iSCSI Boot from SAN

Windows Guide

Version 1.0

iSCSI Boot from SAN

Windows Guide

Version 1.0

Note

Before using this information and the product it supports, read the information in “Notices” on page 37.

First Edition (June 2006)

This edition applies to Version 1.0 of IBM iSCSI Boot from SAN (product number 0000-000) and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

About this guide

The purpose of this guide is to provide users of the iSCSI Boot from SAN application information about Windows® iSCSI boot.

Chapter 1. Overview

A typical computer system has a local disk. The operating system is installed on the local disk and the computer system boots from the local disk. The local disk can be replaced by a Storage Area Network (SAN) adapter and a remote disk. The remote disk can be a physical single disk or a subset of a larger storage subsystem configured to present the equivalent of a disk.

For software-based iSCSI Boot, the SAN adapter is no longer required and a combination of firmware and software accomplish booting over a standard network interface (NIC).

The iSCSI Boot firmware obtains the parameters used to locate the boot disk from either DHCP or from NVRAM storage within the computer system. The firmware initiates the boot sequence, writes a block of information into memory containing the boot parameters, and hands the boot operation off to the operating system. The operating system reads the boot parameters left by the firmware and completes the operating system bootstrap operation.

The configuration process occurs in two phases.

- Phase 1 is the initial setup phase where the SAN is configured with a new LUN. An install is performed to a local disk and the local image is prepared for disk cloning. The disk is cloned to the new LUN. Phase 1 is a one-time step.
- Phase 2 is the deployment phase where the new LUN is duplicated for each new iSCSI Boot system.

Note: The image produced by the following process is valid for a single computer model only. Typically a new and separate image is required for each computer model on which you plan to use image deployment. This is accepted practice for Windows imaging and is not unique to iSCSI Boot.

Chapter 2. Configure SAN for Master Image Creation

Configure your SAN for the initial Master Image creation phase. Refer to the *iSCSI Boot SAN Configuration Guide*.

If you are using CHAP, Windows requires secrets be a minimum of 12 bytes.

Chapter 3. Blade Master install

The imaging process requires that a one time installation be performed on a local disk. The locally installed system in configured as required. Then the local disk is prepared for cloning and then cloned.

Install Windows 2003

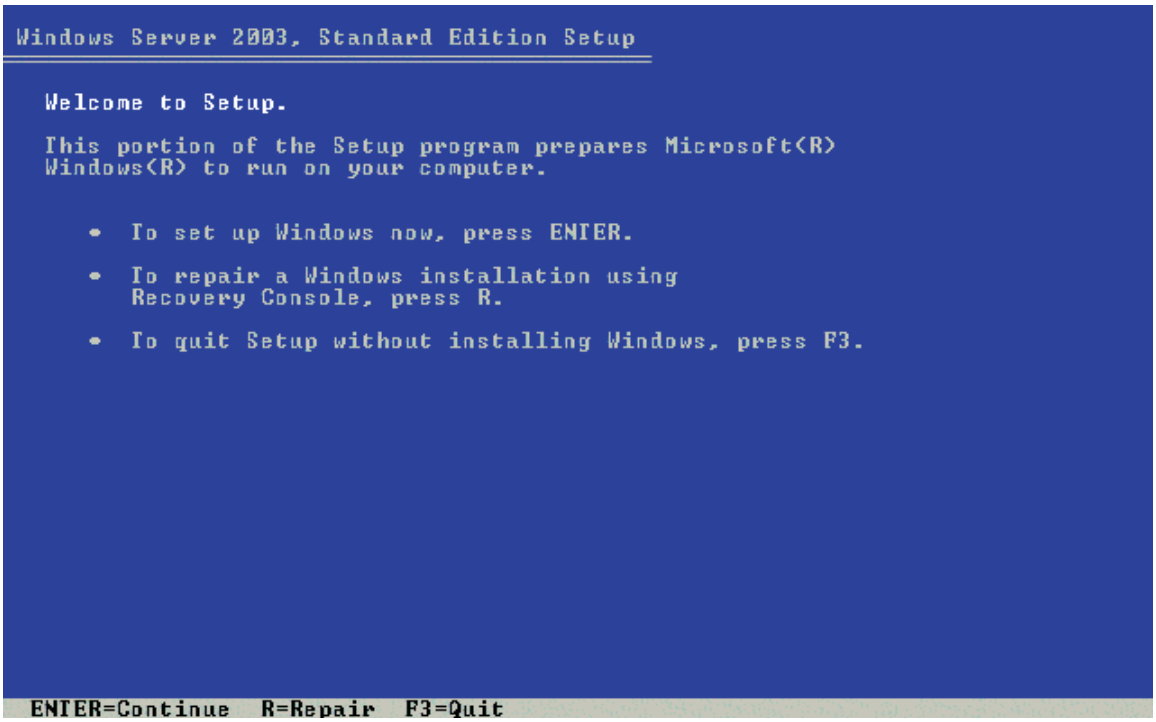
Install a version of Windows 2003. The minimum release levels are as follows:

32-bit

1. Windows Server 2003 Standard SP1
2. Windows Server 2003 Standard R2
3. Windows Server 2003 Enterprise SP1
4. Windows Server 2003 Enterprise R2

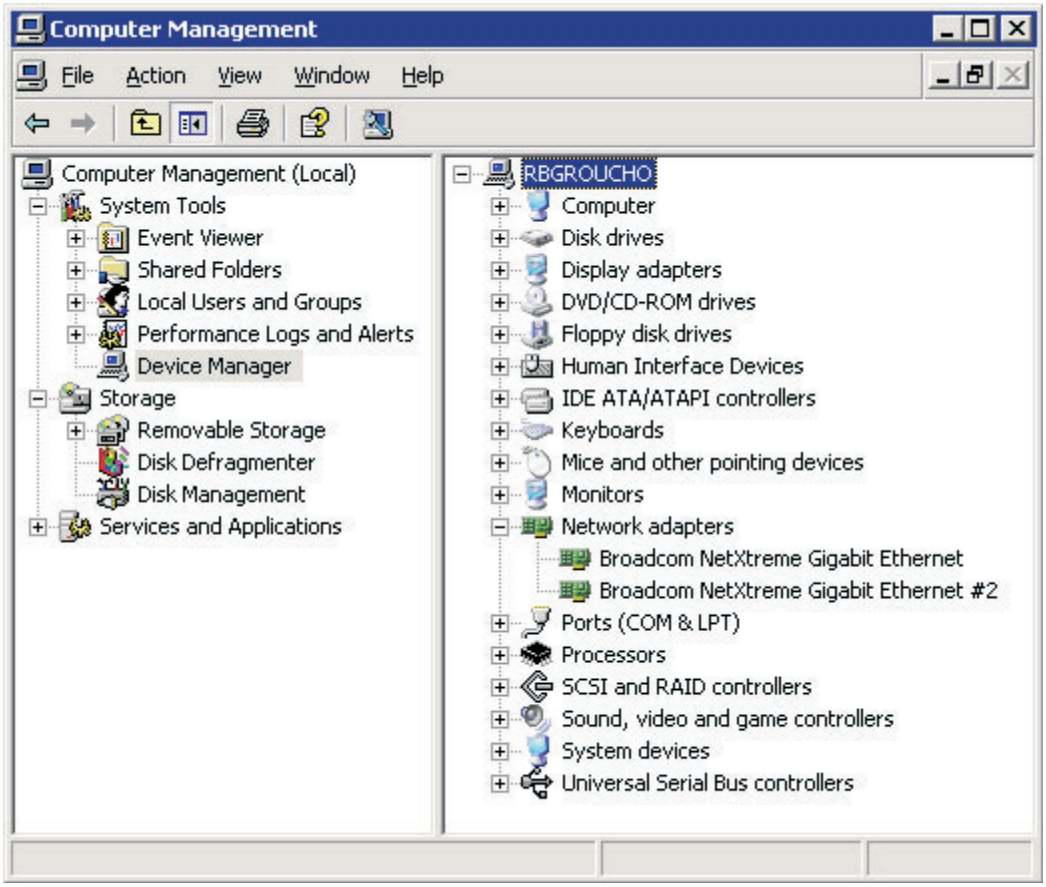
64-bit

1. Windows Server 2003 Standard x64
2. Windows Server 2003 Standard x64 R2
3. Windows Server 2003 Enterprise x64
4. Windows Server 2003 Enterprise x64 R2



Network drivers

Ensure that your network drivers are current. For the 8843, the network drivers should be from Broadcom's v8.3.9 CD-ROM release or later.



Networking configuration

iSCSI Boot SAN TCP/IP settings

The iSCSI Boot SAN IP address is determined during the boot process by the firmware. The IP address is obtained from either DHCP or from NVRAM. The networking parameters for the iSCSI Boot NIC are passed to the operating system. The operating system retrieves these networking values and uses them for the boot NIC. The settings that you have in the TCP/IP Properties for the boot NIC are overwritten by the operating system.

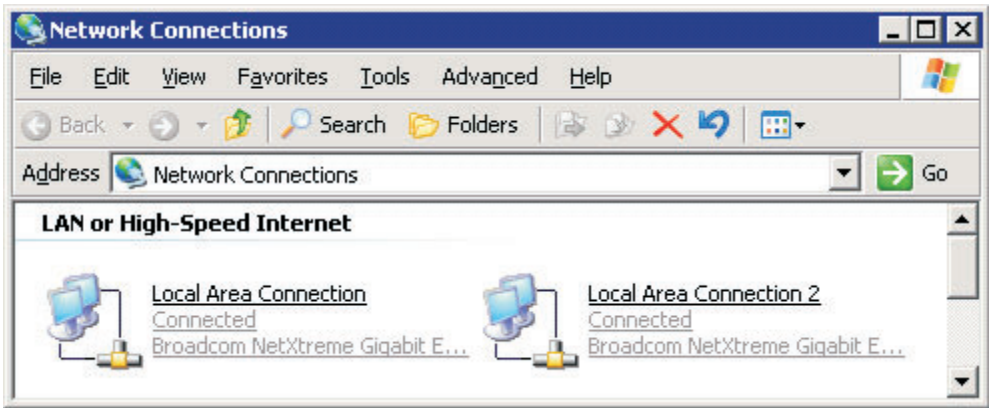
Non-Boot NIC settings

The non-boot NIC is configured according to your own requirements. If you enter a fixed IP address in the TCP/IP Properties of the non-boot NIC, then this setting will be carried over into your Master Deployment Image. Every system you deploy will pick up this fixed IP address. Thus, if you are entering a fixed IP address for the non-boot NIC, you must enter a new nonconflicting fixed IP address for each system deployed. This will need to be one of your post deployment configuration steps.

Enable network connections

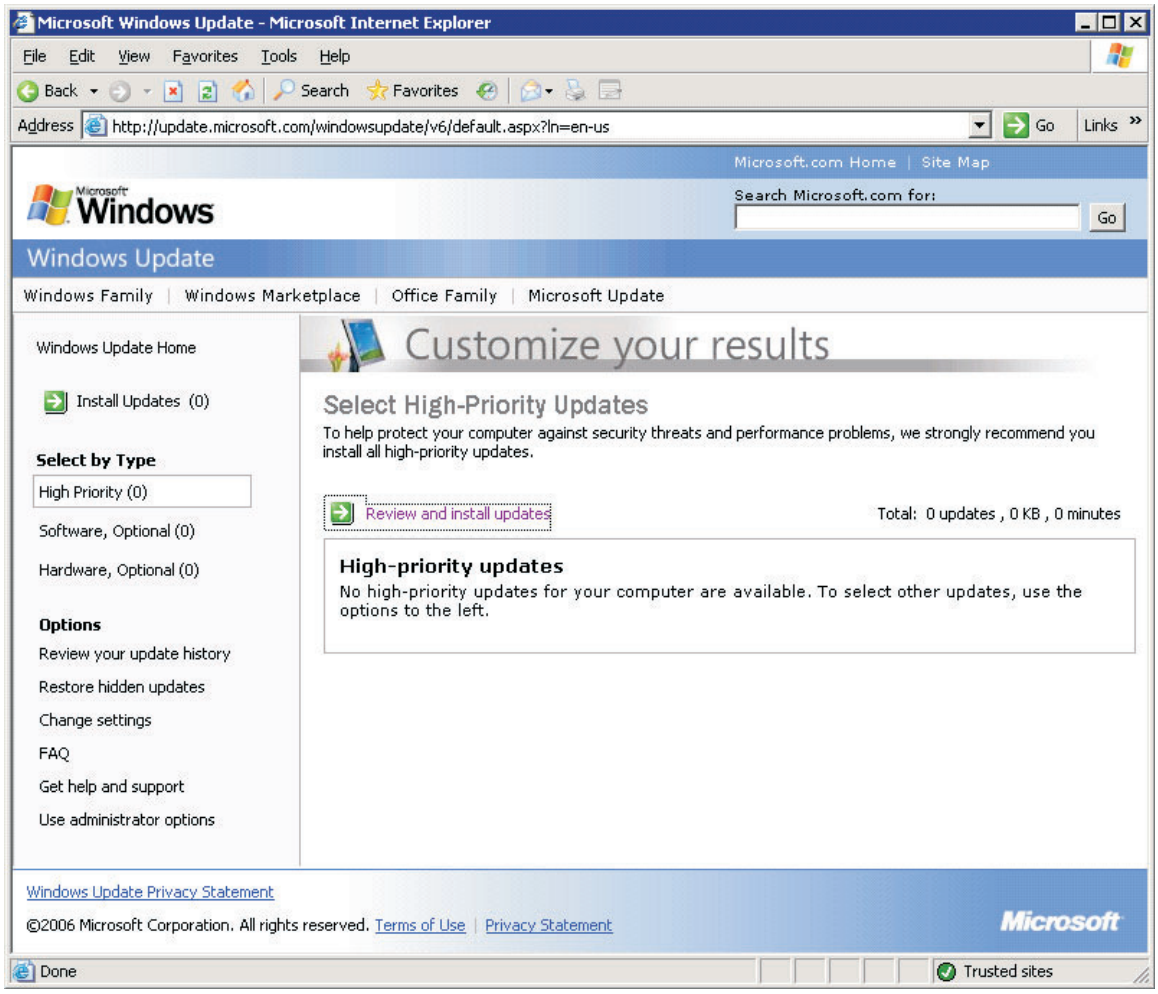
While not mandatory, you should enable both network connections prior to the imaging phase. If you image with one of the connections disabled, it is likely you will experience an 8-minute pause during mini-setup (the first boot of the deployed image).

Your Network Connections should look similar to the following illustration:



Windows update

Install updates and drivers as necessary, including running Windows Update.



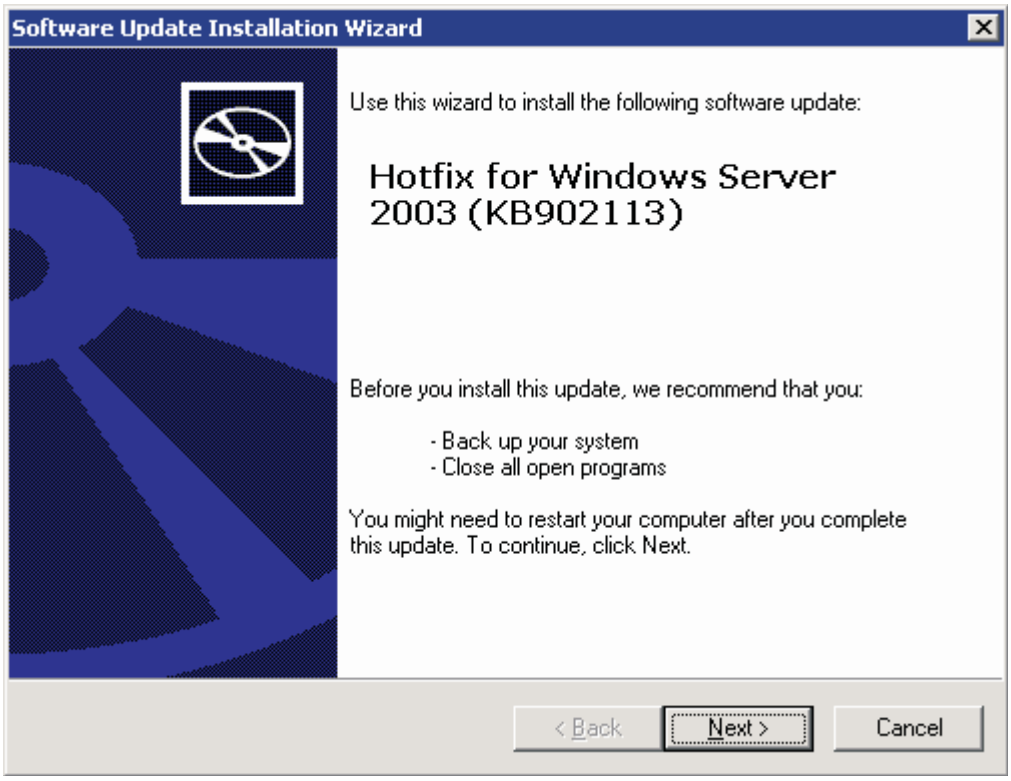
Install Hotfix KB 902113

A Hotfix is required.

Obtain Hotfix KB 902113 from IBM®.

Read more about the Hotfix at:

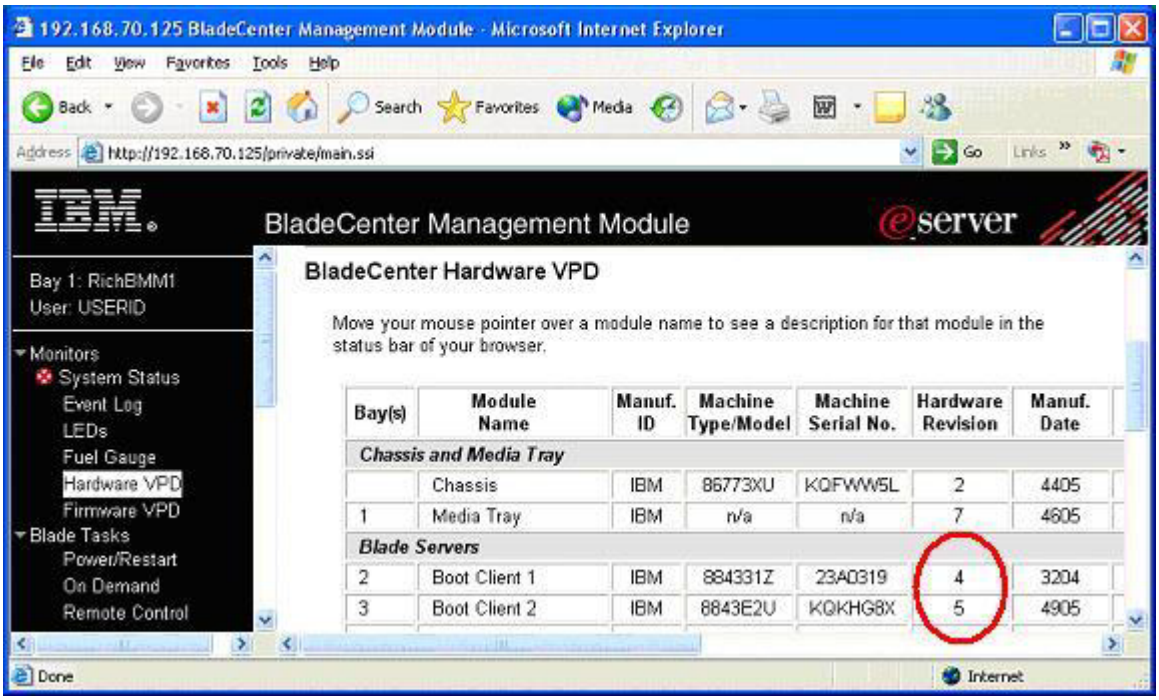
http://support.microsoft.com/kb/902113



Ensure that the system reboots after completing the installation of the Hotfix.

Blade Model 8843 hardware revision check

Check your 8843 hardware revision levels. If you have a mix (see Hardware Revision in the Blade Servers rows in the figure below), you need to adapt the image you are creating to support all the revisions you intend for iSCSI Boot deployment. Remove the disk from the current 8843 and move it to a Blade of differing revision. Allow the system to boot. Repeat this step for any other revisions you may have. This allows Windows to discover and configure hardware devices that may vary slightly due to chip manufacturing revisions or other reasons.

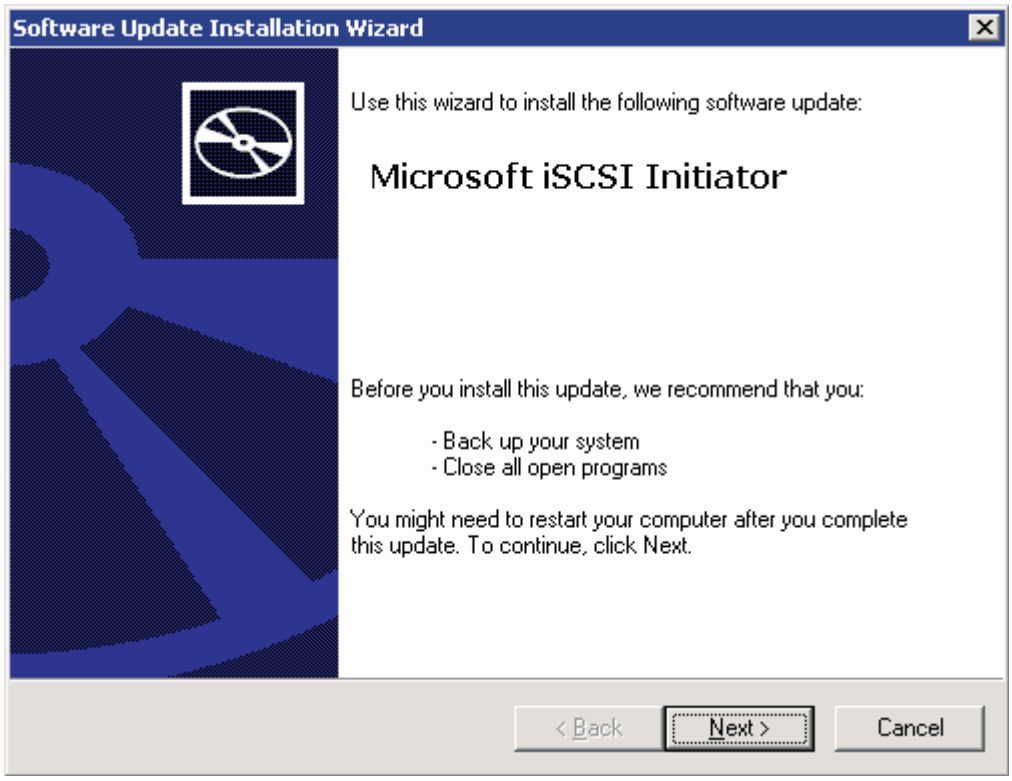


Perform the disk move or boot operation(s) before proceeding to the next step.

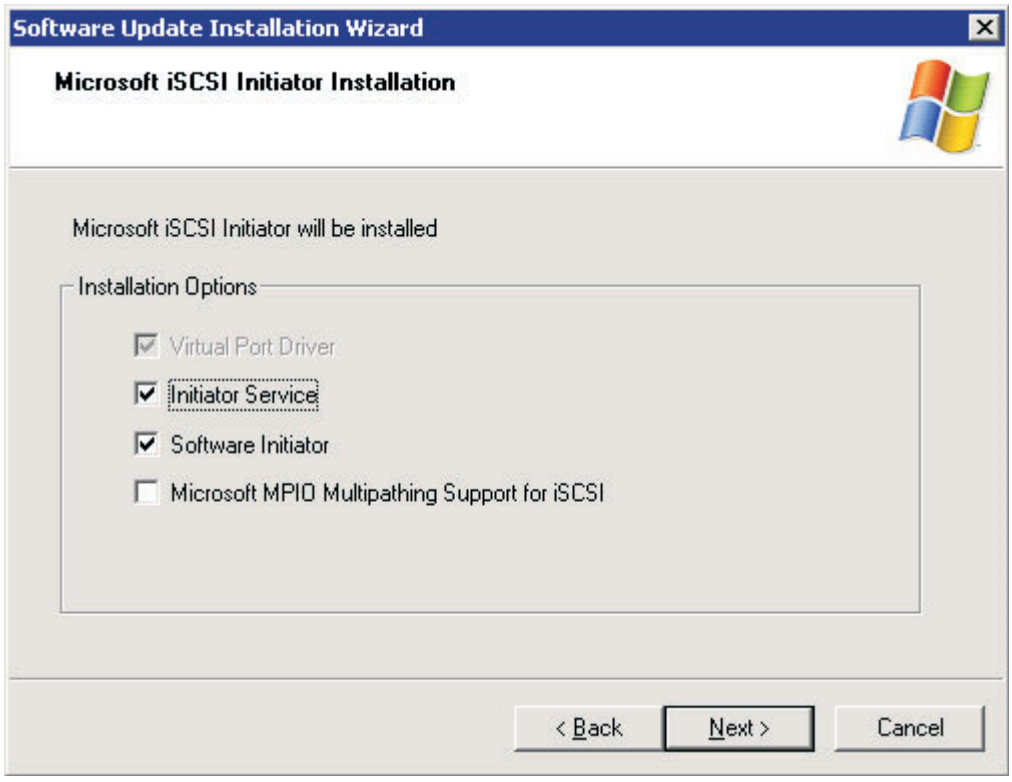
Install Microsoft iSCSI Initiator

Run the iSCSI Initiator installer. You must use the version of the Microsoft® iSCSI Initiator that includes Boot Support.

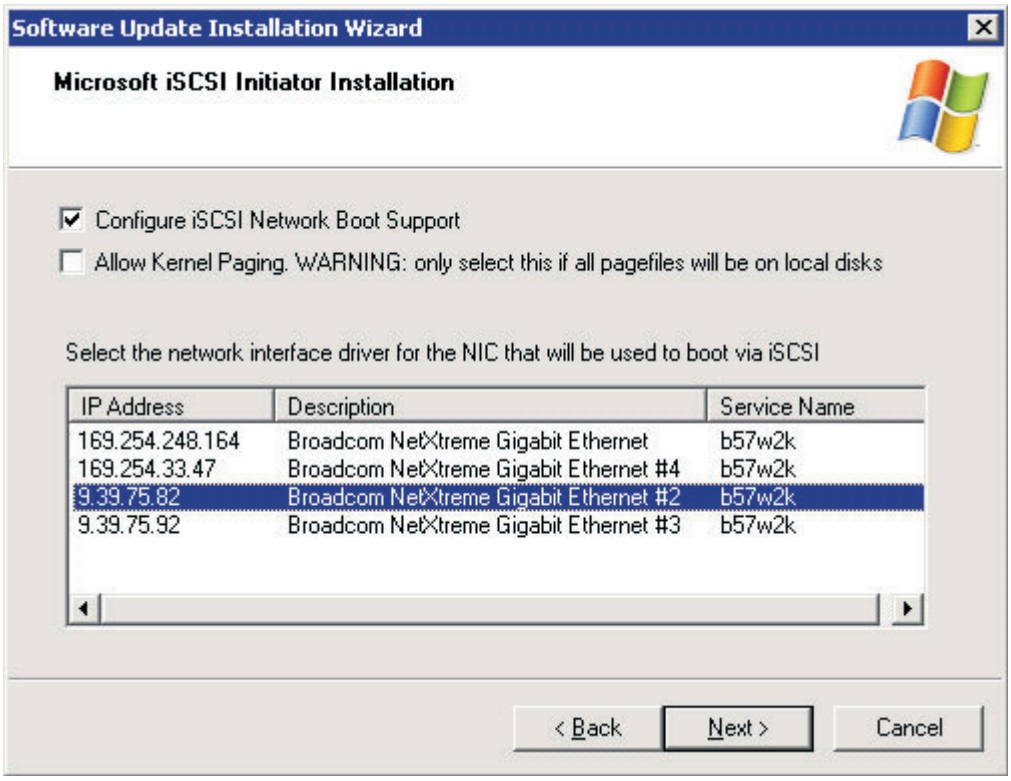
Here is the familiar initial Panel:



Here is the familiar Options Panel:



Here is the new iSCSI Network Boot Panel:



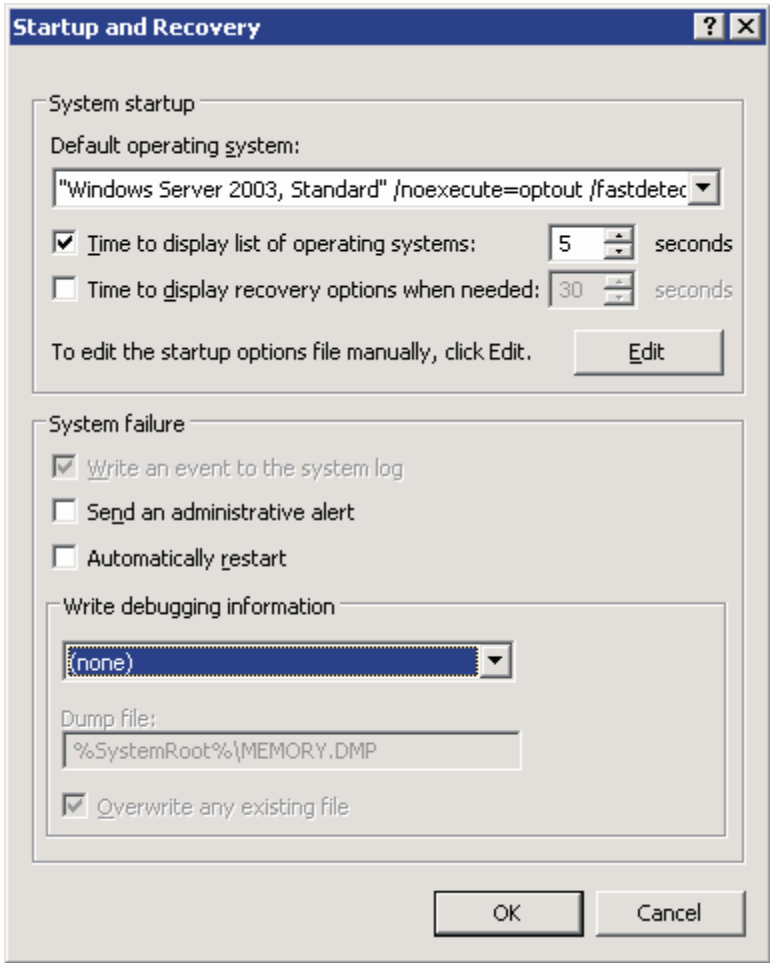
Typically there will be only one Service Name. If there is more than one, you need to know which NIC family that you are using for your SAN.

Boot.ini: Debug and Memory Dump (Optional)

Memory Dump is not supported in an iSCSI Boot environment at this time.

On the Blades being booted using iSCSI, turn off automatic reboot.

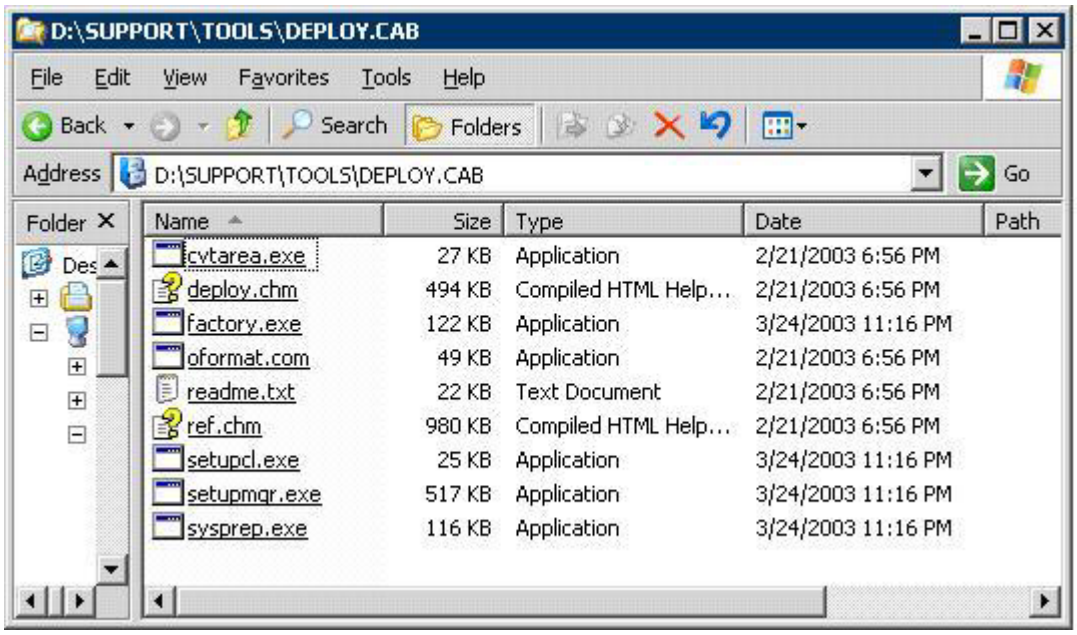
1. Navigate to **My Computer** → **Properties** → **Advanced** .
2. Navigate to **Startup and Recovery** → **Settings**.
3. Make the changes as shown in the diagram below.
4. You could also add the debug options to boot.ini during this phase.
   a. Click **Edit**.
   b. Copy the multi line and add the following at the end of the line:
      /sos /debug /debugport=com1 /baudrate=115200


Startup and Recovery
System startup
Default operating system:
"Windows Server 2003, Standard" /noexecute=optout /fastdetec
Time to display list of operating systems:
5
seconds
Time to display recovery options when needed:
30
seconds
To edit the startup options file manually, click Edit.
Edit
System failure
Write an event to the system log
Send an administrative alert
Automatically restart
Write debugging information
(none)
Dump file:
%SystemRoot%\MEMORY.DMP
Overwrite any existing file
OK
Cancel

Chapter 4. Sysprep

Unpack sysprep

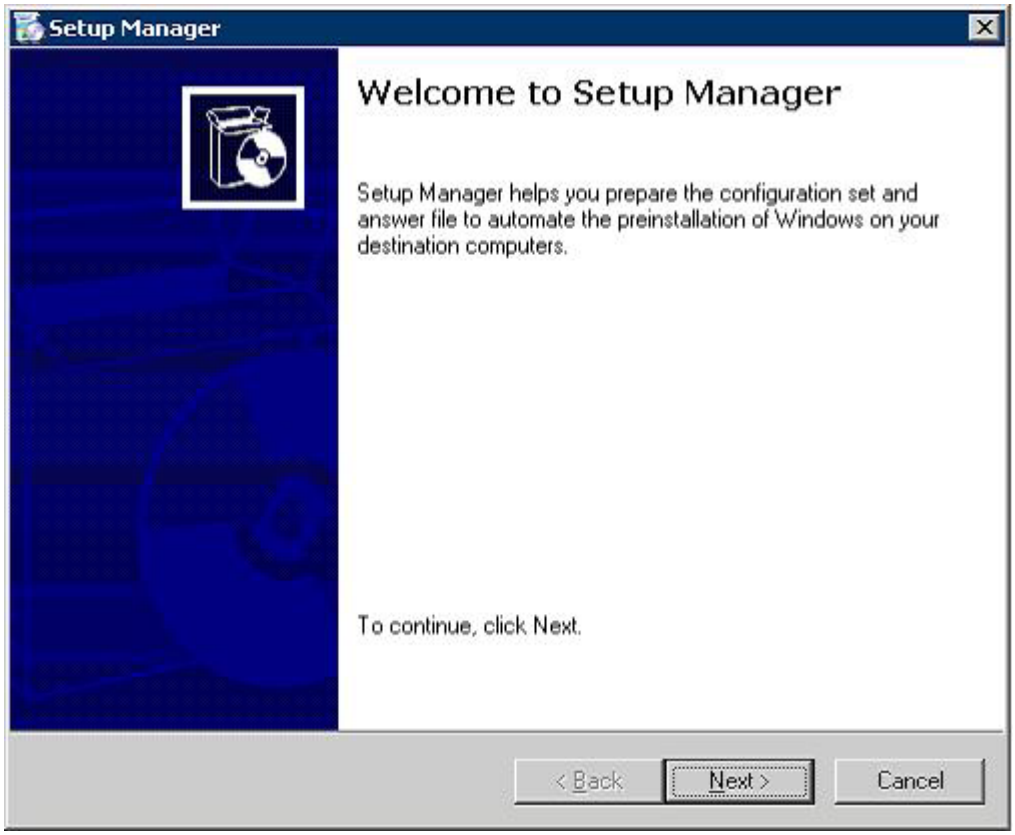
Explore DEPLOY.CAB on the Windows 2003 CD-ROM.

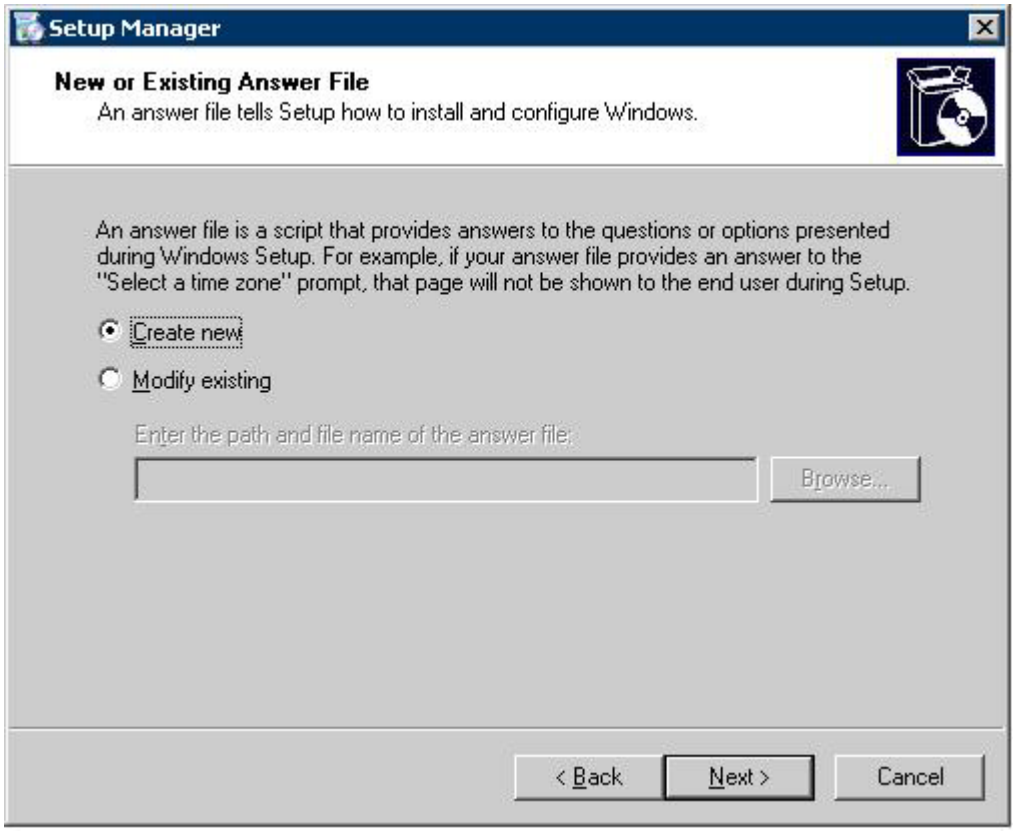


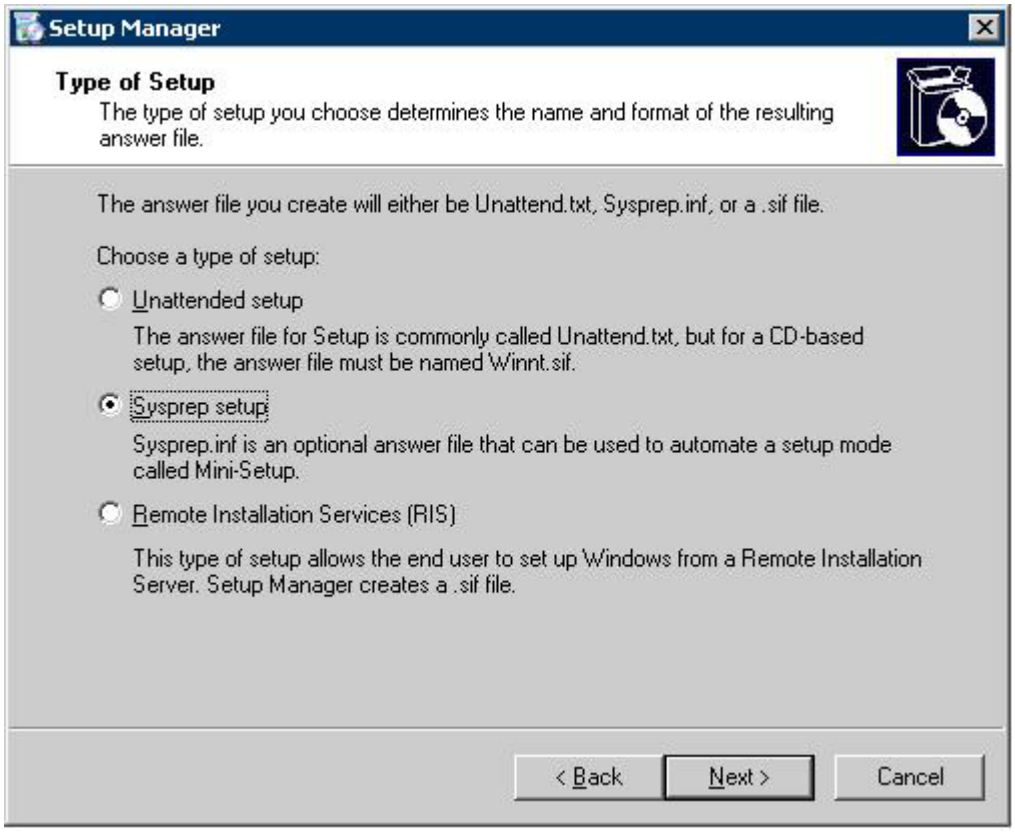
Copy the files to your local drive, typically to c:\sysprep.

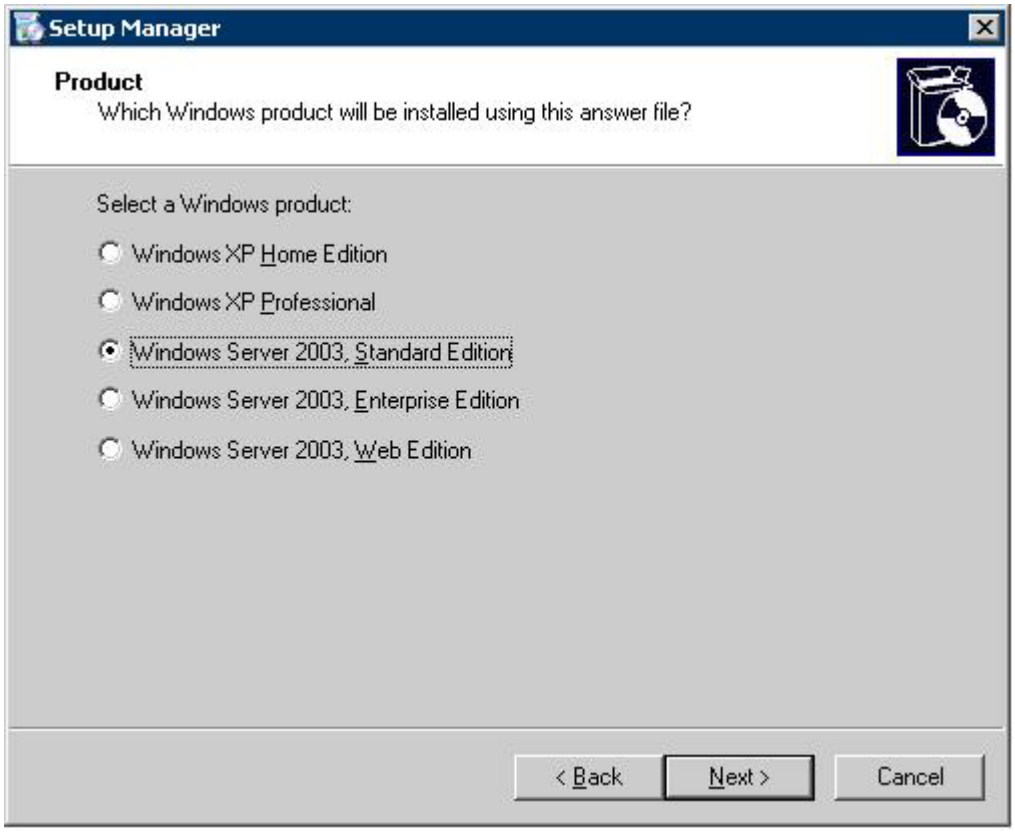
Run setupmgr

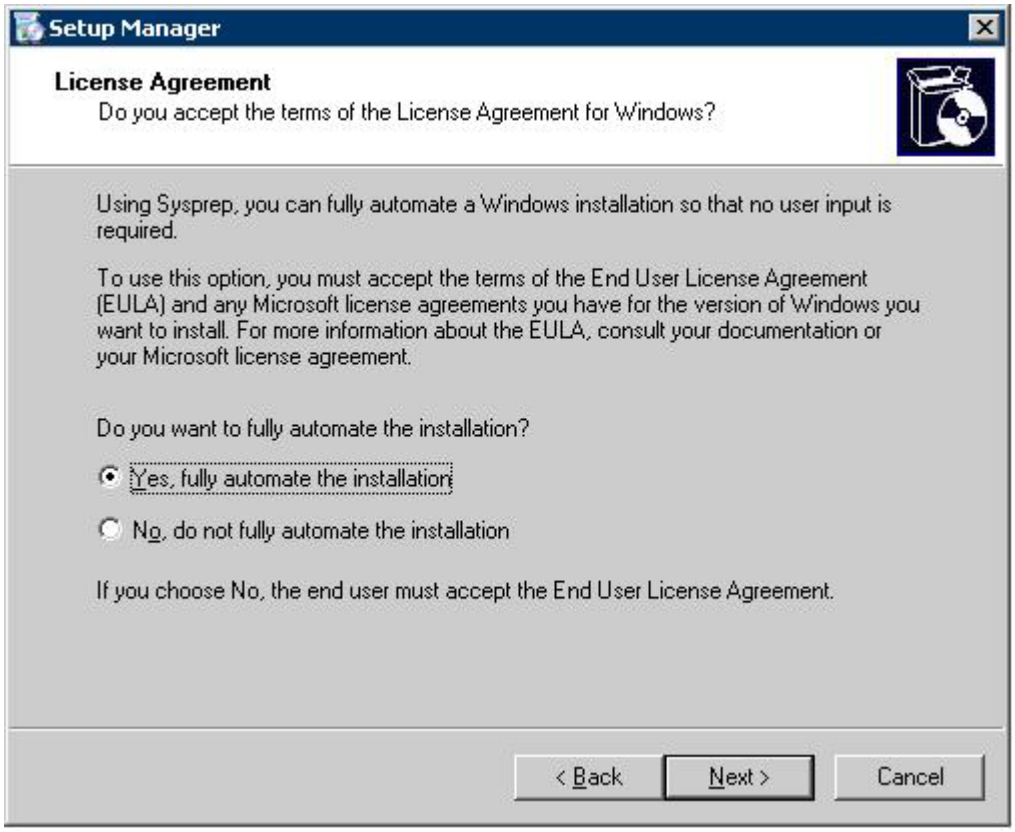
Run setupmgr (c:\sysprep\setupmgr.exe) to generate a sysprep.inf file.

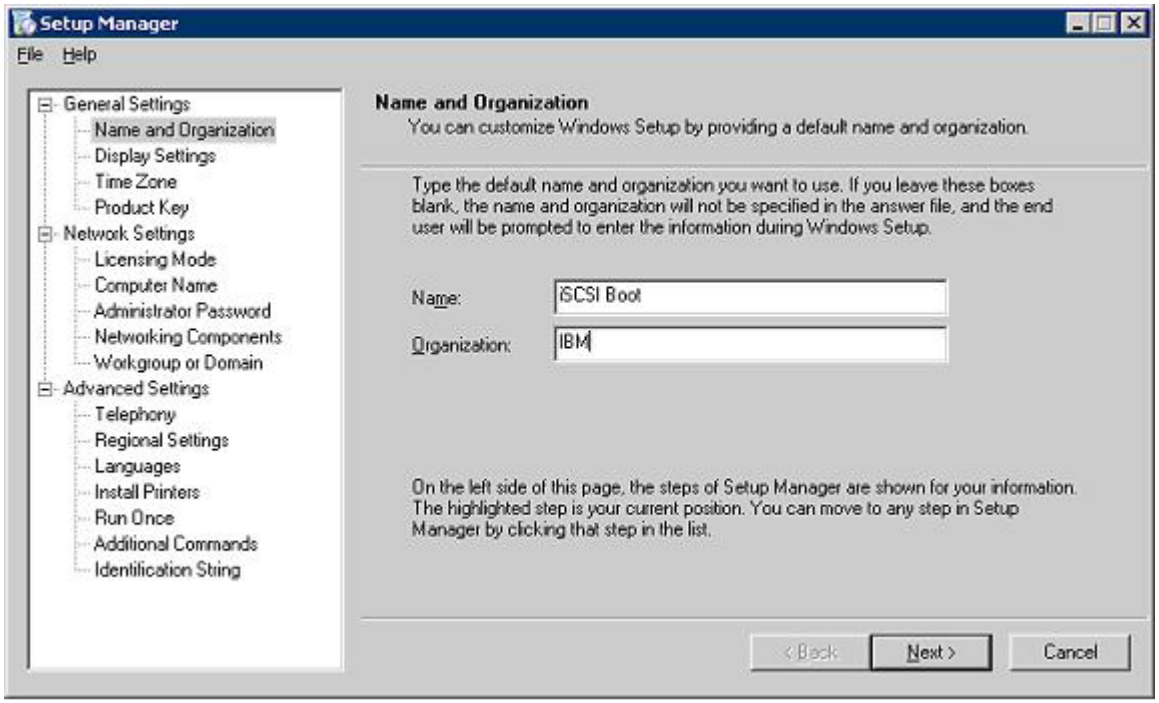

Setup Manager
Welcome to Setup Manager
Setup Manager helps you prepare the configuration set and answer file to automate the preinstallation of Windows on your destination computers.
To continue, click Next.
< Back
Next >
Cancel

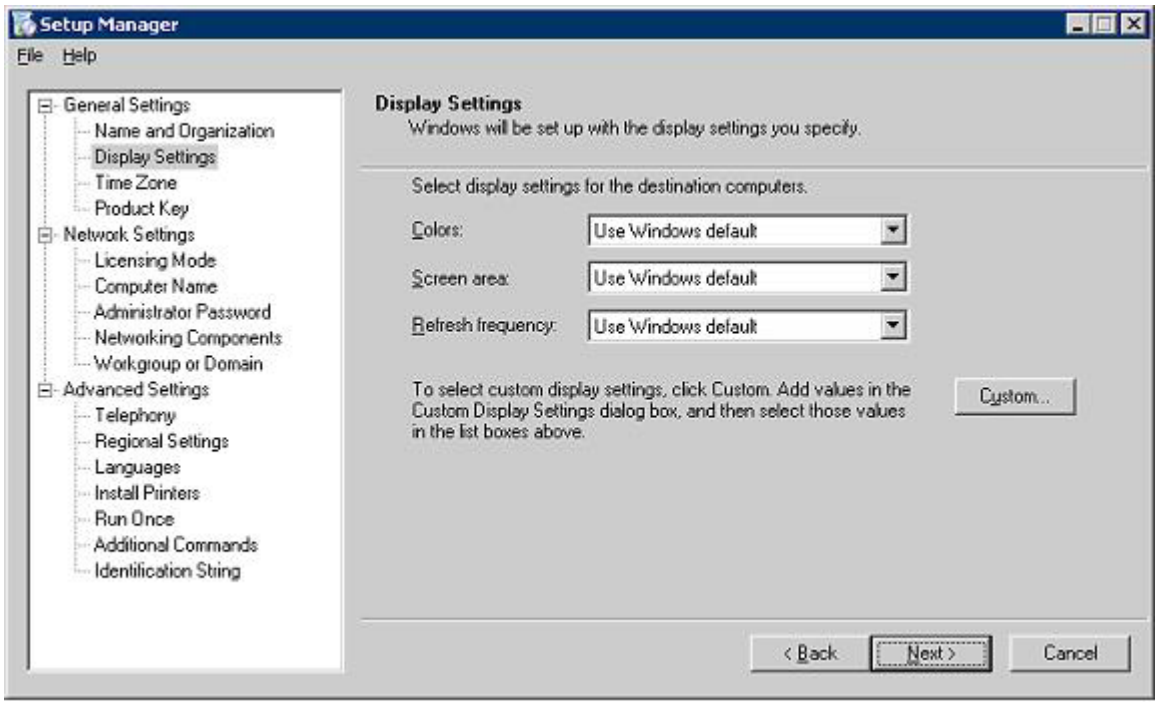

Setup Manager
New or Existing Answer File
An answer file tells Setup how to install and configure Windows.
An answer file is a script that provides answers to the questions or options presented during Windows Setup. For example, if your answer file provides an answer to the "Select a time zone" prompt, that page will not be shown to the end user during Setup.
Create new
Modify existing
Enter the path and file name of the answer file:
Browse...
< Back
Next >
Cancel


Setup Manager
Type of Setup
The type of setup you choose determines the name and format of the resulting answer file.
The answer file you create will either be Unattend.txt, Sysprep.inf, or a .sif file.
Choose a type of setup:
Unattended setup
The answer file for Setup is commonly called Unattend.txt, but for a CD-based setup, the answer file must be named Winnt.sif.
Sysprep setup
Sysprep.inf is an optional answer file that can be used to automate a setup mode called Mini-Setup.
Remote Installation Services (RIS)
This type of setup allows the end user to set up Windows from a Remote Installation Server. Setup Manager creates a .sif file.
< Back
Next >
Cancel

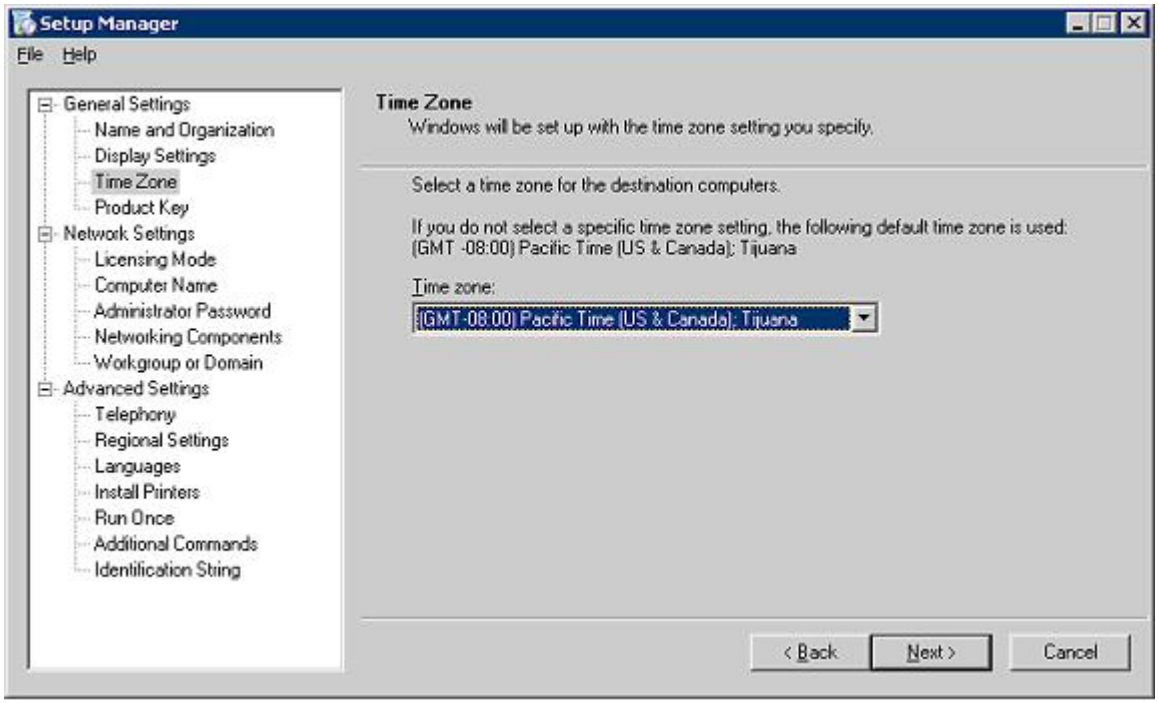

Setup Manager
Product
Which Windows product will be installed using this answer file?
Select a Windows product:
Windows XP Home Edition
Windows XP Professional
Windows Server 2003, Standard Edition
Windows Server 2003, Enterprise Edition
Windows Server 2003, Web Edition
< Back
Next >
Cancel


Setup Manager
License Agreement
Do you accept the terms of the License Agreement for Windows?
Using Sysprep, you can fully automate a Windows installation so that no user input is required.
To use this option, you must accept the terms of the End User License Agreement (EULA) and any Microsoft license agreements you have for the version of Windows you want to install. For more information about the EULA, consult your documentation or your Microsoft license agreement.
Do you want to fully automate the installation?
Yes, fully automate the installation
No, do not fully automate the installation
If you choose No, the end user must accept the End User License Agreement.
< Back
Next >
Cancel

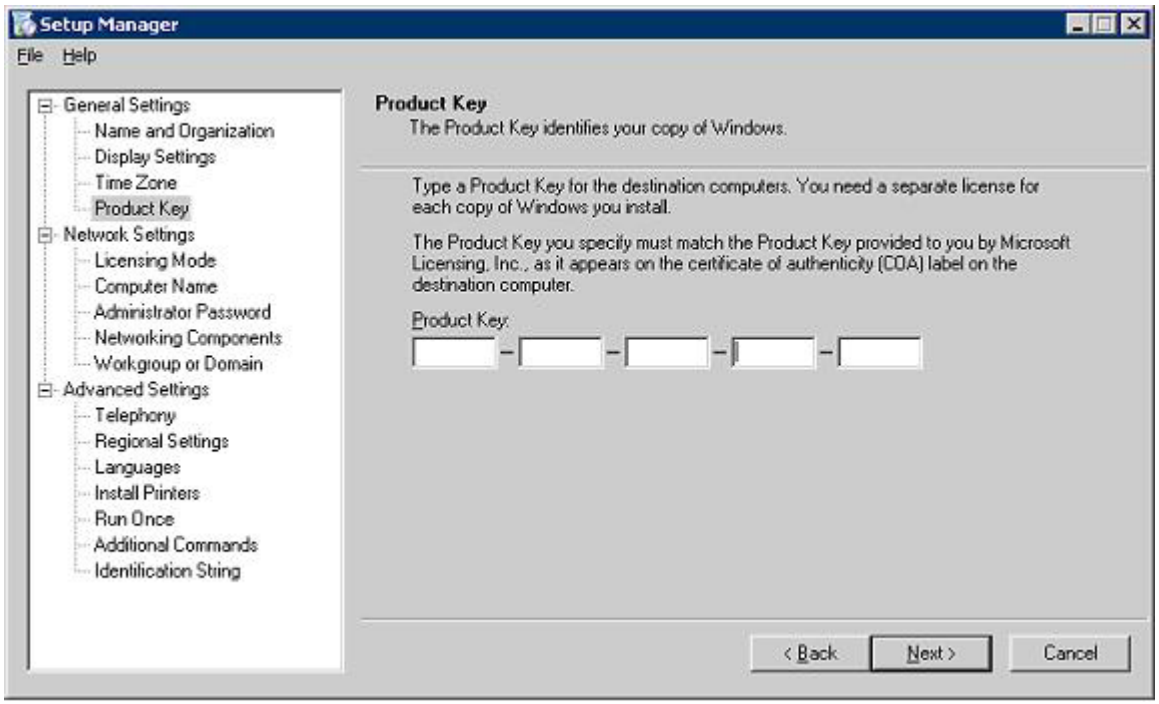

Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Name and Organization
You can customize Windows Setup by providing a default name and organization.
Type the default name and organization you want to use. If you leave these boxes blank, the name and organization will not be specified in the answer file, and the end user will be prompted to enter the information during Windows Setup.
Name:
iSCSI Boot
Organization:
IBM
On the left side of this page, the steps of Setup Manager are shown for your information. The highlighted step is your current position. You can move to any step in Setup Manager by clicking that step in the list.
< Back
Next >
Cancel

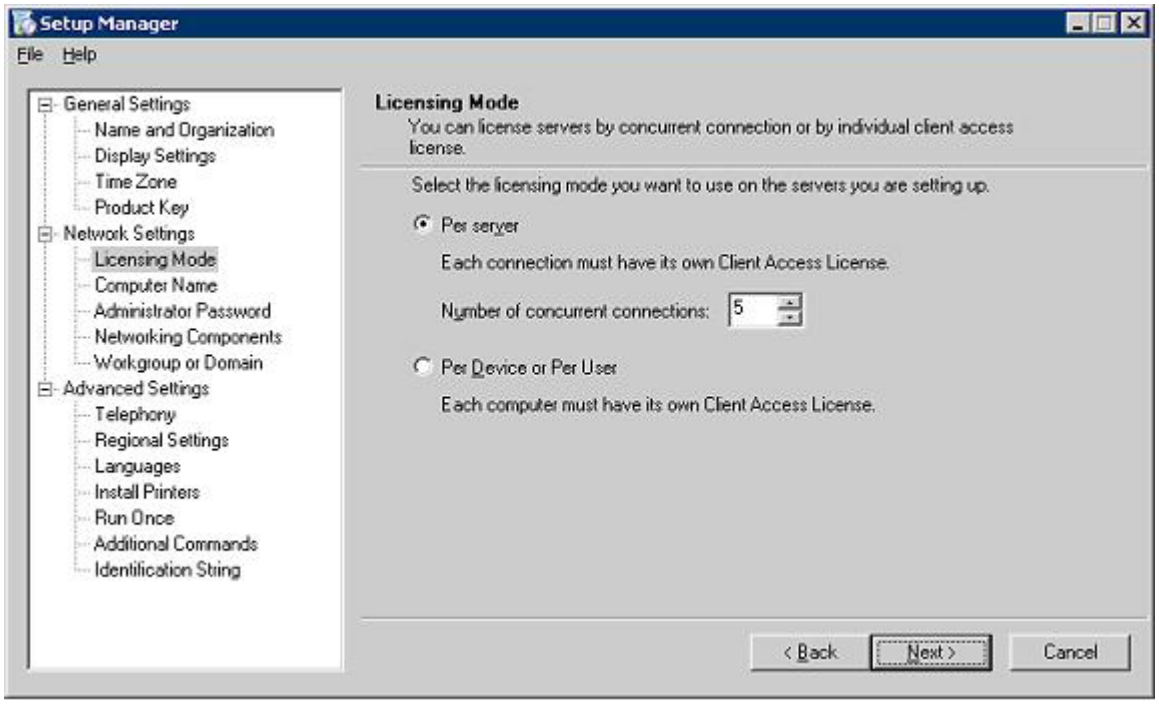


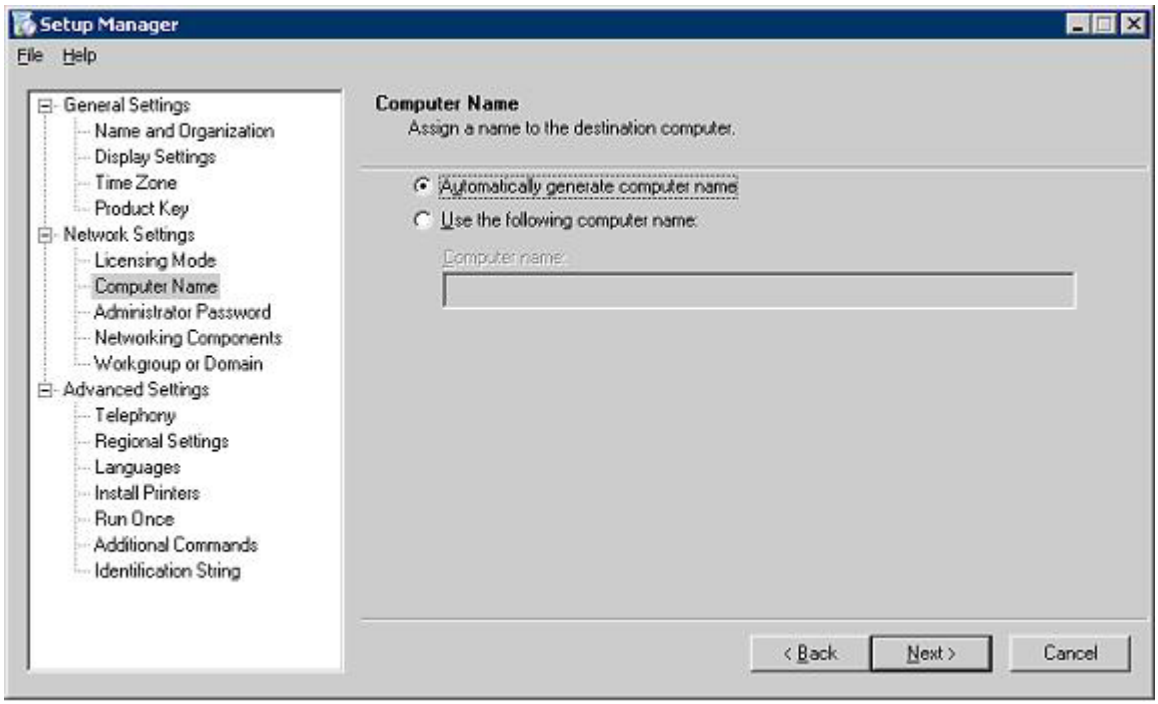
Pick your time zone.

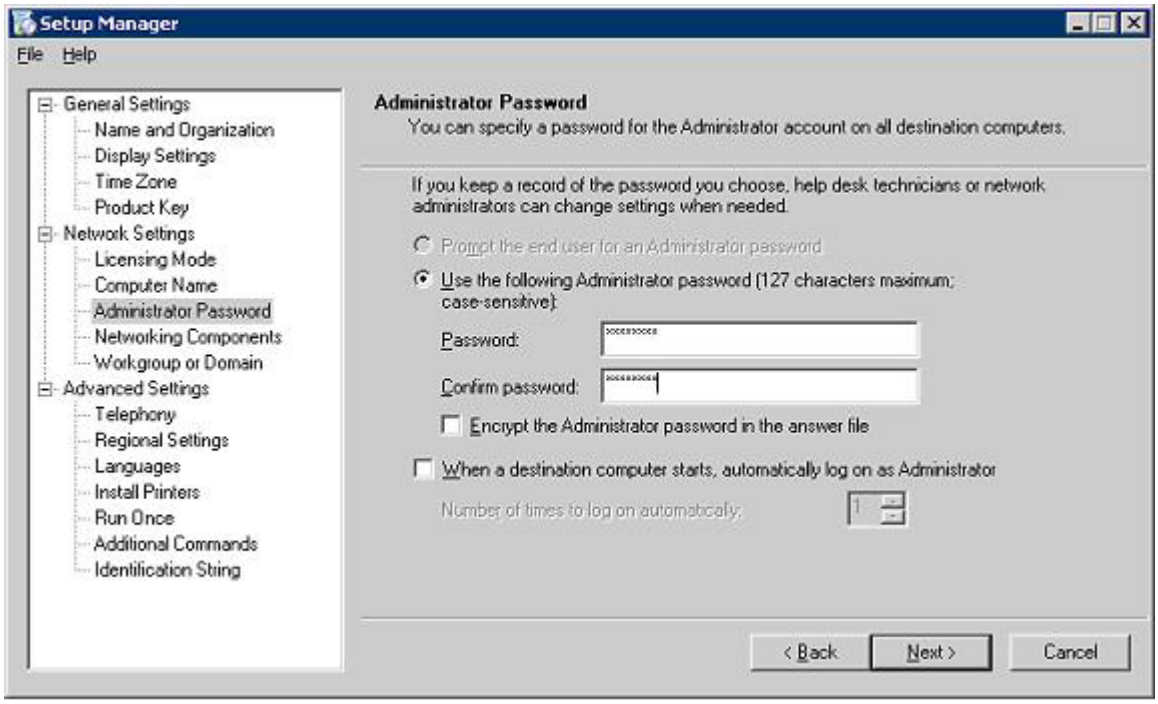


Enter your license information.


Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Product Key
The Product Key identifies your copy of Windows.
Type a Product Key for the destination computers. You need a separate license for each copy of Windows you install.
The Product Key you specify must match the Product Key provided to you by Microsoft Licensing, Inc., as it appears on the certificate of authenticity (COA) label on the destination computer.
Product Key:
< Back
Next >
Cancel


Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Licensing Mode
You can license servers by concurrent connection or by individual client access license.
Select the licensing mode you want to use on the servers you are setting up.
Per server
Each connection must have its own Client Access License.
Number of concurrent connections:
5
Per Device or Per User
Each computer must have its own Client Access License.
< Back
Next >
Cancel

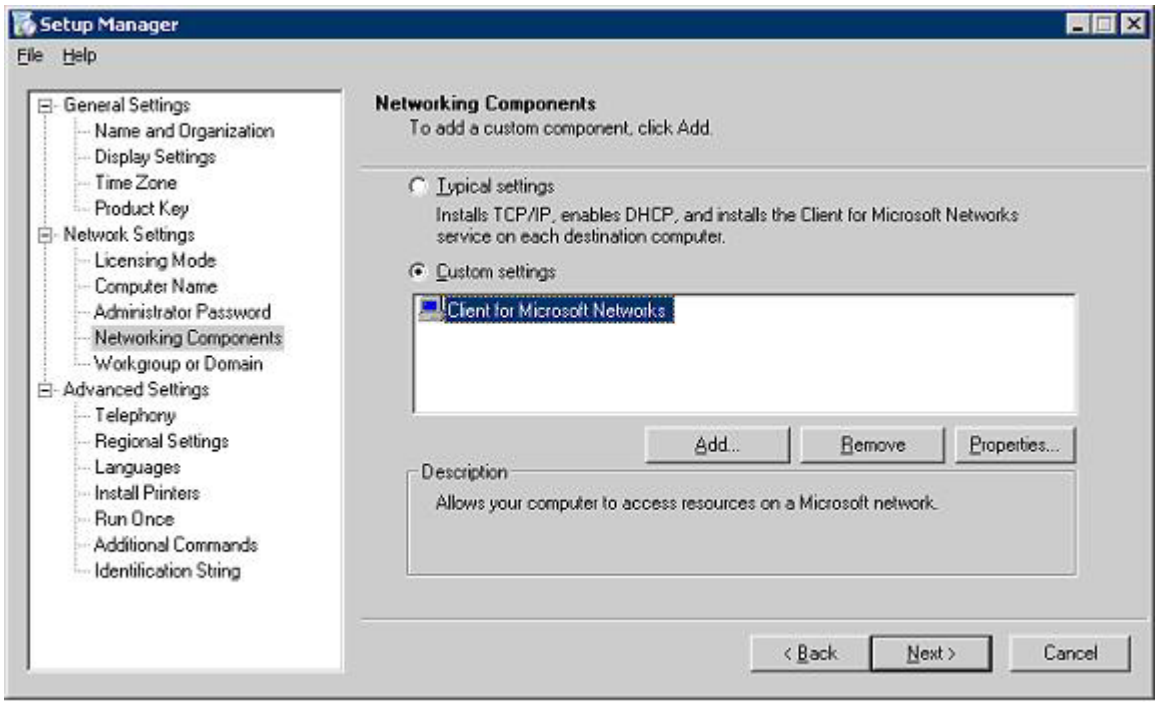




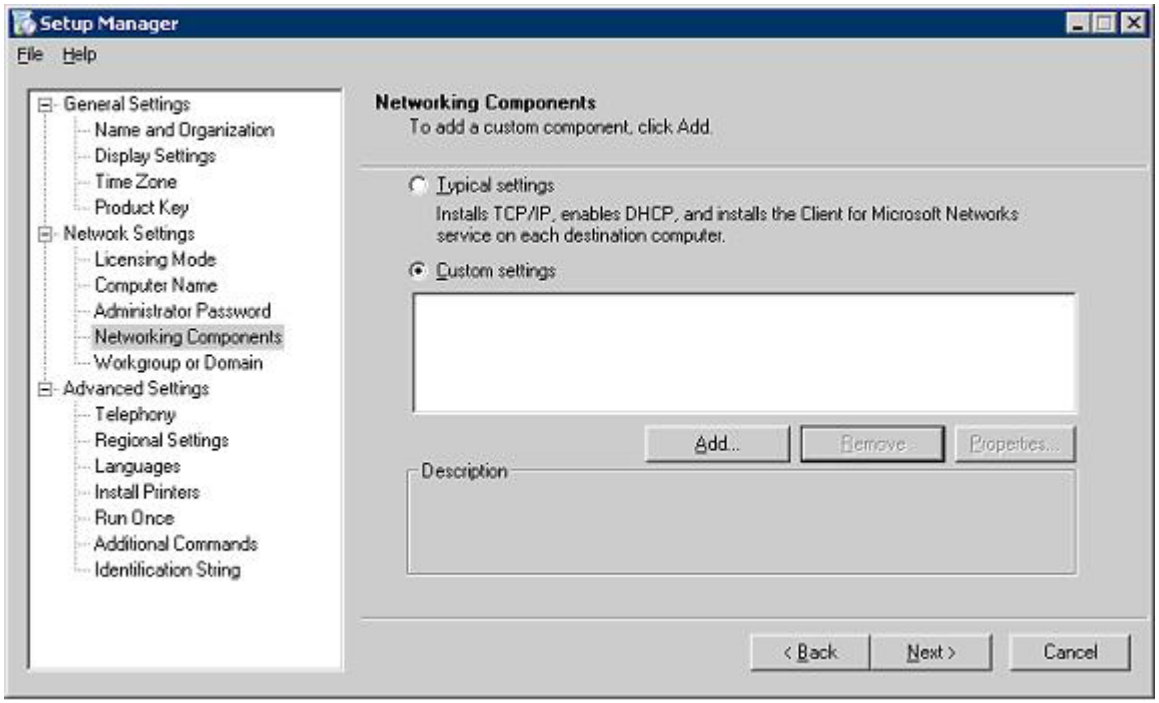
In the Networking components section:

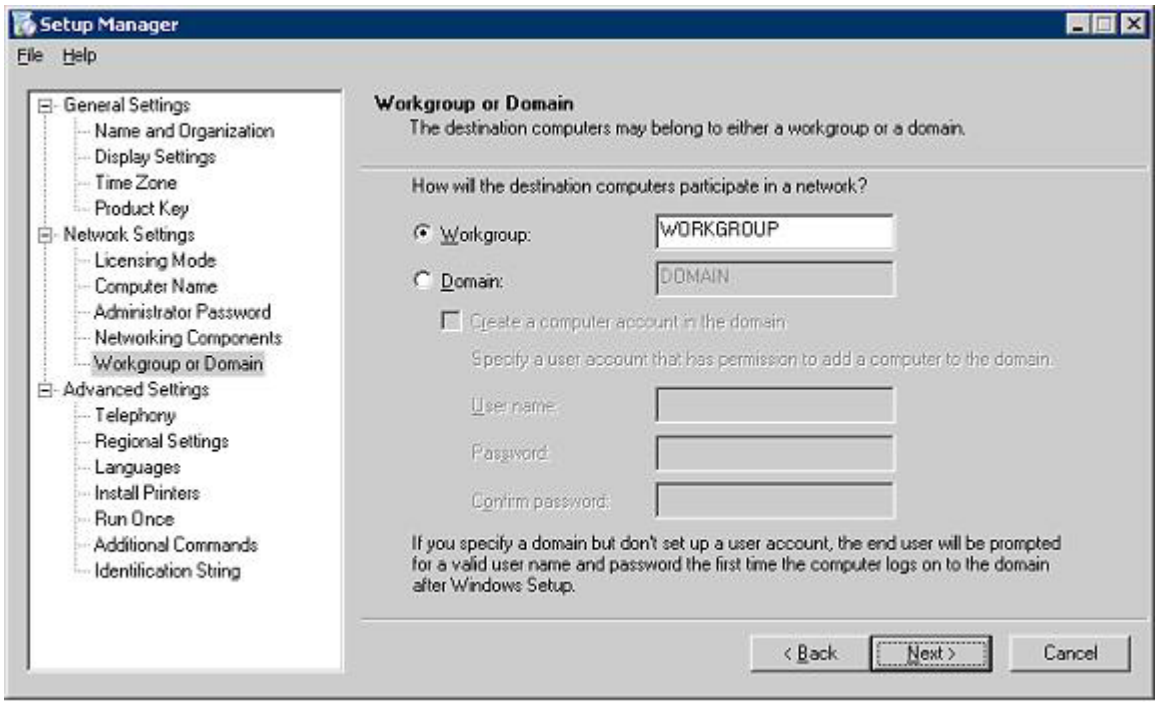
1. Select **Custom settings**
2. Highlight **Client for Microsoft Networks**
3. click **Remove**

.

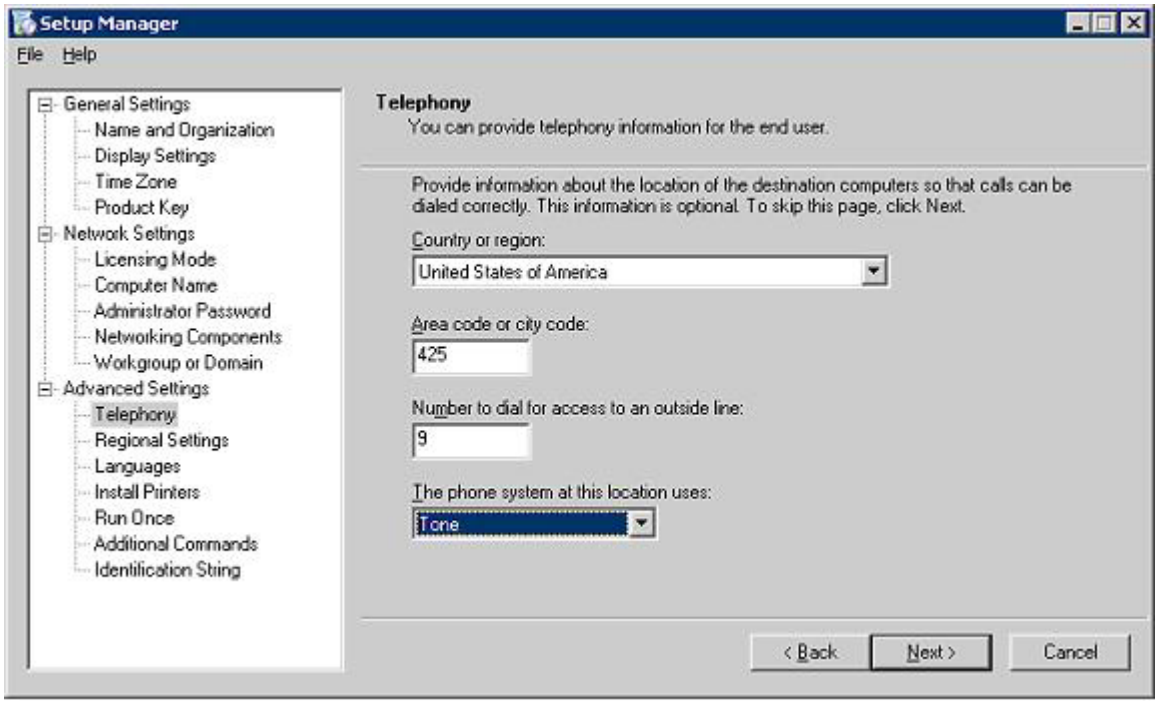


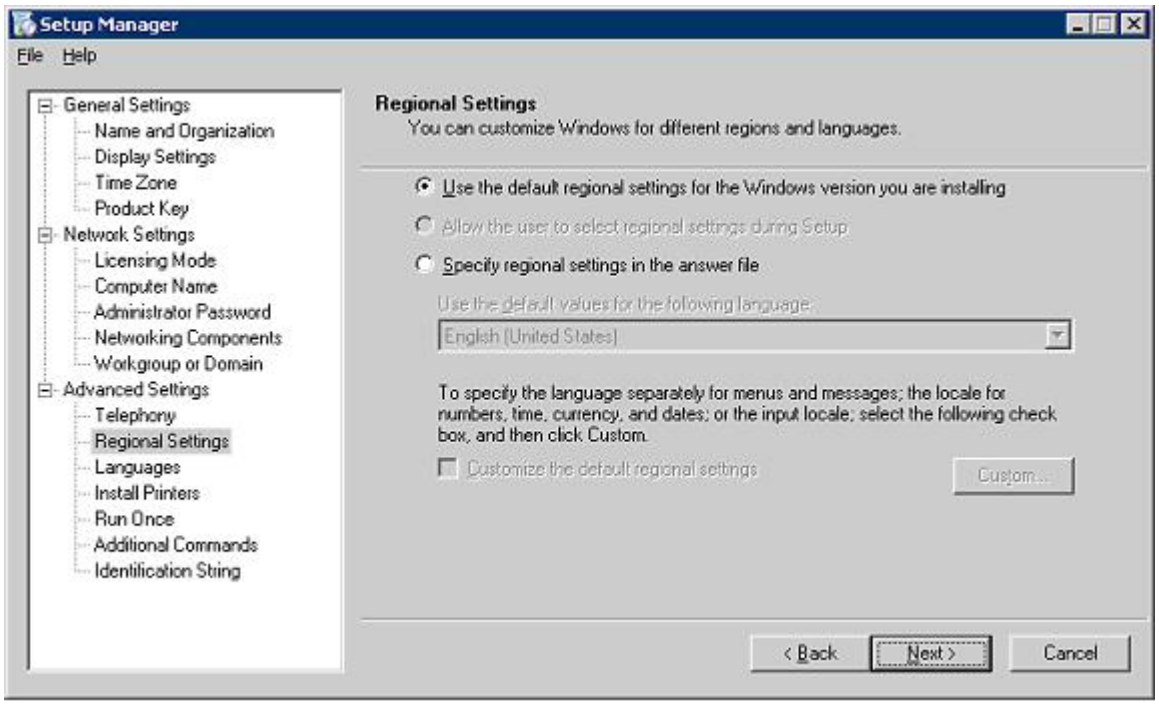
Here is the same panel after clicking **Remove**.

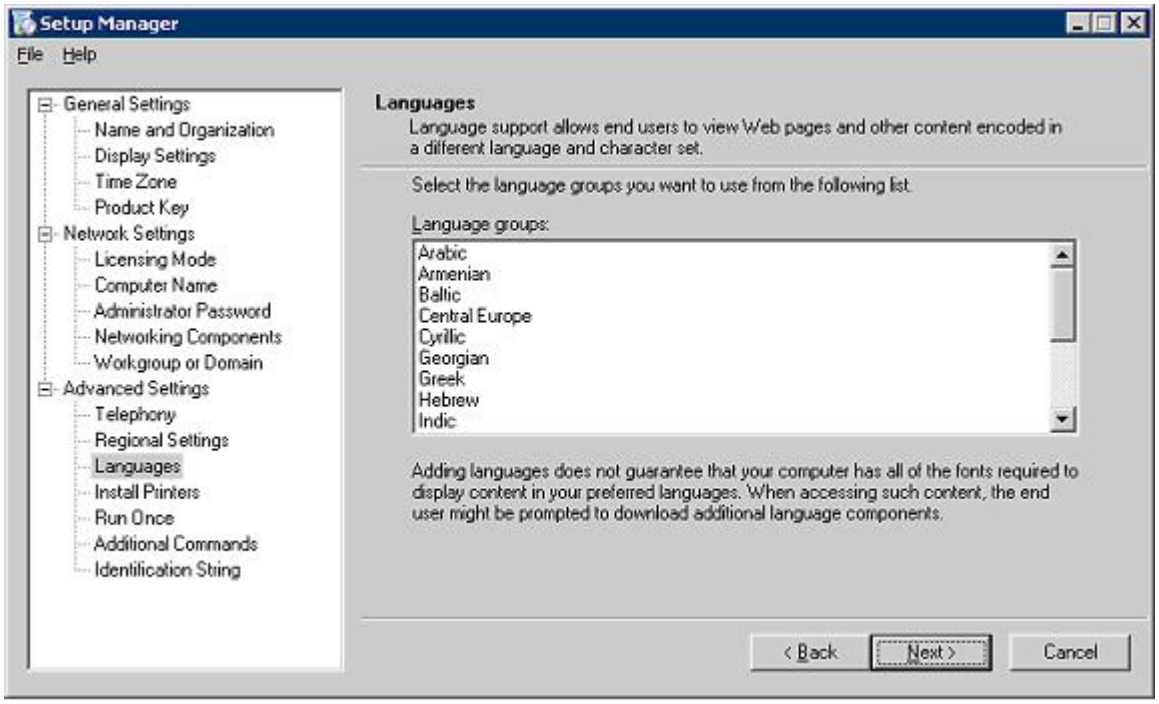


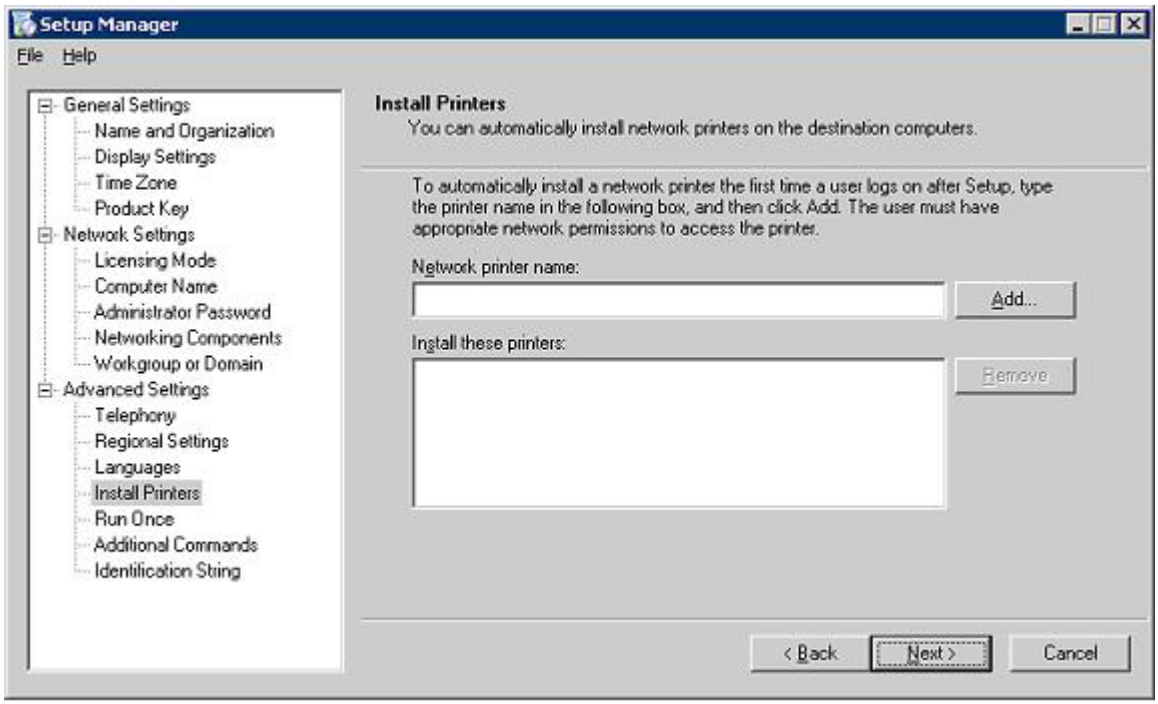


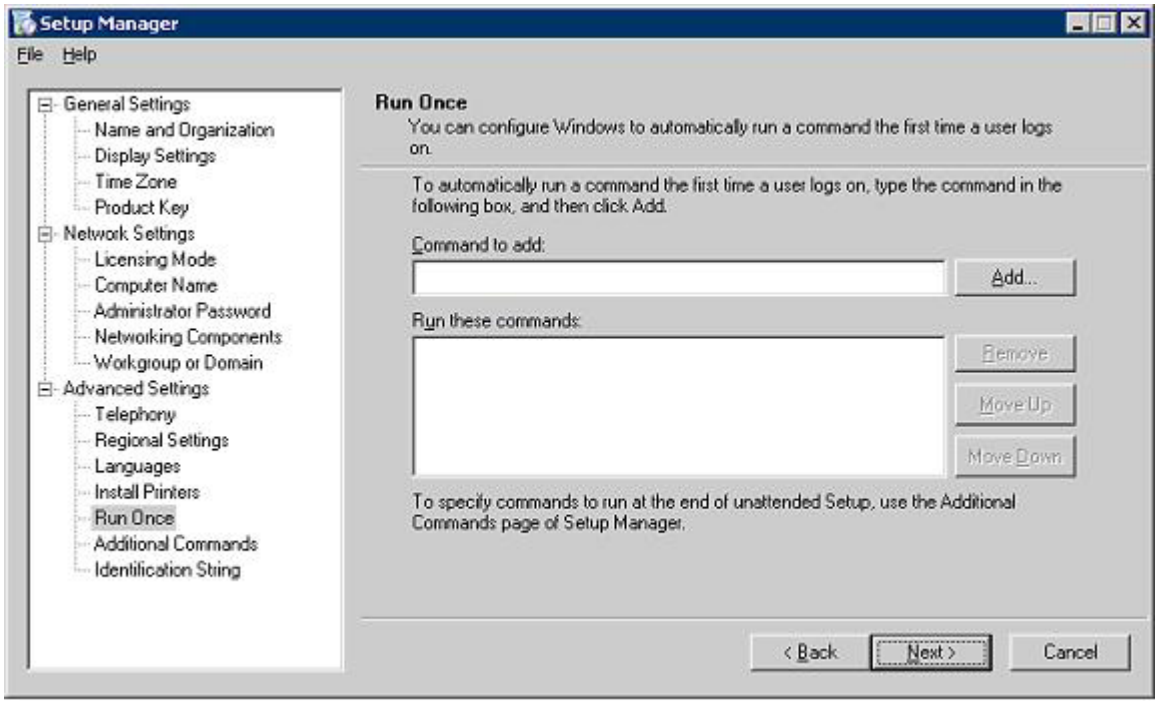
For Telephony, select the values that are appropriate.

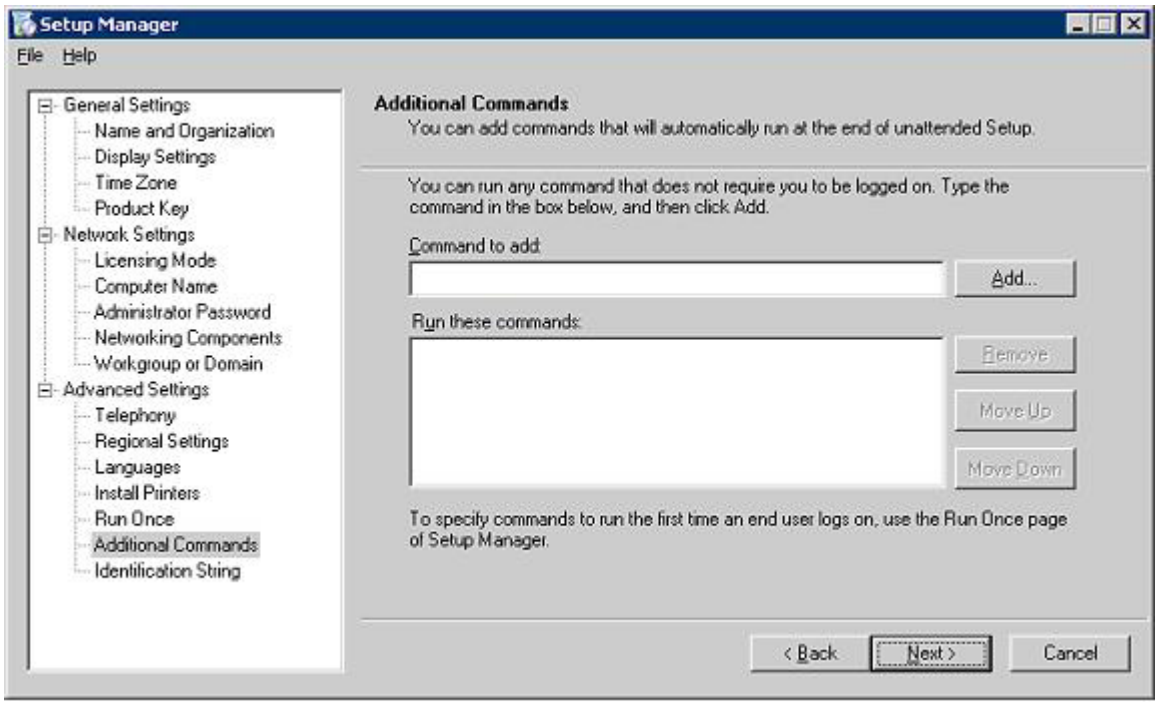


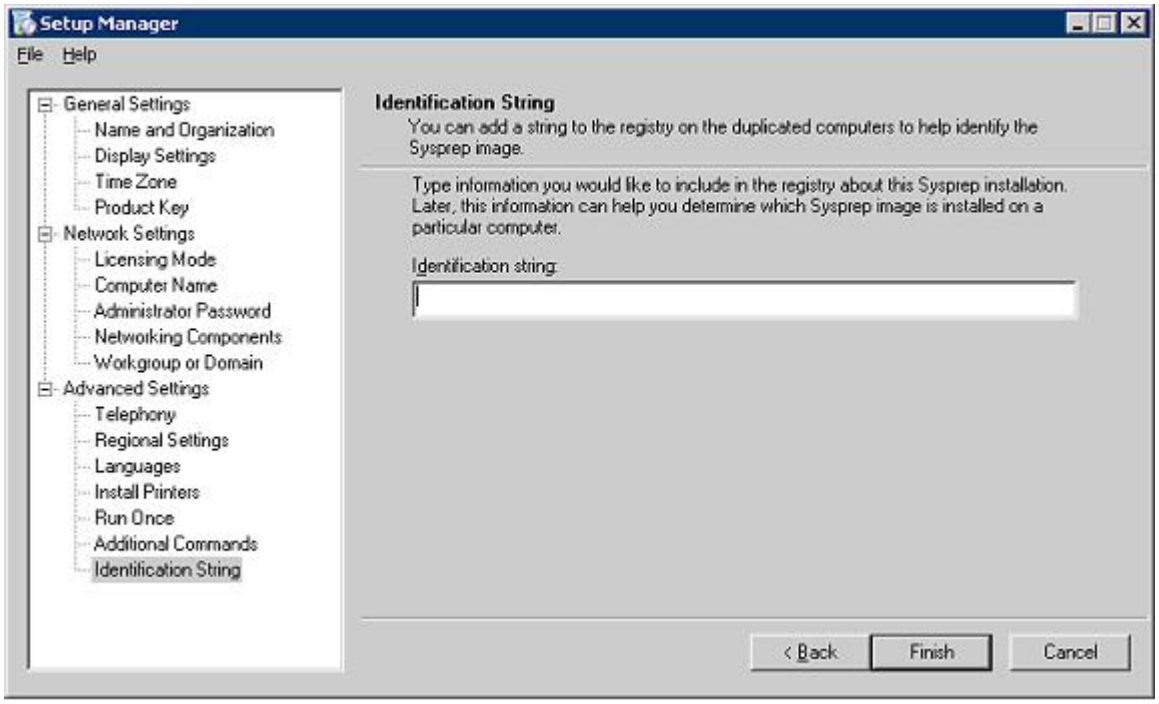

Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Regional Settings
You can customize Windows for different regions and languages.
Use the default regional settings for the Windows version you are installing
Allow the user to select regional settings during Setup
Specify regional settings in the answer file
Use the default values for the following language:
English (United States)
To specify the language separately for menus and messages; the locale for numbers, time, currency, and dates; or the input locale; select the following check box, and then click Custom.
Customize the default regional settings
Custom...
< Back
Next >
Cancel

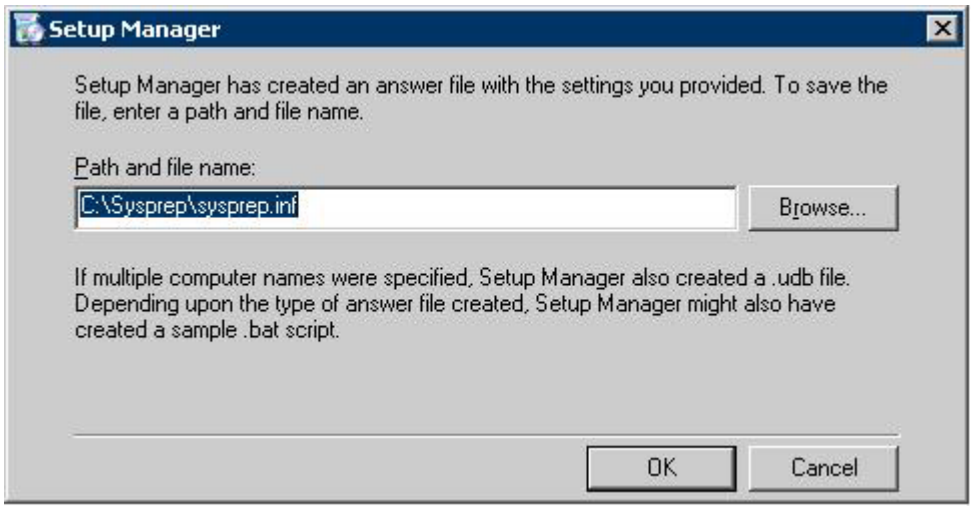

Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Languages
Language support allows end users to view Web pages and other content encoded in a different language and character set.
Select the language groups you want to use from the following list.
Language groups:
Arabic
Armenian
Baltic
Central Europe
Cyrillic
Georgian
Greek
Hebrew
Indic
Adding languages does not guarantee that your computer has all of the fonts required to display content in your preferred languages. When accessing such content, the end user might be prompted to download additional language components.
< Back
Next >
Cancel


Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Install Printers
You can automatically install network printers on the destination computers.
To automatically install a network printer the first time a user logs on after Setup, type the printer name in the following box, and then click Add. The user must have appropriate network permissions to access the printer.
Network printer name:
Add...
Install these printers:
Remove
< Back
Next >
Cancel

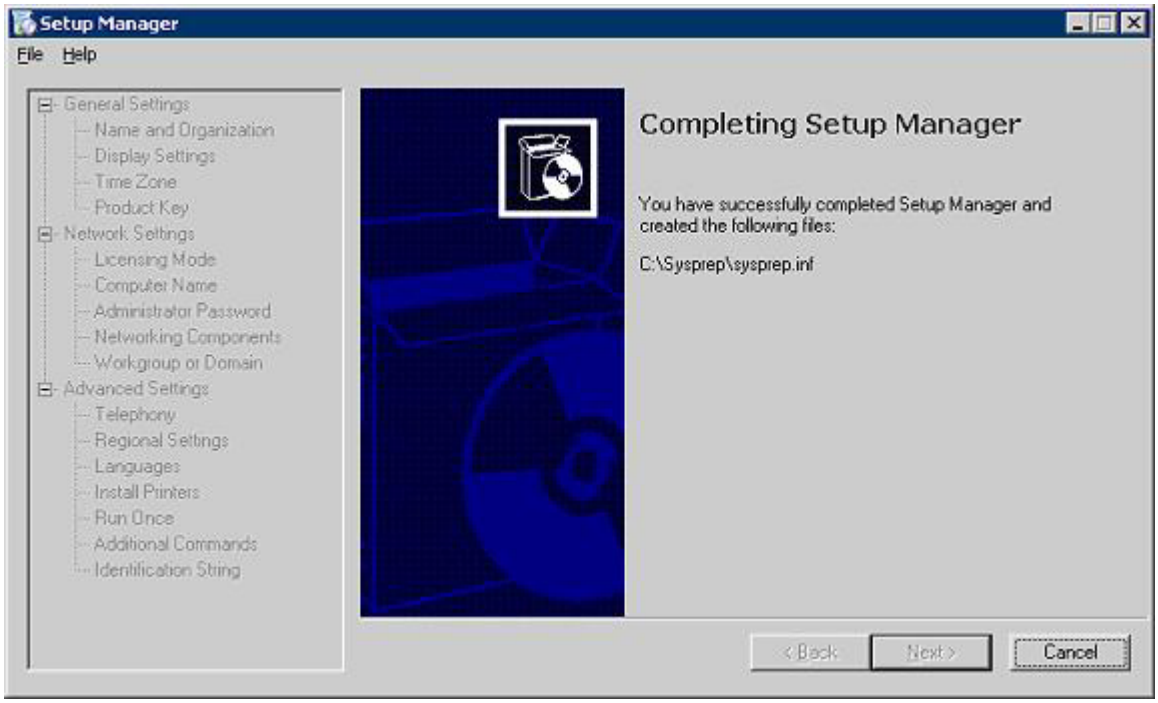

Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Run Once
You can configure Windows to automatically run a command the first time a user logs on.
To automatically run a command the first time a user logs on, type the command in the following box, and then click Add.
Command to add:
Add...
Run these commands:
Remove
Move Up
Move Down
To specify commands to run at the end of unattended Setup, use the Additional Commands page of Setup Manager.
< Back
Next >
Cancel


Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Additional Commands
You can add commands that will automatically run at the end of unattended Setup.
You can run any command that does not require you to be logged on. Type the command in the box below, and then click Add.
Command to add:
Add...
Run these commands:
Remove
Move Up
Move Down
To specify commands to run the first time an end user logs on, use the Run Once page of Setup Manager.
< Back
Next >
Cancel


Setup Manager
File Help
General Settings
Name and Organization
Display Settings
Time Zone
Product Key
Network Settings
Licensing Mode
Computer Name
Administrator Password
Networking Components
Workgroup or Domain
Advanced Settings
Telephony
Regional Settings
Languages
Install Printers
Run Once
Additional Commands
Identification String
Identification String
You can add a string to the registry on the duplicated computers to help identify the Sysprep image.
Type information you would like to include in the registry about this Sysprep installation. Later, this information can help you determine which Sysprep image is installed on a particular computer.
Identification string:
< Back
Finish
Cancel



Click **Cancel** to exit.



Edit sysprep.inf

You must make an addition to the sysprep.inf file as indicated in bold below.

Add LegacyNic=1 to the [Unattended] section of the file.

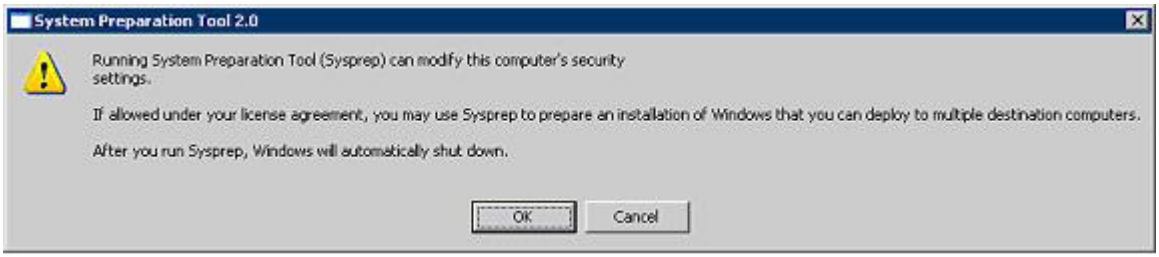
```
;SetupMgrTag
[Unattended]
    OemSkipEula=Yes
    InstallFilesPath=C:\sysprep\i386
    LegacyNic=1
```

Run sysprep

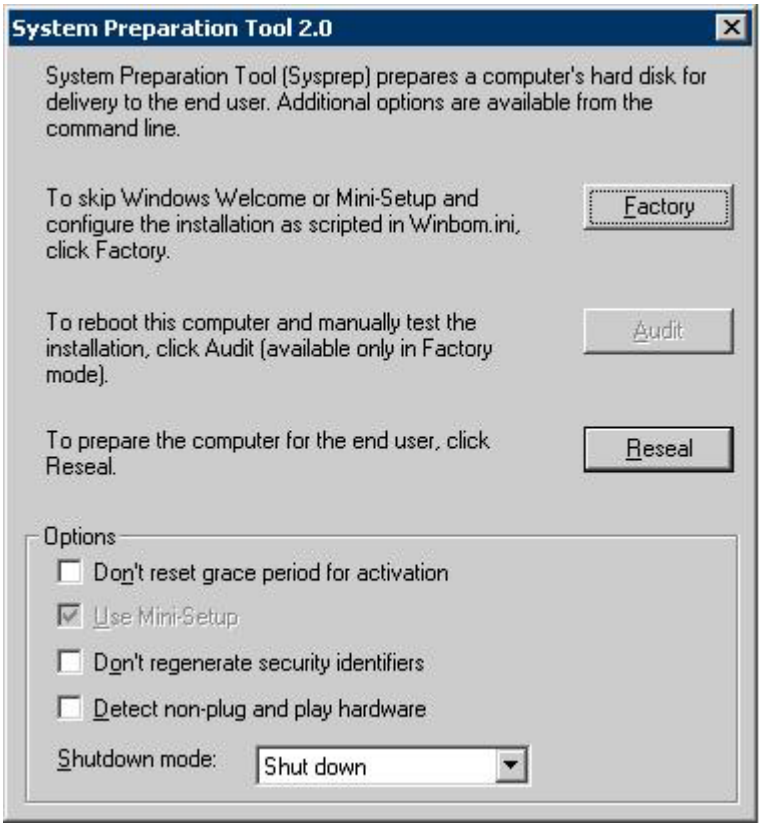
Run c:\sysprep\sysprep.exe

Here is the first screen you get.

Click **OK** if appropriate.

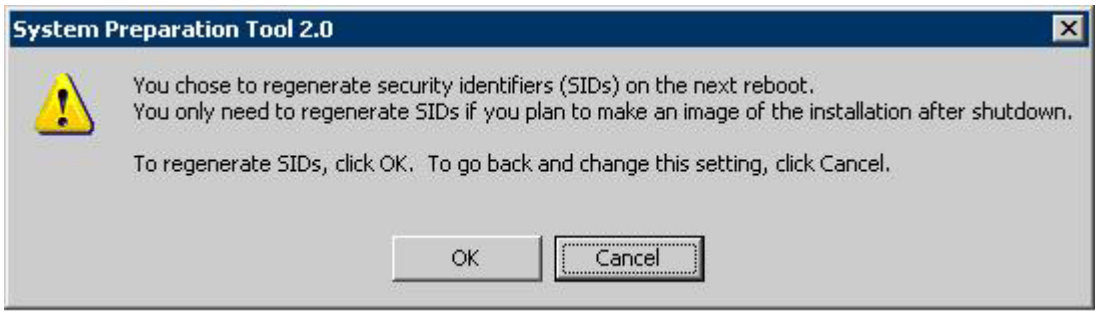


Next, click **Reseal**.



You see the following screen.

Click **OK**.


System Preparation Tool 2.0
You chose to regenerate security identifiers (SIDs) on the next reboot.
You only need to regenerate SIDs if you plan to make an image of the installation after shutdown.
To regenerate SIDs, click OK. To go back and change this setting, click Cancel.
OK
Cancel

Chapter 5. Image creation

Prepare the LUN

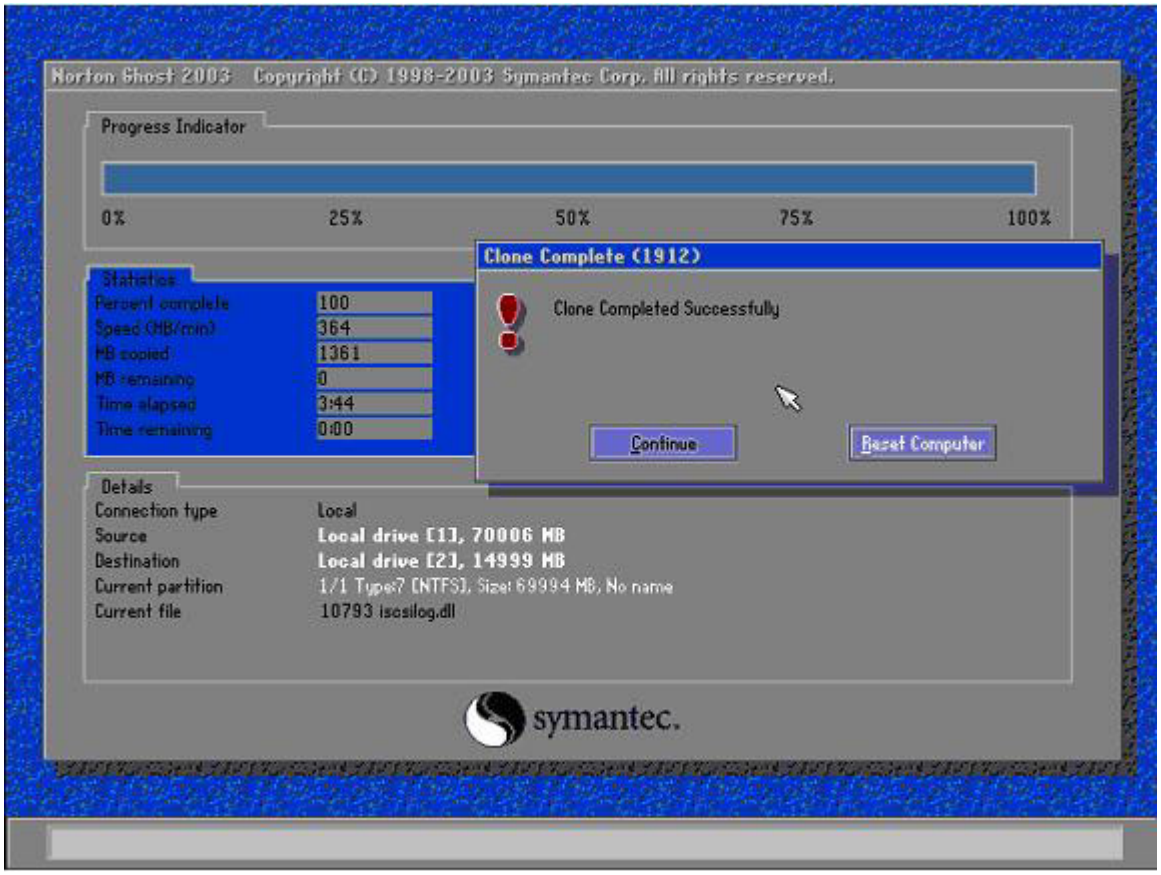
Some cloning tools may require you to have already partitioned the destination LUN. If so, perform the following steps from the Console computer:

1. Set up your Target LUN to accept a connection from the Console computer
2. Use the Microsoft iSCSI Initiator to connect to the Target LUN
3. Use Disk Management to:
   a. Partition the iSCSI LUN
   b. Mark the Partition Active
   c. Format the iSCSI LUN NTFS

Image the LUN

This step creates a Master Image that will be used for deployments.

1. Boot DOS
2. Run your favorite Disk Cloning tool, for example Ghost 2003
3. Clone the local image to a LUN on the iSCSI SAN
   a. For Ghost 2003 you can perform a disk-to-disk copy.
   b. For Ghost 2003, if you have already partitioned, formatted, and marked active the iSCSI LUN, you can perform a partition-to-partition copy.



Chapter 6. Image management

Copy or save the newly cloned image to a Master Deployment Image. The Master Deployment Image will be used for all subsequent deployments.

For example, if you run both x86 and x64 versions of the operating system you might set up the following Master Deployment Images (the naming that is used is just an example):

8843-Windows-2003-SP1-x86
8843-Windows-2003-x64

At this point, basic iSCSI Boot is up and running. For basic booting you are done.

Chapter 7. Advanced topics

Cluster

You will need to set a registry key if you want to have your boot drive and your cluster drive(s) all connected via the Microsoft iSCSI Initiator.

Setup failure

If you set up a new server cluster in Microsoft Windows Server 2003, and the system boot disk, the pagefile disks, and the cluster disks are on the same storage area network (SAN) fabric, a setup failure can occur. In this scenario, the ClusSvc registry subkey might be re-created. Therefore, the ManageDisksOnSystemBuses registry value is removed, and the server cluster is formed by using a local quorum resource.

In Windows Server 2003, you can use the ManageDisksOnSystemBuses registry DWORD value to enable the system boot disk, the pagefile disks, and the cluster disks to be on the same bus.

See the following knowledge-base article:

http://support.microsoft.com/Default.aspx?kbid=888160

Moving or resizing a LUN

Use the following process to move or resize a Windows iSCSI Boot LUN.

1. On a system running Windows, attach both the source and destination LUNs via iSCSI.
2. Prepare the destination LUN as usual.
3. Run Ghost32 to clone the Source to the Destination.
4. Log out of the Source and Destination LUNs.

Windows hotfixes to review

There are some post-SP1 hotfixes that might prove helpful with some or all iSCSI Targets.

- KB 891957
- KB 898790
- KB 902837
- KB 903081

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106-0032, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:
INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Software Interoperability Coordinator, Department 49XA
3605 Highway 52 N
Rochester, MN 55901
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_. All rights reserved.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM the IBM logo, and BladeCenter® are registered trademarks of IBM in the United States.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Linux® is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Printed in USA