

Installing and Upgrading to Windows 7

Before you can install Windows 7 or upgrade to it, you first need to decide which version of 7 you will use. Then, you should check the computer's hardware to make sure it is compatible with Windows 7. Next, you need to decide on an installation method: from DVD, CD, as an image, or over the network. Finally, start the installation. New installations are known as "clean" installs; the other option is to upgrade. Upgrades to Windows 7 can be done directly from Windows Vista, but require more effort from Windows XP or 2000; we will cover more about upgrades to Windows 7 later in this chapter.

Windows 7 Versions

Windows 7 is an entire line of Microsoft operating systems designed for desktop PCs and laptops. Within the Windows 7 group are the versions Starter (only available on small notebook PCs), Home Premium, Professional, and Ultimate, all available in 64-bit and 32-bit versions. In Table 7.1, the check marks indicate the components that are included in these various versions of 7. We talk more about these components in Chapter 8, "Configuring Windows."

TABLE 7.1 Comparison of Windows 7 Versions

Component	Starter	Home Premium	Professional	Ultimate
Windows XP Mode	—	—	3	3
Domain Join	—	—	3	3
Backup to home or business network	—	—	3	3
BitLocker Encryption	—	—	—	3

There is an additional version of 7 called Windows 7 Enterprise (not sold through retail or OEM channels), which is not covered on the exam.

Windows 7 Minimum Requirements and Compatibility

When you decide on the version of 7 you want to use, and before installing that operating system, you should learn as much as you can about the computer you plan to install to. Components in a computer should meet Windows 7's minimum requirements and should be listed on Microsoft's website as compatible with 7. Table 7.2 shows the minimum hardware requirements for Windows 7.

TABLE 7.2 Windows 7 Minimum Requirements

Component	Requirement
Processor	1 GHz
RAM	1 GB (32-bit) or 2 GB (64-bit)
Free disk space	16 GB (32-bit) or 20 GB (64-bit)
Video	DirectX 9 with WDDM 1.0 or higher driver
Other	DVD-ROM drive

You can use several websites and system analysis tools to check whether a system's hardware will be compatible with Windows 7. If you check a computer that already has an operating system installed, use the following tools:

- . Windows Compatibility Center: <http://www.microsoft.com/windows/compatibility/>
- . Windows Logo'd Products List: <http://winqual.microsoft.com/HCL/Default.aspx?m=7>. You can also use this site to check any hardware that you haven't installed yet that you plan on using later on.
- . System Information: The Windows System Information tool can be accessed by opening the Run prompt and typing **msinfo32.exe**.
- . Belarc Advisor: Currently a free download, this program can be found at http://www.belarc.com/free_download.html. To run the program subsequently after installation, just access **Start > All Programs > Belarc Advisor**.

For computers without an installed operating system, consider using self-booting diagnostic programs like the following:

- . PC Diagnostic tools: <http://www.pc-diagnostics.com>
- . #1-TuffTEST: <http://www.tufftest.com/>
- . PC Check: <http://www.eurosoft-uk.com>

You might also opt to make use of the Microsoft Assessment and Planning (MAP) toolkit, one of Microsoft's Solution Accelerators. This kit takes inventory of most currently deployed Microsoft operating systems and server software, analyzes the inventory, and gives in-depth reports on the assessment and analysis of those OSES and software. It is designed to simplify the planning process for IT infrastructures with multiple platform scenarios. The kit can be downloaded from the following link: <http://technet.microsoft.com/en-us/library/bb977556.aspx>.

Windows 7 Installation Methods

There are several types of installation methods for Windows operating systems. They include

- . Local installation from DVD-ROM: Installation by DVD-ROM is the most common. A "local" installation is the default type. It means that you insert the DVD-ROM into the DVD-ROM drive of the computer you are sitting at, known as the local computer. When you sit at the computer and answer all the questions it asks you, it is known as an "Attended Installation;" you are attending to the computer as the install progresses. The steps for this type of installation are listed later in this chapter, in the next section titled "Installing Windows 7."
- . Network installation: You can install Windows over the network in a variety of ways. To automate the process, Windows 7 can be installed from a server automatically, using either Windows Deployment Services, which can be installed on Windows Server 2008/2003, or the Remote Installation Services (RIS) program, which can be installed on Windows Server 2003 and Windows 2000 Server. These two server-based programs work with the Windows System Image Manager program in 7. This program can be used to create an answer file that is used during an Unattended Installation. The answer file provides the responses needed for the installation, with no user intervention. In Windows 7, there is a single XML-based answer file called Unattend.xml.

The Windows System Image Manager (SIM) for 7 is part of the Windows Automated Installation Kit (AIK), which can be downloaded from www.microsoft.com, just search for “Windows Automated Installation Kit (AIK).” For detailed instructions on how to use SIM see the following link: [http://technet.microsoft.com/en-us/library/dd744394\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/dd744394(WS.10).aspx). For general information about Windows 7 deployment, see the following link: [http://technet.microsoft.com/en-us/library/dd744519\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/dd744519(WS.10).aspx)

- . Disk image: Windows can also be installed by cloning the entire disk image of another installation. This can be done by using programs like Acronis True Image or Norton Ghost. When cloning a disk image, both computers need to be identical, or as close to identical as possible. The hard disk of the target for a cloned installation must be at least as large as the original system. To avoid Security Identifier (SID) conflicts, use the Sysprep utility. The Sysprep utility for Windows 7 is installed with the operating system and can be found by navigating to: `C:\Windows\System32\Sysprep`. Sysprep uses an answer file created with the System Image Manager (SIM). It creates a unique SID and makes other changes as needed to the network configuration of the system.
- . Installing from a recovery disc: Computers with Windows preinstalled use a recovery disc, hidden partition, or both. This disc and/or partition contains a factory image of Windows. The purpose of this is to give users the ability to return their computer back to the state when it was first received. This means that the system partition (usually the C: drive) will be formatted, and re-imaged with Windows. This works well in a two partition system, in which the operating system is on C: and data is stored on D: or another drive letter. In this scenario, if the operating system fails and cannot be repaired, the computer can be returned to its original “factory” state, but the data won’t be compromised. Whenever buying a computer from a company such as HP, Dell, and so on, make sure that they offer some kind of recovery disc, or other recovery option.

Although it’s not covered on the exam, it’s also possible to install Windows 7 from a USB flash drive. This is done in essentially the same manner as installing from DVD; however, you need to partition and format the USB drive, xcopy the contents of the DVD to the flash drive, and set the BIOS to boot from USB.

Installing Windows 7

Now that you have decided on the version of 7 to use and have verified compatibility of hardware, it’s time to install. The Windows 7 installation is more simplified than earlier versions of Windows. This section covers the steps involved in a “clean” local installation of 7. Keep in mind that this type of installation will remove any data currently stored on the computer’s hard drive.

Step 1. Begin the installation from the DVD-ROM. There are two methods to perform a clean install of Windows 7 from DVD:

.-Install Windows 7 by running the Setup program from within the current version of Windows. (This is the recommended method.) Insert the Windows 7 DVD. The disc most likely autoruns and you see a setup screen. Otherwise, just go to the DVD drive in Windows Explorer and double-click the `setup.exe` file to start the installation.

-Boot the computer from the Windows 7 DVD. This is necessary if no operating system exists on the computer. If you choose this option, do the following:

1. -Make sure the DVD drive is configured as the first boot device in the system BIOS.
2. -Insert the Windows 7 DVD into the system's DVD drive. (If the drive won't open while in the BIOS, insert the disc immediately after saving the BIOS.)
3. Save the BIOS and restart the system.
4. -The DVD should boot automatically and start the installation, but if you are prompted to boot from the DVD, press any key. There is only a small window of time for this, approximately 5 seconds. This prompt is a protective measure; if you get the prompt, it means that there is data of some sort on the drive. Startup of the installation might take a minute; then you see a GUI-based window asking for information. (There is no text portion.) Setup will load Windows files for a few moments, and start the installation within the Windows GUI.

Step 2. Input the Language to install, Time and currency format, and Keyboard or input method. At this time there is also an option to learn more about the installation by clicking the What to know before installing windows link. After you input your settings for step 2, you must click Next, and then on the next screen click Install now. A minute or so will pass as files are copied and the installation is prepared.

Step 3. Accept the license terms.

Step 4. Select whether you are doing a custom install, which includes a clean installation or an upgrade. (Within these steps we are doing a clean installation.) If you install to a computer with no operating system, the Upgrade option will be disabled. For this exercise we are doing a clean installation so we will select "Custom (advanced)".

Step 5. Select where to install Windows 7. From here you can select the drive and administer partitions as you see fit. The proper disk preparation order when installing any operating system is to partition the drive, format the partition (or partitions), and start the installation (copy files). For more information on partitioning the drive during the installation process, see the section titled "Creating Partitions During a Windows Vista Installation" later in this chapter. (The steps to create partitions during the install of Windows 7 are similar to Windows Vista). If necessary, you can also load third-party drivers for the media (hard drive) to be installed to by clicking on Load Driver. These might be drivers for SATA or SCSI controllers, or other special hard disk controllers. These drivers can come from floppy disk, CD, DVD, or USB flash drive. Microsoft recommends that before you install, you check if the devices you want to use are listed at the Windows Compatibility Center: <http://www.microsoft.com/windows/compatibility/> or at the Windows Logo'd Products List: <http://winqual.microsoft.com/HCL>. If you click on Load Driver and cannot supply a proper driver for Windows 7, or the computer cannot read the media in which the driver is stored, you need to exit the installation program. When you finish, click Next, and the system automatically copies files from the DVD, expands those files, installs features and updates, and completes the installation. The system might need to restart several times during this installation process (for example, after it installs updates and when it completes the installation), but you can let the Windows 7 installation work its magic until you get to the next step.

Step 6. Type a user name and a computer name

Step 7. Type a password, confirm it, and type a password hint

Step 8. Enter the Product key and decide whether to automatically activate Windows (can be delayed up to 30 days).

Step 9. Configure Windows Update to Use Recommended Settings, Install important Updates Only, or Ask Me Later. For more information on Windows Update see Chapter 9, "Maintaining Windows."

Step 10. Set the time zone, time, and date.

Step 11. Set the computer's location: home, work, or public network.

Now it's time to start Windows. Windows 7 checks the computer's performance (which might take a while), prepares the desktop, and then logs you in. Afterwards, you can continue with initial tasks such as connecting to the Internet or transferring files and settings.

Upgrading to Windows 7

Upgrades are done in essentially the same manner as clean installs. The difference is that all the settings, applications, and user files will ultimately be kept in place *if* the upgrade is successful. It is recommended that those files and settings are backed up previous to the upgrade. However, before starting the upgrade, you should first check to see if your computer (and operating system) is compatible and if it will survive the process. Refer to Table 7.2 for the Windows 7 minimum requirements. You can also use the following utilities and websites to do this:

- . Windows Upgrade Advisor: This is a website that is accessed by clicking on the Check compatibility online button when you first insert the Windows 7 DVD. Of course, the computer that you want to upgrade needs to have Internet access. You can also download the Windows 7 Upgrade Advisor from Microsoft's website.
- . Windows Compatibility Center: <http://www.microsoft.com/windows/compatibility/>
- . Windows 7 Logo'd Products List: <http://winqual.microsoft.com/HCL/Default.aspx?m=7>.

Only Windows Vista can be upgraded directly to Windows 7. To upgrade Windows Vista to Windows 7, make sure that service pack 1 or 2 is installed to Vista prior to the upgrade, insert the DVD, and select the "Upgrade" option. The steps to complete the upgrade are similar to the clean installation steps.

Windows Vista Home Basic and Home Premium versions can be upgraded to Windows 7 Home Premium. Windows Vista Business can be upgraded to Windows 7 Professional and Ultimate. Windows Vista Ultimate can only be upgraded to Windows 7 Ultimate. Any other combinations of upgrades from Vista to 7 would require a "Custom/advanced" install, and would require the user to backup all data prior to the upgrade, and reinstall any applications after the upgrade is complete. To upgrade XP or 2000 to Windows 7, a user would again have to back up all files, then start the install, select "Custom/advanced", and later reinstall any applications necessary and restore data files. Microsoft recommends the program Windows Easy Transfer for the backup and restoration of files. 32-bit versions of Windows cannot be directly upgraded to 64-bit versions. 32-bit and 64-bit versions of Windows 7 can be installed to a computer with a 64-bit processor. However, 32-bit processors will only accept 32-bit versions of Windows 7.

Verifying and Troubleshooting Windows 7 Installations

When you complete the clean installation or upgrade, verify that your installation has gone smoothly by testing it. For example, attempt to navigate through Windows, access administrative functions, connect to the Internet, and so on.

If you have confirmed that Windows is working normally, update the system. Install the latest service pack and additional updates as necessary. It is possible that the service pack was included on your installation media, but if not, download it and install it before going any further. Then, download any other updates that are necessary utilizing the Windows Update feature. More information about service packs and updates can be found in Chapter 9, "Maintaining Windows."

Installations usually go smoothly, but not always. If an installation fails for any reason, or if the installation completed but Windows doesn't seem to be behaving properly, consider reviewing the log files to find out more about the problem and why it occurred. Table 7.3 describes the important log files you should know and their locations.

TABLE 7.3 Windows 7 Setup Log Files and Locations

Log file location	Description
\$windows.~bt\Sources\Panther	Log location before Setup can access the drive
\$windows.~bt\Sources\Rollback	Log location when Setup rolls back in the event of a fatal error
%WINDIR%\Panther	Log location of Setup actions after disk configuration

%WINDIR%\Inf\Setupapi*.log	Used to log Plug and Play device installations
%WINDIR%\Panther\Setup.etl	Location of Windows Setup performance events
%WINDIR%\Memory.dmp	Location of memory dump to use for bug checks
%WINDIR%\Minidump*.dmp	Location of mini memory dumps to use for bug checks
%WINDIR%\System32\Sysprep\Panther	Location of logs generated by Sysprep

In the above table you will note the variable directory called %WINDIR%. By default, the name of this folder in Windows 7 will be “Windows”. %WINDIR% is the new name of the variable previously called %systemroot%. Also, \$windows.~bt is a temporary boot folder created during setup. It remains if the installation was not successful, allowing you to analyze the log files, but should be automatically deleted when the installation completes properly.

Windows 7, Vista, as well as Server 2008, include the capability to review Setup events within the Event Viewer, or by way of a script. See the following link for details: [http://technet.microsoft.com/en-us/library/dd744583\(Ws.10\).aspx](http://technet.microsoft.com/en-us/library/dd744583(Ws.10).aspx).

If the system won't start, you can still view these files. However, this depends on the type of installation and how far the installation got. If it was a clean installation, you should boot to the Windows 7 DVD; select “Repair your computer”, then access the System Recovery Options menu, and select the Command Prompt. If it was an upgrade that didn't get far, and if Windows Vista/XP/2000 was previously installed on an NTFS drive, you can boot to the System Recovery Options in Vista, or the Recovery Console from a Windows XP or 2000 CD and view the log files from there. For more information about System Recovery Options (7/Vista), and the Recovery Console (XP/2000), see Chapter 10, “Troubleshooting Windows.”

If you cannot start the clean installation or upgrade, check the following:

- . Processor speed and memory size: Verify that your computer meets the minimum requirements for Windows 7. Refer to Table 7.2 for more information. Make sure you are installing the correct type (32-bit or 64-bit) and version of Windows 7
- . Make sure you are installing the correct type (32-bit or 64-bit) and version of Windows 7 (Starter, Home Premium, and so on...)
- . Free disk space: You need 16 GB/20 GB free for Windows 7 (for 32-bit and 64-bit editions respectively); the more space available, the better.
- . Hardware conflicts or hardware issues: Use the Device Manager to ensure that all hardware works correctly before you start an upgrade.
- . Installation media: Make sure that your DVD-ROM media is not scratched or damaged in any way. Verify that it is genuine Microsoft software and that you have the right type of media for your installation, for example, Windows 7 Full Version License or Upgrade DVD.

Cram Quiz

Answer these questions. The answers follow the last question. If you cannot answer these questions correctly, consider reading this section again until you can.

1. What is the minimum RAM requirement for Windows 7?
 - m A. -1 GB
 - m B. 256 MB
 - m C. 1536 MB
 - m D. 768 MB

2. -Which log file contains information regarding Windows 7 Setup performance events?
- m A. Setupapi*.log
 - m B. Setupact.log
 - m C. -Setup.etl
 - m D. Event Viewer
3. -Where can you go to find out if your current operating system can be upgraded to Windows 7?
- m A. MSKB
 - m B. -Windows Upgrade Advisor
 - m C. HAL
 - m D. Belarc Advisor
4. -Which versions of 7 have the capability to backup to a home or business network? (Select the best two answers.)
- m A. Starter
 - m B. Home Premium
 - m C. -Professional
 - m D. -Ultimate
5. What is the minimum hard drive requirement for Windows 7?
- m A. -16 GB free space
 - m B. 15 GB partition
 - m C. 25 GB free space
 - m D. 16 GB partition

Cram Quiz Answers

1. -A. The minimum RAM requirement for Windows 7 is 1 GB for 32-bit versions, 2 GB for 64-bit versions
2. -C. Setup.etl contains information regarding Windows 7 Setup performance events. Setupapi*.log is used for events about Windows 7 Plug and Play device installations. Setupact.log is a Windows Vista log file that contains information regarding actions during installation. The Event Viewer is an application, not a file.
3. -B. The Windows Upgrade Advisor can tell you if your current operating system can be upgraded to 7. This, and other tools like it, are located at www.microsoft.com, not at the MSKB (<http://support.microsoft.com>). The HAL is a file in Windows; it stands for hardware abstraction layer. Belarc Advisor is a third-party offering that analyzes your computer but does not determine whether it can be upgraded.
4. -C and D. Windows 7 Professional and Ultimate include the capability to backup to a home or business network easily.
5. A. Windows 7 (32-bit) requires a minimum 16 GB of free space. 64-bit versions require 20 GB.