White Paper

Altiris Preboot Image Driver Injection: Cisco UCS C-Series Rack Servers Firmware Release 1.4.6

What You Will Learn

This document describes the process for locating, extracting, preparing, and then injecting Cisco UCS® C-Series Rack Server drivers into the Altiris Microsoft Windows x64 preboot image (based on the Microsoft Windows Preexecution [PE] 2.1 image and Microsoft Windows 2008).

After the Altiris Microsoft Windows x64 preboot image has Cisco UCS C-Series Rack Server drivers injected, this preboot image can be used for scripted OS installation of all supported Microsoft Windows operating systems on Cisco UCS C-Series Rack Servers (this process is not discussed in this document). Examples include:

- **Microsoft Windows 2008:** See the document titled "Altiris Scripted OS Deployment: Microsoft Windows 2008 and Cisco UCS C-Series Rack Servers Firmware Release 1.4.6."
- **Microsoft Windows 2008 R2:** See the document titled "Altiris Scripted OS Deployment: Microsoft Windows 2008 R2 and Cisco UCS C-Series Rack Servers Firmware Release 1.4.6."
- **Microsoft Windows 2012:** See the document titled "Altiris Scripted OS Deployment: Microsoft Windows 2012 and Cisco UCS C-Series Rack Servers Firmware Release 1.4.6d."

Note: See the Cisco UCS C-Series Rack Servers hardware and software matrix for the list of all supported operating systems for different server models: http://www.cisco.com/en/US/products/ps10477/prod_technical_reference_list.html.

This document discusses the following topics:

- Prerequisites for this document
- How to prepare a Microsoft Windows 2008 driver directory for preboot driver injection
- Process for injecting drivers into the Altiris 6.9 SP5 Microsoft Windows x64 preboot image

Prerequisites for This Document

- Altiris Deployment Server version
  - Altiris Deployment Solution 6.9 SP5
  - Altiris Microsoft Windows PE 2.1
- Tested server operating systems
  - Microsoft Windows 2008 SP2 x64
  - Microsoft Windows 2008 R2 x64

Preparing a Microsoft Windows 2008 Driver Directory for Preboot Driver Injection

In this section, you will create a folder structure containing Microsoft Windows 2008 device drivers from the Cisco UCS C-Series Rack Server drivers ISO image. This folder structure will be used for driver injection into the Altiris Microsoft Windows PE preboot image.

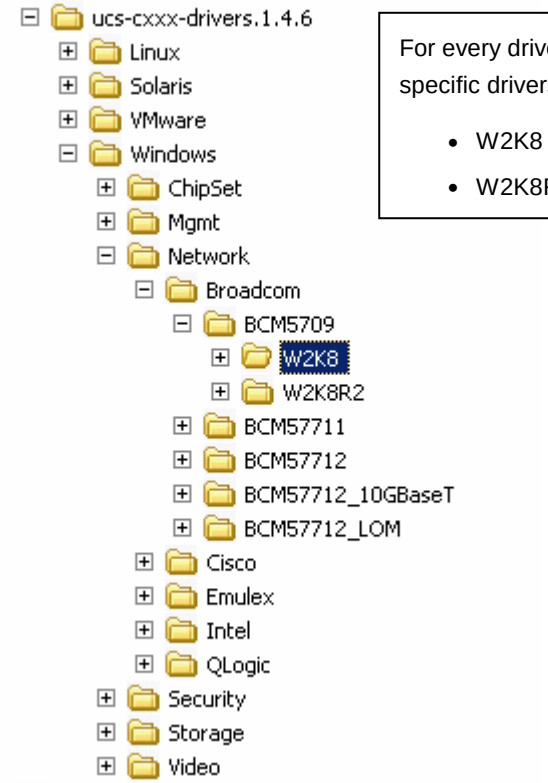
Cisco unifies the OS drivers for Cisco UCS C-Series Servers, packaging certified drivers into a unified ISO image based on the firmware level with which they were certified. This document uses Microsoft Windows OS drivers based on Cisco UCS C-Series Servers Firmware Release 1.4.6.

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



For every driver that is available, you will find subfolders containing specific drivers for:

- W2K8 (Microsoft Windows 2008)
- W2K8R2 (Microsoft Windows 2008 R2)

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 Altiris preboot image. You should rename the subfolders so that you can easily identify the 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.

All the drivers required are documented in the Altiris Support Matrix spreadsheet (on the Driver Injection Matrix tab). They are divided into four categories: disk controllers, network adapters, SAN host bus adapters (HBAs), and converged network adapters (CNAs).

Tables 1 through 4 provide matrices of the four categories of devices that are supported with the Cisco UCS C-Series Rack Servers, with any additional instructions required for extracting the drivers. Figure 2 provides an example of driver extraction using the WinRAR right-click context menu.

Table 1. Disk Controller Drivers

Disk Controllers	Driver Path	Special Instructions
Onboard ICH10	\Windows\Storage\Intel\ICH10R\W2K8\x64	Extract and use the contents of ICH10R_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 1064E	\Windows\Storage\LSI\106xE\W2K8\x64	Extract and use the contents of 106xE_W2K8_x64.iso, Extract with WinZip, WinRAR, or 7-Zip,
LSI 1068E	\Windows\Storage\LSI\106xE\W2K8\x64	Extract and use the contents of 106xE_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9260-4i	\Windows\Storage\LSI\92xx\W2K8\x64	Extract and use the contents of 92xx_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9260-8i	\Windows\Storage\LSI\92xx\W2K8\x64	Extract and use the contents of 92xx_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9261-8i	\Windows\Storage\LSI\92xx\W2K8\x64	Extract and use the contents of 92xx_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9280-4i4e	\Windows\Storage\LSI\92xx\W2K8\x64	Extract and use the contents of 92xx_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS3081E-R	\Windows\Storage\LSI\3081E-R\W2K8\x64	Extract and use the contents of 3081E-R_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS 2008-8i	\Windows\Storage\LSI\2008M\W2K8\x64	Extract and use the contents of 2008M_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI SAS 8708EM2	\Windows\Storage\LSI\8708EM2\W2K8\x64	Extract and use the contents of 8708EM2_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.
LSI 9201 Mass Storage	\Windows\Storage\LSI\9201\W2K8\x64	Extract and use the contents of 9201_W2K8_x64.iso. Extract with WinZip, WinRAR, or 7-Zip.

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

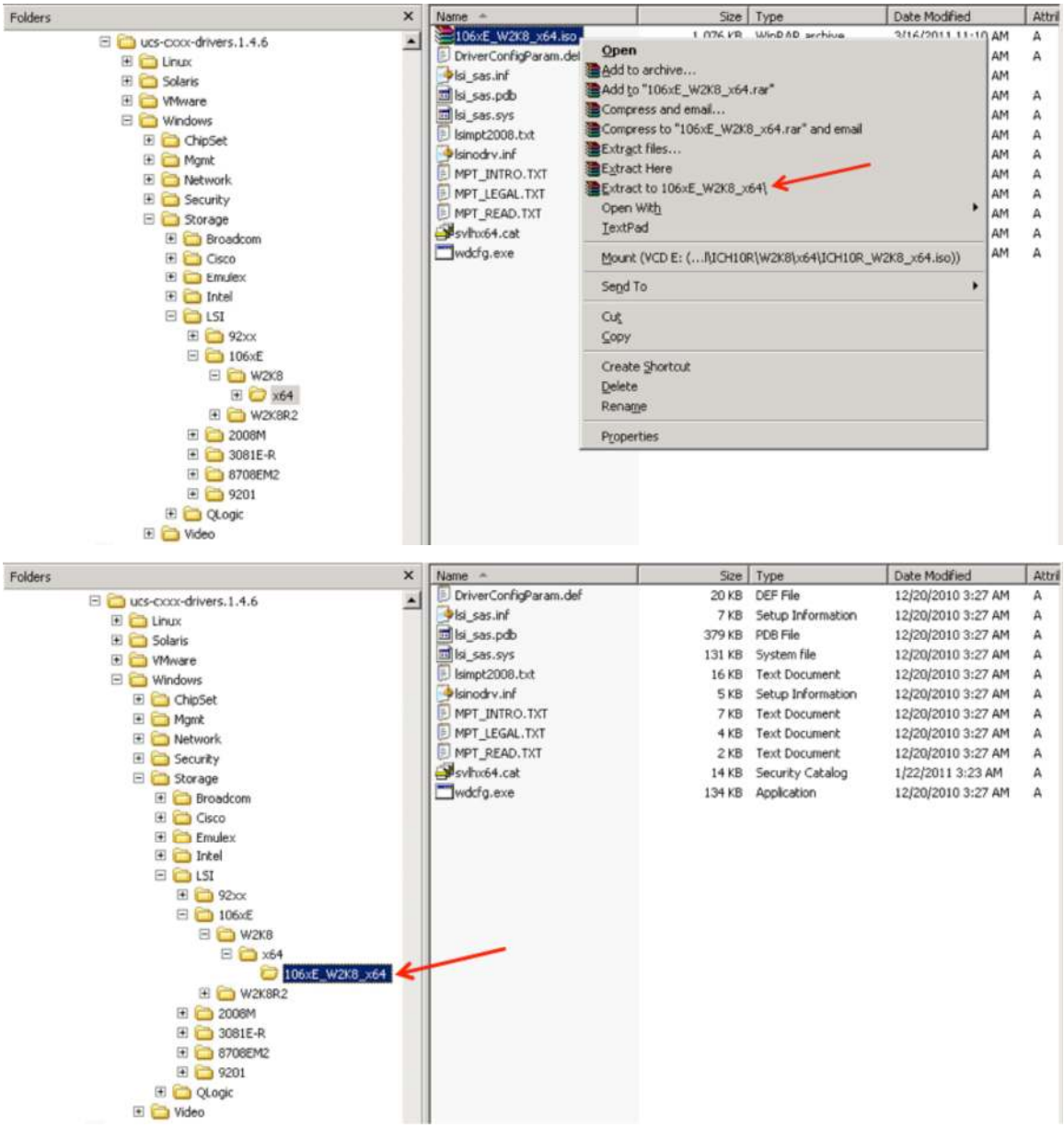


Table 2. Network Adapter Drivers

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\.

Network Adapters	Driver Path	Special Instructions
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 3. 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

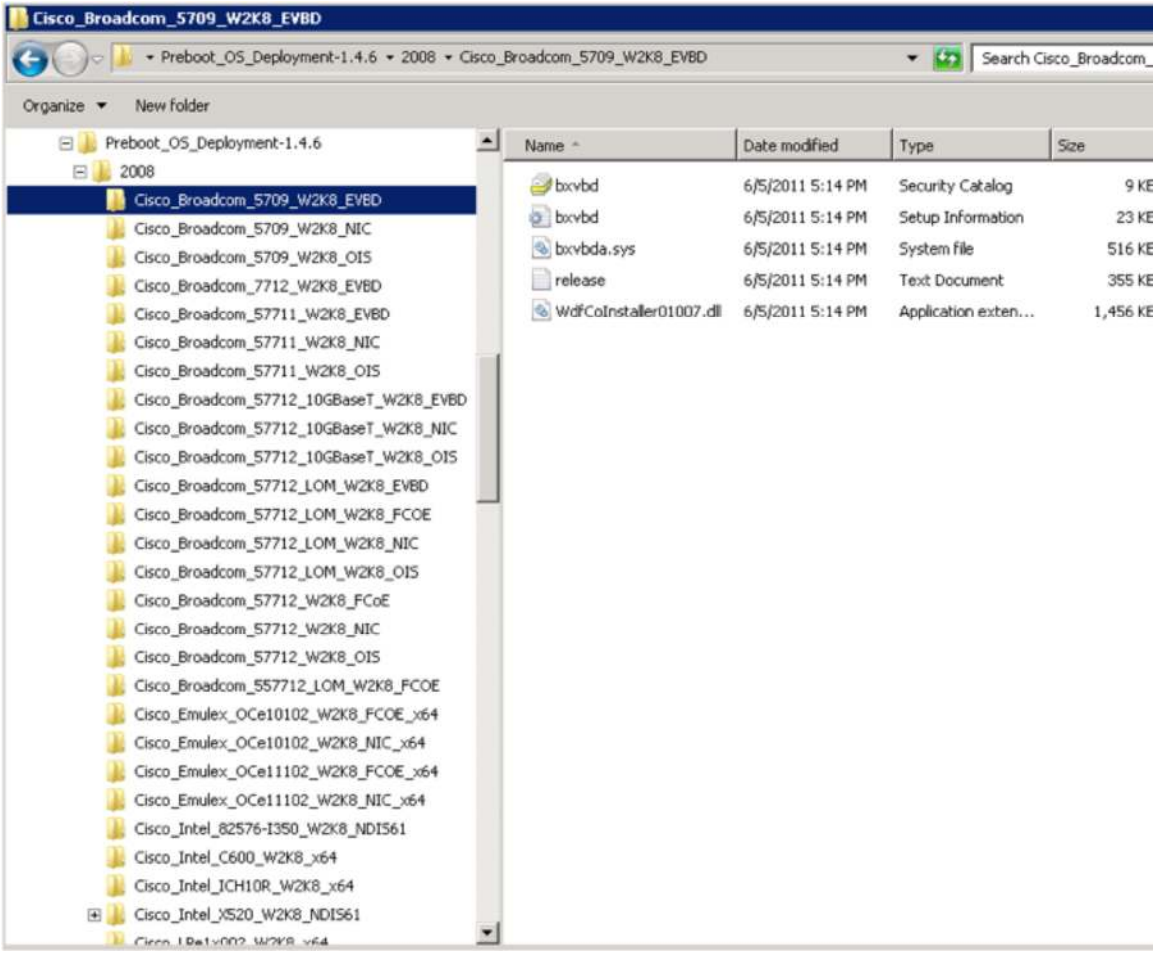
Table 4. CNA Drivers

CNAs	Driver Path	Special Instructions
Cisco UCS P81E Virtual Interface Card (VIC) (Ethernet-enic)	\Windows\Network\Cisco\P81E\W2K8\x64	None
Cisco UCS P81E VIC (Fibre Channel over Ethernet [FCoE]–fnic)	\Windows\Storage\Cisco\P81E\W2K8\x64	None
Cisco UCS VIC 1225 (Ethernet-enic)	\Windows\Network\Cisco\1225\W2K8\x64	None
Cisco UCS VIC 1225 (FCoE-fnic)	\Windows\Storage\Cisco\1225\W2K8\x64	None
Emulex OCe10102-F (Ethernet)	\Windows\Network\Emulex\OCe10102\W2K8\x64	None
Emulex OCe10102-F (FCoE)	\Windows\Storage\Emulex\OCe10102\W2K8\x64	None
Emulex OCe11102-F (Ethernet)	\Windows\Network\Emulex\OCe11102\W2K8\x64	None
Emulex OCe11102-F (FCoE)	\Windows\Storage\Emulex\OCe11102\W2K8\x64	None
QLogic QLE8152 (Ethernet)	\Windows\Network\QLogic\QLE8152\W2K8\x64	None
QLogic QLE8152 (FCoE)	\Windows\Storage\QLogic\QLE8152\W2K8\x64	None
QLogic QLE8242 (Ethernet)	\Windows\Network\QLogic\QLE8242\W2K8\x64	None

CNAs	Driver Path	Special Instructions
QLogic QLE8242 (FCoE)	\Windows\Storage\QLogic\QLE8242\W2K8\x64	None
Broadcom 57712 (FCoE)	\Windows\Storage\Broadcom\BCM57712\W2K8\x64\FCoE	None
Broadcom 57712_LOM (FCoE)	\Windows\Storage\Broadcom\BCM57712_LOM\W2K8\x64\FCoE	None

When you are finished, you should have a folder structure containing all the driver folders referenced in Tables 1 through 4, renamed according to their functions (Figure 3).

Figure 3. Folder Structure for All Drivers



Injecting Drivers into Altiris 6.9 SP5 Microsoft Windows x64 Preboot Image

This section describes how to inject OS drivers in the (default) Altiris Microsoft Windows x64 preboot image.

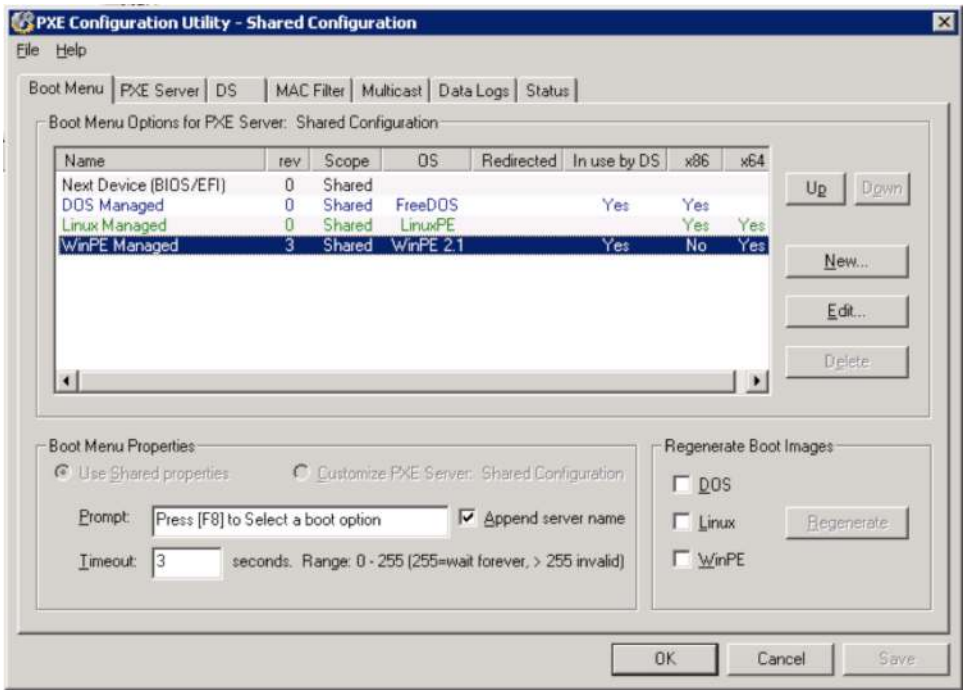
Injecting the drivers for local disk controllers, network interfaces, and storage HBA interfaces allows a server to be discovered and managed by Altiris (for example, it provides the capability to run jobs that deploy the OS to these servers).

Note: Because the Altiris Microsoft Windows x64 preboot image is based on Microsoft Windows PE 2.1 (which is based on Microsoft Windows 2008), only the Microsoft Windows 2008 drivers are required for injection into Microsoft Windows PE.

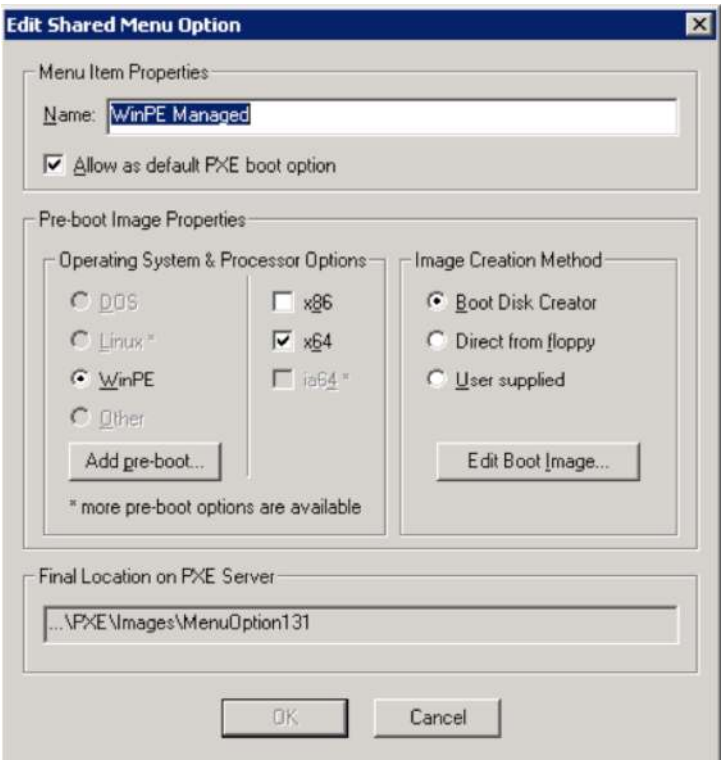
Note: The chip set drivers are not required for injection into the Altiris Microsoft Windows PE preboot image.

As part of the Altiris 6.9 SP5 installation, the default Microsoft Windows x64 preboot image should already be installed (the process is not discussed in this document). In this section, this preboot image will be edited to inject all the Cisco UCS C-Series Rack Server drivers required.

1. On the Altiris deployment console, choose Tools > PXE Configuration. Select the x64-based Microsoft Windows PE image and click edit.

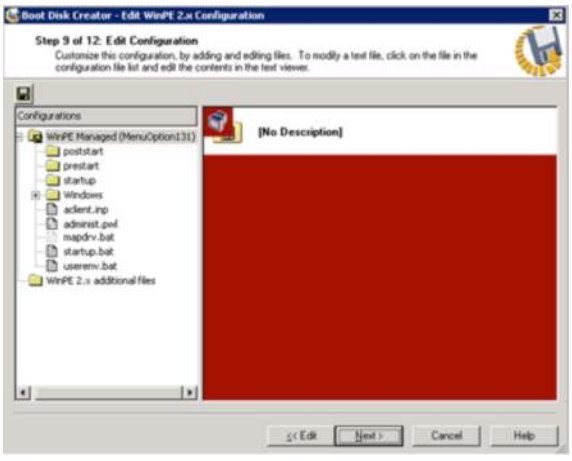


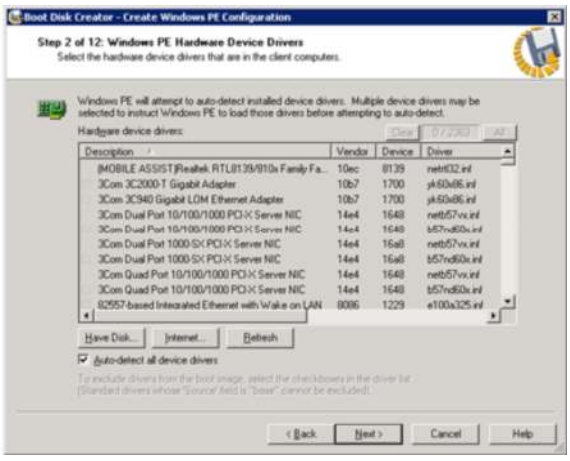
2. On the next screen, deselect x86 (if it is selected). Under Image Creation Method, select Boot Disk Creator; then click Edit Boot Image.



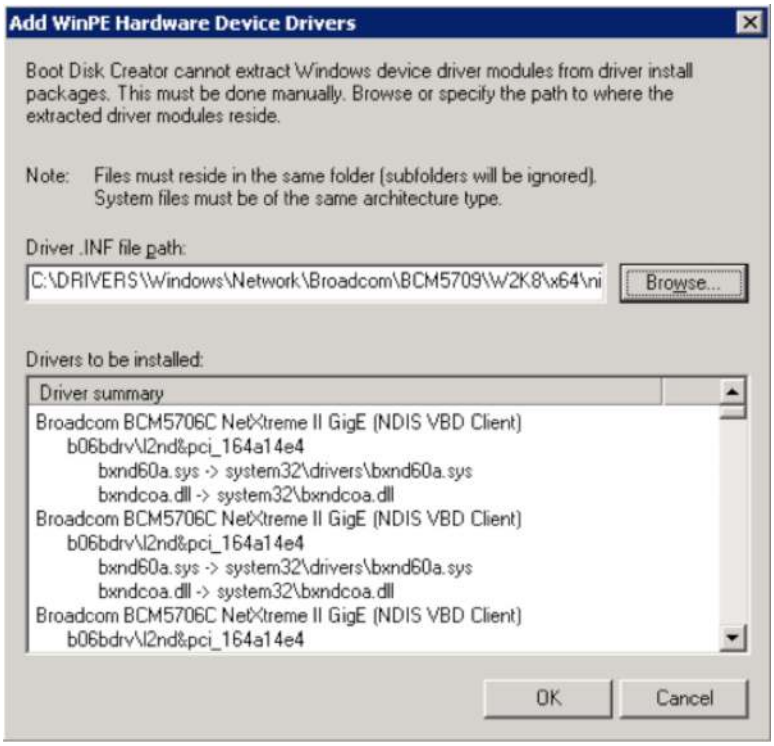
3. The wizard will move by default to the Step 9 of 12: Edit Configuration screen. Click the Edit button to go back to Step1 and then click Next to go to the Step 2 of 12: Windows PE Hardware Device Drivers screen. Add each Cisco device driver (one at a time) by clicking Have Disk and browsing to an .inf file in the target driver folder (as listed in the matrices in Tables 1 through 4 earlier in this document).

Note: If the driver folder contains multiple .inf files, you will need to run this process for each file.

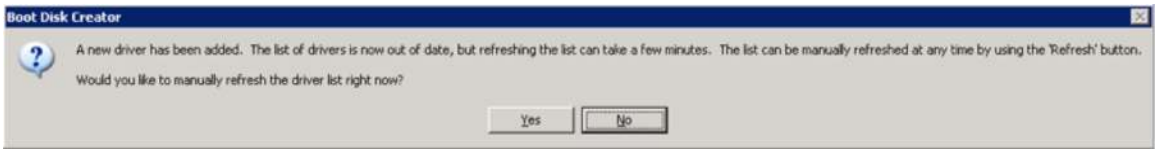




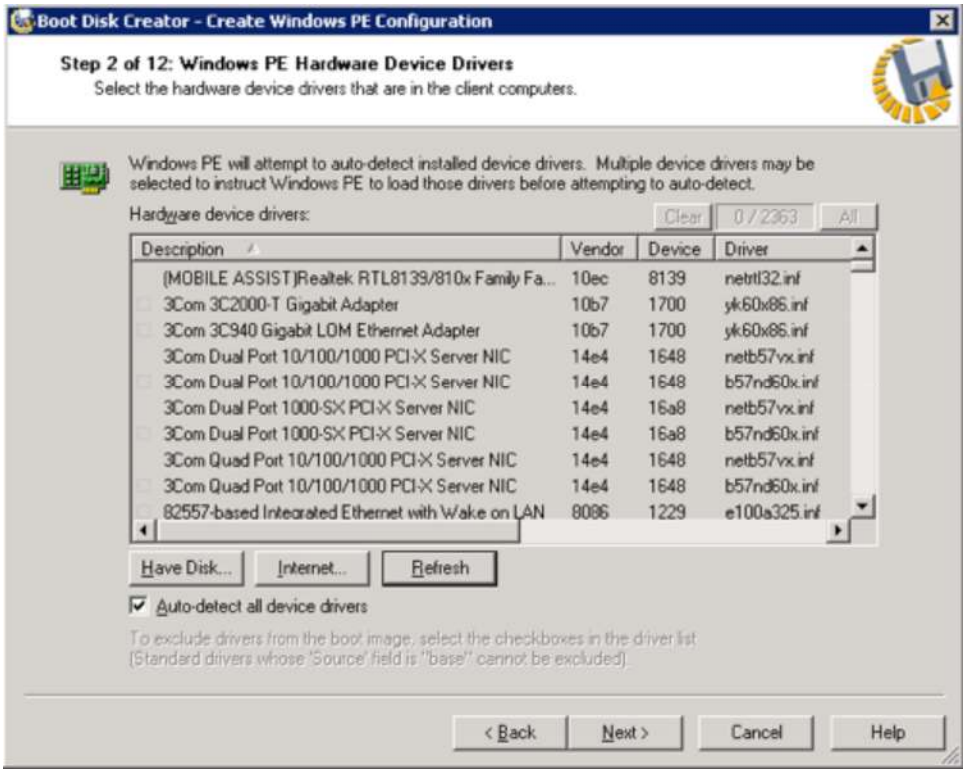
The Add WinPE Hardware Device Drivers screen will simply list what was found in the .inf file and then import what is required automatically after you click OK (the example in the screen image shows drivers for the Broadcom 5709).



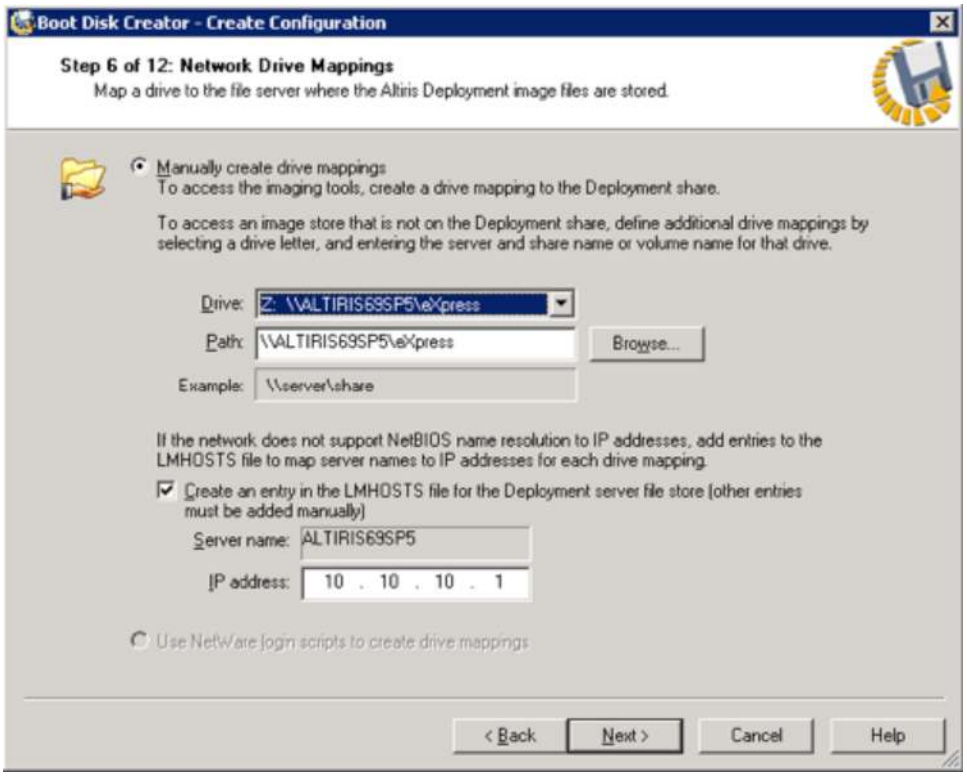
4. Click OK. Processing will occur, followed by this message:



5. Click No. Repeat the process in steps 3 and 4 for each driver (each time clicking No to not refresh the list of drivers) until all the drivers have been added.
6. After the final driver is added, click Yes to refresh the list of drivers in the Boot Disk Creator windows.
7. After all the drivers have been added and the list of drivers has finished refreshing, click Next.

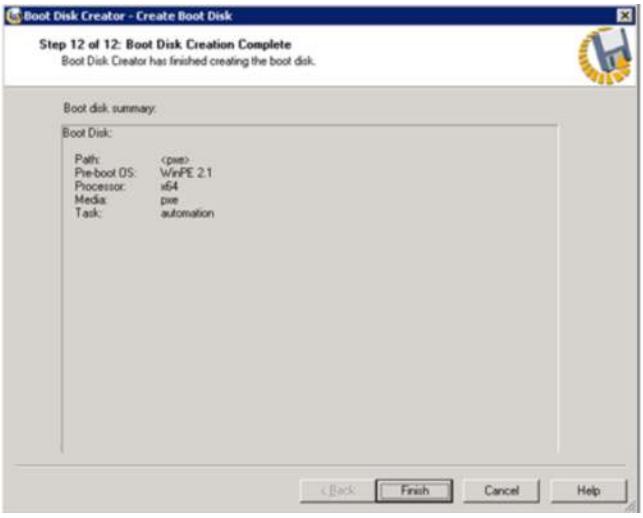


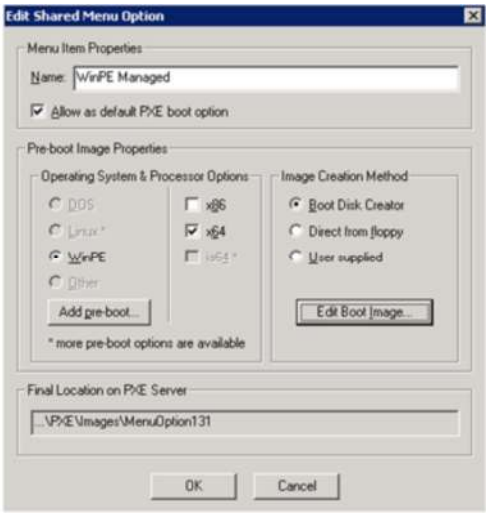
8. Click Next through Boot Disk Creator Steps 3, 4 and 5 (keeping all the existing settings).
9. At Boot Disk Creator Step 6, you should change the drive mapping to use the Z: drive.



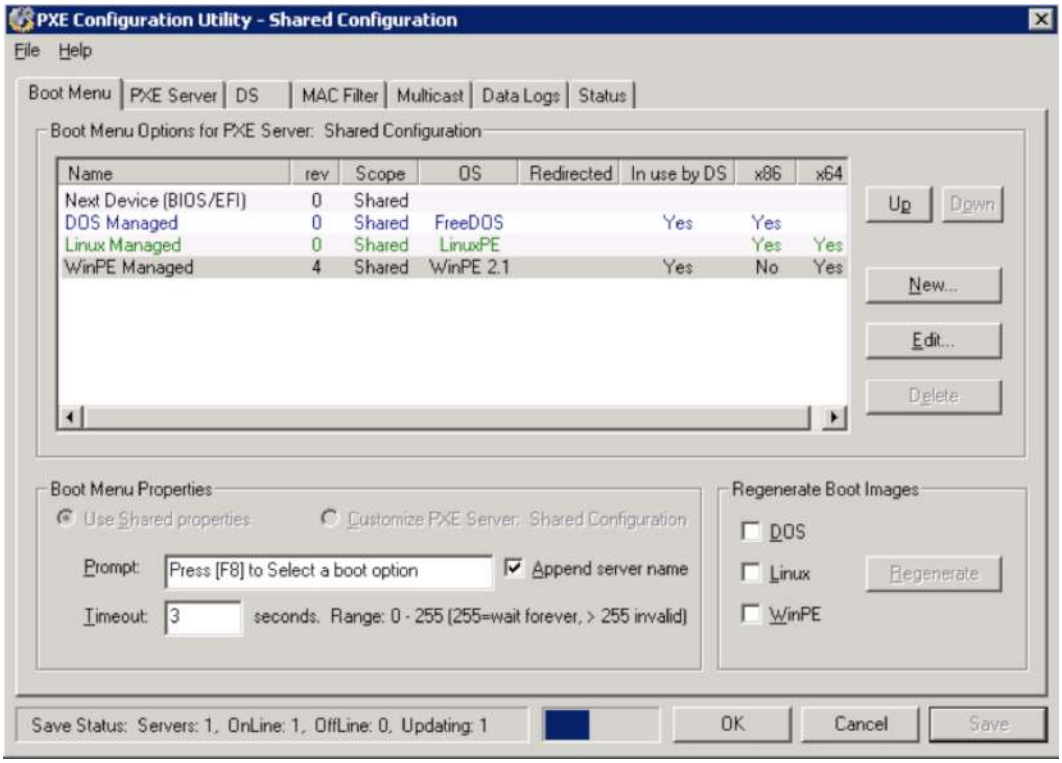
Note: Using the default drive letter (F:) can conflict with the virtual floppy CD/DVD or other system devices. This conflict can prevent the Altiris Express share from being mounted properly.

10. Click Next through Boot Disk Creator Steps 7, 8, 9, and 10 (keeping all the existing settings). At Step 11, the WinPE image will be built (this process can take a few minutes). When the process is completed, you will see the Step 12 of 12: Boot Disk Creation Complete screen. Click Finish and then OK on the screen that follows.





11. When you are back to the PXE Configuration Utility–Shared Configuration screen, be sure to click Save. You will see the status along the bottom of the screen. When processing is finished, Save will be dimmed, and the WinPE Managed revision numerator will be incremented by 1.



12. Click OK to close the PXE Configuration Utility. The process is complete.

For More Information

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