

# Overview of Cloud computing

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# Agenda

- What is a cloud?
- Definition of cloud computing
- Key characteristics of cloud computing
- Why use clouds
- How clouds are changing IT / industry
- Driving factors towards cloud computing
- Concerns related to cloud computing

# What is cloud ?

- The origin of cloud computing traces back from the utility computing that was advocated by the scientist John McCarthy who publicly explained in 1961:
  - ‘If the computers of the kind I have advocated become the computers of the future, the computing may someday be organized in public utility just as the telephone system in public utility...
- Many other scientist also talked about computer networks and how probably they will see the spread to computer utility.
- Network cloud or cloud was introduced in early 1990 by the networking industry however it had slight different evocation than today definition of Cloud.

## What is cloud (continuing)

In mid-1990 the market has seen the raise of companies like google, Yahoo, Facebook, YouTube...Those company incarnated and leveraged many forms of our today cloud computing concepts by offering mail services, and open publishing platforms...

# Definition of cloud computing

- Gartner define Cloud as following:

*“...a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies.”*

*Forester Research*

*“...a standardized IT capability (services, software, or infrastructure) delivered via Internet technologies in a pay-per-use, self-service way.”*

## Definition of cloud computing (continuing)

- The most recognized definition that received industry-wide acceptance was provided by NIST:

*“Cloud computing is a model for enabling ubiquitous, 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 is composed of five essential characteristics, three service models, and four deployment models.”*

# Key characteristics of cloud computing

- On-demand self-service
  - Focuses on delivering IT services driven by user requests
  - No human interaction with the cloud provider (let's say very limited interaction)
  - Cloud computing provides a means of delivering computing services that makes the underlying technology, beyond the user device, almost invisible
- Ubiquitous network access
  - Focuses on delivering IT services anytime, anywhere, and through user-chosen devices
  - Users accessing services via Internet technologies expect a secure, “always-on” computing infrastructure that delivers as easily and reliably as electricity from a wall outlet

# Key characteristics of cloud computing

- **Pool of virtualized resources\***
  - Focuses on delivering IT services through resource pools that can expand and contract based on the requirements of the underlying workload and the usage characteristics
- **Utility-based pricing**
  - Focuses on delivering IT services that can be metered for usage and charged for (if needed) through pricing models including subscription, usage pricing – Service level agreements (SLAs)

# Why we use cloud ?

- Better capital utilization
  - Pay-as-you-go
  - The unit cost of on-demand capacity may be higher than the unit cost per time unit of fixed capacity; offset by no charge when capacity is not being used, additionally reduced CAPEX
- Accelerate software development, deployment, and testing – Fast provisioning of resources

## Why we use cloud ? (continuing)

- Elasticity of resources
  - Scalable and flexible use of resources
- Access to complex infrastructure and resources without internal resources
- Support for geographically distributed users
- New business opportunities

# How clouds are changing IT / industry

- Creating new business models:
- Enabling innovation:
- Reengineering of business processes:
- Support for new levels of collaboration:

# How clouds are changing IT / industry

- Changing the economics of IT
- Automation service delivery
- Exploiting standardization
- Rapidly deploying new capabilities:

# Driving factors towards cloud computing

- There is no more influential driving factor than the disruptive market where companies operate in nowadays.
- The need to access to the market in fast way is one of the key driving adoption factor for the cloud.
- The cost is not the only inhibitor as it was seen for sometime by specialist.

# Driving factors towards cloud computing

- The inherent ability of a cloud to scale IT resources
- High availability of IT resources
- Technology innovation vs Cloud enabling technologies

# Technologies innovation vs Cloud enabling technologies

Technology innovation : Clustering, Virtualization, Grid computing

Cloud enabling technologies are :

Broadband network and internet architecture

Datacenter technologies

Virtualization technology

Web technology

Multitenant technology

Service technology

# Concerns related to cloud computing

- The concerns related to cloud can be grouped to 5 categories:
  - a) Security
  - b) Compliance
  - c) Governance
  - d) Cost
  - e) Design

## A) Security

- Most of the concerns related to cloud are originating from the security challenges that are around the public cloud. The fact that the HW that will be hosting at the same time two different workload for different customer might be a challenges.
- The companies adopting the cloud will have to increase the security and establish secure way to protect its data and its application from being exposed.
- Additionally the Cloud consumer is sharing the risk with the cloud provider and are both responsible to work together within the limitations (sometimes related to HW or SW) to increase the security standards.

## B) Compliance

- One aspect of Compliance challenges within the cloud is related to the data location, some cloud provider reserves the right to move the data between their data center to manage efficiently the workload and the scalability aspect, this might cause that at some point of time a compliance breach and might limit to cloud consumer the options to put workload to the cloud due to compliance issues.
- Some Cloud provider like SoftLayer for example is using this aspect to attract more cloud consumer by stating that only cloud consumer can move the data between different data center.

## C) Governance

- Within the cloud the consumer have less control on the governance than on premise IT, this is due to the fact that Cloud provider might impose a lot of standardization that can impact some of the SLA by limiting customization.
- In order to mitigate the risk Cloud consumer must have strong contracts with strong monitoring and control to achieve the required SLA.
- With fast provisioning many users from the company will be involved in provisioning process, this might cause sometimes issues if its not well controlled with a strong workflow.

## D) Cost

- Pay as you go is one key aspect of Cloud, this has led that many saw the cloud as alternative for on promise IT to reduce cost, this is true when its well managed and planned.
- Cost now is not any more the only driving factor to go to the cloud as prices might significantly increase depending on the Architecture, HA, type of storage and infrastructure network...

## E) Design/ portability

- Complexity with Private cloud.
- Usage of SDN
- Portability between Cloud provider is limited.
- Hybrid Cloud .