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COMPUTER SCIENCE AND ENGINEERING

IV YEAR / VII SEMESTER

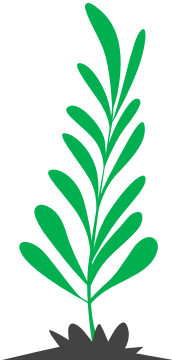
CS8791 CLOUD COMPUTING

A.DURAIMURUGAN, M.E, (Ph.d)

ASSISTANT PROFESSOR

Nadar Saraswathi College of Engineering & Technology,


Vadapudupatti, Annanji (po), Theni - 625531.





UNIT I

Introduction to Cloud Computing



INTRODUCTION

- ✓ Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet).
- ✓ Cloud computing entrusts remote services with a user's data, software and computation.
- ✓ Cloud Computing provides us a means by which we can access the applications as utilities, over the Internet. It allows us to create, configure, and customize applications online.
- ✓ With Cloud Computing users can access database resources via the internet from anywhere for as long as they need without worrying about any maintenance or management of actual resources.

INTRODUCTION

- ✓ The term Cloud refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location.
- ✓ Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN.
- ✓ Applications such as e-mail, web conferencing, customer relationship management (CRM), all run in cloud.
- ✓ Cloud Computing refers to manipulating, configuring, and accessing the applications online. It offers online data storage, infrastructure and application.
- ✓ Cloud Computing is both a combination of software and hardware based computing resources delivered as a network service.

HISTORY OF CLOUD COMPUTING

✓ 1960-69:

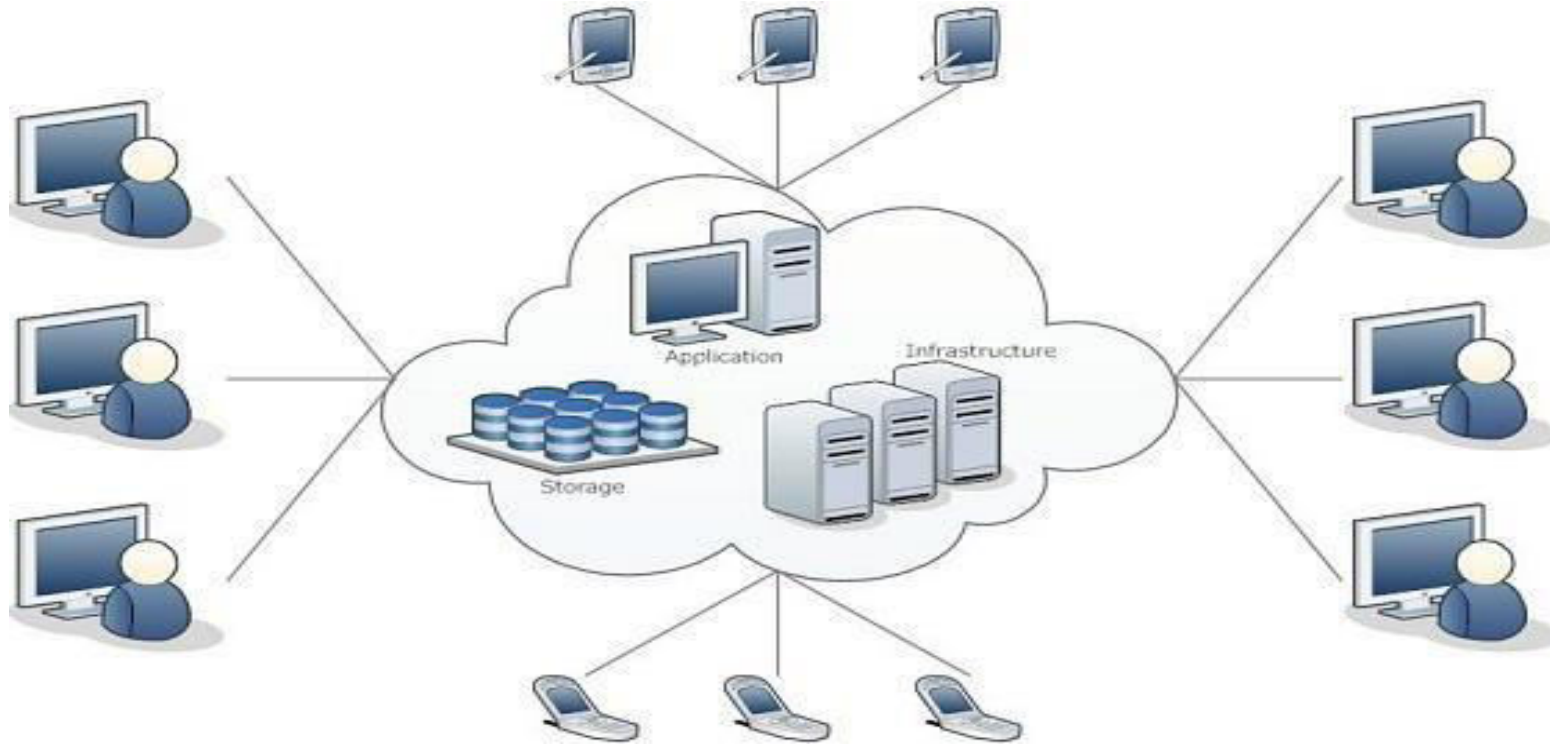
The idea of cloud computing started to emerge before the Internet was invented.

✓ 1983: US computer company Sun Microsystems Inc floated the idea of "the network is the computer".

✓ 1997: IT professor Ramnath Chellappa was the first to use "cloud computing" to describe the new computing system that relies on cooperation of computers.

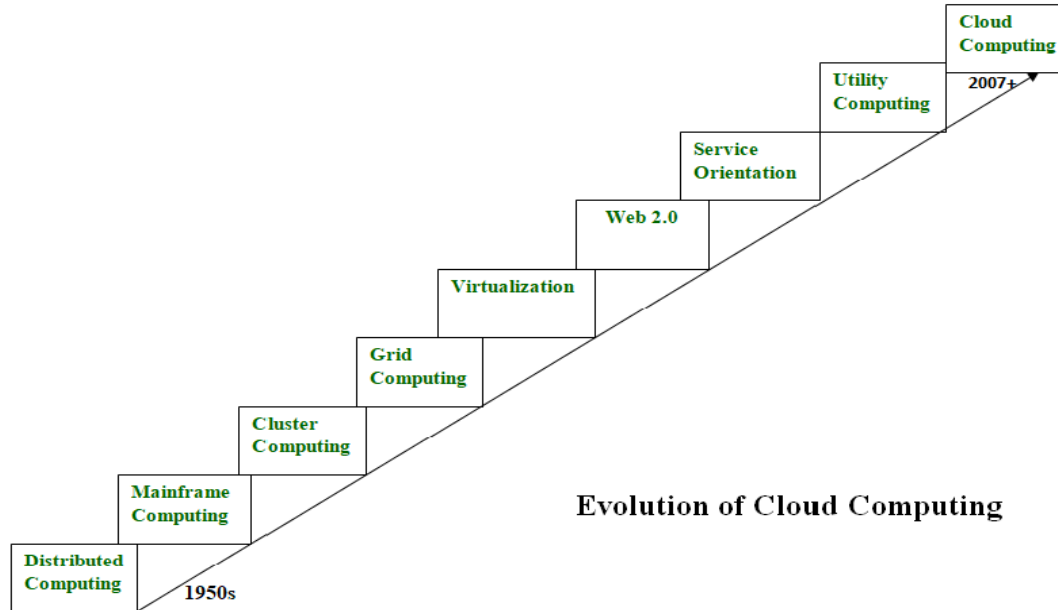
✓ 2006: Web search company Google Inc, for the first time, shared its idea of cloud computing. In the same year, Amazon.com Inc launched one of the world's earliest online storage services named Amazon Simple Storage Service.

CLOUD COMPUTING ARCHITECTURE



- ✓ 'Jobs' – repetition of very well-defined and well understood tasks with very little uncertainty - 'Exploration' – e.g. finding a cure for cancer: the outcome is very uncertain 'Projects' – in the middle!
- ✓ The characteristics of projects are
 - Non-routine
 - Planned
 - Aiming at a specific target
 - Work carried out for a customer
 - Involving several specialism
 - Made up of several different phases
 - Constrained by time and resources

Evolution of Cloud Computing



Evolution of Cloud Computing

Evolution of Cloud Computing

Distributed Systems:

- The purpose of distributed systems is to share resources and also use them effectively and efficiently.
- The main problem with this system was that all the systems were required to be present at the same geographical location.

Mainframe computing:

- It is responsible for handling large data such as massive input-output operations.
- To reduce this cost, cluster computing came as an alternative to mainframe technology.

Evolution of Cloud Computing

Cluster computing:

- Each machine in the cluster was connected to each other by a network with high bandwidth. These were way cheaper than those mainframe systems.
- The problem of the cost was solved to some extent but the problem related to geographical restrictions still pertained.

Evolution of Cloud Computing

Grid computing:

- It means that different systems were placed at entirely different geographical locations and these all were connected via the internet.
- The main problem which was encountered was the low.

Evolution of Cloud Computing


Virtualization:

- It refers to the process of creating a virtual layer over the hardware which allows the user to run multiple instances simultaneously on the hardware.
- It is the base on which major cloud computing services such as Amazon EC2, VMware vCloud, etc work on.

Evolution of Cloud Computing

Web 2.0:

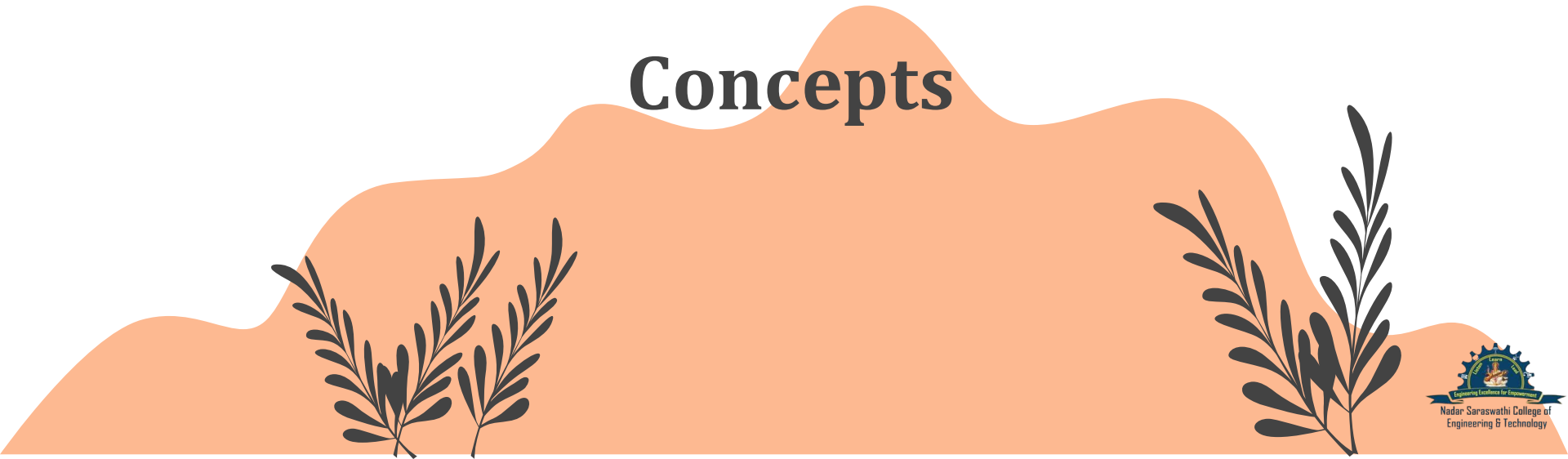
- It is the interface through which the cloud computing services interact with the clients.
- It is because of Web 2.0 that we have interactive and dynamic web pages.



Topic

Basic Model

Concepts



Software Development projects

➤ There are certain services and models working behind the scene making the cloud computing feasible and accessible to end users. Following are the working models for cloud computing:

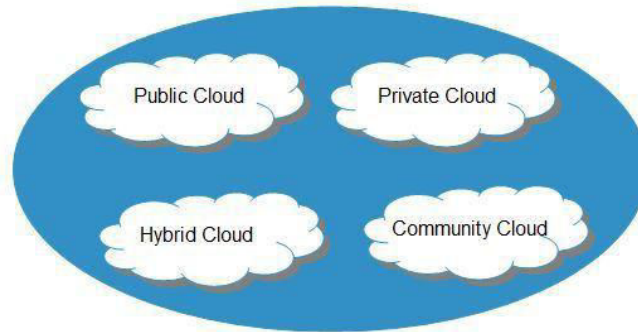
➤ 1. Deployment Models

➤ 2. Service Models

Package Implementation projects

Deployment Models

➤ Deployment models define the type of access to the cloud, i.e., how the cloud is located? Cloud can have any of the four types of access: Public, Private, Hybrid and Community.




PUBLIC CLOUD : The Public Cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness, e.g., e-mail.

PRIVATE CLOUD : The Private Cloud allows systems and services to be accessible within an organization. It offers increased security because of its private nature.

COMMUNITY CLOUD : The Community Cloud allows systems and services to be accessible by group of organizations.

HYBRID CLOUD : The Hybrid Cloud is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.



Topic

Basic Service

Models



Service Models

Service Models are the reference models on which the cloud Computing is based. These can be categorized into three basic service models as listed below:

- 1. Infrastructure as a Service (IaaS)
- 2. Platform as a Service (PaaS)
- 3. Software as a Service (SaaS)

Infrastructure as a Service (IaaS)

IaaS is the delivery of technology infrastructure as an on demand scalable service.

➤ IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.

- Usually billed based on usage
- Usually multi tenant virtualized environment
- Can be coupled with Managed Services for OS and application support

IaaS Examples



Platform as a Service (PaaS)

- PaaS provides the runtime environment for applications, development & deployment tools, etc.
- PaaS provides all of the facilities required to support the complete life cycle of building and delivering web applications and services entirely from the Internet.
- Typically applications must be developed with a particular platform in mind
- Multi tenant environments
- Highly scalable multi tier architecture

PaaS Examples



Software as a Service (SaaS)

SaaS model allows to use software applications as a service to end users.

SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a Web-based service.

- Usually billed based on usage
- Usually multi tenant environment
- Highly scalable architecture

SaaS Examples



Advantages

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

Disadvantages

- Requires a constant Internet connection
- Does not work well with low-speed connections
- Features might be limited
- Can be slow
- Stored data can be lost
- Stored data might not be secure

Cloud Storage

Create an Account User name and password.

Content lives with the account in the cloud.

Log onto any computer with Wi-Fi to find your content

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