

Core Concepts of Cloud Computing

1. Virtualisation

- Used to create a virtual version of Computer
- Used to store files, run programs, to compute and even play games.
- These include:
 - CPU (Central Processing Unit)
 - Memory/RAM (Random Access Memory)
 - Storage
 - Networking
 - GPU and I/O Devices

2. Scalability

- Ability to increase or decrease computing resources to match demand dynamically.
- There are two main types;
 - Vertical Scaling (Scaling Up)
 - Horizontal Scaling (Scaling Out)

3. Agility

- Ability of an organization to rapidly develop, deploy, and scale applications and services in response to changing business needs or market conditions.
- Agility is determined by the following factors;
 - Speed
 - Adaptability
 - Flexibility
 - Continuous Improvement

4. High Availability

- Design and implementation of systems that ensure continuous and reliable operation, minimizing downtime.
- Key principles of high availability include:
 - Redundancy
 - Failover
 - Load Balancing
 - Geographic Distribution
 - Monitoring and Alerting

5. Fault Tolerant

- Ability of a system, to continue functioning correctly even when some of its components fail.
- Key aspects include:
 - Redundancy
 - Replication
 - Monitoring
 - Graceful Degradation

6. Global Reach

- Ability of a system or service to be accessed and utilized from anywhere in the world.
- It includes
 - Low Latency
 - Content Localization
 - Disaster Recovery
 - Market Expansion
 - Workforce Flexibility and Compliance

7. Elasticity

- Ability to automatically adjust resources dynamically and quickly to meet real-time, fluctuating demand.
- In operations, elasticity fosters automatically increases or decreases resource capacity based on current demand.



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Scalability

Scaling - Vertical vs Horizontal Scaling

Vertical Scaling(Scaling Up/Down)

- It involves changing the resources of a single machine or instance

Advantages

- Simpler to implement

Disadvantages

- Limited by the capacity of a single machine

Horizontal Scaling(Scaling In/Out)

- It involves adding or removing more machines or instances to distribute the workload.

Advantages

- Greater scalability and fault tolerance

Disadvantages

- More complex to implement



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Serverful vs Serverless

Serverful vs Serverless

What is a Serverful?

- It involves long-running physical servers to perform computing tasks.
- It is like having a computer located remotely.
- Complete control over the computing infrastructure.
- It provides high levels of
 - Performance
 - Security
 - Reliability.

Benefits of Serverful Computing

- Full Access
- Security
- Offline Access

Drawbacks of Serverful Computing

- Cost
- Dependency on In-house IT

What is Serverless Computing?

- Serverless computing, does not imply the complete absence of servers.
- It involves
 - Outsourcing server management and maintenance.
- You can concentrate on
 - Product Development
 - Coding

while the cloud vendor handles the underlying server infrastructure

Benefits of Serverless Computing

- Cost-Efficiency
- Scalability
- Global Data Access

Drawbacks of Serverless Computing

- Lack of Control and Visibility