Cloud Computing

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ABSTRACT

Cloud computing is a key technological development in the information technology industry. It is one of the best techniques for managing and allocating a lot of information and resources across the entire internet. Technically speaking, cloud computing refers to accessing IT infrastructure through a computer network without having to install anything on your personal computer. Businesses can modify their resource levels to match their operational needs by utilizing cloud computing. Organizations and corporations can cut infrastructural costs with the use of cloud computing. Organizations can test their applications more quickly, with better management, and with less upkeep. The IT team can adapt resources to changing and erratic requirements thanks to cloud computing. There is proof that cloud computing has a role in everyday life thanks to various applications in various contexts. This essay will cover every aspect of cloud computing, including its architecture, traits, types, service models, advantages, and challenges.

KEYWORDS

Cloud computing, Technology Industry, IT Infrastructure, Service Models.

INTRODUCTION

The development of cloud computing has significantly changed, how the IT sector functions today. Cloud computing makes it possible to investigate better IT services with lower expenses and less investment. The popularity of software as a service has increased because of cloud computing's impact on how IT hardware is developed and procured. It is an internet based technology that gives users access to server stored data as a service whenever they want.

Customers only pay for the service they use because it is a pay-as-you-go service. Cloud computing is as a computing model in which massively scalable IT enabled capabilities are offered as a service to numerous customers. It is the use of internet-based computer technology for a variety of services (as storage capacity, processing power, business applications, or components).

It is a set of network-enabled services that offer scalable, guaranteed, typically customized, relatively affordable services in an easy-to-use manner. Cloud computing is defined as a computing approach in which enormously scalable IT-related capabilities are delivered as a service through the internet to various external consumers. This is an

information technology service paradigm in which hardware and software are given to consumers on demand across a network without the use of a device or location. The National Institute of Standards and Technology defines cloud computing as a model for allowing ubiquitous, convenient, a shared pool of customized computing resources, and services that can be swiftly supplied and deployed with minimum administrative work or service contact. Cloud computing are of four types namely private cloud, public cloud, community cloud, and hybrid cloud. There are three popular service models in cloud computing. They are as follows:-

  i)   Platform as a service
  ii)   Infrastructure as a service
  iii)   Software as a service

These are all examples of cloud computing. There are some challenges to be considered in choosing a solution; they also present tremendous chances with significant rewards. This research will present an overview of cloud computing architecture, features, and service models, as well as discuss their advantages and challenges.

BRIEF REVIEW AND METHODOLOGY ON CLOUD COMPUTING

History of cloud computing Cloud computing was developed by John McCarthy in 1960. "The use of computers, as a subject of research may be arranged as a public utility eventually."According to Parkhill in The computer utility challenges, the name "Cloud" computing was introduced in telecommunication industry as a virtual private network. There was wastage of Bandwidth using point-point data lines.

Network utilization was balanced using virtual private network. Servers and network infrastructure are now included. Cloud computing has been widely used by industry participants. Amazon introduced Amazon web services and this has been of great help to their business. Furthermore, Google and IBM have both launched cloud computing research. Eucalyptus was the first open-source platform for private cloud deployment.

Cloud computing, also known as the internet, was first proposed by American Psychologist and Computer scientist Lickliter J.C in 1960 with the aim of connecting information, data, and people together globally. As the years go on, the evolution of cloud computing started around 2006 when Amazon introduced "Amazon web services (AWS)" as an elastic cloud computing. In 2008, Google introduced the "Beta" version of search engine. In 2012, Oracle rolled out Oracle cloud computing. Since the Introduction of cloud computing by many organizations, literature on the application, significance and management of cloud computing have been published over the years. For instance, focused on the adoption of internet computing in the information technology industry in some developing countries. The study focused on how the major information management industry in Pakistan used a constructive questionnaire to gather information about the employees via email to validate the prototype recommended that, to encourage better performance to increase the effectiveness and enhancement of data storage.

The network providers must perform some new tasks to increase the storage capacity of online data evaluated how much larger memory space was available in 2018 by using cloud housed 5347EB to save data. This spacious memory allowed organizations to store, examine, and acquire valuable data on customers' information, interests, and reactions.

It's proposed an internet computing device that allows small companies to save and distribute data. In recent years, there has been an upsurge in how hackers have breached cloud computing security by targeting computers to steal valuable data and damage data stored using ransom ware.

Emphasizing the high-security level of cloud computing firms.

Hackers have acquired substantial smoothness in their exertion; this has compelled organizations to spend quality time and effort to develop an approach to keep data safe and detect malware. These continuous attacks alert security experts to enlarge their security and response time. Detailed descriptions of those are given below-

a) Infrastructure-as-a-service (IaaS)

Cloud users directly make use of the necessary computer resources and information technology infrastructure, such as processing, storage, networks, and other that are made available by the cloud. In the IaaS cloud, virtualization is frequently used to combine and separate physical resources as needed to meet the variable resource demands of cloud users. The core virtualization strategy involves creating distinct virtual machines (VM) that are isolated from both the underlying hardware and other VMs. Since numerous instances (from separate cloud users) can operate on a single application thanks to the multi tenancy paradigm, the software architecture of the application is altered. Contrary to that model, this tactic is different. Google, App Engine, Microsoft Azure, Java, and developer tools are a few examples of infrastructure as a service.

b) Platform as a service (PaaS)

A platform for development known as "platform as a service" enables users of the cloud to build cloud services and apps by supporting the whole "software lifecycle." In contrast to SaaS, which only hosts finished cloud applications, this provides a development platform that hosts both finished and in progress cloud applications. As a result, PaaS offers development infrastructure such as configuration management, tools, programming environments, and other components in addition to a hosting environment. Microsoft Azure, Google App Engine, developer tools, and Java are a few examples of PaaS.

c) Software as a service (SaaS)

A variety of customers with access to networks can access the program that cloud customers publish in a hosting environment (such as web browsers). To achieve economies of scale and optimization in terms of speed, availability, disaster recovery, maintenance, and security, users of the applications of various cloud consumers are grouped on the SaaS cloud in a

single logical environment. The cloud infrastructure commonly employs multi tenancy system architecture and is not under the user's control. Examples include Sales force, Google Docs, and Google.

d) Data storage as service (DaaS)

Virtualized storage that is made available on demand is now a separate cloud service called data storage service. Excellent data storage service as a unique IaaS type. This is due to the fact that expensive upfront expenses for on-premises enterprise database systems are sometimes associated with dedicated servers, software licenses, post-delivery services, and internal IT maintenance. Customers can use DaaS to pay only for the services they use rather than obtaining a site license for the entire database. Along with more traditional storage interfaces like file systems and relational database management systems (RDBMS), which are frequently too big, too slow, and quite expensive, some data storage service providers also offer table-style abstractions that store and retrieve a sizable amount of data in a highly compressed timescale.

CHARACTERISTICS OF CLOUD COMPUTING

According to the National Institute of Standards and Technology, cloud computing has five features that make it suitable for information technology applications and services.

On-Demand Self Service

On-demand self-service: Cloud services such as server time, storage, web applications, computing power, and networks may be delivered automatically to consumers as needed, eliminating the need for human interaction.

Resource Pooling

Cloud providers pool their computing resources together to accommodate multiple customers. This is accomplished either through virtualization, which uses virtual machines to replicate physical hardware or through "multi-tenancy," which allows multiple users of the same resources. This is made possible by having various physical and virtual resources that are dynamically assigned and reassigned in response to changing consumer demand. The concept of a pool-oriented computing paradigm is inspired by economies of scale and resource specialization. Physical computing resources have resulted in this community paradigm. It suggests that the customers are unaware of the available resources. Consumers are oblivious to the origins, location, and physical composition of the resources they utilize. Customers are unable to identify the place in certain clouds where their data is supposed to be kept. This enables resource pooling without exposing the resource provider's management structure and allows for fully flexible resource offering to clients.

Broad network access

Numerous clients (applications) that access the required computer resources through a network, mostly the internet, employ a range of platforms, including laptops,

microcomputers, and mobile phones, all of which are present at the consumer's end. The benefits of cloud computing can be expanded thanks to broadband network connectivity.

Rapid elasticity

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Measured service

In a cloud environment, multiple users may share computer resources (multi-tenancy), but the cloud infrastructure may make use of tools to monitor how each user is using these resources. The cloud computing metering methods enable for the individual invoicing of numerous cloud users.

CLOUD COMPUTING DEPLOYMENT TYPE

There are basically three types of cloud, private cloud, public cloud, and hybrid cloud. These are classified based on the size of the network, security, and the number of users

Private cloud

A private cloud is developed and maintained especially for a single firm, but the administrator also allows outside companies to use the cloud. The private cloud allows for on-site or off-site activities. The private cloud provides good cost management, cost control, privacy, and energy efficiency. Private clouds have a limited capacity and are restricted to a certain area.

Public cloud

This is a cloud computing service that the public or anyone can use or purchase. It is provided by a third party over the public internet. Customers using this type of service only pay for the services they really utilize. If they have internet availability, every employee of the organization can use the programme from any office or branch using whatever device they choose.

Community cloud

Several institutions or organizations with similar objectives host a community cloud. It is frequently used in universities for both teaching and research. Businesses have the option of managing the cloud system themselves, either on- or off-site or by outsourcing with a different organization to handle daily system operations.

Hybrid cloud

Different cloud systems comprise a hybrid cloud. It typically consists of two or more distinct clouds. For instance, a company may opt to use the public cloud for daily operations while

storing sensitive data in their own data center. Using a hybrid cloud could have several advantages. Large and well-known organizations are more likely to make significant investments in the infrastructure needed to offer resources internally. Safety is an additional factor.

CONCLUSION

Cloud computing is a crucial technological advancement in the IT industry, enabling efficient management and allocation of information and resources across the internet. It allows businesses to adjust resource levels, reduce infrastructural costs, and test applications quickly and efficiently. This essay covers cloud computing's architecture, traits, types, service models, advantages, and challenges.

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