

Lecture 2

Introduction to Cloud Computing

Traditional Computing v/s Cloud Computing

Advantages of Cloud Computing

Characteristics of Cloud Computing

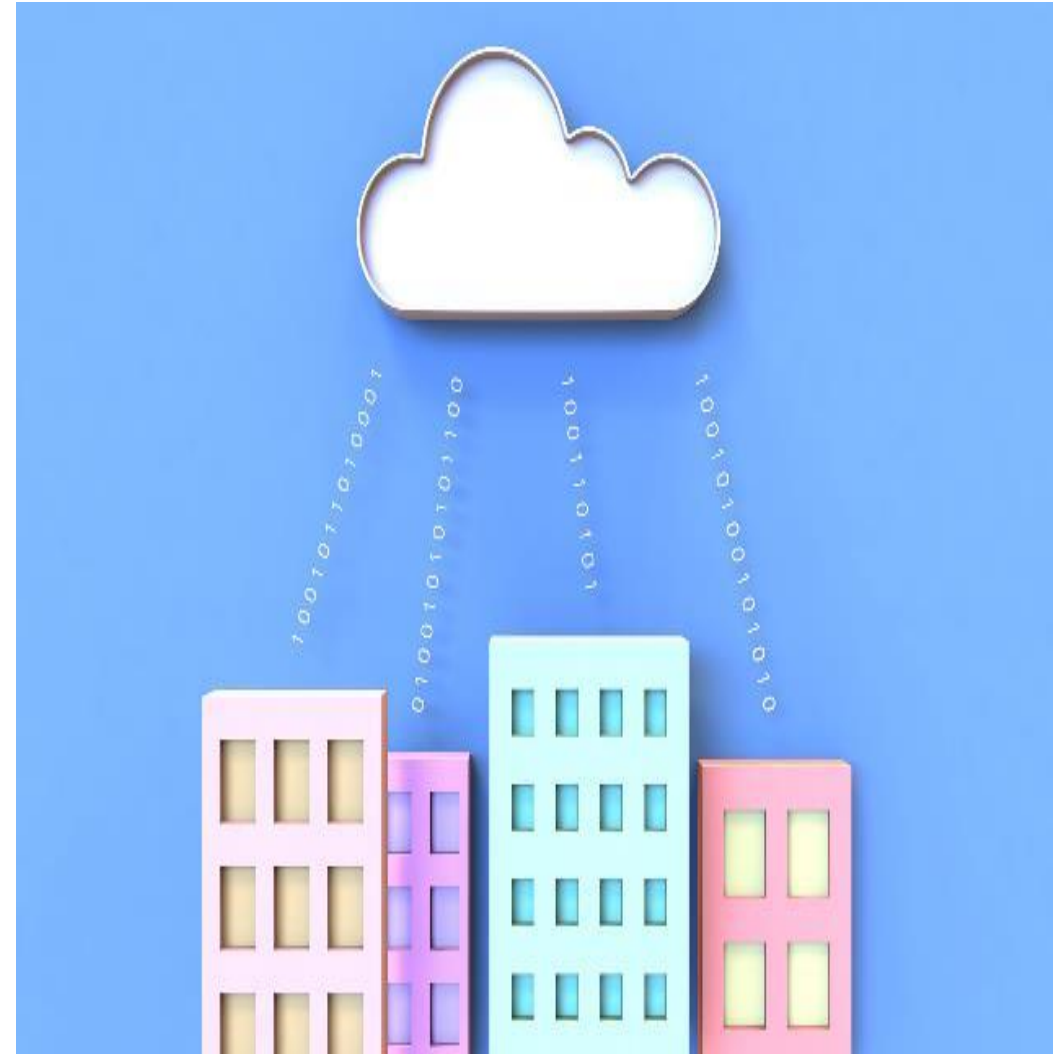
Section 1: Introduction to Cloud Computing

What is Cloud Computing?



Cloud Computing

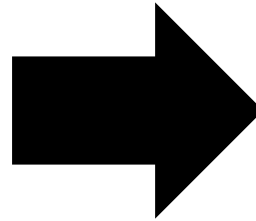
Cloud Computing is the **on-demand** delivery of compute, power, database, storage, applications, and other IT resources **via the internet** with **pay-as-you-go** pricing.



Cloud Computing (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

Cloud Computing



Infrastructure as software

Cloud Computing enables you to **stop thinking of your infrastructure as hardware**, and instead **think of (and use) it as software**.

Section 2: Traditional Computing v/s Cloud Computing

Traditional Computing Model

Infrastructure as hardware

Hardware solutions:

- Require space, staff, physical security, planning, capital expenditure
- Have a long hardware procurement cycle
- Require you to provision capacity by guessing theoretical maximum peaks

Cloud Computing Model

Infrastructure as software

Software solutions:

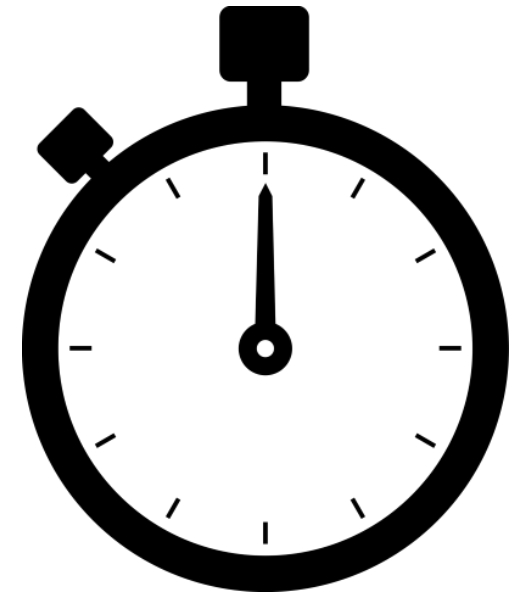
- Are flexible
- Can change more quickly, easily, and cost-effectively than hardware solutions
- Eliminate the undifferentiated heavy-lifting tasks

Section 3: Advantages of Cloud Computing

Trade capital expense for variable expense



Data center investment
based on forecast



Pay only for the amount
you consume

Massive economies of scale

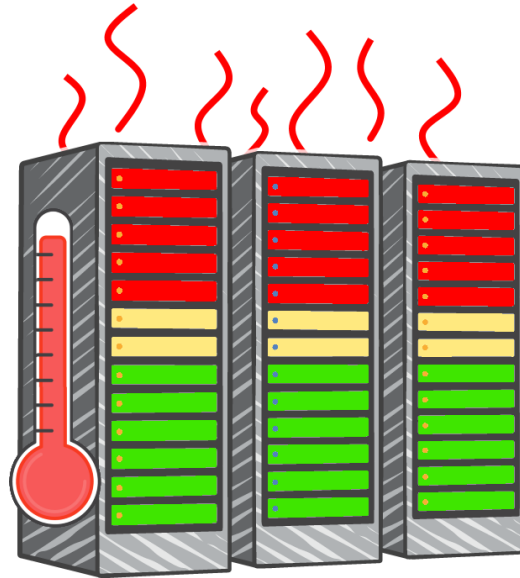
Because of aggregate usage from all customers, Cloud Provider such as AWS can achieve higher economies of scale and pass savings on to customers.



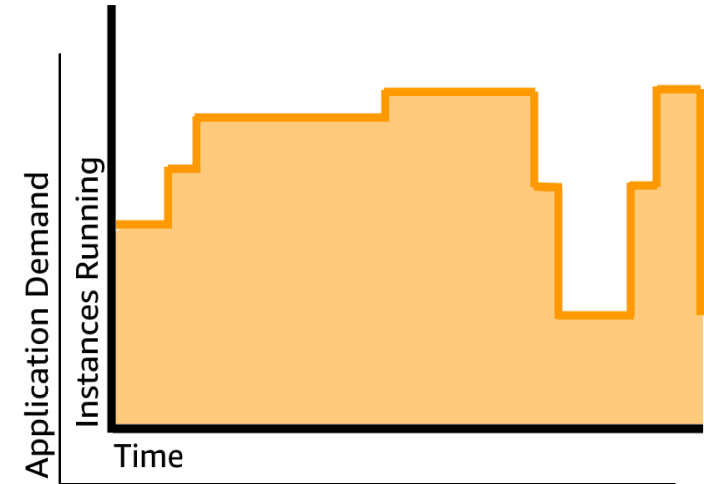
Stop guessing capacity



Overestimated
server capacity



Underestimated
server capacity



Scaling on
demand

Increase speed and agility

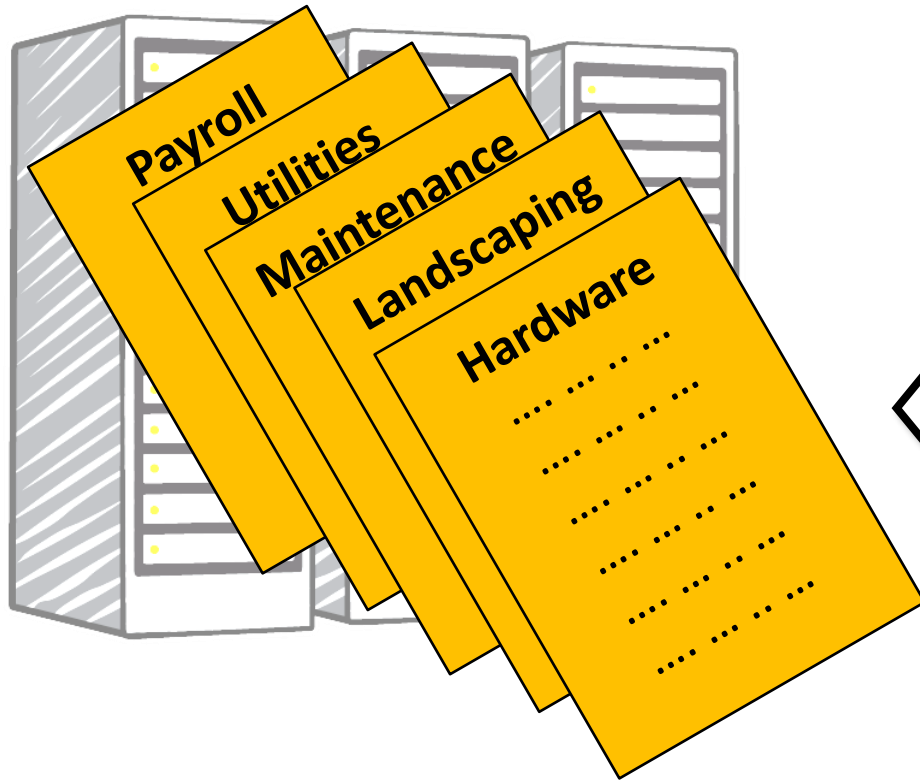


Weeks between wanting
resources and having
resources

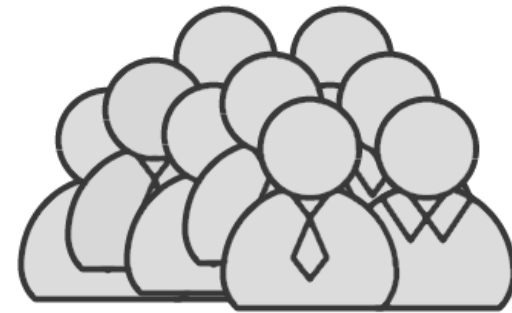
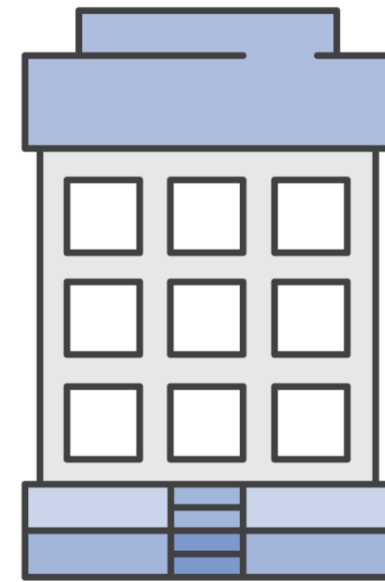
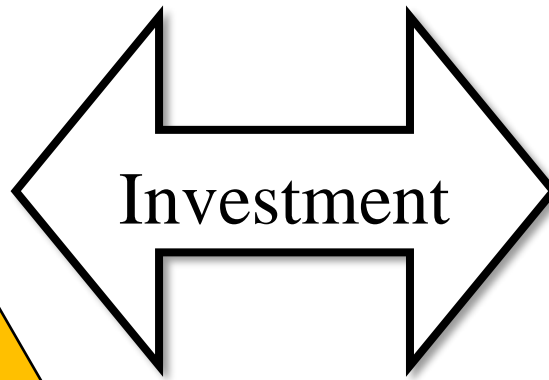


Minutes between wanting
resources and having
resources

Stop spending money on creating and maintaining datacenters



Running data centers



Business and customers

Go global in minutes

aws Services Resource Groups

AWS services

Find a service by name or feature (for example, EC2, S3 or VM, storage).

Recently visited services

- EC2
- Elastic Transcoder
- AWS Budgets
- S3

All services

Build a solution

Get started with simple wizards and automated workflows.

- Launch a virtual machine
With EC2
~2-3 minutes
- Build a web app
With Elastic Beanstalk
~6 minutes
- Connect an IoT device
With AWS IoT
~5 minutes
- Start a development project
With CodeStar
~5 minutes

See more

US East (N. Virginia)
US East (Ohio)
US West (N. California)
US West (Oregon)
Asia Pacific (Mumbai)
Asia Pacific (Osaka-Local)
Asia Pacific (Seoul)
Asia Pacific (Singapore)
Asia Pacific (Sydney)
Asia Pacific (Tokyo)
Canada (Central)
EU (Frankfurt)
EU (Ireland)
EU (London)
EU (Paris)
South America (São Paulo)

Section 4: Characteristics of Cloud Computing

Characteristics of Cloud Computing

- To enable successful remote provisioning of scalable and measured IT resources, the IT environment must have a specified set of characteristics.
- For an IT environment to be considered an effective cloud, these characteristics must be present to a significant extent.

Characteristics of Cloud Computing



On-demand self-service



Broad network access



Resource pooling

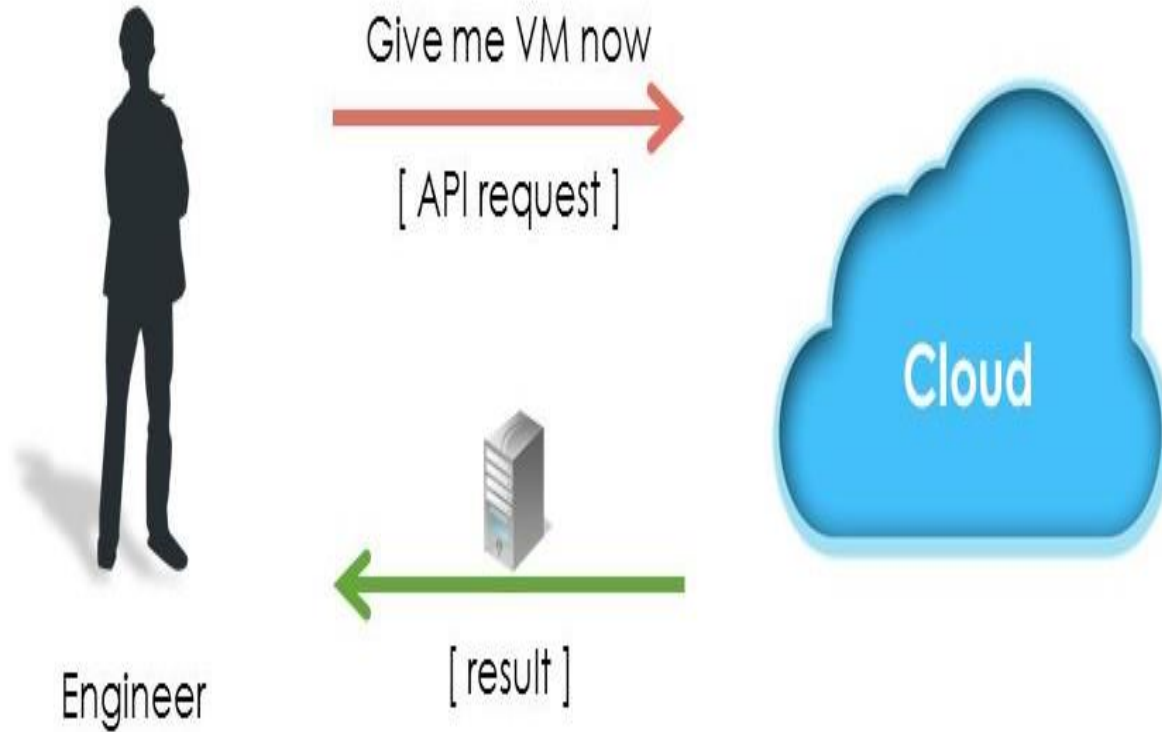


Rapid elasticity



Measured service

On-demand Self service



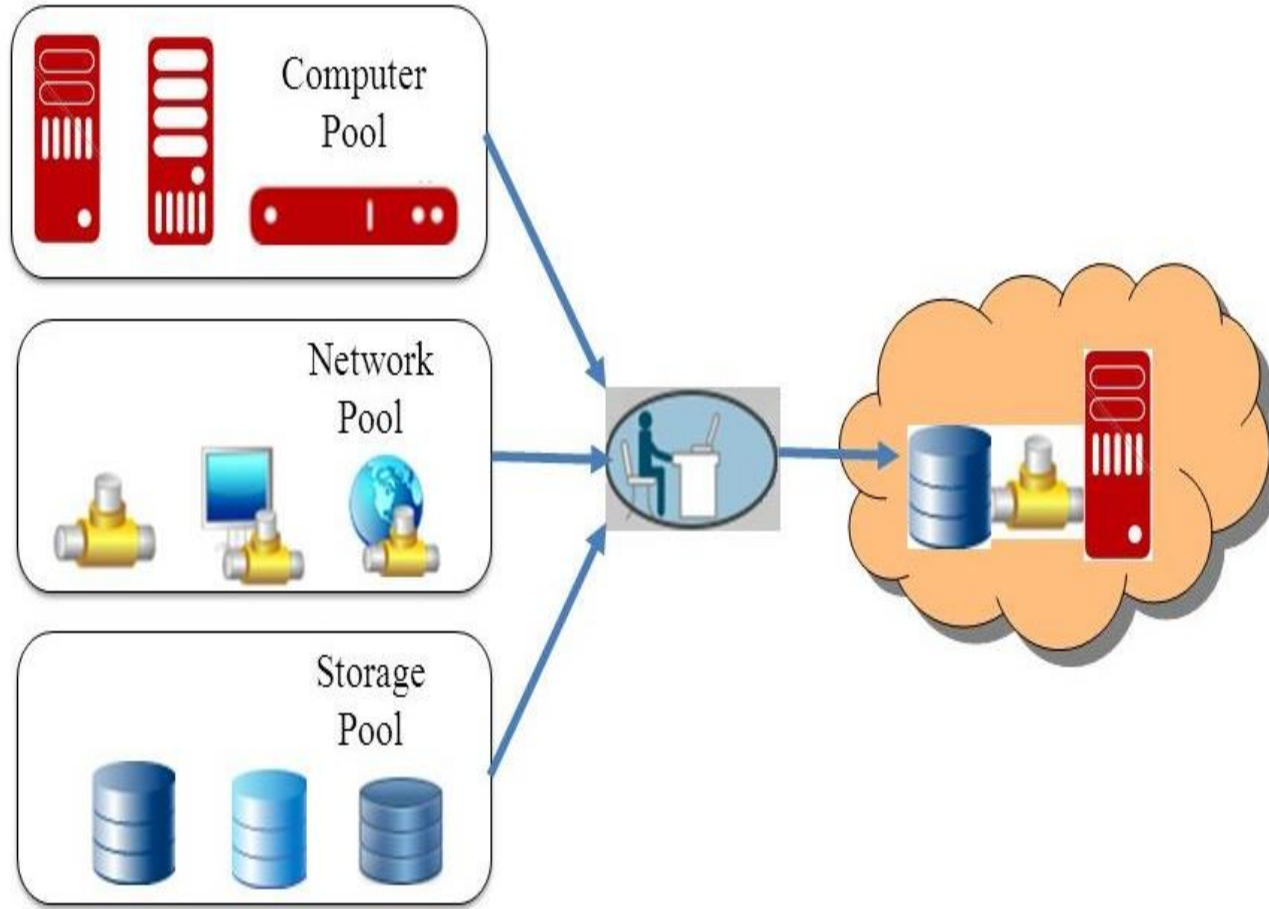
A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access



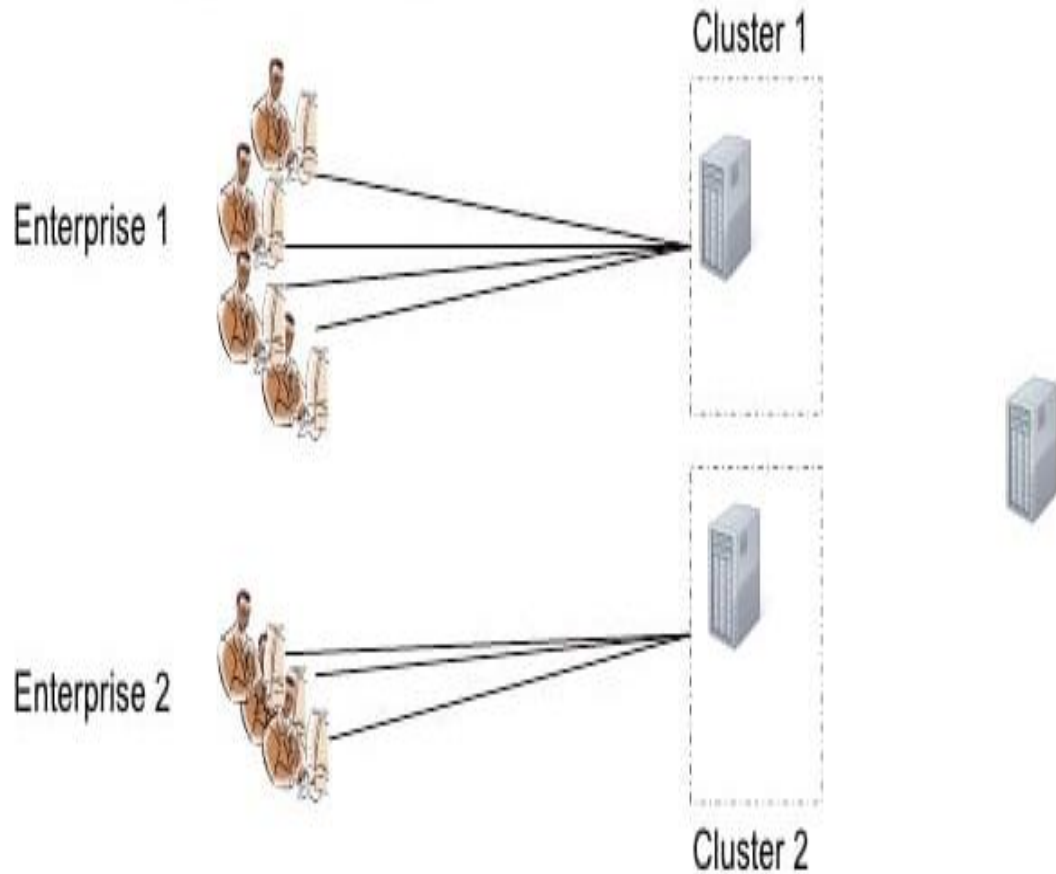
- Capabilities are available over the network.
- Accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

Resource pooling



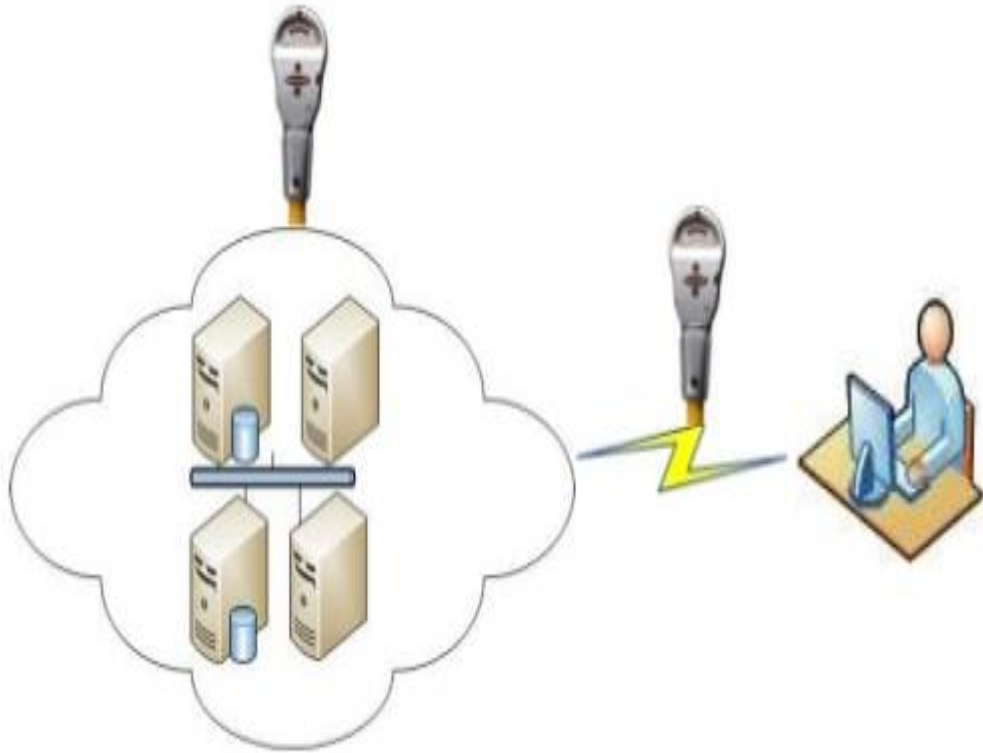
- The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.
- There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter).

Rapid elasticity



- Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand.
- To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Measured services



- Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts).
- Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Characteristics of Cloud Computing

5 Essential Characteristics according to NIST	Traditional Data Center	Virtualized Data Center	Cloud Computing
On-demand Self Service	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Broad Network Access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Resource Pooling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rapid Elasticity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Measured Pooling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Key Takeaways



Cloud computing is the on-demand delivery of IT resources via the internet with pay-as-you-go pricing.

Cloud computing enables you to think of (and use) your infrastructure as software.

Almost anything you can implement with traditional IT can also be implemented as a cloud computing service.

Key Takeaways



Trade capital expense for variable expense

Benefit from massive economies of scale

Stop guessing capacity

Key Takeaways



Increase speed and agility

Stop spending money on running and maintaining data centers

Go global in minutes

Key Takeaways



On-demand self service

Broad network access

Resource pooling

Rapid elasticity

Measured usages

Thanks