Cloud Fundamentals

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Introduction

Cloud Computing is a technology that uses remote server to store, manage, and access data online rather than local machine.

- Developing new applications and services
- Storage, backup, and recovery
- Delivery of data
- Analysis of data
- Streaming videos and audios

Definition

US National Institute of Standards and Technology defines Computing as

" 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. "

Why Cloud?

In traditional methods to provide IT infrastructure, we need a server room.

- In the server room, there should be database server, mail server, firewall routers, high speed net.
- To establish such IT infrastructure, we need to spend lots of money.
- To solve this, cloud computing is needed.

Cloud Computing Features

- On demand self service
- Broad network access
- Resource pooling
- Measured service
- Rapid elasticity
- Minimal maintanance cost

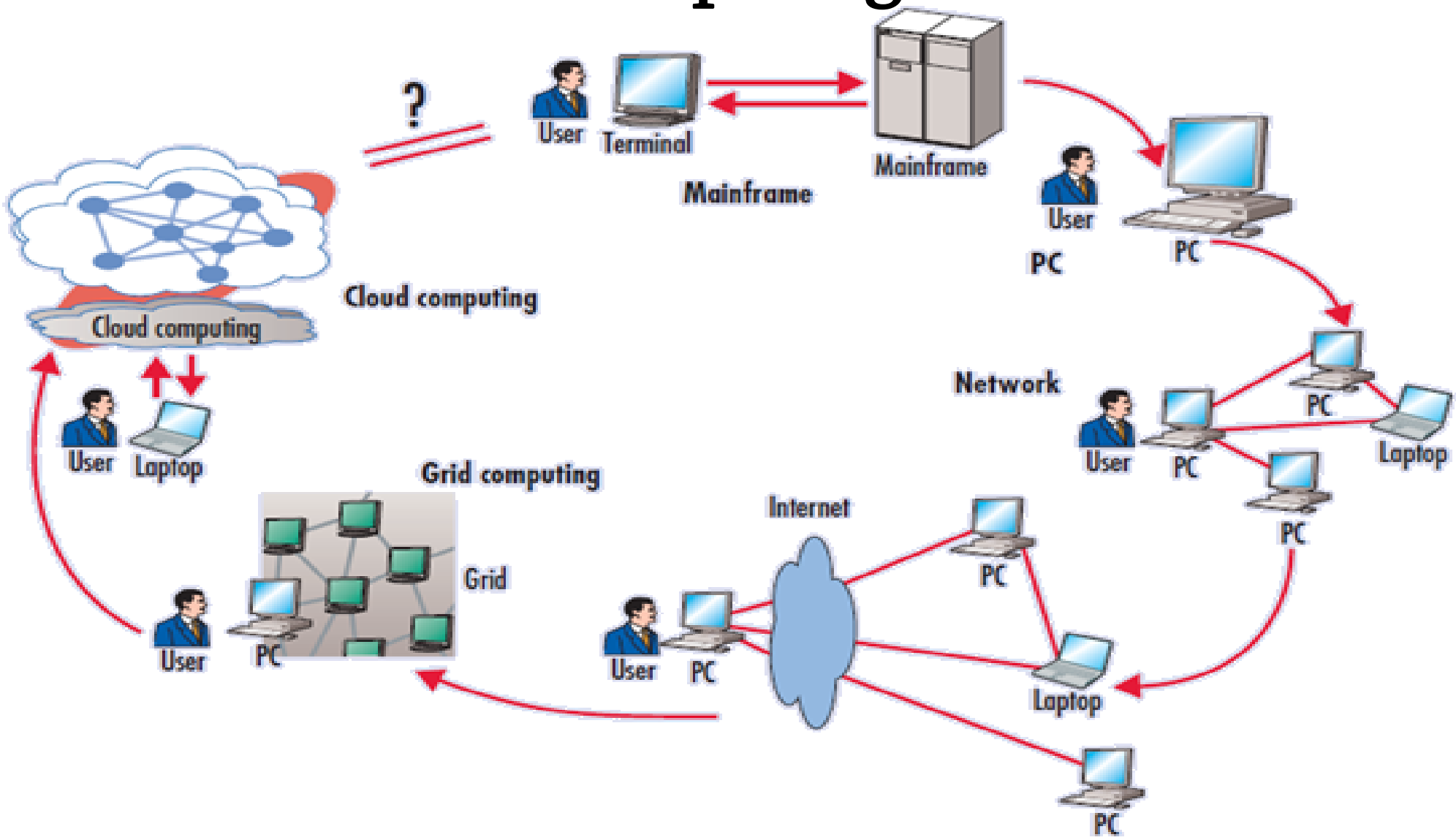
Advantages of Cloud Computing

- Lower computer costs
- Improved performance
- Reduced software costs
- Instant software updates
- Unlimited storage capacity
- Increased data reliability
- Universal information access
- Latest version availability
- Easier group collaboration
- Device independence

Disadvantages of Cloud Computing

- Requires a constant internet connection
- Does not work well with low speed network
- Features might in limited
- Stored data might not be secure
- Stored data can be lost

Evolution of Cloud Computing



Evolution of Cloud Computing

Mainframes

- It came into existence in 1951.
- It is highly powerful and reliable.
- It can handel large data for massive input output.
- No downtime.
- Systems are managed in a separate room with necessary backup.
- It is not distributed. Therefore, large computational power is required.
- Very expensive.

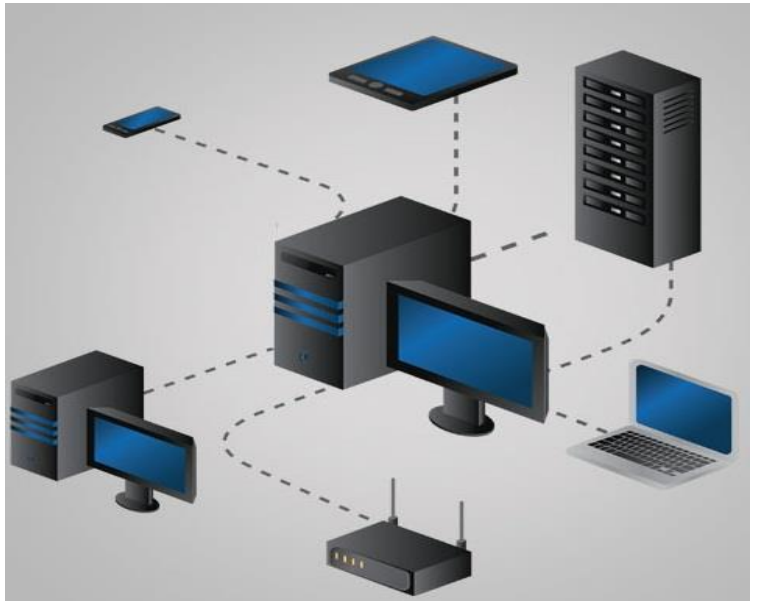
Evolution of Cloud Computing

Cluster Computing

- Cluster computing is a collection of tightly or loosely connected computers that work together so that they act as a single entity.
- Connected computers execute operations as a single entity.
- Machines could then be **connected** by a **high-bandwidth network** and controlled by specific software tools that manage them as a single system.
- Inexpensive than mainframe.

Cluster Computing

- A cluster is a type of parallel and distributed system
- It consists of a collection of inter-connected computers.



The Cluster

- **A Node**
  - A single or multiprocessor system with memory, I/O facilities, & OS

- **A Cluster**
  - Generally two or more computers (nodes) connected together
  - In a single cabinet, or physically separated & connected via a LAN
  - Appear as a single system to users and applications
  - Provide a cost-effective way to gain features and benefits

Evolution of Cloud Computing

Grid Computing

- Appeared in the early 1990s as an evolution of cluster computing.

- Grids initially developed as aggregations of geographically dispersed clusters by means of Internet connections.
- It consists on heterogeneous nodes.
- These clusters belong to different organizations, and arrangements were made among them to share the computational power.

Cluster vs Grid Computing

Key	Cluster Computing	Grid Computing
Computer Type	Nodes or computers has to be of same type.	Nodes or computers can be of same or different types.
Task	Computers of Cluster Computing are dedicated to single task.	Computers of Grid Computing can use the unused computing resources to do other tasks.
Location	Computers of Cluster computing are co-located.	Computers of Grid Computing can be present at different locations.
Topology	Centralized network topology.	De-centralized network topology.
Autonomy	In Cluster computing network, whole system works as a unit.	In Grid computing network, each node is independent.

Cluster vs Grid Computing

Key	Cluster Computing	Grid Computing
Task Scheduling	A centralized server controls the scheduling of tasks in cluster computing.	In Grid Computing, multiple servers can exist.
Resource Manager	Cluster Computing network has a dedicated centralized resource manager.	In Grid Computing, each node is independently managing each own resources.

Thank you