

**Hardware Networking**

**Installation, Storage, and Compute**

**with Windows Server**

**SUBMITTED TO**

**KAMLESH SHUKLA SIR**

**SUBMITTED BY**

**MANAV BANDHANIA**

**1. What two options are provided in the type of installation window during Windows Server 2016 installation?**

When installing Windows Server 2016, you will be presented with two installation options:

1. **Windows Server 2016 (Server with Desktop Experience)**
   * Includes a **Graphical User Interface (GUI)**.
   * Comes with built-in tools like Server Manager, Control Panel, and administrative tools.
   * Suitable for administrators who prefer a **visual interface** for management.
   * Requires **more system resources** than Server Core.
2. **Windows Server 2016 (Server Core)**
   * A **minimal installation** without a GUI.
   * Managed using **Command Prompt**, **PowerShell**, or remote tools like **RSAT (Remote Server Administration Tools)**.
   * Uses **fewer system resources** and is more secure.
   * Best for **high-performance servers, domain controllers, and Hyper-V hosts**.

**2. How to configure a server step by step?**

**Step 1: Install Windows Server 2016**

* Boot from the installation media (USB/DVD).
* Select language, time, and keyboard preferences.
* Choose an installation type (**Server with Desktop Experience** or **Server Core**).
* Select a disk partition and proceed with installation.

**Step 2: Set Up a Static IP Address**

* Open **Network and Sharing Center** → **Change Adapter Settings**.
* Right-click the network adapter → **Properties** → Select **IPv4**.
* Manually configure:
  + **IP Address** (e.g., 192.168.1.100)
  + **Subnet Mask** (e.g., 255.255.255.0)
  + **Default Gateway** (e.g., 192.168.1.1)
  + **DNS Server** (e.g., 8.8.8.8, 8.8.4.4)

**Step 3: Change the Computer Name**

* Go to **Control Panel** → **System** → Click **Change Settings** under **Computer Name**.
* Restart the server.

**Step 4: Configure Roles & Features**

* Open **Server Manager**.
* Click **Add Roles and Features**.
* Choose the necessary roles (e.g., **Active Directory Domain Services (AD DS)**, **DNS**, **DHCP**, etc.).

**Step 5: Configure Firewall and Security Settings**

* Open **Windows Firewall** → **Advanced Settings**.
* Configure inbound and outbound rules.
* Enable **Remote Desktop** if needed.

**Step 6: Create User Accounts and Assign Permissions**

* Open **Active Directory Users and Computers** (for AD DS servers).
* Create users, groups, and set permissions.

**Step 7: Install Updates & Drivers**

* Run **Windows Update**.
* Install necessary drivers.

**Step 8: Set Up Monitoring and Logging**

* Configure **Event Viewer** for system monitoring.
* Set up **automatic backups**.

**3. What are the Pre-installation tasks?**

**System Requirements Check**

* Ensure hardware meets the **minimum system requirements**.
* Check **CPU, RAM, Storage**, and **network compatibility**.

**Backup and Disaster Recovery Planning**

* Backup critical data before installation.

**Prepare Bootable Installation Media**

* Download Windows Server 2016 ISO.
* Use **Rufus** or **Windows Media Creation Tool** to create a bootable USB.

**Determine Server Roles**

* Decide whether the server will be a **Domain Controller, File Server, Web Server, DHCP, or DNS server**.

**Check Network Configuration**

* Plan **IP addressing scheme**.
* Ensure connectivity to **Active Directory (if applicable)**.

**4. What are the Post-installation tasks?**

* **Activate Windows Server** using a license key.
* **Set up static IP address** (if not already configured).
* **Rename the server** to a meaningful name.
* **Install security updates** and patches.
* **Configure Firewall Rules** and **enable RDP**.
* **Set up server monitoring** using Event Viewer.
* **Install server roles** (Active Directory, DNS, DHCP, etc.).
* **Configure user accounts** and permissions.

**5. What is the standard upgrade path for Windows Server?**

* **Windows Server 2012 R2 → Windows Server 2016** (Direct Upgrade Supported).
* **Windows Server 2008 R2 → Windows Server 2012 → Windows Server 2016** (Requires intermediate upgrade).
* **Windows Server 2016 → Windows Server 2019** (Supported).

**6. What is the Physical Structure of Active Directory?**

Active Directory (AD) has a **physical structure** consisting of:

1. **Domain Controllers (DCs)** – Servers that store and manage AD data.
2. **Sites** – Physical locations with well-defined network subnets.
3. **Subnets** – Used to optimize network traffic.
4. **Replication Links** – Ensure **synchronization** between multiple domain controllers.

**7. What are the Logical Components of Active Directory?**

1. **Forest** – The highest level of AD, containing multiple domains.
2. **Domain** – A logical group of **users, computers, and resources**.
3. **Organizational Units (OUs)** – Used for structuring objects and applying policies.
4. **Schema** – Defines attributes and object types within AD.
5. **Global Catalog** – Stores a searchable database of all objects.

**8. What is the Full Form of LDAP?**

* **LDAP stands for Lightweight Directory Access Protocol**.
* It is an **open-standard protocol** used for accessing and managing directory services over a network.
* LDAP is widely used in **Active Directory (AD), OpenLDAP, and other directory-based systems**.
* It allows **authentication, authorization, and directory lookups**.

**Example of LDAP Query:**

CN=John Doe,OU=Users,DC=example,DC=com

* **CN (Common Name)** = John Doe
* **OU (Organizational Unit)** = Users
* **DC (Domain Component)** = example.com

**9. What is the Location of the AD Database?**

* The **Active Directory database (NTDS.dit)** is located at:
* C:\Windows\NTDS\NTDS.dit
* **NTDS.dit (NT Directory Services Database)** stores:
  + Users and Groups
  + Computer Accounts
  + Security Policies
  + Group Policies

Other AD-related files:

* **EDB.log** – Logs database changes.
* **Res1.log & Res2.log** – Reserved logs for database recovery.
* **Temp.edb** – Temporary database for indexing.

**10. What is a Child DC?**

* A **Child Domain Controller (Child DC)** is a domain that is part of a **larger domain hierarchy** in a forest.
* It exists **under a parent domain** but operates **independently**.

**Example:**

* **Parent Domain**: company.com
* **Child Domain**: sales.company.com

**Advantages:**

* Separates administrative tasks.
* Maintains a **trust relationship** with the parent domain.
* Increases security by isolating access.

**11. Explain the term "Forest" in AD**

* A **Forest** is the **highest-level logical structure** in Active Directory.
* It is a **collection of multiple domains** that share:
  + A **single schema** (database structure).
  + A **Global Catalog (GC)**.
  + A **common configuration**.

**Key Components of a Forest**

1. **Root Domain**: The first domain created (e.g., example.com).
2. **Tree**: A hierarchical structure of **domains within a forest**.
3. **Trust Relationships**:
   * **Transitive Trust**: Trust between **all domains** in a forest.
   * **Non-Transitive Trust**: Custom **one-way trust**.

Forests allow **data sharing** across domains but maintain **security boundaries**.

**12. What is Active Directory?**

**Microsoft's implementation of a directory server**  
 **An LDAP-compatible directory server**

Active Directory is a **directory service** used in **Windows Server environments** to:

* **Store and manage** network objects (users, computers, printers).
* Provide **centralized authentication**.
* Apply **security policies** using **Group Policy**.

**13. When you create an Active Directory domain, what’s the default user account?**

**Administrator**

* The **Administrator account** has **full privileges** in the domain.
* It can:
  + **Create and delete users**.
  + **Manage domain settings**.
  + **Install and configure roles and features**.

**14. AD domain provides which of the following advantages?**

**Centralized authentication**  
 **More detailed logging**  
 **Centralized management with GPOs**

**Benefits of Active Directory Domains:**

1. **Centralized Authentication**
   * Users can log in **once** to access multiple resources.
   * Uses **Single Sign-On (SSO)**.
2. **More Detailed Logging**
   * Tracks user activities and system events.
   * Helps in **security audits** and troubleshooting.
3. **Centralized Management with GPOs**
   * Administrators can **enforce security policies** on all computers.
   * Example: Preventing USB access on all workstations.

**15. Minimum Hardware Requirements for Windows Server 2016**

| **Component** | **Minimum Requirement** |
| --- | --- |
| **Processor** | 1.4 GHz (64-bit) |
| **RAM** | 512 MB (Core) / 2 GB (GUI) |
| **Storage** | 32 GB |
| **Network** | Gigabit Ethernet |

**For better performance**, at least **8 GB RAM and 100 GB storage** is recommended.

**16. Windows Server 2016 Editions and Features**

1. **Datacenter Edition**
   * Supports **unlimited** Virtual Machines (VMs).
   * Best for **large enterprises**.
2. **Standard Edition**
   * Supports **2 VMs**.
   * Suitable for **small & medium businesses**.
3. **Essentials Edition**
   * Supports **25 users and 50 devices**.
   * Ideal for **small offices**.
4. **Hyper-V Edition**
   * Only used for **virtualization**.
   * No GUI or extra roles.

**17. Installing Windows Server 2016 in GUI Mode**

1. Boot from **USB/DVD**.
2. Select **Windows Server with Desktop Experience**.
3. Choose **Custom Install**.
4. Select the partition and install.
5. Restart and configure **network & security settings**.

**18. Installing Windows Server 2016 in Server Core Mode**

1. Boot from **USB/DVD**.
2. Select **Windows Server Core**.
3. Complete installation.
4. Use **sconfig** to:
   * Rename the server.
   * Configure IP Address.
   * Enable Remote Desktop.
   * Install roles like **AD DS, DNS, or DHCP**.

**19. Configuring Network Settings**

**GUI Mode:**

1. Open **Network and Sharing Center**.
2. Select **Change Adapter Settings**.
3. Set a **Static IP, Subnet Mask, Gateway, and DNS**.

**PowerShell (CLI Mode):**

New-NetIPAddress -InterfaceAlias "Ethernet" -IPAddress 192.168.1.10 -PrefixLength 24 -DefaultGateway 192.168.1.1

**20. Promoting a Windows Server to a Domain Controller**

1. Install **Active Directory Domain Services (AD DS)**.
2. Run **dcpromo** in PowerShell:
3. Install-ADDSForest -DomainName "example.com"
4. Configure settings and restart.

**21. Creating a New Active Directory User**

1. Open **Active Directory Users and Computers**.
2. Right-click **Users → New → User**.
3. Enter user details and assign a **password**.
4. Set **permissions and group memberships**.

**22. Creating and Managing Group Policy Objects (GPOs)**

1. Open **Group Policy Management Console (GPMC)**.
2. Create a **New GPO**.
3. Configure policies (e.g., **password policies, software restrictions**).
4. Link the GPO to **OUs, Domains, or Sites**.

**23. Organizational Units (OUs)**

* OUs are **logical containers** inside **Active Directory**.
* Used to **organize users, groups, and devices**.

**Example OU Structure:**

Company.com

├── HR (OU)

├── IT (OU)

│ ├── Servers (OU)

│ ├── Workstations (OU)

**Benefits:**

* Easier **Group Policy Management**.
* Delegation of **administrative control**.

**24. Delegating Administrative Privileges**

1. Open **Active Directory Users and Computers**.
2. Right-click on an **OU** → **Delegate Control**.
3. Select **User/Group**.
4. Assign **specific permissions** (e.g., reset passwords).