Chapter 1

Windows 10 Installation

MICROSOFT EXAM OBJECTIVES COVERED IN THIS CHAPTER:

✓ **Prepare for installation requirements.**

- This objective may include but is not limited to the following subobjectives: Determine hardware requirements and compatibility; choose between an upgrade and a clean installation; determine appropriate editions according to device type; determine requirements for particular features, such as Hyper-V, Cortana, Miracast, Virtual Smart Cards, and Secure Boot; determine and create appropriate installation media.

✓ **Install Windows.**

- This objective may include but is not limited to the following subobjectives: Perform clean installations, upgrade using Windows Update, upgrade using installation media, migrate from previous versions of Windows, install on bootable USB, configure Windows for additional regional and language support.

✓ **Configure updates.**

- This objective may include but is not limited to the following subobjectives: Configure Windows Update options; implement Insider Preview, Current Branch (CB), Current Branch for Business (CBB), and Long Term Servicing Branch (LTSB) scenarios; manage update history; roll back updates; update Windows Store apps.

This book is for exam 70-698, and even though it's a higher exam number, this is the first of two MCSA Windows 10 exams (70-698 and 70-697). If you are using both of the Sybex books for the Windows 10 MCSA, you will notice that many of the topics in these books are the same in both books. The reason for this is that no matter what test you take, installing Windows 10 is the same. It has the same control panel, the same applications, and the same way to configure the operating system.

So let me be the first to welcome you to Windows 10 and the beginning of a new journey. But as with the start of any journey, we must take our first steps. The first steps for this exam involves learning about the Windows 10 installation process. It is important that you understand the different versions of Windows 10 and which one is right for you and your organization.

In this chapter, I will show you the many different features of Windows 10 and then I will describe each edition. I will then show you how to install Windows 10 and also how to do an upgrade from a previous version.

Before you can install Windows 10, you must first make sure your hardware meets the minimum requirements and that your hardware is supported by the operating system. After we install the Windows 10 operating system, I will show you how to get upgrades for the Windows 10 system.

Understanding the Basics

Microsoft Windows 10 is the latest version of Microsoft's client operating system software. Windows 10 combines the best of Windows 7 and Windows 8, and it also makes it much easier to work within the cloud.

Microsoft has currently released six different versions of the Windows 10 operating system along with the announcement of a seventh:

- Windows 10 Home
- Windows 10 Professional
- Windows 10 Enterprise
- Windows 10 Education
- Windows 10 Mobility
- Windows 10 Mobility Enterprise
- Windows 10 Anniversary Edition

> **NOTE** At the time this book was written, Windows 10 Anniversary Edition had not been released yet. Microsoft has stated that this version will be released by the end of 2016.

Microsoft also offers a slimmed-down version of some of these operating systems called "Windows 10 IoT Core." This version is one of the above Windows 10 versions that doesn't require a monitor or system. For example, you are building a toy robot and you want to load Windows 10 into his core computer. You can use the IoT versions to run the robot's functionality.

Windows 10 has been improved in many of the weak areas that plagued Windows 8. Windows 10 has a much faster boot time and shutdown compared to Windows 8. It also brings back the - Start button that we are all so familiar with from previous editions.

The Windows 10 operating system functions are also faster than their previous counterparts. The processes for opening, moving, extracting, compressing, and installing files and folders are more efficient than they were in previous versions of Microsoft's client operating systems.

Let's take a look at some of the features of each Windows 10 edition (this is just an overview of some of the benefits to using Windows 10). Table 1.1 shows some of the "core experiences" for each edition.

> **NOTE** Two of the versions listed previously, Windows 10 Mobility and Windows 10 Mobility Enterprise, will not be covered in great detail in this book. If you go to Microsoft's website, you will see both listed and you can see what each offers. But neither of them can be put onto a network, so I don't cover them in this book unless applies to an exam objective.

TABLE 1.1   Windows 10 core experiences

Feature	Home	Pro	Enterprise	Education
Battery saver	•	•	•	•
Built-in ink support	•	•	•	•
Cortana integration	•	•	•	•
Customizable Start Menu	•	•	•	•
Enterprise-level biometric security	•	•	•	•
Fast startup with Hiberboot and InstantGo	•	•	•	•
"Hey Cortana" hands-free activation	•	•	•	•
Native facial and iris recognition	•	•	•	•
Native fingerprint recognition	•	•	•	•

TABLE 1.1 Windows 10 core experiences *(continued)*

Feature	Home	Pro	Enterprise	Education
Personal and proactive suggestions	•	•	•	•
Reading view	•	•	•	•
Reminders	•	•	•	•
Search web, device, and cloud	•	•	•	•
Snap apps (across screens on different monitors)	•	•	•	•
Snap assist (up to four apps on one screen)	•	•	•	•
Switch from PC to tablet mode	•	•	•	•
Talk or type naturally	•	•	•	•
TPM support	•	•	•	•
Virtual desktops	•	•	•	•
Windows Defender and Windows Firewall	•	•	•	•
Windows Update	•	•	•	•

NOTE The information in Table 1.1 and Table 1.2 was taken directly from Microsoft's website.

Now that we've looked at some of the Windows 10 core experiences, let's take a look at the business side. Table 1.2 shows each edition and what some of the "Business Experiences" are for those editions.

TABLE 1.2 Windows 10 business experiences

Feature	Home	Pro	Enterprise	Education
Ability to join Azure Active Directory		•	•	•
AppLocker			•	•
Assigned Access 8.1		•	•	•

Feature	Home	Pro	Enterprise	Education
BitLocker		•	•	•
BranchCache			•	•
Client Hyper-V		•	•	•
Credential Guard			•	•
Current Branch for Business		•	•	•
Device Encryption	•	•	•	•
Device Guard			•	•
Direct Access			•	•
Domain Join		•	•	•
Easy Upgrade from Home to Education Edition	•	•		•
Easy Upgrade from Pro to Enterprise Edition		•	•	
Enterprise Data Protection		•	•	•
Enterprise Mode Internet Explorer (EMIE)		•	•	•
Granular UX Control			•	•
Group Policy Management		•	•	•
Long Term Servicing Branch			•	
Microsoft Passport	•	•	•	•
Mobile device management	•	•	•	•
Remote Desktop		•	•	•
Side-loading of line-of-business apps	•	•	•	•
Start Screen Control with Group Policy			•	•
Trusted Boot		•	•	•
Windows Store for Business		•	•	•

TABLE 1.2   Windows 10 business experiences *(continued)*

Feature	Home	Pro	Enterprise	Education
Windows To Go Creator			•	•
Windows Update	•	•	•	•
Windows Update for Business		•	•	•

Windows 10 Features

Now that we have seen which editions contain which features, let's take a look at some of the Windows 10 features in greater detail. This section describes only a few of these features, but all features will be explained throughout this book.

Cortana Integration   Windows 10 comes with Cortana integration. Cortana is your very own personnel assistant. You can type in or ask Cortana a question, and Cortana will seek out the best possible answer based on your question.

Secure Boot   Windows 10 gives you the ability to use hardware-based virtualization that allows Windows 10 to prevent malware from running on your system. Windows 10 Secure Boot also prevents key processes from being tampered with because Windows 10 isolates these processes from the system.

Virtual Smart Cards   Windows 10 has started offering a new way to do two-factor authentication with virtual smart cards. Virtual smart cards help an IT department that doesn't want to invest in extra hardware and smart cards. Virtual smart cards use Trusted Platform Module (TPM) devices that allow for the same capabilities as physical smart cards with the physical hardware.

Miracast   Windows 10 allows you to project your Windows 10 laptop or mobile device to a projector or television. Miracast allows you to connect to an external device through the use of your mobile wireless display (WiDi) adapter.

Hyper-V   Windows 10 (except Home version) come with Hyper-V built into the operating system. Hyper-V is Microsoft's version of a virtual server.

Enterprise Data Protection   Windows 10 Enterprise Data Protection (EDP) helps protect corporate data in a world that is increasingly becoming a Bring Your Own Device (BYOD) environment. Since many organizations are allowing employees to connect their own devices to their network, the possibility of corporate data being compromised because of non-corporate programs running on these personnel devices is increasing. For example, many third-party apps may put corporate data at risk by accidently disclosing corporate information through the application.

Enterprise Data Protection helps protect information by separating corporate applications and corporate data from being disclosed by personal devices and personal applications.

Device Guard   Because employees can use multiple types of Windows 10 devices (Surface Pros, Windows Phones, and Windows 10 computer systems), Device Guard is a feature that helps guarantee that only trusted applications will run on any of these devices.

Device Guard uses both hardware and software security features to lock down a device so it can run only trusted and approved applications. This also helps protect against hackers running malicious software on these devices.

Microsoft Passport   Windows 10 allows administrators to replace passwords with other types of authentication on the operating system. Microsoft Passport allows for multifactor authentication by using a combination of an enrolled device and biometric authentication or a personal identification number (PIN).

Microsoft has encompassed the use of your Microsoft account with the use of your corporate account. So with Windows 10, Microsoft Passport can log you into your domain as well as into the cloud and Microsoft websites. The user will be required to verify their Microsoft Passport account, and that account will then be tied into a gesture or PIN, and from that point on, the user will not need to use a password to log in to the device and their protected resources. Because no password will be needed, this helps prevent hackers from using software to hack a password on an account.

Start Menu   Windows 10 has brought back the Start menu that users are familiar with. The Windows 10 Start menu combines the best of both Windows 7 and Windows 8. So the Start menu gives you a menu that we were familiar with in Windows 7 as well as the Live Tiles that users liked in Windows 8.

Microsoft Edge and Internet Explorer 11   Windows 10 has introduced a new way to surf the Internet with Microsoft Edge. But Windows 10 also still comes with Internet Explorer 11 in the event that you need to run ActiveX controls or run backward-compatible web services or sites.

Microsoft Edge allows users to start using many new Microsoft features, including Web Note (allows you to annotate, highlight, and call things out directly on web pages), Reading View (allows you to print and save as a PDF for easy reading), and Cortana (personal assistant).

Domain Join and Group Policy   Depending on the version of Windows 10 that you are using, administrators have the ability to join Windows 10 clients to either a corporate version of Active Directory or a cloud-based version of Azure Active Directory.

Windows Store for Business   Microsoft Store has included many applications that allow users to get better functionality and productivity out of their Windows 10 devices. One advantage for corporations is that they can create their own applications and load them into the Microsoft Store for users to download (called *sideloading*).

Mobile Device Management   Mobile Device Management (MDM) allows administrators to set up Windows 10 policies that can integrate many corporate scenarios, including the ability to control users' access to the Windows Store and the ability to use the corporate VPN. MDM also allows administrators to manage multiple users who have accounts set up on Microsoft Azure Active Directory (Azure AD). Windows 10 MDM support is based on the Open Mobile Alliance (OMA) Device Management (DM) protocol 1.2.1 specification.

Windows Feature Deprecation

With the release of its newest operating system, Microsoft has decided that some of the features you may be used to are no longer needed. Here are some of the features that have been deprecated:

- Windows 7 desktop gadgets will be removed as part of Windows 10.

- The Solitaire, Minesweeper, and Hearts games that come preinstalled on Windows 7 will be removed. Microsoft has released versions of Solitaire and Minesweeper called the "Microsoft Solitaire Collection" and "Microsoft Minesweeper."

- Mobile Device Management functionality will not be available in Windows 10 Home edition.

- Users with floppy drives will need to download the latest driver from Windows Update or from the manufacturer's website.

- Users who have Windows Live Essentials installed on their systems will lose the One-Drive application, which will be replaced with the inbox version of OneDrive.

- OneDrive will no longer support placeholder files in Windows 10. Windows 10 users can choose which folders they want to sync from OneDrive settings.

- When upgrading Windows 10 from previous versions of Windows operating systems that support Media Center, Windows Media Center will be removed. For a limited time on systems that were upgraded to Windows 10 from one of these versions of Windows, a DVD playback app, Windows DVD Player, will be installed. If the Windows DVD Player does not install immediately, it will be installed after the first successful Windows update.

Windows 10 Architecture

Windows 10 has limited the number of files that load at system startup to help with the core performance of the operating system. Microsoft has also removed many of the fluff items that Windows Vista used, allowing for better performance.

Microsoft offers both a 32-bit version and a 64-bit version of Windows 10. The terms *32-bit* and *64-bit* refer to the CPU, or processor. The number represents how the data is processed. It is processed either as 2^{32} or 2^{64}. The larger the number, the larger the amount of data that can be processed at any one time.

To get an idea of how 32-bit and 64-bit processors operate, think of a large highway with 32 lanes. Vehicles can travel on those 32 lanes only, so when traffic gets backed up, the result is delays. Now think of how many more vehicles can travel on a 64-lane highway. The problem here is that a 32-lane highway can't handle the number of vehicles a 64-lane highway can. You need to have the infrastructure to allow for that volume of vehicles. The same is true for computers. Your computer has to be configured to allow you to run a 64-bit processor.

So what does all of this mean to the common user or administrator? It's all about random access memory, or RAM. A 32-bit operating system can handle up to 4 GB of RAM, and a 64-bit processor can handle up to 16 exabytes of RAM. None of this is new. Although 64-bit processors are just starting to get accepted with Windows systems, other operating systems, such as Apple, have been using 64-bit processors for many years.

Computer processors are typically rated by speed. The speed of the processor, or central processing unit (CPU), is rated by the number of clock cycles that can be performed in 1 second. This measurement is typically expressed in gigahertz (GHz). One GHz is one billion cycles per second. Keep in mind that processor architecture must also be taken into account when considering processor speed. A processor with a more efficient pipeline will be faster than a processor with a less-efficient pipeline at the same CPU speed.

Now that you have seen the new features of Windows 10, let's look at how to prepare the machine to install Windows 10.

Preparing to Install Windows 10

Installing Windows 10 can be relatively simple because of the installation wizard. The installation wizard will walk you through the entire installation of the operating system.

The most difficult part of installing Windows 10 is preparing and planning for the installation. One thing I often say to IT professionals is, "An hour of planning will save you days of work." Planning a Windows 10 rollout is one of the hardest and most important tasks that you will perform when installing Windows 10.

There are many decisions that should be made before you install Windows 10. The first decision is which version of Windows 10 you want to install. As mentioned previously, Microsoft has six different versions of the Windows 10 operating system. This allows an administrator to custom-fit a user's hardware and job function to the appropriate version of Windows 10. Many times, Microsoft releases multiple editions of the operating system contained within the same Windows 10 media disk. You can choose to unlock the one you want based on the product key you have. Let's take a closer look at the different versions of Windows 10.

In this book, we will not talk much about Windows 10 Education. Windows 10 Education is the counterpart to Windows 10 Enterprise, but it is a volume-licensed version of Windows 10 that is specifically priced for educational institutions. Educational institutions receive the same Enterprise functionality, but they pay much less than a corporation.

Windows 10 Home

Windows 10 Home is the main operating system for home users. Windows 10 Home offers many features, including these:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- Microsoft Passport
- HomeGroup, which allows a user to easily share media, documents, and printers across multiple PCs in homes or offices without the need of a domain
- Improved Taskbar and Jump Lists (Jump Lists is a feature in Windows 10 that allows you to quickly access files that you have been working on.)
- Live thumbnail previews and an enhanced visual experience
- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- View Available Networks (VAN) (Windows 10 by default has the ability, when you use a wireless network adapter, to choose the wireless network that you want to connect to by using the wireless network adapter properties.)
- Device Encryption
- Easy networking and sharing across all your PCs and devices
- Windows Update
- Multitouch
- Improved handwriting recognition

Windows 10 Professional

Windows 10 Professional is designed for small-business owners. Microsoft designed Windows 10 Professional for users to get more done and safeguard their data. Professional offers the following features:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- Microsoft Passport
- Domain Join
- Improved Taskbar and Jump Lists
- Enterprise Mode Internet Explorer (EMIE)
- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- View Available Networks (VAN) (Windows 10 by default has the ability, when you use a wireless network adapter, to choose the wireless network that you want to connect to by using the wireless network adapter properties.)

- Mobility Center
- Action Center, which makes it easier to resolve many IT issues yourself
- Easy networking and sharing across all your PCs and devices
- Group Policy Management
- Windows Update and Windows Update for Business
- Multitouch
- Improved handwriting recognition
- Domain Join, which enables simple and secure server networking
- BitLocker, which protects data on removable devices
- Device Encryption
- Encrypting File System, which protects data
- Client Hyper-V
- Location Aware Printing, which helps find the right printer when moving between the office and home
- Start menu that includes Live Tiles

Windows 10 Enterprise

Windows 10 Enterprise is the version designed for midsize and large organizations. This operating system has the most features and security options of all Windows 10 versions. Here are some of the features:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- Microsoft Passport
- Enterprise Mode Internet Explorer (EMIE)
- Group Policy Management
- Windows Update and Windows Update for Business
- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- View Available Networks (VAN) (Windows 10 by default has the ability, when you use a wireless network adapter, to choose the wireless network that you want to connect to by using the wireless network adapter properties.)
- Mobility Center
- Easy networking and sharing across all your PCs and devices
- Multitouch
- Start menu that includes Live Tiles

- Improved handwriting recognition

- Domain Join, which enables simple and secure server networking

- Device Encryption

- Encrypting File System, which protects data

- Location Aware Printing, which helps find the right printer when you are moving between the office and home

- Client Hyper-V

- Credential Guard

- Device Guard

- BitLocker, which protects data on removable devices

- DirectAccess, which links users to corporate resources from the road without a virtual private network (VPN)

- BranchCache, which makes it faster to open files and web pages from a branch office

- AppLocker, which restricts unauthorized software and also enables greater security hardware requirements

Before you can install the operating system, you must make sure the machine's hardware can handle the Windows 10 operating system.

To install Windows 10 successfully, your system must meet or exceed certain hardware requirements. Table 1.3 lists the minimum requirements for a Windows 10–capable PC.

TABLE 1.3 Hardware requirements

Component	Requirements
CPU (processor)	1 GHz or faster processor or system-on-a-chip (SoC)
Memory (RAM)	1 GB for 32-bit or 2 GB for 64-bit
Hard disk	16 GB for 32-bit OS or 20 GB for 64-bit OS
Video adapter	DirectX 9 or later with WDDM 1.0 driver
Optional drive	DVD-R/W drive
Network device	Compatible network interface card

The hardware requirements listed in Table 1.3 are those specified at the time this book was written. Always check the Microsoft website for the most current information.

The Windows 10–capable PC must meet or exceed the basic requirements to deliver the core functionality of the Windows 10 operating system. These requirements are based on the assumption that you are installing only the operating system, without any premium functionality. For example, you may be able to get by with the minimum requirements if you are installing the operating system just to learn the basics of the software. Remember, the better the hardware, the better the performance.

Real World Scenario

Deciding on Minimum Hardware Requirements

The company you work for has decided that everyone will have their own laptop running Windows 10. You need to decide on the new computers' specifications for processor, memory, and disk space.

The first step is to determine which applications will be used. Typically, most users will work with an email program, a word processor, a spreadsheet application, presentation software, and maybe a drawing or graphics program. Additionally, an antivirus application will probably be used. Under these demands, a 1 GHz Celeron processor and 1 GB of RAM will make for a very slow-running machine. So for this usage, you can assume that the minimum baseline configuration would be higher than a 1 GHz processor with at least 2 GB of RAM.

Based on your choice of baseline configuration, you should then fit a test computer with the applications that will be used on it and test the configuration in a lab environment simulating normal use. This will give you an idea of whether the RAM and processor calculations you have made for your environment are going to provide a suitable response.

Today's disk drives have become capable of much larger capacity while dropping drastically in price. So for disk space, the rule of thumb is to buy whatever is the current standard. At the time this book was written, 500 GB drives were commonplace, which is sufficient for most users. If users plan to store substantial graphics or video files, you may need to consider buying larger-than-standard drives.

Also consider what the business requirements will be over the next 12 to 18 months. If you will be implementing applications that are memory or processor intensive, you may want to spec out the computers with hardware sufficient to support upcoming needs to avoid costly upgrades in the near future.

The requirements for the graphics card depend on the resolution at which you want to run. The required amount of memory is as follows:

- 64 MB is required for a single monitor at a resolution of 1,310,720 pixels or less, which is equivalent to a 1280×1024 resolution.

- 128 MB is required for a single monitor at a resolution of 2,304,000 pixels or less, which is equivalent to a 1920×1200 resolution.
- 256 MB is required for a single monitor at a resolution larger than 2,304,000 pixels.

Measurement Used for Disk Space and Memory

Hard disks are commonly rated by capacity. The following measurements are used for disk space and memory capacity:

- 1 MB (megabyte) = 1,024 KB (kilobytes)
- 1 GB (gigabyte) = 1,024 MB
- 1 TB (terabyte) = 1,024 GB
- 1 PB (petabyte) = 1,024 TB
- 1 EB (exabyte) = 1,024 PB

If you are not sure if your machine meets the minimum requirements, Microsoft includes some tools that can help you determine if a machine is Windows 10 compatible, which we will look at in the following sections.

The Hardware Compatibility List

Along with meeting the minimum requirements, whenever possible your hardware should appear on the *Hardware Compatibility List (HCL)*. The HCL is an extensive list of computers and peripheral hardware that have been tested with the Windows 10 operating system. To determine if your computer and peripherals are on the HCL, check the most up-to-date list at `https://msdn.microsoft.com/en-us/library/windows/hardware/dn922588(v=vs.85).aspx`.

The Windows 10 operating system requires control of the hardware for stability, efficiency, and security. The hardware and supported drivers on the HCL have been put through rigorous tests to ensure their compatibility with Windows 10. Microsoft guarantees that the items on the list meet the requirements for Windows 10 and do not have any incompatibilities that could affect the stability of the operating system.

If you call Microsoft for support, the first thing a Microsoft support engineer will ask about is your configuration. If you have any hardware that is not on the HCL, you may not be able to get support from Microsoft.

BIOS Compatibility

Before you install Windows 10, you should verify that your computer has the most current BIOS. This is especially important if your current BIOS does not include support for Advanced Configuration and Power Interface (ACPI) functionality. ACPI functionality is required for Windows 10 to function properly. Check the computer vendor's website for the latest BIOS version information.

Driver Requirements

To successfully install Windows 10, you must have the critical device drivers for your computer, such as the hard drive device driver. The Windows 10 media come with an extensive list of drivers. If your computer's device drivers are not on the Windows 10 installation media, you should check the device manufacturer's website.

New Install or Upgrade?

Once you've determined that your hardware meets the minimum requirements, you need to decide whether you want to do an upgrade or a clean install. An upgrade allows you to retain your existing operating system's applications, settings, and files. If you currently have a computer with Windows Vista, you are eligible to use an upgrade copy of Windows 10.

The bad news is that if you are moving from Windows Vista, Windows XP, or earlier versions of Windows to Windows 10, you must perform a clean install. (You can, however, use a third-party tool like the Laplink utility to migrate files and settings from Windows XP to Windows 10 on the same computer.)

You can perform an upgrade to Windows 10 if the following conditions are true:

- You are running Windows 7 or Windows 8.
- You want to keep your existing applications and preferences.
- You want to preserve any local users and groups you've created.

You must perform a clean install of Windows 10 if any of the following conditions are true:

- There is no operating system currently installed.
- You have an operating system installed that does not support an in-place upgrade to Windows 10 (such as DOS, Windows 9*x*, Windows NT, Windows Me, Windows 2000 Professional, Windows Vista, or Windows XP).
- You want to start from scratch, without keeping any existing preferences.
- You want to be able to dual-boot between Windows 10 and your previous operating system.

Table 1.4 shows each operating system that can be upgraded and the minimum edition of Windows 10 to which it should be upgraded.

TABLE 1.4   Windows 7 and Windows 8 upgrade options

From Current Edition	Windows 10 Edition
Windows 7 Starter	Windows 10 Home
Windows 7 Home Basic	Windows 10 Home

TABLE 1.4 Windows 7 and Windows 8 upgrade options *(continued)*

From Current Edition	Windows 10 Edition
Windows 7 Home Premium	Windows 10 Home
Windows 7 Professional	Windows 10 Pro
Windows 7 Ultimate	Windows 10 Pro
Windows 7 Enterprise	Windows 10 Enterprise
Windows Phone 8.1	Windows 10 Mobile
Windows 8.1 Home	Windows 10 Home
Windows 8.1 Pro	Windows 10 Pro
Windows 8.1 Enterprise	Windows 10 Enterprise
Windows 8.1 Pro for Students	Windows 10 Pro

Upgrade Considerations

Almost all Windows 7 and Windows 8 applications should run with the Windows 10 operating system. However, possible exceptions to this statement include the following:

- Applications that use file-system filters, such as antivirus software, may not be compatible.
- Custom power-management tools may not be supported.

Before upgrading to Windows 10, be sure to stop any antivirus scanners, network services, or other client software. These software packages may see the Windows 10 install as a virus and cause installation issues.

If you are performing a clean install to the same partition as an existing version of Windows, the contents of the existing Users (or Documents and Settings), Program Files, and Windows directories will be placed in a directory named Windows.old, and the old operating system will no longer be available.

Hardware Compatibility Issues

You need to ensure that you have Windows 10 device drivers for your hardware. If you have a video driver without a Windows 10–compatible driver, the Windows 10 upgrade will install the Standard VGA driver, which will display the video with an 800×600 resolution. Once you get the Windows 10 driver for your video, you can install it and adjust video properties accordingly.

Application Compatibility Issues

Not all applications that were written for earlier versions of Windows will work with Windows 10. After the upgrade, if you have application problems, you can address the problems in any of the following ways:

- If the application is compatible with Windows 10, reinstall the application after the upgrade is complete.

- If the application uses dynamic-link libraries (DLLs) and there are migration DLLs for the application, apply the migration DLLs.

- Use the Microsoft Application Compatibility Toolkit (ACT) to determine the compatibility of your current applications with Windows 10. ACT will determine which applications are installed, identify any applications that may be affected by Windows updates, and identify any potential compatibility problems with User Account Control and Internet Explorer. Reports can be exported for detailed analysis.

- If applications were written for earlier versions of Windows but are incompatible with Windows 10, use the Windows 10 Program Compatibility Wizard. From the Control Panel, click the Programs icon, and then click the Run Programs From Previous Versions link to start the Program Compatibility Wizard. If the application is not compatible with Windows 10, upgrade your application to a Windows 10–compliant version.

An Upgrade Checklist

Once you have made the decision to upgrade, you should develop a plan of attack. The following upgrade checklist (valid for upgrading from Windows 7 or Windows 8) will help you plan and implement a successful upgrade strategy:

- Verify that your computer meets the minimum hardware requirements for Windows 10.

- Be sure your hardware is on the HCL.

- Make sure you have the Windows 10 drivers for the hardware. You can verify this with the hardware manufacturer.

- To audit the current configuration and status of your computer, run the Get Windows 10 App tool from the Microsoft website, which also includes documentation on using the utility. It will generate a report of any known hardware or software compatibility issues based on your configuration. You should resolve any reported issues before you upgrade to Windows 10.

- Make sure your BIOS is current. Windows 10 requires that your computer has the most current BIOS. If it does not, it may not be able to use advanced power-management features or device-configuration features. In addition, your computer may cease to function during or after the upgrade. Use caution when performing BIOS updates because installing the incorrect BIOS can cause your computer to fail to boot.

- Take an inventory of your current configuration. This inventory should include documentation of your current network configuration, the applications that are installed, the hardware items and their configuration, the services that are running, and any profile and policy settings.

- Back up your data and configuration files. Before you make any major changes to your computer's configuration, you should back up your data and configuration files and then verify that you can successfully restore your backup. Chances are, if you have a valid backup, you won't have any problems. Likewise, if you don't have a valid backup, you will likely have problems.

- Delete any unnecessary files or applications, and clean up any program groups or program items you don't use. Theoretically, you want to delete all the junk on your computer before you upgrade. Think of this as the spring-cleaning step.

- Verify that there are no existing problems with your hard drive prior to the upgrade. Perform a disk scan, a current virus scan, and defragmentation. These too are spring-cleaning chores. This step just prepares your hard drive for the upgrade.

- Perform the upgrade. In this step, you upgrade from the Windows 7 or Windows 8 operating system to Windows 10.

- Verify your configuration. After Windows 10 has been installed, use the inventory to compare and test each element that was inventoried prior to the upgrade to verify that the upgrade was successful.

Handling an Upgrade Failure

Before you upgrade, you should have a contingency plan in place. Your plan should assume the worst-case scenario. For example, what happens if you upgrade and the computer doesn't work anymore? It is possible that, after checking your upgrade list and verifying that everything should work, your attempt at the actual upgrade may not work. If this happens, you may want to return your computer to the original, working configuration.

Indeed, I have made these plans, created my backups (two, just in case), verified them, and then had a failed upgrade anyway—only to discover that I had no clue where to find the original operating system CD. A day later, with the missing CD located, I was able to get up and running again. My problem was an older BIOS, and the manufacturer of my computer did not have an updated BIOS.

Disk Partitioning

Disk partitioning is the act of taking the physical hard drive and creating logical partitions. A logical drive is how space is allocated to the drive's primary and logical partitions. For example, if you have a 500 GB hard drive, you might partition it into three logical drives:

- C: drive, which might be 200 GB
- D: drive, which might be 150 GB
- E: drive, which might be 150 GB

The following sections detail some of the major considerations for disk partitioning:

Partition Size   One important consideration in your disk-partitioning scheme is determining the partition size. You need to consider the amount of space taken up by your operating system, the applications that will be installed, and the amount of stored data. It is also important to consider the amount of space required in the future.

Microsoft recommends that you allocate at least 16 GB of disk space for Windows 10. This allows room for the operating system files and for future growth in terms of upgrades and installation files that are placed with the operating system files.

The System and Boot Partitions   When you install Windows 10, files will be stored in two locations: the system partition and the boot partition. The system partition and the boot partition can be the same partition.

The system partition contains the files needed to boot the Windows 10 operating system. The system partition contains the Master Boot Record (MBR) and boot sector of the active drive partition. It is often the first physical hard drive in the computer and normally contains the necessary files to boot the computer. The files stored on the system partition do not take any significant disk space. The active partition is the system partition that is used to start your computer. The C: drive is usually the active partition.

The boot partition contains the Windows 10 operating system files. By default, the Windows operating system files are located in a folder named Windows.

Disk Partition Configuration Utilities   If you are partitioning your disk prior to installation, you can use several utilities, such as the DOS or Windows FDISK program, or a third-party utility, such as Norton's Partition Magic. You can also configure the disks during the installation of the Windows 10 operating system.

You might want to create only the first partition where Windows 10 will be installed. You can then use the Disk Management utility in Windows 10 to create any other partitions you need. The Windows 10 Disk Management utility is covered in Chapter 3, "Configuring Devices and Drivers."

Language and Locale

Language and locale settings determine the language the computer will use. Windows 10 supports many languages for the operating system interface and utilities.

Locale settings are for configuring the format for items such as numbers, currencies, times, and dates. For example, English for the United States specifies a short date as mm/dd/yyyy (month/day/year), while English for South Africa specifies a short date as yyyy/mm/dd (year/month/day).

It is very important to only choose the locales that this machine will need to use. The reason for this is that for every locale you choose, your system will get updates for all chosen locales that you set up.

Installing Windows 10

The first step to installing Windows 10 is to know what type of media you need to install the Windows 10 operating system. Windows 10 gives you multiple ways to do an install.

You can install Windows 10 either from the bootable DVD or through a network installation using files that have been copied to a network share point or USB device. You can also install Windows 10 by using a virtual hard drive (vhd). This option will be discussed in Chapter 2, "Installing in an Enterprise Environment." You can also launch the setup.exe file from within the Windows 10 operating system to upgrade your operating system.

To start the installation, you simply restart your computer and boot to the DVD. The installation process will begin automatically. You will walk through the steps of performing a clean install of Windows 10 from the DVD in Exercise 1.1.

If you are installing Windows 10 from the network, you need a distribution server and a computer with a network connection. A distribution server is a server that has the Windows 10 distribution files copied to a shared folder. The following steps are used to install Windows 10 over the network:

1. Boot the target computer.
2. Attach to the distribution server and access the share that has the files copied to it.
3. Launch setup.exe.
4. Complete the Windows 10 installation using either the clean install method or the upgrade method. These methods are discussed in detail in the following sections.

Performing a Clean Install of Windows 10

On any installation of Windows 10, there are three stages.

Collecting Information   During the collection phase of the installation, Windows 10 gathers the information necessary to complete the installation. This is where Windows 10 gathers your local time, location, keyboard, license agreement, installation type, and installation disk partition information.

Installing Windows   This section of the installation is where your Windows 10 files are copied to the hard disk and the installation is completed. This phase takes the longest because the files are installed.

Setting Up Windows   In this phase, you set up a username, computer name, and password; enter the product key; configure the security settings; and review the date and time. Once this is finished, your installation will be complete.

As explained earlier, you can run the installation from the optical media, from a USB, or over a network. The only difference in the installation procedure is your starting point: from your optical drive or USB or a network share. The steps in Exercise 1.1 and Exercise 1.2 assume you are using the Windows 10 DVD to install Windows 10.

Setting Up Your Computer for Hands-On Exercises

Before beginning Exercise 1.1, verify that your computer meets the requirements for installing Windows 10, as listed earlier in Table 1.3. For Exercise 1.1, it is assumed you are not currently running a previous version of Windows that will be upgraded.

The exercises in this book are based on your computer being configured in a specific manner. Your computer should have at least a 50 GB hard drive (this exceeds the basic minimums) that is configured with the minimum space requirements and partitions.

When you boot to the Windows 10 installation media, the Setup program will automatically start the Windows 10 installation. In Exercise 1.1, you will perform a clean install of Windows 10. This exercise assumes that you have access to Windows 10 Enterprise; other editions may vary slightly. You can also download an evaluation version of Windows 10 from the Microsoft website.

Also, I may list steps that you may not see or I may not list steps that you see—this is because my version of Windows may be different. For example, I am installing an MSDN Windows 10 Enterprise edition. At this time, I am not required to enter a license number during install. A normal version bought from a vendor may ask for the license during the actual install.

> **NOTE**
>
> I am loading Windows 10 Enterprise into a VMware Workstation virtual machine. Again, this may make your installation a little different than the steps listed in Exercise 1.1.

EXERCISE 1.1

Performing a Clean Install of Windows 10

1. Insert the Windows 10 DVD into a machine or virtual machine with no operating system and start the computer.

2. If you are directed to "Hit any key" to start the DVD, press Enter.

3. The first screen will ask you to enter your language, time and currency format, and keyboard or input method (see Figure 1.1). After filling in these fields, click Next.
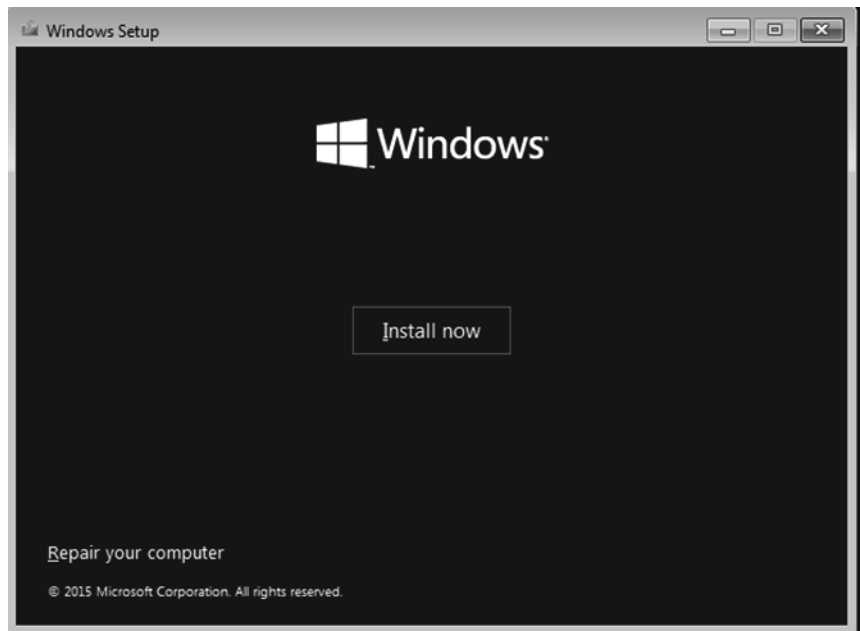
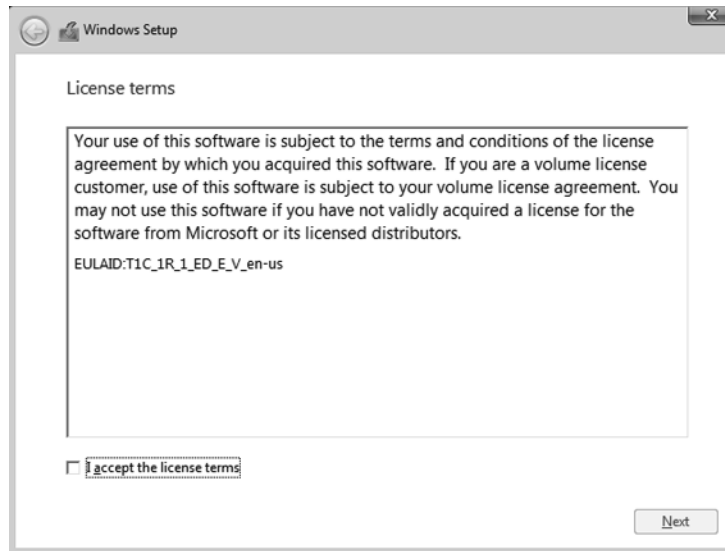**F I G U R E 1.1**   Windows setup screen

4.   On the next screen, click the Install Now button (see Figure 1.2).

F I G U R E 1 . 2   Windows install screen

5. A message appears to tell you that the setup is starting. The licensing screen will be first. Read the license agreement and then check the I Accept The License Terms check box (see Figure 1.3). Click Next.

**FIGURE 1.3**   Windows license screen

6. When asked which type of installation you want, click Custom (Advanced) as shown in Figure 1.4.

FIGURE 1.4   Type of install screen
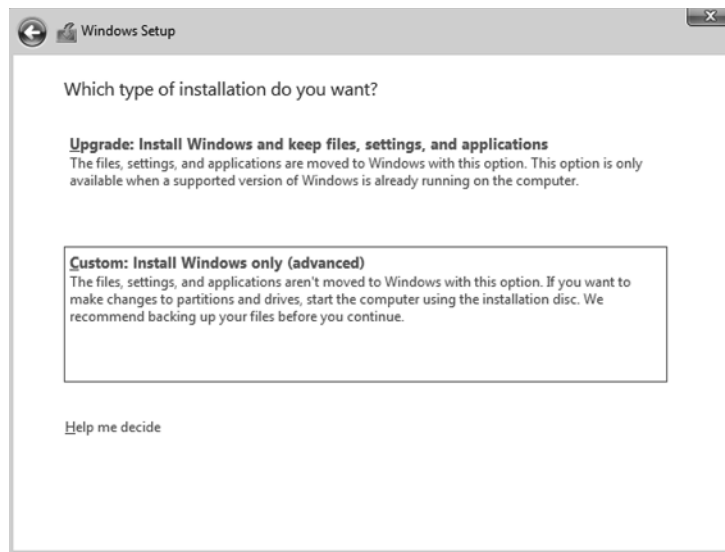
7. The next screen asks you to identify the disk to which you would like to install Windows 10. Choose an unformatted free space or a partition (partition will be erased) with at least 50 GB available. You can also click the Drive Options (Advanced) link to create and format your own partition as shown in Figure 1.5. After you choose your partition, click Next.

F I G U R E   1 . 5   Windows disk setup screen
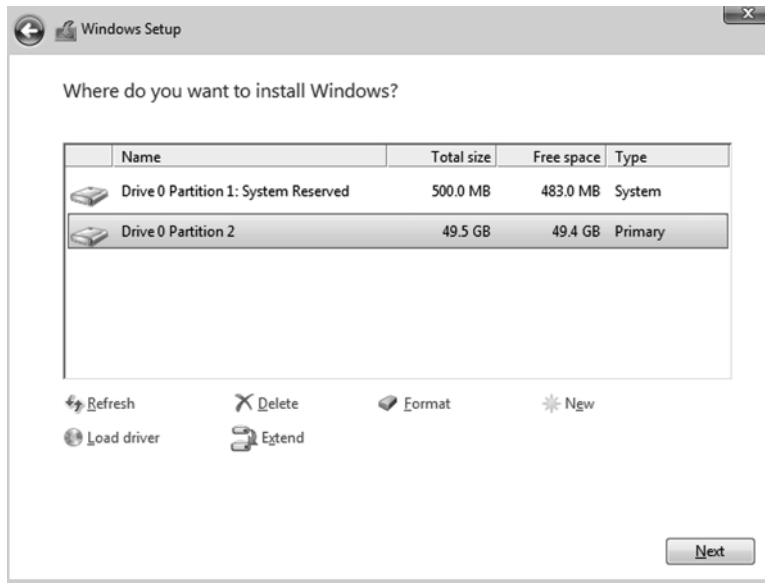
8. When your partition is set, the installation will start (as shown in Figure 1.6). You will see the progress of the installation during the entire process. When the installation is complete, the machine will reboot.

F I G U R E   1 . 6   Windows installation status screen
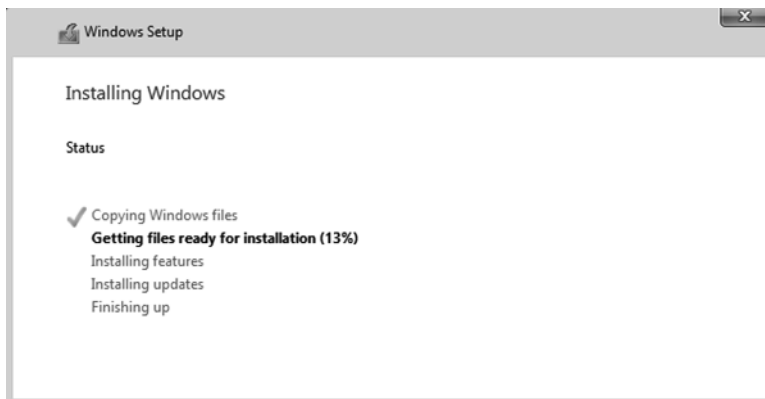
9. After the system restarts, a screen appears that asks if you want to use custom or express settings, as shown in Figure 1.7. Click the Use Express Settings button. The system will then restart.

F I G U R E   1 . 7   Windows express settings screen
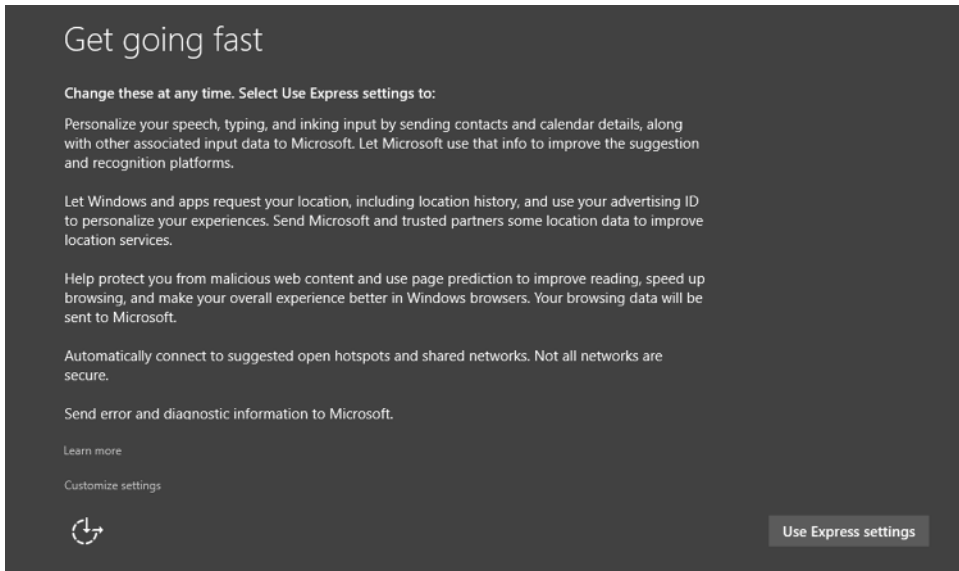
10. After the restart, a screen appears that asks you to choose how you will connect. Select Join A Domain (see Figure 1.8), and then click the Next button.

F I G U R E   1 . 8   Choosing a domain
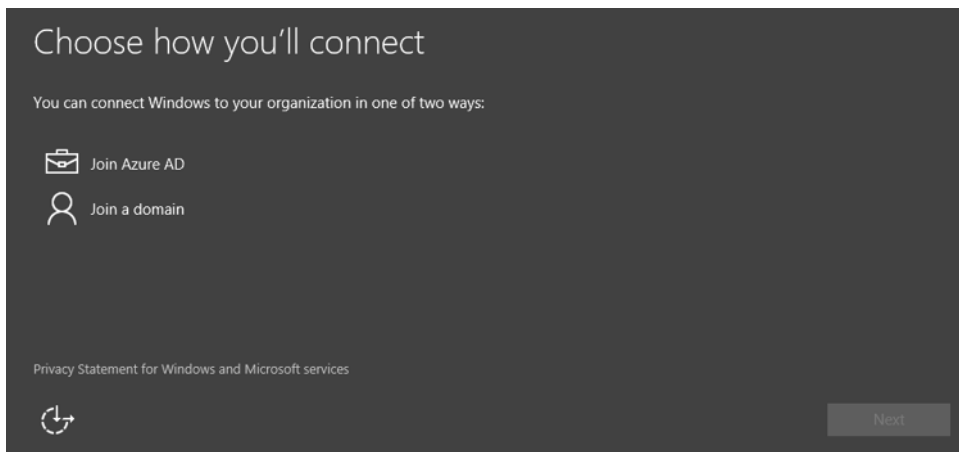
11. The next screen asks you to enter a username and password. Type in your username, password, and a password hint, as shown in Figure 1.9. Then click Next.

FIGURE 1.9 PC account screen

Create an account for this PC

If you want to use a password, choose something that will be easy for you to remember but hard for others to guess.

Who's going to use this PC?

WillPanek

Make it secure.

•••••••••••••••

•••••••••••••••

child Friend

Back   Next

The Hi screen will appear, and the system will continue its setup. Then the system applications will be installed.

12. You will be asked if you want your system to be recognized by other systems on the network. This is a choice you can make. If you want other machines to see this Windows 10 system, choose Yes.

Once Windows 10 finishes its installation, you should see the Windows 10 desktop, as shown in Figure 1.10.

FIGURE 1.10   Windows 10 screen

Before we talk about the Windows 10 upgrade procedure, I want to quickly explain something that you saw during the Windows 10 install. In step 10, I had you choose Join A Domain instead of Azure AD. We will explore both of the choices in greater detail, but I wanted to quickly explain why we chose one over the other.

Microsoft offers two main networks: workgroup-based or domain-based. *Workgroups* (also referred to as peer-to-peer networks) is when you just connect your computers together directly to each other. A perfect example for most of us is what you do in your home network. Most home users connect their machines together without the use of a main server.

Corporations normally do things a bit differently than that. *Domains* are networks that are controlled by servers called domain controllers. Domain controllers are Windows servers that have a copy of a database called Active Directory (AD). Recently Microsoft took domain-based networks a step further by allowing companies to set up a cloud-based version of an Active Directory domain (Azure AD). This means that companies no longer need to maintain and manage their own domain controllers. Since most people don't have a cloud-based version of Azure AD, I had you choose the option Join A Domain so that we could finish the Windows 10 install.

We will go over all of these options in greater detail throughout this book, but I wanted to introduce you to these two Windows 10 options.

Performing an Upgrade to Windows 10

This section describes how to perform an upgrade to Windows 10 from Windows 8.1. Similar to a clean install, you can run the installation from the installation DVD, from a USB, or over a network. The only difference in the installation procedure is your starting point: from your optical or USB drive or from a network share. For the steps in the following sections, it is assumed that you are using the Windows 10 DVD to install the Windows 10 operating system.

Upgrading a Windows 7 or Windows 8.1 system to Windows 10 will save you a lot of time and trouble. Because we are upgrading the system, all of the user's data and applications will remain installed and most likely still work the exact same way. Sometimes when we upgrade a system, we run into problems with applications. But many times that is caused by a driver or a needed software update that will most likely solve the issue.

The three main steps in the Windows 10 upgrade process are very similar to the ones for a clean install. The three steps of upgrading to Windows 10 are as follows:

1. Collecting information
2. Installing Windows
3. Setting up Windows

In Exercise 1.2, you will go through the process of installing Windows 10 by upgrading Windows 8.1. As you can see in Figure 1.11, I have a Windows 8.1 Enterprise system that I will update to Windows 10 Enterprise.
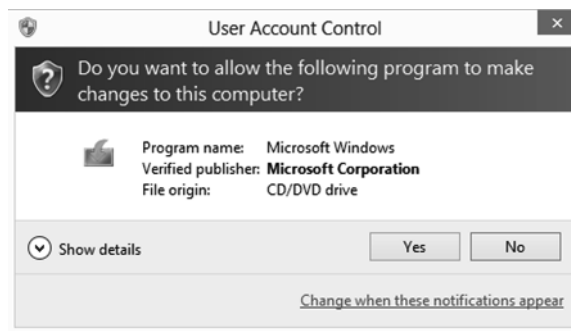
FIGURE 1.11   Windows 8.1
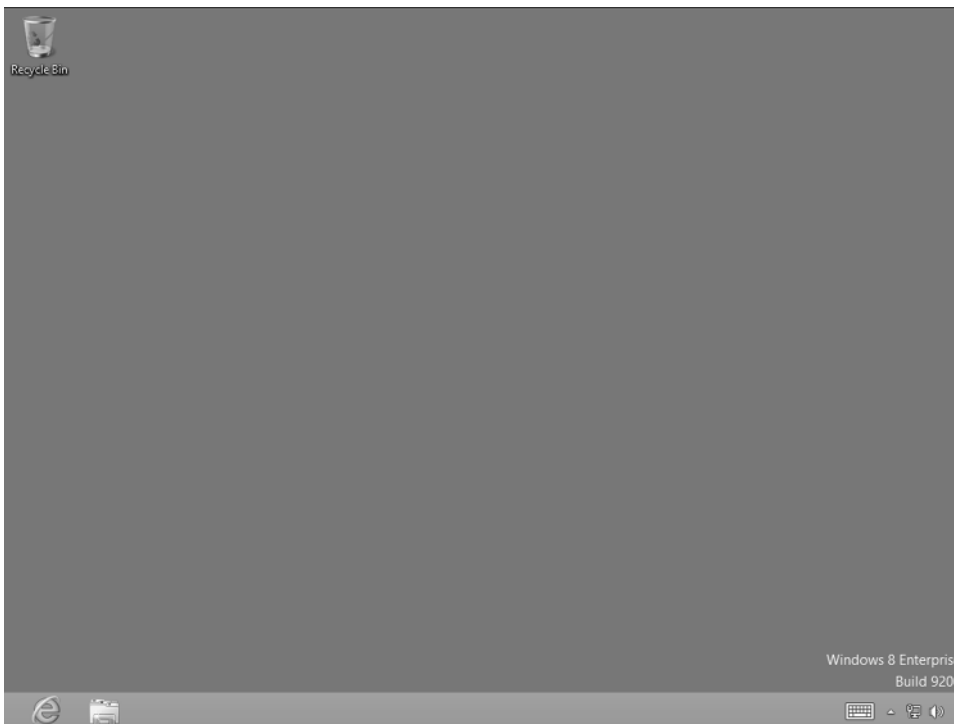
### Upgrading Windows 8.1 to Windows 10

1. Insert the Windows 10 DVD. (We are upgrading Windows 8.1 Enterprise to Windows 10 Enterprise.)

2. If Autorun does not start, navigate to the DVD drive and click `setup.exe`. Once the setup starts (via either `setup.exe` or Autorun), click Run Setup.exe as shown in Figure 1.12.

FIGURE 1.12 DVD setup screen
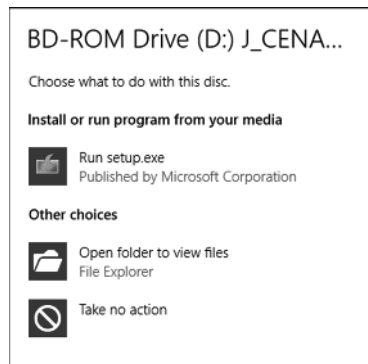
3. If a pop-up box appears for User Account Control, click the Yes button (see Figure 1.13).

FIGURE 1.13 User Account Control screen

You should then see a message appear stating that Windows is preparing the system, as shown in Figure 1.14.

F I G U R E   1.14   Preparing screen
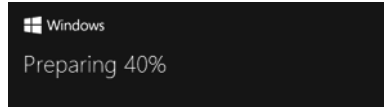
4. You may be prompted to Get Important Updates. You can choose to either download the updates or not do them at this time. Make a choice and click the Next button. (During my installation, I decided to download the updates.)

5. The Microsoft Windows 10 license terms appear. Read the terms and then click Accept. (The installation will not allow you to continue until you click Accept.)

6. At the Ready To Install screen (shown in Figure 1.15), you can change what files and/ or apps you want to keep by clicking the Change What To Keep link. Once you're ready, click the Install button.

F I G U R E   1.15   Ready To Install screen
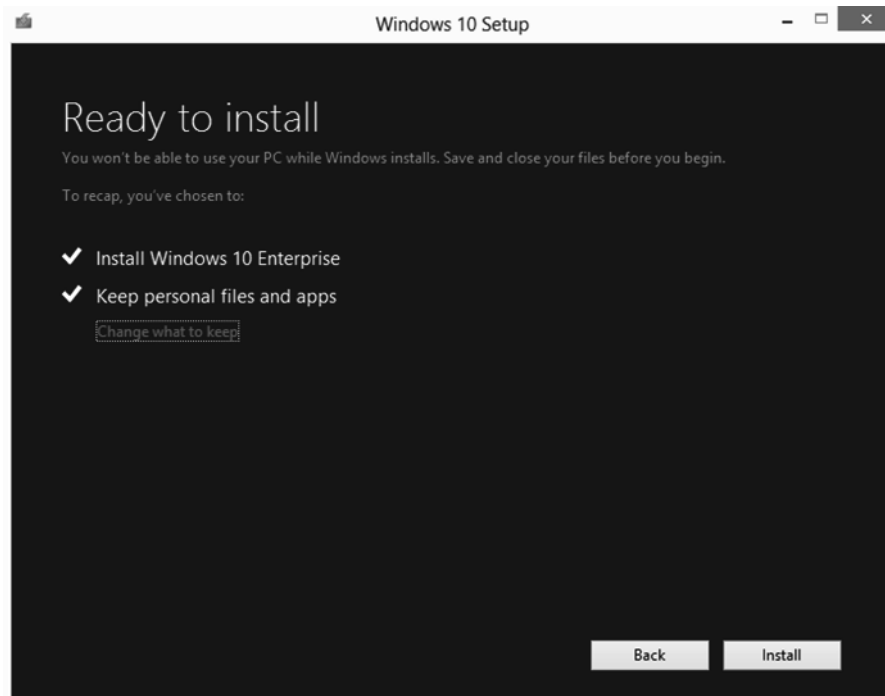
7. Windows 10 will begin to install (as shown in Figure 1.16). Your computer may restart multiple times. This is normal. As the upgrade status screen states, "Sit back and relax."

FIGURE 1.16   Installing Status screen

8. After the upgrade has completed, a welcome screen will be displayed, similar to the one shown in Figure 1.17. Click Next.
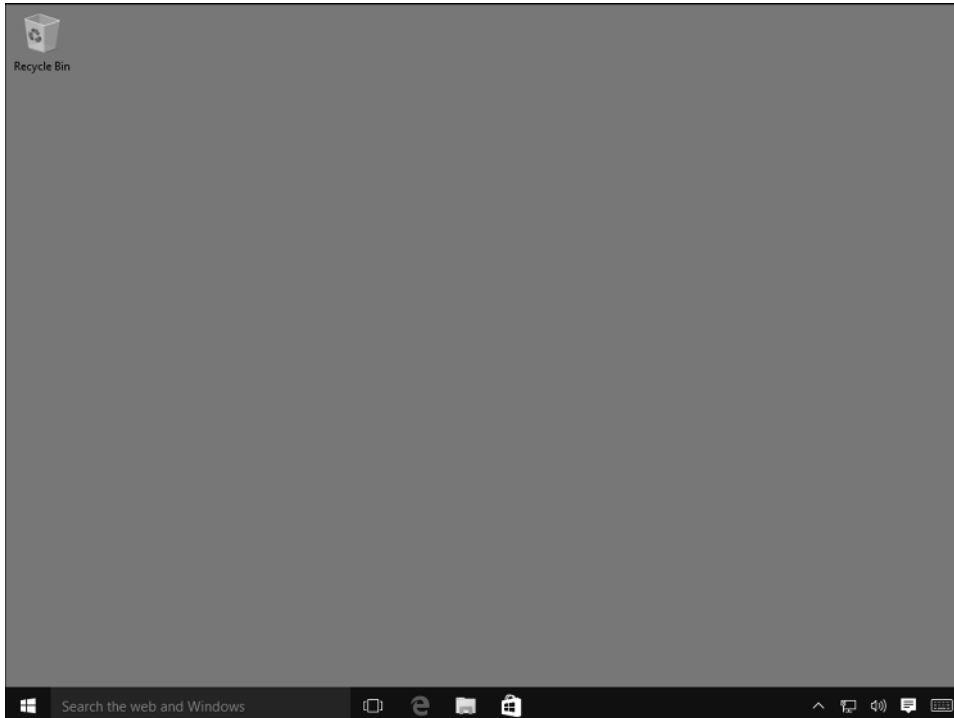
FIGURE 1.17   Welcome screen
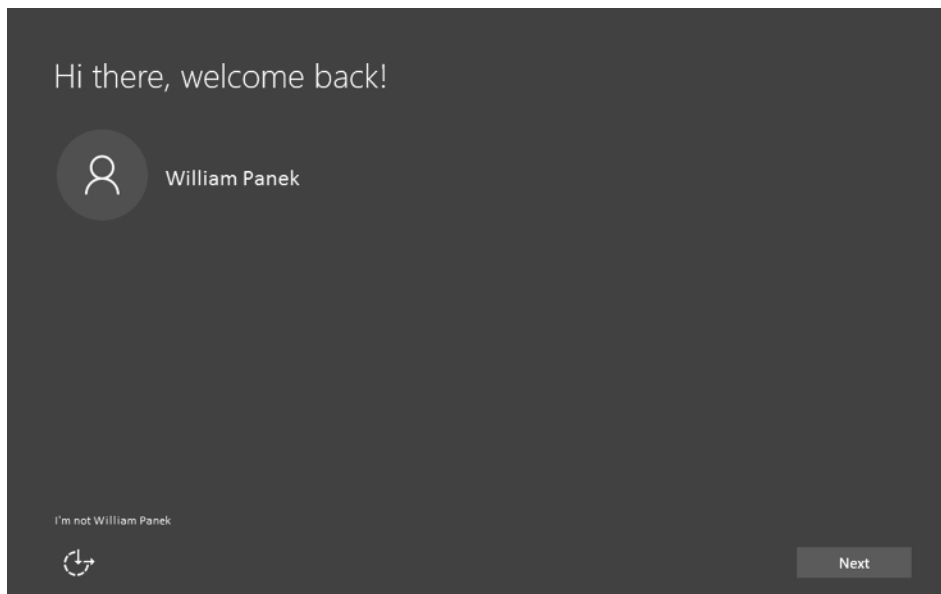
9. At the Get Going Fast screen, click the Use Express Settings button.

10. At the New Apps screen, just click Next.

And that's it—Windows 10 is installed (see Figure 1.18). Congrats.

F I G U R E 1 . 1 8   Windows 10 screen

Now that we have installed the Windows 10 operating system, let's take a look at how to change your system's locales. Earlier I explained that the locale settings help you with the systems language format, settings, and region-specific details.

In Exercise 1.3, I will show you how to change your current locale. This helps when you take your Windows 10 laptop, tablet, or phone to another part of the world.

E X E R C I S E 1 . 3

Configuring Locales

1. Click the Start button and choose Settings.

2. Once in the Settings screen, choose Time And Language.

3.   This should place you on the Date & Time screen. Make sure that your time zone is set correctly. If it's not, pull down the Time Zone options and choose your time zone.

4.   Scroll down and make sure the date and time formats are set the way you want. If they are not, click the Change Date And Time Formats link. Change the formats to the way you want them set.

5.   Click the Region And Language link on the left-hand side.

6.   Make sure the country or region is set properly. If you want to add a second language to this Windows 10 system, click the Add A Language link. Choose the language you want.

7.   Once completed, close the Settings screen.

Troubleshooting Installation Problems

The Windows 10 installation process is designed to be as simple as possible. The chances for installation errors are greatly minimized through the use of wizards and the step-by-step process. However, it is possible that errors will occur.

Identifying Common Installation Problems

As most of you are aware, installations sometimes do get errors. You might encounter some of the following installation errors:

Media Errors   Media errors are caused by defective or damaged DVDs. To check the disc, put it into another computer and see if you can read it. Also check your disc for scratches or dirt—it may just need to be cleaned.

Insufficient Disk Space   Windows 10 needs at least 16 GB for the 32-bit OS and 20 GB for the 64-bit OS to execute properly. If the Setup program cannot verify that this space exists, the program will not let you continue.

Not Enough Memory   Make sure your computer has the minimum amount of memory required by Windows 10 (1 GB for 32-bit or 2 GB for 64-bit). Having insufficient memory may cause the installation to fail or blue-screen errors to occur after installation.

Not Enough Processing Power   Make sure your computer has the minimum processing power required by Windows 10 (1 GHz or faster processor or SoC). Having insufficient processing power may cause the installation to fail or blue-screen errors to occur after installation.

Hardware That Is Not on the HCL   If your hardware is not listed on the HCL, Windows 10 may not recognize the hardware or the device may not work properly.

Hardware with No Driver Support   Windows 10 will not recognize hardware without driver support.

Hardware That Is Not Configured Properly   If your hardware is Plug and Play (PnP) compatible, Windows 10 should configure it automatically. If your hardware is not Plug and

Play compatible, you will need to manually configure the hardware per the manufacturer's instructions.

Incorrect Product Key   Without a valid product key, the installation will not go past the Product Key screen. Make sure you have not typed in an incorrect key (check your Windows 10 installation folder or your computer case for this key).

Failure to Access TCP/IP Network Resources   If you install Windows 10 with typical settings, the computer is configured as a DHCP client. If there is no DHCP server to provide IP configuration information, the client will still generate an autoconfigured IP address but be unable to access network resources through TCP/IP if the other network clients are using DHCP addresses.

Installing Nonsupported Hard Drives   If your computer is using a hard disk that does not have a driver included on the Windows 10 media, you will receive an error message stating that the hard drive cannot be found. You should verify that the hard drive is properly connected and functional. You will need to obtain a disk driver for Windows 10 from the manufacturer and then specify the driver location by selecting the Load Driver option during partition selection.

Troubleshooting with Installation Log Files

When you install Windows 10, the Setup program creates several log files. You can view these logs to check for any problems during the installation process. Two log files are particularly useful for troubleshooting:

- The action log includes all of the actions that were performed during the setup process and a description of each action. These actions are listed in chronological order. The action log is stored as \Windows\setupact.log.

- The error log includes any errors that occurred during the installation. For each error, there is a description and an indication of the severity of the error. This error log is stored as \Windows\setuperr.log.

In Exercise 1.4, you will view the Windows 10 Setup logs to determine whether there were any problems with your Windows 10 installation.

EXERCISE 1.4

Troubleshooting Failed Installations with Setup Logs

1. Select Start ➢ Computer.

2. Double-click Local Disk (C:).

3. Double-click Windows.

4. In the Windows folder, double-click the Setupact.log file to view your action log in Notepad. When you are finished viewing this file, close Notepad.

5. Double-click the `Setuperr.log` file to view your error file in Notepad. If no errors occurred during installation, this file will be empty. When you are finished viewing this file, close Notepad.

6. Close the directory window.

Supporting Multiple-Boot Options

You may want to install Windows 10 but still be able to run other operating systems. *Dual-booting* or multibooting allows your computer to boot multiple operating systems. Your computer will be automatically configured for dual-booting if there was a dual-boot–supported operating system on your computer prior to the Windows 10 installation, you didn't upgrade from that operating system, and you installed Windows 10 into a different partition.

One reason for dual-booting is to test various systems. If you have a limited number of computers in your test lab and you want to be able to test multiple configurations, you should dual-boot. For example, you might configure one computer to dual-boot with Windows 7, Windows 8.1, and Windows 10.

Here are some keys to successful dual-boot configurations:

- Make sure you have plenty of disk space.

- Windows 10 must be installed on a separate partition in order to dual-boot with other operating systems.

- Install older operating systems before installing newer operating systems. If you want to support dual-booting with Windows 7 and Windows 10, Windows 7 must be installed first. If you install Windows 10 first, you cannot install Windows 7 without ruining your Windows 10 configuration.

- Do not install Windows 10 on a compressed volume unless the volume was compressed using NTFS compression.

Once you have installed each operating system, you can choose the operating system that you will boot to during the boot process. You will see a boot-selection screen that asks you to choose which operating system you want to boot.

The Boot Configuration Data (BCD) store contains boot information parameters that were previously found in `boot.ini` in older versions of Windows. To edit the boot options in the BCD store, use the `bcdedit` utility, which can be launched only from a command prompt. To open a command prompt window, you can do one of the following:

- Launch `\Windows\system32\cmd.exe`.

- Open the Run command by pressing the [Windows] key + R and then entering **cmd**.

- Type **cmd.exe** in the Search Programs And Files box and press Enter.

Once the command-prompt window is open, type **bcdedit** to launch the bcdedit utility. You can also type **bcdedit/?** to see all the different bcdedit commands. A few bcdedit commands may be needed when dual-booting a machine. Table 1.5 shows some of the bcdedit commands that may be needed when dual-booting.

TABLE 1.5   Bcdedit commands for dual-booting

Command	Explanation
/createstore	Creates a new empty boot configuration data store
/default	Allows you to specify which operating system will start when the time-out expires
/deletevalue	Allows you to delete a specified element from a boot entry
/displayorder	Shows the display order that the boot manager uses when showing the display order to the user
/export	Allows you to export the contents of the system store into a file
/import	Restores the system store by using the data file previously generated by using the /export option
/set	Allows you to set an entry option value
/store	Specifies the store to be used
/timeout	Specifies the amount of time used before the system boots into the default operating system

Using Windows Activation

Windows Activation is Microsoft's way of reducing software piracy. Unless you have a corporate license for Windows 10, you will need to perform post-installation activation. This can be done online or through a telephone call. Windows 10 will attempt automatic activation three days after you log on to it for the first time. There is a grace period when you will be able to use the operating system without activation. After the grace period expires, you will not be able to create new files or save changes to existing files until Windows 10 is activated. When the grace period runs out, the Windows Activation Wizard will automatically start (see Figure 1.19); it will walk you through the activation process. You may need to click the Change Product Key button and put in the license number that came with your Windows 10 copy.

FIGURE 1.19   The Windows Activation Wizard screen
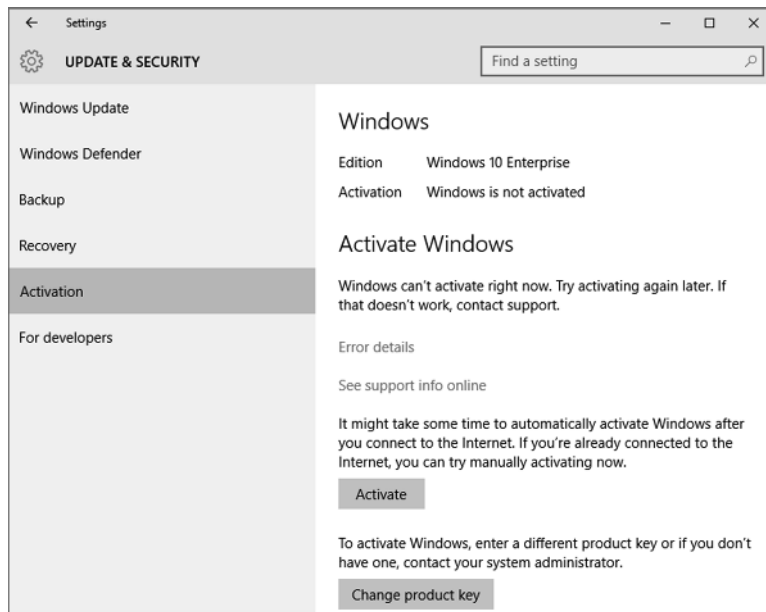
Windows Update

Windows Update is a utility that connects to the Microsoft website or to a local update server called a Windows Server Update Services (WSUS) server to ensure that the Windows 10 operating system (along with other Microsoft products) has the most up-to-date versions of Microsoft operating system files or software.

Some of the common update categories associated with Windows Update are as follows:

- Security updates
- Critical updates
- Service packs
- Drivers
- Product/Software updates
- Windows Store

So let's begin by looking at how Windows 10 updates get created by Microsoft.

The Update Process

To truly understand updates, you need to understand how the update process works with Microsoft. Microsoft normally releases updates to its products on Tuesdays (this is why

we use the term *Patch Tuesdays*). But before that update gets released to the public, it has already been tested at Microsoft.

It all starts with the Windows engineering team adding new features and functionality to Windows using product cycles. These product cycles are comprised from three phases: development, testing, and release.

After the new Windows 10 features and functionality are developed, Microsoft employees test these updates out themselves on their own Windows 10 machines. This is referred to as "selfhost testing."

After the updates get tested at Microsoft, they then get released to the public. With Windows 10, Microsoft has introduced new ways to service updates. Microsoft's new servicing options are referred to as Current Branch (CB), Current Branch for Business (CBB), and Long-Term Servicing Branch (LTSB). Table 1.6 (taken directly from Microsoft's website) shows the different servicing options and the benefits of those options.

TABLE 1.6   Update Servicing Options

Servicing Option	Availability of Updates	Minimum length of servicing lifetime	Key benefits	Supported editions
Current Branch (CB)	Immediately after first published by Microsoft	Approximately 4 months	Makes new features available to users as soon as possible	Home, Pro, Education, Enterprise, IoT Core, Windows 10 IoT Core Pro (IoT Core Pro)
Current Branch for Business (CBB)	Approximately 4 months after first published by Microsoft	Approximately 8 months	Provides additional time to test new feature upgrades before deployment	Pro, Education, Enterprise, IoT Core Pro
Long-Term Servicing Branch (LTSB)	Immediately after published by Microsoft	10 Years	Enables long-term deployment of selected Windows 10 releases in low-change configurations	Enterprise LTSB

> **NOTE**   For more information on Microsoft servicing options, go to Microsoft's website:
>
> `https://technet.microsoft.com/en-us/itpro/windows/manage/`
>
> `introduction-to-windows-10-servicing`

Using Windows Update

There are two ways a user can receive updates: directly from Microsoft or using Microsoft Windows Server Update Services (WSUS). WSUS runs on a Windows server, and that server goes out to the Microsoft website and downloads the updates for your Windows clients. This allows client machines to receive their updates from a local server.

   One advantage to using WSUS is that administrators can approve the updates before they get deployed to the client machines. Another advantage is that your clients only need to download updates locally, without using your Internet bandwidth.

> **NOTE**   WSUS is discussed in detail in *MCSA: Windows Server 2012 R2 Complete Study Guide* by William Panek (Sybex, 2015).

   If you want the Windows 10 clients to access and get their own updates, they would follow these steps to configure Windows Update:

1. Select Start ➢ Control Panel.

- From Windows Icons View, select Windows Update.
- From Windows Category View, select System And Security ➢ Windows Update.

2. Configure the options you want to use for Windows Update by clicking the Advanced Options link. The options you can access from Windows Update include the following:

- Choose how updates are installed
  - This setting allows you to set how the machine updates are done. You can set this setting to Automatic or Notify to schedule a restart.
- Give me updates for other Microsoft products
  - This setting allows you to get updates for other Microsoft products like Microsoft Office.
- Defer Upgrades
  - When you choose to defer upgrades, new Windows features will not be downloaded or installed. Deferring upgrades doesn't apply security updates.
- View Update History
  - This option allows you to see which updates have been loaded or not loaded.
- Choose how updates are delivered
  - This option allows you to choose how you get your updates, either from Microsoft's website (internet) or from a WSUS server.
- Get Insider Builds
  - This option allows you to join the Windows Insider Program and you'll be able to receive preview builds and give Microsoft feedback.

Check For Updates

When you click Check For Updates, Windows Update will retrieve a list of available updates from the Internet. You can then click View Available Updates to see what updates are available. Updates are marked as Important, Recommended, or Optional. Figure 1.20 shows the Check For Updates button.

FIGURE 1.20   Check For Updates button
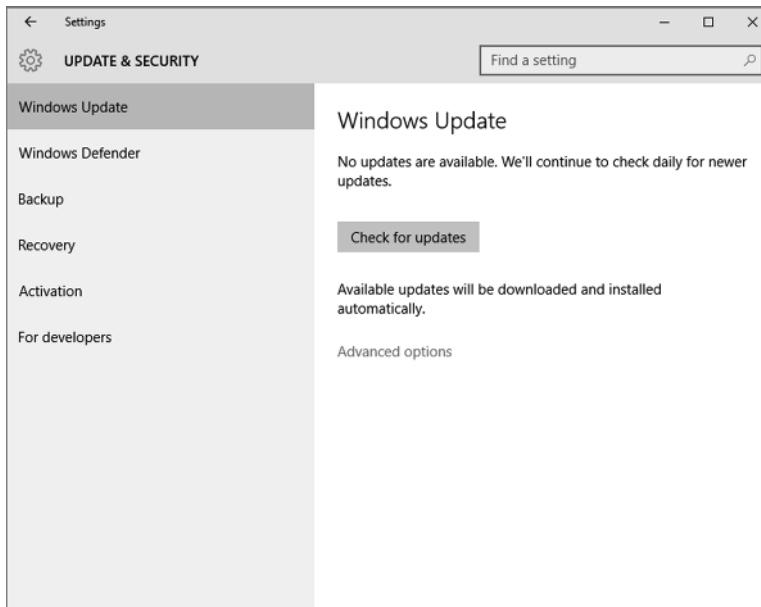
Installing Windows Service Packs

Service packs are updates to the Windows 10 operating system that include bug fixes and product enhancements. Some of the options that might be included in service packs are security fixes or updated versions of software, such as Internet Explorer.

Prior to installing a service pack, you should perform the following steps:

1. Back up your computer.

2. Check your computer to ensure that it is not running any malware or other unwanted software.

3. Check with your computer manufacturer to see whether there are any special instructions for your computer prior to installing the service pack.

You can download service packs from `https://support.microsoft.com/en-us/help/14162/windows-service-pack-and-update-center`.

You can also receive service packs via Windows Update, or you can pay for a copy of a service pack to be mailed to you on disk. Before you install a service pack, you should read the release notes that are provided on the Microsoft website.

Installing Windows Store Updates

Besides getting updates for the Windows 10 operating system and the different Microsoft products, you may also need to get updates for any of the applications, games, music, videos, and software that you downloaded from the Windows Store. To receive Windows Store updates, you need to go out to the Windows Store and then click on your user's account (see Figure 1.21).

FIGURE 1.21   Windows Store button
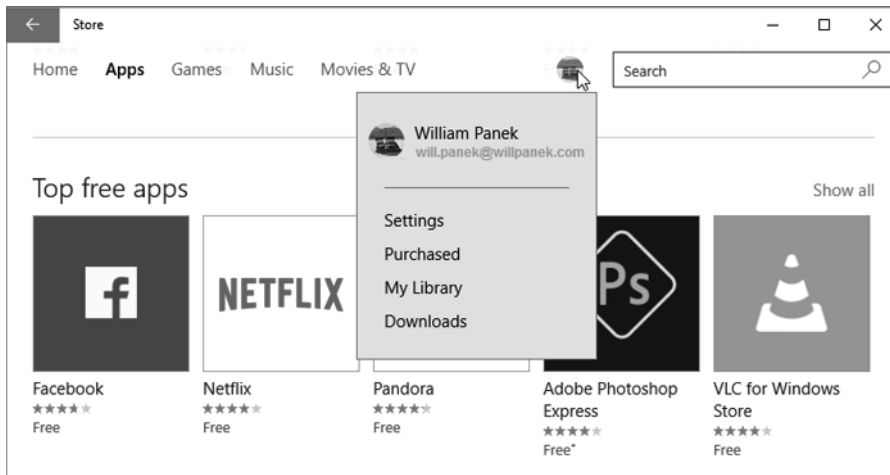
After you click on the Windows Store user's account, you click on the Downloads link. That will take you to the Downloads And Installs page (see Figure 1.22). Once on this page, click the Check For Updates button. This will allow you to download and install any Windows Store updates.

FIGURE 1.22   Check For Updates button
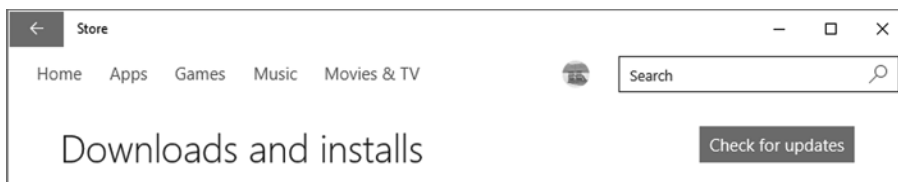
Summary

This chapter started with a discussion of the features included with Windows 10. We also took a look at the difference between 64-bit and 32-bit operating systems and showed some of the advantages that 64-bit entails, such as greater RAM and processor speed.

Then you learned about installing Windows 10. Installation is an easy process, but you must first make sure the machine is compatible with the Windows 10 operating system.

There are two main ways to install Windows 10: upgrade or clean install. You can upgrade a Windows 7 or Windows 8 machine to Windows 10. You can't upgrade Windows XP to Windows 10.

After the Windows 10 installation is complete, you'll want to make sure all updates and service packs are installed. You can use Windows Update to complete that task.

Video Resources

There are videos available for the following exercises:

1.1
1.2

You can access the videos at `http://www.wiley.com/go/sybextestprep`.

Exam Essentials

Understand the Windows 10 hardware requirements.   The minimum hardware requirements to run Windows 10 properly are 1 gigahertz (GHz) or faster processor or SoC, 1 gigabyte (GB) for 32-bit or 2 GB for 64-bit of RAM, 16 GB for 32-bit OS, 20 GB for 64-bit OS of hard drive space, DirectX 9 or later with WDDM 1.0 video driver, and a DVD-R/W drive or compatible network interface card.

Understand the Hardware Compatibility List.   The Hardware Compatibility List (HCL) is an extensive list of computers and peripheral hardware devices that have been tested with the Windows 10 operating system. The hardware and supported drivers on the HCL have been put through rigorous tests to ensure their compatibility with Windows 10. Microsoft guarantees that the items on the list meet the requirements for Windows 10 and do not have any incompatibilities that could affect the stability of the operating system.

Understand how to complete a clean install.   If your machine meets the minimum hardware requirements, you can install Windows 10. There are a few different ways to install Windows 10 onto a computer. You can use the installation disk or USB, install it over a network, or install it from an image (see Chapter 2 for more details on imaging).

Understand how to complete an upgrade.   You can't upgrade a Windows Vista machine to Windows 10. To complete an upgrade on a Windows 7 or Windows 8 machine, insert the Windows 10 DVD into the Windows machine or connect to the Windows 10 files over the network and complete an upgrade on the computer.

You can't upgrade a Windows XP machine directly to Windows 10. If the machine is running Windows XP, you have to use a migration tool to migrate all the user data from Windows XP to a Windows 10 machine.

Understand how to receive updates.   You need to understand how to set up and receive Microsoft updates for Windows 10, Microsoft products, and the Windows Store. Make sure you know the different settings for configuring update advanced options.

Review Questions

1. You are the administrator in charge of a computer that runs both Windows 7 and Windows 10. Windows 10 is installed on a different partition from Windows 7. You have to make sure that the computer always starts Windows 7 by default. What action should you perform?

    A. Run `Bcdedit.exe` and the `/default` parameter.

    B. Run `Bcdedit.exe` and the `/bootcd` parameter.

    C. Create a `Boot.ini` file in the root of the Windows 10 partition.

    D. Create a `Boot.ini` file in the root of the Windows 7 partition.

2. You are the administrator for a Windows 10 computer. You have decided to use Windows Update, but you want to be able to change the settings manually. What should you do?

    A. Log on to Windows 10 as a member of the Administrators group.

    B. From the local Group Policy, modify the Windows Update settings.

    C. Right-click Windows Update and select Run As Administrator.

    D. Right-click the command prompt, select Run As Administrator, and then run `Wuapp.exe`.

3. You are the administrator for a large organization. You have a Windows 10 Enterprise machine called Machine1. Machine1 is configured to receive updates from Microsoft's website. If a user is currently logged onto Machine1, you need to prevent Machine1 from restarting without the user's consent. How do you configure this?

    A. Configure the setting "Choose how updates are installed."

    B. Enable the "Defer Settings" button.

    C. Edit the "Schedule Automatic Updates" settings.

    D. Configure the setting "Choose how updates are delivered."

4. You are the IT manager for a medium-sized organization. Your organization is looking at upgrading its Windows XP machines to Windows 10. The managers have heard of a new feature that allows you to connect a device to the machine and then the Windows 10 operating system shows a graphic of the device for use. Which Windows 10 feature are they referring to?

    A. Device Manager

    B. Device Stage

    C. Staging Manager

    D. Add/Remove Hardware

5. You are the IT manager for your organization. The organization is looking at upgrading all of its machines from Windows XP to Windows 10. Many of the managers are concerned that their Windows XP applications won't be compatible with Windows 10. Which Windows 10 feature can you use to assure the managers that all of their Windows XP applications will continue to work?

    A. Windows XP Compatibility Checker

    B. Windows XP Application Center

    C. Windows Hyper-V client

    D. Windows XP Application Upgrade tool

6. You are the network administrator for a large company that wants all users to receive their updates from a local WSUS server. Currently all of your users receive their updates from the Internet. How do you configure the Windows 10 system to get the updates from a WSUS server?

   A. Configure the setting "Choose how updates are installed."

   B. Enable the "Defer Settings" button.

   C. Edit the "Schedule Automatic Updates" settings.

   D. Configure the setting "Choose how updates are delivered."

7. You are the IT administrator for a large computer-training company that uses laptops for all its employees. Currently the users have to connect to the wireless network through the wireless network adapter. Windows 10 now includes this built in as which feature?

   A. Available Network Finder (ANF)

   B. View Networks (VN)

   C. Network Availability Viewer (NAV)

   D. View Available Networks (VAN)

8. You are the network administrator for a midsized company. One of the managers has come into your office and asked you about setting up a network in his house. He wants to use Windows 10. What feature allows him to set up a home network using Windows 10?

   A. Home Networking

   B. HomeGroup

   C. Quick Connect

   D. Networking Groups

9. Which new Windows 10 feature allows you to quickly access files that you have been working on?

   A. Quick Connect

   B. Jump Lists

   C. File Finder

   D. Quick File Access

10. You are the IT manager for a pharmaceutical company. The company wants to create a medication dispenser that can be used on the floors of hospital units. The dispensers have to work through touch-screen technology. Which Windows 10 feature provides built-in touch-screen technology?

   A. Windows Touch Screen

   B. Windows Pure Touch

   C. Windows Touch

   D. Windows Pure Screen