

Chapter 3

Automating the Windows 7 Installation

As you saw in the previous chapter, installing Windows 7 is quick and easy. But as an IT manager and professional, you might have to install hundreds of copies of Windows 7. You wouldn't want to do that one machine at a time.

You can automate the installation of Windows 7 in several ways. You can use the Microsoft Deployment Toolkit (MDT) to deploy Windows 7 in your organization. The MDT will help you automate your desktop and server deployments.

You can also perform an unattended installation by using Windows Deployment Services (WDS) to remotely deploy unattended installations (which requires a Windows Server 2008 machine), or by using the System Preparation Tool for disk imaging.

Another utility that we'll explore is the Windows Automated Installation Kit (Windows AIK), which is a set of utilities and documentation that allows you to configure and deploy Windows operating systems, including Windows 7.

To help customize these tools for automating remote installations, you can take advantage of answer files. Answer files are used with automated installations to provide answers to the questions that are normally asked during the installation process. After you install Windows 7, you can also automate the installation of applications by using Windows Installer packages.

This chapter begins with an overview of the automated deployment tools available with Windows 7. Then, we describe how to access the deployment tools available for Windows 7. Next, we detail the use of unattended installation; discuss WDS; explain how you can use the System Preparation Tool, along with ImageX, to create disk images for automated installation; and explore using Windows System Image Manager (SIM) to create unattended answer files. This chapter will help you build a good foundation for the rest of this book.

In this chapter, you'll learn how to:

- ◆ Use the Microsoft Deployment Toolkit (MDT) 2010
- ◆ Take advantage of the Windows Deployment Services (WDS)
- ◆ Utilize the Windows Automated Installation Kit (Windows AIK)
- ◆ Make the most of the Microsoft Assessment and Planning (MAP) Toolkit

Choosing Automated Deployment Options

If you need to install Windows 7 on multiple computers, you could manually install the operating system on each computer, as described in Chapter 2, “Installing Windows 7.” However, automating the deployment process can make your job easier, more efficient, and more cost-effective if you have a large number of client computers. Windows 7 comes with several tools that you can use for deploying and automating the Windows 7 installation. By using multiple utilities with different functionality, you have increased flexibility in determining how to best deploy Windows 7 within a large corporate environment.

The following sections provide overviews of the automated deployment tools that will help you choose which solution is best for your requirements and environment. Each utility is then covered in more detail throughout this chapter. The tools for automated deployment of Windows 7 are as follows:

- ◆ Microsoft Deployment Toolkit (MDT) 2010
- ◆ Unattended installation, or unattended setup, which uses `Setup.exe`
- ◆ WDS, which requires Windows Server 2008 for deployment
- ◆ System Preparation Tool (`Sysprep.exe`), which is used to create and deploy disk imaging or cloning
- ◆ Windows Automated Installation Kit (Windows AIK)

Later in the chapter, you’ll see a table that summarizes the features and requirements of each installation deployment tool.

SYSTEM CENTER CONFIGURATION MANAGER 2007

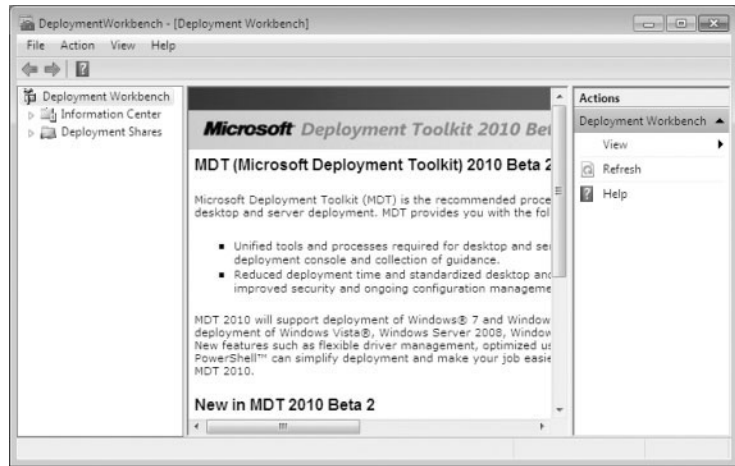
Another tool that you have to deploy Windows 7 is through System Center Configuration Manager (SCCM) 2007. Because SCCM 2007 is its own application, it is beyond the scope of this book. You can learn more about SMS on the Microsoft website at www.microsoft.com.

Introducing the Microsoft Deployment Toolkit (MDT) 2010

Microsoft has released a new beta program called the Microsoft Deployment Toolkit (MDT) 2010. This toolkit is a way of automating desktop and server deployment. The MDT offers an administrator the following benefits:

- ◆ Administrative tools that allow for the deployment of desktops and servers through the use of a common console, as shown in Figure 3.1
- ◆ Quicker deployments and the capability to have standardized desktop and server images and security
- ◆ “Zero Touch” deployments of Windows 7, Windows Server 2008, Windows Vista, Windows Server 2003, and Windows XP

FIGURE 3.1
The MDT console



To install the MDT 2010 package onto your computer (regardless of the operating system being deployed), you must first meet the minimum requirements. These requirements need to be met only on the computer where MDT 2010 is being installed:

- ◆ Microsoft Management Console (MMC) 3.0
- ◆ Microsoft .NET Framework 2.0 or higher
- ◆ Windows PowerShell command-line interface, version 1.0 or 2.0
- ◆ Community Technology Preview (CTP) 3 or higher
- ◆ Windows AIK for Windows 7 RC (Release Candidate). We describe the installation procedure later in this chapter

MDT 2010 INSTALLATION

You can install MDT 2010 without installing Windows AIK first, but you won't be able to use the package fully until Windows AIK is installed.

For Zero Touch deployments, MDT 2010 requires the following components:

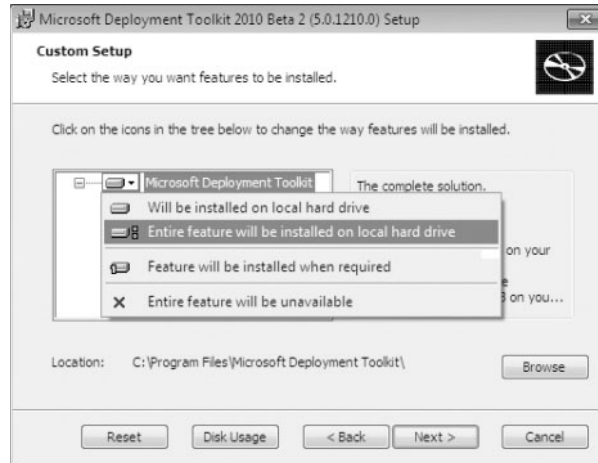
- ◆ If deploying Windows 7 or Windows Server 2008, SCCM 2007 Service Pack 2 (SP2) is required.
- ◆ If you want to deploy previous versions of Windows using MDT 2010, SCCM 2007 Service Pack 1 (SP1) can be used, but you can't use Deployment Workbench in this configuration to maintain an MDT database. If you're using an MDT database with SCCM, you should use SCCM 2007 SP2.

You can install the MDT 2010 on the Windows 7 operating system machine that we installed in Chapter 2. If you decide to install the MDT onto a server or production machine, we recommend that you perform a full backup before you complete these steps. Installing MDT 2010 will replace any previous version of the MDT that the machine is currently using.

Perform these following steps to download and install MDT 2010:

1. Download the MDT 2010 utility from Microsoft's website.
2. Double-click `MicrosoftDeploymentToolkit_x86.exe` to start the installation. If you downloaded the 64-bit version, click that version.
3. At the Welcome screen, click Next.
4. At the License screen, select the "I accept the terms in the license agreement" radio button and click Next.
5. At the Custom Setup screen, shown in Figure 3.2, click the down arrow next to the Microsoft Deployment Toolkit and choose "Entire feature will be installed on local hard drive." Click Next.

FIGURE 3.2
MDT's Custom
Setup screen

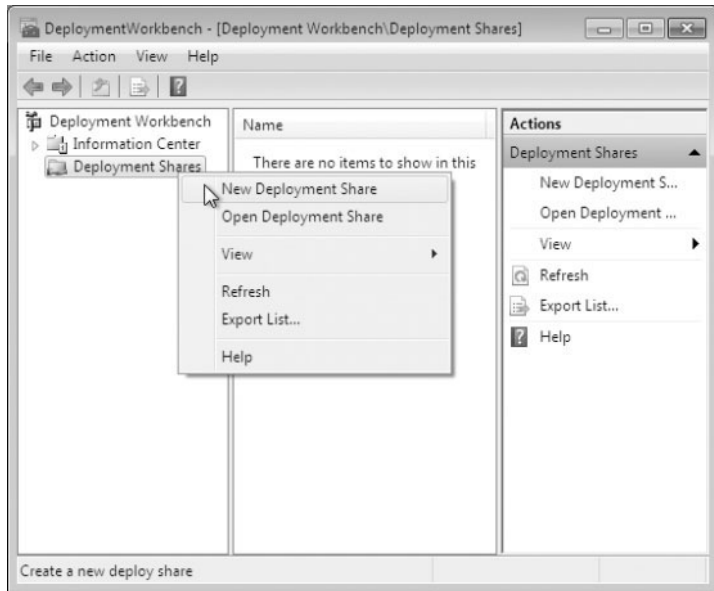


6. At the Ready To Install screen, click Install.
7. When the installation completes, click Finish.

Once you've installed MDT 2010, follow these steps to configure it and set up a distribution share and database:

1. Create a shared folder on your network called **Distribution** and give the Everyone group full control for this exercise.
2. Open the MDT workbench by clicking Start > All Programs > Microsoft Development Toolkit > Deployment Workbench.
3. If the User Account Control box appears, click Yes.
4. In the left-hand pane, right-click Deployment Shares and choose New Deployment Share, as shown in Figure 3.3.

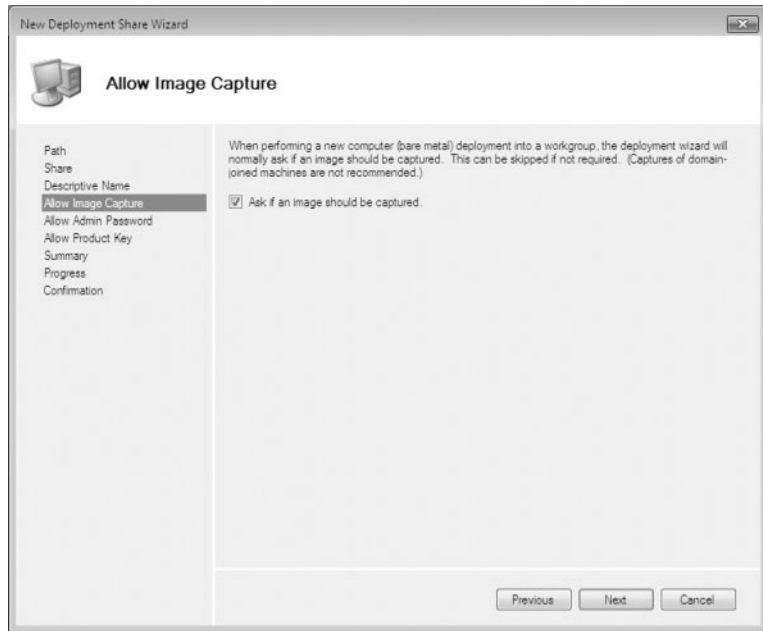
FIGURE 3.3
Select New Deployment
Share from this menu.



5. The New Deployment Share Wizard begins. At the first screen, choose the directory where the deployments will be stored. Click the Browse button and choose the distribution share that you created in step 1. Then click Next.
6. At the Share Name screen, accept the default, of distribution. Click Next.
7. At the Deployment Share Description screen, accept the default description name and click Next.
8. At the Allow Image Capture screen, make sure the “Ask if an image should be captured” check box is selected, as shown in Figure 3.4. Images can be captured after they’re deployed to a domain. By checking this box, you have the option to either capture or not capture the image after deployment. Click Next.
9. At the Allow Admin Password screen, check the box that allows the user to set the admin password for the local machine. If the box is not checked, you can preset the password before deployment.
10. At the Allow Product Key screen, select the option “Ask users to enter a product key at time of installation.” You also can preset the product key and then the user would not be required to supply the product key. Many organizations have site licenses and the user would not be required to enter a product key. Click Next.
11. At the Summary screen, verify all of your settings and click Next.
12. Once the installation is complete, a confirmation screen appears. Click Finish. Close the MDT Workbench.

Now that you have seen how to install the MDT 2010 utility, let’s look at other ways to automatically install Windows 7.

FIGURE 3.4
The Allow Image
Capture screen



Performing an Unattended Installation

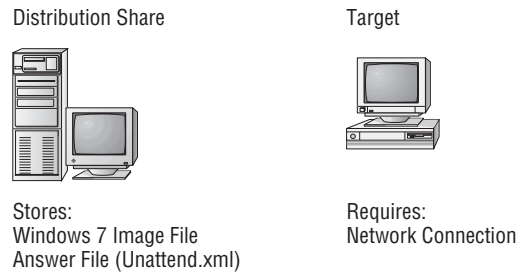
Unattended installation is a practical method of automatic deployment when you have a large number of clients to install and the computers require different hardware and software configurations. Unattended installations utilize an answer file called `Unattend.xml` to provide configuration information during the unattended installation process. Recall the Windows 7 installation from the previous chapter: it asks you for your locale, type of installation, and so forth. The answer file enables these questions to be answered without user intervention.

With an unattended installation, you can use a distribution share to install Windows 7 on the target computers. You can also use a Windows 7 DVD with an answer file located on the root of the DVD, on a floppy disk, or on a universal flash device (UFD), such as an external USB flash drive.

Unattended installations allow you to create customized installations that are specific to your environment. Custom installations can support custom hardware and software installations. Because the answer file for Windows 7 is in XML format, all custom configuration information can be contained within the `Unattend.xml` file. This is different from past versions of Windows where creating automated installation routines for custom installations required that multiple files be used. In addition to providing standard Windows 7 configuration information, you can use the answer file to provide installation instructions for applications, additional language support, service packs, and device drivers.

If you use a distribution share, it should contain the Windows 7 operating system image and the answer file to respond to installation configuration queries. The target computer must be able to connect to the distribution share over the network. After the distribution share and target computers are connected, you can initiate the installation process. Figure 3.5 illustrates the unattended installation process.

FIGURE 3.5
Unattended installation
with a distribution share
and a target computer



ADVANTAGES OF USING AN UNATTENDED INSTALLATION

In a mid-sized or large organization, it just makes sense to use automated setups. As stated earlier, it's impossible to install hundreds of Windows 7 machines one at a time. There are many advantages to using unattended installations as a method for automating Windows 7 installation. Some of the advantages include the following:

- ◆ An unattended install saves time and money because users do not have to interactively respond to each installation query.
- ◆ The process can be configured to provide automated query response, while still selectively allowing users to provide specified input during installations.
- ◆ An unattended install can be used to install clean copies of Windows 7 or upgrade an existing operating system (providing it is on the list of permitted operating systems) to Windows 7.
- ◆ An unattended install can be expanded to include installation instructions for applications, additional language support, service packs, and device drivers.
- ◆ The physical media for Windows 7 does not need to be distributed to all computers that will be installed.

DISADVANTAGES OF USING AN UNATTENDED INSTALLATION

A client operating system is one of the most important items that you'll install onto a machine. You probably feel better installing a client operating system when you're physically doing it. That way, if there's a glitch, you can spot it and deal with it immediately.

This method is not practical for mass installations. But one of the biggest disadvantages to using an unattended installation is that an administrator does not physically walk through the installation of Windows 7. If something happens during the install, you might never know it, but the end user might experience small issues throughout the entire lifetime of the machine.

Two other disadvantages to using unattended installations as a method for automating Windows 7 installations include the following:

- ◆ They require more initial setup than a standard installation of Windows 7.
- ◆ Someone must have access to each client computer and must initiate the unattended installation process on the client side.

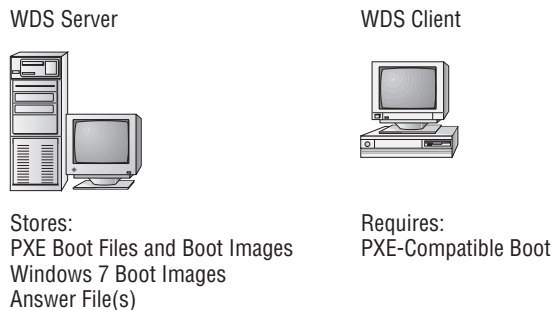
In the next section we'll look at the Windows Deployment Services utility.

Using Windows Deployment Services

Windows Deployment Services (WDS) is an updated version of Remote Installation Services (RIS). WDS is a suite of components that allows you to remotely install Windows 7 on client computers.

A WDS server installs Windows 7 on the client computers, as shown in Figure 3.6. The WDS server must be configured with the Preboot Execution Environment (PXE) boot files, the images to be deployed to the client computers, and the answer file. WDS client computers must be PXE capable. PXE is a technology that's used to boot to the network when no operating system or network configuration has been installed and configured on a client computer.

FIGURE 3.6
WDS uses a WDS server
and WDS clients.



The WDS clients access the network with the help of a Dynamic Host Configuration Protocol (DHCP) server. This allows the WDS client to remotely install the operating system from the WDS server. The network environment must be configured with a DHCP server, a Domain Name System (DNS) server, and an Active Directory to connect to the WDS server. No other client software is required to connect to the WDS server. Remote installation is a good choice for automatic deployment when you need to deploy to large numbers of computers and the client computers are PXE compliant.

ADVANTAGES OF USING WDS

The advantages of using WDS as a method for automating Windows 7 installations are as follows:

- ◆ You can standardize Windows 7 installations across a group or organization.
- ◆ You do not need to distribute the physical media for Windows 7 to all computers that will be installed.
- ◆ You can control end-user installation deployment through the Group Policy utility. For example, you can configure which choices a user can access and which are automatically specified through the end-user Setup Wizard.

Now that we've listed the advantages of WDS, let's take a look at the disadvantages.

DISADVANTAGES OF USING WDS

The disadvantages of using WDS as a method for automating Windows 7 installations include the following:

- ◆ You can use it only if your network is running Windows Server 2003 or Windows Server 2008 with Active Directory installed.

- ◆ The clients that use WDS must be PXE capable.

Next let's look at the System Preparation Tool.

Using the System Preparation Tool and Disk Imaging

The System Preparation Tool (Sysprep.exe) is used to prepare a computer for disk imaging, which can then be captured using ImageX (a new imaging management tool included with Windows 7) or third-party imaging software.

Disk imaging is the process of taking a snapshot of a computer and then using that snapshot to create new computers, allowing for automated deployments. The reference, or source, computer has Windows 7 installed and is configured with the settings and applications that should be installed on the target computers. The image (snapshot) is then created and that image can be transferred to other computers, thus installing the operating system, settings, and applications that were defined on the reference computer.

ADVANTAGE OF IMAGING

Using the System Preparation Tool and disk imaging is a good choice (and the most commonly used in the real world) for automatic deployment when you have a large number of computers with similar configuration requirements or machines that need to be rebuilt frequently.

For example, Stellacon Training Center, a Microsoft education center that employs one of the authors, reinstalls the same software every week for new classes. Imaging is a fast and easy way to simplify the deployment process.

Using imaging software can save time and money. It saves time because you do not have to rebuild machines from scratch, and saving time in turn saves an organization money.



Real World Scenario

USING IMAGING SOFTWARE

In the real world, imaging software is the most common way to install or reinstall corporate computers. The reason that most organizations use images is not only to create new machines quickly and easily, but also to re-image end users' machines that crash.

In most companies, end users will have space on a server (home folders) that allow them to store data. The reason we give our end users space on the server is because this way, at night we only need to back up the servers and not the end users' machines. If our end users place all of their important documents on the server, it gets backed up.

Now if we're also using images in our company and an end user's machine crashes, we just reload the image and the user is back up and running in minutes. Because their documents are being saved on the server, users don't lose any of their information.

Many organizations use third-party imaging software instead of using Sysprep.exe and ImageX. This is another good way of imaging your Windows 7 machines. Just make sure that your third-party software supports the Windows 7 operating system.

To perform an unattended install, the System Preparation Tool prepares the reference computer by stripping away any computer-specific data, such as the security identifier (SID), which is used to uniquely identify each computer on the network, any event logs, and any other unique system information. The System Preparation Tool also detects any Plug and Play devices that are installed and can adjust dynamically for any computers that have different hardware installed.

When the client computer starts an installation using a disk image, you can customize what is displayed on the Windows Welcome screen and the options that are displayed through the setup process. You can also fully automate when and how the Windows Welcome screen is displayed during the installation process by using the `/oobe` (out-of-the-box experience) switch with the System Preparation Tool and an answer file named `Oobe.xml`.

The System Preparation Tool is a utility that's good only for setting up a new machine. You do not use it to image a computer for upgrading a current machine. There are a few switches that you can use in conjunction with `Sysprep.exe` to configure the tool for your specific needs. Table 3.1 shows you some of the `Sysprep.exe` switches and what they can do for you.

TABLE 3.1: Sysprep.exe Switches

SWITCH	EXPLANATION
<code>/pnp</code>	Forces a mini-setup wizard to start at reboot so that all Plug and Play devices can be recognized.
<code>/generalize</code>	Allows Sysprep to remove all system-specific data from the Sysprep image. If you're running the GUI version of Sysprep, this is a check box.
<code>/oobe</code>	Initiates the Windows Welcome at the next reboot.
<code>/audit</code>	Initiates Sysprep in Audit mode.
<code>/nosidgen</code>	Forces a mini-setup on restart. Sysprep does not generate new SIDs upon restart.
<code>/reboot</code>	Stops and restarts the computer system.
<code>/quiet</code>	Runs without displaying any confirmation dialog messages.
<code>/mini</code>	Tells Sysprep to run the mini-setup on the next reboot.

The Windows System Preparation tool is a free utility that comes on all Windows operating systems. By default, the Sysprep utility can be found on the Windows Server 2008 and Windows 7 operating systems in the `\Windows\system32\sysprep` directories.



Real World Scenario

THE PROBLEMS WITH DEPLOYMENT SOFTWARE

For many years when we had to create several machines with a Microsoft operating system on them, we'd have to use files to help deploy the multiple systems.

Then multiple third-party companies came out with software that allowed us to take a picture of the Microsoft operating system and then we could deploy that picture to other machines. One advantage to this is that all the software that's installed on the system could also be part of that picture. This was a great way to copy an entire machine's software over to another machine.

However, for years there was one major problem: SID numbers. All computers are assigned a unique number that represents them on a domain network, and that number is called a *security identifier (SID)*. The problem was when we copied one machine to another machine, the SID number was also copied.

Microsoft released Sysprep many years ago and that helped solve this problem. Sysprep allows us to remove the SID number so that a third-party software can image it to another machine. Many third-party image software products now also remove the SID numbers, but Sysprep was one of the first utilities to help solve this problem.

When you decide to use Sysprep to set up your images, you must follow a few rules in order for the utility to work properly:

- ◆ You can use images to restart the Windows activation clock. The Windows activation clock starts to decrease as soon as Windows starts for the first time. You can only restart the Windows activation clock three times using Sysprep.
- ◆ The computer you're running Sysprep on has to be a member of a workgroup. The machine can't be part of a domain. If the computer is a member of the domain, when you run Sysprep the computer is automatically removed from the domain.
- ◆ When you install the image, the system prompts you for a product key. You can use an answer file during the install, which will have all the information needed for the install and you won't be prompted for any information.
- ◆ A third-party utility or ImageX is required to deploy the image that is created from Sysprep.
- ◆ If you're using Sysprep to capture an NTFS partition, any files or folders that are encrypted will become corrupted and unreadable.

One advantage to Sysprep and Windows 7 is that you can use Sysprep to prepare a new machine for duplication. You can use Sysprep to take an image from one machine and then a third-party application can use that image to create another machine. The steps needed to image a new machine are as follows:

1. Install the Windows 7 operating system.
2. Install all components on the OS.
3. Run Sysprep /generalize to create the image.

When you image a computer using the Windows Sysprep utility, a Windows image (.wim) file is created. Most third-party imaging software products can work with the Windows image file.

ADVANTAGES OF USING THE SYSTEM PREPARATION TOOL

The advantages of using the System Preparation Tool as a method for automating Windows 7 installations include the following:

- ◆ For large numbers of computers with similar hardware, it greatly reduces deployment time by copying the operating system, applications, and Desktop settings from a reference computer to an image, which can then be deployed to multiple computers.
- ◆ Using disk imaging facilitates the standardization of Desktops, administrative policies, and restrictions throughout an organization.
- ◆ Reference images can be copied across a network connection or through DVDs that are physically distributed to client computers.

DISADVANTAGES OF USING THE SYSTEM PREPARATION TOOL

The disadvantages of using the System Preparation Tool as a method for automating Windows 7 installations include the following:

- ◆ You must use ImageX, third-party imaging software, or hardware disk-duplicator devices for an image-based setup.
- ◆ You must use the version of the System Preparation Tool that shipped with Windows 7. You cannot use an older version of Sysprep on a Windows 7 image.
- ◆ Sysprep cannot detect any hardware that is non-Plug and Play compliant.

Using the Windows Automated Installation Kit (Windows AIK)

Another way to install Windows 7 is to use the Windows Automated Installation Kit (Windows AIK). The Windows AIK is a set of utilities and documentation that allows an administrator to configure and deploy Windows operating systems. You can use the Windows AIK to

- ◆ Capture Windows images with ImageX
- ◆ Configure and edit your images by using the Deployment Image Servicing and Management (DISM) utility
- ◆ Create Windows PE images
- ◆ Migrate user data and profiles using the User State Migration Tool (USMT)
- ◆ Centrally manage volume activations by using the Volume Activation Management Tool (VAMT)

You can install and configure the Windows AIK on the following operating systems:

- ◆ Windows 7
- ◆ Windows Server 2008
- ◆ Windows Server 2003 with SP3
- ◆ Windows Vista with SP1

The Windows AIK is a good solution for organizations that need to customize the Windows deployment environments. The Windows AIK allows an administrator to have the flexibility needed for mass deployments of Windows operating systems. Because every organization's

needs are different, the Windows AIK allows you to use all or just part of the deployment tools available. The Windows AIK allows you to manage deployments by using some additional tools:

Microsoft Deployment Toolkit The tools included with this part of the Windows AIK allow you to easily deploy and configure Windows operating systems and images.

Application Compatibility Toolkit When you're installing new Windows operating systems, applications that ran on the previous version of Windows might not work properly. The Application Compatibility Toolkit helps solve these issues before they occur.

Microsoft Assessment and Planning (MAP) Toolkit The MAP toolkit is a utility that will locate computers on a network and then perform a thorough inventory of these computers. This inventory can then be used to determine which machines can have Windows 7 installed. The MAP utility is explained later in this chapter in the "Microsoft Assessment and Planning" section, and install instructions are also provided.

Summary of Windows 7 Deployment Tools

Table 3.2 summarizes the installation tools for Windows 7 and lists the client hardware and server requirements, and indicates whether the option supports a clean install or an upgrade.

Table 3.3 summarizes the unattended installation tools and files that are used with automated installations of Windows 7, the associated installation method, and a description of each tool.

The Windows 7 installation utilities and resources relating to automated deployment are found in a variety of locations. Table 3.4 provides a quick reference for each utility or resource and its location.

TABLE 3.2: Summary of Windows 7 Installation Tools

TOOL	REQUIRED CLIENT HARDWARE	REQUIRED SERVER HARDWARE AND SERVICES	CLEAN INSTALL OR UPGRADE ONLY
MDT 2010	PC that meets Windows 7 requirements; access to the network	Network installation, distribution server.	Clean install
Windows AIK	PC that meets Windows 7 requirements	None. Windows AIK can be installed on any compatible machine.	Clean install
Unattended installation	PC that meets Windows 7 requirements; access to the network	None with DVD; if using network installation, distribution server with preconfigured client images.	Clean install or upgrade

TABLE 3.2: Summary of Windows 7 Installation Tools (*CONTINUED*)

TOOL	REQUIRED CLIENT HARDWARE	REQUIRED SERVER HARDWARE AND SERVICES	CLEAN INSTALL OR UPGRADE ONLY
WDS	PC that meets the Windows 7 requirements and that is PXE compliant	Windows Server 2003 with SP1 or Windows Server 2008 to act as a WDS server with image files, Active Directory, DNS server, and DHCP server.	Clean install
System Preparation Tool	Reference computer with Windows 7 installed and configured; PC that meets the Windows 7 requirements; ImageX, third-party disk imaging software, or hardware disk-duplicator device	None.	Clean install

TABLE 3.3: Summary of Windows 7 Unattended Deployment Utilities

TOOL OR FILE	AUTOMATED INSTALLATION TOOL	DESCRIPTION
Setup.exe	Unattended installation	Program used to initiate the installation process
Unattend.xml	Unattended installation	Answer file used to customize installation queries
Windows System Image Manager	Unattended installation	Program used to create answer files to be used for unattended installations
ImageX.exe	Sysprep	Command-line utility that works in conjunction with Sysprep to create and manage Windows 7 image files for deployment
Sysprep.exe	Sysprep	System Preparation Tool that prepares a source reference computer that is used in conjunction with a distribution share or with disk duplication through ImageX, third-party software, or hardware disk-duplication devices

TABLE 3.4: Location of Windows 7 Deployment Utilities and Resources

UTILITY	LOCATION
Sysprep.exe	Included with Windows 7; installed to %WINDIR%\system32\sysprep
ImageX	Installed with the Windows AIK; installed to C:\Program Files\Windows AIK\Tools\x86\imagex.exe
Windows System Image Manager	Installed with Windows AIK; installed to C:\Program Files\Windows AIK\Tools\Image Manager\ImgMgr.exe

Now that you have seen some of the ways you can install Windows 7, let's take a more detailed look at each one.

Deploying Unattended Installations

You can deploy Windows 7 installations or upgrades through a Windows 7 distribution DVD or through a distribution server that contains Windows 7 images and associated files, such as `Unattend.xml` for unattended installations. Using a DVD can be advantageous if the computer on which you want to install Windows 7 is not connected to the network or is connected via a low-bandwidth network. It is also typically faster to install a Windows 7 image from DVD than to use a network connection.

Unattended installations rely on options configured in an answer file that is deployed with the Windows 7 image. Answer files are XML files that contain the settings that are typically supplied by the installer during attended installations of Windows 7. Answer files can also contain instructions on how programs and applications should be run.

The Windows Setup program is run to install or upgrade to Windows 7 from computers that are running compatible versions of Windows, as discussed in Chapter 2. In fact, Windows Setup is the basis for the other types of installation procedures that we discuss in this chapter, including unattended installations, WDS, and image-based installations.

The Windows Setup program (`Setup.exe`) replaces `Winnt32.exe` and `Winnt.exe`, which are the setup programs used in versions of Windows prior to Windows Vista. Although a graphical tool, Windows Setup can be run from the command line. For example, you can use the following command to initiate an unattended installation of Windows 7:

```
setup.exe /unattend:answerfile
```

The Windows Setup program has several command-line options that can be applied, as you can see in Table 3.5.

Next we'll look at the System Preparation tool (Sysprep), which is one of many ways to install Windows 7 automatically.

Using the System Preparation Tool to Prepare an Installation for Imaging

You can use disk images to install Windows 7 on computers that have similar hardware configurations. Also, if a computer is having technical difficulties, you can use a disk image to quickly restore it to a baseline configuration.

TABLE 3.5: Setup.exe Command-Line Options and Descriptions

Setup.exe OPTION	DESCRIPTION
<code>/1394debug: channel [baudrate:baudrate]</code>	Enables kernel debugging over a FireWire (IEEE 1394) port for troubleshooting purposes. The <code>[baudrate]</code> optional parameter specifies the baud rate for data transfer during the debugging process.
<code>/debug:port [baudrate:baudrate]</code>	Enables kernel debugging over the specified port for troubleshooting purposes. The <code>[baudrate]</code> optional parameter specifies the baud rate for data transfer during the debugging process.
<code>/dudisable</code>	Prevents a dynamic update from running during the installation process.
<code>/emsport:{com1 com2 usebiossettings off} [/emsbaudrate:baudrate]</code>	Configures EMS to be enabled or disabled. The <code>[baudrate]</code> optional parameter specifies the baud rate for data transfer during the debugging process.
<code>/m:folder_name</code>	Used with Setup to specify that replacement files should be copied from the specified location. If the files are not present, then Setup will use the default location.
<code>/noreboot</code>	Specifies that the computer should not restart so that you can execute another command prior to the restart. Normally, when the down-level phase of Setup.exe is complete, the computer restarts.
<code>/tempdrive:drive letter</code>	Specifies the location that will store the temporary files for Windows 7 and the installation partition for Windows 7.
<code>/unattend:[answerfile]</code>	Specifies that you'll be using an unattended installation for Windows Vista. The <code>answerfile</code> variable points to the custom answer file you'll use for installation.

To create a disk image, you install Windows 7 on the source computer with the configuration that you want to copy and use the System Preparation Tool to prepare the installation for imaging. The source computer's configuration should also include any applications that should be installed on target computers.

After you prepare the installation for imaging, you can use imaging software such as ImageX to create an image of the installation.

The System Preparation Tool (`Sysprep.exe`) is included with Windows 7, in the `%WINDIR%\system32\sysprep` directory. When you run this utility on the source computer, it strips out information from the master copy that must be unique for each computer, such as the SID. Table 3.6 defines the command options that you can use to customize the `Sysprep.exe` operation.

In the following sections, you'll learn how to create a disk image and how to copy and install from a disk image.

TABLE 3.6: System Preparation Command-Line Options

SWITCH	DESCRIPTION
/audit	Configures the computer to restart in Audit mode, which allows you to add drivers and applications to Windows or test the installation prior to deployment
/generalize	Removes any unique system information from the image, including the SID and log information
/oobe	Specifies that the Windows Welcome screen should be displayed when the computer reboots
/quiet	Runs the installation with no user interaction
/quit	Specifies that the System Preparation tool should quit after the specified operations have been completed
/reboot	Restarts the target computer after the System Preparation Tool completes
/shutdown	Specifies that the computer should shut down after the specified operations have completed
/unattend	Indicates the name and location of the answer file to use

Preparing a Windows 7 Installation

Follow these steps to run the System Preparation Tool and prepare an installation for imaging:

1. Install Windows 7 on a source computer. The computer should have a similar hardware configuration to the destination computer(s). The source computer should not be a member of a domain. (See Chapter 2 for instructions on installing Windows 7.)
2. Log on to the source computer as an Administrator and, if desired, install and configure any applications, files (such as newer versions of Plug and Play drivers), or custom settings (for example, a custom Desktop) that will be applied to the target computer(s).
3. Verify that your image meets the specified configuration criteria and that all applications are properly installed and working.
4. Select Start > Computer, and navigate to C:\%WINDIR%\System32\sysprep. Double-click the Sysprep application icon.
5. The Windows System Preparation Tool dialog box appears. Select the appropriate options for your configuration.
6. If configured to do so, Windows 7 is rebooted into Setup mode, and you are prompted to enter the appropriate setup information.
7. You are now able to use imaging software to create an image of the computer to deploy to other computers.

Perform the following steps to use the System Preparation Tool to prepare the computer for disk imaging. The Sysprep utility must be run on a machine with a clean version of Windows 7. If you upgraded a Windows Vista machine to Windows 7, you won't be able to run Sysprep.

1. Log on to the source computer as Administrator and, if desired, install and configure any applications that should also be installed on the target computer.
2. Select Start > Computer, and navigate to C:\%WINDIR%\System32\sysprep. Double-click the Sysprep application icon.
3. In the System Preparation Tool dialog box, select the Enter System Out-of-Box Experience (OOBE) in the system cleanup action.
4. Under the Shutdown options, depending on the options selected, you can specify whether the System Preparation Tool will quit, the computer will shut down, or the computer will be rebooted into Setup mode (and you'll need to configure the setup options). Choose the Reboot option. Click OK.
5. Configure the Sysprep utility and name the image **image.wim**.

After creating the Sysprep image, you need to use some type of third-party software to install the image. Windows includes a utility called ImageX for just that purpose.

Using ImageX to Create a Disk Image

After you've run the System Preparation Tool on the source computer, you can create an image from the installation, and you can then install the image on target computers.

To create an image, you can use ImageX, which is a command-line utility that lets you create and manage Windows Image (.wim) files.

Before you can create your disk image using ImageX, you must first build a Windows Preinstallation Environment (PE) disk so you can boot into the Windows PE environment.

WINDOWS AIK

To complete the following steps, you must have the Windows AIK utility installed. If the Windows AIK is not installed, you can install the Windows AIK by following the installation steps in the section "Creating Answer Files with Windows System Image Manager" later in this chapter.

To create the Windows PE boot DVD:

1. Click Start > All Programs > Windows AIK > Deployment Tools Command Prompt.
2. At the command prompt, run

```
Copype.cmd <architecture> <destination>
```

where *<architecture>* is **x86**, **amd64**, or **ia64**, and *<destination>* is a path to a local directory.

For example:

```
copyype.cmd x86 c:\winpe_x86)
```

will create the following directories:

```
\winpe_x86
\winpe_x86\ISO
\winpe_x86\mount
```

3. On the same computer, create your .iso file using the following command:

```
oscdimg -n -bc:\winpe_x86\etfsboot.com c:\winpe_x86\ISO
c:\winpe_x86\winpe_x86.iso
```

4. Burn the .iso image to a DVD.

Now that you have created the Windows PE disk, you'll run the ImageX utility to create a disk image of a Windows 7 installation:

1. Boot the computer into Windows PE.
2. Type the following command, assuming that your DVD\CD drive is configured as drive D:

```
D:\ImageX.exe /capture C: C:\Images\image.wim "Windows 7" /verify
```

3. Copy the new image to a network share at \\Server\Images by using these commands:

```
net use z: \\Server\Images
copy C:\Images\image.wim z:
```

After you create the disk image, the next step is to install the disk image. In the next section, you'll learn to install the disk image to a new machine.

Installing from a Disk Image

Now that you've run the System Preparation Tool and ImageX on the source computer, you can copy the image and install it on the target computer.

After the image is copied, you should boot the destination computer into Windows PE. If the computer has been used previously, it may be necessary to reformat the hard drive (which you can do using the diskpart utility in Windows PE).

THE DISKPART UTILITY

Diskpart is a command-line utility that allows you to manage and configure your hard disks, volumes, or partitions. To learn more about how to use this utility, check Microsoft's website at www.microsoft.com.

If the image is stored over the network, you should then copy the image to the destination computer by using the `net use [dir] [network share]` and `copy [file] [dir]` commands. Then, use the `/apply` option of the ImageX utility to apply the image to the local computer. If an answer file has not been deployed along with the image, you might have to supply such information as regional settings, the product key, the computer name, and the password to the new computer after the destination computer is rebooted.

Next, you'll install Windows 7 from a disk image. You'll use the stripped image that you created in the previous section to simulate the process of continuing an installation from a disk image.

1. Boot the target computer into the Windows PE environment.
2. Copy the image you created in the previous section to the local computer by using these commands:

```
net use z: \\Server\Images
copy Z:\Images\image.wim C:
```

3. Apply the image to the target computer using the following ImageX command:

```
D:\ImageX.exe /apply C:\Images\image.wim C:
```

When you install Windows 7, the installation wizard asks you questions such as your username and computer name. There is way to answer these questions without actually being in front of the computer. As you'll see in the next section, you can do this by using an answer file.

Using Windows System Image Manager to Create Answer Files

Answer files are automated installation scripts used to answer the questions that appear during a normal Windows 7 installation. You can use answer files with Windows 7 unattended installations, disk image installations, or WDS installations. Setting up answer files allows you to easily deploy Windows 7, with little or no user intervention, to computers that might not be configured in the same manner. Because answer files are associated with image files, you can validate the settings in an answer file against the image file.

You can create answer files by using the Windows System Image Manager (SIM) utility. There are several advantages to using Windows SIM to create answer files:

- ◆ You can easily create and edit answer files through a graphical interface, which reduces syntax errors.
- ◆ It simplifies the addition of user-specific or computer-specific configuration information.
- ◆ You can validate existing answer files against newly created images.
- ◆ You can include additional application and device drivers to the answer file.

In the following sections, you'll learn about options that you can configure through Windows SIM, how to create answer files with Windows SIM, how to format the answer file, and how to manually edit answer files.

CONFIGURING COMPONENTS THROUGH WINDOWS SIM

You can use Windows SIM to configure a wide variety of installation options. The following list defines what components you can configure through Windows SIM and gives a short description of each component:

auditSystem Adds additional device drivers, specifies firewall settings, and applies a name to the system when the image is booted into Audit mode. Audit mode is initiated by using the `sysprep /audit` command.

auditUser Executes `RunSynchronous` or `RunAsynchronous` commands when the image is booted into Audit mode. Audit mode is initiated by using the `sysprep /audit` command.

generalize Removes system-specific information from an image so that the image can be used as a reference image. The settings specified in the `generalize` component will only be applied if the `sysprep /generalize` command is used.

offlineServicing Specifies the language packs and packages to apply to an image prior to the image being extracted to the hard disk.

oobeSystem Specifies the settings to apply to the computer the first time that the computer is booted into the Windows Welcome screen, which is also known as the out-of-the-box experience (OOBE). To boot to the Welcome screen, use the `sysprep /oobe` command.

specialize Configures the specific settings for the target computer, such as network settings and domain information. This configuration pass is used in conjunction with the `generalize` configuration pass.

Windows PE Sets the Windows PE-specific configuration settings, as well as several Windows Setup settings, such as partitioning and formatting the hard disk, selecting an image, and applying a product key.

Now let's take a look at how you can create answer files using Windows SIM.

CREATING ANSWER FILES WITH WINDOWS SIM

To create an answer file with Windows SIM, the first thing you must do is install the Windows AIK.

Perform the following steps to download and install the Windows Automated Installation Kit. The Windows AIK is a free download from Microsoft's website.

1. Download the Windows AIK `.iso` file from Microsoft's website.
2. Transfer the `.iso` file to a DVD.
3. Insert the DVD into your Windows 7 machine.
4. When Autoplay starts, select `Run StartCD.exe`. If `Autorun` does not appear, open Windows Explorer and click `StartCD.exe` under the DVD drive.
5. At the User Account Control screen, click Yes.
6. The Welcome To Windows Automated Installation Kit screen appears, as shown in Figure 3.7. Click the Windows AIK Setup link on the left.

FIGURE 3.7
The Windows AIK
installation screen



7. When you see the Welcome screen, click Next.
8. At the License Terms screen, click the I Agree radio button and click Next.
9. At the Select Installation Folder screen (see Figure 3.8), choose where you want to install the Windows AIK files. You can also choose who has the rights to use the Windows AIK. We are choosing the Everyone radio button. Click Next.

FIGURE 3.8
The Select Installation
Folder screen



10. At the Confirmation screen, verify your settings and click Next.

11. At the installation complete screen, verify that there are no errors and click Close.
12. Close the Windows AIK installation screen.

After you install the Windows AIK, you can run the Windows SIM utility to create a new answer file or edit existing answer files.

Perform the following steps to create a new answer file using Windows SIM:

1. Select Start > All Programs > Microsoft Windows AIK, and click Windows System Image Manager.
2. Windows System Image Manager displays an empty screen with five panes, as shown in Figure 3.9: a pane for selecting distribution shares, a pane for selecting Windows image files, the answer file pane, a properties pane, and a pane for displaying validation messages.

FIGURE 3.9
The Windows SIM
screen



3. Select the Windows 7 image file for which a new answer file should be created by clicking File > Select A Windows Image or catalog file or by right-clicking the Windows Image pane in Windows SIM and clicking Select Windows Image (see Figure 3.10).
4. Select File > New Answer File or right-click the Answer File pane and select New Answer File from the context menu to generate the structure of the new answer file.
5. Right-click each component as desired to modify the configuration pass options that are specific to the new environment. You can drill down within a component to provide specific customizations, or you can modify parent-level components.

- When you have finished customizing the answer file for the desired environment, click File > Save Answer File to save the answer file.

FIGURE 3.10
Selecting the Windows
Image option



You can use an answer file to provide automated answers for a DVD-based installation. Simply create a new answer file named **Unattend.xml** and copy it to the root of the DVD. Insert the Windows 7 DVD and set the BIOS to boot from the DVD drive. As the installation begins, Windows Setup will implicitly search for answer files in a number of locations, including the root of removable media drives.

In the next section you'll see how to install Windows 7 remotely through the use of Windows Deployment Services.

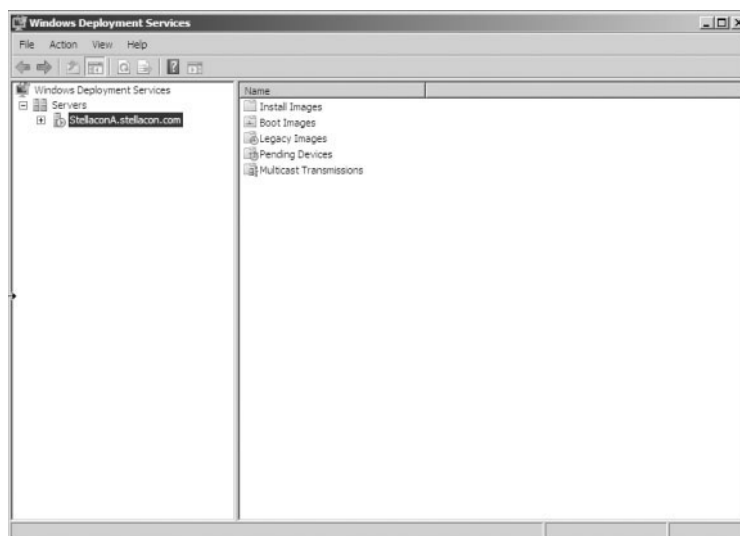
Using Windows Deployment Services (WDS)

In earlier Windows versions, another method that many IT departments used to deploy operating systems was Remote Installation Services (RIS). RIS was a utility that allowed an administrator to deploy an operating system remotely. On the client machine that was receiving the operating system, you'd use a set of disks (RIS client disks) that would automatically initiate a network card, connect to the RIS server, and download the operating system.

For Windows 7 and Windows Server 2008, a new version of RIS has been developed that's called Windows Deployment Services (WDS). WDS (see Figure 3.11) allows an IT administrator to install a Windows operating system without using a CD or DVD installation disc. Using WDS allows you to deploy the operating system through a network installation. WDS

can deploy Windows XP, Windows Server 2003, Microsoft Vista, Windows 7, and Microsoft Windows Server 2008.

FIGURE 3.11
Windows Deployment
Services



Here are some of the advantages of using WDS for automated installation:

- ◆ You can remotely install Windows 7.
- ◆ The procedure simplifies management of the server image by allowing you to access Windows 7 distribution files from a distribution server.
- ◆ You can quickly recover the operating system in the event of a computer failure.

The basic steps of the WDS process from a PXE-enabled WDS client are as follows:

1. The WDS client initiates a special boot process through the PXE network adapter (and the computer's BIOS configured for a network boot). On a PXE client, the client presses F12 to start the PXE boot process and to indicate that you want to perform a WDS installation.
2. A list of available Windows PE boot images displays. Select the appropriate Windows PE boot image from the menu.
3. The Windows Welcome screen displays. Click Next.
4. Enter your credentials for accessing and installing images from the WDS server.
5. A list of available operating system images displays. Select the appropriate image file to install.
6. At the next screen, enter the product key for the selected image.
7. The Partition And Configure The Disk screen displays. You can install a mass storage device driver, if needed, by pressing F6.
8. The image copy process is initiated, and the selected image is copied to the WDS client computer.

The following sections describe how to set up the WDS server and the WDS clients and how to install Windows 7 through WDS.

PREPARING THE WDS SERVER

With the WDS server, you can manage and distribute Windows 7 operating system images to WDS client computers. The WDS server contains any files necessary for PXE booting, Windows PE boot images, and the Windows 7 images to be deployed.

The following steps for preparing the WDS server are discussed in the upcoming sections:

1. Make sure the server meets the requirements for running WDS.
2. Install WDS.
3. Install the WDS Server components.
4. Configure and start WDS.
5. Configure the WDS server to respond to client computers (if this was not configured when WDS was installed).

For WDS to work, the server on which you'll install WDS must meet the requirements for WDS and be able to access the required network services. Now let's take a look at the requirements needed for WDS.

WDS SERVER REQUIREMENTS

The WDS server must meet the following requirements:

- ◆ The computer must be a domain controller or a member of an Active Directory domain.
- ◆ At least one partition on the server must be formatted as NTFS.
- ◆ WDS must be installed on the server.
- ◆ The computer must be running the Windows Server 2003 or Windows Server 2008 operating system.
- ◆ A network adapter must be installed.

NETWORK SERVICES REQUIREMENTS

The following network services must be running on the WDS server or be accessible to the WDS server from another network server:

- ◆ TCP/IP (installed and configured)
- ◆ A DHCP server, which is used to assign DHCP addresses to WDS clients (ensure that your DHCP scope has enough addresses to accommodate all the WDS clients that will need IP addresses)
- ◆ A DNS server, which is used to locate the Active Directory controller
- ◆ Active Directory, which is used to locate WDS servers and WDS clients, as well as to authorize WDS clients and manage WDS configuration settings and client installation options

In the next section you'll see how to install the WDS server components.

INSTALLING THE WDS SERVER COMPONENTS

You can configure WDS on a Windows Server 2003 or Windows Server 2008 computer by using the Windows Deployment Services Configuration Wizard or by using the `wdsutil` command-line utility. Table 3.7 describes the options for the `wdsutil` command.

TABLE 3.7: `wdsutil` Command-Line Options

OPTION	DESCRIPTION
<code>/initialize</code>	Initializes the configuration of the WDS server
<code>/uninitialize</code>	Undoes any changes made during the initialization of the WDS server
<code>/add</code>	Adds images and devices to the WDS server
<code>/convert</code>	Converts Remote Installation Preparation (RIPrep) images to WIM images
<code>/remove</code>	Removes images from the server
<code>/set</code>	Sets information in images, image groups, WDS servers, and WDS devices
<code>/get</code>	Gets information from images, image groups, WDS servers, and WDS devices
<code>/new</code>	Creates new capture images or discover images
<code>/copy</code>	Copies images from the image store
<code>/export</code>	Exports to WIM files images contained within the image store
<code>/start</code>	Starts WDS services
<code>/stop</code>	Stops WDS services
<code>/disable</code>	Disables WDS services
<code>/enable</code>	Enables WDS services
<code>/approve</code>	Approves Auto-Add devices
<code>/reject</code>	Rejects Auto-Add devices
<code>/delete</code>	Deletes records from the Auto-Add database
<code>/update</code>	Uses a known good resource to update a server resource

The first step in setting up WDS to deploy operating systems to the clients is to install the WDS role. You do this by using Server Manager. You must make sure that DNS, DHCP, and Active Directory are installed before completing the following steps.

NETWORK INFRASTRUCTURE

DNS and DHCP are discussed in detail in *MCTS: Windows Server 2008 Network Infrastructure Configuration Study Guide* by William Panek, Tylor Wentworth, and James Chellis (Sybex, 2008).

To install WDS on Windows Server 2008:

1. Start Server Manager by clicking Start > Administrative Tools > Server Manager.
2. On the left-hand side, click Roles.
3. In the right-hand window pane, click the Add Roles link, which launches the Add Roles Wizard.
4. Click Next at the Before You Begin screen.
5. Click the Windows Deployment Services check box. Click Next.
6. At the Overview screen, click Next.
7. At the Select Role Services screen, make sure both check boxes (Deployment Server and Transport Server) are selected, and then click Next.
8. At the Confirmation screen, verify the installation selections and click Install.
9. At the Installation Results screen, click Close.
10. Close Server Manager.

The next step is to configure the WDS server to respond to the WDS clients.

Configuring the WDS Server to Respond to Client Requests

Perform these steps to configure the WDS server:

1. Start WDS by clicking Start > Administrative Tools > Windows Deployment Services.
2. In the left-hand window pane, expand the Servers link. Click the name of your server, and then right-click it and choose Configure Server.
3. The Welcome screen appears explaining that you need an Active Directory Domain Services, DHCP, DNS, and an NTFS partition. If you meet these minimum requirements, click Next.
4. The Remote Installation Folder Location screen appears. Accept the defaults by clicking Next.
5. When you see the System Volume Warning dialog box, click Yes.
6. The DHCP Option 60 screen is next, as shown in Figure 3.12. Select both check boxes and click Next.
7. The PXE Server Initial Settings screen (see Figure 3.13) asks you to choose how PXE will respond to clients. Choose the “Respond to all (known and unknown) client computers” radio button. Click Finish.

8. At the Configuration Complete screen, make sure the Add Image To The Windows Deployment Server Now check box is deselected. Click Finish.

FIGURE 3.12
The DHCP Option 60
screen

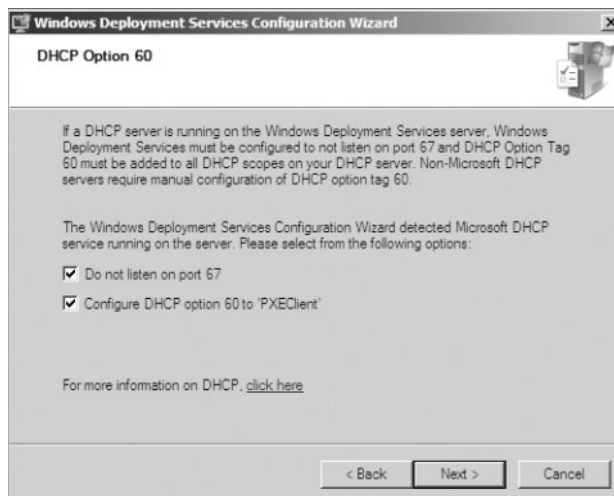


FIGURE 3.13
The PXE Server Initial
Settings screen



One of the advantages of using WDS is that it can work with Windows image (.wim) files. As you learned earlier, you can create Windows image files by using the Windows Sysprep utility.

One component that you need to pay attention to when using WDS is the Preboot Execution Environment (PXE) boot device. PXE boot devices are network interface cards (NICs) that can talk to a network without the need for an operating system because they have a set of preboot commands within the boot firmware.

PXE boot adapters connect to a WDS server and request the data needed to load the operating system remotely. Since most of the machines that you're using WDS for do not have an operating system on the computer, you must have NIC adapters that can connect to a network without an operating system in order for WDS to work properly.

For the same reason, you must set up DHCP to accept PXE machines. Those machines need a valid TCP/IP address so that they can connect to the WDS server.

The WDS server side is now installed and configured. The next step involves setting up the WDS client side.

Preparing the WDS Client

The WDS client is the computer on which Windows 7 will be installed. WDS clients rely on a technology called PXE, which allows the client computer to remotely boot and connect to a WDS server.

To act as a WDS client, the computer must meet all the hardware requirements for Windows 7 (see Chapter 2) and have a PXE-capable network adapter installed. Also, a WDS server must be present on the network. Additionally, the user account used to install the image must be a member of the Domain Users group in Active Directory.

After you install and configure the WDS server, you can install Windows 7 on a WDS client that uses a PXE-compliant network card.

To install Windows 7 on the WDS client:

1. Start the computer. When prompted, press F12 for a network service boot.
2. The Windows PE displays. When you see the Windows Welcome screen, click Next to start the installation process.
3. Enter the username and password of an account that has permissions to access and install images from the WDS server.
4. A list of available operating system images stored on the WDS server appears. Select the image to install and click Next.
5. Enter the product key for the selected Windows 7 image and click Next.
6. At the Partition And Configure the Disk screen, select the desired disk partitioning options, or click OK to use the default options.
7. Click Next to initiate the image-copying process. The Windows Setup process begins after the image is copied to the WDS client computer.

Now you know all the different ways to install Windows 7. Next let's look at a tool that can help you determine which machines can install Windows 7.

Microsoft Assessment and Planning (MAP) Toolkit

This chapter is about installing Windows 7 on multiple computers. One utility that you can use to help design your network is the Microsoft Assessment and Planning (MAP) Toolkit. MAP is a utility that will locate computers on a network and then perform a thorough inventory of these computers. To obtain this inventory, MAP uses multiple utilities like the Windows Management Instrumentation (WMI), the Remote Registry Service, or the Simple Network Management Protocol (SNMP).

Having this information will allow you to determine if the machines on your network will be able to load Windows 7, Windows Vista, Windows Server 2008, Microsoft Office 2007, and Microsoft Application Virtualization. One advantage of using MAP when determining the requirements for Windows 7 is that MAP will also advise you of any hardware upgrades needed for a machine or device driver availability.

Anyone who has been in the industry for a while can see the potential of using MAP. A utility that goes out and discovers your network hardware and then advises you of needed resources to allow the operating system to operate properly is a tool that should be in every administrator's arsenal.

When deciding to locate the computers on your network, you have several approaches. The following list shows your discovery options and how they try to discover the computers:

Use Active Directory Domain Services Select this check box to find computer objects in Active Directory.

Use The Windows Networking Protocols Select this check box to find computers in workgroups and Windows NT 4.0 domains.

Import Computer Names From A File Select this check box to import computer names from a file.

Scan An IP Address Range Select this check box to find computers within a specified IP address range.

Manually Enter Computer Names And Credentials Select this check box to enter computer names individually.

You'll probably find it challenging to determine how many servers are needed for Windows 7 end users and where to place them on your network. A useful feature included with MAP is the ability to obtain performance metric data from the computers. MAP will also generate a report that recommends which machines can be used for Windows 7.

MAP generates your report in both Microsoft Excel and Word. These reports can provide information to you in summary and full detail modes. MAP can generate reports for you for some of the following scenarios:

- ◆ Identify currently installed client operating systems and their requirements for migrating to Windows 7.
- ◆ Identify currently installed Windows Server systems and their requirements for migrating to Windows Server 2008.
- ◆ Identify currently installed Microsoft Office software and their requirements for migrating to Office 2007.
- ◆ Server performance by using the Performance Metrics Wizard.
- ◆ Hyper-V or Virtual Server 2005 server consolidation and placement.
- ◆ Assessment of machines (clients, servers) for installation of Microsoft Application Virtualization (formerly known as SoftGrid).

To install MAP, we must first take a look at the system requirements.

MAP System Requirements

MAP is a free utility that you can download from Microsoft. But before you can install MAP, you must verify that the computer that MAP will be installed on meets minimum requirements. The minimum requirements to install MAP are as follows:

Supported Operating Systems The supported operating systems include Windows 7, Windows Server 2008, Windows Server 2003, Windows Vista with Service Pack 1, and Windows XP Professional Edition.

CPU Architecture MAP can be installed on both the 32-bit and 64-bit versions of any of the listed operating systems.

Hardware Requirements Hardware requirements include: 1.6 GHz or faster processor minimum or dual-core for Windows 7; 1.5 GB of RAM minimum, 2 GB recommended for Windows 7 or Windows Vista; minimum of 1 GB of available hard disk space; and a network card that supports 10/100 Mbps.

Additional Requirements Some additional requirements are Microsoft SQL Server 2005 Express Edition, Microsoft Word (2003 with SP2 or 2007), and Microsoft Excel (2003 with SP2 or 2007).

Follow these steps to install MAP from the Windows AIK installation utility that you downloaded previously in this chapter:

1. Insert the Windows AIK DVD into your machine.
2. When Autoplay starts, click Run StartCD.exe. If Autorun does not display, open Windows Explorer and click StartCD.exe under the DVD drive.
3. At the User Account Control screen, click Yes.
4. The Welcome to Windows Automated Installation Kit screen appears, as shown in Figure 3.14. Click the MAP Download link on the left. This takes you to the Microsoft website where you can download MAP.
5. Scroll down to the bottom of the page and click the download button for Microsoft_Assessment_and_Planning_Solution_Setup.x64.exe or x86.exe.
6. Click Save. Save the file to your hard drive.
7. After the file is downloaded to your hard drive, click Run.
8. The Microsoft Assessment and Planning Solution Accelerator Setup Wizard appears, as shown in Figure 3.15. Make sure the option to automatically check for device compatibility is checked and click Next.
9. The License Agreement screen appears next. Click the "I accept the terms of the license agreement" radio button and click Next.
10. At the Installation Folder screen, accept the default location by clicking Next.
11. A screen appears asking about SQL Server 2005 Express. If you have a previous version of SQL Server 2005 Express on your machine, click the radio button "Install from previous downloaded installation files." If you do not have a previous copy of SQL, make sure that the radio button Download And Install is checked. After your selection, click Next.

FIGURE 3.14
The Windows AIK
installation screen

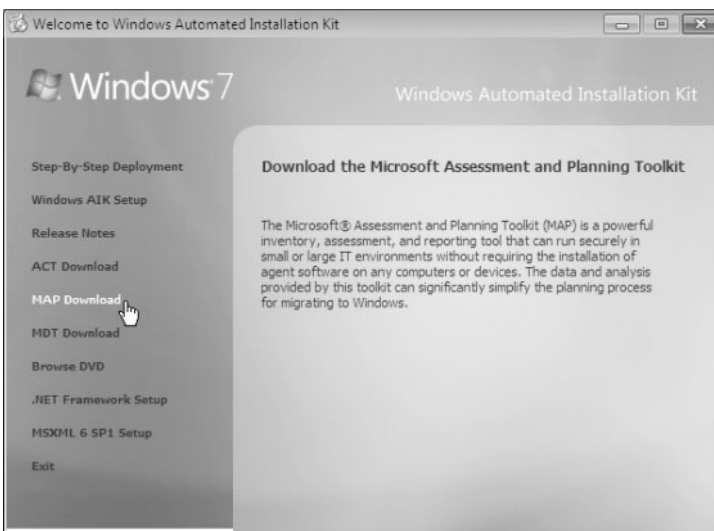
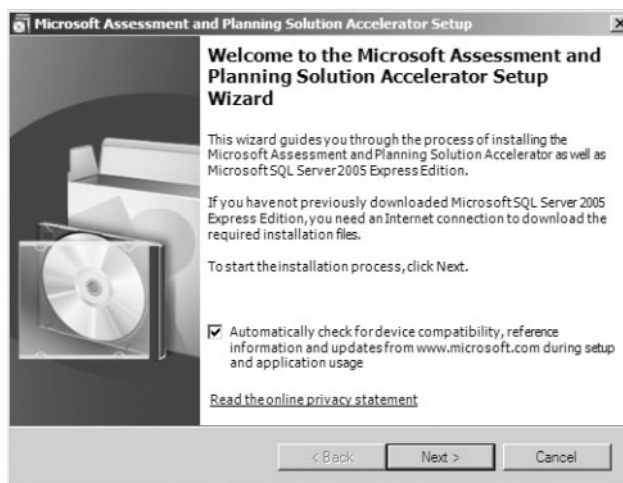


FIGURE 3.15
The MAP setup screen



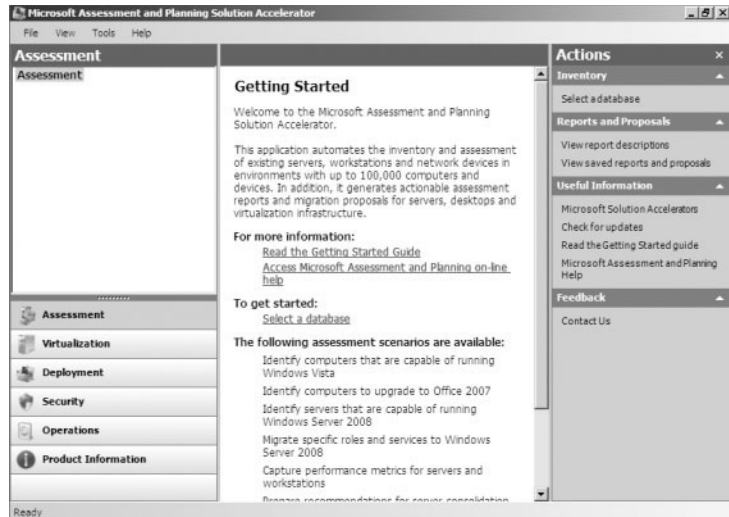
12. The SQL Server 2005 Express License Agreement screen appears next. Click the “I accept the terms of the license agreement” radio button and click Next.
13. At the Ready To Install screen, click Install. The Installing The Microsoft Assessment And Planning Solution Accelerator status screen appears and shows you the status of the installation process. Once the installation is complete, the Installation Successful screen appears.

Now that you have installed MAP, it’s time to configure and test the server. Perform the following steps to create your database for testing:

1. Start MAP by clicking Start > All Programs > Microsoft Planning And Assessment Solution Accelerator, and then clicking Microsoft Planning And Assessment Solution.

2. The first thing you need to do is select your database. You are going to create your database at this time. To accomplish this, click **Select A Database** in either the center or right window pane, as shown in Figure 3.16.

FIGURE 3.16
Click **Select A Database** in either the center or right window pane.



3. The **Create Or Select A Database** screen appears. Make sure that you click the **Create An Inventory Database** radio button. In the **Name** field, type **Windows 7** and click **OK**.

Once your database is created, you'll have the ability to run the various options to test the machines and servers. At this point, you decide which scenario you'd like to test for your network.

It's useful to have a utility like MAP to help you not only detect your network and its operating systems, but also recommend enhancements.

The Bottom Line

Use the Microsoft Deployment Toolkit (MDT) 2010. Microsoft Deployment Toolkit (MDT) 2010 is a way of automating desktop and server deployment. The MDT gives you tools for deployment of desktops and servers through the use of a common console. It allows for quicker deployments and standardized desktop and server images and security. MDT 2010 also allows for Zero Touch deployments of Windows 7, Windows Server 2008, Windows Vista, Windows Server 2003, and Windows XP.

Master It Your organization has asked you to set up one application that all administrators can use to configure and deploy Windows desktop operating systems. Which utility should you use?

Take advantage of the Windows Deployment Services (WDS). WDS is an updated version of Remote Installation Services (RIS). WDS is a suite of components that allows you to remotely install Windows 7 on client computers.

A WDS server installs Windows 7 on the client computers. The WDS server must be configured with the Preboot Execution Environment (PXE) boot files, the images to be deployed to the client computers, and the answer file. WDS client computers must be PXE capable.

Master It You are hired as a consultant by a large organization with multiple locations. The organization wants to have the ability to deploy Windows 7 remotely. How can you set this up?

Utilize the Windows Automated Installation Kit (Windows AIK). The Windows AIK is a set of utilities and documentation that allows you to configure and deploy Windows operating systems. You can use the Windows AIK to capture Windows Images with ImageX, configure and edit your images by using the Deployment Image Servicing and Management (DISM) utility, create Windows PE images, migrate user data and profiles using the User State Migration Tool (USMT), and centrally manage volume activations by using the Volume Activation Management Tool (VAMT).

Master It You need to configure and deploy Windows operating systems by using images. How can you accomplish this task?

Make the most of the Microsoft Assessment and Planning (MAP) Toolkit. MAP is a utility that will locate computers on a network and then perform a thorough inventory of these computers. To obtain this inventory, MAP uses multiple utilities like the Windows Management Instrumentation (WMI), the Remote Registry Service, or the Simple Network Management Protocol (SNMP).

Having this information will allow you to determine if the machines on your network will be able to load Windows 7, Windows Vista, Server 2008, Microsoft Office 2007, and Microsoft Application Virtualization. One advantage of using MAP when determining the needs for Windows 7 is that MAP will also advise you of any hardware upgrades needed for a machine or device driver availability.

Master It You are a consultant who is hired by an organization to migrate the computers from Windows XP to Windows 7. How would you accomplish this?