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**Module**

**1**

**Introduction to Windows 10**

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Chapter Introduction

After reading this module and completing the exercises, you will be able to:

* **1**Describe the role of an operating system
* **2**Select an appropriate edition of Windows 10
* **3**Install Windows 10
* **4**Select an appropriate activation method for Windows 10
* **5**Understand the Windows 10 user interface
* **6**Identify network models available for Windows 10

For business computing, Windows is the most popular client operating system and Windows 10 is the latest version. Windows 10 is popular because it is widely supported by business applications. Microsoft also provides well-understood tools that information technology (IT) departments can use to deploy Windows 10 and control Windows 10 configuration.

In this module, you begin by learning the core functionality that Windows 10 provides for applications and hardware management. Then you learn about the multiple editions of Windows 10 that are available to ensure that you can select the most fitting edition for a given scenario. Performing an attended installation of Windows 10, including activation, also is discussed. Finally, you learn about the network models available for Windows 10 that control who can sign in.

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**1-1**Understanding Operating Systems

At home, you use computers for gaming, accessing websites, and running productivity software such as Microsoft Word. You also use computers to communicate with friends and family using email and messaging applications such as Skype. At work, you use computers for similar purposes but also include line-of-business applications and other specialized software.

The common need among home users and business users is running applications. [**Applications**](javascript://) are programs used to accomplish tasks, and the purpose of computing is to complete those tasks. When you select an [**operating system**](javascript://) for computing, you first identify the applications you want to run and then identify the operating system requirement for those applications.

One of the reasons that Windows 10 is popular is the wide availability of applications. Windows operating systems have a long history of providing developers with features that simplify application development. Consequently, many home and business applications were created only for Windows.

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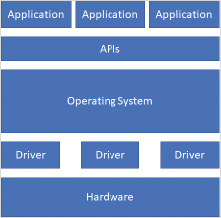
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## 1-1aOperating System Architecture

[**Computer hardware**](javascript://) (i.e., the physical components of a computer), an operating system, and applications all work together as shown in [Figure 1-1](javascript://). Applications are written to communicate with a specific operating system. The operating system is responsible for communicating with hardware. This simplifies application development because the developers don’t need to be aware of specific hardware details.

**Figure 1-1Operating System Architecture**



A computer requires an operating system to function because you need to have software that understands how to use computer hardware. The processor, memory, hard drive, graphics card, and other components have the potential to perform tasks, but they must be instructed what to do.

Many hardware manufacturers and types of hardware exist. It is impossible for any operating system to understand all of them, so operating systems use a modular approach that loads small pieces of software called hardware drivers. [**Hardware drivers**](javascript://) provide the functionality required for the operating system to work with specific types of hardware. Almost all hardware manufacturers create hardware drivers for Windows 10.

To support application developers, an operating system provides [**application programmer interfaces (APIs)**](javascript://). Application developers use APIs to perform common functions like opening and writing to a file. Even functionality like the Save as dialog box is provided by the operating system. An API is generally provided as part of a programming framework such as the .NET Framework provided with Windows 10. Application developers select a consistent framework to use for development.

In general, an application written for one operating system will not run on another operating system because each operating system uses different APIs. That is why it’s important to identify applications you need, and the operating system requirements for those applications, before selecting an operating system.

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## 1-1bWindows 10 Extras

While application availability is one reason for the popularity of Windows 10, much of the extra functionality is also useful. For end users, Windows 10 includes an intuitive and familiar graphical interface for using applications and managing files. Many simple but useful applications are included in Windows 10, such as:

* Notepad
* Calculator
* Microsoft Edge (browser)
* Remote Desktop Connection
* Snip & Sketch

For IT departments, manageability is a key concern for operating systems. Windows 10 includes tools for centralized management with no extra costs. Many additional tools that you can purchase for enhanced management also are available.

Some of the management features included in Windows 10 are:

* Automatic updates: Updates are provided by Microsoft for free and are automatically deployed to Windows 10.
* Integration with Active Directory: [**Active Directory**](javascript://) is a centralized database that contains information about users and computers. By using Active Directory, administrators can control authentication to Windows 10 clients without manually configuring user accounts on each one.
* Group Policy: The settings available in [**Group Policy**](javascript://) allow administrators to configure thousands of operating system settings in Windows 10. These policies can be deployed quickly to thousands of computers for consistent configuration of all computers in a department or across the entire organization.

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## 1-1cAlternative Operating Systems

Windows 10 is not the only operating systems available. Most organizations have a mix of operating systems in use for different purposes. For example, Windows 10 is not available on smartphones.

Some alternative operating systems include the following:

* MacOS is a desktop operating system for Apple computers that is popular with businesses for graphic design tasks. It is also popular with home users because it is easy to use.
* Linux is an open source operating system for desktops that is preferred by some IT professionals; however, it is generally too difficult for an average computer user to configure and has limited applications.
* Android is a mobile operating system that is used by many smartphones and tablets.
* iOS is a mobile operating system for Apple iPhones.
* iPadOS is a mobile operating system for Apple iPad tablets.

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**1-2**Windows 10 Editions

Not all Windows 10 users have the same requirements for an operating system. For example, home users do not typically need their computer to integrate with Active Directory for authentication. To address the needs of each user segment, Microsoft has created multiple editions of Windows 10. Each edition is designed to meet the needs of a unique group of users and has unique features.

The five market segments with unique editions of Windows 10 are:

* Home
* Small business
* Small business power users
* Enterprise
* Education

**Tip**

If you need an updated list of features in the varying editions of Windows 10, Wikipedia provides a well-maintained list at [https://en.wikipedia.org/wiki/Windows\_10\_editions](https://en.wikipedia.org/wiki/Windows_10_editions" \t "_blank).

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## 1-2aWindows 10 Home

[**Windows 10 Home**](javascript://) edition is the baseline edition of Windows 10 that is oriented to home users. This edition of Windows 10 includes all the core functionality required to run Windows applications. When you buy a PC with Windows 10 from a retail store, this is the edition of Windows 10 that is most likely included.

The following are some of the features in Windows 10 Home:

* Support for 1 physical processor and up to 128 GB of memory
* Run Windows applications
* Customizable Start menu
* Cortana voice assistant
* Microsoft Edge browser
* Windows Hello biometric authentication
* Device encryption
* Tablet mode
* Windows Update
* Local user accounts
* Local Group Policy
* Windows Defender Antivirus
* Windows Defender Firewall
* Windows Defender Exploit Protection (partial features)
* Microsoft Store

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## 1-2bWindows 10 Pro

Business environments have management requirements that home users don’t have. The IT department needs to be able to centrally control authentication to desktop computers, access to resources and applications, deployment of applications, and security settings. None of these is possible with Windows 10 Home. [**Windows 10 Pro**](javascript://) adds these features that businesses require.

Some of the features added in Windows 10 Pro are:

* Support for 2 physical processors and up to 2 TB of memory
* Domain join to Active Directory for centralized authentication
* Azure Active Directory (Azure AD) join for centralized management and authentication
* Group Policy from Active Directory for centralized management
* Windows Hello for Business with PIN authentication
* Remote Desktop for remote access
* Client Hyper-V to create virtual machines
* BitLocker drive encryption
* Windows Defender Credential Guard
* Windows Defender System Guard
* Windows Autopilot for deployment
* Windows Update for Business with additional controls
* Microsoft Store for Business with organization-specific customization

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## 1-2cWindows 10 Pro for Workstations

For power users with high speed processing requirements, Microsoft has introduced [**Windows 10 Pro for Workstations**](javascript://). This edition of Windows 10 has support for higher end hardware that might be used for processing large amounts of data performing data analysis or engineering works.

Features added in Windows 10 Pro for Workstations include:

* Support for 4 physical processors and up to 6 TB of memory
* ReFS file system to support larger volumes and files
* Persistent memory using nonvolatile memory for high-performance local file access
* SMB Direct for high-performance network file access

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## 1-2dWindows 10 Enterprise

For larger organizations with advanced security and management needs, Microsoft produces [**Windows 10 Enterprise**](javascript://) edition. This edition of Windows 10 provides the fullest feature set.

Features added in Windows 10 Enterprise include:

* Windows Defender Application Guard to isolate untrusted websites from enterprise data
* Windows Defender Application Control and Applocker to control which applications are allowed to run
* Desktop Analytics to analyze upgrade readiness and compliance
* Branchcache
* [**Windows 10 Enterprise Long Term Servicing Channel (LTSC)**](javascript://) for specialized software
* Cloud activation
* Manage Microsoft Store access, the Start menu, Taskbar, and Cortana settings
* Windows Virtual Desktop use rights
* Microsoft Application Virtualization (App-V) for easier application distribution
* Microsoft User Environment Virtualization (UE-V) for simplified user roaming among computers

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## 1-2eWindows 10 Enterprise LTSC

Microsoft releases feature updates of Windows 10 twice per year, and each feature update is supported for 18 months. A feature update can enable and remove features from Windows 10. During the 18-month period, updates are provided for a feature update. For example, if a feature update is released in March of 2020 then updates are provided until September 2021. The intent is that you will install a new feature update before support ends.

**Tip**

Some older documentation refers to Windows 10 Enterprise LTSC as Windows 10 Enterprise Long Term Servicing Branch (LTSB).

In some scenarios where certification is required for a specific combination of hardware and software, performing updates every two years might not be possible. For example, consider a computer that controls specialized medical equipment, such as an MRI. The hardware and software vendor might consider it too much of a burden to recertify on a regular basis. The Windows 10 Enterprise LTSC is designed for these scenarios, and each release is supported for 10 years. A new version of Windows 10 LTSC is released every 2–3 years.

Windows 10 Enterprise LTSC has removed some features from Windows 10 Enterprise to minimize change requirements. Some of the functionality removed includes:

* The Microsoft Store
* Modern apps (a newer development method for applications)
* Microsoft Edge

Below is a list of items to remember about using Windows 10 Enterprise LTSC:

* Most applications are not tested or supported on Windows 10 Enterprise LTSC.
* The .NET Framework required for many applications will not be updated to the latest versions.
* The latest hardware advances will not be supported, and you might be limited using older hardware.

**Caution**

Do not use Windows 10 Enterprise LTSC as a standard desktop operating system to avoid applying updates to Windows 10 or to disable the Microsoft Store. Instead develop a deployment and update process that works for your organization.

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## 1-2fWindows 10 Education Editions

Schools are a unique market because, unlike business environments, computers are typically shared by students, and it is not desirable for students to configure those computers. Microsoft makes two versions of Windows available specifically for schools:

* [**Windows 10 Pro Education**](javascript://) has the same feature set as Windows 10 Pro.
* [**Windows 10 Education**](javascript://) has the same feature set as Windows 10 Enterprise.

Both education editions of Windows 10 disable the display of Windows 10 tips, “fun facts,” and Microsoft Store suggestions by default. If you turn on Microsoft Store suggestions, then only Microsoft apps are displayed. This is the primary technical difference between the education editions and the editions on which they are based.

**Tip**

Before version 1703, Windows 10 Pro Education and Windows 10 Education disabled Cortana by default. That is no longer the case.

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## 1-2gWindows 10 N & KN Editions

Microsoft makes variants of Windows 10 editions available specifically for the European and South Korean markets. European versions are denoted with an N and South Korean versions are denoted with KN. Neither the N nor KN variants include Windows Media Player or other multimedia software; however, users with these variants can download the Media Feature Pack from Microsoft, which includes the removed functionality. These variants exist due to legal requirements in Europe and South Korea.

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## 1-2h32-Bit Versions

Windows 10 is available in both 32-bit and 64-bit versions. For example, there is a 32-bit version of Windows 10 Pro and a 64-bit version of Windows 10 Pro. Older computers (prior to 2010) had processors that were capable only of 32-bit processing. All newer computers support 64-bit processing, which you might see referred to as [**x64 architecture**](javascript://).

A 32-bit processor can address only 4 GB of memory. When you use this 32-bit version of Windows 10 with a 64-bit processor, the same 4 GB limit applies. The 32-bit version of Windows 10 can use only 4 GB of memory regardless of how much physical memory is installed in the computer.

Many applications are still written as 32-bit applications that can run on 32-bit or 64-bit versions of Windows 10. Some applications that are written as 64-bit applications, however, cannot run on the 32-bit version of Windows 10. To use 64-bit applications, you need to have the 64-bit version of Windows 10.

**Tip**

For best application compatibility and performance, you should always use a 64-bit version of Windows 10 unless you have a specific requirement to use a 32-bit version.

The main reason to run a 32-bit version of Windows 10 is to support legacy software or hardware drivers. Some legacy software is 16-bit software that can’t run on a 64-bit version of Windows 10. A 32-bit version of Windows 10 can run 16-bit software.

Some examples of 16-bit software are:

* A driver for specialized hardware, such as lab equipment
* An older business-critical application that was not updated by the vendor
* A custom-developed application with no ongoing support

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**1-3**Installing Windows 10

Most computers are purchased with Windows 10 already installed by the manufacturer. As a home user, you just turn on the computer, wait for a small setup routine to run, and then start using it. In a business environment, however, it is quite common for the Windows 10 operating system installed by the manufacturer to be removed and a different version installed.

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## 1-3aHardware Requirements

The minimum hardware requirements for Windows 10 that Microsoft provides are sufficient to install Windows 10, but they do not provide a satisfactory user experience. The minimum requirements are listed in [Table 1-1](javascript://) below.

**Table 1-1**

### Minimum Hardware Requirements for Windows 10

| **System Component** | **Recommendation** |
| --- | --- |
| CPU | 32- or 64-bit processor, 1 GHz or faster |
| System RAM | 1 GB for 32-bit, 2 GB for 64-bit CPU |
| Disk space | 16 GB for 32-bit, 32 GB for 64-bit editions |
| Video card drivers | DirectX 9 graphical processor and WDDM 1.0 (or higher) |

The minimum RAM (random access memory) identified by Microsoft is inadequate for day-to-day use of Windows 10. At minimum, you should have 4 GB of memory for reasonable performance; if you are purchasing new computers, strongly consider getting 8 GB of memory to ensure that you can run multiple applications simultaneously without impacting performance. It’s not uncommon for a browser with a few tabs open to consume over 1 GB of memory.

The disk space required for the operating system files is not an accurate representation of the disk space required in the computer. Additional disk space is consumed by data files, applications, and temporary files. Some users might be able to function with 120 GB hard drives, but 240 GB or larger is preferred.

**Tip**

Using an SSD (solid-state drive) instead of a spinning disk has a dramatic impact on system performance. If you’re buying new systems, opt for an SSD drive.

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## 1-3bDVD Boot Installation

The simplest method for installing Windows 10 is a [**DVD boot installation**](javascript://). To perform a DVD boot installation, you need to have the Windows 10 installation files on DVD and configure your computer to boot from DVD. When you start your computer with the DVD inserted, the computer starts the installation of Windows 10 from the DVD.

The DVD boot installation method is the least suitable method for a large volume of computers. It requires you to visit each computer with a DVD and to leave the DVD in the computer during the installation process. This method is suitable for small organizations that only occasionally install Windows 10. Other installation methods are covered later in [Module 12](javascript://) Automating Windows 10 Deployment.

With a DVD boot installation, the degree of customization performed is low because it includes only the drivers and components included on the Windows 10 installation DVD. It does not include additional applications or updates; however, you can add drivers during installation by using removable media, such as USB storage.

To speed up a DVD boot installation, you can put the installation files on faster media, such as USB storage. The USB interface on modern computers with an external disk drive or flash storage is much faster than a DVD drive.

**Activity 1-1**

### Installing Windows 10

**Time Required:**30 to 60 minutes

**Objective:**Install Windows 10

**Description:**You have just received a new copy of Windows 10. You are considering deploying Windows 10 for your organization. To sell the management team on implementing Windows 10, you need to install the system and provide a demonstration of the new features. In this activity, you install Windows 10 (a new install, not an upgrade) on your computer.

1. 1

Ensure that your computer is configured to boot from DVD. The boot configuration of your computer is configured in the BIOS or UEFI firmware settings of your computer. Refer to the documentation specific to the computer to determine the steps to complete this requirement. Many newer computers will boot from the DVD drive automatically if no operating system is installed on the system’s hard drive.

1. 2

Place your Windows 10 DVD in the DVD drive of your computer.

1. 3

Restart your computer.

1. 4

If directed by the startup screen, press any key to boot from DVD. This message may appear only if the hard drive has an existing bootable partition or if the computer’s boot sequence is configured to allow it.

1. 5

In the Windows Setup window, confirm that the installation language, time and currency format, and keyboard layout are correct and then click **Next**.

1. 6

Click **Install now** and then wait for setup to start.

1. 7

On the Applicable notices and license terms page, select the **I accept the license terms** check box and then click **Next**.

1. 8

On the Which type of installation do you want screen, click **Custom: Install Windows only (advanced)**. This is required to perform a new installation.

1. 9

On the Where do you want to install Windows screen, if necessary, install additional disk drivers as described by your instructor.

1. 10

If any existing partitions appear, delete each partition using the following steps:

* 1. Click the partition to select it.
  2. Click **Delete**.
  3. Click **OK** to confirm that you understand that all data on the partition will be deleted.

1. 11

Examine the number in the Free space column. Exercises in other modules require at least 30 GB of space to remain unallocated.

1. 12

Click **Drive 0 Unallocated Space** and then click **New**.

1. 13

In the **Size** text box, enter a value that is no less than 50000 and that leaves at least 30000 MB of disk space unallocated and then click **Apply**.

1. 14

In the warning window, click **OK** to acknowledge that additional partitions may be created. Windows 10 automatically creates several partitions to support recovery and advanced boot options.

1. 15

Click **Drive 0 Partition 4** to select it and then click **Format**.

1. 16

In the warning window, click **OK** to confirm that all data on the partition will be lost when it is formatted. No data is on this partition at this time.

1. 17

If necessary, click **Drive 0 Partition 4** to select it and then click **Next**. Windows now copies system files to the hard drive, reboots, performs additional configuration tasks, reboots one or more times, and then asks for user input again. This portion of the installation can take up to 30 minutes but may be faster depending on your hardware. When your computer reboots, do not press a key to start from the DVD.

1. 18

On the Let’s start with region screen, select your region and then click **Yes**.

1. 19

On the Is this the right keyboard layout screen, select the correct keyboard layout and then click **Yes**.

1. 20

On the Want to add a second keyboard layout screen, click **Skip**.

1. 21

On the Sign in with Microsoft screen, in the lower left corner, select **Domain join instead**.

1. 22

On the Who’s going to use this PC screen, in the Name box, type **Userx**, where x is a number assigned to you by your instructor.

1. 23

On the Create a super memorable password screen, in the Password box, type **password** and then click **Next**.

**Note 1**

If you choose a more secure password than “password” be sure to document it so that you don’t forget it.

1. 24

On the Confirm your password screen, in the Confirm password box, type **password** and then click **Next**.

1. 25

On the Create security questions for this account screen, in the Security question (1 of 3) box, select a security question.

1. 26

In the Your answer box, type an answer and then click **Next.**

1. 27

Repeat [Steps 25](javascript://) and [26](javascript://) twice to complete answers for questions 2 and 3.

1. 28

On the Do more across devices with activity history screen, click **Yes**.

1. 29

On the Get help from your digital assistant screen, click **Accept**.

1. 30

On the Choose privacy settings for your device screen, click **Accept**.

1. 31

Wait for a minute or two while your user profile is created.

1. 32

Right-click the Start button and select **Windows PowerShell (Admin)**.

1. 33

In the User Account Control window, click **Yes** to allow this app to make changes to your computer.

1. 34

At the Windows PowerShell prompt, type **hostname** and then press **Enter**. Note that the name of the computer is listed as the output of the command, and that the name has been automatically generated during the operating system’s installation.

1. 35

Type **Get-ComputerInfo** and then press **Enter**. This returns a large amount of information about your computer in addition to the computer name.

1. 36

Type **shutdown /s /t 5** and then press **Enter**. This causes the computer to exit all running applications and shut down the computer in 5 seconds. Note that the computer can be shut down from the Start menu, but this command-line technique is commonly used by administrators who are remotely managing a user’s computer.

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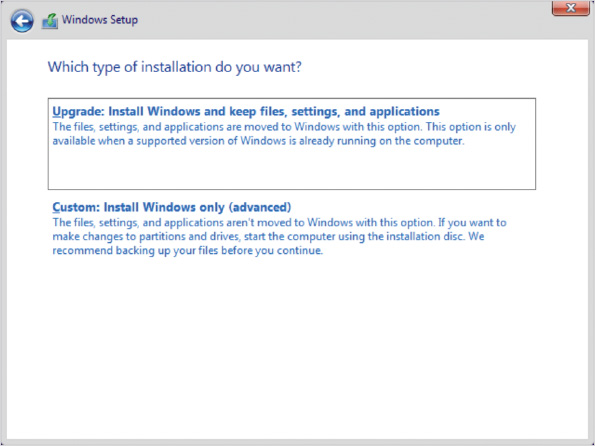
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## 1-3cUpgrading to Windows 10

If you have computers running a previous version of Windows, they can be upgraded to Windows 10. During the installation of Windows 10, you need to select the option Upgrade: Install Windows and keep files, settings, and applications, as shown in [Figure 1-2](javascript://). When you perform an upgrade, user data and applications are retained; however, if an application is not compatible with Windows 10 it won’t be functional after the upgrade. In rare cases, the upgrade process will identify an incompatible application.

**Figure 1-2The Windows 10 Setup Screen**



Enlarge Image

Not all previous versions of Windows can be upgraded to Windows 10. You can upgrade Windows 7 SP1 or Windows 8.1 to Windows 10. It is not possible to upgrade Windows 8.0 to Windows 10.

You should consider the restrictions on which editions of Windows 10 you might purchase when upgrading. In general, you should be upgrading to an equivalent or better edition of Windows 10. For example, you can upgrade Windows 7 Pro to Windows 10 Pro, but you cannot upgrade Windows 7 Pro to Windows 10 Home.

**Note 2**

You can view a complete list of Windows 10 upgrade paths at [https://docs.microsoft.com/en-us/windows/deployment/upgrade/windows-10-upgrade-paths](https://docs.microsoft.com/en-us/windows/deployment/upgrade/windows-10-upgrade-paths" \t "_blank).

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## 1-3dEdition Upgrades

You can upgrade the edition of Windows 10 without doing an installation from DVD. To upgrade from a lower version of Windows 10 to a higher version of Windows 10, you can enter the new product key. For example, you can upgrade from Windows 10 Home to Windows 10 Pro by entering the Windows 10 Pro product key. This is useful if you’ve purchased a computer with Windows 10 Home included but need the features of Windows 10 Pro to join the domain in the office.

**Note 3**

You can view a complete list of Windows 10 edition upgrade paths at [https://docs.microsoft.com/en-us/windows/deployment/upgrade/windows-10-edition-upgrades](https://docs.microsoft.com/en-us/windows/deployment/upgrade/windows-10-edition-upgrades" \t "_blank).

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**1-4**Licensing Windows 10

Multiple methods for purchasing Windows 10 licenses are available to you. You can select the type of licensing that you want based on pricing and ease of implementation. A general overview of licensing is provided below, but Microsoft licensing is a complex subject; you should verify all licensing details before you purchase your own license(s).

When you purchase a new computer that includes Windows 10, the license for Windows 10 is an [**original equipment manufacturer (OEM) license**](javascript://). This type of license is tied to the physical device and cannot be reused if you purchase a new computer. OEM product keys are stored in the firmware of your computer and are automatically detected if you reinstall Windows 10.

A [**full packaged product (FPP) license**](javascript://) is purchased from a retail store and generally includes the media for installation and a product key. This type of license typically includes the option to move from one computer to another. In part because the license is transferrable, it costs more than OEM licensing.

[**Volume licensing**](javascript://) is a license agreement that organizations purchase to obtain software directly from Microsoft. When you purchase volume licenses for Windows 10, you are given access to a website where you can download the software you have licensed. That same website also has the product keys for your software.

You get additional benefits when you purchase volume licensing. For example, Windows 10 volume licensing includes imaging rights for easier installation that are not included with OEM licenses. Microsoft also provides an option to purchase software assurance with volume licensing, which provides new version rights and other benefits.

**Caution**

Volume licensing for Windows 10 is upgrade licensing from OEM versions. You cannot use volume licensing on a computer without an OEM license.

[**Cloud licensing**](javascript://) is available to upgrade computers from Windows 10 Pro to Windows 10 Enterprise. You can purchase a cloud-based subscription for Windows 10 Enterprise alone; it also is included in larger packages, such as Microsoft 365. This type of licensing is enabled by signing in to Microsoft Azure AD, where a license has been assigned, rather than by using a product key.

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**1-5**Activating Windows 10

[**Product activation**](javascript://) is a process put in place by Microsoft to reduce piracy. If an installation of Windows 10 is not activated, some operating system features are disabled. At a minimum, some personalization features are disabled. At this writing, no other functionality is impaired, but older Microsoft operating systems have also forced a shutdown every 60 minutes for a nonactivated system.

Product activation requires very little additional work on the part of a computer user and significantly reduces piracy. It is now designed to inform a user that an unscrupulous retailer is selling illegitimate copies of Windows 10 rather than to punish the user.

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[**help**](javascript://)

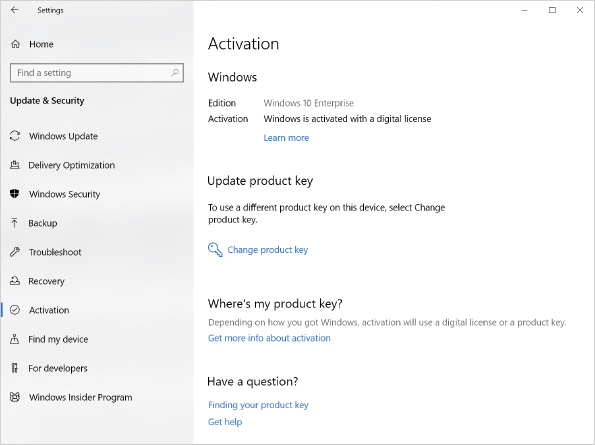
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## 1-5aOEM and FPP License Activation

For OEM and FPP licenses, activation usually happens automatically over the Internet after installation. You can view activation status for Windows 10 on the Activation screen in Update & Security. [Figure 1-3](javascript://) shows the Activation screen for a computer that has already been activated. You can also view the edition of Windows 10 and change the product key.

**Figure 1-3Activation Information**



Enlarge Image

**Tip**

If activation can’t be completed via the Internet, you can use phone-based activation; however, this option should be avoided when possible because it is time-consuming.

When Windows 10 is activated, the product key used during installation is associated with the specific computer that is performing the activation. Information about the hardware in the computer is used to generate a unique identifier that is sent as part of the activation process. No personal information is sent as part of the process.

If you perform significant hardware changes to your computer, you may be forced to reactivate Windows 10, because Windows 10 assumes that it is installed on a new computer. Reactivation is not forced for simple upgrades such as an additional hard drive or additional RAM; however, installing a new motherboard typically requires reactivation.

In practice, at the time of this writing, Microsoft has been allowing two automatic product activations for FPP license keys before requiring users to call the Activation Center. This is useful when moving your copy of Windows 10 to a new computer. If you do need to call the Activation Center, Microsoft confirms your license information and the reason for an additional installation before issuing you an activation code.

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## 1-5bVolume License Activation

In larger organizations, managing license keys separately for each computer would be time consuming. Volume licensing simplifies the management of license keys and provides multiple options for activation, which are listed below:

* [**Multiple Activation Key (MAK)**](javascript://)—This type of product key functions the same as an OEM or retail product key that can be activated over the Internet or by phone. A MAK, however, can be used on a specific number of computers rather than just once. This simplifies key management for midsized organizations.
* [**Key Management Service (KMS)**](javascript://)—This type of product key requires you to install KMS on a computer to act as a central point for product registration on your internal network. Product keys are installed on the KMS server and activated by having the KMS server communicate with the Internet. Computers activate by communicating with the KMS server on the internal network. This scenario simplifies key management in very large organizations. It also allows activation to occur in scenarios where the client computer is not able to directly perform activation due to firewalls.
* [**Active Directory-based activation**](javascript://)—If computers will contact an Active Directory domain at least every 180 days, you can implement Active Directory-based activation. Computers activate by communicating with Active Directory rather than a specific server. This option for activation was introduced for Windows 8 or newer operating systems. This is an improvement over KMS because there is no need to communicate with a specific server.

**Note 4**

For an in-depth reference on volume activation, see Troubleshooting Windows Volume Activation at [https://docs.microsoft.com/en-us/windows-server/get-started/activation-troubleshooting-guide](https://docs.microsoft.com/en-us/windows-server/get-started/activation-troubleshooting-guide" \t "_blank).

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## 1-5cTroubleshooting MAK Activation

When you use MAK product keys for Windows 10, not many things can go wrong. The most common problem is a lack of Internet connectivity during the initial activation attempt. To resolve this, connect the computer to the Internet.

If it is not possible to connect computers to the Internet for activation, you can use phone-based activation, but that would be very time-consuming. Instead, you should configure proxy activation by using the [**Volume Activation Management Tool (VAMT)**](javascript://). VAMT is also the tool that you use to configure a computer as a KMS host. You can download VAMT from Microsoft as part of the Windows Automated Deployment Toolkit (Windows ADT).

When you use VAMT for proxy activation, you install it on a computer that has access to the Internet. Then, the product keys you want to activate are installed into VAMT and the isolated computers. VAMT uses the product keys to generate activation information that is distributed to the isolated computers.

If the isolated environment can’t allow VAMT to communicate with the Internet, then you can export information from an isolated VAMT server to file and import it to a VAMT server that does have Internet access for activation. When activation data has been gathered, it is exported from the Internet connected VAMT server as a file and imported on the isolated VAMT server. You can move the exported file between the isolated VAMT server and Internet-connected VAMT server by using removable media or a network file copy.

**Note 5**

For detailed steps about using VAMT for proxy activation, see Scenario 2: Proxy Activation at [https://docs.microsoft.com/en-us/windows/deployment/volume-activation/scenario-proxy-activation-vamt](https://docs.microsoft.com/en-us/windows/deployment/volume-activation/scenario-proxy-activation-vamt" \t "_blank).

Activation with a MAK can also fail when the maximum number of activations for a key is reached. This can occur when you are using the same MAK to install Windows on a new set of computers. For example, you might have purchased 50 licenses of Windows 10 Pro and used the MAK with 50 activations for a set of computers two years ago. When you purchase 25 new computers and use the same MAK, it exceeds your activation limit even though you are within your license terms because you are retiring 25 older computers. In such a case, call the Activation Center and inform them of what you are doing; they will increase the number of activations for the MAK.

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## 1-5dTroubleshooting KMS Activation

KMS activation simplifies product key management on computers, but is fairly complex to set up and configure. You need to set up a KMS server in your organization and add the license keys to that KMS server. Clients automatically connect to the KMS server for activation and you can view the number of activations on the KMS server.

**Caution**

If you have an older KMS server already implemented, you might need to update it to support Windows 10 clients.

To use KMS activation, the client computers being activated need to be configured with a [**generic volume license key (GVLK)**](javascript://). The GVLK for an edition of Windows 10 is not unique to your organization. If a computer is not activating, ensure that you have entered the correct GVLK.

**Tip**

You can obtain the GVLKs for all Windows editions at [https://docs.microsoft.com/en-us/windows-server/get-started/kmsclientkeys](https://docs.microsoft.com/en-us/windows-server/get-started/kmsclientkeys" \t "_blank).

A KMS server has minimum activation thresholds that must be met before clients can be activated. For Windows 10, the minimum activation threshold is 25. This means that no instances of Windows 10 are activated until 25 instances have attempted to activate on the KMS server. You can verify the number of activation attempts on the KMS server.

When you install the KMS server, it creates a service (SRV) record in the domain name system (DNS). This SRV record contains the name of the KMS server for clients to contact. For example, if your domain is [giganticlife.com](http://giganticlife.com/" \t "_blank) then an SRV record of [\_vlmcs.\_tcp.giganticlife.com](http://_vlmcs._tcp.giganticlife.com/" \t "_blank) is created. That SRV record points to the KMS server. When troubleshooting, you should verify that the SRV record is present and that the client computer can connect to the KMS server.

**Caution**

In a multidomain environment you need to configure the DNSDomainPublishList registry key on the KMS server to ensure that the SRV record is created in all domains.

A KMS activation is valid for 180 days. If a computer is going to be disconnected from the KMS server for more than 180 days, you should use MAK for activation instead. For example, if you have computers for external sales staff that do not visit the office regularly, then use MAK instead of KMS activation.

**Tip**

When troubleshooting activation, you can use the command **slmgr /dlv** to view detailed licensing information.

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## 1-5eTroubleshooting Active Directory-Based Activation

Active Directory-based activation is like KMS activation but is not reliant on a KMS server. Instead, all of the information is stored in Active Directory as activation objects, which is a more reliable source than a single KMS server. Active Directory-based activation also does not have minimum activation thresholds. The first client can be activated using Active Directory-based activation.

Because so much less configuration is required in Active Directory-based activation, much less troubleshooting is necessary. The steps for troubleshooting are to confirm the following:

* Windows 10 has a GVLK installed
* Windows 10 is joined to Active Directory where Active Directory-based activation is configured
* Windows 10 can properly authenticate to Active Directory
* Windows 10 has authenticated to Active Directory within the last 180 days
* The KMS key for Windows 10 was installed for Active Directory-based activation

**Activity 1-2**

### Viewing Activation Information

**Time Required:**5 minutes

**Objective:**View Windows 10 activation information.

**Description:**You have recently installed Windows 10 and want to verify that it was activated properly. This is useful for troubleshooting activation issues.

1. 1

If necessary, start your computer and sign in.

1. 2

Click the **Start** button and then click **Settings**.

1. 3

In the Settings window, select **Update & Security**.

1. 4

In the left pane, select **Activation** and read the activation information.

1. 5

Close the Settings window.

1. 6

Right-click the Start button and then click **Windows PowerShell (Admin)**.

1. 7

In the User Account Control window, click **Yes**.

1. 8

At the Windows PowerShell prompt, type **slmgr /dlv** and press **Enter**.

1. 9

In the Windows Script Host window, read the licensing information and then click **OK**.

1. 10

At the Windows PowerShell prompt, type **slmgr** and then press **Enter**. This shows all the available parameters for running slmgr.

1. 11

In the Windows Script Host window, read the options and then click **OK**.

1. 12

Repeat [Step 11](javascript://) four times to read all five screens of information.

1. 13

At the Windows PowerShell prompt, type **Get-CimInstance -ClassName SoftwareLicensingProduct** and then press **Enter**.

1. 14

Read the licensing information and then close the Windows PowerShell prompt.

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**1-6**Using Windows 10

The Windows 10 user interface is similar to previous versions of Windows and quite intuitive to use. For anyone who has used previous version of Windows, the interface is similar and familiar.

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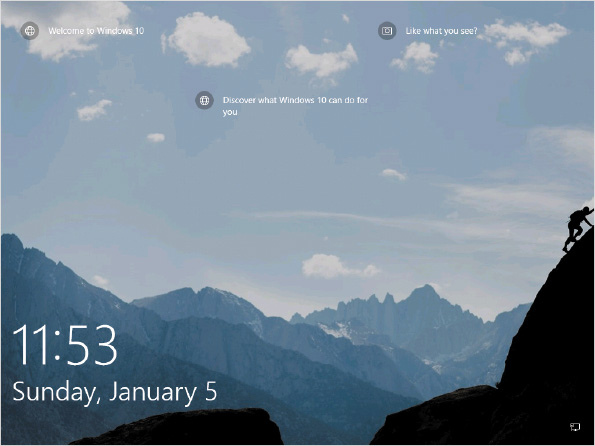
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## 1-6aLock Screen

The Windows 10 lock screen is displayed when the computer first starts, as shown in [Figure 1-4](javascript://). The lock screen is a security and display layer that initiates access to the local device running Windows 10. Previous versions of Windows presented a screen asking the user to press **Ctrl+Alt+Delete** to initiate the sign-in process. Given that Windows 10 is used with a larger range of devices, the lock screen was changed to a format that is similar to what you would see on a smartphone. Useful information can be displayed on the lock screen, such as weather, battery charge indicator, date and time, Windows Store information, Cortana, and other customizable details that would be safe for anyone to see. By default, the picture displayed on this screen is updated every few days by Microsoft. The icons on the screen provide additional information when you move the pointer over them.

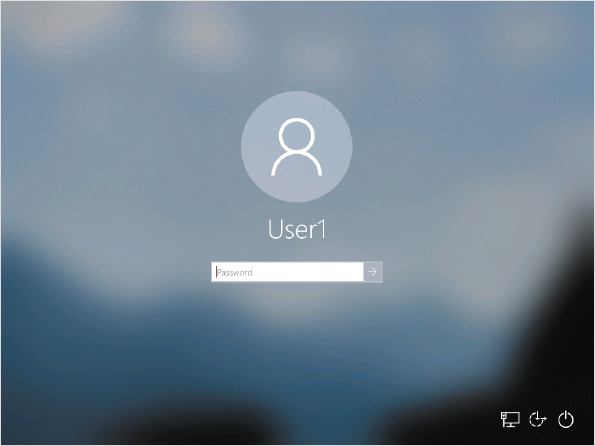
**Figure 1-4The Windows 10 Lock Screen**



Enlarge Image

You can trigger the lock screen to remove itself by performing an action like clicking a mouse button, pressing a key, or touching a touch-sensitive screen. After one of these actions occur, the sign-in screen replaces the lock screen and allows the user to sign in, as shown in [Figure 1-5](javascript://). If multiple local accounts are detected, a list of accounts appears in the lower-left corner and you can click to select the one you want to sign in as. The lower-right corner of the screen contains icons for network connectivity, accessibility settings, and shutdown.

**Figure 1-5The Windows 10 Sign-In Screen**



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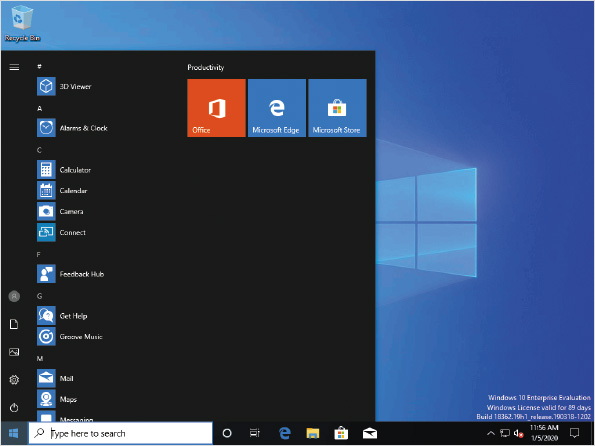
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## 1-6bStart Menu

Many people were disappointed when the [**Start menu**](javascript://) was removed in Windows 8. The same Start menu that was popular in Windows 7 returns to Windows 10 with an updated look. Clicking the Start button displays the Start menu, as shown in [Figure 1-6](javascript://).

**Figure 1-6Start Menu**



Enlarge Image

When you browse the Start menu, three columns of information are displayed. The left-hand column displays small icons to identify the currently signed-in user and to access documents, pictures, system settings, and power controls. A description of each small icon can be seen by hovering the pointer over the icon. If desired, this column can be expanded by clicking the menu icon at the top of the column.

The middle column contains a list of applications, with the user’s most frequently used applications at the top, and a sorted list of installed applications below that. When new applications are installed, they appear in this area. Folders in this column are used to organization applications. To view the applications, you need to expand the folder.

The right-hand column is an area that you can customize to contain your most commonly used apps in the order that you prefer. For example, you could put the Microsoft Office apps here along with your preferred browser. When you install applications, they sometimes automatically place an icon here, but you can remove it.

**Tip**

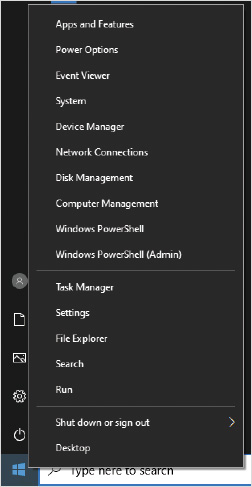
Centralized management of the Start menu layout for computers in an organization is possible with Windows 10 Pro, Windows 10 Enterprise, and Windows 10 Education. For detailed information about how to customize the Start menu layout, visit [https://blogs.technet.microsoft.com/deploymentguys/2016/03/07/windows-10-start-layout-customization/](https://blogs.technet.microsoft.com/deploymentguys/2016/03/07/windows-10-start-layout-customization/" \t "_blank).

Some of the applications in the Start menu have Live Tiles. Live Tiles allow applications to provide quick summary information without the need to run the application. For example, a weather application can display the temperature in the icon. Some people prefer that the icons remain static so that they are more easily identifiable, and this feature can be disabled.

Windows 10 uses jump lists to identify content recently opened by an application or common tasks for that application. To view the jump list for an application, right-click it. For example, if you right-click the icon for Microsoft Word, you will see a list of documents recently opened by using Word. Similarly, right-clicking a browser application will display a list of frequently visited websites.

For administrators, right-clicking the Start button displays a shortcut menu of commonly used administrative tools, as shown in [Figure 1-7](javascript://). This is a fast and easy to remember way to access these tools.

**Figure 1-7Shortcut Menu for Administrative Tools**



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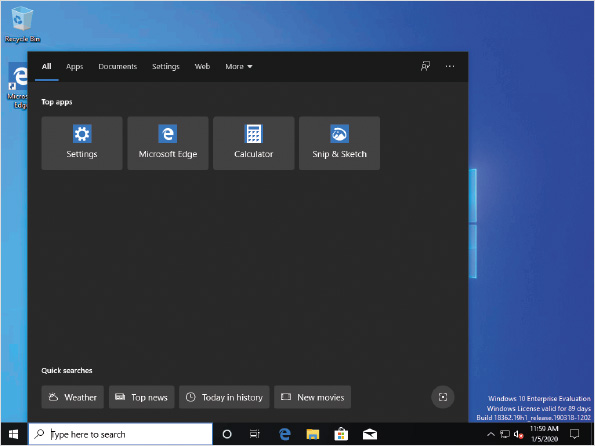
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## 1-6cSearch Interface

A Search box appears next to the Start button, as shown in [Figure 1-8](javascript://). Typing text in the Search box allows you to find content on the local computer, the Internet, and the Microsoft Store. This provides a single point you can use to search for documents, windows settings, websites, and applications.

**Figure 1-8Search Tool**



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## 1-6dTaskbar

The [**taskbar**](javascript://) is a horizontal bar located at the bottom of the screen by default, as shown in [Figure 1-9](javascript://). On the left side of the taskbar are the Start button and search tool. On the right side of the taskbar is the notification area. In the middle of the taskbar is an area containing icons to start applications and icons that identify running applications.

**Figure 1-9Taskbar**

The taskbar which is a default horizontal bar present on the bottom of the screen in Windows 10. The Start button and the search tool are present on the left side of the taskbar. The middle of the taskbar contains icons to start applications and the icons of running applications. A notification area is present on the right side of the taskbar.

Enlarge Image

The taskbar has some application icons by default. You can customize these to match your own work habits. The applications here by default are Cortana, Task View, Microsoft Edge, File Explorer, the Microsoft Store, and Mail. Many people remove the Microsoft Store and Mail icons to make room for more running applications. You can also select applications that you want easily available and pin them to the taskbar.

When multiple windows are open, the screen can get cluttered and windows might overlap one another. To better organize open windows, an icon is placed on the taskbar that represents the running application.

Hovering the pointer over an icon for a running program (indicated by a colored bar beneath the icon) displays a preview of each window the application has open above the taskbar button. Hovering the pointer over a preview window previews only that window on the desktop. This is known as the Peek feature because a user can conveniently peek at an active window without having to fully switch to it. If the pointer is moved away from the preview window without selecting it, the desktop reverts to the way it was before the preview. If the user clicks a preview window, that window becomes the active window.

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## 1-6eNotification Area

In previous versions of Windows, the [**notification area**](javascript://) could easily get cluttered with notifications and icons from multiple applications and the operating system. The notification area has been simplified by default to display the clock and icons for volume, network connectivity, and Action Center notifications. Additional icons may be displayed for touch screen controls, battery power, and stylus utilities, depending on the hardware capabilities of the device running Windows 10.

The [**Action Center**](javascript://) lists important notifications from the operating system to the user in one place. You should periodically check this area to see if there are new notifications of problems or solutions that Windows 10 has discovered.

Other applications can add icons to the notification area, but they are not displayed automatically. The extra icons are viewed by clicking the up arrow icon at the left-hand side of the notification area, which opens a window containing other notification icons that may be active. You can configure settings to control which icons are displayed in the notification area.

**Activity 1-3**

### Configuring the Windows 10 User Interface

**Time Required:**5 minutes

**Objective:**Configure the Windows 10 user interface.

**Description:**You have recently installed Windows 10. You are configuring the user interface to gain more experience with the available options. This will help you understand the options available to end users in your organization when you need to help them.

1. 1

If necessary, start your computer and sign in.

1. 2

Click **Start**, right-click **Calculator**, and then click **Pin to Start**.

1. 3

In the Search box, type **notepad**.

1. 4

In the details pane, below **Notepad**, click **Pin to Start**.

1. 5

Click **Start** and verify that both Calculator and Notepad are on the Start menu.

1. 6

Click **Start** to close the Start menu.

1. 7

On the taskbar, right-click the **Mail** icon and then click **Unpin from taskbar**.

1. 8

On the taskbar, right-click the **Microsoft Store** icon and then click **Unpin from taskbar**.

1. 9

On the taskbar, right-click an open area, expand **Search**, and click **Show search icon**. This frees up a great deal of space on the taskbar when the screen resolution is low.

1. 10

On the taskbar, right-click an open area, point to Cortana on the shortcut menu, and then click **Show Cortana button** on the submenu. This removes the Cortana icon from the taskbar.

1. 11

On the taskbar, in the notifications area, click the up arrow to display the status of background applications.

1. 12

On the taskbar, click the Action Center icon on the far right. Because your computer is a brand-new installation, there might be no new notifications to view.

1. 13

Click the Action Center icon again to close the Action Center.

1. 14

On the taskbar, right-click an open area and then click **Taskbar settings**.

1. 15

In the Settings window, read the available settings.

1. 16

Click the Start tab in the left pane and read the available settings.

1. 17

Close the Settings window.

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## 1-6fAdvanced Window Management

Windows 10 includes features that make it easier to manage open windows and arrange them. These features are useful when you have multiple applications running.

The Snap feature allows you to quickly resize windows by clicking the title bar of the window and dragging it to the top, sides, or middle of the screen. If the window is dragged to the top of the screen, the application is maximized to use the whole screen. If the window is dragged to the right or left side of the screen, window is resized to fill half the screen on that side. Note that windows resizing doesn’t take effect until you let go of the mouse button after dragging the window.

The Shake feature minimizes all other windows except for one you are interested in. To shake a window, you click the title bar and move (shake) the mouse rapidly from side to side. All other windows automatically minimize. Repeating the shake restores all other windows to their original size and location.

The [**Task View**](javascript://) feature has a dedicated taskbar icon next to the Search box at the lower-left side of the screen. Clicking the Task View icon changes the display to show an ordered preview of all application windows that are currently open. Clicking a window’s preview image brings that window forward to become the active window.

Clicking the Task View icon also allows you to access a new feature called [**Virtual Desktop**](javascript://). Virtual Desktop allows you to create multiple desktops that can host different open windows. The windows visible on a desktop are specific to that virtual desktop. You could decide to have one virtual desktop to show only business-related applications and perhaps another to show only personal applications. Using the Task View control, you can toggle between virtual desktops as required and avoid a confusing mix of windows on a single desktop.

**Activity 1-4**

### Performing Advanced Window Management

**Time Required:**10 minutes

**Objective:**Perform advanced window management for applications.

**Description:**You have recently installed Windows 10 and want to learn about advanced windows management. You will use this knowledge to help the end users in your organization to use their computers more efficiently.

1. 1

If necessary, start your computer and sign in.

1. 2

Click **Start** and then click **Notepad**.

1. 3

Click **Start** and then click **Calculator**.

1. 4

In the Calculator window, click the title bar and drag it until the pointer is at the far right of the screen. When you release the mouse button, Calculator is sized to use the right side of the screen.

1. 5

On the left side of the screen, click **Notepad**. When you snap a window to the right or left side, you are given the option to select a second window for the other side. This configuration is very useful for wide monitors when you want to work on two applications at the same time.

1. 6

In the Notepad window, click the title bar and drag it down until the window reverts to its original size.

1. 7

In the Notepad window, click the title bar and shake it back and forth rapidly. This minimizes the Calculator window.

1. 8

In the Notepad window, click the title bar and shake it back and forth rapidly. This restores the Calculator window to its previous state.

1. 9

In the Notepad window, click the title bar and drag it to the top of the screen. This maximizes the window to use the whole screen.

1. 10

On the taskbar, hover the pointer over Calculator to display a preview of content in the Calculator window.

1. 11

On the taskbar, click the **Task View** icon. Notice that you can see both Notepad and Calculator listed.

1. 12

Click **Calculator** to make Calculator the active window.

1. 13

On the taskbar, click the **Task View** icon and then click **New desktop**. Task View now shows Desktop 1 and Desktop 2.

1. 14

Click **Desktop 2**. This desktop copies all the configuration for Desktop 1 but does not include the running applications.

1. 15

On the desktop, right-click the Microsoft Edge shortcut and click **Delete**.

1. 16

On the taskbar, click **Microsoft Edge**.

1. 17

On the taskbar, click the **Task View** icon and click **Desktop 1**.

1. 18

Close Calculator and Notepad. Notice that the Microsoft Edge shortcut deleted from Desktop 2 is also deleted from Desktop 1.

1. 19

On the taskbar, click the **Task View** icon and click **Desktop 2**.

1. 20

Close the Microsoft Edge window.

1. 21

On the taskbar, click the **Task View** icon.

1. 22

In Task View, hover the pointer over **Desktop 2** and click the **X** to remove it.

1. 23

Press **Esc** to view the desktop again.

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**1-7**Windows 10 Networking Models

Networks connect multiple computers to share data and resources. A network model details a logical framework for sharing, securing, and managing data and resources across that network. Just as different versions of Windows 10 are available to meet the differing needs of customers, different network models also are available to connect computers. Some networking models support more computers and offer greater administrative control. Other models try to simplify the framework for simpler and smaller environments.

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## 1-7aWorkgroup Model

By default, when you install Windows 10, it is configured as a member of a workgroup. A [**workgroup**](javascript://) is a loosely knit collection of peer computers on a network where no computer has control over or plays a superior role to any other computer. The peers can share resources with one another over the network. This can be useful for a small number of computers in a typical home or small business network.

When you browse the network, you see the workgroup name, and if you expand the workgroup, you’ll see computers that are members of that workgroup. Each computer is identified by its name and address on the network. The workgroup itself is identified by an assigned name. The default workgroup name is WORKGROUP.

A computer can be a member of only one workgroup at a time. More than one workgroup can coexist on the same network. Being a member of a workgroup helps you find shared resources such as files and printers on the peer computers, but it does not restrict you from accessing resources located outside the workgroup of which your computer is a member.

In low-security environments where resources can be shared with all users, the workgroup model is fairly easy to manage. For example, you can share a printer attached to your computer with everyone. If you have varying security requirements for access to different sets of data, however, a workgroup is very difficult to manage.

The workgroup model relies on local user accounts that you create on each computer running Windows 10. No mechanism exists to create a user account that has access to resources on all computers.

Managing access to resources in a workgroup can quickly become difficult. For example, if you want to share files on your computer with Jeff, then you need to create a local user account with a password on your computer for Jeff. Then when Jeff attempts to access the shared files from his computer, he is prompted for the username and password you created. This means that Jeff might have a unique username and password for each computer on which he accesses resources.

You can try to simplify access to resources in a workgroup by creating user accounts on each computer with the same username and password. That works in the short term, but as soon as Jeff changes the password for the account on his own computer, the passwords are out of sync.

Microsoft recommends that workgroups should not be used for more than 10 to 20 computers. Sharing resources from computers running Windows 10 has a practical limit. All Windows 10 editions are limited to support a maximum of 20 simultaneous connections. For example, a shared folder can be accessed from only 20 other computers at the same time.

**Caution**

Windows 10 can be configured to use a Microsoft account for authentication. This works well for authenticating locally but not for assigning access to shared resources.

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## 1-7bDomain Model

A domain model is a client/server strategy that simplifies management of its members. A [**domain**](javascript://) is a collection of computers and users that are identified by a common security database. The database is stored on one or more dedicated servers called domain controllers (DCs). Computers that are part of the domain can reference the domain database and read the user and computer accounts contained within. Member computers can access shared resources on other computers from the same domain, using the security information referenced by the DC to control access.

The major differences between the workgroup and domain models are how the members are managed and the limits to sharing resources. A computer running Windows 10 can be used as a server in a domain, but the connection limits mentioned in the workgroup model still apply. Server-class operating systems, such as Windows Server 2019, can theoretically have an unlimited number of clients access a shared resource simultaneously. The practical limit with centralized servers is determined by overall performance and licensing.

Domain networking is typically employed in business environments, so not all editions of Windows 10 have support for it. Windows 10 Pro, Education, and Enterprise editions support joining a domain networking system.

When a server shares a resource, it can define permissions to access the resource based on the domain user and computer names stored on the DC. If a new user is added to the domain, each domain computer can directly reference the new domain user name by verifying it with the domain controller. Likewise, if a domain user account needs to be removed, it has to be removed only from the domain database on the domain controller and not each domain member computer.

A computer can be a member of a workgroup or a domain, but not both at the same time. A computer cannot be a member of more than one domain at the same time. The computer and the domain must be identified by unique names.

Access to shared resources in other domains and workgroups is still allowed, but the user has to authenticate to those remote systems. For example, if a computer is a member of a workgroup and accessing resources in a domain, the user would be prompted to provide a user ID and password for the domain.

More than one domain can coexist on a network, with the domain defining a security boundary. Changes made to the security or configuration of a domain usually only impact domain members. It is possible, however, for different domains to trust one another to allow shared access among domains. The limits of how domains trust one another depend on the type of domain in use.

The Microsoft implementation of a central database that stores domain information is Active Directory. Active Directory has a central database of user and computer accounts and centralized tools to manage them. The domain database is stored on dedicated DC servers. All DCs are capable of updating the database and replicating those changes to the other DCs in the domain. This is commonly referred to as multimaster replication.

Active Directory systems use a naming strategy based on Domain Name System (DNS) technology. Active Directory domain names are in the same format as Internet names, such as [microsoft.com](http://microsoft.com/" \t "_blank). This was done to better support the TCP/IP network protocols that link networks around the globe today.

From an administrator’s perspective, another advantage of Active Directory is the ability to manage the user and computer environment of its members. The administrator can use Group Policy to configure items such as installed applications, security settings, environment settings, and limits. The Group Policy settings are stored as part of the Active Directory database and are visible to all members of the Active Directory domain. The Active Directory administrator can define specific criteria that control to which computers or users the settings apply.

Windows 10 can be a client of a domain, but it can never be a DC. To create an Active Directory domain, you must purchase and install a Windows Server operating system that supports Active Directory on a dedicated computer (which can be a physical or virtual system). Likewise, domain Group Policy settings apply only if the Windows 10 computer is a member of the domain.

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## 1-7cAzure AD Join

[**Azure AD**](javascript://) is a directory service hosted by Microsoft as a cloud-based service via the Internet. A company can create a tenant in Azure AD that can be used to manage Windows 10 devices.

You can use [**Azure AD join**](javascript://) to register a Windows 10 device with Azure AD to enable centralized management of that device by the company’s administrators. Once registered, an Azure AD joined device can be given access to organizational applications and resources whether the Windows 10 device is owned by the corporation or the individual.

The traditional Active Directory domain model is still used with corporate computers, on-premises, with limited domain management functionality outside the corporate private network from the Internet. The traditional domain join can still provide the best on-premises managed experience for devices that are capable of domain joining.

Azure AD join is suitable for devices that cannot join a domain and in environments where users can best be managed from the cloud with [**Mobile Device Management (MDM)**](javascript://) solutions, such as Microsoft Intune, instead of traditional domain management tools like Group Policy. As organizations move their business to the cloud and reduce on-premises infrastructure, Azure AD becomes key in several areas.

User accounts created in Azure AD can be used to sign in to a computer running Windows 10 that is Azure AD joined. This allows administrators to centrally control user accounts for authentication even if the computer is outside the office. As long as the computer has Internet access, the computer can be Azure AD joined.

With the configuration capabilities linked to Azure AD join, end users can configure a brand-new device out of the box without help from an administrator. Everything is configured ahead of time and automatically applied when the user signs in.

Azure AD joined devices are not typically used for sharing data like computers in a workgroup are. Instead, using Azure AD join is appropriate for the small business environment that uses cloud services for collaboration. The services available in Office 365 are one example of a set of cloud services that can be used for collaboration.

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# Chapter Review

## 1-8a**Summary**

* The main purpose for using a computer is completing tasks by using applications. Applications are written for specific operating systems. It is the operating system that manages the computer hardware. In addition to managing hardware, Windows 10 also includes some small but useful applications.
* Multiple editions of Windows 10 are available. Each edition has different features; you need to select the correct edition for your scenario. Windows 10 Pro and Windows 10 Enterprise are the two editions more commonly used for business.
* The minimum hardware requirements provided by Microsoft for Windows 10 installation are not realistic for day-to-day use. If you are installing Windows 10 or upgrading, ensure your computer systems have adequate hardware for reasonable performance.
* When you upgrade from a previous version of Windows to Windows 10, you need to ensure that it is a valid upgrade path. In general, you can upgrade to the same edition or a higher-level edition. Windows 8 cannot be upgraded to Windows 10.
* Windows 10 can be licensed by using an OEM license, an FPP license, volume licenses, or cloud licenses. Consider factors such as whether you need to move licenses to new hardware when you select licensing.
* You can activate Windows 10 via the Internet, by using a KMS server, or by using Active Directory-based activation. Only volume licensing can use a KMS server or Active Directory-based activation.
* The Windows 10 user interface is similar to previous version of Windows. The user interface includes a Start menu and taskbar. The taskbar includes a search area and a notifications area. Some advanced window management options are available, such as virtual desktops and snap.
* For networking and sharing resources, Windows 10 can use the workgroup model, the domain model, and Azure AD join. The domain model is used by most businesses. The workgroup model and Azure AD join are used by small organizations or in situations where joining a domain is not practical.

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# Chapter Review

## 1-8b**Key Terms**

* [**Action Center**](javascript://)
* [**Active Directory**](javascript://)
* [**Active Directory-based activation**](javascript://)
* [**application programmer interfaces (APIs)**](javascript://)
* [**applications**](javascript://)
* [**Azure AD**](javascript://)
* [**Azure AD join**](javascript://)
* [**cloud licensing**](javascript://)
* [**computer hardware**](javascript://)
* [**domain**](javascript://)
* [**DVD boot installation**](javascript://)
* [**full packaged product (FPP) license**](javascript://)
* [**generic volume license key (GVLK)**](javascript://)
* [**Group Policy**](javascript://)
* [**hardware drivers**](javascript://)
* [**Key Management Service (KMS)**](javascript://)
* [**Mobile Device Management (MDM)**](javascript://)
* [**Multiple Activation Key (MAK)**](javascript://)
* [**notification area**](javascript://)
* [**operating system**](javascript://)
* [**original equipment manufacturer (OEM) license**](javascript://)
* [**product activation**](javascript://)
* [**Start menu**](javascript://)
* [**Task View**](javascript://)
* [**taskbar**](javascript://)
* [**Virtual Desktop**](javascript://)
* [**Volume Activation Management Tool (VAMT)**](javascript://)
* [**volume licensing**](javascript://)
* [**Windows 10 Education**](javascript://)
* [**Windows 10 Enterprise**](javascript://)
* [**Windows 10 Enterprise Long Term Servicing Channel (LTSC)**](javascript://)
* [**Windows 10 Home**](javascript://)
* [**Windows 10 Pro**](javascript://)
* [**Windows 10 Pro Education**](javascript://)
* [**Windows 10 Pro for Workstations**](javascript://)
* [**workgroup**](javascript://)
* [**x64 architecture**](javascript://)

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# Chapter Review

## 1-8c**Review Questions**

1. A friend has asked you which version of Windows 10 should be purchased to start a new home-based business. Your friend needs only one computer for now and requires support for Windows Store applications needed to manage the business. Your friend is not very experienced with computers and has asked for easy-to-use features. Which version of Windows 10 do you recommend?
   1. Windows 10 Education
   2. Windows 10 Home
   3. Windows 10 Pro
   4. Windows 10 Enterprise
2. The new browser included with Windows 10 is called .
   1. Charlie
   2. Virtual Desktop
   3. Cortana
   4. Microsoft Edge
   5. Windows Hello
3. You are considering purchasing an inexpensive computer from a friend that has a 32-bit CPU and 8 GB of RAM. You install Windows 10 Home, 32-bit edition, but you can’t see the full amount of RAM. What is wrong?
   1. The CPU does not support hyperthreading.
   2. You need to install a 64-bit version of Windows 10.
   3. The CPU does not support multiple cores.
   4. You must install Windows 10 Pro.
   5. Windows 10, 32-bit editions cannot support more than 4 GB of RAM.
4. Your workstation is running Windows 10 Pro, and you decide to share a folder on your computer. Twenty-two people in your office are trying to connect to that folder at the same time over the network. The first 20 people can connect, but the other two cannot. To fix this, you could .
   1. buy a computer, software, and licenses to run Windows Server 2016
   2. restart your computer
   3. make sure the network card is using WDF device drivers
   4. none of the above
5. Which of the following is an advantage of domain networking?
   1. no central security database
   2. included in every version of Windows 10
   3. centralized security management
   4. support for up to 25 simultaneous shared connections
6. A new company will have 40 workstations in one building sharing a single network. All users must be able to share files and printers with one another. Access to shared information must be secure and simple to administer. The best technology for this system is .
   1. workgroups
   2. Windows Peer-to-Peer Networking
   3. people to people
   4. domain networking
7. Application windows can be docked to the sides and corners of the screen using a feature called .
   1. Snap
   2. Shake
   3. Virtual Desktop
   4. Peek
   5. Docker
8. An administrator of a manufacturing company would like to manage corporate computers with Group Policy. The administrator is reviewing a purchase request for 20 new computers from the business owners. Which version of Windows 10 should the administrator consider for installation on the new computers? (Select two.)
   1. Windows 10 Home
   2. Windows 10 Pro
   3. Windows 10 Education
   4. Windows 10 Enterprise
   5. Windows 10 Ultimate
9. You are installing a computer to run a nuclear reactor management system. The software lists Windows 10 as a requirement. To ensure that future feature updates do not impact the stability of the software, you should consider what type of Windows 10 installation?
   1. Windows 10 Pro
   2. Windows 10 Enterprise
   3. Windows 10 Core
   4. Windows 10 Enterprise LTSC
10. Which of the following is a disadvantage of workgroup computing?
    1. Requires one or more expensive servers
    2. Supports an unlimited number of workstations
    3. No centralized security management
    4. Simple to set up initially
11. What type of software does Windows 10 require to manage a new type of hardware?
    1. Hardware driver
    2. Hardware shim
    3. Plug and play software
    4. Resource configuration driver
    5. API
12. Which editions of Windows 10 have support for 6 TB of memory? (Select two.)
    1. Windows 10 Enterprise
    2. Windows 10 Home
    3. Windows 10 Pro
    4. Windows 10 Pro for Workstations
    5. Windows 10 Pro Education
13. Which type of license cannot be moved from one physical computer to another?
    1. OEM
    2. FPP
    3. MAK
    4. KMS
    5. Volume licensing
14. A volume license for Windows 10 is an upgrade from an OEM edition of Windows 10. True or False?

True

False

1. Which of the following are valid upgrade paths? (Select 3)
   1. Windows 7 Home to Windows 10 Pro
   2. Windows 8 Enterprise to Windows 10 Enterprise
   3. Windows 7 Enterprise to Windows 10 Pro
   4. Windows 8.1 Pro to Windows 10 Enterprise
   5. Windows 8.1 Pro to Windows 10 Pro
2. You can use cloud licensing for which specific scenario?
   1. New installations of Windows 10 Enterprise
   2. Upgrading from Windows 10 Pro to Windows 10 Enterprise
   3. Upgrading Windows 8.1 Pro to Windows 10 Enterprise
   4. New installations of Windows 10 Pro
3. Which type of license has the product key embedded in firmware?
   1. OEM
   2. FPP
   3. MAK
   4. KMS
   5. Volume licensing
4. Active Directory-based activation is more reliable than KMS. True or False?

True

False

1. What is the minimum activation threshold when using KMS with Windows 10?
   1. 5
   2. 10
   3. 15
   4. 20
   5. 25
2. To use KMS or Active Directory-based activation, you need to configure all Windows 10 computers with the same key. True or False?

True

False

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