Cloud Computing

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Introduction to Cloud Computing

Cloud Computing

Cloud Computing is a delivery model of computing services over the internet. Cloud computing is the on-demand delivery of compute power, database storage, applications and other resources through a cloud service platform over the internet with pay-as-you-go pricing model.

Following are the most popular Cloud computing Vendors

- Amazon Web Services (AWS)
- Microsoft Azure
- Google Cloud
- Rackspace
- Aliyun (Alibaba Cloud)
- DigitalOcean

Why Cloud Computing?

Cloud computing have five fundamental characteristics, involve three service models and four deployment models.

The five essential characteristics of cloud computing are:

- On-demand self-services
- Broad network access
- Location-independent resource pooling
- Rapid elasticity
- Measured pay-per-use service.

On-demand self services: IT services can be provided without requiring human interaction with each service provider.

Broad network access: Cloud capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms such as mobile phones, laptops and PDAs.

Resource pooling: The provider's computing resources are pooled together to serve multiple consumers using multiple-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.

Rapid elasticity: The cloud is flexible and scalable to suit consumer immediate business needs. Cloud services can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

Measured pay per use service: Cloud computing resource usage can be measured, controlled, and reported providing transparency for both the provider and consumer of the utilized service. Cloud

computing services use a metering capability which enables to control and optimize resource use. This implies that IT services are charged per usage metrics – pay per use.

Apart from the essential ones, there are some other significant features of cloud computing

Multitenancy – a single instance of an application serves multiple consumers (tenants) with the possibility (for the tenants) to customize some details of the software applications

Identity management and access control – application of advanced techniques in identity checks and access control in order to provide legitimate data use

Security of services – implementation of the most stringent cutting-edge security measures for service provision

Increased reliability – because errors are constantly removed and repaired

Centralization of infrastructure and lower expenses of operation and maintenance;

Diverse platform support – where cloud providers often provide services with built-in support for an abundant compilation of client platforms to reach a broader base of users

Faster development – cloud computing platforms with a large number of services and preset templates for application development, considerably facilitate the development process.

Types of Clouds:

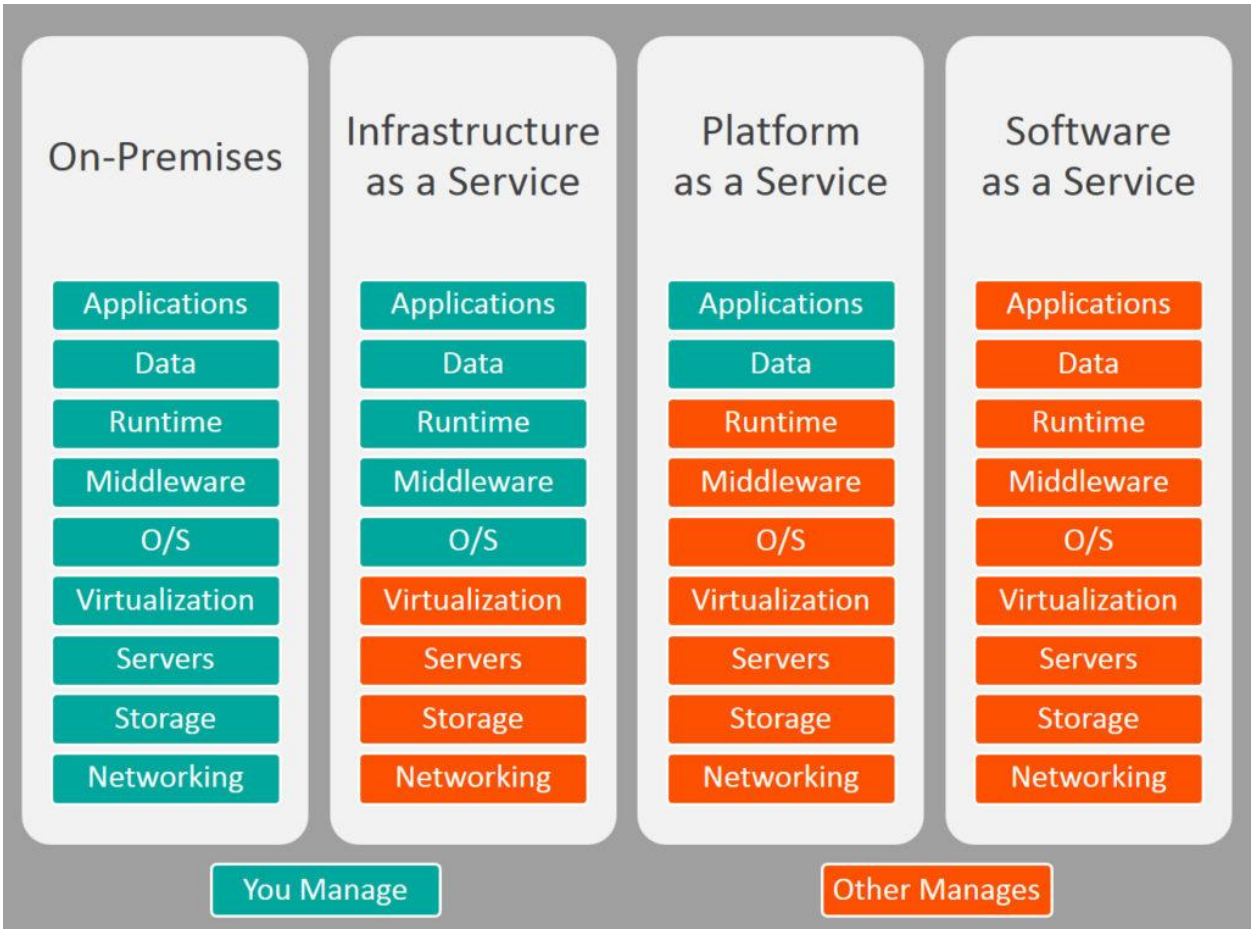
- IaaS - Infrastructure as a Service
- PaaS - Platform as a Service
- SaaS - Software as a Service

IaaS: Form of cloud computing that provides virtualized computing resources over the internet
Ex: AWS, Microsoft Azure, RackSpace, DigitalOcean etc.

PaaS: Provides a Platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining the infrastructure
Ex: ElasticBeanStalk, Salesforce Heroku, Microsoft Azure etc.

SaaS: It is a software distribution model in which a third-party provider hosts applications and makes them available to customers over the Internet.
Ex: Google Apps, DropBox, GotoMeeting etc.

On-Premises vs IaaS vs PaaS vs SaaS:



Cloud Deployment Models:

1. Private Cloud
2. Community Cloud
3. Public Cloud
4. Hybrid Cloud

Private Cloud:

A private cloud is dedicated to a single organization, private cloud offers hosted services to a limited number of people behind a firewall, so it minimizes the security risks that few organizations have in the cloud.

Community Cloud:

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns. A community cloud is a multi-tenant infrastructure that is shared among several organizations from a specific group with common computing requirements.

Public Cloud:

The cloud infrastructure is provisioned for open use by the general public.it may be owned, managed and operated by a business. It exists in the premises of the cloud provider. It reduces the need for organizations to invest in and maintain their own on-premises IT Resources. Also, it enables scalability to meet workloads and user demand.

Hybrid Cloud:

Hybrid cloud is a combination of public and private cloud services with orchestration between the two.

Advantages of Cloud Computing:

Cloud computing introduces a revolutionary shift in how technology is obtained, used, and managed, and in how organizations budget and pay for technology services. With the ability to reconfigure the computing environment quickly to adapt to changing business requirements, organizations can optimize spending.

Capacity can be automatically scaled up or down to meet fluctuating usage patterns. Services can be temporarily taken offline or shut down permanently as business demands dictate. In addition, with pay-per-use billing, AWS Cloud services become an operational expense instead of a capital expense.

- **Variable vs. Capital Expense**
    - Another advantage of cloud computing is that organizations benefit from massive economies of scale. By using cloud computing, you can achieve a lower variable cost than you would get on your own. Because usage from hundreds of thousands of customers is aggregated in the cloud, providers such as AWS can achieve higher economies of scale, which translates into lower prices.

- **Stop Guessing Capacity**
    - When you make a capacity decision prior to deploying an application, you often end up either sitting on expensive idle resources or dealing with limited capacity. With cloud computing, organizations can stop guessing about capacity requirements for the infrastructure necessary to meet their business needs. They can access as much or as little as they need and scale up or down as required with only a few minutes' notice.
- **Increase Speed and Agility**
    - In a cloud computing environment, new IT resources are one click away, which allows organizations to reduce the time it takes to make those resources available to developers from weeks to just minutes. This results in a **Focus on Business Differentiators** dramatic increase in speed and agility for the organization, because the cost and time it takes to experiment and develop is significantly lower.
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    - Cloud computing allows organizations to focus on their business priorities, instead of on the heavy lifting of racking, stacking, and powering servers. By embracing this paradigm shift, organizations can stop spending money on running and maintaining data centers.