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V SEMESTER

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
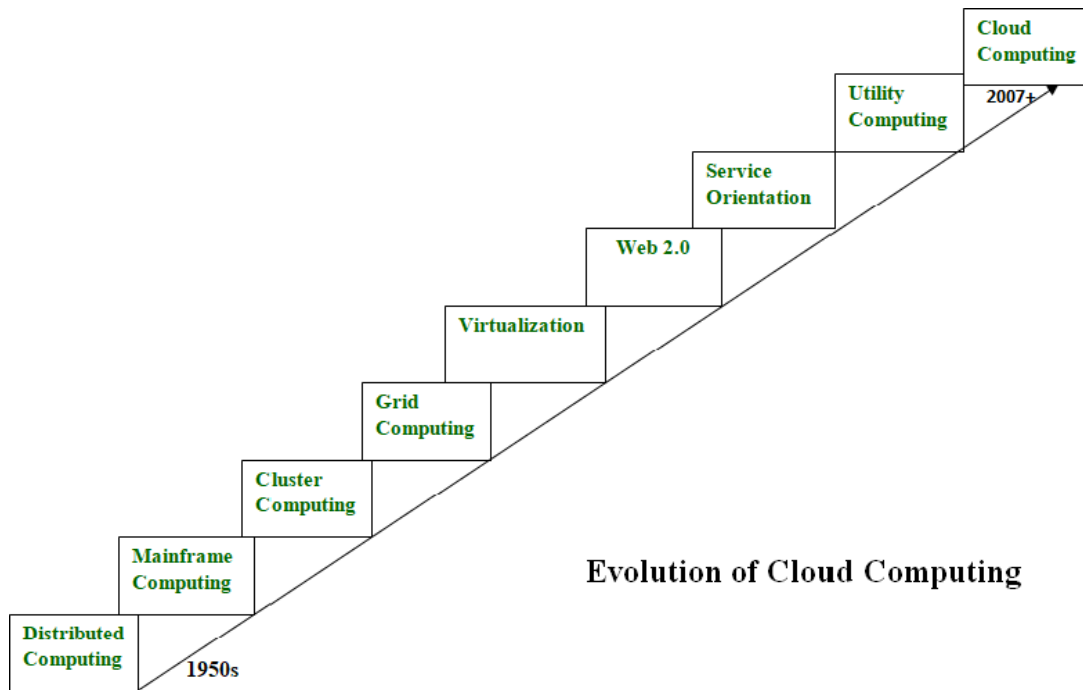
19TS501 - Cloud Computing

(Regulation – 2019)

UNIT – 1

Topic: 1.3 Evolution of Cloud Computing

Academic Year 2024 – 2025 (Odd Semester)

1.3 Evolution of Cloud Computing

The phrase "Cloud Computing" was first introduced in the 1950s to describe internet- related services, and it evolved from distributed computing to the modern technology known as cloud computing. Cloud services include those provided by Amazon, Google, and Microsoft. Cloud computing allows users to access a wide range of services stored in the cloud or on the Internet. Cloud computing services include computer resources, data storage, apps, servers, development tools, and networking protocols.

Evolution of Cloud Computing

Cloud computing allows users to access a wide range of services stored in the cloud or on the Internet. Cloud computing services include computer resources, data storage, apps, servers, development tools, and networking protocols. It is most commonly used by IT companies and for business purposes.

Distributed Systems

Distributed System is a composition of multiple independent systems but all of them are depicted as a single entity to the users. The purpose of distributed systems is to share resources and also use them effectively and efficiently. Distributed systems possess characteristics such as scalability, concurrency, continuous availability, heterogeneity, and independence in failures. But the main problem with this system was that all the systems were required to be present at the same geographical location. Thus to solve this problem, distributed computing led to three more types of computing and they were-Mainframe computing, cluster computing, and grid computing.

Mainframe Computing

Mainframes which first came into existence in 1951 are highly powerful and reliable computing machines. These are responsible for handling large data such as massive input-output operations. Even today these are used for bulk processing tasks such as online transactions etc. These systems have almost no downtime with high fault tolerance. After distributed computing, these increased the processing capabilities of the system. But these were very expensive. To reduce this cost, cluster computing came as an alternative to mainframe technology.

Cluster Computing

In 1980s, cluster computing came as an alternative to mainframe 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. These were equally capable of high computations. Also, new nodes could easily be added to the cluster if it was required. Thus, the problem of the cost was solved to some extent but the problem related to geographical restrictions still pertained. To solve this, the concept of grid computing was introduced.

Grid Computing

In 1990s, the concept of grid computing was introduced. It means that different systems were placed at entirely different geographical locations and these all were connected via the internet. These systems belonged to different organizations and thus the grid consisted of heterogeneous nodes. Although it solved some problems but new problems emerged as the distance between the nodes increased. The main problem which was encountered was the low availability of high bandwidth connectivity and with it other network associated issues. Thus. cloud computing is often referred to as "Successor of grid computing".

Virtualization

Virtualization was introduced nearly 40 years back. 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 a key technology used in cloud computing. It is the base on which major cloud computing services such as Amazon EC2, VMware vCloud, etc work on. Hardware virtualization is still one of the most common types of virtualization.

Web 2.0

Web 2.0 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. It also increases flexibility among web pages. Popular examples of web 2.0 include Google Maps, Facebook, Twitter, etc. Needless to say, social media is possible because of this technology only. It gained major popularity in 2004.

Service Orientation

A service orientation acts as a reference model for cloud computing. It supports low-cost, flexible, and evolvable applications. Two important concepts were introduced in this computing model. These were Quality of Service (QoS) which also includes the SLA (Service Level Agreement) and Software as a Service (SaaS).

Utility Computing

Utility Computing is a computing model that defines service provisioning techniques for services such as computing services along with other major services such as storage, infrastructure, etc which are provisioned on a pay-per-use basis.

Cloud Computing

Cloud Computing means storing and accessing the data and programs on remote servers that are hosted on the internet instead of the computer's hard drive or local server. Cloud computing is also referred to as Internet-based computing; it is a technology where the resource is provided as a service through the Internet to the user. The data that is stored can be file s, images, documents, or any other storable document.