

Cloud Computing Concepts

Objectives:

At the end of this episode, I will be able to:

Understand what the defining Cloud Computing concepts are.

Explain what the three accepted types of Cloud Computing Services are.

Identify what the separation of responsibilities is between the customer and the provider in Cloud Computing.

Define the four Cloud Deployment Models used in Cloud Computing.

Identify the roles/actors defined by the NIST Cloud Reference Architecture.

External Resources:

Cloud Computing Concepts:

- On-demand self service
- Distributed storage
- Rapid elasticity
- Automated management
- Broad network access
- Resource pooling
- Measured service
- Virtualization technology

What are the three accepted types of Cloud Computing Services?

Infrastructure-as-a-Service (IaaS) - The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications.

The consumer DOES NOT manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

Platform-as-a-Service (PaaS) - The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.

The consumer DOES NOT manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.

Software-as-a-Service (SaaS) - The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface.

The consumer DOES NOT manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user specific application configuration settings.

What are the separation of responsibilities in the Cloud? -

Cloud Responsibility Matrix - Customer vs Provider.vsdx

What are the Cloud Deployment Models?

Private - The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Public - The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid - The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Community - The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

What are the roles/actors defined by the NIST Cloud Reference Architecture?

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Cloud Consumer - A person or organization that uses cloud computing services

Cloud Provider - A person or organization providing services to interested parties

Cloud Carrier - An intermediary for providing connectivity and transport services between cloud consumers and providers

Cloud Auditor - A party for making independent assessments of cloud service controls and taking an opinion thereon

Cloud Broker - An entity to manage cloud services in terms of use, performance, and delivery who also maintains relationship between cloud providers and consumers

Cloud brokers provide services in three categories:

- o **Service Intermediation** - Improves a given function by a specific capability and provides value-added services to cloud customers
- o **Service Aggregation** - Combines and integrates multiple services into one or more new services
- o **Service Arbitrage** - the services being aggregated are not fixed (cloud broker has the flexibility to choose services from multiple agencies)