Module 12: Installation, Storage, and Compute with Windows Server

4. What are the Post installation tasks?

→ What Are Post-Installation Tasks?

Post-installation tasks are the things we do **after** setting up (or installing) a device like a switch, router, or even software, to make sure it works properly and securely.

Common Post-Installation Tasks:

1. Check the Installation

- Make sure the device or software is working correctly.
- Test connections and see if everything powers on.

2. Set Up Basic Configuration

- o Give the device a **name** (hostname).
- Set up passwords to protect access.

3. Assign IP Addresses

• Set the **IP address** so the device can communicate on the network.

4. Update Firmware or Software

 Install the latest version of the software (Cisco IOS) to get new features and security fixes.

5. Save the Configuration

Save our settings so they don't disappear after a restart:

copy running-config startup-config

6. Test Network Connectivity

 Use commands like ping to check if the device can talk to other devices on the network.

7. Create Backups

• Save a copy of our configuration to use later in case something goes wrong.

8. Document the Setup

- Write down what we configured—IP addresses, passwords, port numbers, etc.
- 5. What is the standard upgrade path for Windows Server?

What is the Standard Upgrade Path for Windows Server?

The **standard upgrade path** for Windows Server means the **correct order of versions** we can upgrade from one to another **without needing to reinstall everything**.

Key Points:

- we can **only upgrade from one version to the next one directly** (not skip multiple versions).
- we must upgrade to a **supported edition** (like from Standard to Standard).
- The **hardware** must meet the system requirements of the new version.

Example of a Common Upgrade Path:

Current Version	You Can Upgrade Directly To		
Windows Server 2012 R2	Windows Server 2016		
Windows Server 2016	Windows Server 2019		
Windows Server 2019	Windows Server 2022		

So if we have Windows Server 2012 R2, and we want to move to 2022, we must:

• First upgrade to 2016

- Then to 2019
- Finally to 2022

This is called a **step-by-step upgrade path**.

Things we Should Do Before Upgrading:

- 1. Backup our system.
- 2. Check hardware compatibility.
- 3. Make sure our apps will work on the new version.
- 4. Test in a lab or virtual machine first, if possible.
- 6. What is the Physical structure of AD?
 - → What is the Physical Structure of Active Directory (AD)?

The **physical structure of Active Directory (AD)** is how the **servers** that run AD are organized and connected in the real world.

Main Parts of AD's Physical Structure:

- 1. Domain Controllers (DCs)
 - These are **servers** that store a copy of the Active Directory database.
 - They handle logins, store user accounts, and control access to resources.

2. Sites

- A site represents a physical location (like a branch office or different building).
- Helps AD control **network traffic** and decide which DC is closest to a user.
- Sites are used to optimize replication (how changes are copied between servers).

3. Subnets

- A subnet is a range of IP addresses.
- Tells AD which computers belong to which site.
- Helps users connect to the nearest domain controller.

Example:

Let's say a company has offices in New York and London:

- Each office is a site.
- Each site has one or more **Domain Controllers**.
- Each site is linked to a **subnet** (IP range for that office).
- 7. What are the Logical components of Active Directory?

The **logical components** of Active Directory are the **structures we create and manage inside AD**—they don't depend on physical location, but help organize **users**, **computers**, **and resources** in a clear, manageable way.

Main Logical Components of AD:

1. Forest

- The top level of an AD structure.
- A forest is a collection of one or more domains that share a common structure and trust each other.
- Think of it as the entire organization.

2. Domain

- A group of users, computers, and other resources under a single name (like company.com).
- o Each domain stores its own data and policies.

Domains are like departments or sections inside the forest.

3. Organizational Units (OUs)

- Containers inside a domain to organize users and computers.
- we can apply **Group Policies** to OUs (like rules for passwords or desktop settings).
- Think of them as **folders** for easier management.

4. Objects

- Everything stored in AD is an **object**—users, computers, printers, groups, etc.
- o Each object has properties (like a user's name, email, etc.).

5. Tree

- A group of domains connected in a hierarchy under the same namespace (like hr.company.com, sales.company.com).
- Trees live inside a forest.
- 8. What is the Full form Of LDAP?
 - → LDAP stands for:

Lightweight Directory Access Protocol

What Does That Mean ?

- LDAP is a way for computers to talk to a directory service—like Active Directory.
- It helps programs **find information** such as usernames, passwords, email addresses, and more.
- Think of it like a phone book search system for a network.

Example Use:

When we **log into a computer at work**, LDAP helps check our **username and password** in Active Directory to see if we're allowed to log in.

9. What is the location of the AD database?

→ What is the Location of the Active Directory (AD) Database?

The **Active Directory database** is a special file stored on every **Domain Controller** (DC), and it holds all the important information like **user accounts**, **passwords**, **and group policies**.

Default Location:

The AD database file is stored here:

C:\Windows\NTDS\NTDS.dit

- NTDS stands for NT Directory Services
- NTDS.dit is the main database file where all AD data is stored

What's in the NTDS.dit File?

- Usernames and passwords (in a secure format)
- Computer accounts
- Security groups
- Group Policy data
- Directory structure
- 10. What is child DC?

→ What is a Child DC?

A **Child DC** (Child Domain Controller) is a **Domain Controller (DC)** that belongs to a **child domain** in a larger Active Directory (AD) structure.

1. Domain Controller (DC)

2. A server that runs Active Directory and handles things like logins, user accounts, and security.

3. Child Domain

- A smaller domain that is part of a larger parent domain.
- o Example:
 - Parent domain: company.com
 - Child domain: sales.company.com

4. Child DC

- A **Domain Controller** that is set up inside a **child domain**.
- It handles AD services only for that child domain, like user logins and policies for sales.company.com.

Why Use a Child DC?

- To separate departments or locations.
- For better security and delegated control.
- To organize a large company's network.
- 11. Explain the term forest in AD

A **Forest** in Active Directory (AD) is the **top-level container** that holds one or more **domains** and the entire **directory structure** of an organization.

Let's Break It Down:

1. What's Inside a Forest?

- A Forest can contain one or more domains.
- Each **domain** has its own users, computers, and resources.

 All the domains in a forest trust each other and share a common schema (rules about what data can be stored).

2. Example of a Forest:

o Imagine a large company with multiple branches:

■ Parent Domain: company.com

■ Child Domain: hr.company.com

■ Child Domain: sales.company.com

• These domains are part of the same **forest** called company.com.

3. Why Use a Forest?

- To group and manage multiple domains.
- To maintain security and data consistency across all the domains in the organization.

Forest and Trusts:

• Domains within the same **forest** automatically **trust each other**, meaning users in one domain can access resources in another domain (with the right permissions).

12. What is Active Directory? Check all that apply.

What is Active Directory? (Check all that apply)

- A Windows-only implementation of a directory server
 Active Directory (AD) is designed specifically for Windows environments, and it is a Windows-only directory service.
- Microsoft's implementation of a directory server
 AD is Microsoft's proprietary directory service, developed to manage and organize network resources, like users, computers, and services, within a Windows domain.
- An LDAP-compatible directory server
 Active Directory is LDAP-compatible (Lightweight Directory Access Protocol), meaning it can work with LDAP to search and access directory data.

X An open-source directory server

Active Directory is **not open-source**; it is a proprietary technology developed by Microsoft.

- 13. When you create an Active Directory domain, what's the name of the default user account? Superuser Root Username Administrator
 - ✓ Administrator

Explanation:

When we create a new **Active Directory** domain, the default user account that is created is called **Administrator**. This account has full **administrative rights** to manage the domain and its resources.

The other options are incorrect because:

- Superuser and Root are typically terms used in Unix/Linux systems.
- **Username** is too generic and not a default account name in AD.
- 14. AD domain provides which of the following advantages? Check all that apply. Centralized authentication More detailed logging Centralized management with GPOs Better performance
 - **V** Centralized authentication

Active Directory (AD) allows for **centralized authentication**, meaning users can log in once, and AD verifies their credentials across the entire network (instead of needing separate logins for different resources).

Centralized management with GPOs (Group Policy Objects)
 AD provides centralized management of user and computer settings through
 Group Policy Objects (GPOs). GPOs allow administrators to enforce policies for password complexity, desktop settings, security, and more across all machines in the domain.

X More detailed logging

While AD can generate logs (like event logs for security and authentication), more detailed logging isn't inherently an advantage of AD itself. It's about how logging is configured and implemented in the environment.

• X Better performance

AD doesn't directly improve network **performance**. It provides centralized management and authentication, but performance depends on other factors like

hardware, network infrastructure, and server configuration.

15. What are the minimum hardware requirements for installing Windows Server 2016?

1. Processor (CPU)

- 1.4 GHz 64-bit processor (at least).
- This is the brain of the server, and it should be fast enough to handle the server's tasks.

2. RAM (Memory)

- 2 GB of RAM (minimum).
- The more RAM there is, the better the server can handle multiple tasks and users.

3. Storage (Hard Drive Space)

- 32 GB of available disk space (minimum).
- We need this space to install the operating system and store files. More space is needed if we're going to store a lot of data.

4. Network Adapter

 A network adapter that supports Gigabit Ethernet or higher (for connecting to a network).

5. Graphics

- A graphics adapter and monitor capable of at least 1024x768 resolution for basic setup and management.
- 16. Explain the different editions of Windows Server 2016 and their features.

→ 1. Windows Server 2016 Essentials

• Best for: Small businesses (up to 25 users and 50 devices)

• Features:

- Simple to set up and manage
- No virtualization rights (we can only install it on one physical or virtual machine)
- o Limited to one server in the network

Limitations:

 No support for features like Hyper-V Replica, Storage Spaces Direct, or advanced Active Directory functions

2. Windows Server 2016 Standard

- Best for: Medium businesses needing basic server features and limited virtualization
- Features:
 - Includes full Active Directory, File/Print Services, Remote Desktop Services
 - Supports 2 virtual machines (VMs)
 - Supports containers (limited)
- Good for: Companies that use a physical server and need just a few virtual servers

3. Windows Server 2016 Datacenter

- Best for: Large organizations and data centers
- Features:
 - Everything in Standard Edition plus more
 - Unlimited virtualization (run as many VMs as we want)

Advanced features like:					
■ Storage Spaces Direct					
■ Shielded Virtual Machines					
■ Software-defined networking (SDN)					
Good for: Companies running many virtual machines or cloud infrastructure					
17. Walk through the steps of installing Windows Server 2016 using GUI mode.					
 1. Boot from the Installation Media Insert the Windows Server 2016 DVD or USB drive. 					
Restart the computer.					
 Press the key (like F12, Esc, or Del) to open the boot menu and select the DVD/USB. 					
2. Choose Language and Region					
On the first screen, choose:					
o Language (e.g., English)					
Time and currency format					
Keyboard layout					
Click Next.					

• 3. Click "Install Now"

4. Select the Edition with GUI

• Choose:

- Windows Server 2016 Standard (Desktop Experience) or
- Windows Server 2016 Datacenter (Desktop Experience)
- The "Desktop Experience" means GUI (Graphical User Interface).
- Click Next.

5. Accept License Terms

- Check the box "I accept the license terms"
- Click Next.

6. Choose Installation Type

• Select: Custom: Install Windows only (advanced) (This is for a clean install.)

7. Select the Drive to Install Windows

- Choose the hard drive (usually **Drive 0**).
- If needed, click **New** to create a partition.
- Click **Next** to start installation.

8. Wait for Installation to Complete

- The system will copy files and restart a few times.
- Just let it finish.

9. Set the Administrator Password

- After reboot, wel be asked to create a **strong Administrator password**.
- Enter it and click **Finish**.

• 10. Log In

- Press Ctrl + Alt + Delete to log in.
- Enter the password you just created.
- we'll now see the Windows Server 2016 desktop with GUI.
- 18. Describe the steps for installing Windows Server 2016 in Server Core mode.

1. Boot from Installation Media

- Insert the Windows Server 2016 DVD or USB.
- Restart our computer.
- Use the **boot menu key** (like F12 or Esc) to boot from DVD/USB.

2. Choose Language and Region

- On the first screen, choose:
 - Language
 - Time and currency
 - Keyboard layout
- Click Next.

3. Click "Install Now"

4. Select the Server Core Edition

 Choose Windows Server 2016 Standard OR

Windows Server 2016 Datacenter

(Do NOT choose the ones with "Desktop Experience"—those are GUI versions)

5. Accept the License Terms

- Check the box for "I accept the license terms"
- Click Next.

6. Choose Installation Type

• Select Custom: Install Windows only (advanced)

7. Select the Drive to Install Windows

- Pick the hard drive where we want to install.
- If needed, click **New** to create a partition.
- Click Next to start installing.

8. Installation and Restart

- The setup will copy files and install the OS.
- The system will **restart automatically** when done.

9. Set the Administrator Password

- After restart, we'll be asked to create a strong password for the Administrator account.
- Type it twice and press Enter.

10. Log In

- Press Ctrl + Alt + Delete.
- Enter the Administrator password.
- we'll see a black command-line screen (CMD).
 No desktop, just text!

V Done!

We've installed Windows Server 2016 in Server Core mode. Now we can manage it using:

- Command line
- PowerShell
- Remote Server Tools (RSAT) from another computer
- 19. How do you configure network settings during Windows Server 2016 installation?
- If we're Using the GUI Version (Desktop Experience):

- 1. Log in to the server.
- 2. Click Start → Control Panel → Network and Sharing Center.
- 3. Click Change adapter settings.
- 4. Right-click our network adapter (usually named "Ethernet") and click Properties.
- 5. Select Internet Protocol Version 4 (TCP/IPv4) and click Properties.

- 6. Enter:
 - IP address
 - o Subnet mask
 - Default gateway
 - o Preferred DNS server
- 7. Click OK to save.
- If we're Using Server Core (Command Line Only):
- - 1. After logging in, open the command prompt.
 - 2. Type this to view our network adapter name:

netsh interface ipv4 show interfaces

3.Use this to set a static IP (replace values as needed): netsh interface ipv4 set address name="Ethernet" static 192.168.1.10 255.255.255.0 192.168.1.1

4. Set the DNS server:

netsh interface ipv4 set dnsservers name="Ethernet" static 8.8.8.8

- 20. Explain the process of promoting a Windows Server to a domain controller.
 - → Promoting a server to a **Domain Controller (DC)** means setting it up to run **Active Directory**, so it can manage **users**, **computers**, **and security** on a network.
- Step-by-Step Guide (Using GUI Desktop Experience):
- 1. Install Active Directory Domain Services (AD DS) Role
 - Open **Server Manager** (it starts automatically).

- Click "Add roles and features".
- Click **Next** through the first few screens until we reach "Server Roles".
- Check "Active Directory Domain Services".
- Click Next until we can click Install.
- Wait for installation to finish (no restart needed yet).

2. Promote the Server to a Domain Controller

- After the role is installed, click "Promote this server to a domain controller" in Server Manager (yellow flag appears).
- Choose one of these:
 - Add a new forest (if we're starting fresh)
 - Add a domain to an existing forest (if joining another domain)
- Enter our domain name (e.g., mycompany.local).

3. Set Directory Services Restore Mode (DSRM) Password

This is a special password used for recovery mode-don't forget
 it!

4. Review and Confirm Settings

 Click through the DNS and NetBIOS options (defaults are usually fine).

- Review the settings and click **Next**.
- The system will run a prerequisite check.
- If everything is OK, click **Install**.

5. Restart the Server

- After installation, the server will restart automatically.
- When it starts up again, it's now a **Domain Controller** and part of the **Active Directory domain**.
- 21. Discuss the steps involved in upgrading from a previous version of Windows Server to Windows Server 2016.
 - → 1. Check System Requirements
 - Make sure our server has:
 - o At least 1.4 GHz 64-bit CPU
 - o 2 GB RAM
 - o 32 GB free disk space
 - Confirm our hardware is compatible with Server 2016.

2. Check the Upgrade Path

we can upgrade directly from:

- Windows Server 2012
- Windows Server 2012 R2

(we **can't** upgrade directly from Windows Server 2008 or older-we'd need to go step by step.)

3. Back Up Your Server

- Use **Windows Backup** or other tools to create a **full backup** of our system.
- This protects our data in case something goes wrong.

4. Insert Windows Server 2016 Installation Media

- Insert the DVD or USB drive with Server 2016.
- Run **setup.exe** from inside the current Windows Server (don't boot from the USB/DVD-this would do a fresh install, not an upgrade).

5. Choose Upgrade Option

- When prompted, choose:
 - Keep personal files and apps
- This ensures our settings and data stay the same.

6. Enter Product Key and Select Edition

- Enter our **product key** if asked.
- Choose the **same edition** we4're upgrading from (e.g., Standard to Standard).

7. Accept License Terms and Start Upgrade

- Click through the license agreement.
- Confirm the summary screen and click **Install**.

8. Wait for the Upgrade to Complete

- The process will take time and may restart several times.
- Do **not turn off** the server during this.

9. Log In and Verify

- After the final reboot, log in as Administrator.
- Check that our files, settings, and roles (like AD, DNS, etc.) are still there and working.
- 22. What is Active Directory Domain Services (AD DS), and what are its key components?
 - → Active Directory Domain Services (AD DS) is a feature in Windows Server that helps us to manage and organize users, computers, and other devices on a network.

It acts like a central brain of the network, controlling:

- Who can log in
- What they can access
- How resources are managed

Key Things AD DS Does:

• Stores user and computer information

- Handles logins and authentication
- Controls access to files, printers, and systems
- Lets we apply rules (Group Policies) across many computers

Key Components of AD DS:

Component	Simple Explanation		
Domain	A group of users and computers with the same rules and security (e.g., company.com)		
Organizational Unit (OU)	Like folders inside a domain to organize users, computers, or groups		
Forest	The top-level container that holds one or more domains		
Tree	A group of connected domains within a forest		
Domain Controller (DC)	The server that runs AD DS and handles logins, directory changes, and security		
Objects	Everything stored in AD (like user accounts, computers, groups)		
Group Policy	Settings used to control what users and computers can do on the network.		

- 23. How do you create a new Active Directory user account in Windows Server ?
 - → To create a new user in **Active Directory** using **Windows Server** with **GUI**:
 - Step-by-Step:
- 1. Open Server Manager
 - Click the Start menu, then open Server Manager.
- 2. Open Active Directory Users and Computers
 - In Server Manager, click on **Tools** (top-right corner).
 - Select Active Directory Users and Computers.
- 3. Choose Where to Create the User
 - In the left panel, click on our **domain name** (e.g., yourcompany.local).
 - Navigate to the **Organizational Unit (OU)** or folder where we want the user account to go (e.g., Users).
- 4. Create a New User
 - Right-click the folder or OU, then choose:
 - New → User
- 5. Fill in User Info

- Enter:
 - First Name and Last Name
 - User logon name (e.g., jsmith)
- Click Next.

6. Set a Password

- Type a strong password for the user.
- Choose password options like:
 - "User must change password at next logon" (recommended)
- Click Next.

7. Finish

- Review the info, then click Finish.
- 24. Explain the process of creating and managing Group Policy Objects (GPOs) in Windows Server 2016 or 2019.

A Group **Policy Object (GPO)** is a set of rules or settings that control **how computers and users behave** in a network.

For example, we can use a GPO to:

- Force all users to use strong passwords
- Hide control panel settings
- Automatically set the desktop wallpaper
- ✓ How to Create and Manage GPOs in Windows Server 2016/2019 (Simple Steps)
- Step 1: Open Group Policy Management

- 1. Click **Start** → Go to **Server Manager**
- 2. Click Tools → Select Group Policy Management

Step 2: Choose Where to Apply the GPO

- In the left panel, expand our **domain name** (e.g., company.local)
- Right-click on the **Organizational Unit (OU)** or the **domain** where we want the GPO
- Choose "Create a GPO in this domain, and Link it here..."

Step 3: Name the GPO

- Give our GPO a clear name (e.g., Password Policy, Desktop Settings)
- Click OK

Step 4: Edit the GPO

- Right-click our new GPO → Click **Edit**
- The Group Policy Management Editor opens

Step 5: Set the Policies

Inside the editor, we'll see two sections:

• Computer Configuration - rules for computers

• User Configuration - rules for users

Examples:

- To force a password policy:
 Go to Computer Configuration → Policies → Windows Settings →
 Security Settings → Account Policies → Password Policy
- To set a desktop wallpaper:
 Go to User Configuration → Policies → Administrative
 Templates → Desktop → Desktop

Step 6: Close and Apply

- After setting the policies, close the editor
- The GPO is now linked and will apply to users or computers in that location

Step 7: Force GPO Update (Optional)

To apply the policy immediately on a client computer: gpupdate /force

- 25. What are Organizational Units (OUs) in Active Directory, and how do you use them?
 - → An Organizational Unit (OU) is like a folder inside Active Directory that helps us organize and manage users, computers, and groups more easily.

Simple Explanation:

- OUs are **containers** used to group related items in Active Directory.
- we can put users, computers, and groups inside an OU.
- This helps we apply **Group Policies (GPOs)** or give **specific permissions** to only certain people or devices.

Why Use OUs?

Benefit Example

Organize Create separate OUs for HR, Sales, IT, etc.

Apply GPOs Apply a GPO to just the Sales OU to limit

internet access

Delegate control Allow a junior admin to manage only the HR OU,

not the whole domain

Simplify Makes it easier to find and manage users or

management devices

How to Create and Use an OU:

- 1. Open Active Directory Users and Computers
 - ullet Go to Start ullet Server Manager ullet Tools ullet Active Directory Users and Computers

2. Create an OU

- Right-click our domain name
- Choose New → Organizational Unit
- Give it a name (e.g., "Marketing") and click **OK**
- 3. Move Items into the OU
 - Drag and drop users, computers, or groups into the OU
- 4. Apply GPOs or Delegate Control
 - Right-click the OU to link a **Group Policy**
 - we can also use the "Delegate Control" wizard to give someone permission to manage just that OU
- 26. Describe the process of delegating administrative privileges in Active Directory.
 - → Delegating administrative privileges means giving a user or group specific rights to manage certain parts of Active Directory (AD), without giving them full control over the entire system. This is useful when we want to allow certain people (like junior admins or department heads) to manage users or resources in specific areas, but not everything.
- Step-by-Step Guide to Delegating Administrative Privileges:
- 1. Open Active Directory Users and Computers
 - Click Start, go to Server Manager.
 - Then select **Tools** and choose **Active Directory Users** and **Computers**.
- 2. Right-Click the OU or Domain

- In Active Directory Users and Computers, find the Organizational Unit (OU) or domain where we want to delegate permissions.
- Right-click that OU or domain and select **Delegate Control**.

3. Delegate Control Wizard

• The Delegation of Control Wizard will pop up. Click Next.

4. Select the User or Group

- Choose the user or group to whom we want to delegate control.
 - we can pick a specific user or a group of users (e.g., ITAdmins, HRGroup).
- Click Next.

5. Choose Permissions to Delegate

- Select the specific tasks you want the user or group to manage. Some common permissions include:
 - Create, delete, and manage user accounts
 - Reset passwords
 - Modify group memberships
 - Read or modify properties
- We can also choose Advanced Permissions if we need to customize permissions more specifically.
- Click Next.

6. Finish the Wizard

- Review the settings we've chosen and click Finish.
- The user or group now has the specific permissions we assigned to them, but not full admin rights over the entire domain.

Example:

If we want to allow someone in the **HR** department to **reset user passwords** but not give them full admin rights:

• we would delegate "Reset password" permission for the HR OU to that user or group.