



Methods to Capture and Deploy OS/Disk Images on the Intel® Modular Server System

Technical White Paper

Revision 1.0

March 2008

Enterprise Platforms and Services Division - Marketing

Revision History

Date	Revision Number	Modifications
March 2008	1.0	Initial release.

Disclaimers

Information in this document is provided in connection with Intel® products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, and Intel disclaims any express or implied warranty, relating to sale and/or use of Intel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Intel products are not intended for use in medical, life saving, or life sustaining applications. Intel may make changes to specifications and product descriptions at any time, without notice.

Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them.

The Methods to Capture and Deploy OS/Disk Images on the Intel® Modular Server System may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Intel, Pentium, Celeron, and Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Copyright © Intel Corporation 2008.

*Other names and brands may be claimed as the property of others.

Table of Contents

1. Overview	1
2. Using Symantec* Ghost Solution Suite.....	1
2.1 Hardware and Software Requirements.....	1
2.2 Configuring the Host Server	2
2.2.1 Install and Configure the Host Operating System.....	2
2.2.2 Install Symantec* Ghost Solution Suite	2
2.3 Preparing to Capture and Deploy Images	2
2.3.1 Prepare a Bootable Symantec* Ghost CD-ROM	2
2.3.2 Install the Operating System to be Captured.....	12
2.4 Capturing and Deploying Images	13
2.4.1 Boot the Server Compute Module to the Symantec* Ghost Client	13
2.4.2 To Capture an Image.....	13
2.4.3 To Deploy an Image	14
2.5 For More Information	15
2.5.1 Documentation.....	15
2.5.2 Information on the Web	15
3. Using Microsoft Remote Installation Service	16
3.1 Host Server Requirements	16
3.2 Network Requirements	16
3.3 Installation and Configuration	17
3.3.1 Installing Remote Installation Services.....	17
3.3.2 Configuring Remote Installation Services: Editing the Answer File.....	17
3.3.3 Configuring Remote Installation Services: Adding Drivers	18
3.4 Sample Answer File.....	20

4. Using Active@ Disk Image*	22
4.1 Hardware and Software Requirements.....	22
4.2 Configuring the Host Server	22
4.2.1 Configure the Intel® Modular Server System.....	22
4.2.2 Install and Configure the Operating System.....	22
4.2.3 Install Active@ Disk Image*	22
4.3 Cloning a Virtual Drive	23
4.4 Capturing and Deploying Images	28
4.4.1 To Capture an Image.....	28
4.4.2 To Restore an Image	33
4.5 For More Information	39
4.5.1 How to Obtain the Software.....	39
5. Using Linux Drive Cloning to External USB Drive or Network Location.....	40
5.1 Hardware and Software Requirements.....	40
5.2 Configuring the Host Server	40
5.2.1 Configure the Server.....	40
5.3 Cloning a Virtual Drive	40
5.3.1 Virtual Drive to Virtual Drive.....	40
5.3.2 Virtual Drive to an External USB Device.....	40
5.3.3 Virtual Drive to a Virtual Drive in Another Intel® Modular Server System over Ethernet 41	

1. Overview

This white paper is intended to provide a simple description of the requirements and processes for using various software packages to capture and deploy OS/disk images with the Intel® Modular Server System.

Note: *The information in this paper is intended to assist users in deploying operating systems to the Intel® Modular Server System only. The processes described in this paper are not intended as a guide for data backup. Data security and data retention are the sole responsibility of the user.*

2. Using Symantec* Ghost Solution Suite

This section is intended to provide a simple description of the requirements and processes for using Symantec* Ghost Solution Suite to capture and deploy images with the Intel® Modular Server System.

2.1 Hardware and Software Requirements

The following is a list of the recommended minimum software and hardware requirements for creating an effective host server and network environment for capturing and deploying operating system images:

- Symantec* Ghost Solution Suite, version 2
- CD writing software
- A host computer to serve as the Symantec* Ghost server and console:
 - Intel® Architecture PC suitable for supporting Microsoft Windows XP*, Microsoft Vista*, or Microsoft Windows Server 2003* SP1 or later.
 - 1GbE Ethernet NIC
 - CD-RW drive (Symantec* Ghost Solution Suite includes a tool for creating a bootable Ghost CD-ROM)
 - 40 GB or larger hard drive
- A TCP/IP-based 1GbE Ethernet network
- An Intel® Modular Server System with at least one compute module installed and at least one virtual drive configured for each server to be imaged
- An USB CD-ROM drive

2.2 Configuring the Host Server

Symantec* Ghost Solution Suite can be installed on a variety of Microsoft Windows* operating systems. Refer to the Symantec documentation for more information.

The host server will host the Symantec* Ghost Solution Suite along with operating system images that can be deployed to an Intel® Modular Server System. Depending upon the source operating system, the operating system configuration and installed applications, an image may be as large as 2 GB. Ideally, the host server will be located within the same local area network as the modular server to be imaged.

2.2.1 Install and Configure the Host Operating System

1. Install your choice of Microsoft Windows* operating system and apply the current service pack(s) and updates
2. Configure the TCP/IP network settings to match the TCP/IP settings of the network in which the Intel® Modular Server System is connected.
3. Create a folder within Microsoft Windows* to store the operating system image files. Ideally the image files should be stored on a hard drive separate from the hard drive where the operating system is being installed.

2.2.2 Install Symantec* Ghost Solution Suite

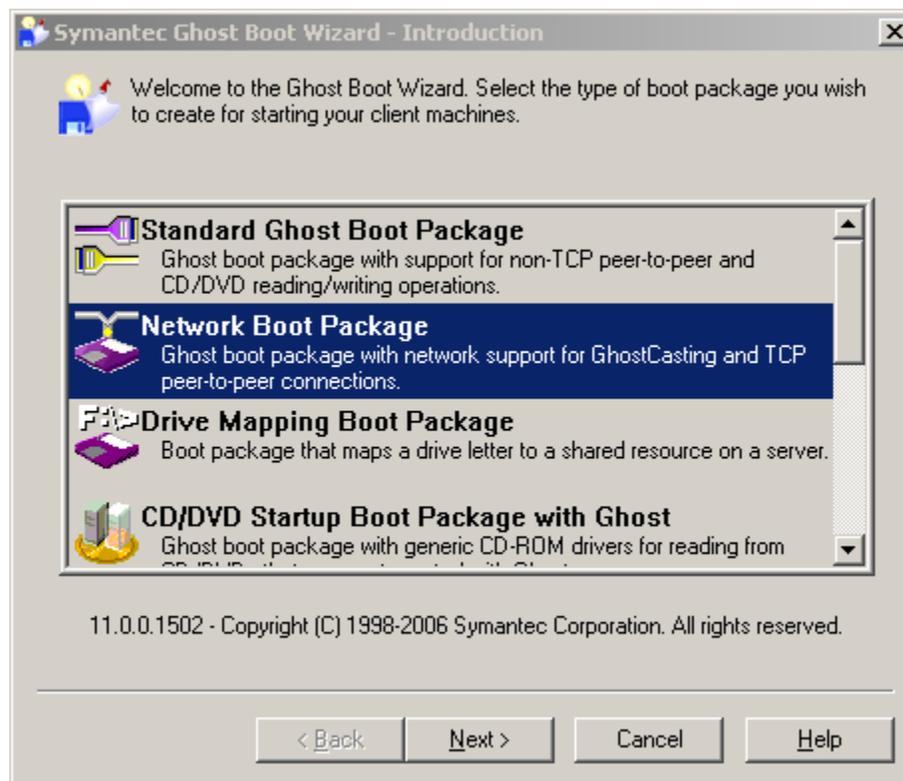
Refer to the documentation that shipped with the Symantec* Ghost Solution Suite you installed for installation instructions.

2.3 Preparing to Capture and Deploy Images

2.3.1 Prepare a Bootable Symantec* Ghost CD-ROM

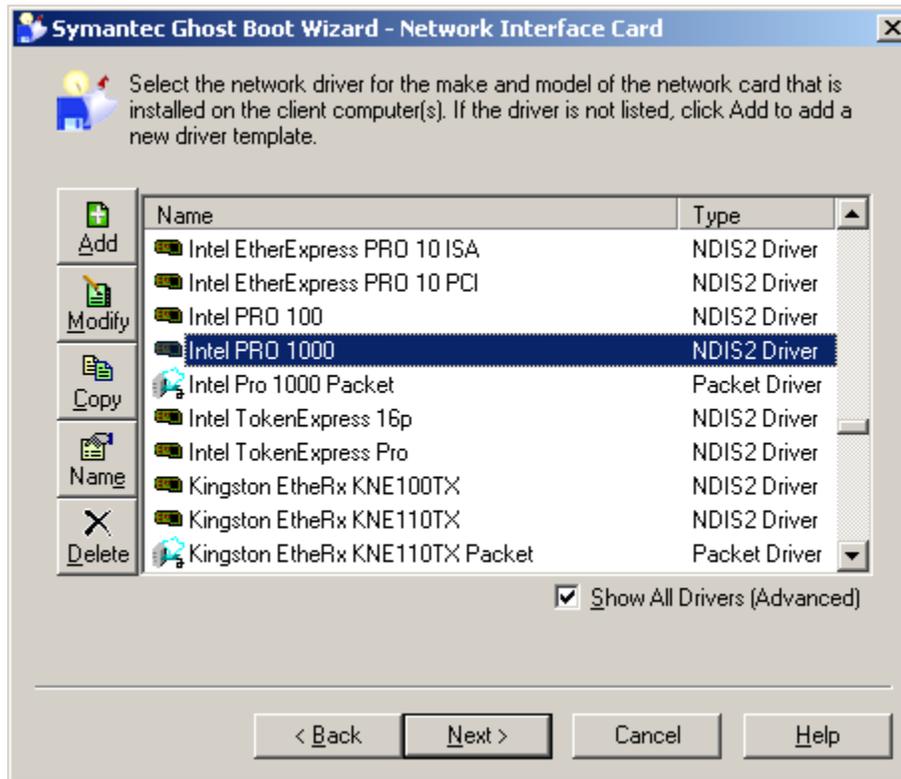
1. Download the latest Intel® PRO 1000 NDIS2 driver from the Intel support website at <http://support.intel.com> and extract the package to a folder on the host server.
2. Launch the *Ghost Boot Wizard*.

3. Select *Network Boot Package*.

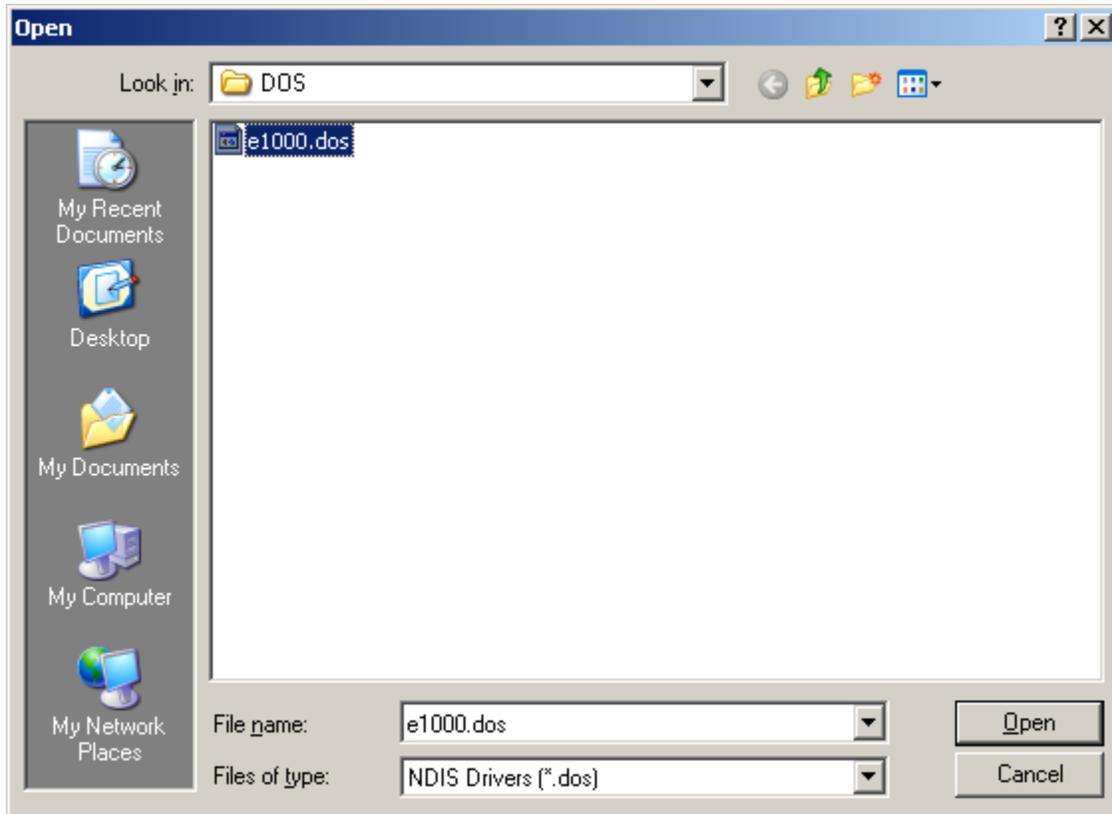


4. Click *Next*.
5. At the Network Interface Card Driver template selection screen, click the *Show All Drivers (Advanced)* checkbox.

6. Scroll down the list of drivers and highlight the Intel® PRO 1000 NDIS2 driver.

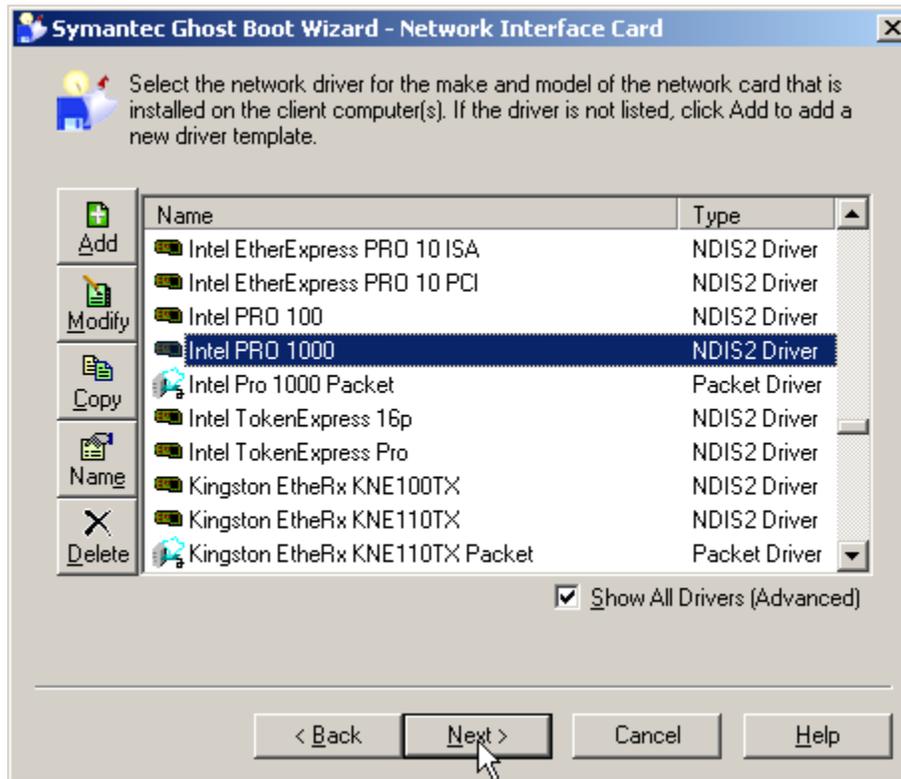


7. If this is the first time you have used the Ghost Boot Wizard to create a bootable disk, you must update the Intel® PRO 1000 NDIS2 driver template to include the latest driver:
 - a. With the Intel® PRO 1000 NDIS2 driver template highlighted, select *Modify*.
 - b. On the NDIS driver tab, click *Setup* and browse to the folder that contains the latest Intel® PRO 1000 NDIS2 driver.

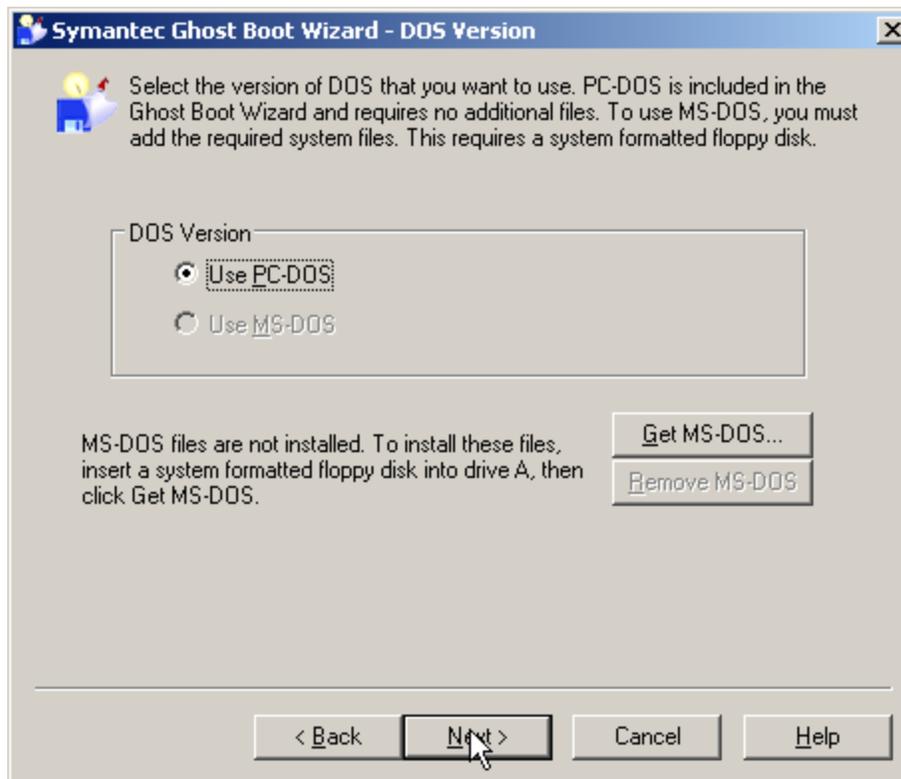


- c. Click *OK*.
- d. The new driver will automatically be loaded into the driver template and you will be returned to the Network Interface Card driver template selection screen

- With the Intel® PRO NDIS2 driver highlighted, click *Next*.

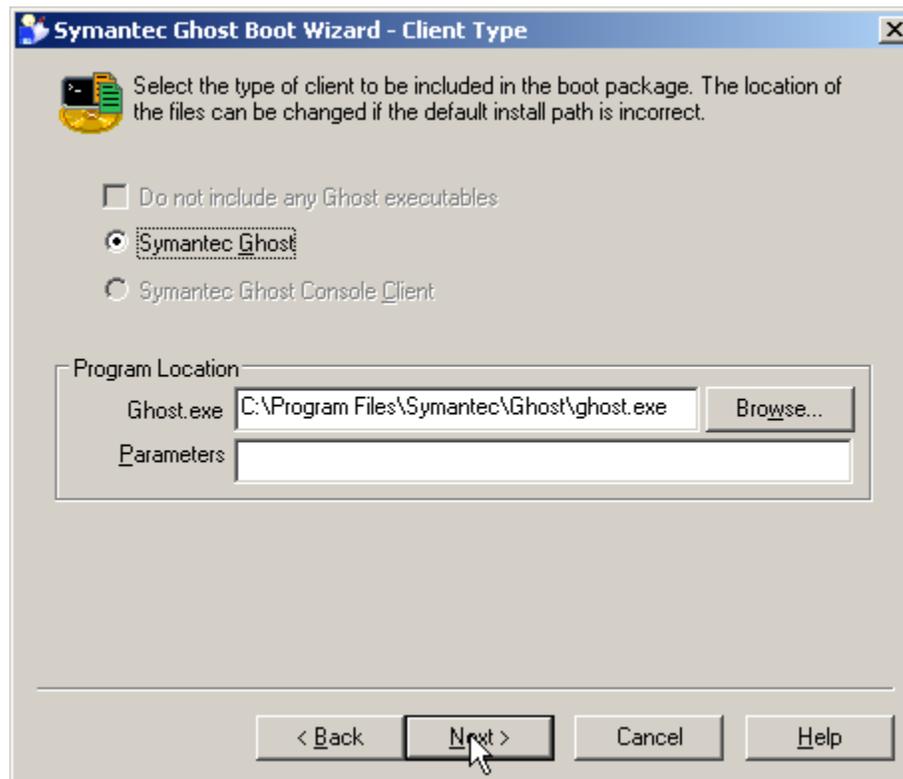


- At the DOS Version selection screen, ensure *Use PC-DOS* is selected.



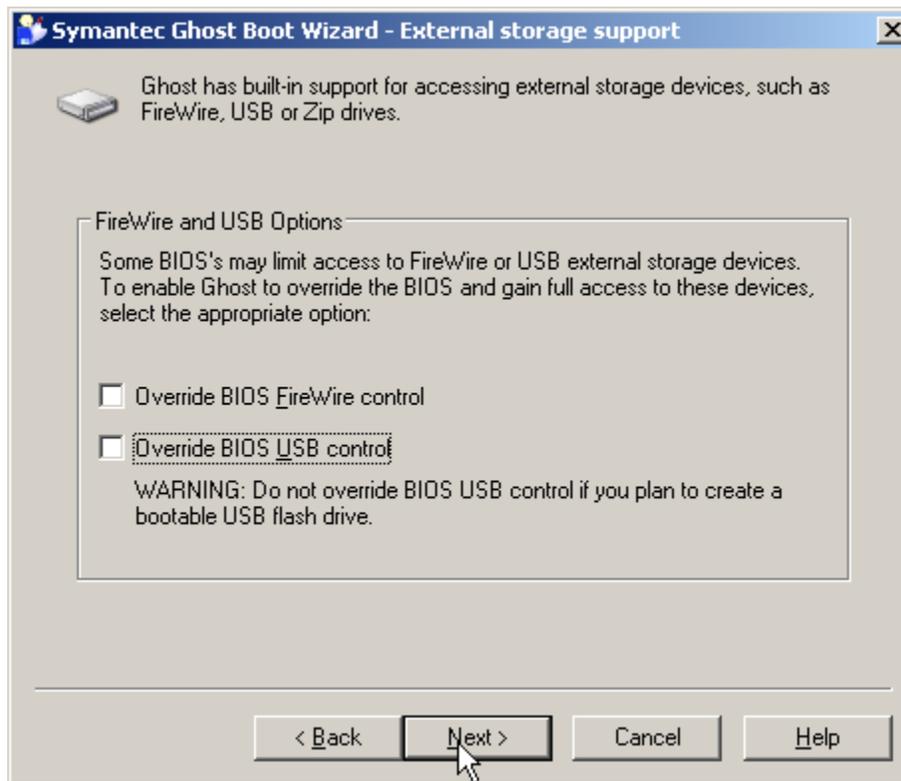
10. Click *Next*.

11. At the Client Type selection screen, ensure *Symantec Ghost* is selected.



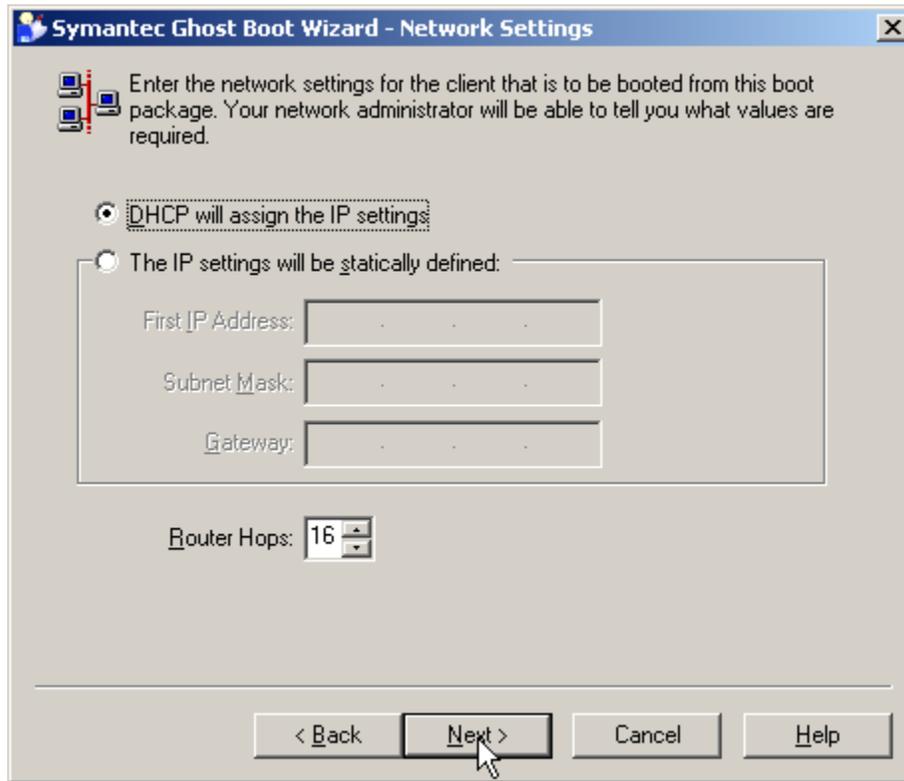
12. Click *Next*.

13. At the External Storage Support selection screen, leave the check boxes unchecked.



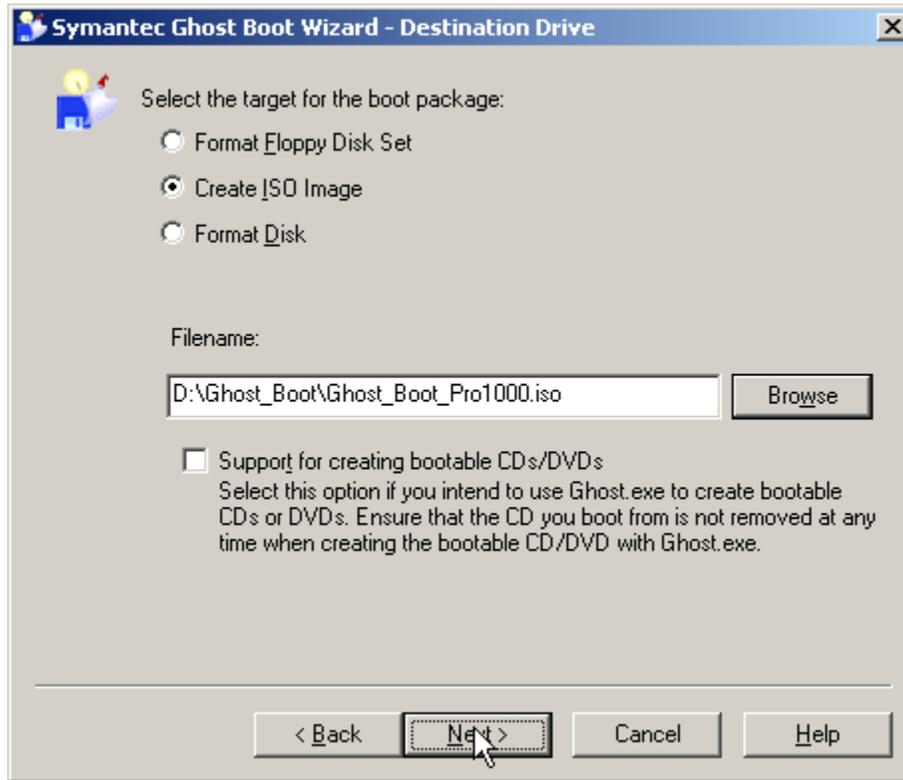
14. Click *Next*.

- At the Network Settings selection screen, select *DHCP will assign the IP settings* if your network uses a DHCP server to assign IP addresses. Otherwise select *The IP settings will be statically defined* and enter the IP address settings appropriate for your network.



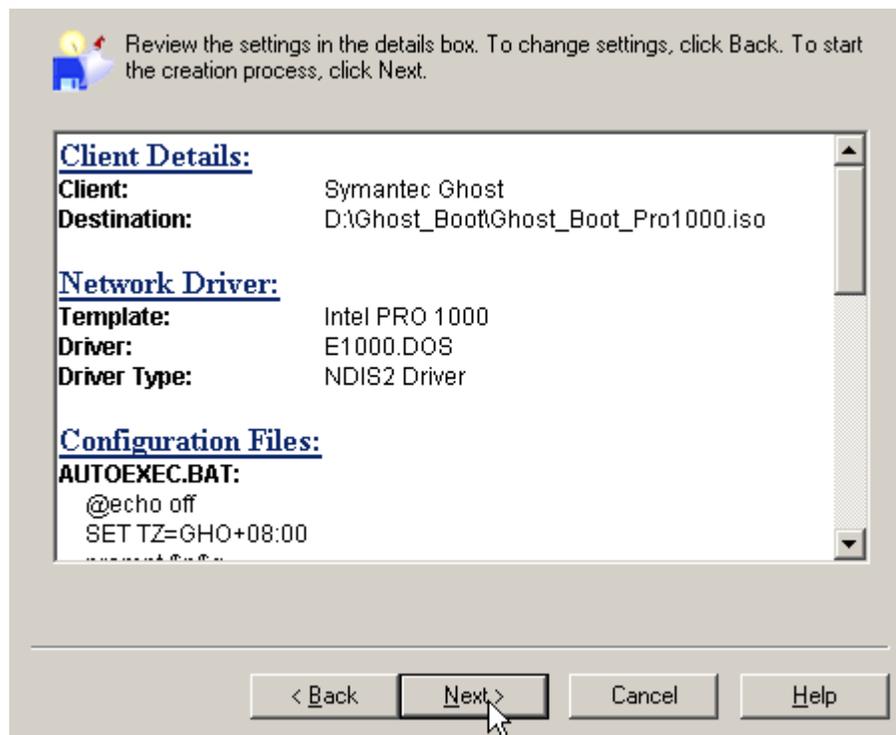
- Click *Next*.

17. At the Destination Drive selection screen, ensure that *Create ISO* is selected. Provide a filename and path (the filename must end with the extension .iso).



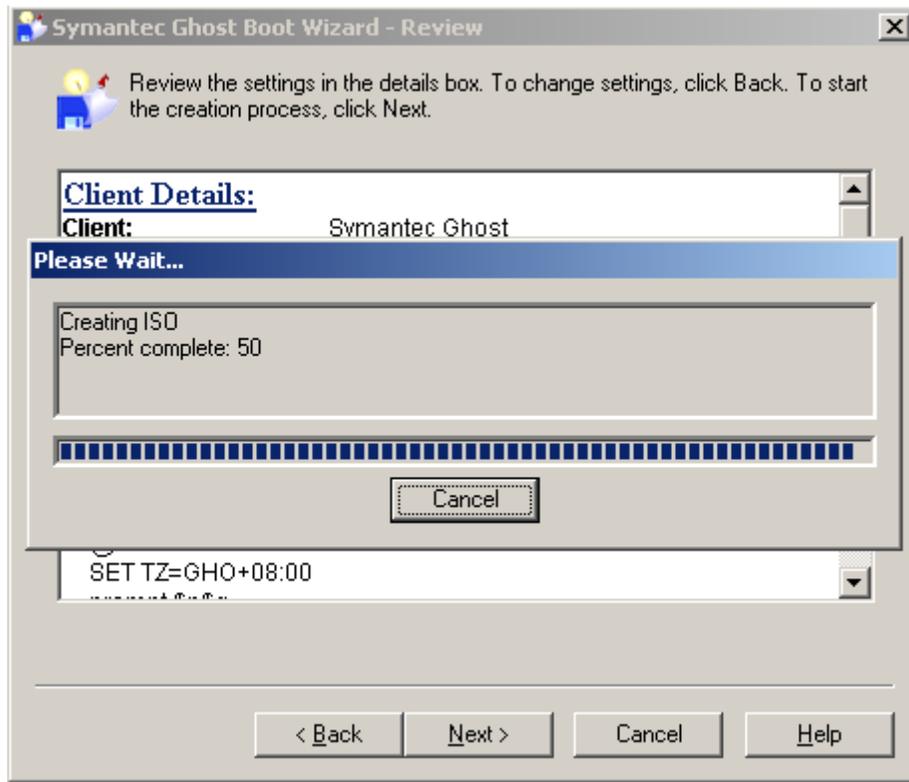
18. Click *Next*.

19. At the Review screen, review the configuration.



20. Click *Next*.

21. The Symantec* Ghost Boot Wizard will automatically create an ISO image that can be used to create a bootable CD-ROM.



22. Click *Finish*.
23. Use your choice of CD burning software to write the ISO image to a CD.

2.3.2 Install the Operating System to be Captured

1. Prepare the Intel® Modular Server System:
 - a. Create a virtual drive and assign it to the server compute module.
 - b. Connect a video monitor to the VGA port on the front panel of the server compute module.
 - c. Connect a USB 2.0 hub to the USB port on the front panel of the server compute module.
 - d. Connect a USB CD-ROM or DVD-ROM drive, a USB floppy drive, a USB keyboard and a USB mouse to the USB 2.0 hub.
2. Install and configure the operating system to be captured:
 - a. Install any required applications and/or patches.
 - b. For Microsoft Windows* operating systems, consider using the Microsoft* Sysprep tool to prepare the operating system for duplication.

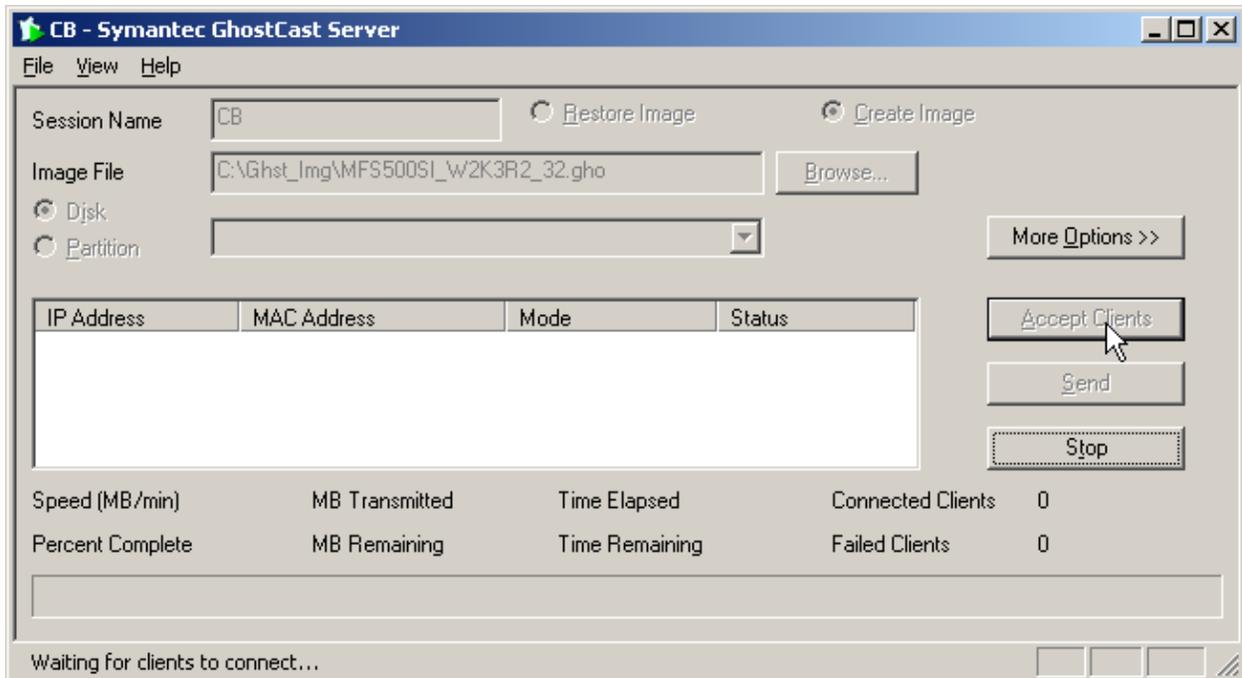
2.4 Capturing and Deploying Images

2.4.1 Boot the Server Compute Module to the Symantec* Ghost Client

1. With a USB CD-ROM drive, USB keyboard and video monitor attached to the front panel of the server compute module you want to image, insert the bootable CD-ROM into the USB CD-ROM drive.
2. Power-on or restart the server compute module.
3. If the server compute module BIOS has been configured to boot to the USB CD-ROM drive let the system boot; otherwise, press F2 for BIOS setup and from the BIOS setup screen arrow over to the Boot Menu and select the USB CD-ROM drive.

2.4.2 To Capture an Image

1. From the host server (where the Symantec* Ghost Solution Suite is installed), launch Symantec* GhostCast Server and apply the following settings:
 - a. Session Name: CB (this may be anything you want but must match the Ghost .exe client running on the server compute module)
 - b. Restore Image / Create Image: Create Image
 - c. Disk / Partition: Disk
 - d. Image File: Browse to the folder where the images are to be stored; type a name for the image file in the *File Name* box. Example: W2K3R232.gho
 - e. Click the *Accept Clients* button.

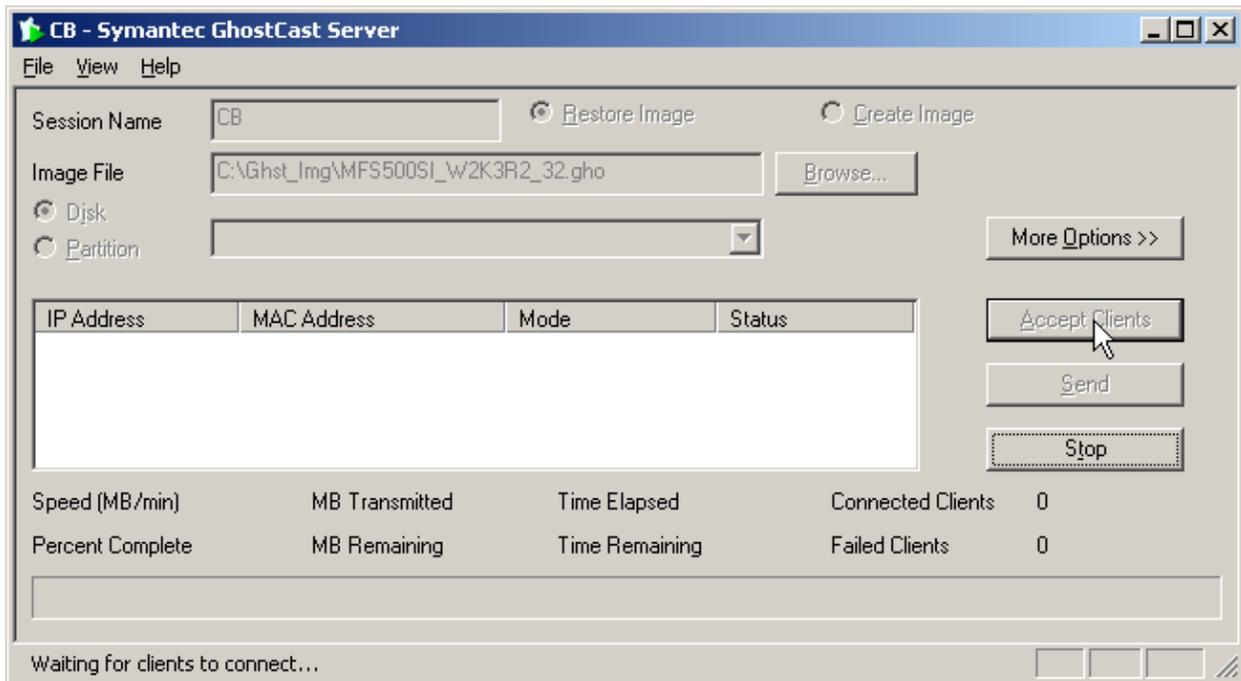


2. At the server compute module:
 - a. Press *OK* at the Symantec* Ghost splash screen.

- b. Arrow down to *GhostCast* and press *Enter*.
- c. Select *Multicast*.
- d. Enter the session name from above (i.e., CB) and press *Enter*.
- e. Select the drive to be imaged.
- f. Follow the prompts.
- g. Symantec* Ghost will capture an image of the virtual drive assigned to the server.

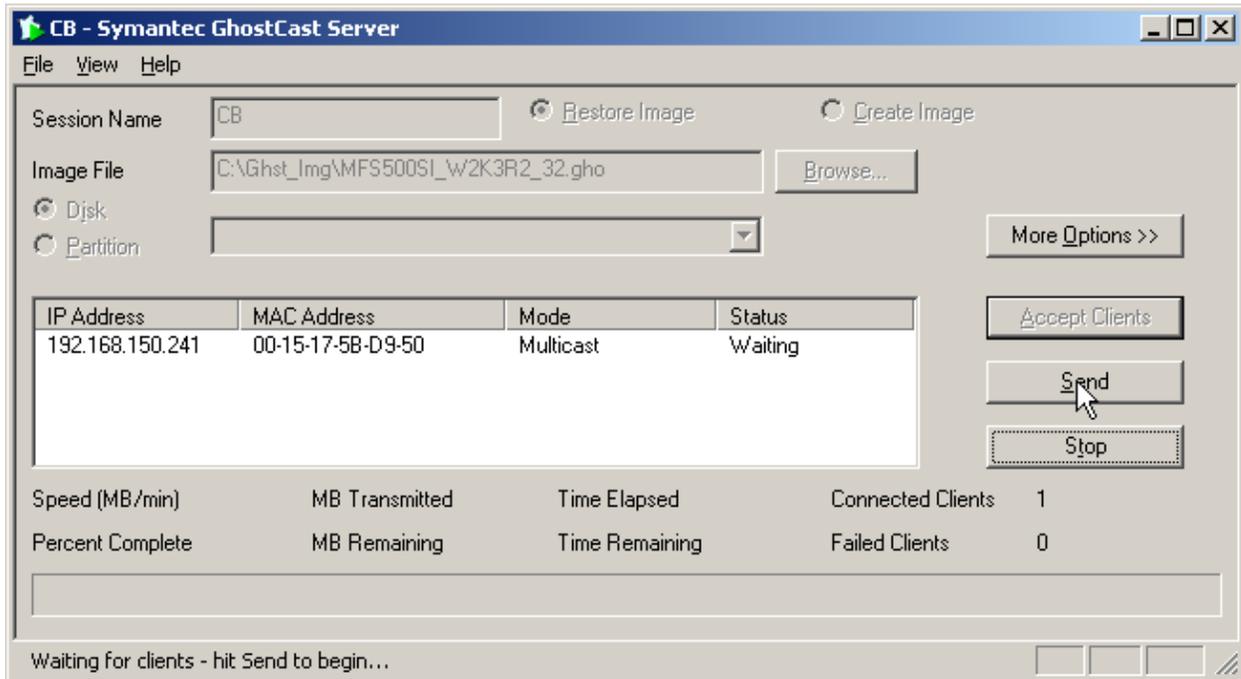
2.4.3 To Deploy an Image

3. From the host server, launch Symantec* GhostCast Server and apply the following settings:
 - a. Session Name: CB (this may be anything you want but must match the `Ghost.exe` client running on the server compute module)
 - b. Restore Image / Create Image: Restore Image
 - c. Disk / Partition: Disk
 - d. Image File: Browse to the folder where the images are to be stored and select an image file to be deployed.
 - e. Click the *Accept Clients* button.



4. At the server compute module:
 - a. Press *OK* at the Symantec* Ghost splash screen.
 - b. Arrow down to *GhostCast* and press *Enter*.
 - c. Select *Multicast*.

- d. Enter the session name from above (i.e., CB) and press *Enter*.
 - e. Select the drive to be imaged.
 - f. Follow the prompts.
5. At the Symantec® GhostCast Server console:
 - a. Click *Send*.



- b. Symantec® Ghost will deploy the image to the virtual drive assigned to the server.

2.5 For More Information

2.5.1 Documentation

1. Symantec provides a set of tutorials which are accessible from the Help drop-down menu on the Symantec® Ghost console.
2. Symantec provides complete documentation (covering planning, implementation and use of Symantec® Ghost Solution Suite 2) on the installation CD.

2.5.2 Information on the Web

For more information, visit the Symantec website at <http://www.symantec.com>.

3. Using Microsoft Remote Installation Service

Microsoft includes the Remote Installation Services (RIS) tool with Microsoft Windows Server 2003* to enable fully automated server deployment. Through the TechNet Web portal, Microsoft provides a number of technical documents that describe in great detail how to set up and configure Microsoft* operating systems, set up Microsoft* Networking, and set up and use a variety of tools, including RIS.

This chapter is intended to provide information specific to the requirements and processes for using Microsoft* Remote Installation Services to deploy Microsoft Windows Server 2003* to the Intel® Modular Server System. It will discuss the highlights of setting up and configuring a RIS server. For detailed information, see the applicable **Microsoft TechNet** article.

Microsoft* Remote Installation Services must be installed on a server running either Microsoft Windows Server 2000* or Microsoft Windows Server 2003*. This chapter focuses on a host server installed with Microsoft Windows Server 2003*.

3.1 Host Server Requirements

1. The host server must meet the minimum requirements for the version of Microsoft Windows Server 2003* being installed on the host server.
2. The host server must include at least two separate hard drives or partitions: a boot drive/partition where the operating system will be installed and a second drive/partition of at least 4 GB that is formatted with an NTFS file system for storing the RIS folder tree. The disk/partition must also provide sufficient storage for additional applications and files.
3. The host server must have a Microsoft Windows*-compatible network interface controller (NIC) that supports TCP/IP and has a minimum speed of 1000Mb/sec. This NIC should be configured with a static IP address.

3.2 Network Requirements

1. A TCP/IP-based Ethernet network
2. The network must include:
 - a. An active Domain Name System (DNS) server
 - b. An active Dynamic Host Configuration Protocol (DHCP) server
 - c. At least one Microsoft* domain controller
3. An Active Directory must exist on the network.

For additional information detailing the installation and troubleshooting of RIS, refer to the following **Microsoft TechNet** article at:

<http://technet2.microsoft.com/WindowsServer/en/library/c62e5951-5eb9-42f1-95ae-490e5d7a55511033.msp?mfr=true>

3.3 Installation and Configuration

3.3.1 Installing Remote Installation Services

1. Install Remote Installation Services through the **Add or Remove Programs, Add / Remove Windows Components** section of the Control Panel.
2. Once the RIS installation is complete you will be prompted to reboot the server.
3. When the server reboot is finished, log in to the server and navigate to Start → Settings → Control Panel → Administrative Tools → Remote Installation Services Setup.
4. The RIS Setup Wizard will launch and walk you through the steps to add an operating system image to be deployed by RIS.
5. The Setup Wizard will prompt for:
 - a. A path to the remote installation folder - This is where the remote installation files will be stored. The drive/partition must be formatted with NTFS version 5 or later. The drive/partition cannot be the system drive.
 - b. Whether the system should respond to client computers requesting service – Put a check in the check box and click *Next*.
 - c. A path to the CD or network location that contains the Microsoft Windows* installation files – This is where RIS will get the files to be placed in the remote installation folder.
 - d. A name for the Microsoft Windows* installation image folder – Enter an appropriate descriptive name such as W2K3_R2_SP2.
 - e. A friendly description and help text – This description will help users select the correct installation image.
6. The Setup Wizard will display the settings for the new image folder. If the settings are correct, click *Finish*.
7. The Setup Wizard will then perform the following:
 - f. Create the remote installation folder.
 - g. Copy the installation files from the source location to the installation image folder. This may take several minutes.
 - h. Create an Unattended Setup answer file – `ristndrd.sif`
 - i. Start the required remote installation services.
8. The Setup Wizard must be run for each operating system to be made available through RIS.

3.3.2 Configuring Remote Installation Services: Editing the Answer File

1. The Unattended Setup answer file must be edited before many of the functions will be truly automated. By default, answer files are located as follows:
 - c. For an x86 OS -
RemoteInstall\Setup\English\Images**ImageName**\i386\templates\
ristndrd.sif

- d. For an x64 OS -
RemoteInstall\Setup\English\Images*ImageName*\amd64\templates
ristndrd.sif
2. Connect a video monitor to the VGA port on the front panel of the server compute module.
3. Connect a USB 2.0 hub to the USB port on the front panel of the server compute module.

3.3.3 Configuring Remote Installation Services: Adding Drivers

The LSI* SAS driver and Intel® NIC driver for the Intel® Compute Module MFS5000SI must be added to the installation image folder for each installation image. The `ristndrd.sif` file must then be edited to include these drivers in the operating system installation routine. Optional drivers (such as the Trusted Platform Module driver, Intel® chipset driver) can also be installed.

1. Adding the Microsoft Windows 2003* 32-bit LSI* SAS driver
 - a. Download the current Microsoft Windows Server 2003* LSI SAS drivers for the Intel® Compute Module MFS5000SI from <http://support.intel.com>.
 - b. Create the following directories in the installation image folder:
 - \\${OEM\$}\\$1\Drivers\LSI_SAS
 - \\${OEM\$}\TEXTMODE
 - c. Copy the following files to the two directories you just created:
 - `lsi_sas.inf`
 - `lsi_sas.sys`
 - `lsinodrv.inf`
 - `s2k332.cat`
 - d. If this is the first set of drivers to be added to the image folder, copy the `txtsetup.oem` file to the `\${OEM$}\TEXTMODE` directory. If a `txtsetup.oem` file already exists in this directory, DO NOT copy over it as you will lose the existing driver configuration. Instead, edit the existing `txtsetup.oem` file by copying the information under the following headings from the `txtsetup.oem` file that is included in the driver package:
 - [Disks]
 - [SCSI]
 - [Files]
 - [Config]
 - e. Edit the unattended install answer file, `RemoteInstall\Setup\English\Images\ImageName\i386\templates\ristndrd.sif`, to include the following entries:

```
[Unattended]
OemPnpDriversPath = \Drivers\LSI_SAS
```

```
[MassStorageDrivers]
"LSI Logic Fusion-MPT SAS Driver (Server 2003 32-bit)"
= "OEM"

[OEMBootFiles]
lsi_sas.inf
lsi_sas.sys
lsinodrv.inf
s2k332.cat
```

4. Adding the Intel® NIC driver:

- e. Download the current Microsoft Windows Server 2003* Intel® NIC driver for the Intel® Compute Module MFS5000SI from <http://support.intel.com>.
- f. Create the following directory in the installation image folder:
 - \\${OEM}\\$1\Drivers\Intel_NIC
- g. Copy all of the files from the pro1000\win32 directory in the Intel® NIC driver package to the \\${OEM}\\$1\Drivers\Intel_NIC directory you just created.
- h. Extract the .INF files from the pro1000\win32\RIS_INF\E1000325.zip and E1E5132.zip to the \i386 folder located in the installation image folder.
- i. Edit the unattended install answer file, RemoteInstall\Setup\English\Images**ImageName**\i386\templates\rlistndrd.sif, to include the following entries:
 - [Unattended]
 - OemPnpDriversPath = \Drivers\Intel_NIC
 - OEMPreinstall = yes
 - DriverSigningPolicy = Ignore

Note: When adding multiple entries to the OemPnpDriversPath line, each entry must be separated by a semi-colon without spaces. The last entry must NOT be followed by a semi-colon. Example: OemPnpDriversPath = \Drivers\LSI_SAS;\Drivers\Intel_NIC

5. Adding the Intel® chipset driver:

- j. Download the current version of the Microsoft Windows Server 2003* Intel® chipset driver for the Intel® Compute Module MFS5000SI from <http://support.intel.com>.
- k. Create the following directory in the installation image folder:
 - \\${OEM}\\$1\Drivers\IntelINF
- l. Copy all the files from the win2003 directory in the Intel® chipset driver package to the \\${OEM}\\$1\Drivers\IntelINF directory you just created.

- m. Edit the `ristndrd.sif` file to include the following entries:
 - `[Unattended]`
 - `OemPnpDriversPath = \Drivers\IntelINF`
- 6. Adding the Intel® TPM driver:
 - n. Download the current version of the Microsoft Windows Server 2003* Intel® TPM driver for the Intel® Compute Module MFS5000SI from <http://support.intel.com>.
 - o. Create the following directory in the installation image folder:
 - `\OEM\$1\Drivers\TPM`
 - p. Copy all the files from the `win2003` directory in the Intel® TPM driver package to the `\OEM\$1\Drivers\TPM` directory you just created.
 - q. Edit the `ristndrd.sif` file to include the following entries:
 - `[Unattended]`
 - `OemPnpDriversPath = \Drivers\TPM`

3.4 Sample Answer File

The following is an example of an answer file that may be used to install Microsoft Windows Server 2003* on an Intel® Modular Server System. Changes to the original file entries are in ***bold italics***.

```
[data]
floppyless = "1"
msdosinitiated = "1"
OriSrc = "\\%SERVERNAME%\RemInst\%INSTALLPATH%\%MACHINETYPE%"
OriTyp = "4"
LocalSourceOnCD = 1
DisableAdminAccountOnDomainJoin = 1

[SetupData]
OsLoadOptions = "/noguiboot /fastdetect"
SetupSourceDevice =
"\Device\LanmanRedirector\%SERVERNAME%\RemInst\%INSTALLPATH%"

[Unattended]
OemPreinstall = yes
OemPnpDriversPath =
\Drivers\LSI_SAS;\Drivers\Intel_NIC;\Drivers\IntelINF;\Drivers\TPM
FileSystem = LeaveAlone
ExtendOEMPartition = 0
TargetPath = \WINDOWS
OemSkipEula = yes
InstallFilesPath =
"\%SERVERNAME%\RemInst\%INSTALLPATH%\%MACHINETYPE%"
LegacyNIC = 1
DriverSigningPolicy = Ignore
WaitForReboot = no

[UserData]
FullName = "Your Company"
```

```
OrgName = "Your Company"
ComputerName = %MACHINENAME%
ProductKey = XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

[MassStorageDrivers]
"LSI Logic Fusion-MPT SAS Driver (Server 2003 32-bit)" = "OEM"

[OEMBootFiles]
lsi_sas.inf
lsi_sas.sys
lsinodrv.inf
s2k332.cat

[GuiUnattended]
OemSkipWelcome = 1
OemSkipRegional = 1
TimeZone = %TIMEZONE%
AdminPassword = "*"
EncryptedAdminPassword=NO
AutoLogon=Yes
AutoLogonCount=1

[LicenseFilePrintData]
AutoMode = PerSeat

[Display]
BitsPerPel = 32
XResolution = 1024
YResolution = 768
VRefresh = 60

[Networking]
InstallDefaultComponents = Yes

[NetServices]
MS_Server=params.MS_P Sched

[Identification]
JoinDomain = %MACHINEDOMAIN%
DoOldStyleDomainJoin = Yes

[RemoteInstall]
Repartition = Yes
UseWholeDisk = Yes

[Shell]
DefaultStartPanelOff = Yes

[OSChooser]
Description = "Windows Server 2003 Enterprise x64 Edition"
Help = "Automatically installs Windows Server 2003, Enterprise and
allows manual disk partitioning"
LaunchFile = "%INSTALLPATH%\%MACHINETYPE%\templates\startrom.com"
ImageType = Flat
Version = "5.2 (3790)"
```

4. Using Active@ Disk Image*

Active@ Disk Image* is a Microsoft Windows* based disk imaging tool that allows a user to clone one hard drive to another hard drive, or to capture and deploy hard drive images.

This section is intended to provide a simple description of the requirements and processes for using Active@ Disk Image* to clone a virtual drive to another virtual drive on the Intel® Modular Server System.

4.1 Hardware and Software Requirements

The following is a list of the recommended minimum software and hardware requirements:

- Active@ Disk Image*, version 3.1
- An Intel® Modular Server System with at least one server compute module installed and at least two virtual drives configured.
- A USB CD-ROM drive
- A USB floppy drive
- Microsoft Windows Server 2003*, R2

4.2 Configuring the Host Server

Active@ Disk Imaging* software may be used with a variety of Microsoft Windows* operating systems. This document focuses on using Active@ Disk Image* to clone Intel® Modular Server System virtual drives with Microsoft Windows Server 2003* installed.

4.2.1 Configure the Intel® Modular Server System

1. Create at least one storage pool using one or more physical hard drives.
2. Create at least two virtual drives. Each virtual drive must be of identical size and be large enough to support the installation of Microsoft Windows Server 2003*. They must also provide sufficient storage for additional applications and user files.
3. Assign the virtual drives to a server compute module as Drive 0, Drive 1, etc.

4.2.2 Install and Configure the Operating System

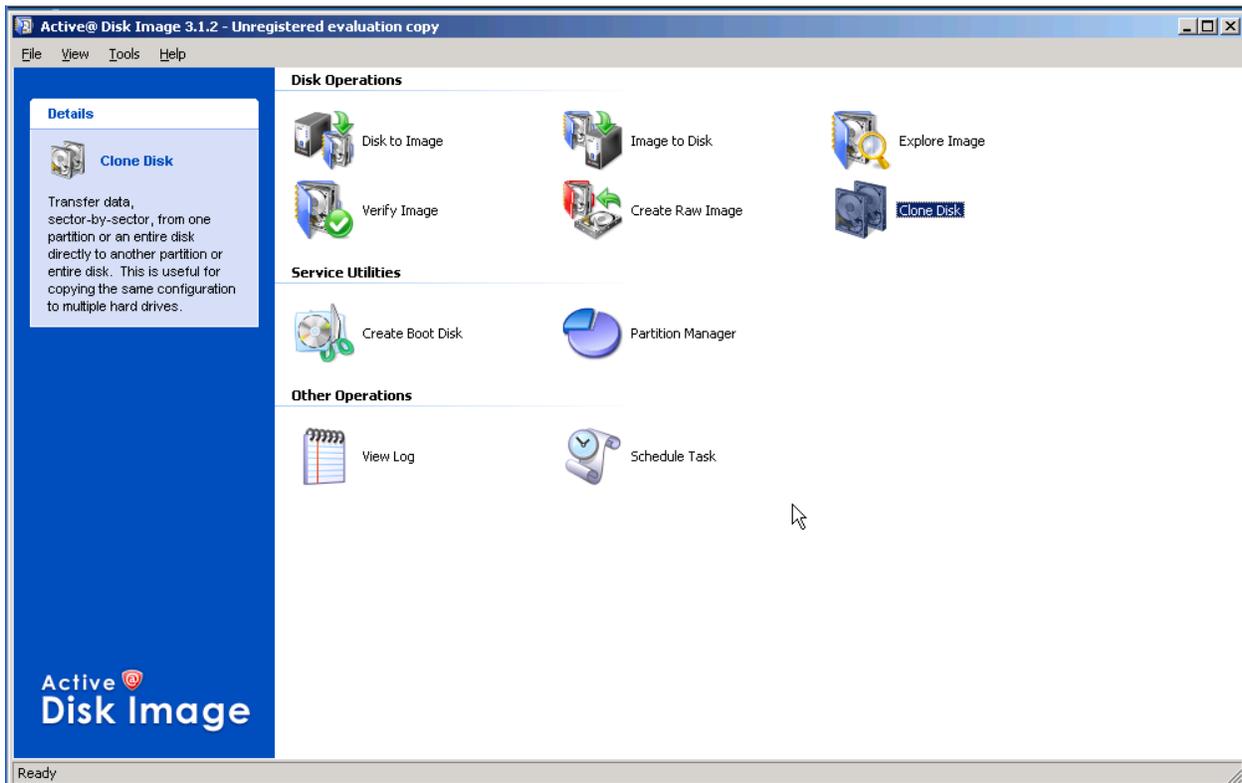
1. Install Microsoft Window* Server 2003* on the virtual drive that is assigned as Drive 0.
2. Apply all current service packs and updates.
3. Install additional application software as required.

4.2.3 Install Active@ Disk Image*

1. Install Active@ Disk Image* on the virtual drive that is assigned as Drive 0. For installation instructions, refer to the documentation included with the Active@ Disk Image software.

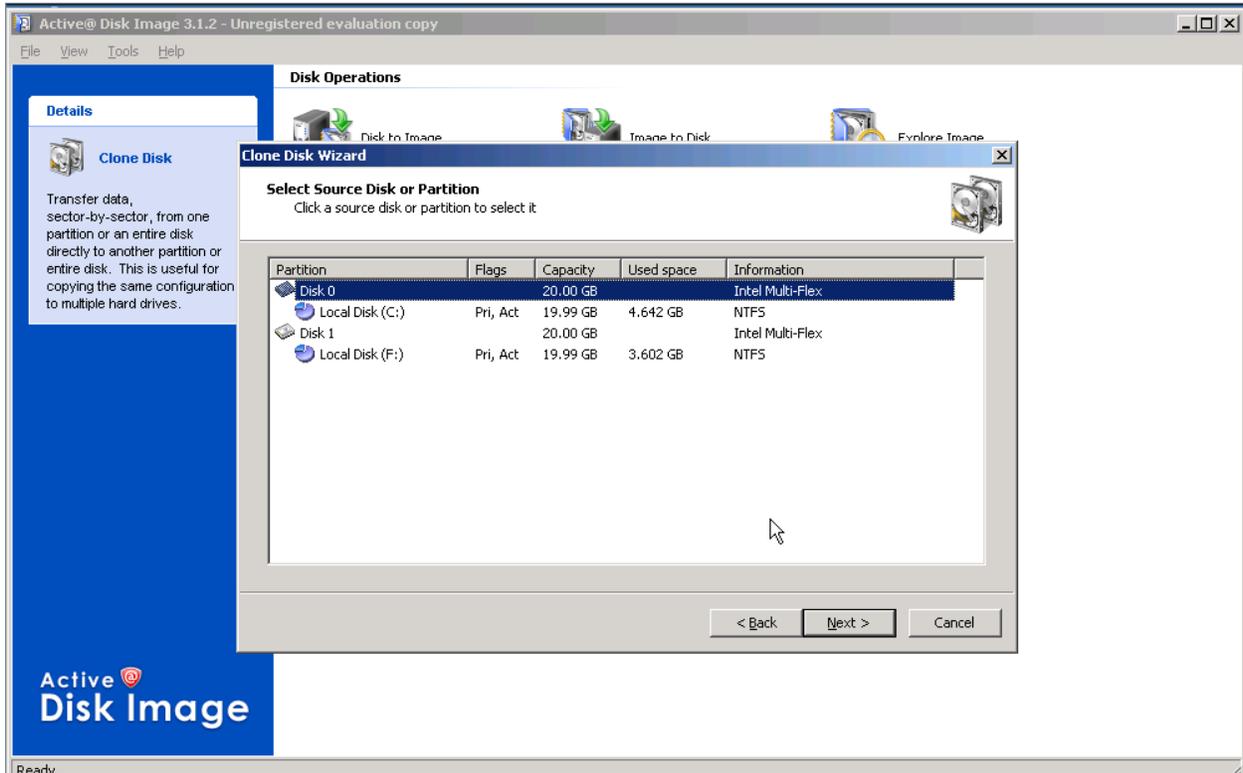
4.3 Cloning a Virtual Drive

1. Boot the server compute module that is hosting the virtual drives you created in step 4.2.1
2. Launch Active@ Disk Image*.
3. Double-click *Clone Disk*.



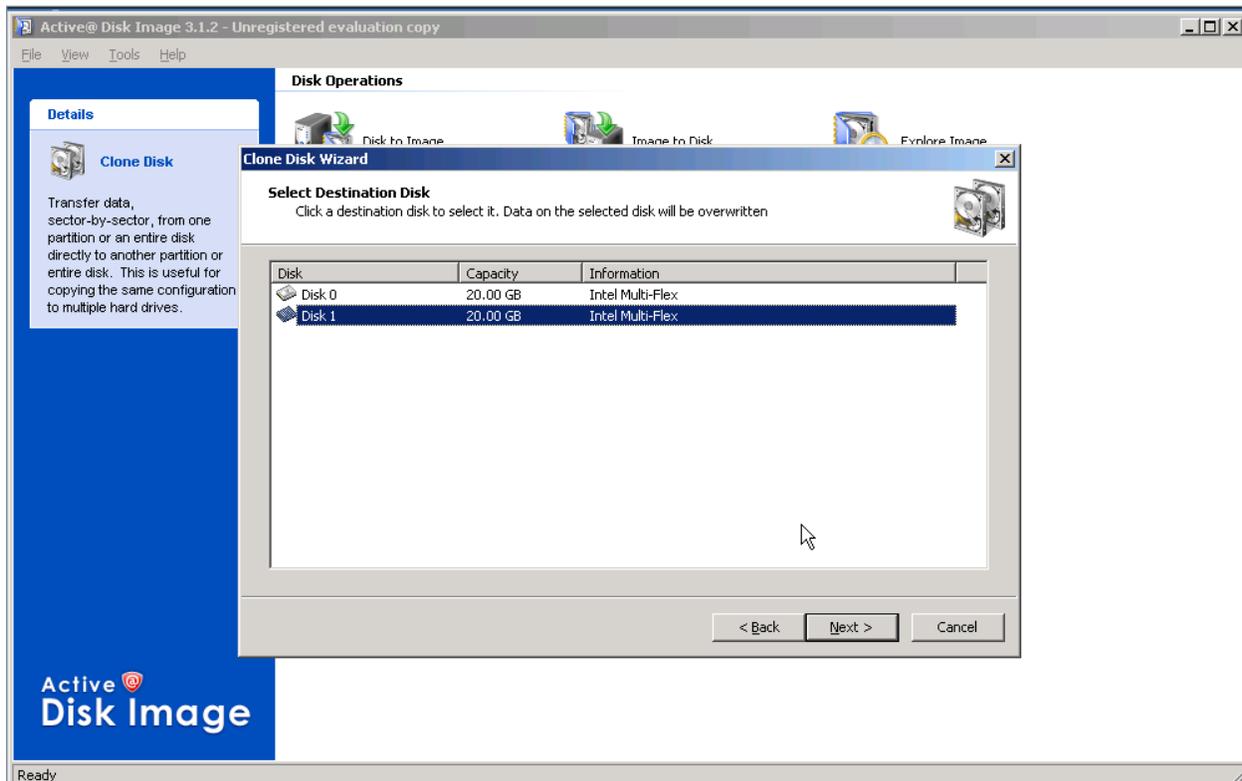
4. Click *Next*.

5. Select Disk 0 as the source disk.



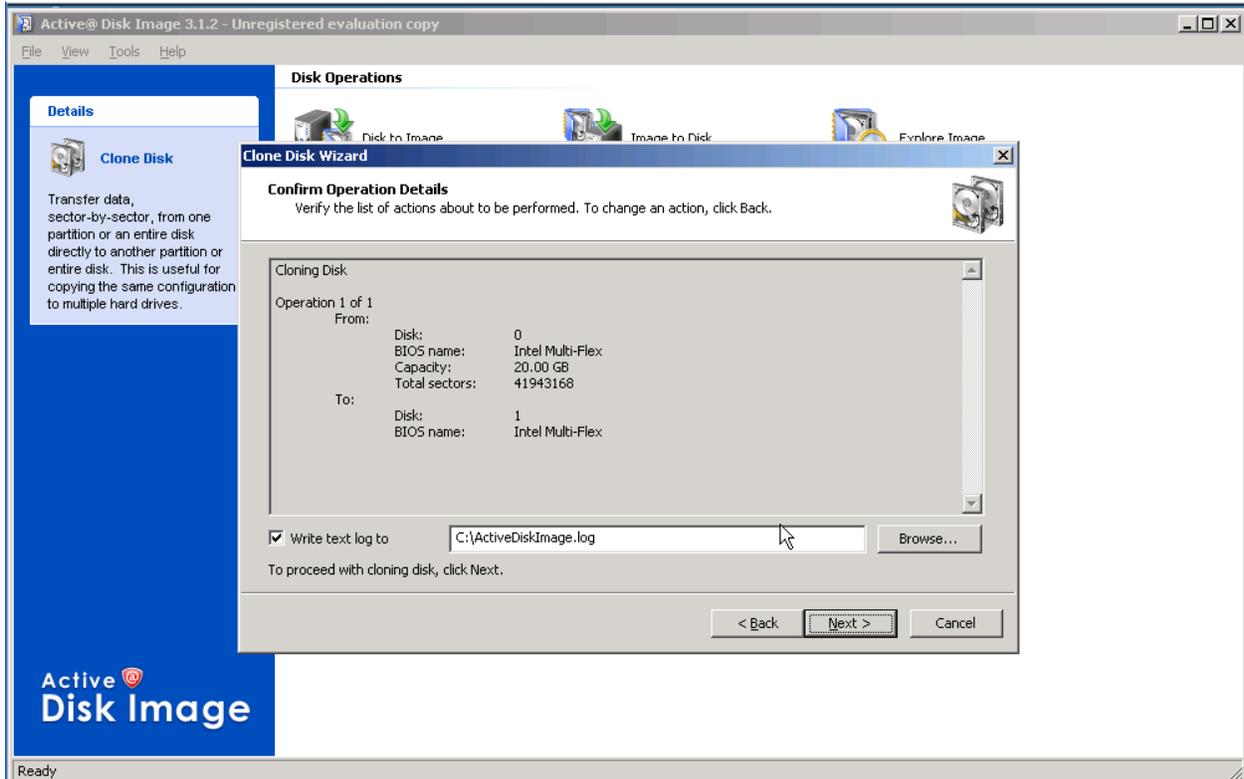
6. Click Next.

7. Select the destination disk that will receive the cloned image.



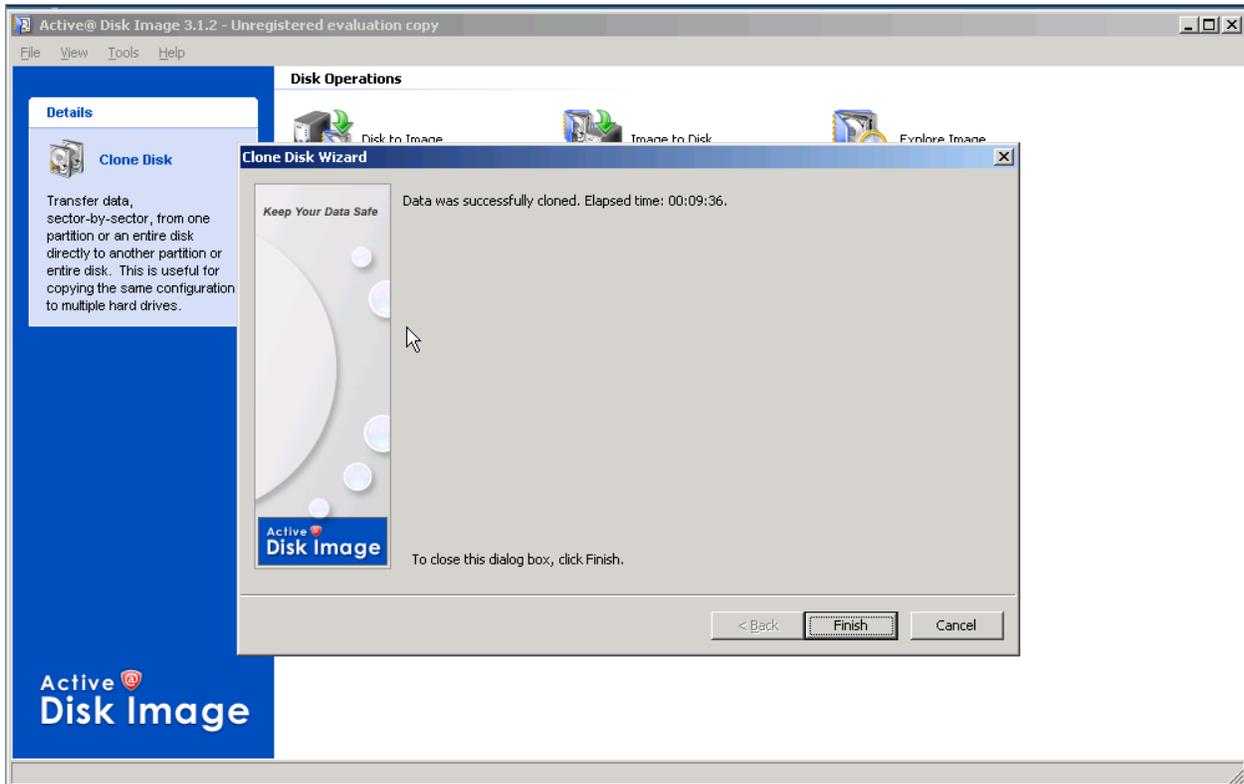
8. Click *Next*.

9. On the confirmation page, accept the default setting for the log file.



10. Click *Next*.

11. When the drive clone process is complete, click *Finish*.



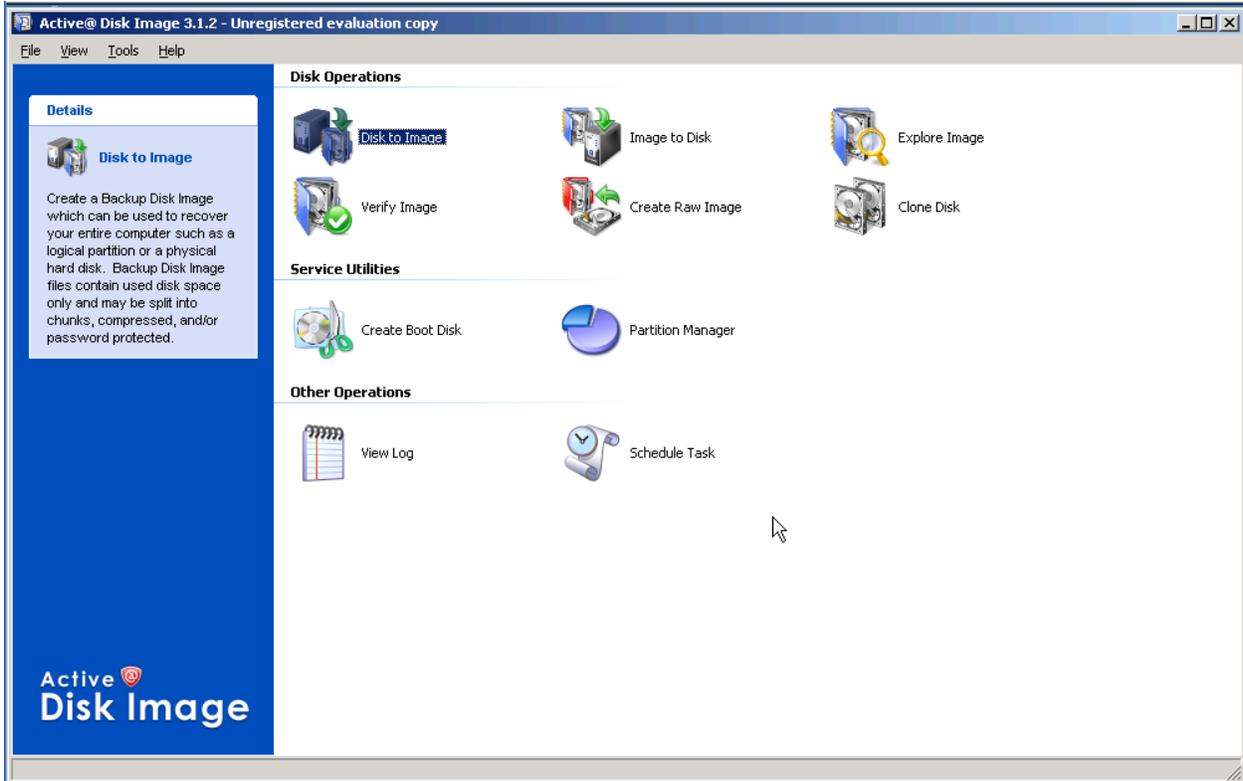
Note: To use the newly cloned drive, reassign it to another server compute module as Drive 0 and boot the server compute module.

The cloned image is an exact copy of the original drive including server name, IP address, etc. To avoid conflicts on the network, these settings must be changed to something unique.

4.4 Capturing and Deploying Images

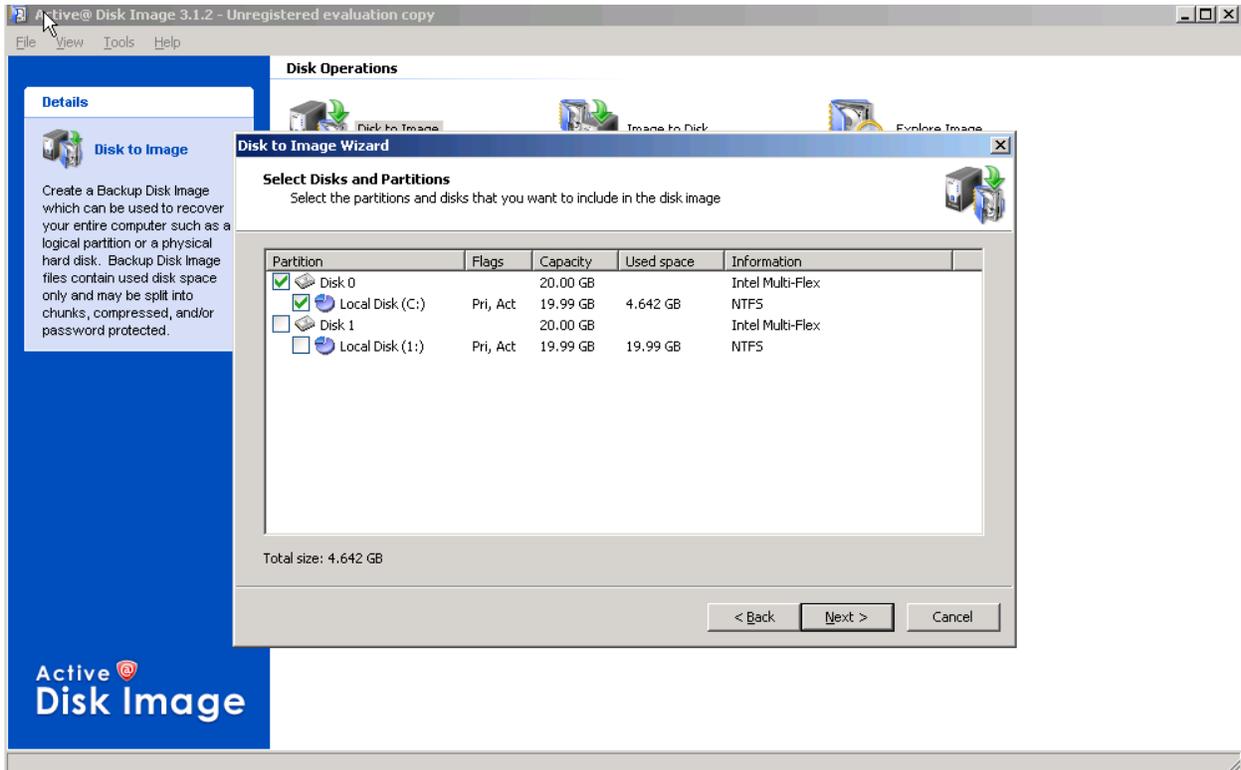
4.4.1 To Capture an Image

1. Double-click *Disk to Image*.



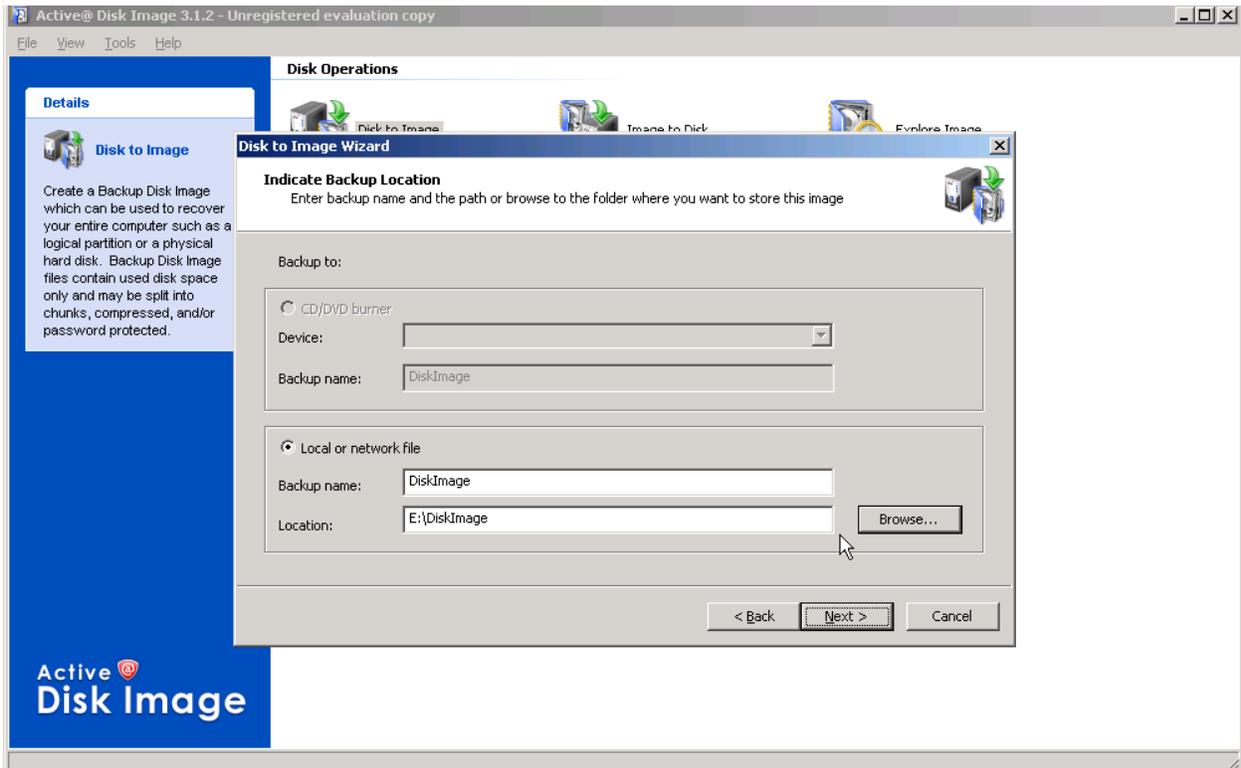
2. Click *Next*.

3. Select the source drive.



4. Click Next.

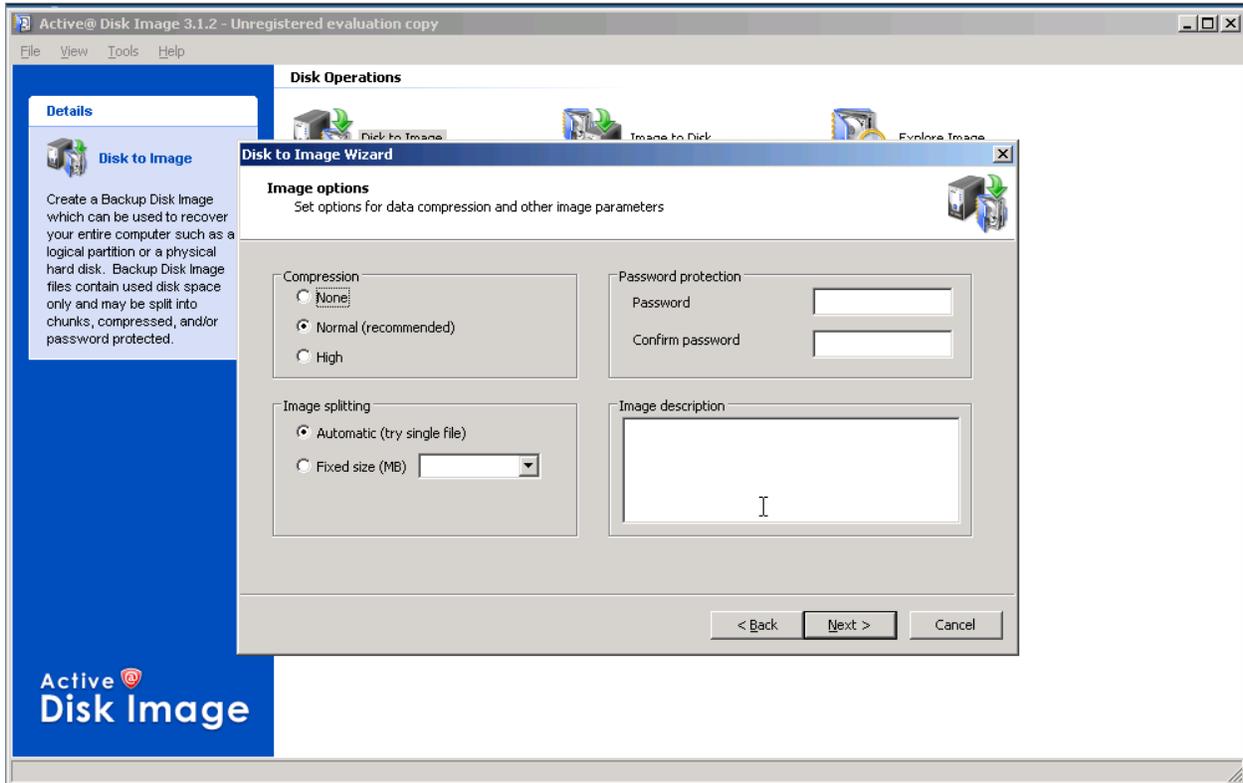
5. Select the destination location for the image.



6. Click *Next*.

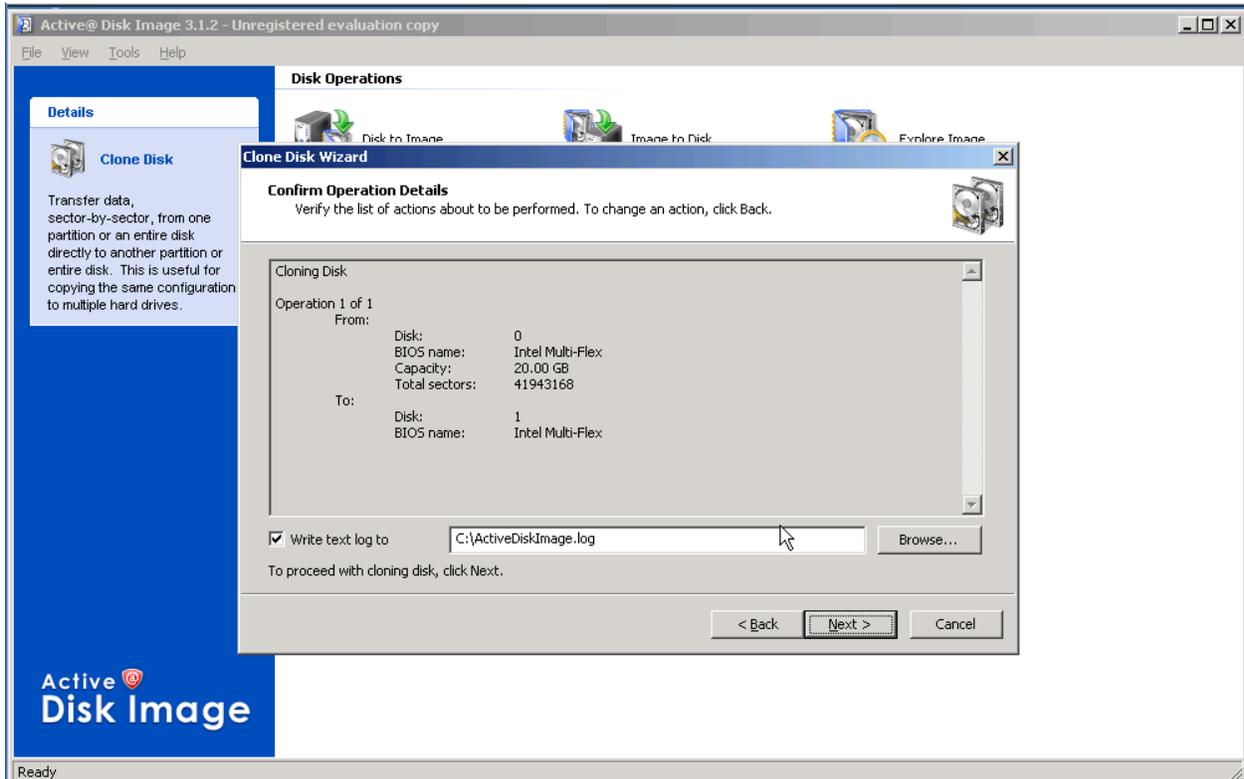
Note: The destination disk may be a USB Flash drive, a USB CD/DVD-ROM drive, or another virtual drive that is mounted on the same server compute module you are using to capture the image, etc.

7. Accept the default settings for Image Options.



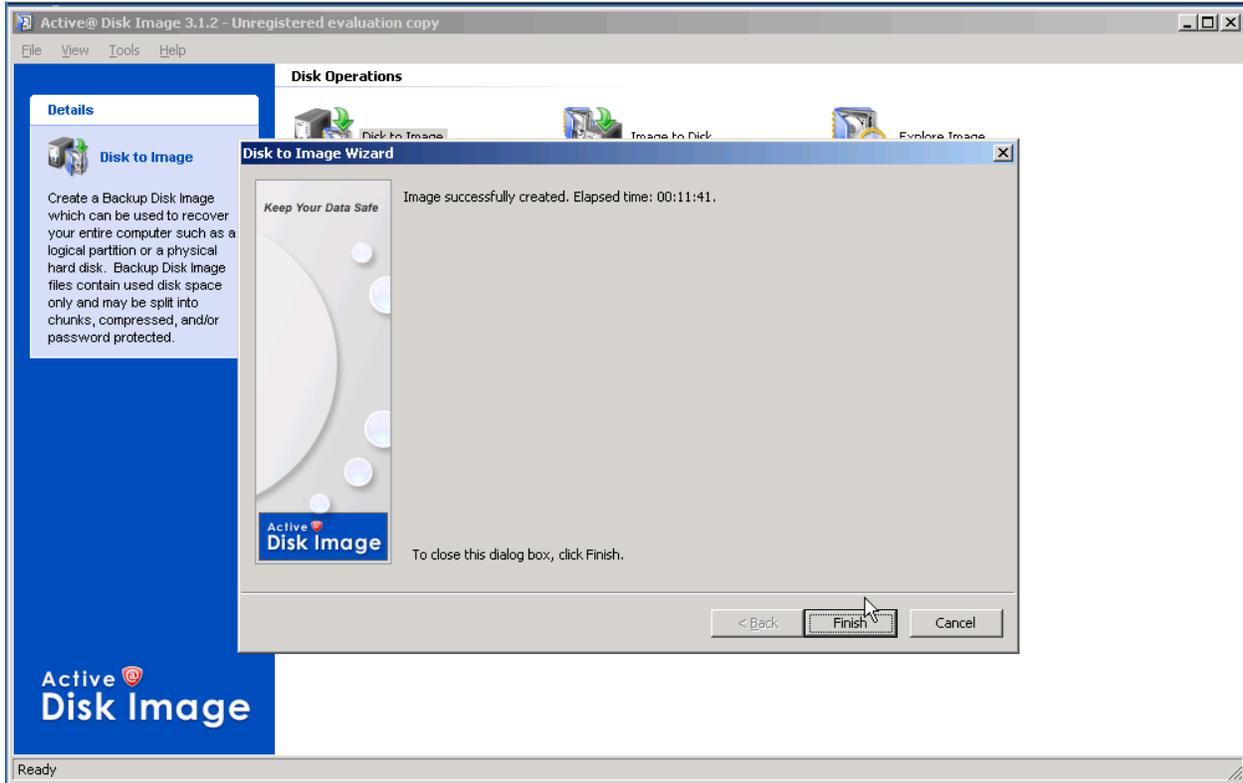
8. Click *Next*.

9. On the confirmation page, accept the default settings for the log.



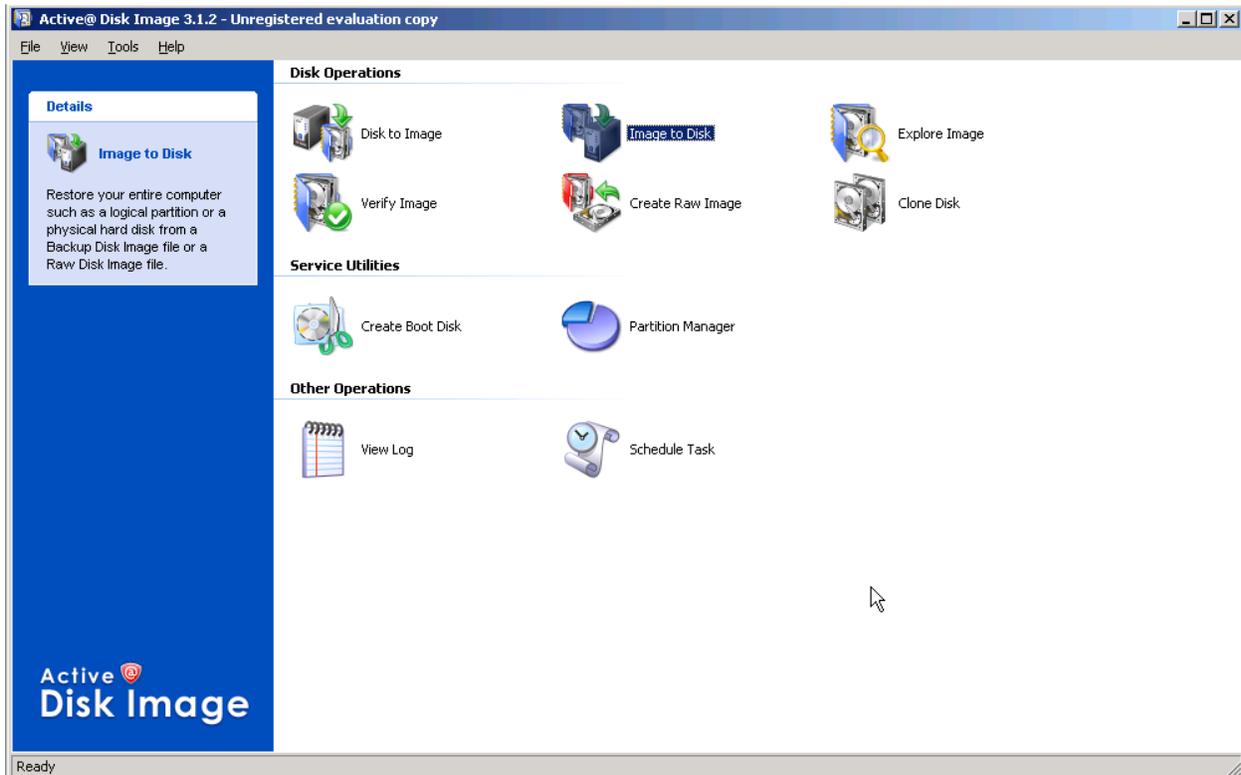
10. Click *Next*.

11. When the drive image process is complete, click *Finish*.



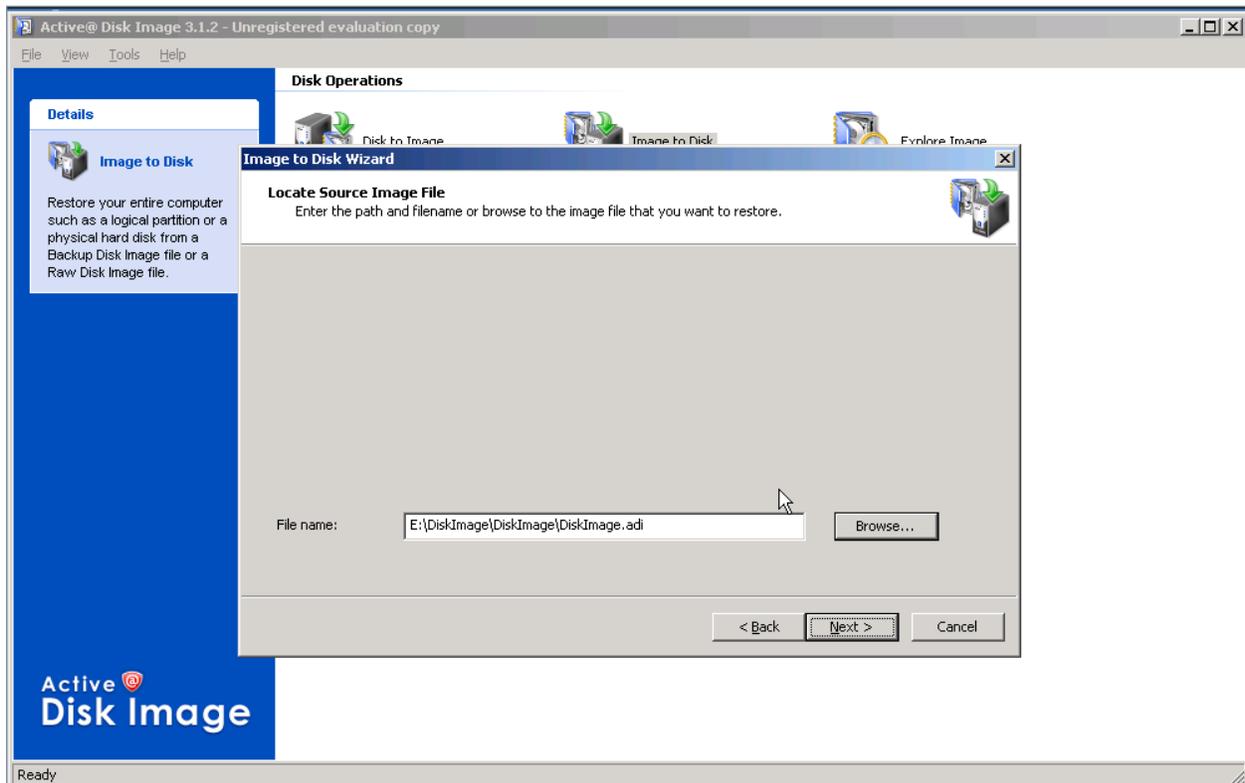
4.4.2 To Restore an Image

1. Double-click *Image to Disk*.



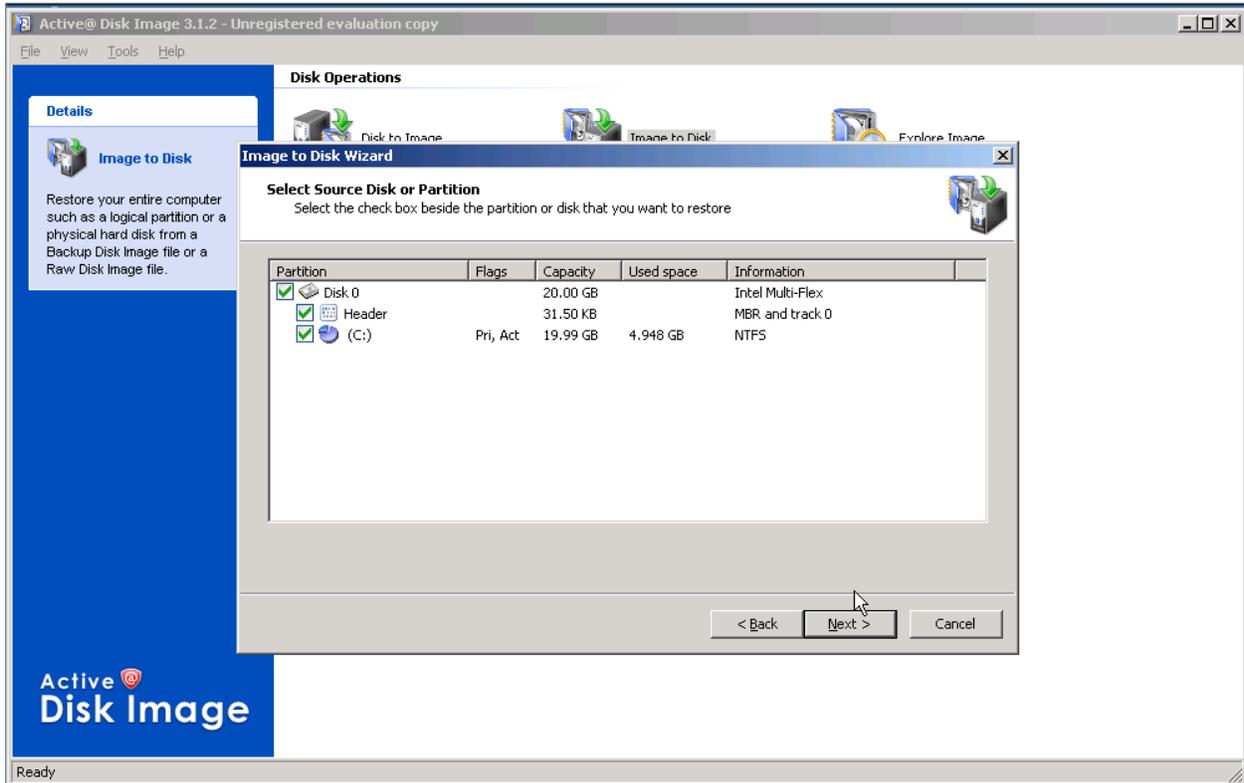
2. Click *Next*.

3. Browse to the location of the image file to restore.



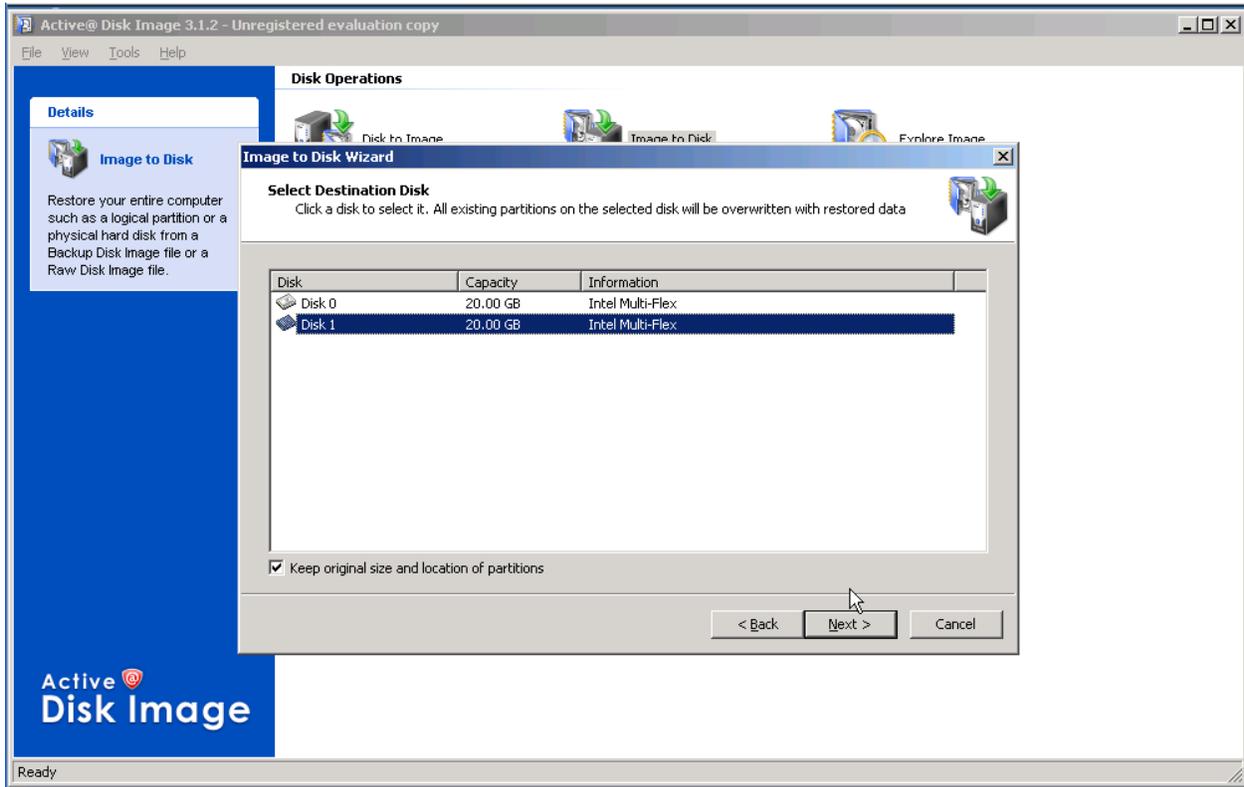
4. Click *Next*.

5. Select the source to be restored (the source component from within the restore image).



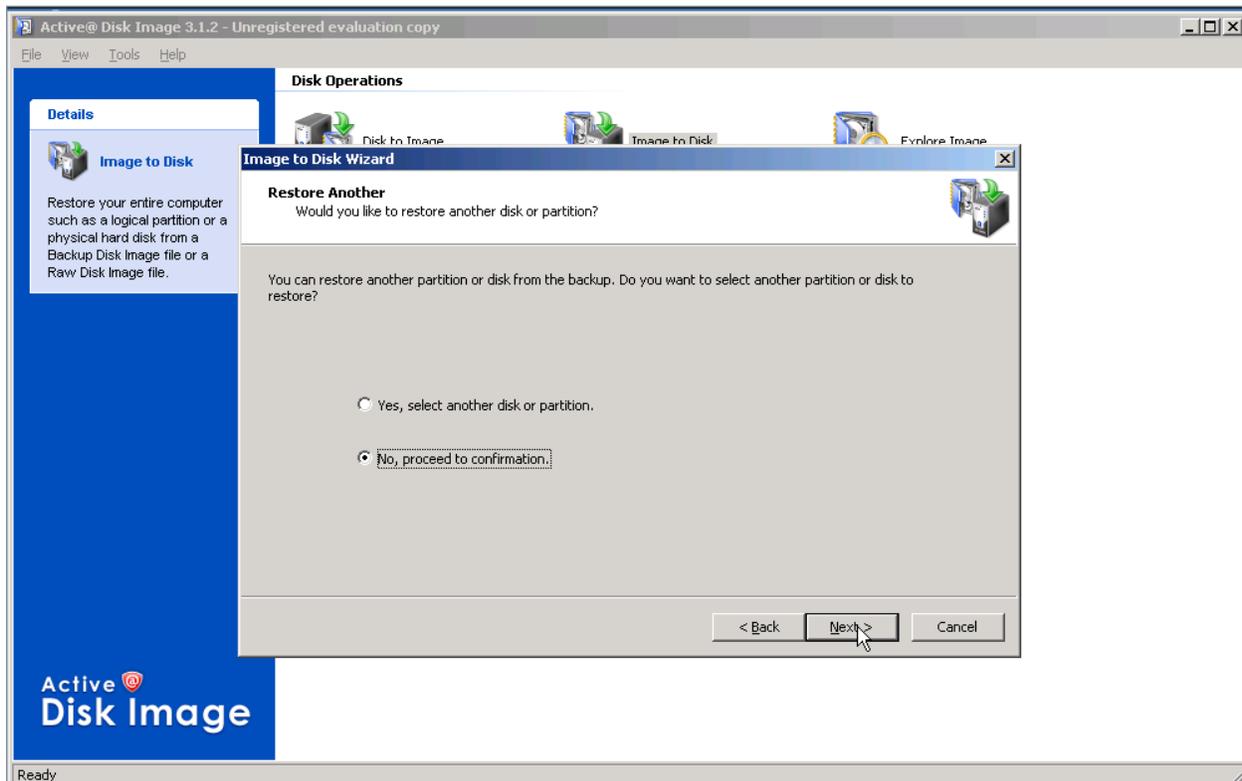
6. Click *Next*.

7. Select the destination drive (this is the drive to which the image will be written).



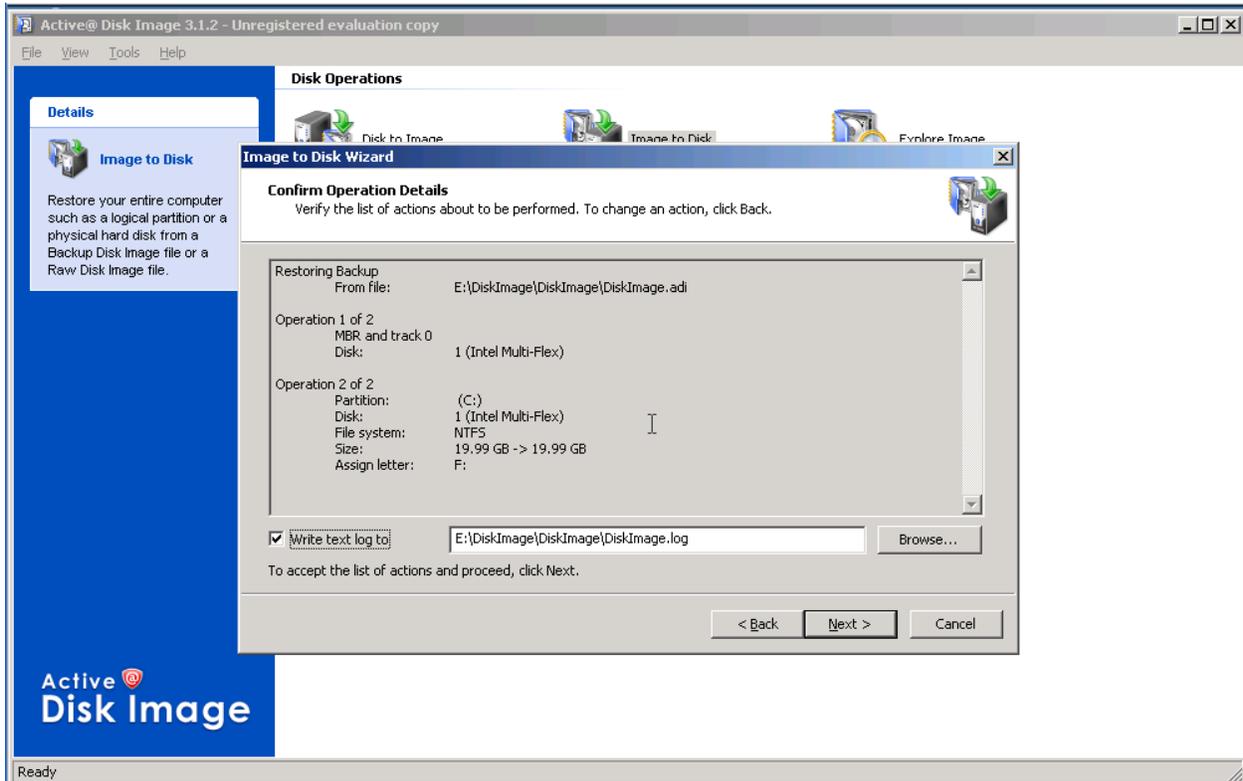
8. Click *Next*.

9. On the Restore Another page, accept the default setting of *No, proceed to confirmation*.

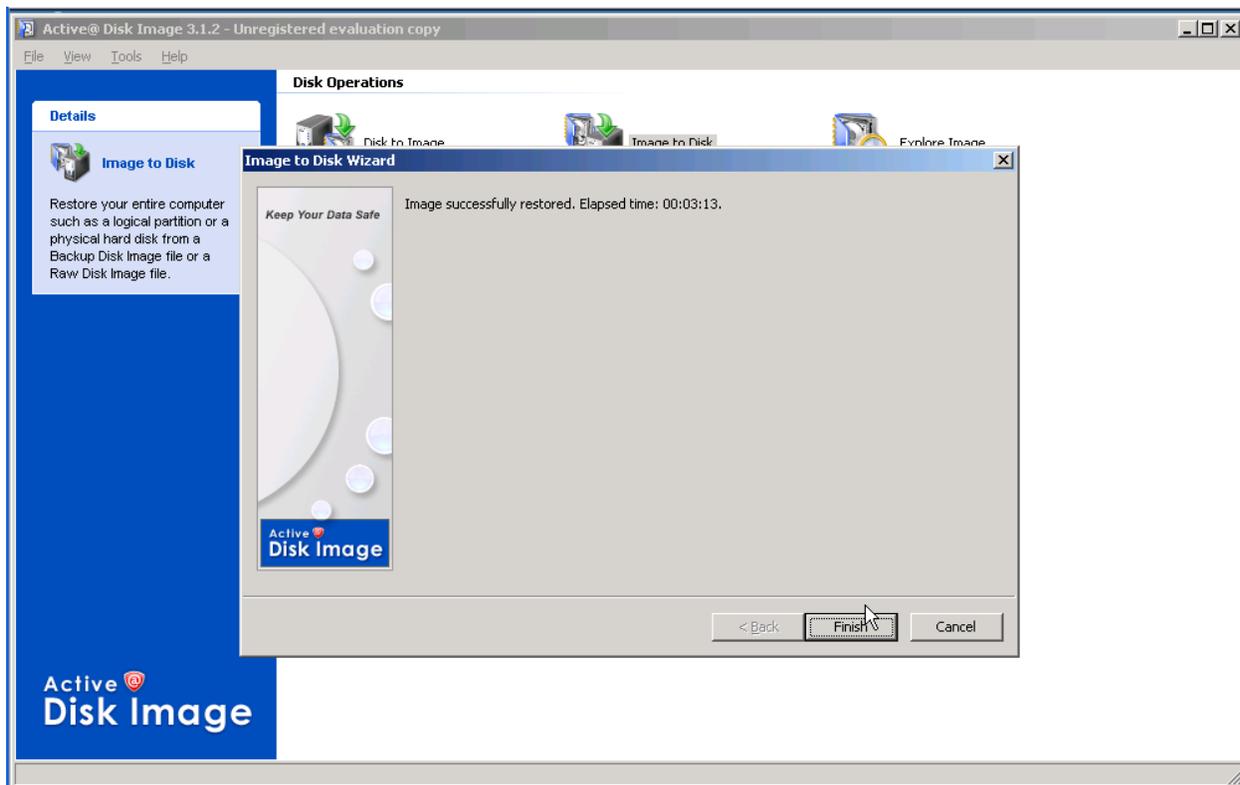


10. Click *Next*.

11. Accept the default settings for the log.

12. Click *Next*.

13. When the image restore process is complete, click *Finish*.



4.5 For More Information

4.5.1 How to Obtain the Software

1. Active@ Disk Image software is available for purchase or as a limited-function demo online version from the Active Data Recovery Software website at <http://www.disk-image.net/>
2. The Active Data Recovery website also provides comprehensive documentation and extensive FAQs for the Active@ Disk Image* software.

5. Using Linux Drive Cloning to External USB Drive or Network Location

This section is intended to provide a simple description of the requirements and processes for using Linux tools to back up drives to an external USB drive or network location with the Intel® Modular Server System.

Note: *The following commands can and will overwrite existing data. Make sure you understand the implications of each command before executing it. These commands are destructive and final.*

5.1 Hardware and Software Requirements

The following is a list of the recommended minimum software and hardware requirements:

Note: *This information was verified using the Fedora 8* live disk as well as OpenSuSE* 10.3 and 10.2.*

- An Intel® Modular Server System with at least one server compute module installed and at least one virtual drive configured for each server.
- A USB CD-ROM drive
- A USB Flash drive or USB hard disk drive

5.2 Configuring the Host Server

5.2.1 Configure the Server

1. Create at least one storage pool using one or more physical hard drives.
2. Assign the virtual drives to a server compute module as Drive 0, Drive 1, etc.

5.3 Cloning a Virtual Drive

5.3.1 Virtual Drive to Virtual Drive

1. Boot the server compute module to a Live Linux CD/DVD.
2. Login to Linux and open a terminal session as the root user.
3. Locate the primary disk partition (typically `/dev/sda` for the first disk) and the secondary disk partition (typically `/dev/sdb`)
4. Use the `dd` command to create an exact mirror of the content: `dd bs=8192 if=/dev/sda of=/dev/sdb`

5.3.2 Virtual Drive to an External USB Device

1. Connect an externally powered USB disk device to the USB port on the front panel of the server compute module that is hosting the virtual drives.

2. Boot the server compute module to a Live Linux* CD/DVD.
3. Login to Linux and open a terminal session as the root user.
4. Locate the primary disk partition (typically `/dev/sda` for the first disk) and the USB disk drive (typically `/dev/sdb` – assuming no other drives; see the `/var/log/messages` file for further information if needed).
5. Mount the USB disk drive if necessary (`mount /dev/sdb1 /media/disk`)
6. Use the `dd` command and `gzip` to create a compressed image of the disk: `dd bs=8192 if=/dev/sda | gzip -9 > /media/disk/backup.gz`
7. On the new server, uncompress the image and restore the virtual drive content using `gzip` and `dd`: `gzip -d /media/disk/backup.gz | dd bs=8192 of=/dev/sda`

5.3.3 Virtual Drive to a Virtual Drive in Another Intel® Modular Server System over Ethernet

1. This requires two modular server systems: a source system and a destination system. Both systems must be running Linux; preferably the same distribution.

Note: *The destination system must be configured with two virtual drives: one to boot from and one to receive the clone image. If a raw disk partition is used, the destination drive should be the same size as the source drive.*

2. Boot both server compute modules to a Live Linux* CD/DVD.
3. Login to Linux and open a terminal session as the root user.
4. Use ICMP Ping to test the network connectivity between the two systems. Disable the firewall if necessary.
5. On the destination system, execute: `nc -l 10000 | gzip -d | dd bs=8192 of=/dev/sda`. (The `nc` command is `netcat` on OpenSuSE*).
6. A listening device will be created on port 10000 to write incoming data to `/dev/sda`.
7. On the source machine, execute: `dd if=/dev/sda bs=8192 | gzip -9 | nc remote_ip 10000`