



NSCET E-LEARNING PRESENTATION

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COMPUTER SCIENCE AND ENGINEERING

IV YEAR / VII SEMESTER

CS8791 CLOUD COMPUTING

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UNIT III

CLOUD ARCHITECTURE, SERVICES AND STORAGE



NIST Cloud Computing Reference Architecture

- ✓ The goal is to accelerate the federal government's adoption of secure and effective cloud computing to reduce costs and improve services.
- ✓ NIST working group - Cloud Computing Target Business Use Cases - Cloud Computing Reference Architecture and Taxonomy - Cloud Computing Standards Roadmap - Cloud Computing SAJACC (Standards Acceleration to Jumpstart the Adoption of Cloud Computing) - Cloud Computing Security

Objectives

- ✓ Provides a simple and unambiguous taxonomy of three service models - Software as a service (SaaS) - Platform as a service (PaaS) - Infrastructure as a service (IaaS) (Private cloud, Community cloud, Public cloud, and Hybrid cloud)

- ✓ Provides a unifying view of five essential characteristics - On-demand self-service - Broad network access - Resource pooling - Rapid elasticity - Measured service The project team developed a Strawman model of architectural concepts

Cloud Computing Reference Architecture

3. Cloud Computing Reference Architecture

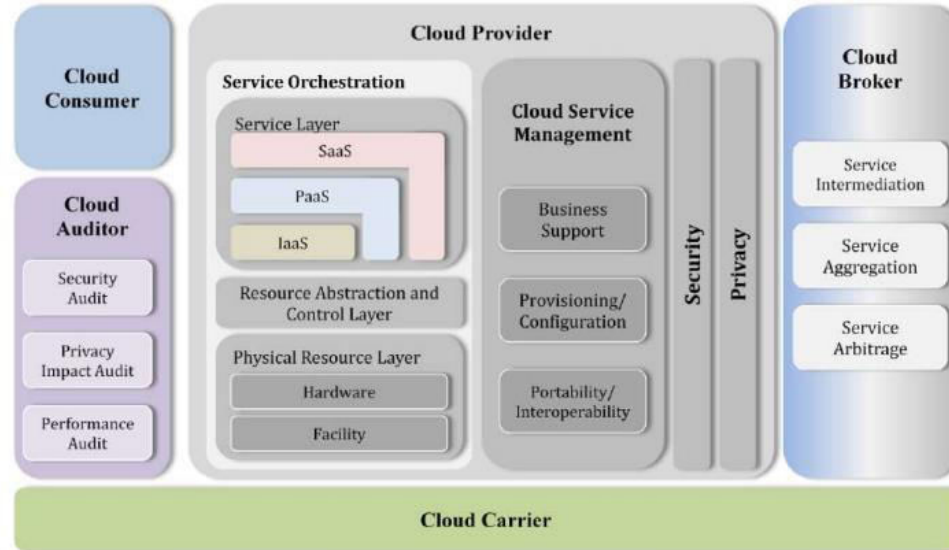


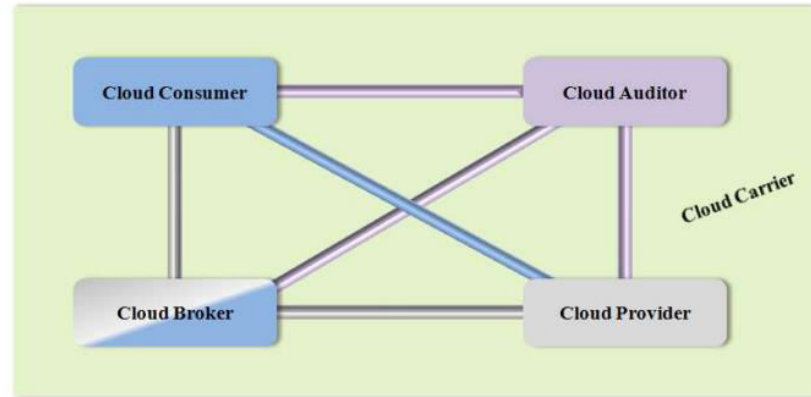
Figure 1: The Conceptual Reference Model

Interactions between the Actors in Cloud Computing

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Figure 1: The Conceptual Reference Model



- The communication path between a cloud provider and a cloud consumer
- The communication paths for a cloud auditor to collect auditing information
- The communication paths for a cloud broker to provide service to a cloud consumer

Figure 2: Interactions between the Actors in Cloud Computing

Interactions between the Actors in Cloud Computing

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Figure 2: Interactions between the Actors in Cloud Computing



Figure 3: Usage Scenario for Cloud Brokers

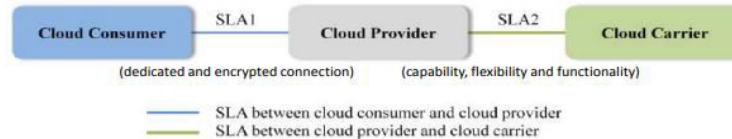


Figure 4: Usage Scenario for Cloud Carriers

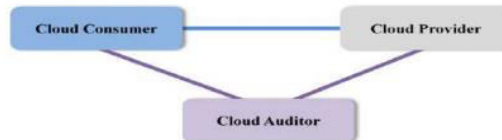


Figure 5: Usage Scenario for Cloud Auditors



Topic NIST Components



Cloud Consumer

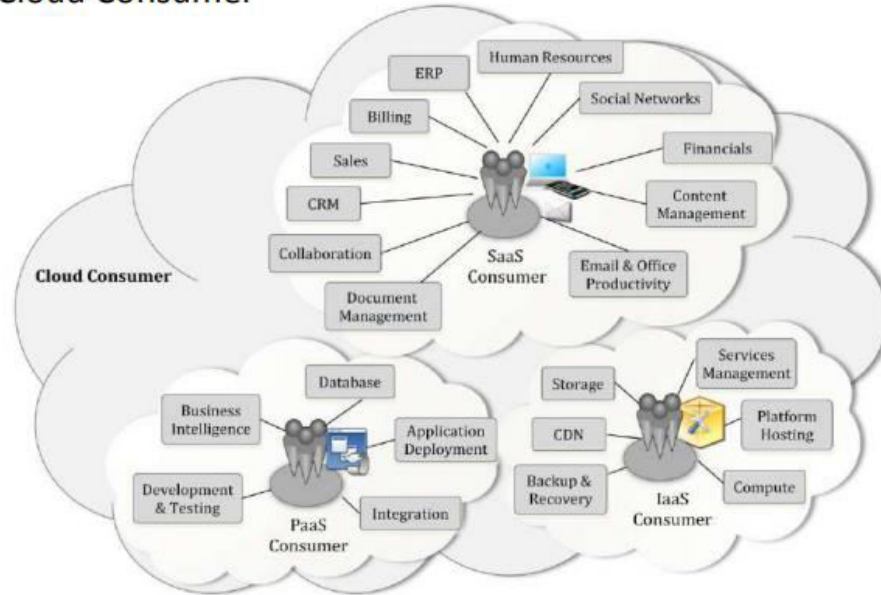


Figure 6: Example Services Available to a Cloud Consumer

Infrastructure Technologies

Cloud Provider

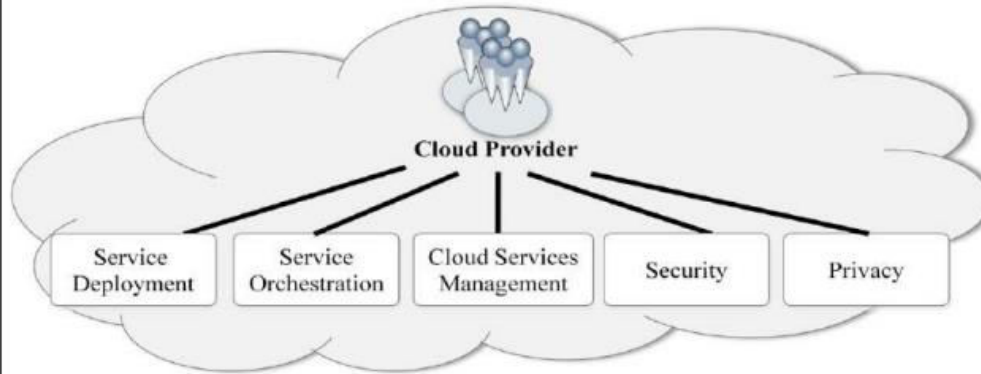


Figure 7: Cloud Provider - Major Activities

Cloud Auditor => security controls, privacy impact, performance
Cloud Broker
=> intermediation, aggregation, arbitrage

Cloud Carrier provides connectivity and transport of cloud services between cloud consumers and cloud providers (network, telecommunication, access devices)

SOA Life Cycle

- SOA lifecycle resembles “traditional” application lifecycle, but introduces new terminology.
- SOA in terms of life cycle requires a start in the SOA model Phase by gathering business requirement and designing their business processes.
- Once they have been optimized the business processes, they implement it by combining new and existing services. These assets are then deployed into a secure and integrated environment for integrating people, processes and information



Topic

Service-oriented Computing



- Service orientation is a design paradigm comprised of specific set of design principles. Its most important feature is its reliance of the separation of concerns design philosophy.
- Separation of concern (SoC) is based on the simple fact that a problem becomes easier to approach if it is divided into small units and handled separately
- Example of SoC

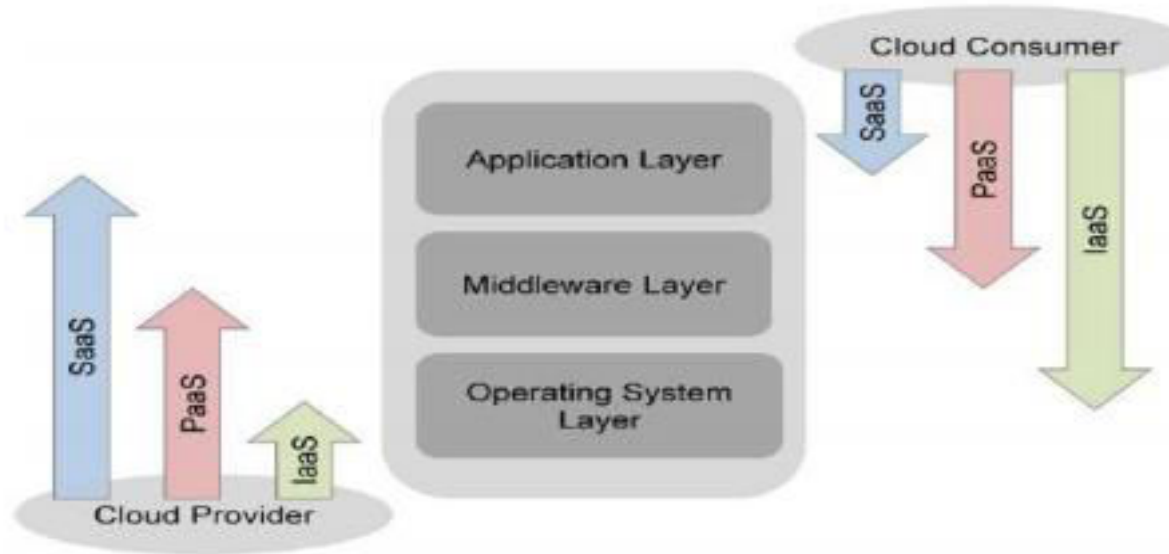


Figure 8: Scope of Controls between Provider and Consumer

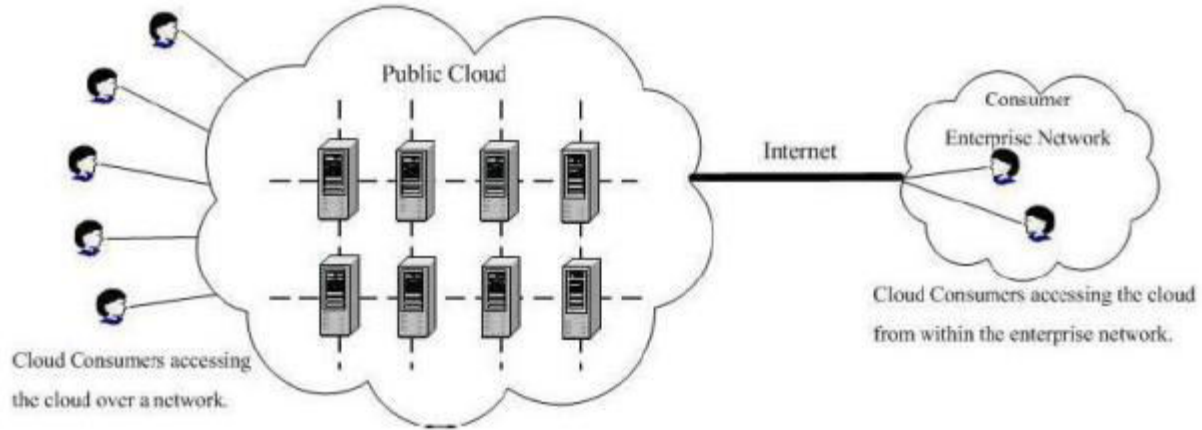


Figure 9: Public Cloud

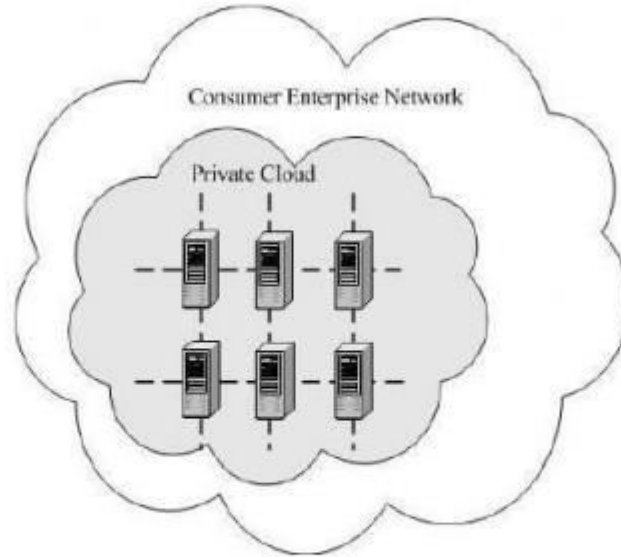


Figure 10: On-site Private Cloud

Virtualization

- Virtualization technology is one of the fundamental components of cloud computing, especially in regard to infrastructure-based services. Virtualization allows the creation of a secure, customizable, and isolated execution environment for running applications, even if they are untrusted, without affecting other users' applications. The basis of this technology is the ability of a computer program—or a combination of software and hardware—to emulate an executing environment separate from the one that hosts such programs.

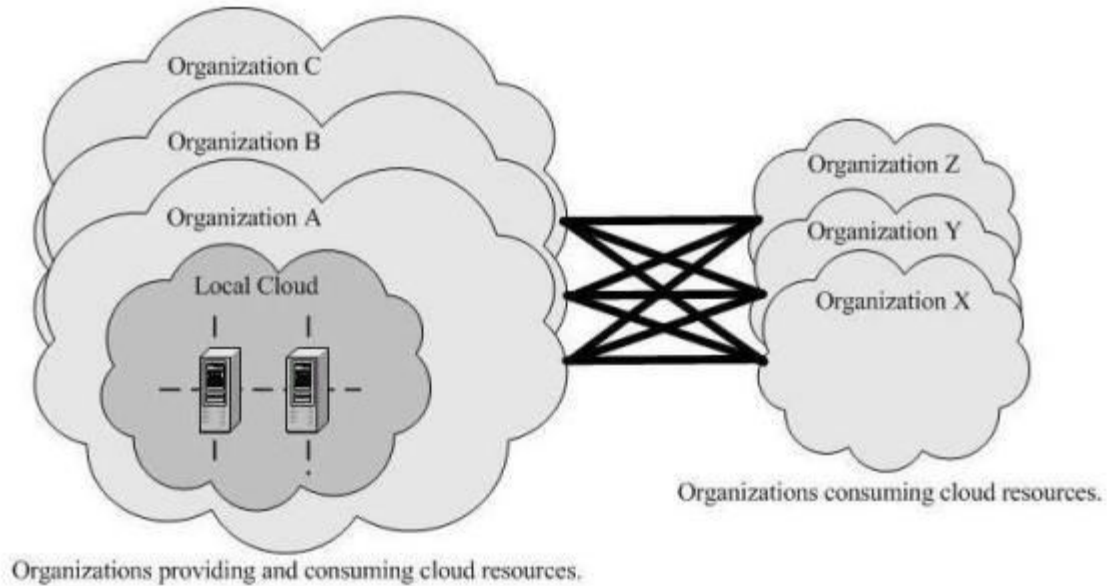


Figure 12: On-site Community Cloud

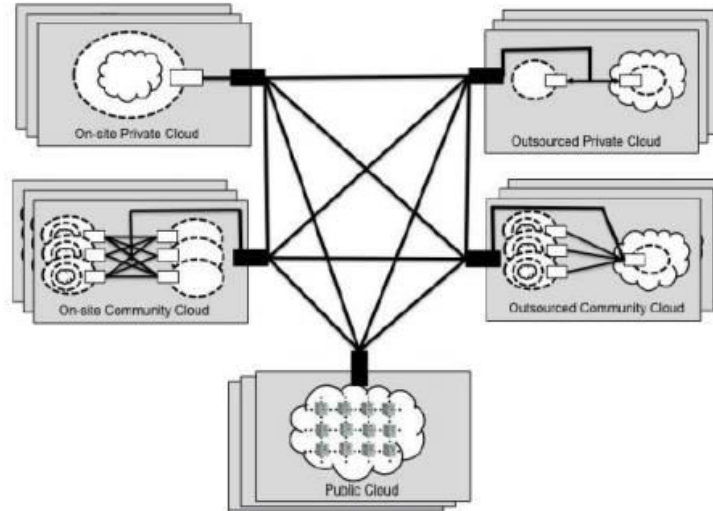


Figure 14: Hybrid Cloud

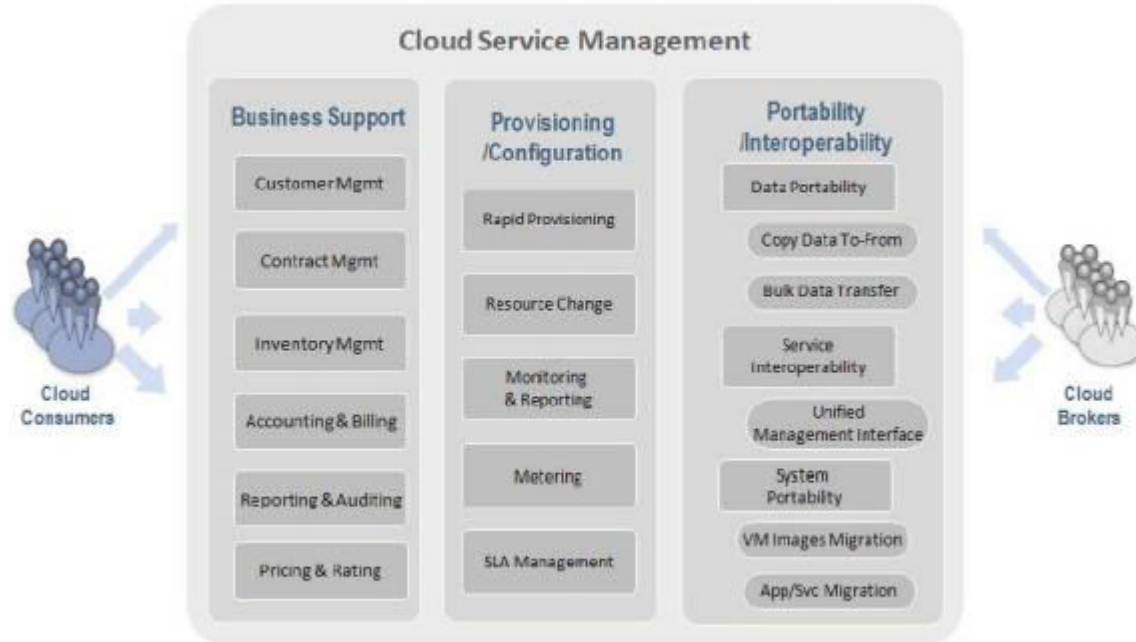


Figure 16: Cloud Provider - Cloud Service Management

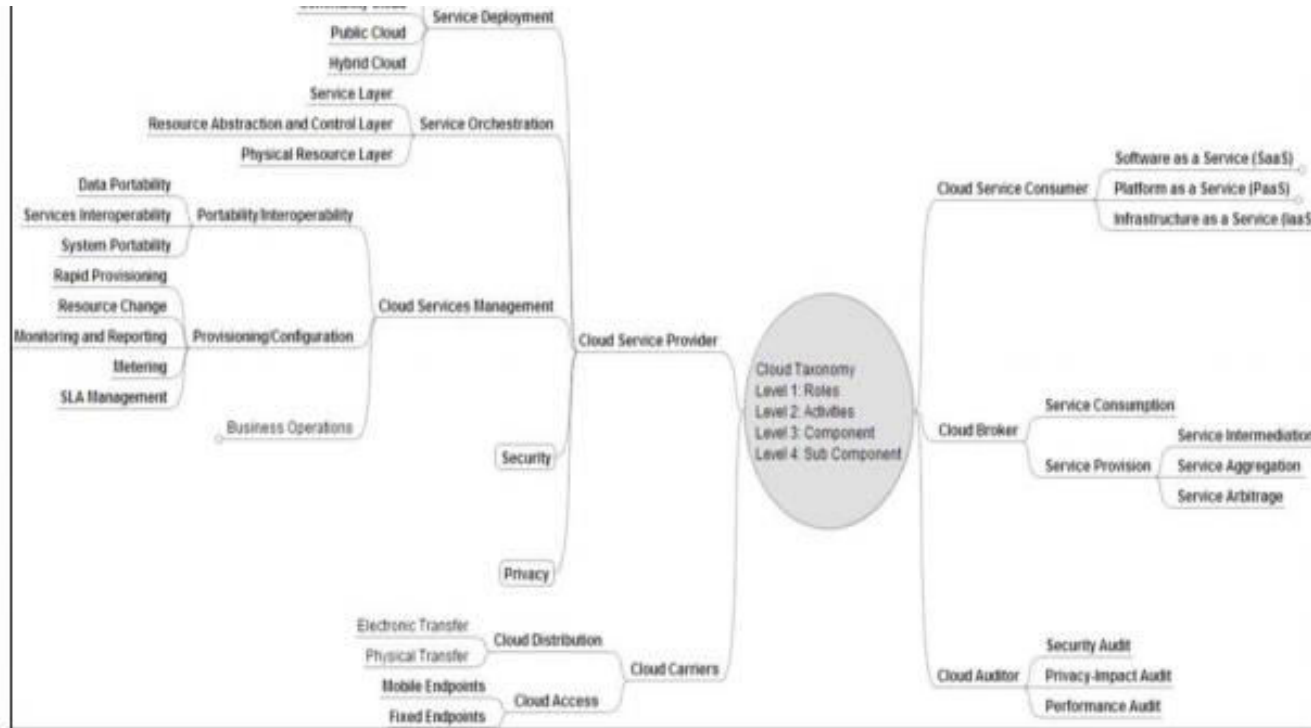


Figure 17: Cloud Taxonomy