

Jug 7th Chapter 1: Computer Basics  
2025

## \* Computer Parts

- Motherboard
- CPU : Central Processing Unit
- RAM : Random Access Memory
- GPU : Graphics Processing Unit
- Hard Drive / SSD

## \* Motherboard

- Connects all the components
- Lets them communicate and work together
- Supplies power and manages data flow

## \* CPU Specs

- Number of cores
- Core Speed
- Number of Threads

## \* RAM

- Stores data and programs that are currently in use
- Provides fast access to the CPU for quick read/write operations
- Temporary storage - data is lost when power is off

## \* GPU

- Handles graphics and visual tasks (images, videos, games)
- Helps with rendering, video editing, 3D work etc

Types :  
1. Integrated GPU : Built into the CPU, good for basic tasks  
2. Dedicated GPU : Separate chip (like NVIDIA / AMD), powerful for gaming and heavy graphics.

## \* SSD's & Harddrives

### \* Harddrives

- Older Storage type
- uses spinning magnetic disks to read/write data
- Slower performance
- Mechanical parts can wear out or get damaged

### \* SSD

- Newer, faster storage
- Uses flash memory (no moving parts)
- Very fast read/write speeds, silent & more durable
- Good for: fast booting, app loading, overall performance

→ SSD = Speed & performance

→ HDD = More space at lower cost

Network Attached Storage

\* Webservers : Sends websites (Apache, Nginx, IIS)

\* File servers : Stores and shares files (FTP server, NAS)

\* Database server : Manages databases (MySQL, PostgreSQL)

\* Application server : Runs application logic (Tomcat, Weblogic)

\* Mail server : Handles emails (SMTP, IMAP) → Apache's ~~Java~~ Oracle

\* Game Server : Handles ~~hosts~~ & multiplayer games → Java application

\* Proxy Server : Acts as a middleman between client and Internet

\* DNS server : Translates domain names to IP addresses.

\* A server is any computer (including your computer/laptop) running special software to serve others.

## Module 1 : Windows Server Administration

- ★ What is server administration
  - Server administration comprehends all tasks related to managing, optimizing and monitoring servers, networks and systems in order to ensure they work properly and safely.
  - It requires 24/7 availability and monitoring to guarantee business operations at all times.

### ★ Different categories of server administrator

- • Hardware management and maintenance
- Application maintenance and updates
- Backup scheduling
- Server and system monitoring
- Performance optimization
- Access management
- Technical support and ticketing management
- Implementing security barriers against cyber attacks
- Data Protection
- Data center safety, when opting for on-premise servers.

### ★ Operating Systems

- An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer.
- The application program makes use of the OS by making requests for the services through a defined application program interface (API).

- In addition, users can interact directly with the OS through a user interface, such as a command-line interface (CLI) or a graphical UI (GUI)

## ★ Types of Operating Systems

### → Client OS

- Windows 10
- Windows 11

### → Server OS

- Server 2012
- 2016
- 2019
- 2022

→ Desktop / Client OS - windows, macOS, Linux

→ Server OS - Windows Server, Linux Server

→ Mobile OS - Android, iOS

→ Embedded OS - Smart TV's, washing machines, IoT devices

→ Real Time OS (RTOS) - Robotics, aerospace, medical devices.

## ★ Client Operating System

→ Client OS works within computer desktops, laptops and smartphones.

→ Client OS manages different hardware components that are connected to printers, monitors & cameras.

→ It supports a single user at a time.

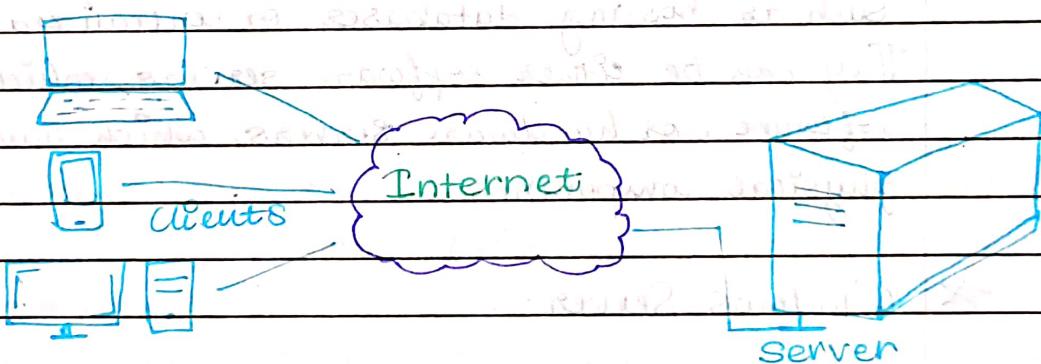
→ It is also capable of obtaining services from a server OS.

→ When compared to a server OS it helps in providing multiprocessing power for a minimum price.

→ Examples - Windows, Mac.

## \* Server Operating System

- A server OS is an OS that operates on the server.
- Server OS is an advanced version of an OS which has more features and capabilities to provide various ~~and~~ services to other devices or client machines connected to it.
- In server OS, most processes execute from the OS commands.
- It helps to install and deploy ~~various~~ business and web applications and is also capable of managing & monitoring the connected client devices.
- The server OS execute other administrative process.



## \* Client vs Server Operating System

- A client machine is simple and inexpensive on the other hand server OS is expensive & more powerful.
- The main difference b/w both is the performance. There are multiple clients working on a single server. Clients sends requests for network access to the server and a client is an end user.
- A server OS is an OS to run on a server, they are special OS that work on client/server architecture & serve for requests from the client side.
- If a client uses a browser to search information then a server sends the source to the client to search directly.

→ Client OS

- Only request for service

→ Server OS

- Request & offer services

→ DHCP - assign IP address to a device

→ DNS - host name to IP and vice versa

## ★ Server

→ A server is a computer that is used to store & process data for other computers. Servers are typically used in businesses to handle high-end processing work, such as hosting databases or centralized file keeping. They can be either software servers, which run on software, or hardware servers, which have their physical components.

## ★ Windows Server

→ Windows Server is a line of OS that Microsoft specifically creates for use on a server.

→ Windows Server 2016 comes in 3 Editions: Essentials, Standard & Datacenter.

→ Windows Server 2016 Essentials is ideal for small business with 25 users & upto 50 devices & does not support virtualization.

→ Windows Server 2016 Standard is ideal for companies that require advanced features & virtualization (upto 2 VMs).

→ Windows Server 2016 Datacenter is for companies that require advanced features & needs more than 2 VMs (unlimited)

## ★ Windows Server 2019 Edition → The one which we use

→ Windows Server 2019 Standard : Key Features

- The Standard edition is designed for physical or minimally virtualized environments. As for the maximum no. of users, it is based on CALS (Client Access License) Requirements.
- When it comes to virtualization, Windows Server 2019 Standard includes permission for 2 OSes (operating system environments) or VMS per license, plus one Hyper-V host.
- Allows for replication between servers for disaster recovery purposes.

## ★ Windows Server vs. Regular Windows : The Basics :

- Same look, including the Taskbar, desktop icons & Start button.
- Each Windows Server version corresponds to a consumer Windows version.
  - Example :- Windows Server 2003 → Windows XP (server version)
- Current versions:
  - Windows Server 2016 - based on ~~Windows 10 Anniversary~~ update
  - Windows Server 2019.
- Both share the same code base, so many functions are similar.
- It can install normal Windows programs (browsers, photo editors) on Windows server.
- Basic tools like Notepad are included by default.

## ★ Windows Server Has Enterprise Management Softwares

→ Active Directory : is a user management service that allows a server to act as a domain controller. Instead of logging into a local computer, the domain controller handles all user account authentication.

Eg: Employees log in with the same id on any office computer.

→ DHCP : Dynamic Host Configuration Protocol lets a server automatically assign IP address to all devices on the network. At home, router probably handles this. But in a business setting, IT staff can take advantage of the greater DHCP functionality in Windows Server.

Eg: Office laptop gets IP automatically when connected to WiFi.

→ File and Storage Services : This allows to keep important data in a central location and set permissions to control who can access what.

Eg: HR department shares salary files only with HR team.

→ Print services : If a business has dozens of printers across the building, it's a waste of time for IT staff to configure them individually for each new workstation. Setting up a print server allows to easily map printers to computers & reduce redundant work.

Eg: Employees can print to any office printer without individual setup.

→ Windows Update Services : Often, businesses don't want all Windows updates to come through right away. By setting up a server as a Windows update controller, workstation updates can be routed through that server and configured with specific rules for how they work.

Eg: IT ensures critical updates go first, non-critical ones later.

Example to remember

### \* Server Core vs Desktop GUI

- Server core → minimal, no GUI
- Desktop Experience → full (GUI)
- The specific edition and its form are selected in the beginning of windows setup.
- Windows Server 2016 Datacenter could have been installed as Datacenter and then converted to Standard, and vice versa.
- Similarly, Windows Server could have been installed as core server and then converted to Desktop Experience.
- Though converting between Datacenter to Standard is still supported, Server core or Desktop Experience (GUI) cannot be converted anymore.

### \* Windows Server Desktop Experience (GUI)

→ • Windows Server Desktop Experience (GUI) is the classic & well known form of Windows Server, which has been evolving throughout time since Windows NT.

- Classic, user friendly version with graphical interface.

→ Advantages:

- Easier to manage locally or remotely.
- Server Manager dashboard appears on login for easy management.

Eg: GUI = like using a computer with windows & icons"

→ Easier than typing commands in core version.