Introduction to AWS Cloud Computing

1. Understanding Physical Servers and Cloud Computing

What is a Physical Server?
A physical server is a dedicated hardware machine that provides computing resources like CPU, RAM, storage, and networking for applications. It is usually hosted in on-premises data centers.

Limitations of Physical Servers:
• High upfront costs for purchasing hardware
• Requires physical maintenance and administration
• Scalability is slow and expensive
• Risk of hardware failure leading to downtime
• Need for physical security, cooling, and backup systems

What is Cloud Computing?
Cloud computing refers to the on-demand delivery of IT resources (such as computing power, storage, and applications) over the internet, with a pay-as-you-go pricing model.

Advantages of Cloud Computing:
• Low initial investment
• On-demand scalability
• High availability and disaster recovery options
• No need for physical infrastructure maintenance
• Access resources globally over the internet

2. Key Differences Between Physical Servers and Cloud Computing

Feature	Physical Server (On-Premise)	Cloud Computing (AWS, Azure, GCP)
Infrastructure Cost	High upfront investment	Pay-as-you-go model
Scalability	Slow and expensive	Instant and flexible
Maintenance	Requires IT staff & hardware upkeep	Managed by the provider
Security	Requires physical security	Cloud providers ensure security
Disaster Recovery	Manual backup required	Built-in redundancy
Accessibility	Limited to local network	Accessible from anywhere

3. AWS Cloud Computing Overview

What is AWS?

Amazon Web Services (AWS) is a cloud computing platform offering a wide range of services, including computing power, storage, databases, and networking.

Key Features of AWS:
• On-Demand: Resources are available whenever needed.
• Scalable: Resources can be increased or decreased based on demand.
• Pay-Only-for-Usage: No upfront costs, you only pay for what you use.

4. Cloud Computing Service Models

1. Infrastructure as a Service (IaaS):
• Provides virtual machines, storage, and networking.
• Example: AWS EC2 (Elastic Compute Cloud).

2. Platform as a Service (PaaS):
• Provides a platform to develop and deploy applications.
• Example: AWS Elastic Beanstalk.

3. Software as a Service (SaaS):
• Provides ready-to-use software applications.
• Example: Gmail, Office 365.

5. Autoscaling in AWS

Problem: If web traffic increases beyond server capacity, performance degrades or the server crashes.

Solution with AWS Autoscaling:
• Automatically adds servers when CPU usage goes beyond 80%.
• Reduces servers when CPU usage drops below 30%.
• Ensures cost efficiency and high availability.

Conclusion

AWS cloud computing provides a cost-effective, scalable, and high-availability alternative to physical servers. By leveraging AWS services, businesses can reduce infrastructure costs, improve performance, and achieve greater flexibility.