A+ Guide to Managing & Maintaining Your PC, 8th Edition

Chapter 7
Installing Windows

Objectives

- How to plan a Windows installation
- How to install Windows 7
- What to do after the installation
- Learn about special concerns when installing Windows in a large enterprise

How to Plan a Windows Installation

- Situations requiring a Windows installation
  - New hard drive
  - Existing Windows version corrupted
  - Operating System upgrade

Choose the Edition, License, and Version of Windows 7

- Editions of Windows 7
  - Windows 7 Starter: intended to be used on notebooks or in developing nations
    - Only comes in the 32-bit version
  - Windows 7 Home Basic: has limited features and is available only in underdeveloped countries
  - Windows 7 Home Premium: similar to Home Basic but includes additional features
  - Windows 7 Professional: intended for business users
    - Can purchase multiple site licenses
  - http://windows.microsoft.com/en-US/windows7/products/compare

Choose the Edition, License, and Version of Windows 7

- Editions of Windows 7 (continued)
  - Windows 7 Enterprise: similar to Windows 7 Professional but includes additional features
    - Does not include Windows DVD Maker
    - Multiple site licenses are available
  - Windows 7 Ultimate: includes every Windows 7 feature
    - Multiple site licenses are not available

| Feature	Starter	Home Basic	Home Premium	Professional	Enterprise	Ultimate
Aero user interface			X	X	X	X
Create homegroups			X	X	X	X
Scheduled backups	X	X	X	X	X	X
Backup to network				X	X	X
BitLocker Drive Encryption					X	X
Encrypting File System (EFS)				X	X	X
Windows DVD Maker			X	X		X
Windows Media Center			X	X	X	X
Join a domain				X	X	X
Group Policy				X	X	X
Remote Desktop host				X	X	X
Multiple languages					X	X
Windows XP Mode				X	X	X
Processor: 32-bit or 64-bit		X	X	X	X	X

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Table 2-1 Windows 7 editions and their features

Choose the Edition, License, and Version of Windows 7

- Purchase options
  - Retail
    - Costs less if you purchase a license to upgrade from Vista or XP
    - Must purchase a Windows 7 full license for any computer that has an OS other than Vista or XP
  - Original Equipment Manufacturer (OEM)
    - Costs less but can only be installed on a new PC for resale

Choose the Edition, License, and Version of Windows 7

- 32-bit or 64-bit Versions
  - 64-bit installation usually performs better than 32-bit
    - Can also support 64-bit applications, which run faster
  - 64-bit installations of Windows require 64-bit device drivers

32-bit setup disc

64-bit setup disc
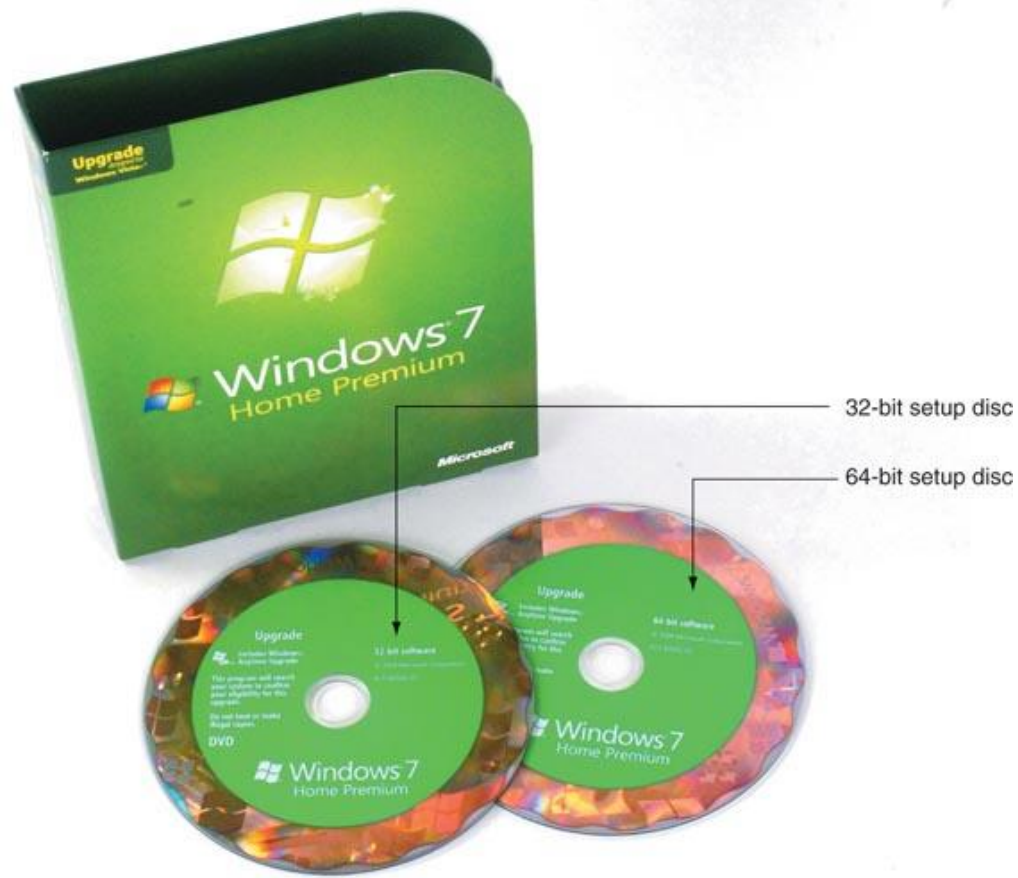
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Figure 7-1 A Windows 7 DVD contains either a 32-bit version or a 64-bit version of Windows

Operating System	32-bit Version	64-bit Version
Windows 7 Ultimate	4 GB	192 GB
Windows 7 Enterprise	4 GB	192 GB
Windows 7 Professional	4 GB	192 GB
Windows 7 Home Premium	4 GB	16 GB
Windows 7 Home Basic	4 GB	8 GB
Windows 7 Starter	2 GB	NA

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Table 7-2 Maximum memory supported by Windows 7 editions and versions

Verify Your System Qualifies for Windows 7

• Download, install, and run the Windows 7 Upgrade Advisor to find out if a system can be upgraded

Hardware	For 32-bit Windows 7	For 64-bit Windows 7
Processor	1 GHz or faster	1 GHz or faster
Memory (RAM)	1 GB	2 GB
Free hard drive space	16 GB	20 GB
Video device and driver	DirectX 9 device with WDDM 1.0 or higher driver	DirectX 9 device with WDDM 1.0 or higher driver

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Table 2-3 Minimum and recommended hardware requirements for Windows 7

Verify Your System Qualifies for Windows 7

- To understand if a system qualifies for Windows 7, it helps to understand how Windows relates to hardware by using device drivers and system BIOS

- When system is turned on:

  - The motherboard BIOS manages essential devices such as keyboard, monitor, and hard drive

  - Motherboard BIOS is contained on a chip on the motherboard (firmware chip)
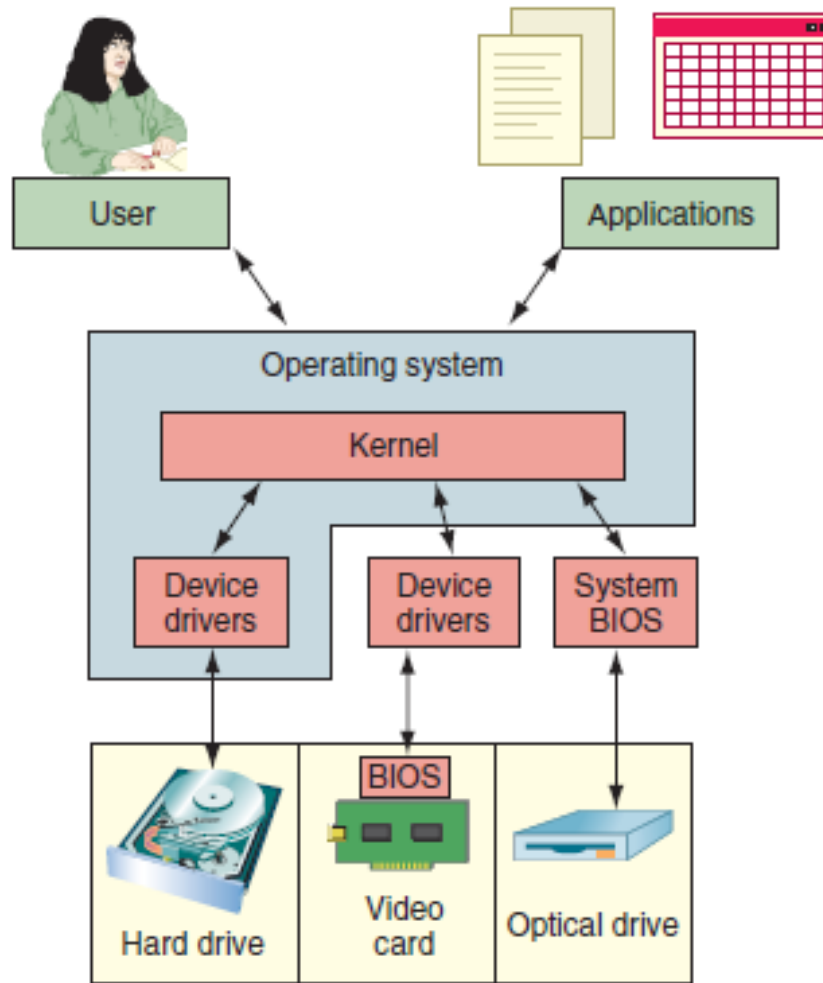
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Figure 7-3 Windows relates to hardware by way of device drivers or system BIOS

Verify Your System Qualifies for Windows 7

- Motherboard BIOS provides three functions:
  - **System BIOS** contains instructions for running hardware devices before an OS is started
  - **Startup BIOS** starts the computer and finds a boot device that contains an OS
    - Then turns the startup process over to the OS
  - **Setup BIOS** is used to change motherboard settings
    - Can use it to enable or disable a device on the motherboard, change data and time, or select the order of boot devices for startup BIOS to search

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Computer BIOS

http://www.computerhope.com

CMOS memery

BIOS Chip

Verify Your System Qualifies for Windows 7

- Device drivers: small programs stored on the hard drive that tell the computer how to communicate with a specific hardware device

  - 32-bit OS requires 32-bit drivers and 64-bit OS requires 64-bit drivers

  - Device drivers can be downloaded from the manufacturer's website or found on installation DVDs

  - When installing, be sure to have Windows 7 device drivers for all critical devices

- **Windows XP Mode**: environment installed in Windows 7 that supports older applications

Installations with Special Considerations

- When the computer does not have a DVD drive
  - Download Windows 7 from Microsoft's website
    - Assumes the computer already has a working OS
  - Use an external DVD drive
    - If PC does not have an OS installed, you must change boot order in BIOS setup
  - Copy the installation files to a USB flash drive
  - Use a DVD drive on another computer
    - Share the DVD drive and install from there
    - Assumes the computer already has a working OS
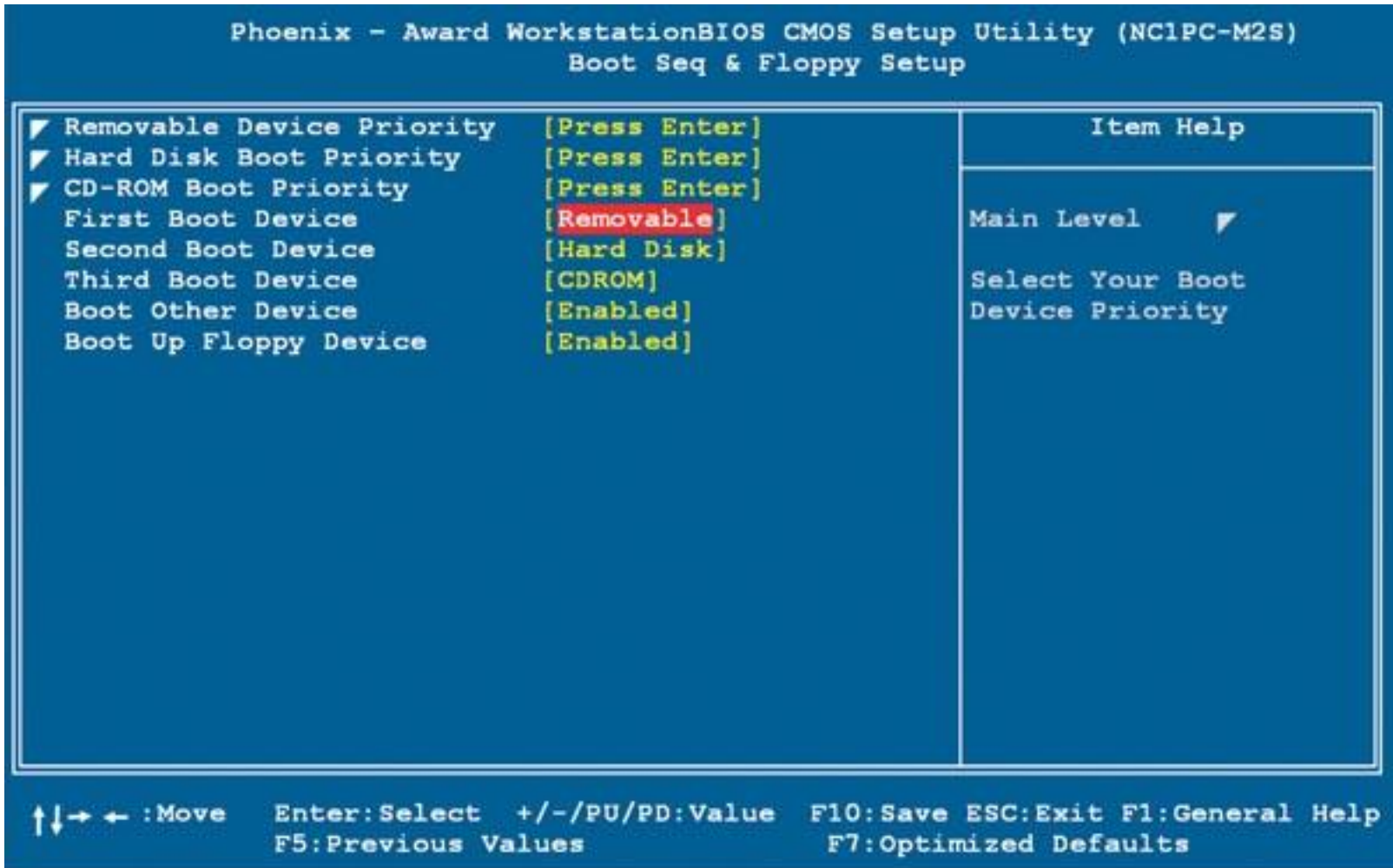
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Figure 7-6 Set the boot order in BIOS setup

Installations with Special Considerations

- Factory recovery partition
  - Some brand-name computers have hidden recovery partition
    - Contains a utility to create a recovery CD
    - Recovery CD must be created before drive failure
    - To access hidden partition, press a key during startup

Figure 7-7 Use the recovery utility on this laptop to create DVDs that can be used to recover the system in the event the hard drive fails

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Installations with Special Considerations

- Installation in a virtual computer
  - Virtual computer or virtual machine
    - Software simulating hardware of a physical computer
    - Allows installation and running of multiple operating systems at the same time on a PC
  - Reason to use a virtual machine
    - Train users, run legacy software, and support multiple operating systems
    - Can capture screen shots of boot process in a virtual machine

Installations with Special Considerations

- Popular virtual machine programs for Windows:
  - Virtual PC by Microsoft, VirtualBox by Oracle, and VMware by VMware INC.

- Windows XP Mode
  - Windows XP installation runs under Virtual PC
    - Can be installed on a Windows 7 Professional, Enterprise, or Ultimate computer

Choose the Type of Installation: In-Place Upgrade, Clean Install, or Dual Boot

- If hard drive is new, a clean install must be installed
- If an OS is already installed, you have three options
  - Clean install: overwrites the existing OS and applications
    - Advantage: get a fresh start
  - In-place upgrade: a Windows installation launched from the Windows desktop and keeps user settings and installed applications from the old OS
    - Requires qualifying OSs called upgrade paths
  - Dual boot: Can install Windows in a second partition
    - Need at least two partitions or a second hard drive

From OS	To OS
Vista Home Basic	Windows 7 Home Basic, Home Premium, or Ultimate
Vista Home Premium	Windows 7 Home Premium or Ultimate
Vista Business	Windows 7 Professional, Enterprise, or Ultimate
Vista Enterprise	Windows 7 Enterprise
Vista Ultimate	Windows 7 Ultimate
Windows 7 any edition	Can be repaired by performing an in-place upgrade of the same OS
Windows 7 Starter	Anytime Upgrade to Windows 7 Home Premium, Professional or Ultimate
Windows 7 Home Basic	Anytime upgrade to Windows 7 Home Premium, Professional or Ultimate
Windows 7 Premium	Anytime upgrade to Windows 7 Professional or Ultimate
Windows 7 Professional	Anytime upgrade to Windows 7 Ultimate

Table 2-4 In-place upgrade paths to Windows 7

Choose the Type of Installation: In-Place Upgrade, Clean Install, or Dual Boot

- Other tips to keep in mind:
  - A 64-bit version of Windows can only be upgraded to a 64-bit OS
  - A 32-bit OS can only be upgraded to a 32-bit OS
    - If you want to install a 64-bit version of Windows over a 32-bit OS, a clean install must be performed
  - Can only upgrade Windows Vista to Windows 7 after Vista Service Pack 1 or later has been installed

Understand the Choices You'll Make During the Installation

- Size of the Windows Partition
  - Each partition formatted with a file system and assigned a drive letter
    - Called a volume
  - decide whether to use all the available space on the drive
    - Reasons to use multiple volumes
      - Dual-boot system
      - Organize data on one drive and OS on the other
  - Windows can have up to four partitions

Understand the Choices You'll Make During the Installation

- Administrator Account
  - Every Windows computer has two local administrator accounts:
    - During installation – an account name and password can be entered to create a local user account that is assigned administrator privileges
    - A built-in administrator account is created by default (named Administrator)

Understand the Choices You'll Make During the Installation

- Network Configuration
  - Homegroup – each computer shares files, folders, libraries, and printers with other computers in the homegroup
    - Provides less security than a workgroup
    - new to Windows 7 (cannot be used with earlier versions)
  - Workgroup – each computer maintains a list of users and their rights on that particular PC
    - The computer allows a user access to local resources based on this file

Understand the Choices You'll Make During the Installation

- Network Configuration
  - Domain – a logical group of networked computers that share a centralized directory database of user account information and security for the entire group of computers
    - A type of client/server network
    - Active Directory: the directory database used by Windows Servers
    - During installation, you will need to know the domain name and computer name to use so that you can join the domain
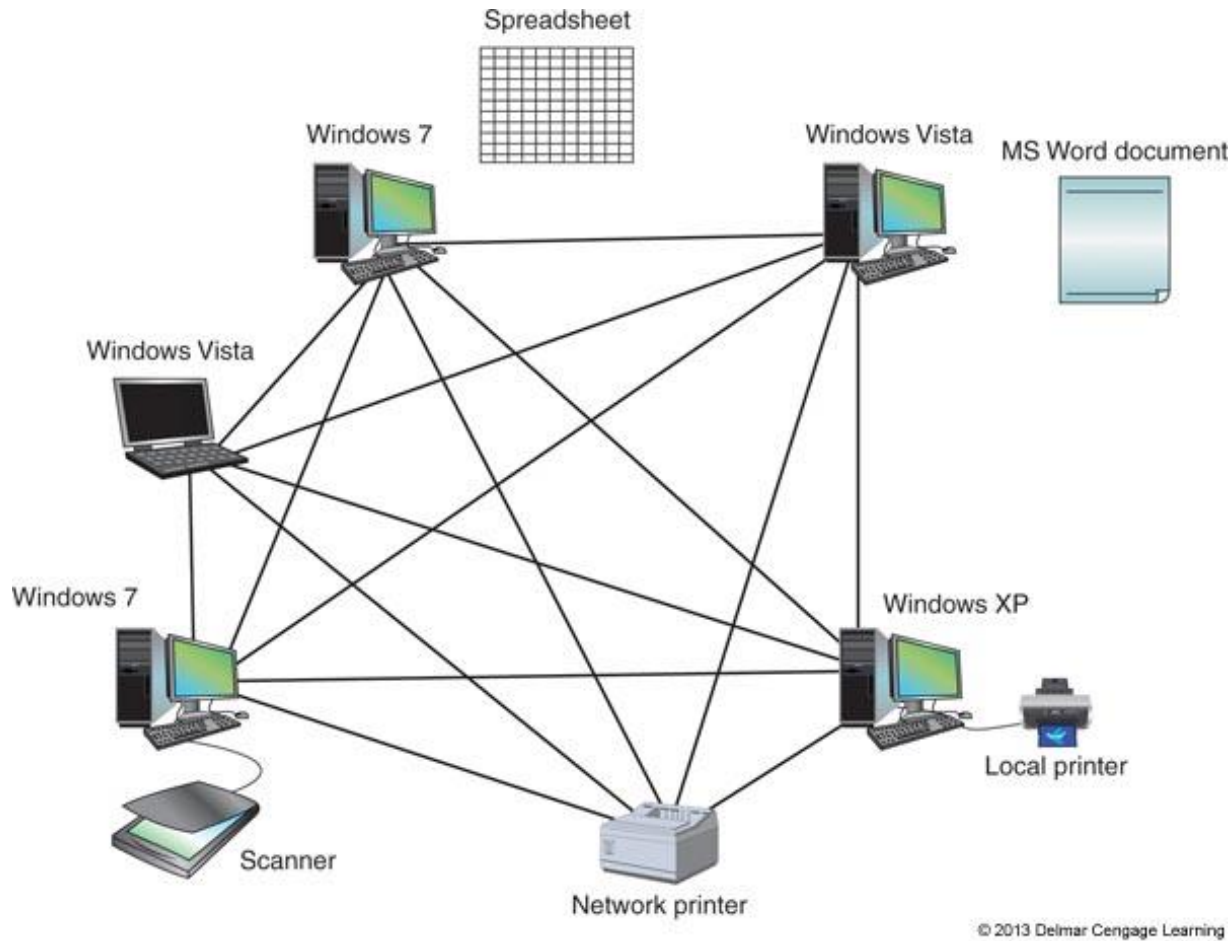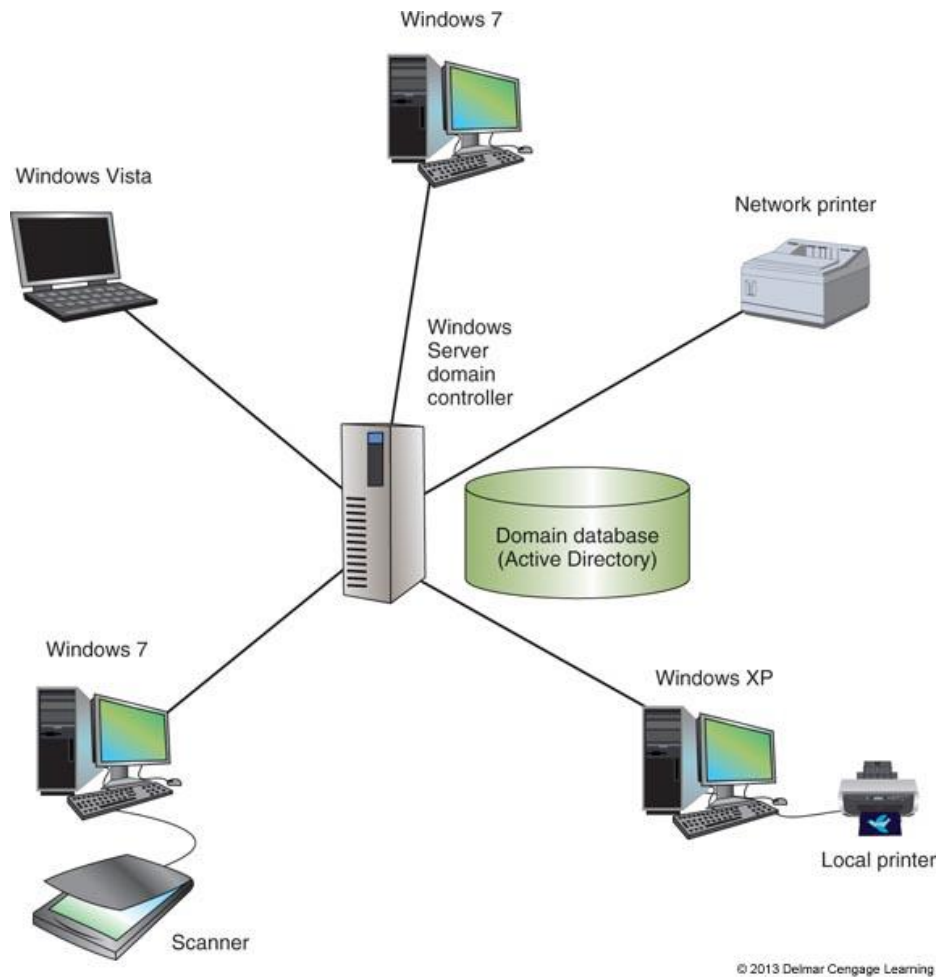
Figure 7-12 A Windows workgroup is a type of peer-to-peer network where no single computer controls the network and each computer controls its own resources.

Figure 7-13 A Windows domain is a type of client/server network where security on each PC or other device is controlled by a centralized database on a domain controller

Questions to Answer	Further Information
Does the PC meet the minimum or recommended hardware requirement?	CPU: RAM: Hard drive partition size: Free space on the partition:
Do you have in hand the Windows device drivers for your hardware devices and application setup CDs?	List hardware and software that need to be upgraded:
Do you have the product key available?	Product key:
How will users be recognized on the network?	Homegroup password: Workgroup name: Domain name: Computer name:
How will the PC be recognized on the network?	Static or dynamic IP addressing: IP address (for static addressing):
Will you do an upgrade or clean install?	Current operating system: Does the old OS qualify for an upgrade?

For a clean install, will you set up a dual boot?	List reasons for a dual boot:
	For a dual boot
	    Size of the second partition:
	    Free space on the second partition:

Have you backed up important data on your hard drive?	Location of backup:

Table 2-5 Checklist to complete before installing Windows

Final Checklist Before Beginning the Installation

- Verify all application software DVDs and device drivers are available

- Back up all important data

- If not reformatting the drive, run antivirus software to ensure the drive is free from malware

- Use BIOS setup to verify the boot sequence needed for installation

  - Also disable any virus protection setting that might prevent the boot area of the drive from being altered

- For laptops, use AC adapter so you don't run out of battery

Installing Windows 7

- Topics covered
  - Learn how to install Windows 7 as an:
    - In-place upgrade
    - Clean install
    - Dual boot

- Make sure you document what you did during the installation
  - Documentation might be helpful for future maintenance and troubleshooting

Steps to Performing a Windows 7 In-Place Upgrade

- Steps to upgrade from Vista to Windows 7
  - 1. Close applications
  - 2. Launch Windows 7 Setup
    - Click **Install** or Run **setup.exe**
  - 3. *Check compatibility* if you have not already done so
  - 4. Allow setup program to download updates
  - 5. Accept license agreement
  - 6. Select **Upgrade** for type of installation
  - 7. Setup will check for compatibility issues and will verify the upgrade path is valid

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Steps to Performing a Windows 7 In-Place Upgrade

- Steps to upgrade from Vista to Windows 7 (cont.)
  - 8. PC might reboot several times, will then ask for the product key to be entered
  - 9. You will be asked how to handle updates
    - It is suggested to **Use recommended settings**
  - 10. Verify the time and date settings are correct
  - 11. Select the network location
  - 12. Different options may appear at this step, depending on what you did in Step 11
  - 13. Windows Update downloads and installs updates and the system restarts

Steps to Perform a Clean Install or Dual Boot

- If no OS is installed on PC:

  – boot from Windows 7 DVD and choose Custom installation

- If an OS is already installed on PC:

  – Begin the installation from the Windows Desktop or by booting from Windows 7 DVD

- If installing a 64-bit OS when a 32-bit OS is already installed:

  – Must begin the installation by booting from the DVD

Steps to Perform a Clean Install or Dual Boot

- 1. When booting directly from Windows 7 DVD
  - Select language and click **Next**
- 2. Click **Install Now**
- 3. Accept license agreement
- 4. Choose **Custom (advanced)** for type of installation
- 5. List of partitions displayed
  - For a clean install, make selection and click **Next**
  - If performing a dual boot and need to create a partition, click **Drive options (advanced)**
    - Setup steps you through creating a new partition

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Steps to Perform a Clean Install or Dual Boot

- 6. Windows will ask for a username and computer name.

  – Click **Next** to get to the screen where you will enter a password

- 7. Installation will now continue in the same way as an upgrade

Steps to Perform a Clean Install or Dual Boot

- Boot with a dual boot
  - Boot loader menu automatically appears
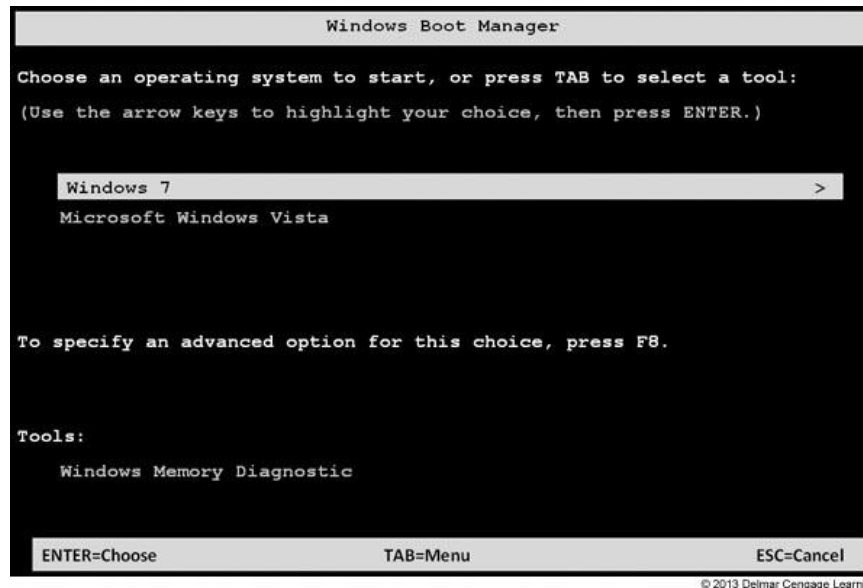   - Provides a selection for an operating system

Figure 7-28 Boot loader menu in a dual-boot environment

Use the Windows 7 Upgrade DVD on a New Hard Drive

- Sometimes you might need to use the upgrade DVD to install Windows 7 when replacing a hard drive
  - Setup expects that an old OS is installed if you use the upgrade DVD
- Solutions:
  - Reinstall Vista or Windows XP and install Windows 7 as an upgrade
  - Install Windows 7 twice
    - Use Windows 7 upgrade DVD to perform a clean install
      - Do not enter product key
    - Install Windows 7 again but this time as an upgrade

What to Do After A Windows Installation

- Verify network access

- Activate Windows

- Install Windows updates and service packs

- Verify automatic updates are set as you want them

- Install hardware

- Install applications, including antivirus software

- Set up user accounts and transfer (or restore) user data

- Turn Windows features on or off

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Verify That You Have Network Access

- To join the computer to a domain:
  - Right-click **Computer** and select **Properties** to bring up the System window
  - Scroll down to *Computer name, domain and workgroup settings* – Click **Change settings**
  - Click **Network ID** and follow directions on-screen
- If not connecting to a network:
  - Use the Network and Sharing Center to try to resolve the problem

Activate Windows 7

- Microsoft requires product activation
  - Ensures a valid Windows license has been purchased
  - You have 30 days after installation to activate
- To activate Windows 7:
  - Click the **Start** button and enter **activate** in the *Search* box
  - Windows Activation window opens
  - Click **Activate Windows online now**

Install Windows Updates and Service Packs

- To download and apply updates:
  - Click **Start**, **All Programs**, and **Windows Update**
  - Windows Update window will appear and will display a message if updates are available
  - Click **important updates** to get a list of updates available
  - Select the ones you want to install
    - May not always list the ones needed the first time
    - May take 2-3 passes to get the PC entirely up to date

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Configure Automatic Updates

- During installation, you chose how you want to handle Windows updates

- To verify or change this setting:
  - Click **Change settings** in the left pane of the Windows Update window
  - Recommended setting is to allow Windows to automatically download and install updates daily
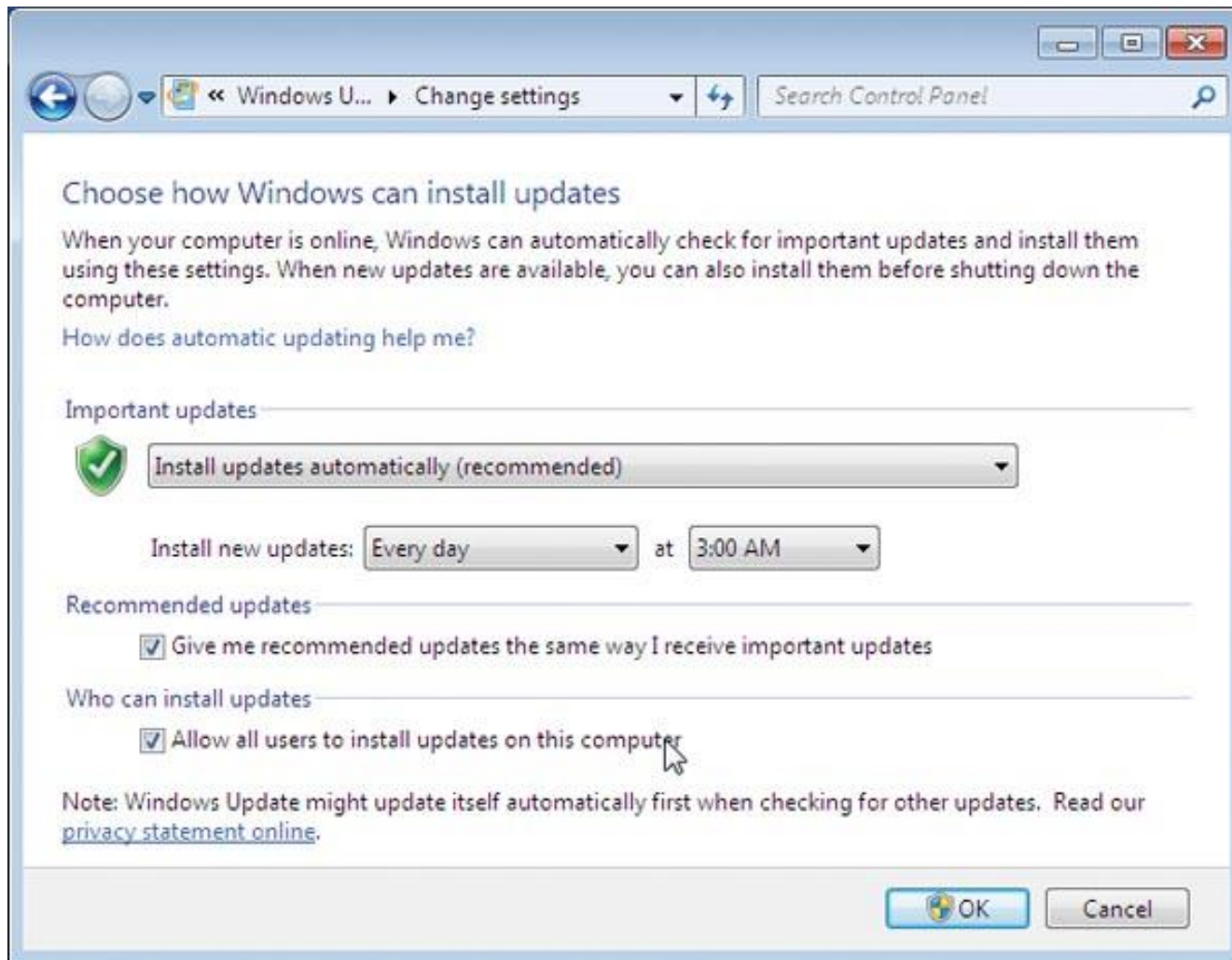
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Figure 7-34 Manage how and when Windows is updated

Install Hardware

- Devices that were not automatically installed during the installation must be installed

- As you install each device, reboot and verify operation before moving on to next device

- You may need to:
  - Install drivers for the motherboard
  - Install drivers that cam with any video cards
  - Install the printer
  - For other hardware devices, read and follow manufacturer directions

Install Hardware

- Device Manager: the primary Windows tool for managing hardware

  - You can disable or enable a device, update its drivers, uninstall a device, and undo a driver update

- Problems with Legacy Devices

  - If the driver does not load correctly or gives errors, try searching the Internet for a Windows 7 driver

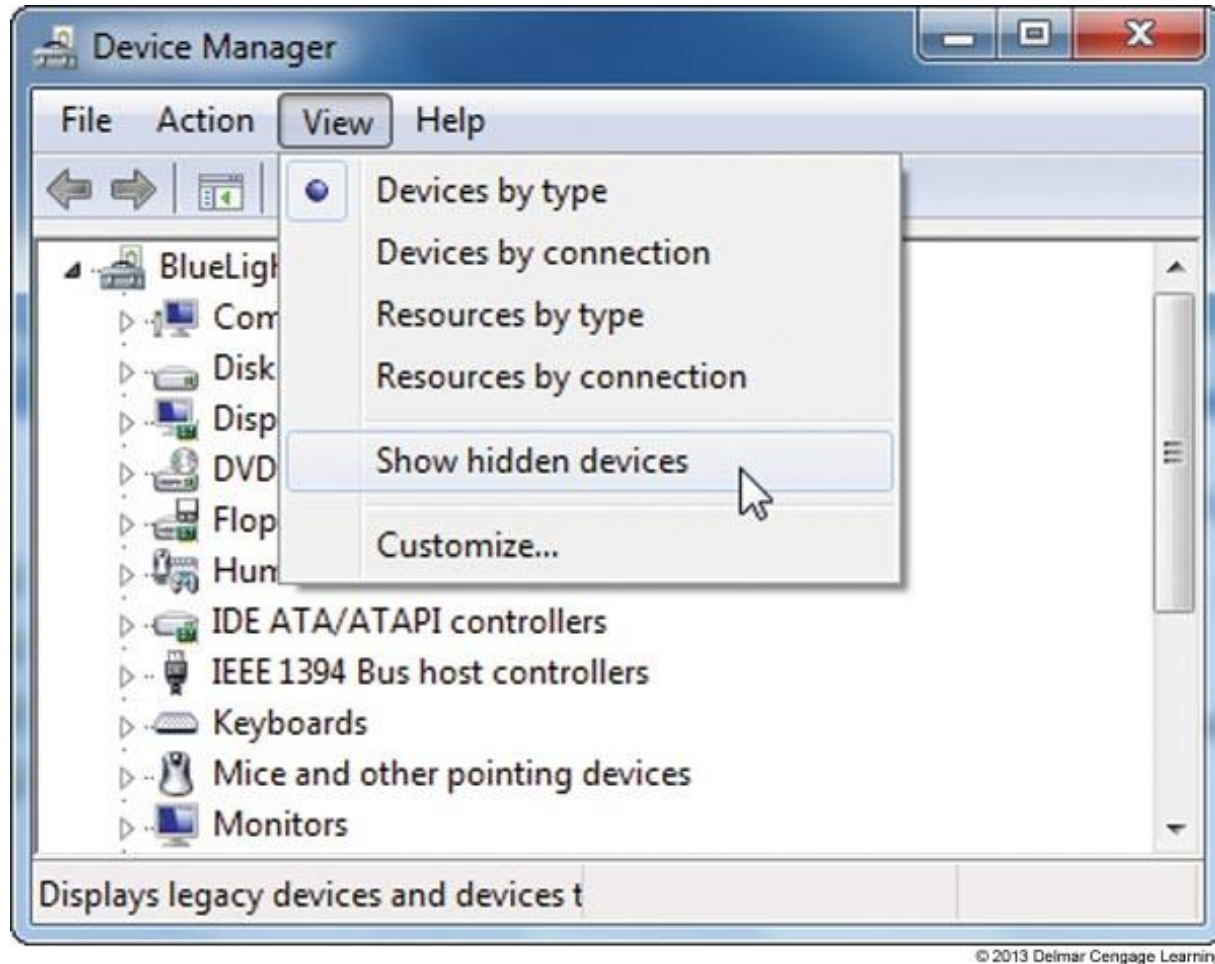 - If you don't find one, run Vista driver installation program in compatibility mode

Figure 7-41 By default, Windows does not display legacy drivers in Device Manager; you show these hidden devices by using the View menu

Install Applications

- Follow installation instructions for each application that needs to be installed

- Be sure to install antivirus software

- After an application is installed, check to see if any updates are available for the application

- If you need to uninstall an application, open Control Panel and click **Uninstall a program**
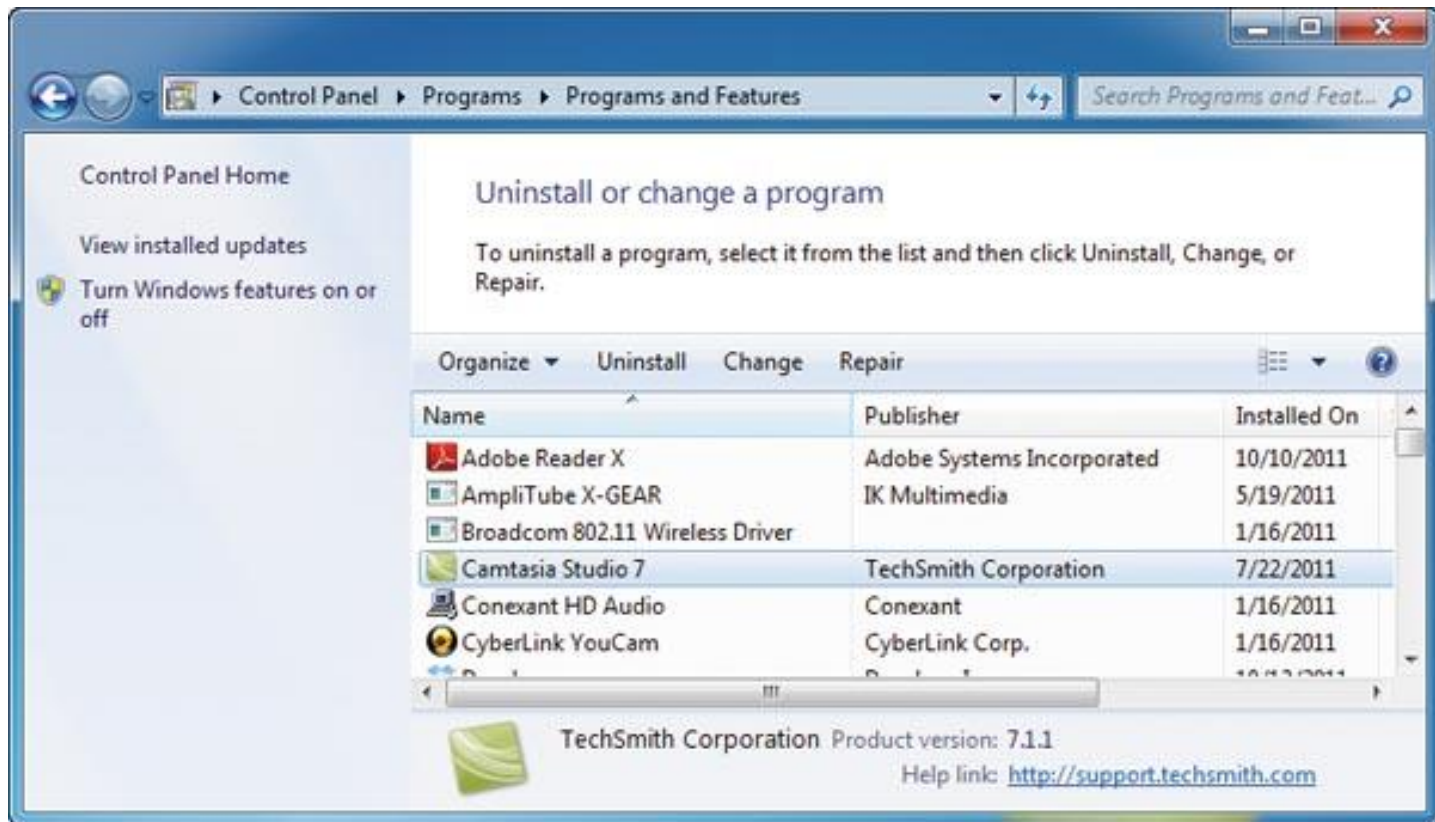
Figure 7-46 Select a program from the list to view your options to manage the software

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Set Up User Accounts and Transfer User Data

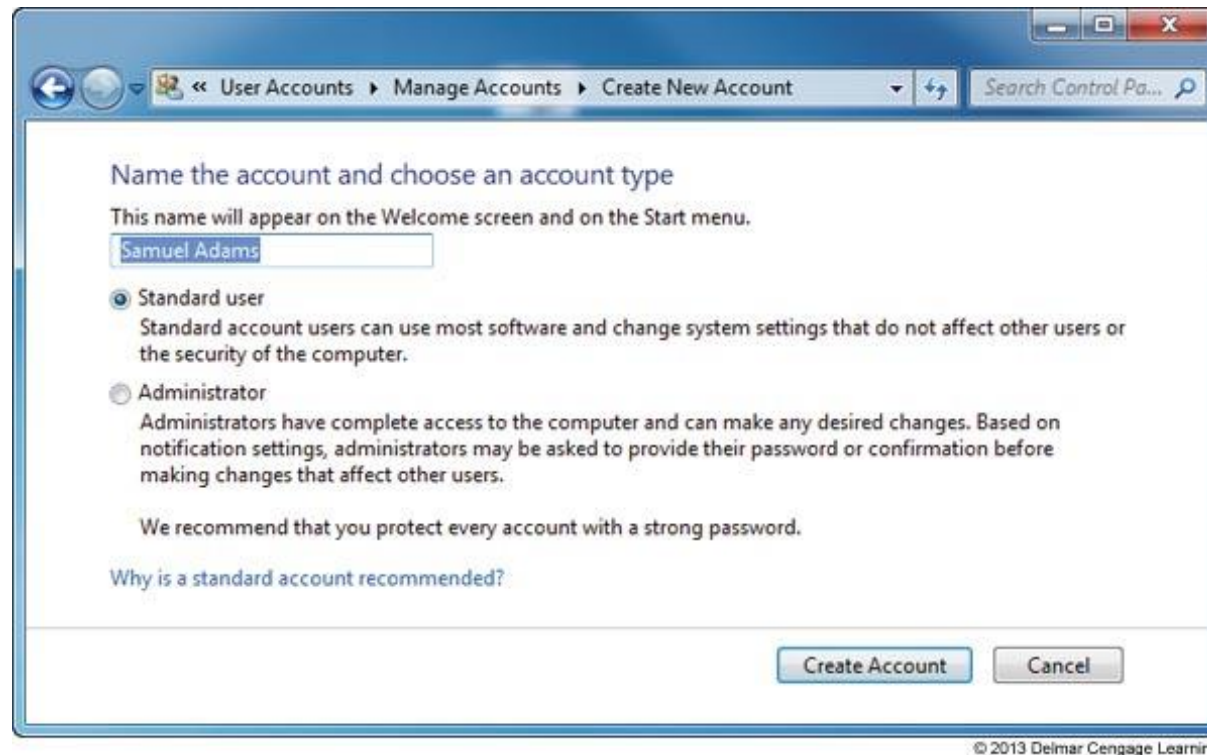- Use Control Panel to add or remove user accounts

Figure 7-47 Decide the privilege level for the new account

Turn Windows 7 Features On or Off

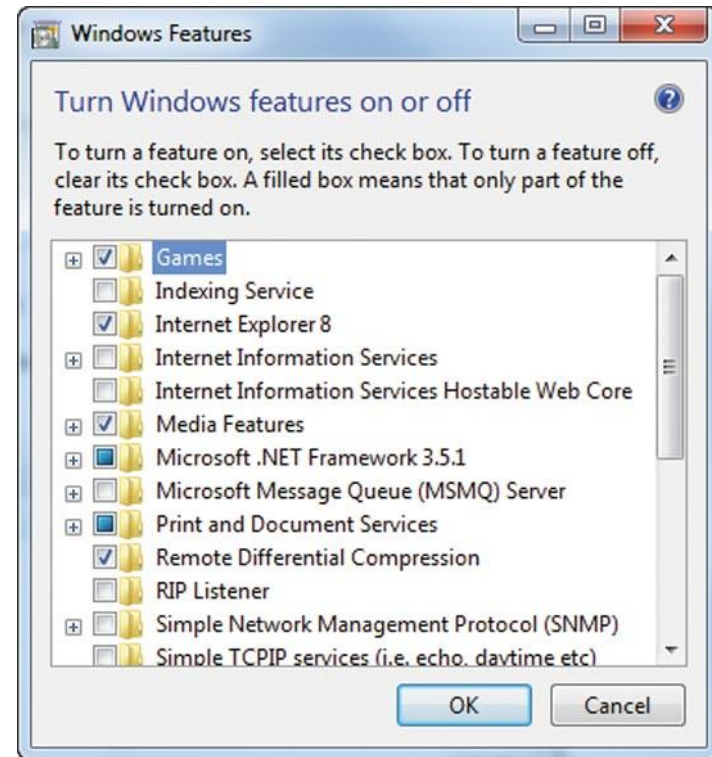- Save on system resources by turning off Windows features you will not use

Figure 7-48 Turn Windows features on or off

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Deployment Strategies for Windows 7

- Deployment strategy: a procedure to install Windows, device drivers, and applications on a computer

  - Can include the process to transfer user settings, application settings, and user data files from an old installation to the new installation

- A deployment strategy is essential when supporting large corporations with hundreds of computers

- Microsoft suggest four deployment strategies based on the number of computers to be deployed

Deployment Strategies for Windows 7

- High-Touch with Retail Media (recommended for fewer than 100 computers)
  - All work is done by a technician sitting at the computer
  - Copy setup files on setup DVD to a file server and share the folder
  - Server used in this way is called a **distribution server**
  - Use Windows 7/Vista Easy Transfer to transfer user settings and user data
  - User State Migration Tool (USMT) – command-line tool that can be used in a domain environment

Deployment Strategies for Windows 7

- High-Touch with Standard Image (recommended for 100-200 computers)
  - Drive-imaging software is used to clone the entire hard drive to another bootable media (process is called **drive imaging** or **disk cloning**)
  - Can use tools in **Windows Automated Installation Kit (AIK)** or third-party software
  - Installing a standard image on another computer is called **image deployment**
  - Takes longer for initial setup but les time to install on each computer

Deployment Strategies for Windows 7

- Lite-Touch High Volume Deployment (recommended for 200-500 computers)
  - Uses a deployment server on the network to serve up the installation after a technician starts the process
  - Files in installation include Windows, device drivers and applications (called the distribution share)
  - Technicians boot the computer to Windows PE
    - Windows Preinstallation Environment is a minimum OS
    - Can be installed on a USB drive
  - Responses to prompts are stored in an answer file so a technician is not required to sit through installation

Deployment Strategies for Windows 7

- Lite-Touch High Volume Deployment (continued)
  - USMT is then used to transfer user settings, application settings, and user data
  - **Microsoft Assessment and Planning (MAP) Toolkit**
    - Can be used to query hundreds of computers in a single scan
    - Automatically examines hardware and applications on each computer to verify compatibility with Windows 7

Deployment Strategies for Windows 7

- Zero-Touch, High-Volume Deployment (recommended for more than 500 computers)
  - Most difficult to set up and requires complex tools
  - Uses a push automation
    - A server automatically pushes the installation to a computer when a user is not likely to be sitting at it
  - Automated with no user intervention required
  - Can turn on a computer that is turned off and even works on when no OS is installed

Using the USMT Software

- General steps to use USMT:
  - Download and install AIK software on a technician's computer
  - Copy the USMT program files from technician's computer to source computer
  - Run the scanstate command on source to copy user files and settings to a file server
  - Install Windows 7, device drivers, and applications on the destination computer
  - Run the loadstate command to apply user files and settings from the file server to the destination computer

Summary

- Planning requires many decisions
  - Purchase options, versions, 32-bit or 64-bit, hardware requirements, installation method, and network issues (user accounts, workgroup vs. domain)
- Windows 7 installation choices
  - Upgrade, clean install, or dual boot
  - Also need to know how to install Windows on a new hard drive using an upgrade license
  - Vista installation works the same as a Windows 7 installation

Summary

- After installation
  - Verify network access, activate Windows, install any Windows updates or service packs, verify automatic updates is configured correctly, install hardware and applications, create user accounts, and turn Windows features on or off

- When working in a Large Enterprise
  - Four deployment strategies are recommended
    - High-touch with retail media, high-touch with a standard image, lite-touch with high volume, and zero-touch with high volume