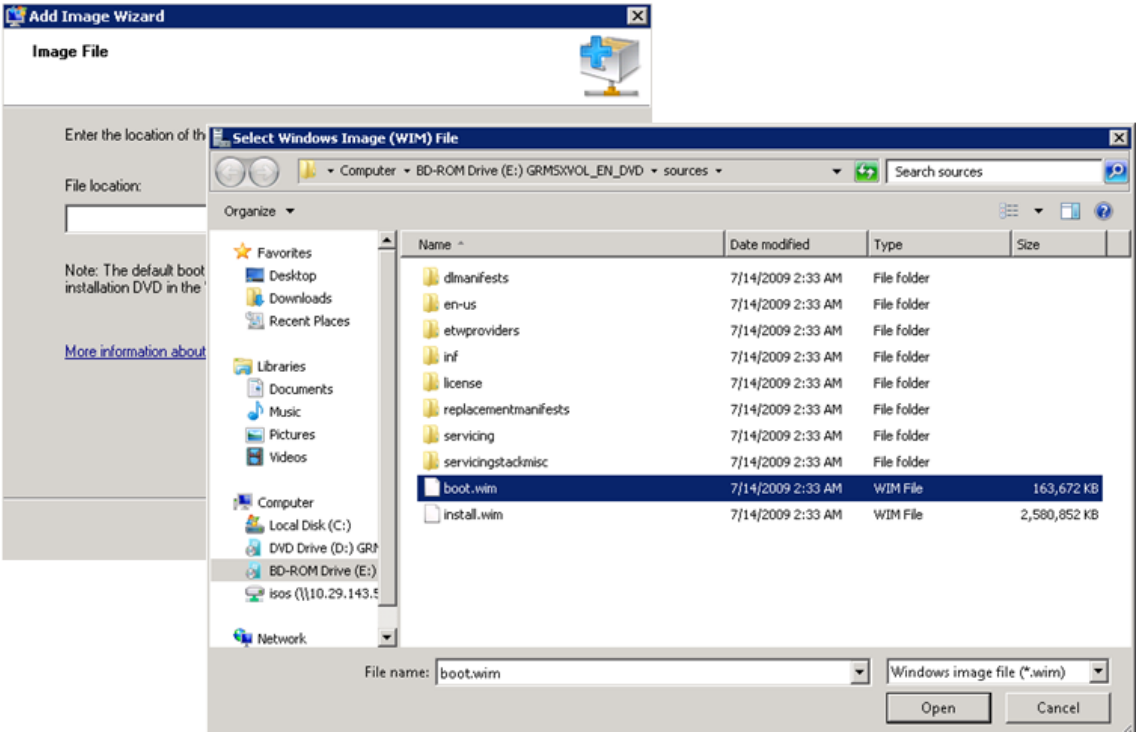
1. Import the boot.wim file from the installation media. Be sure to insert the Microsoft Windows installation media or mount the ISO image using a virtual image tool such as Virtual CloneDrive.

Note: Generally, you can use a Microsoft Windows 2008 R2 boot image to deploy any supported Microsoft Windows OS.

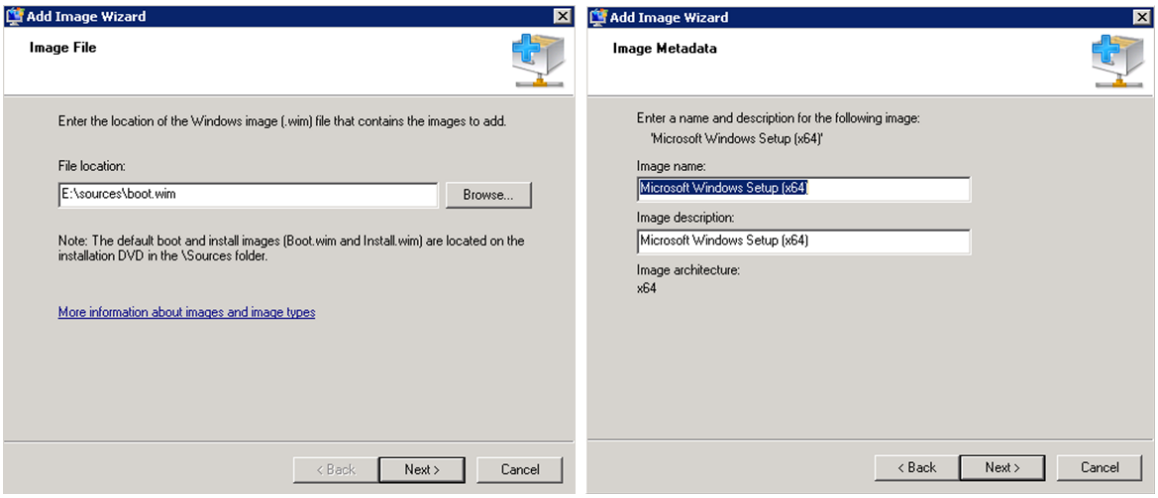
2. In Microsoft WDS, right-click Boot Images and choose Add Boot Image.



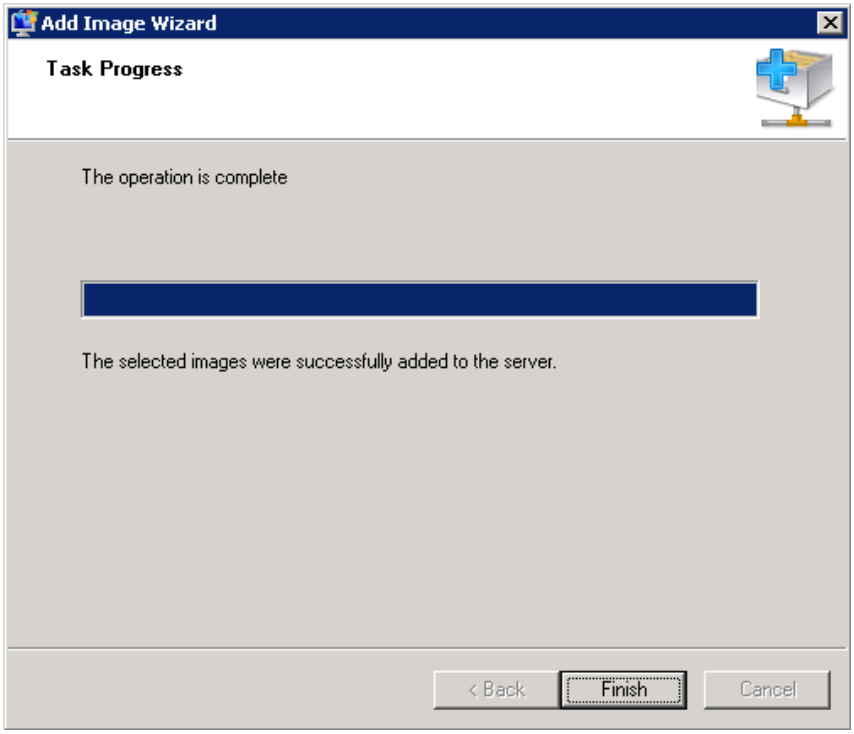
3. On the next screen, browse to the boot.wim file located in \sources\ and click Open.



4. On the next screen, click Next to confirm the boot.wim selection, and on the following screen, click Next to maintain the default image name and description.



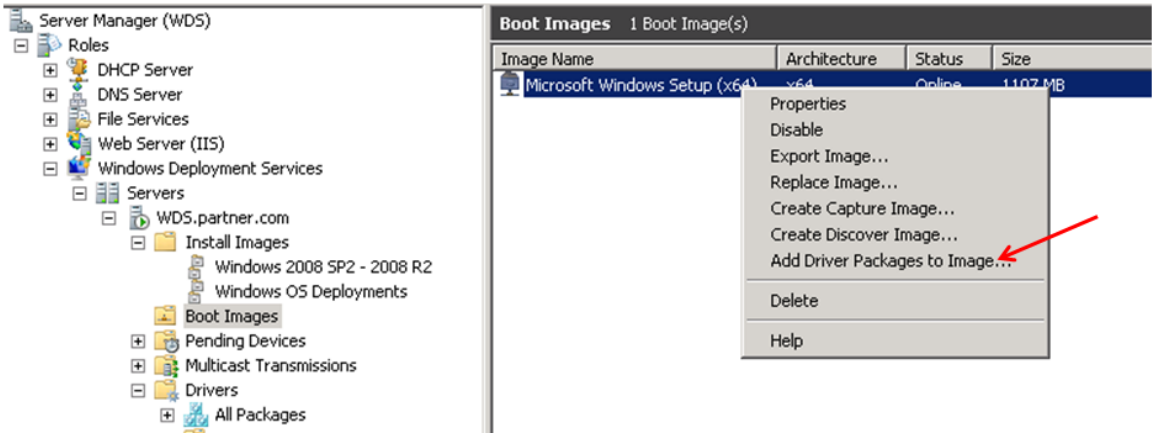
5. You will see a Task Progress screen followed by confirmation that the image was successfully added. Click Finish.



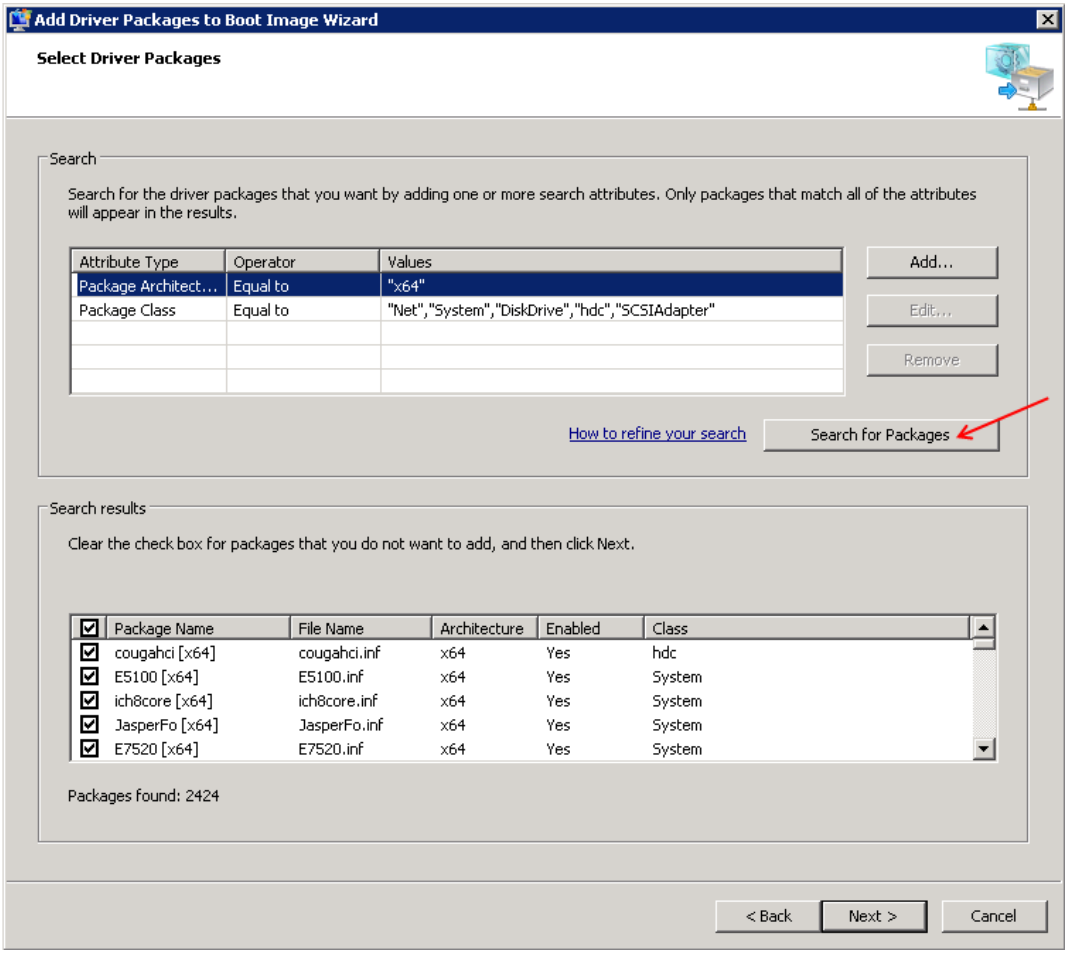
Adding Driver Packages to the New Microsoft Windows 2008 R2 Boot Image

This section discusses how to mount the new boot image, inject all the selected drivers, and then unmount the image.

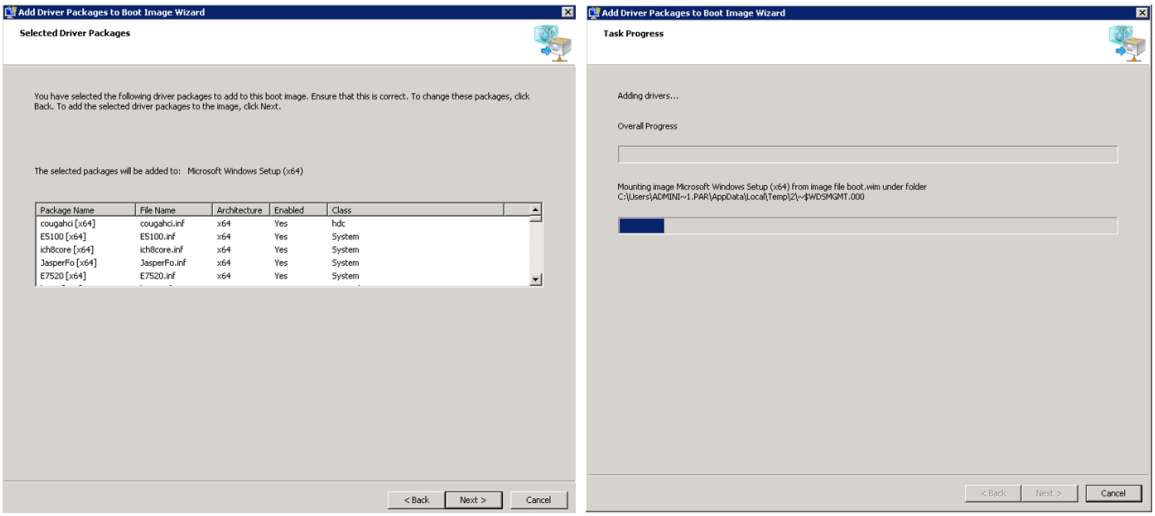
1. Right-click the new boot image and choose Add Driver Packages to Image.



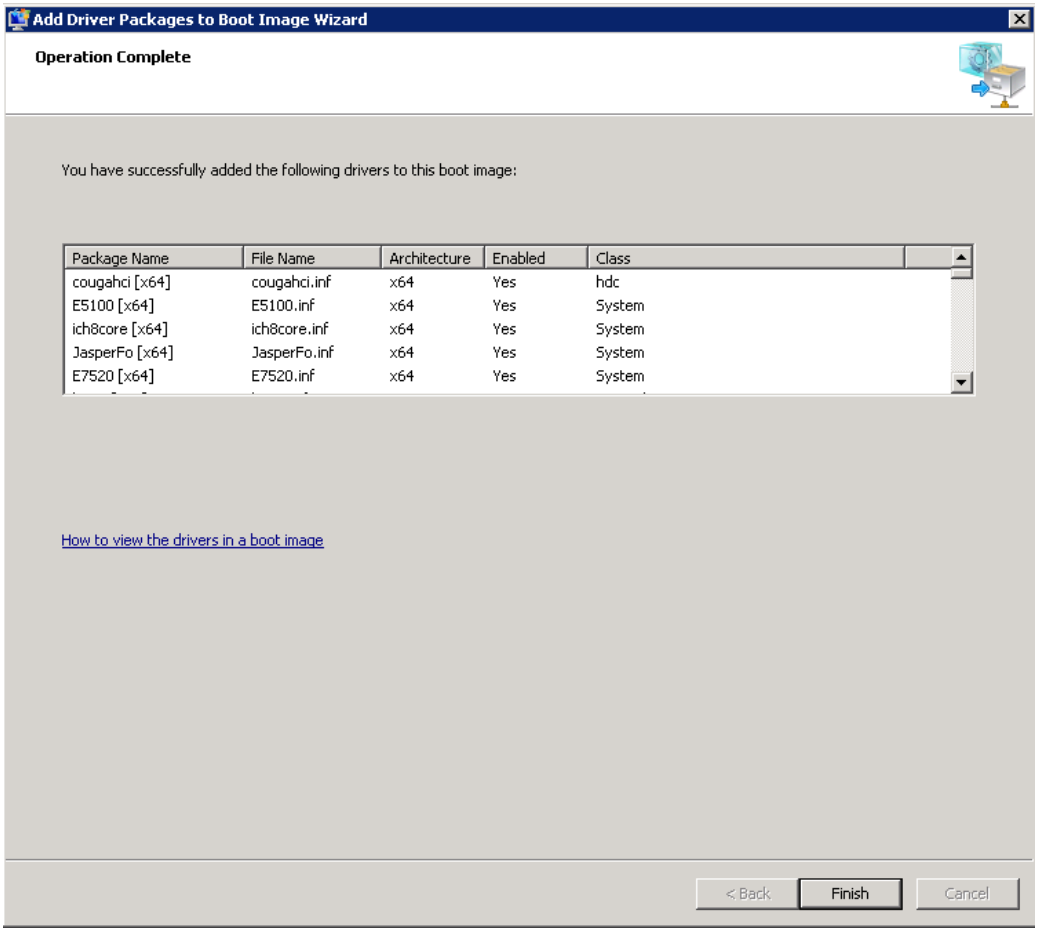
2. Click Next to ignore the warning, and then on the Select Driver Packages screen, click Search for Packages to populate the search results section. Click Next when the search is complete.



3. On the next screen, click Next to confirm the selected driver packages. you will see a task progress bar as the files are copied.



4. When copying is complete, you will see the Operation Complete screen; click Finish.



Configuring Microsoft WDS to Use the New Microsoft Windows 2008 R2 Boot Image for Server Discovery

This section provides an example showing how you can automate the deployment of servers. Many methods are available for automating server deployment.

In this example, you will create a Microsoft Windows PE boot unattend.xml file. For this example, you will use a specially crafted file (bootunattenddefault.xml) to automate deployment of any installed versions of Microsoft Windows Server. This file is processed during the Microsoft Windows PE boot phase.

Prerequisites

Before beginning this example, copy the provided bootunattenddefault.xml file to the WdsClientUnattend folder (the default location for this folder is in the RemoteInstall share created by Microsoft WDS (for example, C:\RemoteInstall\WdsClientUnattend\).

This bootunattenddefault.xml file contains two sections:

1. Configure the disk: wipe the disk and create a partition on Disk 0.

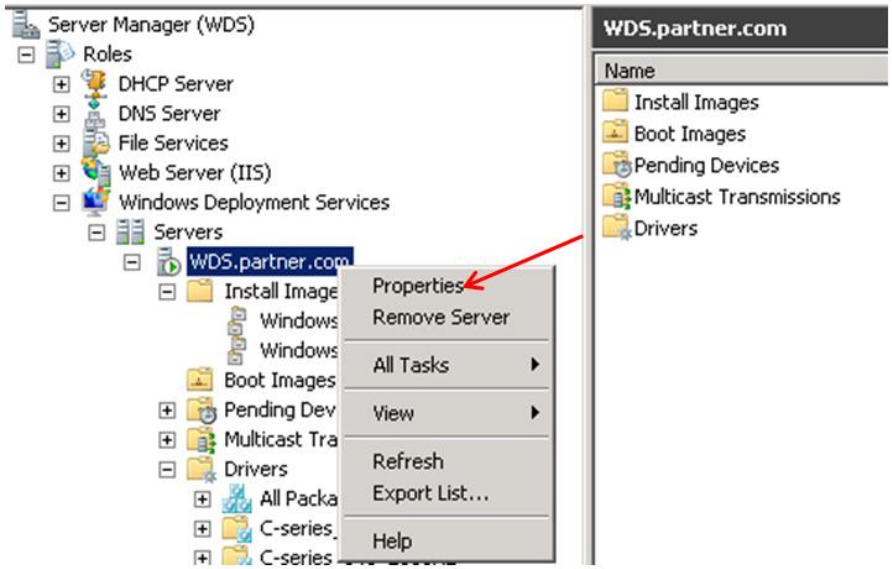
```
<DiskConfiguration>
    <WillShowUI>Never</WillShowUI>
    <Disk wcm:action="add">
        <CreatePartitions>
            <CreatePartition wcm:action="add">
                <Type>Primary</Type>
                <Extend>true</Extend>
                <Order>1</Order>
            </CreatePartition>
        </CreatePartitions>
        <WillWipeDisk>true</WillWipeDisk>
        <DiskID>0</DiskID>
    </Disk>
</DiskConfiguration>
<ImageInstall>
    <OSImage>
        <InstallTo>
            <DiskID>0</DiskID>
            <PartitionID>1</PartitionID>
        </InstallTo>
        <InstallToAvailablePartition>false</InstallToAvailablePartition>
        <WillShowUI>Never</WillShowUI>
    </OSImage>
</ImageInstall>
```

2. Instruct the Microsoft Windows PE environment to log into the Microsoft WDS server and provide a list of the OS images available for automated deployment.

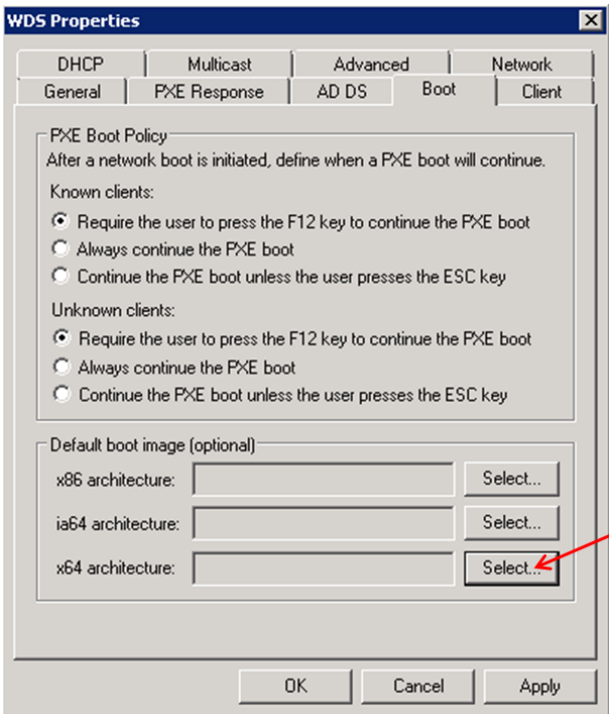
```
<WindowsDeploymentServices>
    <Login>
        <Credentials>
            <Domain>partner</Domain>
            <Password>Nbv12345</Password>
            <Username>administrator</Username>
        </Credentials>
    </Login>
    <ImageSelection>
        <InstallImage>
            <ImageGroup>Windows OS Deployments</ImageGroup>
        </InstallImage>
        <InstallTo>
            <DiskID>0</DiskID>
            <PartitionID>1</PartitionID>
        </InstallTo>
    </ImageSelection>
</WindowsDeploymentServices>
```

Configure Microsoft WDS Automation

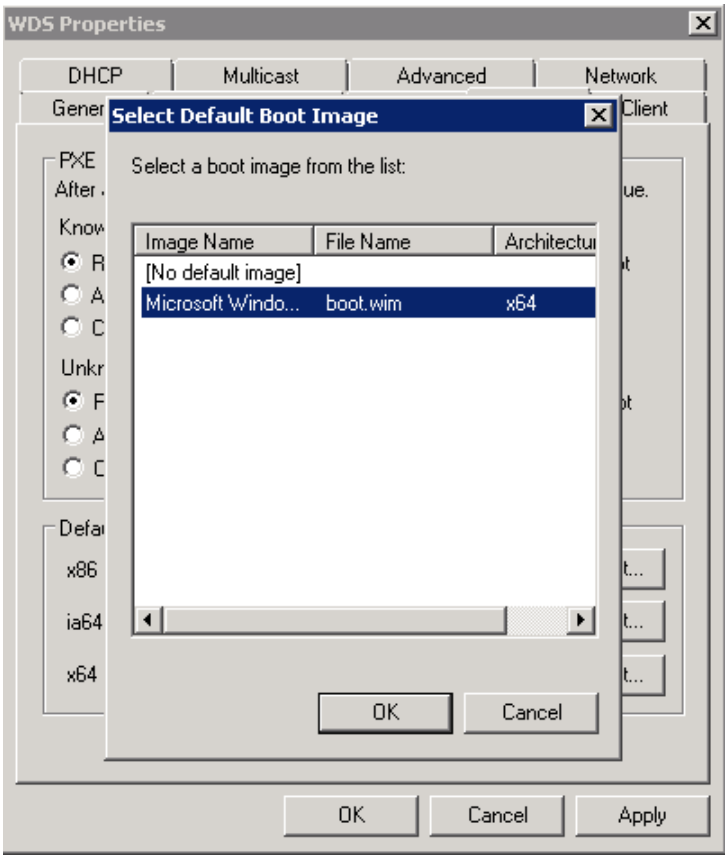
1. In Microsoft WDS, right-click your Microsoft WDS server and choose Properties.



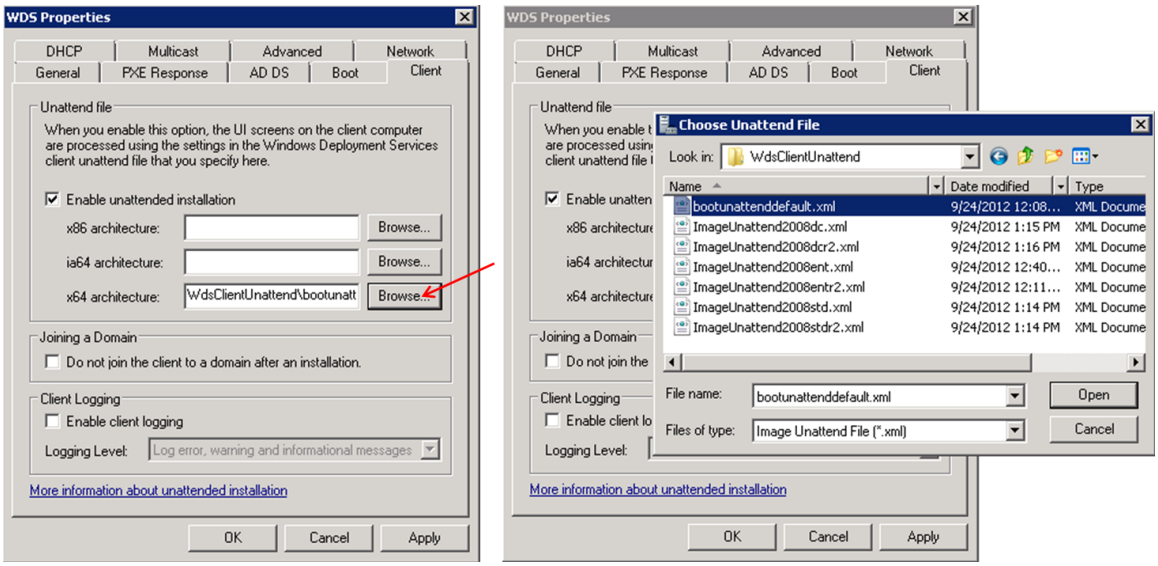
2. On the WDS Properties screen, select the Boot tab and then click the Select button to select the x64 architecture.



3. Select the name of the Microsoft Windows boot image that you imported earlier; then click OK to go back to the WDS Properties screen.



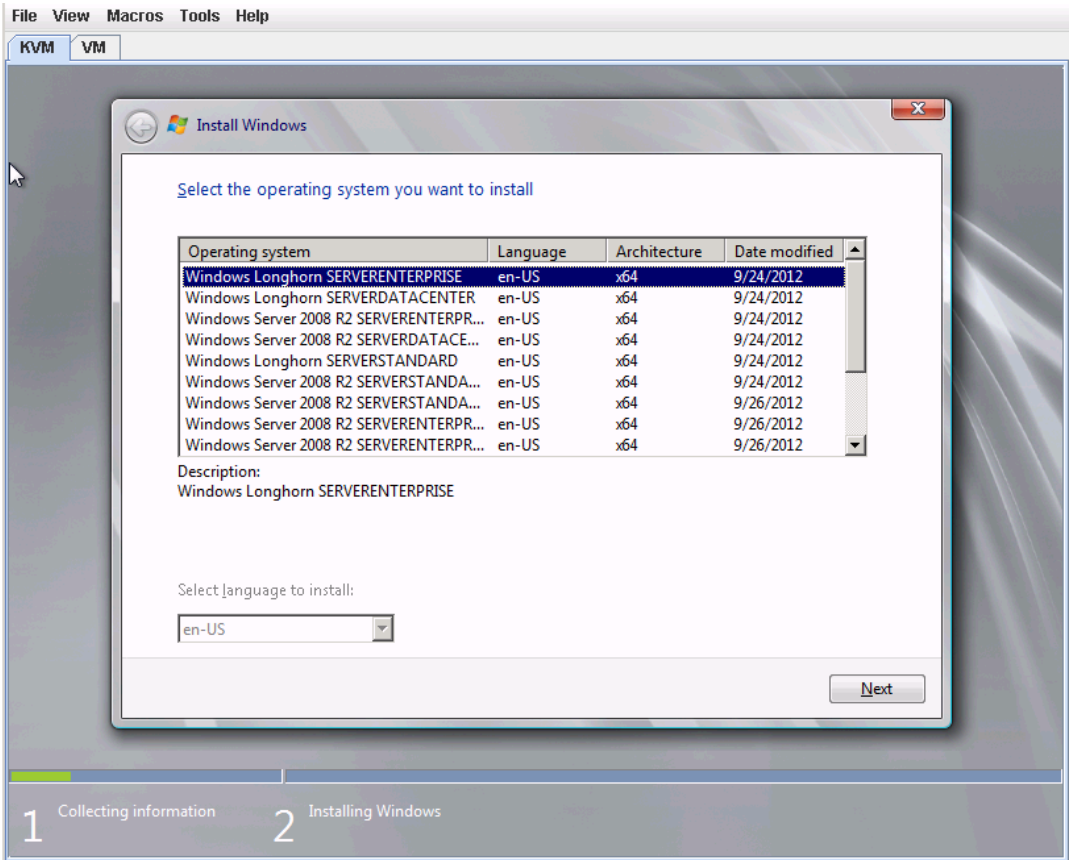
4. Click the Client tab and click the Browse button for the x64 architecture. Browse to the bootunattenddefault.xml file, which is provided in the appendix of this document. (As mentioned earlier, the default location for this file is C:\RemoteInstall\WdsClientUnattend\.)



About the Specially Crafted bootunattenddefault.xml File

When the new server is discovered and the defined boot image is booted, initial drivers will load, and you will be presented with a list of installed OS versions that can be selected for unattended installation (Figure 7).

Figure 7. List of Available Installed OS Versions



For these OS selections to run properly, each requires its own copy of an unattended installation file, with appropriate edits.

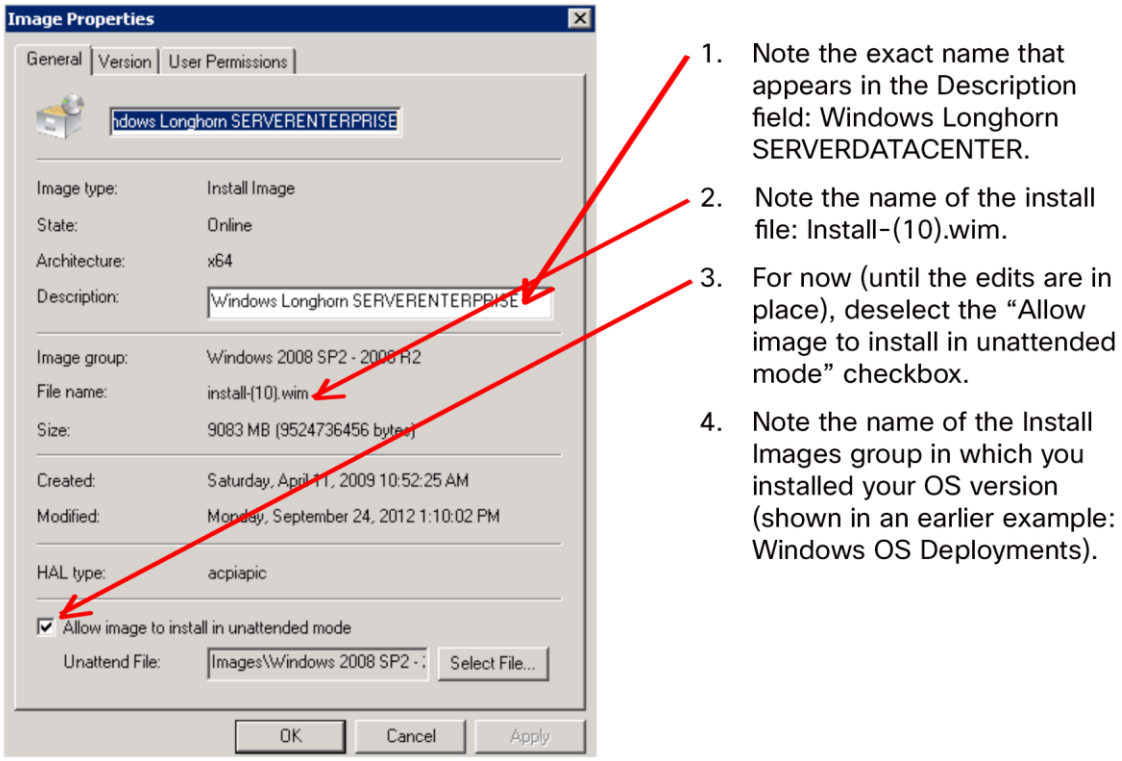
Edit the unattend.xml File for Each Target OS (Install Image) Installed

This section shows examples for configuring Microsoft Windows 2008 Enterprise and Microsoft Windows 2008 R2 Enterprise. The same logic can be used to support any of OS that is installed in Microsoft WDS.

1. Copy the provided unattend.xml files located at end of this document. You will use these files as a starting point for making the required edits. Create the files using the XML content provided. Copy these files to a folder on the system. In the example here, they have been copied to C:\RemoteInstall\WdsClientUnattend\.

2. Select the Install Image group in Microsoft WDS; then right-click the first OS version listed and choose Properties.

The Properties screen appears. Follow the steps in the screen image.



3. Open the newly created file (for example, C:\RemoteInstall\WdsClientUnattend\ImageUnattend2008ent.xml). Make the following edits to the file:

   a. Provide a valid Microsoft Windows product key and organization and owner details:

```
<settings pass="specialize">
    <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
    language="neutral" versionScope="nonSxS" xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <ProductKey>12345-12345-12345-12345-12345</ProductKey>
        <RegisteredOrganization>Cisco Systems, Inc.</RegisteredOrganization>
        <RegisteredOwner>Cisco Systems</RegisteredOwner>
    </component>
</settings>
```

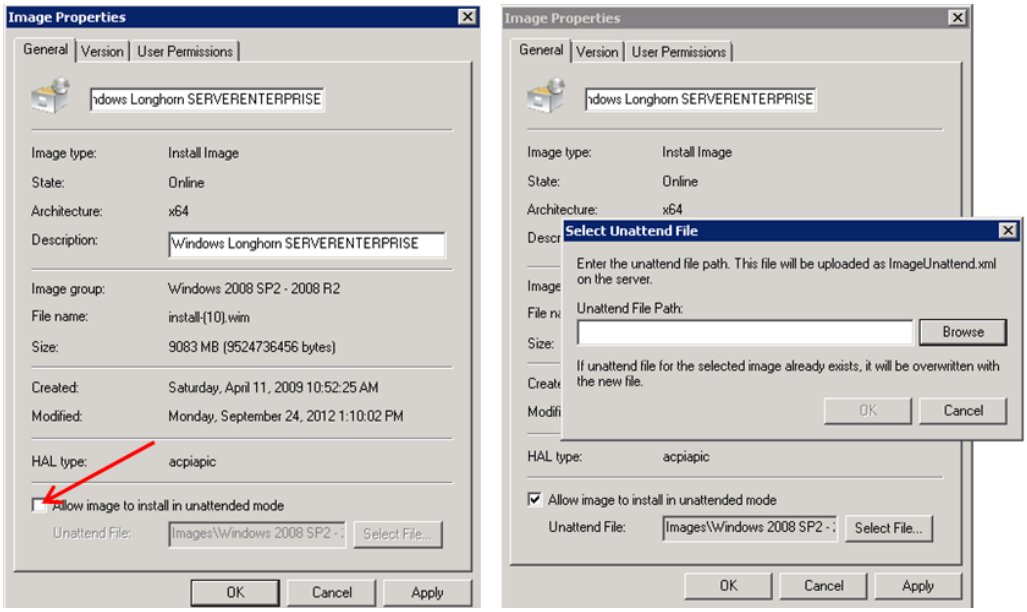
b. Provide an encrypted administrator password:

```
<AdministratorPassword>
    <Value>TgBiAHYAMQAyADMANAA1AEEAZABtAGkAbgBpAHMAdAByAGEAdABvAHIAUABhAHMAcwB3AG8AcgBkAA==</Value>
    <PlainText>false</PlainText>
</AdministratorPassword>
```

c. Provide the exact install file name, install image group name, and description that you captured earlier and edit this section:

```
<InstallImage>
    <Filename>install-(10).wim</Filename>
    <ImageGroup>Windows 2008 SP2 - 2008 R2</ImageGroup>
    <ImageName>Windows Longhorn SERVERENTERPRISE</ImageName>
</InstallImage>
```

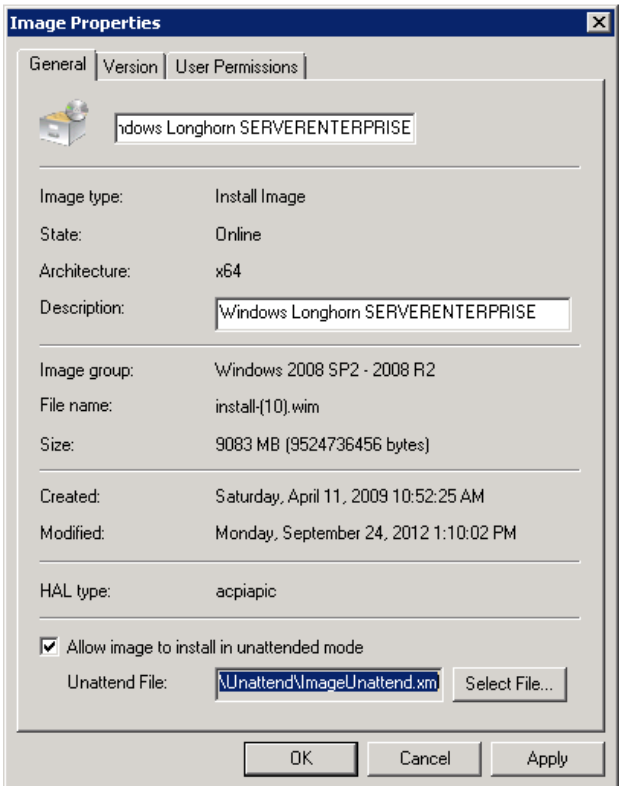
4. After these edits are made, go back to Image Properties screen for the install image you are setting up (Microsoft Windows 2008 Enterprise in this example). Select the “Allow image to install in unattended mode” checkbox. Then click Select File and browse to the newly edited unattend.xml file (for example, C:\RemoteInstall\WdsClientUnattend\ImageUnattend2008entr2.xml).



After the “Allow image to install in unattended mode” box is checked and you select the newly edited unattend.xml file, Microsoft WDS will copy this file to a new target location and filename. This new location is where the file will be used by Microsoft WDS during deployment.

Note: If you highlight the embedded URL in the Unattend File text box, you will see a different URL than the one to which you just browsed.

In the example here, the file is Images\Windows 2008 SP2 —2008 R2\install-(10)\Unattend\ImageUnattend.xml.



For More Information

[Cisco UCS C-Series Rack Servers]

Appendix: Source unattend.txt Files: BootUnattendDefault, ImageUnattend2008ent, and ImageUnattend2008r2ent

BootUnattendDefault.xml (Special Default Boot File)

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">
  <settings pass="windowsPE">
    <component name="Microsoft-Windows-International-Core-WinPE"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <UILanguage>EN-US</UILanguage>
       <UILanguageFallback>EN-US</UILanguageFallback>
       <UserLocale>EN-US</UserLocale>
    </component>
    <component name="Microsoft-Windows-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <DiskConfiguration>
          <WillShowUI>Never</WillShowUI>
          <Disk wcm:action="add">
             <CreatePartitions>
                <CreatePartition wcm:action="add">
                   <Type>Primary</Type>
                   <Extend>true</Extend>
                   <Order>1</Order>
                </CreatePartition>
             </CreatePartitions>
             <WillWipeDisk>true</WillWipeDisk>
             <DiskID>0</DiskID>
          </Disk>
       </DiskConfiguration>
       <ImageInstall>
          <OSImage>
             <InstallTo>
                <DiskID>0</DiskID>
                <PartitionID>1</PartitionID>
             </InstallTo>
             <InstallToAvailablePartition>false</InstallToAvailablePartition>
             <WillShowUI>Never</WillShowUI>
          </OSImage>
       </ImageInstall>
       <WindowsDeploymentServices>
          <Login>
```

```
                <Credentials>
                    <Domain>partner</Domain>
                    <Password>Nbv12345</Password>
                    <Username>administrator</Username>
                </Credentials>
            </Login>
            <ImageSelection>
                <InstallImage>
                    <ImageGroup>Windows 2008 SP2 –2008 R2</ImageGroup>
                </InstallImage>
                <InstallTo>
                    <DiskID>0</DiskID>
                    <PartitionID>1</PartitionID>
                </InstallTo>
            </ImageSelection>
        </WindowsDeploymentServices>
        <DynamicUpdate>
            <Enable>true</Enable>
        </DynamicUpdate>
        <UserData>
            <AcceptEula>true</AcceptEula>
            <FullName>Cisco</FullName>
            <Organization>Cisco</Organization>
        </UserData>
    </component>
  </settings>
<cpi:offlineImage cpi:source="catalog:e:/sources/install_windows longhorn
serverenterprise.clg" xmlns:cpi="urn:schemas-microsoft-com:cpi" />
</unattend>
```

ImageUnattend2008ent.xml (for Microsoft Windows 2008 Enterprise)

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">
  <servicing></servicing>
  <settings pass="specialize">
    <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <ProductKey> XXXXX-XXXXX-XXXXX-XXXXX-XXXXX</ProductKey>
        <RegisteredOrganization>Cisco Systems, Inc.</RegisteredOrganization>
        <RegisteredOwner>Cisco Systems</RegisteredOwner>
    </component>
  </settings>
  <settings pass="oobeSystem">
```

```
    <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <OOBE>
          <HideEULAPage>true</HideEULAPage>
       </OOBE>
       <UserAccounts>
          <DomainAccounts>
             <DomainAccountList wcm:action="add">
                <DomainAccount wcm:action="add">
                   <Group>Administrators</Group>
                   <Name>Enterprise Admins</Name>
                </DomainAccount>
                <Domain>partner</Domain>
                <DomainAccount wcm:action="add">
                   <Group>Administrators</Group>
                   <Name>Administrator</Name>
                </DomainAccount>
             </DomainAccountList>
          </DomainAccounts>
          <AdministratorPassword>
             <Value>TgBiAHYAMQAyADMANAA1AEEAZABtAGkAbgBpAHMAdAByAGEAdABvAHIAUABhA
HMAcwB3AG8AcgBkAA==</Value>
             <PlainText>false</PlainText>
          </AdministratorPassword>
       </UserAccounts>
    </component>
    <component name="Microsoft-Windows-International-Core"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <InputLocale>0409:00000409</InputLocale>
       <SystemLocale>en-US</SystemLocale>
       <UILanguage>en-US</UILanguage>
       <UserLocale>en-US</UserLocale>
    </component>
  </settings>
  <settings pass="windowsPE">
    <component name="Microsoft-Windows-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <DiskConfiguration>
          <WillShowUI>OnError</WillShowUI>
       </DiskConfiguration>
       <WindowsDeploymentServices>
```

```
            <ImageSelection>
               <InstallImage>
                  <Filename>install-(10).wim</Filename>
                  <ImageGroup>Windows 2008 SP2 –2008 R2</ImageGroup>
                  <ImageName>Windows Longhorn SERVERENTERPRISE</ImageName>
               </InstallImage>
               <InstallTo>
                  <DiskID>0</DiskID>
                  <PartitionID>1</PartitionID>
               </InstallTo>
            </ImageSelection>
         </WindowsDeploymentServices>
         <ImageInstall>
            <OSImage>
               <InstallTo>
                  <DiskID>0</DiskID>
                  <PartitionID>1</PartitionID>
               </InstallTo>
               <WillShowUI>OnError</WillShowUI>
               <InstallToAvailablePartition>false</InstallToAvailablePartition>
            </OSImage>
         </ImageInstall>
      </component>
   </settings>
   <cpi:offlineImage cpi:source="catalog:e:/sources/install_windows longhorn
serverenterprise.clg" xmlns:cpi="urn:schemas-microsoft-com:cpi" />
</unattend>
```

ImageUnattend2008entr2.xml (for Microsoft Windows 2008 R2 Enterprise)

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">
   <servicing></servicing>
   <settings pass="specialize">
      <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
         <ProductKey> XXXXX-XXXXX-XXXXX-XXXXX-XXXXX</ProductKey>
         <RegisteredOrganization>Cisco Systems</RegisteredOrganization>
         <RegisteredOwner>Cisco Systems</RegisteredOwner>
         <ShowWindowsLive>false</ShowWindowsLive>
      </component>
   </settings>
   <settings pass="oobeSystem">
      <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
```

```
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <OOBE>
          <HideEULAPage>true</HideEULAPage>
       </OOBE>
       <UserAccounts>
          <DomainAccounts>
             <DomainAccountList wcm:action="add">
                <DomainAccount wcm:action="add">
                   <Group>Administrators</Group>
                   <Name>Enterprise Admins</Name>
                </DomainAccount>
                <Domain>partner</Domain>
                <DomainAccount wcm:action="add">
                   <Group>Administrators</Group>
                   <Name>Administrator</Name>
                </DomainAccount>
             </DomainAccountList>
          </DomainAccounts>
          <AdministratorPassword>
             <Value>TgBiAHYAMQAyADMANAA1AEEAZABtAGkAbgBpAHMAdAByAGEAdABvAHIAUABhA
HMAcwB3AG8AcgBkAA==</Value>
             <PlainText>false</PlainText>
          </AdministratorPassword>
       </UserAccounts>
    </component>
    <component name="Microsoft-Windows-International-Core"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <InputLocale>0409:00000409</InputLocale>
       <SystemLocale>en-US</SystemLocale>
       <UILanguage>en-US</UILanguage>
       <UserLocale>en-US</UserLocale>
    </component>
  </settings>
  <settings pass="windowsPE">
    <component name="Microsoft-Windows-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
       <DiskConfiguration>
          <WillShowUI>OnError</WillShowUI>
       </DiskConfiguration>
       <WindowsDeploymentServices>
          <ImageSelection>
```

```
                <InstallImage>
                    <Filename>install-(3).wim</Filename>
                    <ImageGroup>Windows 2008 –2008 R2</ImageGroup>
                    <ImageName>Windows Server 2008 R2 SERVERENTERPRISE</ImageName>
                </InstallImage>
                <InstallTo>
                    <DiskID>0</DiskID>
                    <PartitionID>1</PartitionID>
                </InstallTo>
            </ImageSelection>
        </WindowsDeploymentServices>
        <ImageInstall>
            <OSImage>
                <InstallTo>
                    <DiskID>0</DiskID>
                    <PartitionID>1</PartitionID>
                </InstallTo>
                <WillShowUI>OnError</WillShowUI>
                <InstallToAvailablePartition>false</InstallToAvailablePartition>
            </OSImage>
        </ImageInstall>
    </component>
  </settings>
  <cpi:offlineImage cpi:source="catalog:d:/sources/install_windows server 2008 r2
serverenterprise.clg" xmlns:cpi="urn:schemas-microsoft-com:cpi" />
</unattend>
```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