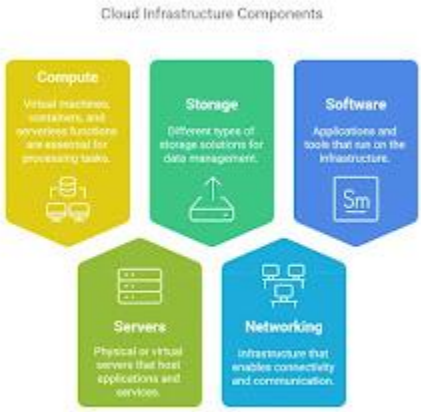
AWS

Amazon Web Services (AWS) provides cloud infrastructure that helps companies run websites, applications, and databases without owning physical servers. To understand AWS, we first need to understand some basic infrastructure concepts.

1. What Is Infrastructure (Infra)?



Infrastructure (Infra) is the basic foundation needed to run applications and IT systems.

In Simple Words:

Infrastructure is **everything that makes a computer system work**.

It Includes:

- Servers (computers)
- Storage (hard disks)
- Network (internet, cables, routers)
- Power and cooling
- Operating systems

In AWS:

- AWS owns and manages the physical infrastructure
- Users rent resources like servers and storage
- You don’t need to buy or maintain hardware

Example:
Instead of buying a server, AWS gives you a virtual server called **EC2**.

2. What Are AWS Regions?

An **AWS Region** is a **physical location** in the world where AWS has data centers.

In Simple Words:

A region is **a country or area** where AWS runs its cloud services.

Examples:

- US East (Virginia)
- Europe (Ireland)
- Asia Pacific (Mumbai)

Why Regions Are Important:

- Faster access for nearby users
- Meet local laws and data rules
- Backup and disaster recovery

Example:
If your users are in India, you choose the **Mumbai region**.

3. What Are Availability Zones (AZs)

An **Availability Zone (AZ)** is a **data center** inside an AWS Region.

In Simple Words:

AZs are **separate buildings** with servers inside the same region.

Key Points:

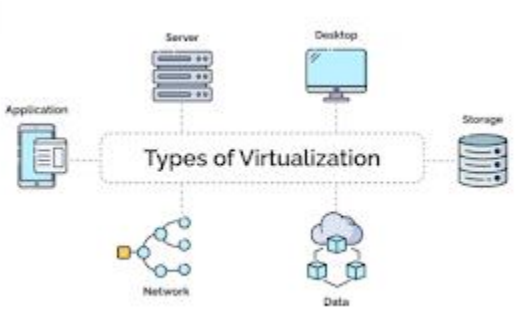
- Each region has **2 or more AZs**
- AZs are isolated from each other
- Connected using fast private networks

Why AZs Are Important:

- High availability
- If one AZ fails, others keep working

Example:
If one data center has a power issue, your application still runs in another AZ.

4. How Virtualization Works



Virtualization allows multiple virtual computers to run on one physical machine.

In Simple Words:

One powerful computer is divided into **many small virtual computers**.

Without Virtualization:

- One server → one application
- Waste of resources

With Virtualization:

- One server → many virtual machines
- Each VM works independently

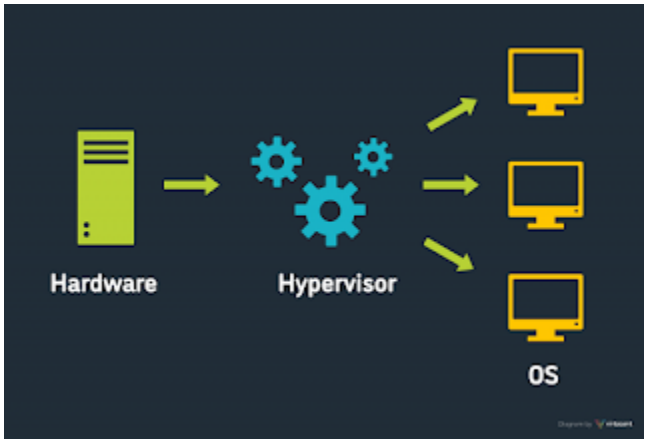
What Each Virtual Machine Has:

- Its own operating system
- CPU, memory, and storage (virtual)
- Applications

In AWS:

Services like **EC2** use virtualization to create virtual servers quickly.

5. How a Hypervisor Works



A **hypervisor** is software that makes virtualization possible.

In Simple Words:

A hypervisor is a **manager** that controls virtual machines.

What It Does:

- Sits between hardware and virtual machines
- Shares CPU, memory, and storage
- Keeps VMs isolated from each other

Types of Hypervisors:

- **Type 1 (Bare Metal):** Runs directly on hardware (used by AWS)
- **Type 2:** Runs on top of an OS (used on laptops)

AWS Hypervisor:

AWS uses a modern system called **AWS Nitro**, which gives:

- Better performance
- Higher security
- Faster networking

Conclusion

AWS Infrastructure makes cloud computing easy and reliable.

Quick Summary:

- **Infrastructure** = foundation of IT systems
- **Region** = geographic area
- **Availability Zone** = data center
- **Virtualization** = multiple VMs on one server
- **Hypervisor** = software that controls VMs