BASICS OF CLOUD COMPUTING

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Agenda

- What is ‘Cloud Computing’?
- Service models
- Essential characteristics
- Deployment models
- Industry and international standards
- Drivers and concerns
- Adoption statistics

What is ‘Cloud Computing’?

“Cloud computing is not a product you buy. It’s not a SKU. It’s not a technology. It’s an IT delivery model.”

What is ‘Cloud Computing’?

- “Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources(e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.”
- *-NIST (National Institute of Standards and Technology)*

Service models (1/4)

- IaaS (Infrastructure as a Service)
- PaaS (Platform as a Service)
- SaaS (Software as a Service)

Service models –IaaS

- Instead of owning, managing, and operating your own computer hardware, you can use computers that someone else owns, manages, and operates!
- **Infrastructure:**Storage, networks, and other fundamental computing resources
- **Usage:** Deploy and run software, OS, etc.

- **Key premises:**
- Economies of scale
- Virtualization

Service models –IaaS

- **Definition**
- “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 system and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating system, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).”

Service models –PaaS

- Service provider is responsible for run-time monitoring and management. The consumer defines the configuration for service provider to follow.
- This requires middleware and application deployment mechanism is defined.

Service models –PaaS

- **Typical technology support:**
- Linux, Windows OS
- SQL database
- Java, PHP, others

Service models –PaaS

- **Definition**
- “The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages 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 application s and possibly application hosting environment configurations.”

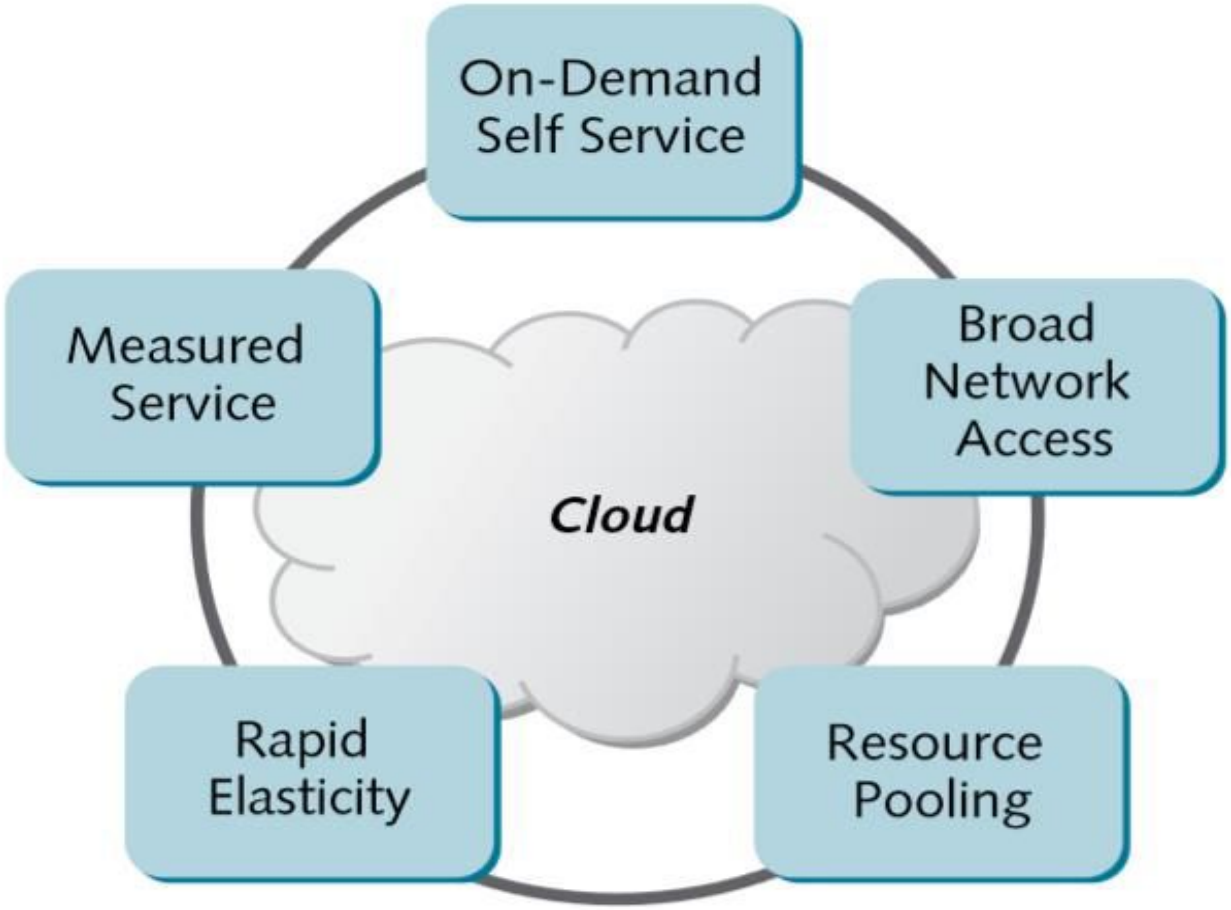
Service models –SaaS

- Ultimately, you can let the service provider run all your software. You may need different applications from different vendors. In that case, you may have to worry about integration.
- **Variations:**
- Thin client (browsers)
- Mobile applications (browser-less)

Service models –SaaS

- **Definition**
- “The capability provided to the consumer is to use provider’s applications running on a cloud infrastructure. The applications are accessible from various client devices through a think client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration setting.”

Essential characteristics



Deployment models –The measure

- Public Cloud
- Private Cloud
- Hybrid Cloud
- Community Cloud
- Private / Virtual Private cloud

Deployment models –The measure

- **Private/ Virtual private cloud**

"The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on-premise or off-premise."

- **Public cloud**

"The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services."

Deployment models –The measure

- **Community cloud**

"The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on-premise or off-premise."

- **Hybrid cloud**

"The cloud infrastructure is a composition of two or more clouds (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)."

Industry and international standards

- Use of standards is fundamental to the existence of cloud. Standards assist in:

- ***(1) Portability (2) Uniformity***
- **Areas of standardization:**
- **Physical networking:** The IEEE (Institute for Electrical and Electronics Engineers) provides standards for physical networking, such as Ethernet.
- **Logical networking:** The ISO (International Standards Organization) provides logical networking standards, such as the networking framework known as the OSI (Open System Interface) model. The Internet Engineering Task Force provides logical networking standards, such as the protocol standard such TCP/IP, the foundation of the Internet.
- **Security protocols:** Security is another area where standards are necessary. Some security standards, such as 802.1X, are part of the IEEE part networking protocols. This standard deals with port security, switches, and wireless access points.
- Industry specific privacy regulations:
- •HIPAA (Health Insurance Portability and Accountability Act)
- •GLBA (TheGramm–Leach–Bliley Act, also known as the Financial Services Modernization Act of 1999)
- •Other international privacy regulations

Drivers

- **42%**
- Improved backup and disaster recovery
- **40%**
- Always available application access
- **40%**
- Cost savings
- **38%**
- Reduction of onsite infrastructure
- **35%**
- Easier scalability in capacity
- **33%**
- Improved workforce mobility

concerns

- **65%**
- Security
- **34%**
- Inability to integrate current systems/ applications
- **32%**
- Legal and security compliance
- **28%**
- Lack of cloud standards
- **27%**
- Lack of visibility into future costs
- **20%**
- Managing a vendor/ partner

Adoption statistics