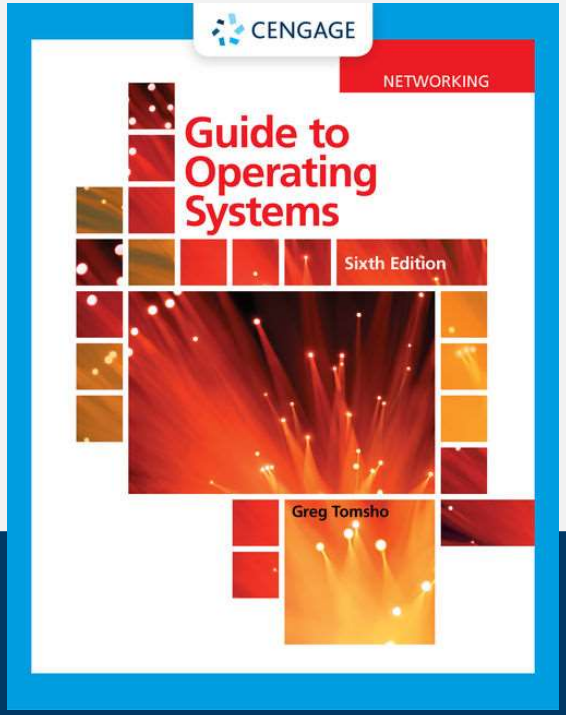

Guide to Operating Systems, 6th Edition

Module 5: Installing Operating Systems

generic questions about the core process but not specific installs

Learning Objectives

By the end of this module, you should be able to:

- Prepare to install an operating system
- Install and upgrade Windows 10, Windows Server 2019, and Linux Fedora 30 Workstation
- VirtualBox Overview

CENGAGE

Preparing to Install an Operating System

- The amount of preparation required to install an OS depends on the following questions:
  - What role will the system play: client or server?
  - Is the OS being installed on a physical computer or a virtual machine?
  - Are you performing an upgrade or a clean installation?
    - In a clean installation, the OS is installed on a new disk partition
  - What type of network environment is the OS being installed into?
  - Do you have just a few OSs to install or dozens or hundreds?

Preparing to Install a Client OS (1 of 4)

- Verify Minimum Requirements
  - The most common hardware requirements include:
    - CPU architecture and speed
    - Minimum amount of RAM
    - Minimum free disk space
    - Network connection
- Ensure that the Hardware is Operating Correctly

Preparing to Install a Client OS (2 of 4)

- Installation Media
  - Most OS installation programs can be started by booting to a DVD or a USB flash drive that has been properly prepared with a bootable ISO file
    - An ISO file is an image of a DVD disk
- Device Drivers
  - If you have a computer with a disk controller that is not recognized by the installation media, you are usually given an opportunity to install the driver for the controller during the installation

Preparing to Install a Client OS (3 of 4)

- Verifying Storage Configuration
  - When you install an OS, you will be prompted to choose which storage device to use at this point, partitioning and stuff?
- Username and Password
  - During installation, you need to specify the name and/or password of an initial user account
- Network Environment
  - You should know if your network has an automatic IP address assignment, and possibly the wireless network name and encryption password

Preparing to Install a Client OS (4 of 4)

- Installing on a Virtual Machine (VM)
  - a machine that's run on top of something else
  - advantages:
    - use multiple OSs
    - partial resources (resource consumption)
    - easier to recreate and install
    - hardware extraction
  - Differences between installing an OS on a physical computer versus a VM:
    - You must create the VM first, using the VM software installed on the host
    - There is no need to verify hardware functionality
      - usually provides virtual hardware compatible with the OS you want to run
    - There is no need to have physical installation media
    - There is no need to worry about device drivers
    - You must choose the type of network connection you want

Preparing to Install Windows Server (1 of 4)

- Many of the same considerations for installing a client OS apply to installing a server OS
- The roles a server will play on the network should be considered when planning a server installation
  - A server used to support only a dozen users has different minimum hardware requirements than a server running Active Directory and supporting a few hundred users

multiple people accessing the machine

Preparing to Install Windows Server (2 of 4)

- Selecting Server Hardware for Windows Server
  - Features you might need to decide on before purchasing a server:
    - *CPU architecture* – the minimum requirement is a 1.4 GHz CPU
    - *Disk subsystem* – SAS vs. SATA
    - *Memory* – the minimum requirement is 512 MB of RAM
    - *Hot-add/hot-replace features*

Preparing to Install Windows Server (3 of 4)

- Selecting the Right Windows Edition licensing key
  - Datacenter Edition is suitable for businesses managing huge amounts of data, using virtualization on a large scale, and running high-end applications
  - Standard Edition is suitable for most small to medium-sized businesses
    - Permits only two virtual instances
  - Essentials Edition is aimed at small businesses with 25 or fewer users

Preparing to Install Windows Server (4 of 4)

- Windows Server Preinstallation Decisions
  - What should you name the server?
  - How should you assign an IP address to the server?
  - Setting the correct time zone
  - Should you use the workgroup or domain model?
  - What services should you install?

helpful so you can talk between two servers and knowing who is who

some people like to run a server on the same time zone no matter where it is; always have to be synched with ntp (time synched); important when investigating situations

domain model = active directory, directory services; workgroup would be just our own computer w/ own little systems

Preparing to Install Linux

- Decide which Linux distribution to use
  - A Web site called *DistroWatch.com* lists distributions along with descriptions
- Download a disk image of the installation medium and burn it to a CD or DVD
- The preinstallation and postinstallation tasks for Linux are not very different from those for Windows Server
  - Linux requires more input and decision-making during installation

Preparing to Install macOS

almost all installs are the same process

- Installing macOS generally requires fewer questions and less preparation than installing Windows or Linux
  - macOS comes pre-installed on Mac computers and is not designed to run on computers from other vendors
- In most instances, macOS installations are upgrades from an earlier version to a newer version
- It is possible to perform a clean installation of macOS from a DVD

Knowledge Check 1

- True or false: All OSs today require a network connection to be useful.
  - A) True
  - B) False

Knowledge Check 1: Answer

- True or false: All OSs today require a network connection to be useful.

- A) True

almost everything requires some sort of connection (unless it's a self-standing application).
it's like how do you share stuff to other things? network connection (share data, or even Internet and AirDrop)

CENGAGE

Performing an Operating System Installation

- This section covers the steps of performing OS installations and upgrades for the following OSs:
  - Windows 10
  - Windows Server 2016 or 2019
  - Fedora Linux 30 Workstation
  - macOS

Installing and Upgrading Windows 10 (1 of 7)

- Ensure that your computer is configured to boot to the installation media you have supplied
- On the initial setup screen, you are prompted for the language you want, the time and currency format, and the keyboard layout
- Accept the license terms and then choose whether you want to perform an upgrade or custom installation
  - A custom installation is a fresh installation and must be selected when you boot the computer to the installation media

Installing and Upgrading Windows 10 (2 of 7)

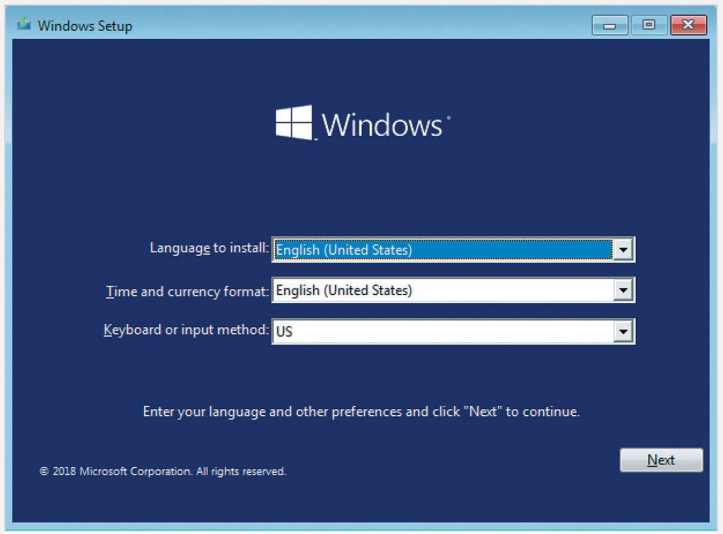

Figure 5-1 Windows 10 Setup screen

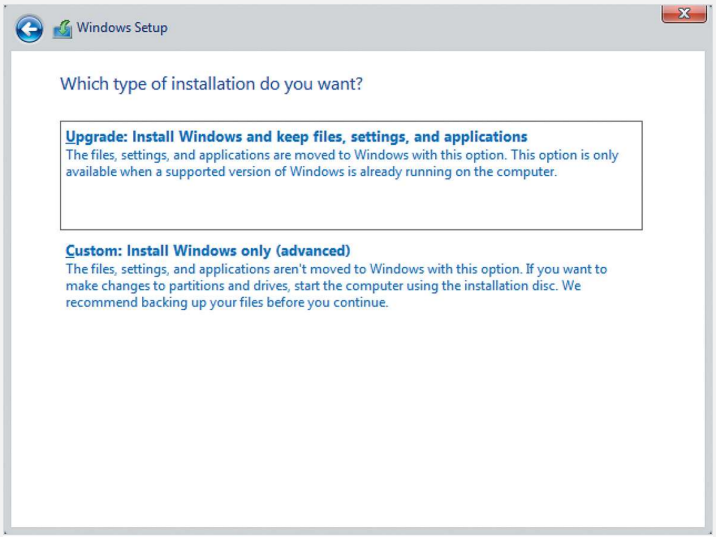

Figure 5-3 Upgrade or custom installation

Installing and Upgrading Windows 10 (3 of 7)

- After selecting the custom option, choose from a list of disks and partitions to specify where you want to install Windows
  - You can use the Load driver link to install a driver for a disk controller if your disk isn't shown loading the driver
  - If you click the New link, you're prompted to create a new volume from the selected disk
  - If you select a disk and click Next, Windows creates three volumes
- The installation proceeds, and your computer reboots at least once

Installing and Upgrading Windows 10 (4 of 7)

- When the initial installation is complete, you are prompted to verify the region of the world in which the computer is being used
  - Next, verify the keyboard settings
- The next screen varies depending on the edition of Windows 10 you are installing, but on most business editions, you are prompted to sign in to the computer
- When you choose the option to join the computer to a domain, you are prompted to enter the name of a person who will use the computer and to provide a password

Installing and Upgrading Windows 10 (5 of 7)

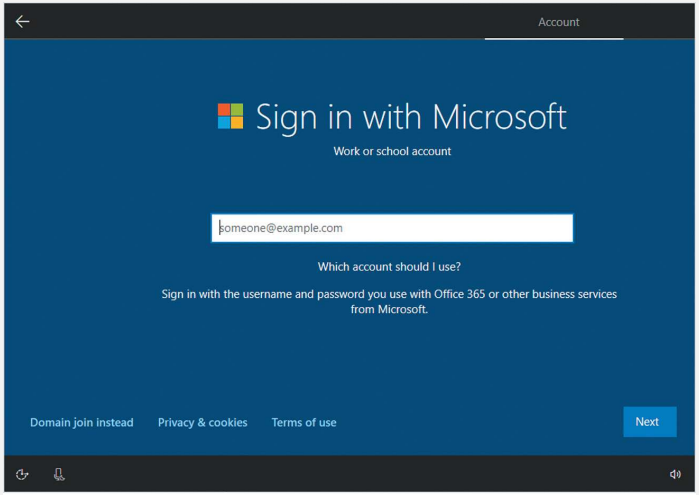

Figure 5-5 Choosing the initial user account in Windows 10

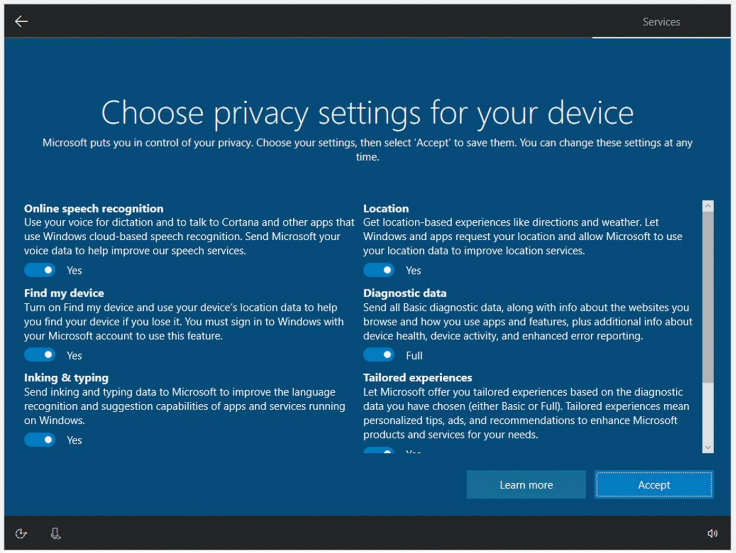

Figure 5-7 Choosing privacy settings

Installing and Upgrading Windows 10 (6 of 7)

- Upgrading to Windows 10
  - In-place upgrades to Windows 10 are supported for Windows 7 and Windows 8/8/1
  - An in-place upgrade overwrites your current OS installation and maintains your applications, settings, and data
  - Other Windows versions require a fresh installation
  - The easiest way to upgrade to Windows 10 is to use the Windows download tool

Installing and Upgrading Windows 10 (7 of 7)

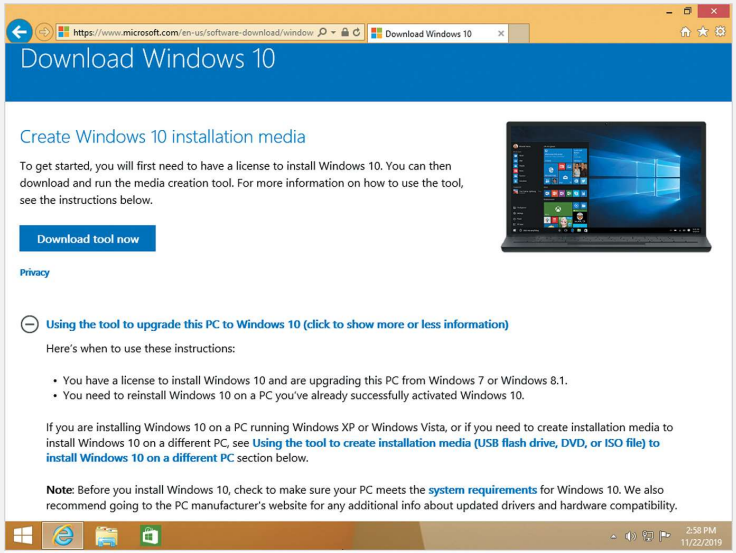

Figure 5-8 The Download Windows 10 site

Installing and Upgrading Windows Server 2016 or 2019 (1 of 8)

- The installation procedure for Windows Server is roughly the same as for Windows 10, with the following differences:
  - When you select the OS to install (Standard or Datacenter), you have two additional options:
    - A Server Core installation, the default option, does not include a GUI
    - The Desktop Experience includes a GUI
  - The built-in Administrator account is enabled and you must only enter a password for it
  - There are not choices for Cortana, the timeline feature, or privacy settings

Installing and Upgrading Windows Server 2016 or 2019 (2 of 8)

- What If Your Disk Isn't Found?
  - If Windows setup does not recognize your disk controller:
    - Click the Load driver link
  - You're prompted to insert a medium containing the disk controller driver
    - Check the disk controller's Web site if you do not have the driver
  - After the driver is loaded, the disk should be displayed and you can continue the installation

Installing and Upgrading Windows Server 2016 or 2019 (3 of 8)

- Windows Server Postinstallation Tasks
  - Activate Windows Server
  - Set the correct date, time, and time zone important for server
  - Assign a static IP address address that aren't going to change (dhcp would change it?)
  - Assign a computer name
  - Configure automatic updates
  - Download and install available updates security patches

Installing and Upgrading Windows Server 2016 or 2019 (4 of 8)

- Activate Windows Server 2016
  - **Activation** should take place automatically, but if it doesn't, it must be done within 10 days after installation
  - If you are using a volume license copy, you need to activate Windows manually in the Local Server Properties window
- Setting the Time Zone and Date
  - Having the wrong one can cause problems, especially in a domain environment

Installing and Upgrading Windows Server 2016 or 2019 (5 of 8)

- Assigning an IP Address
  - Servers should have a static IP address
  - Use the GUI, the *netsh* command prompt command, or the *New-NetIPaddress* PowerShell cmdlet to set your IP address
- Assigning a Computer Name
  - You should devise a naming scheme for your servers

Installing and Upgrading Windows Server 2016 or 2019 (6 of 8)

- Configuring and Installing Updates
  - Patches
    - Fixes to bugs and security vulnerabilities
    - Can be installed through Windows Update
  - Feature release
    - Add features or change the functions of existing features
    - Testing a feature release on a test server is highly recommended
  - Windows Update downloads and installs new updates

Installing and Upgrading Windows Server 2016 or 2019 (7 of 8)

- To configure Windows Update and view installed updates, click the link in the Local Server Properties window next to Windows Update to open the Update status window

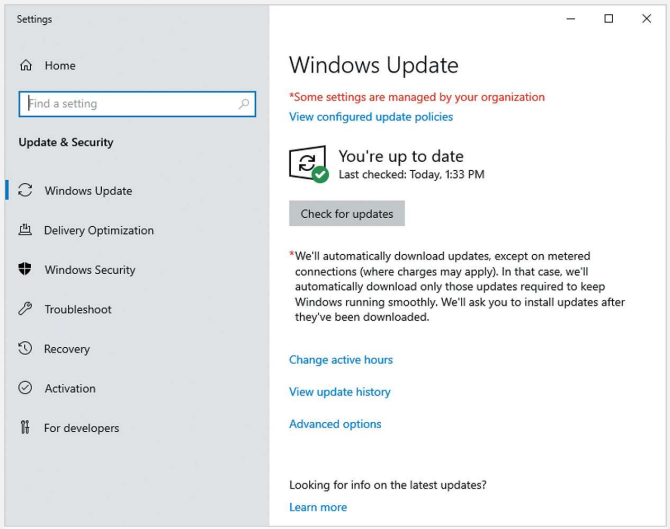

Figure 5-11 Update status

Installing and Upgrading Windows Server 2016 or 2019 (8 of 8)

domain name service (DNS) - transfers/translates ip addresses to domain names (mac/physical address is the first thing retrieved, first 3 digits are vendor lookups, makes a broadcast and something on the network) = think about a phonebook to remember what ip address = anytime you type a url

- What's Next?
  - After your server is configured and up to date, you can start installing server roles and additional features
  - Most networks in a domain environment usually run these services at a minimum:
    - AD DS, DNS, DHCP, and File and Storage Services

gives you address on the network

active directory/directory services

  - If you plan to use server virtualization, install the Hyper-V role on your first server and install VMs to run server roles like Active Directory and DHCP

Adding Windows Servers (1 of 2)

- When adding a new server, you must decide whether the server will be one of the following:
  - A domain controller (DC) in the existing domain
    - Adding a second domain controller can reduce server load and provide fault tolerance
  - A member server in the existing domain
    - Belongs to the domain and falls under domain management but doesn't run Active Directory or participate in managing directory services
  - A standalone server

Adding Windows Servers (2 of 2)

- Reasons to Add Servers to a Network:
  - Company growth
  - Excessive load on existing servers too many users
  - Need to isolate an application multiple applications running on a server, might want that out so that it can load quicker and better
  - Need for fault tolerance if something fails, something should be done
  - Addition of branch office
- To address server security, administrators can use a **Read Only Domain Controller (RDOC)** no questions

Upgrading Windows Server (1 of 3)

- Two Main Upgrade Methods:
  - In-place upgrade – boot to the existing OS and run setup.exe from the installation medium
  - Server role migration – perform a clean installation of Windows Server 2016 and migrate the server roles the old OS version performed

- could take longer to do a full install
- helps keep all your settings/data?

VS a clean wipe

Upgrading Windows Server (2 of 3)

no

- In-place Upgrade Considerations:
  - An in-place upgrade to Windows Server 2016 is only supported for Windows Server 2012 and 2012 R2 versions
    - An upgrade to Windows Server 2019 is supported for Windows Server 2012, Windows Server 2012 R2, and Windows Server 2016
  - If running Server Core, you can only upgrade to Windows Server 2016 Server Core
    - You must do a clean installation if you want the GUI instead
  - You can't upgrade to a different language

Upgrading Windows Server (3 of 3)

- Migrating from an Earlier Version of Windows Server
  - Microsoft recommends a clean installation followed by server role migration
  - Migration allows you to do the following:
    - Migrate from Windows Server 2008 R2 and later versions
    - Migrate from a Windows Server 2008 R2 Server Core installation to a GUI installation
    - Upgrade the server with no downtime, depending on the roles involved

Knowledge Check 2

- Which of the following Windows Server installation options is the default option?
  - A) Server Core installation
  - B) Read-Only Domain Controller
  - C) Desktop Experience
  - D) Server Role migration

Knowledge Check 2: Answer

- Which of the following Windows Server installation options is the default option?

- A) Server Core installation

not a question

similar to a Linux experience, cmd line

Installing and Upgrading Linux (1 of 3)

- Installing and upgrading Linux isn't much different from installing and upgrading Windows
- However, there are many distributions of Linux and details will differ depending on the distribution
- This section discusses how to install Fedora 30 workstation

Installing and Upgrading Linux (2 of 3)

- Hardware Requirements
  - The optimal hardware requirements of Linux depend on how the computer will be used
- Installing Linux
  - Fedora Linux can be booted and run from a DVD or it can be loaded as a permanent OS that boots from the computer's hard drive
    - The first option is a good way to test-drive Linux without committing a computer or VM to its installation

Installing and Upgrading Linux (3 of 3)

- Upgrading Linux
  - The upgrade process works like the original installation
  - You start the installation in the normal way and then choose to perform an upgrade
  - The installer asks for some basic system information and checks to determine what hard disks to use for the installation

Installing and Upgrading macOS (1 of 2)

- The installation of macOS uses a graphical interface and a Setup Assistant that functions like the Windows setup wizards
- Apple no longer produces separate server versions
  - Users can install the macOS Server add-on package through the Mac App Store for about $20
- The server add-on package includes:
  - Profile Manager
  - Xsan
  - Open Directory

Installing and Upgrading macOS (2 of 2)

- Hardware Requirements for macOS Server Add-On
  - The macOS Server add-on requirements are shown in Table 5-5 in the textbook
- Installing macOS
  - You upgrade your current version of macOS by downloading an installer from the App store and running the installer app
  - You may want to perform a DVD installation if you need to replace your disk
    - See general steps for this procedure starting on page 224 of the textbook

Regular Updates for OSs (1 of 4)

- Linux Updates
  - In Fedora 30 with the GNOME desktop, you can manually obtain and install updates by clicking Activities, Show Applications, Software, and then click the Updates tab to list any new updates
  - To configure automatic updates, open a shell prompt, type *dnf install dnf-automatic*, and press Enter
    - Next, you must edit the /etc/dnf/automatic.conf file to specify the schedule
    - Enable and run the update timers (see page 226 of the textbook)

Regular Updates for OSs (2 of 4)

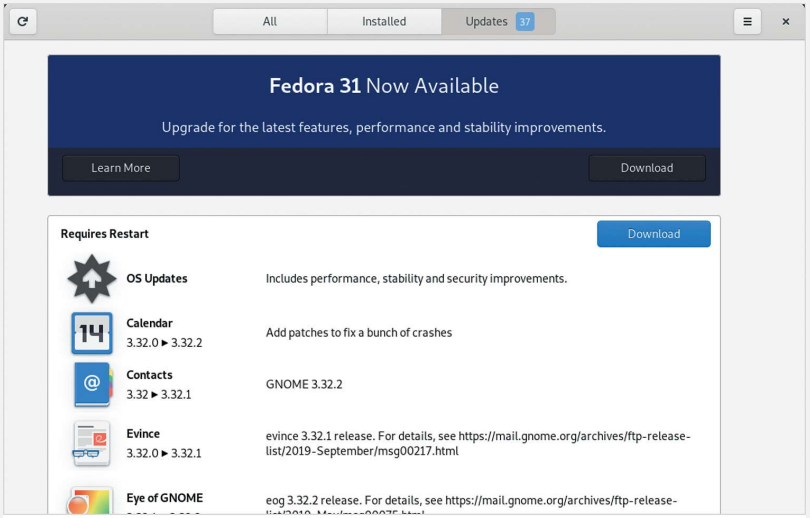

Figure 5-12 Checking for updates on Linux Fedora 30 Workstation

Regular Updates for OSs (3 of 4)

- Mac Updates
  - MacOS Mojave provides update applications through the App Store and macOS offers them through System Preferences
  - Click the Apple icon in the menu bar and then click System Preferences to check to see if macOS updates are available
  - For automatic updates, click the check box at the bottom of the Software Update window
  - MacOS will also display a notification when updates are available; you can choose to install them immediately or wait until later

Regular Updates for OSs (4 of 4)

Figure 5-13 Checking for updates on macOS Mojave

Source: Apple Inc.

Summary (1 of 3)

- The amount of preparation required to install an OS depends on several factors
- The preparation needed to install a client OS such as Windows 10, a Linux client distribution, or macOS varies depending on the computer's operating environment
- The role a server will play on the network is a key consideration in planning the server OS installation
- Preparing to install Linux and macOS is similar to preparing to install Windows, although macOS runs only on Mac hardware

Summary (2 of 3)

- The actual installation process for Windows seems to become more streamlined and hands-off with each successive version
- Windows creates three volumes during installation
- Windows Server offers two installation options for the Standard and Datacenter editions: Server Core or Desktop Experience
- Windows Server postinstallation tasks include activating the server, setting the time zone and date, assigning an IP address and computer name, and configuring updates

Summary (3 of 3)

- When you upgrade Windows Server, you can use two main methods: an in-place upgrade and server role migration
- Booting from a DVD and running Linux without installing it is a good way to test-drive Linux without committing a computer or VM to its installation
- The installation of macOS uses a graphical interface and a Setup Assistant that functions like the Windows setup wizards
- After installation and at regular intervals, it is a good idea to check for OS updates and download them