كلية الرشيد الجامعة
قسم هندسة تقنيات الحاسوب
المرحلة الرابع

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Cloud Computing

History

Cloud computing was popularized with Amazon.com releasing its Elastic Compute Cloud product in 2006.

References to the phrase "cloud computing" appeared as early as 1996, with the first known mention in a Compaq internal document.

The cloud symbol was used to represent networks of computing equipment in the original ARPANET by as early as 1977, and the CSNET by 1981—both predecessors to the Internet itself. The word *cloud* was used as a metaphor for the Internet and a standardized cloud-like shape was used to denote a network on telephony schematics. With this simplification, the implication is that the specifics of how the endpoints of a network are connected are not relevant to understanding the diagram.

The term *cloud* was used to refer to platforms for distributed computing as early as 1993, when Apple spin-off General Magic and AT&T used it in describing their (paired) Telescript and PersonaLink technologies. In *Wired's* April 1994 feature "Bill and Andy's Excellent Adventure II", Andy Hertzfeld commented on Telescript, General Magic's distributed programming language:

"The beauty of Telescript ... is that now, instead of just having a device to program, we now have the entire Cloud out there, where a single program can go and travel to many different sources of information and create a sort of a virtual service. No one had conceived that before. The example Jim White [the designer of Telescript, X.400 and ASN.1] uses now is a date-arranging service where a software agent goes to the flower store and orders flowers and then goes to the ticket shop and gets the tickets for the show, and everything is communicated to both parties."

CLOUD

• It is a term used to describe a global network of servers, each with a unique function.

• The cloud is not a physical entity, but instead is a vast network of remote servers around the globe which are linked together and meant to operate as a single ecosystem.

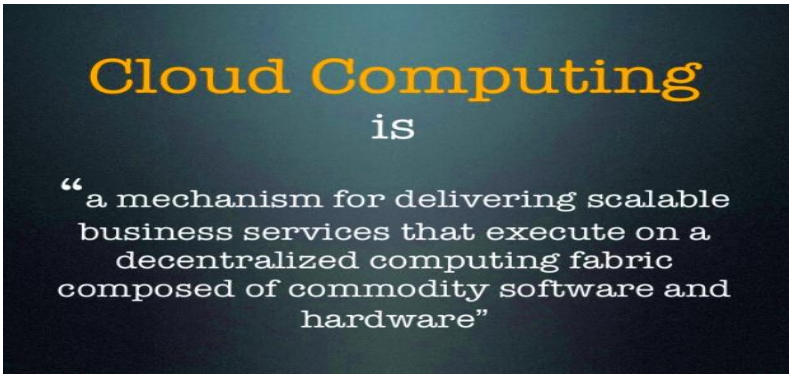
What is Cloud Computing

Cloud computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth.

In its simplest form, cloud computing consists of shared computing resources that are virtualized and accessed as a service, through an API. The cloud enables users in an organization to run applications by deploying them to the cloud, a virtual datacenter. The physical resources may reside in a number of locations inside and outside of an organization: on local hardware, in an enterprise data center, or at remote or managed service providers on a pay-to-use basis. Cloud computing resources are offered as a service on an as-needed basis, and delivered by IP-based connectivity, providing highly scalable, reliable on-demand services with agile management capabilities.

Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software. The cloud enables anyone with an internet connection to access IT resources on-demand, such as those consumed by cloud-based applications.

The basic resources available are compute, storage, and networking, all of which are needed for a business critical application to deliver a full experience.



Advantages of Cloud Computing

➢ Reduced Cost

Cloud technology is paid incrementally, saving organizations money.
The financial challenge of an on-premises data center is the capex that goes into creating, fixing, and updating the hardware in it, often involving substantial overprovisioning of resources to ensure the data center can handle traffic spikes. This is in addition to the opex of energy bills and paying personnel to operate and monitor the data center.

Using the cloud reduces the capex costs, replacing them with opex costs as part of the service subscription. This means that costs better reflect actual infrastructure use and infrastructure upgrade costs can be more easily absorbed into operating budgets.

➢ Increased Storage
Organizations can store more data than on private computer systems.

➢ Highly Automated
No longer do IT personnel need to worry about keeping software up to date.

➢ Flexibility
Cloud computing offers much more flexibility than past computing methods.

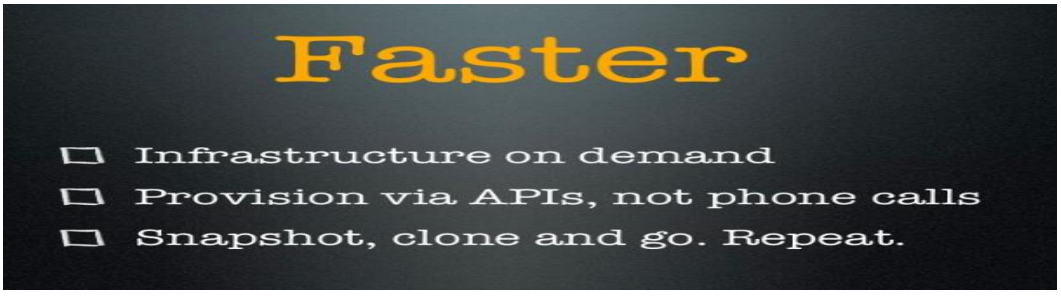
➢ More Mobility
Employees can access information wherever they are, rather than having to remain at their desks.

➢ Allows IT to Shift Focus
No longer having to worry about constant server updates and other computing issues, government organizations will be free to concentrate on innovation.

➢ Scalability
While an on-premises data center has the ability to scale (especially when using hyperconverged infrastructure (HCI) or composable infrastructure), it can't compare to a public cloud environment. When a company is subscribed to a cloud service, it can easily scale resources up and down as needed.

➢ Resource Management
A key takeaway from all this is that cloud computing and networking allows companies to improve resource management from infrastructure to personal. Resources can be procured, paid for, and used with greater specificity. Monitoring tools allow organizations to watch resource use and adjust their usage so they aren't paying for unused resources.

Why use cloud computing



What is Cloud Computing ?

What is Cloud Computing

Gartner

"Cloud computing is a style of computing where massively scalable IT-related capabilities are provided as a service across the Internet to multiple external customers"

FORRESTER®

"Cloud computing: A pool of abstracted, highly scalable, and managed infrastructure capable of hosting end-customer applications and billed by consumption"

WIKIPEDIA
The Free Encyclopedia

"Cloud computing is Web-based processing, whereby shared resources, software, and information are provided to computers and other devices (such as smart phones) on demand over the Internet."

CAPEX to OPEX

- CAPEX model → buy the dedicated hardware over a period of time.
- OPEX model → use a shared cloud infrastructure and pay as one uses it.
- **Moving to cloud:** CAPEX →→→ OPEX model
- Business in profit.

CAPEX to OPEX

- **Benefit of OPEX and why cloud?**
  1. Sharing of resources to achieve coherence and economies of scale.
  2. Avoid upfront infrastructure costs
  3. Focus on code development instead of infrastructure.
  4. Applications can run faster, with improved manageability and less maintenance, and enables IT.
  5. Adjustment with fluctuating and unpredictable business demand.
  6. Cloud providers use "pay as you go" model. Charges may be high if administrators do not used cloud.
  7. Reason for the growth of cloud computing: availability of high-capacity networks, low-cost computers and storage devices, hardware virtualization, service-oriented architecture, utility computing.
- **Results:** Cloud vendors are experiencing high growth rates annually

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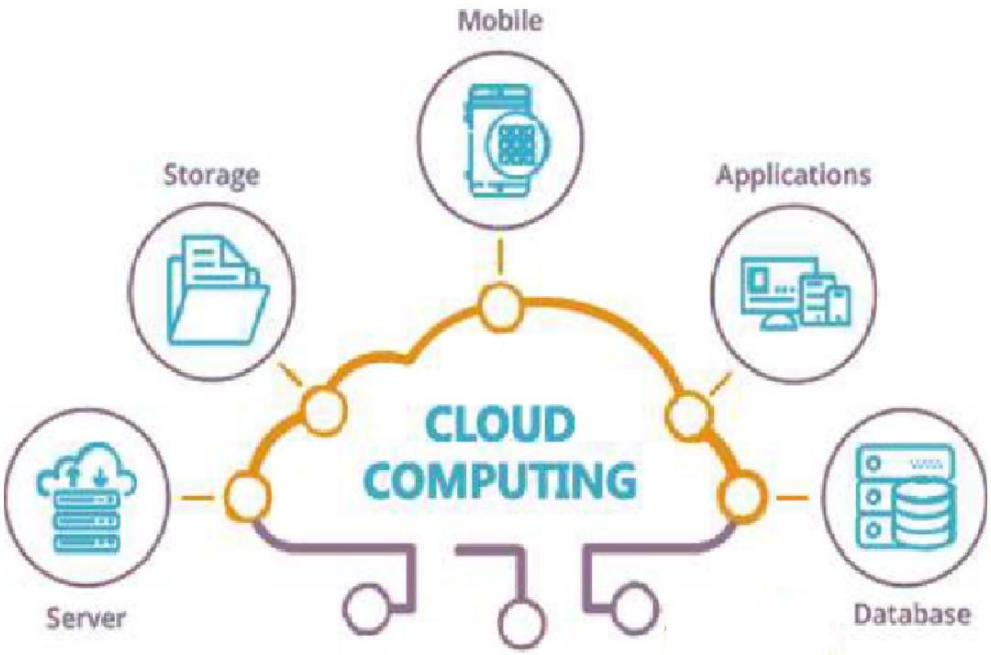
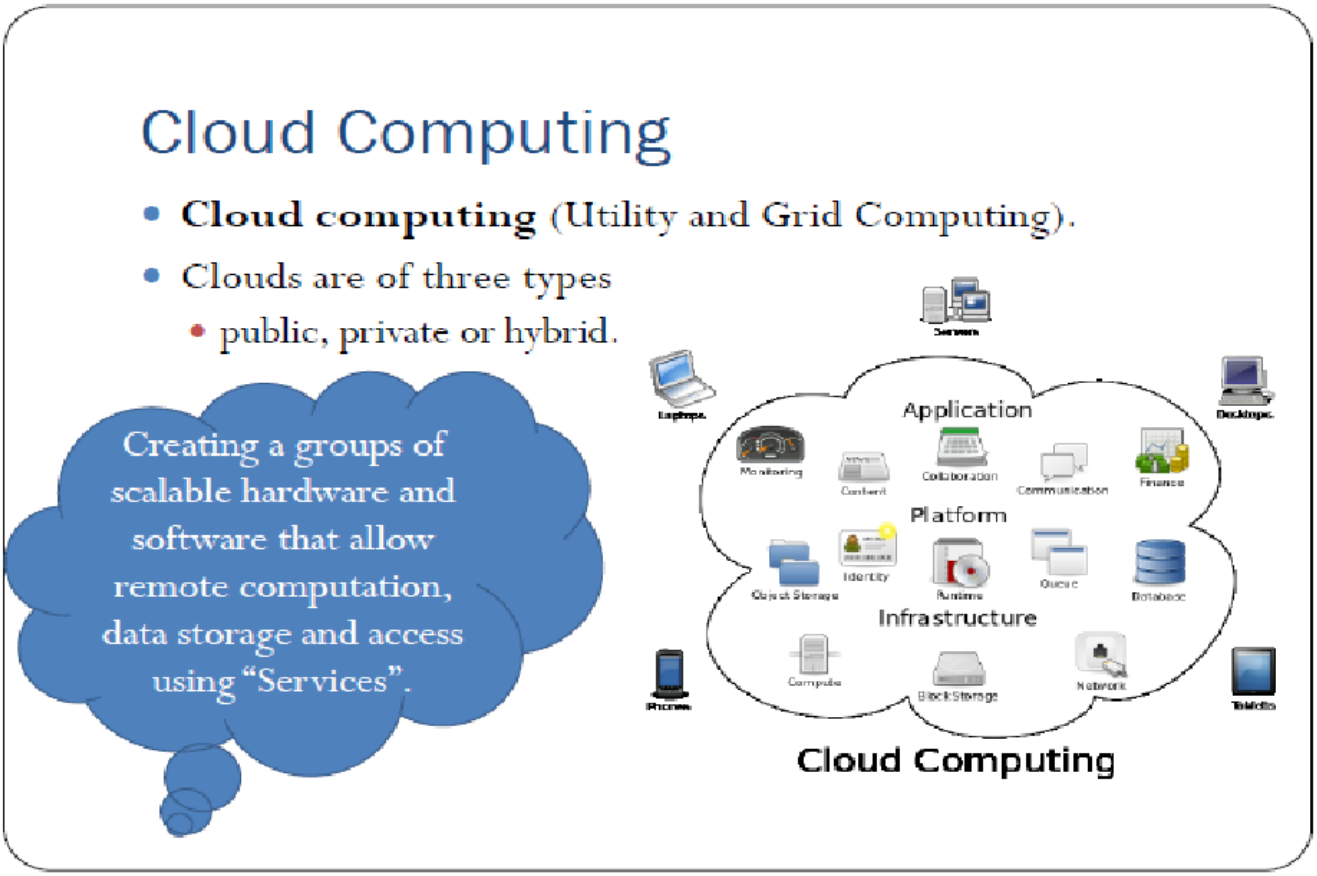
Definitions

"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."



Overview

- Cloud computing in computer science is analogous to electricity grid over a electric network.
- Concept of converged infrastructure and shared services.
- Maximizing the effectiveness of the shared resources.
- Resources are shared by multiple users.
- Resources are dynamically reallocated as per demand.
- Efficient use of computing power thus being eco-friendly (less power, air conditioning, rack space, etc.).
- Multiple users can work on a machine.
- Users can retrieve and update the data with flexible licenses for different applications.



relevant technologies

- Mainframe computer — Powerful computers used for critical applications for bulk data processing.
- Peer-to-peer — Distributed Architecture without central coordination. Participants are both suppliers and consumers of resources (in contrast to the traditional client–server model).
- Grid computing — computer are composed into a cluster using networked, cluster is acting as converged resource.
- Utility computing — The package of computing resources (CPUand storage) are charged according to the pay-as-you-go.
- Service oriented Computing: This organize and utilize the distributed services offered by different owners. It gives a formal way of offering, discover, interaction with the flexibility to orchestrate according to requirement.