Cloud Computing Concepts and its Types – A Research Paper.

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Abstract*: This paper presents a survey on Cloud Computing by clarifying its ideas, types, applications and meaning of cloud computing. Cloud computing is used in the IT infrastructure that are provided the services to the customer through the internet. Cloud computing delivered by a third party provider. It gives the low cost environment for the end user. It is a storage device to stored and maintain the data and application. We can get the any of the information through the internet and take backup. There are two types of cloud computing models. The Deployment model of the cloud computing is Public, Private and Hybrid models. The service model of the cloud computing is Software as a services(SAAS), platform as a Service (PAAS), and infrastructure as a Service (IAAS). These various services gives the different performance to access and maintain the data and application. It is appropriate the stored the data or information via internet.*

Keywords: Cloud Computing; Cloud Computing Services; Public, Private and hybrid ;PaaS, IaaS, SaaS

I. INTRODUCTION

What is cloud computing?

Cloud computing is the on-demand access of computing resources—physical servers or virtual servers, data storage, networking capabilities, application development tools, software, AI-powered analytic tools and more—over the internet with pay-per-use pricing.

The cloud computing model offers customers greater flexibility and scalability compared to traditional on-premises infrastructure.

Cloud computing plays a pivotal role in our everyday lives, whether accessing a cloud application like Google Gmail, streaming a movie on Netflix or playing a cloud-hosted video game.

Cloud computing has also become indispensable in business settings, from small startups to global enterprises. Its many business applications include enabling remote work by making data and applications accessible from anywhere, creating the framework for seamless omnichannel customer engagement and providing the vast computing power and other resources needed to take advantage of cutting-edge technologies like generative AI and quantum computing[2].

Cloud infrastructure involves the hardware and software components required for the proper deployment of a cloud computing model. Cloud computing can also be thought of as utility computing or on-demand computing.

The name cloud computing was inspired by the cloud symbol that's often used to represent the internet in flowcharts and diagrams.

Cloud computing services can offer benefits such as scalability, simplicity, expense reduction, and high resources resistance, which is why this computing model is popular among different users[3].
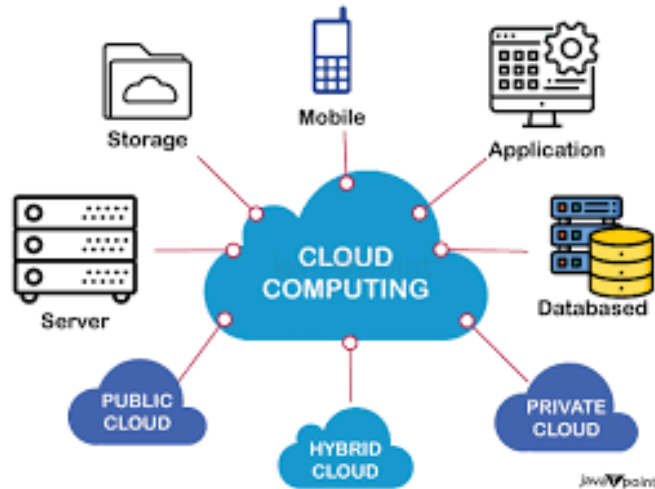
Cloud computing [4]

Benefits of cloud computing

Accessibility anywhere, with any device:

Each branch or office across various states or countries. The improved accessibility doesn't just impact employees; clients and customers can also log in to an account and access their information as well. This ensures everyone has up-to-date information whether they're at the office or on the go.

Ability to get rid of most or all hardware and software:

With cloud computing, you're no longer required to have your own server, cables, network switches, backup generators, redundant routers, and so on. Depending on the cloud provider you choose, they can manage all of this for a monthly fee. Reducing expenses is essential in any business model and every cloud-based platform benefits from this factor alone.

Centralized data security:

When you use cloud computing, data backups are centralized in the cloud providers' data centres, removing the need for individual users or teams to maintain their own backups onsite or offsite. This lowers the risk of data loss should any one backup fail or be destroyed by a disaster. Cloud providers can restore the data from another copy maintained in their cloud storage, which is continuously updated with every piece of data added.Teams can take advantage of cloud security technologies such as data encryption and two-factor authentication for greater privacy than they'd have when relying on their own equipment or servers at home or in the office. Oracle uses a security-first cloud architecture with automated protection built in.

Higher performance and availability:

By using cloud computing resources together simultaneously, you reap greater performance gains than by having your own dedicated server hardware. Cloud computing increases input/output operations per second (IOPS).

Learn about cloud computing economics:

Cloud services also offer high availability with no downtime because they're distributed across multiple cloud facilities. Cloud providers are responsible for updating cloud systems and fixing bugs and security issues in cloud software, which is transparent to end users.

Quick application deployment

Unpredictable business needs often require cloud computing resources on short notice. You can improve your cloud application development by quickly deploying cloud applications because they are readily available without the need to procure additional hardware or wait for IT staff to set up servers.In addition, you can choose from a broad range of services that support different types of cloud infrastructure technologies[5].

Essential Characteristics:

On-demand self-service. A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.

Rapid elasticity. Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability1 at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.[6]
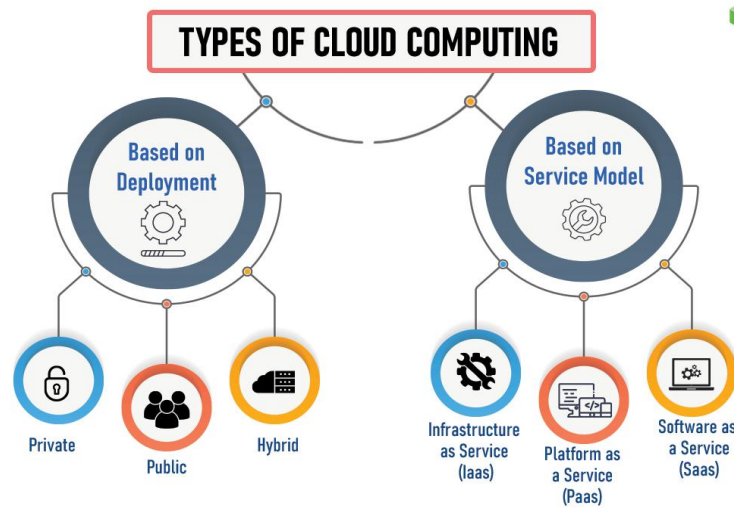
Cloud service provider:
- Amazon Web Services (AWS)
- Microsoft Azure
- Google Cloud Platform
- IBM Cloud Services
- VMware Cloud
- Oracle cloud
- Red Hat
- Alibaba Cloud

Types of cloud computing:
Cloud computing is divided into two types:
- Deployment model
- Service model



Types of cloud computing [7]

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Deployment model: -

Cloud Deployment Model acts as a virtual computing environment that offers a choice of deployment model according to how much data users want to store and who will have access to the infrastructure. It signifies how servers are deployed and provisioned over the internet so that various organizations and companies can access these servers without configuring them. Deployment model is further divided into three types.

Public Cloud Model: As the name indicates, the public cloud is available for the general public who want to use computing resources such as software and hardware over the internet. It is a good choice for companies and organizations with low-security concerns. There is no need to manage these resources as cloud computing providers configure and manage these services. Generally, public clouds are used for application development and testing.

Examples of top Public Cloud Deployment model Providers:

- Amazon EC2
- Google App Engine
- Microsoft Azure
- IBM Cloud
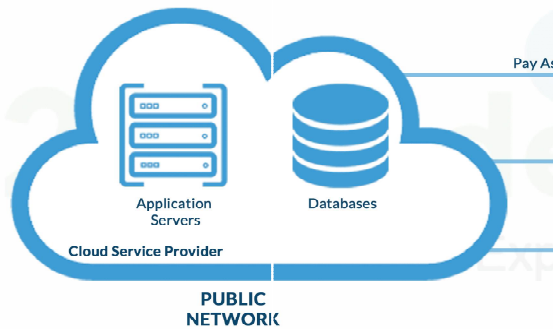
Public Cloud

Private Cloud Model: As the name suggests, Private Cloud lets you use the infrastructure and resources for a single organization. Users and organizations do not share resources with other users. That is why it is also called as Internal or corporate model. Private clouds are more costly than public clouds due to their costly maintenance.

Examples of top Private Cloud Deployment model Providers:

- Amazon Web Services
- Microsoft Azure
- Google Cloud Platform
- Dell
- Cisco
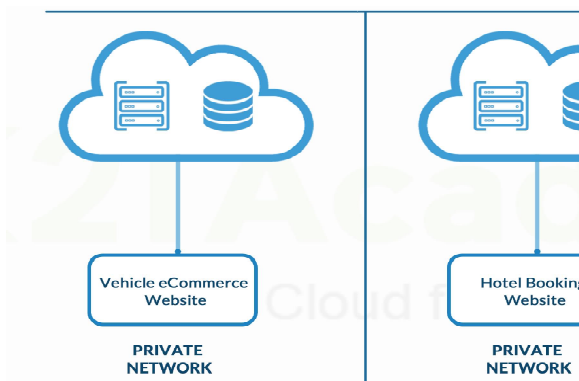
Private Cloud

Hybrid Cloud Model: The Hybrid Cloud is a combination of both public and private clouds. Very few companies and organizations can migrate their tech stack to cloud computing rapidly in one go. Hence, Cloud vendors came up with a hybrid cloud that offers a smooth transition with public and private cloud facilities. They keep the sensitive data in the private cloud and non-sensitive data in the public cloud.[8]
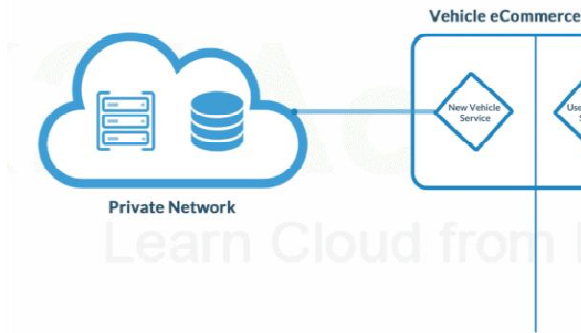

Hybrid Cloud

Service model:

Cloud computing is certifiably not a solitary piece of innovation like a CPU or a cellphone. Rather, it's a framework principally contained three services:

- Infrastructure-as-a-service (IaaS): It contains a plan for delivering everything from working frameworks to servers and storage as part of an on-demand service using IP-based availability. Clients can avoid having to purchase programming or servers by opting for a rethought, on-demand service. IaaS providers include DigitalOcean, Linode, Rackspace, Amazon Web Services (AWS), Cisco Metapod, Microsoft Azure, and Google Compute Engine (GCE).
- Platform-as-a-service (PaaS): The most puzzling of the three layers of cloud computing is this one. PaaS shares some similarities with SaaS, the main difference being that instead of delivering programming over the Internet, it is a platform for creating programming that is delivered over the Internet. Platforms like Salesforce.com and Heroku are used in this model. PaaS services include Salesforce Heroku, AWS Elastic Beanstalk, Microsoft Azure, and Engine Yard, to name a few.
- Software as a Service (SaaS):SaaS provides a full application stack as a service that customers can access and use. SaaS solutions often come as ready-to-use applications, which are managed and maintained by the cloud service provider.[9]
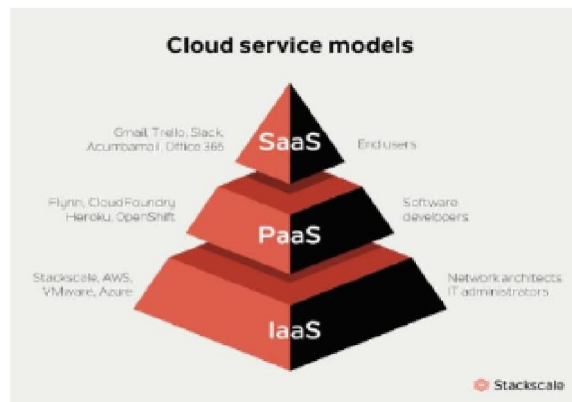
Cloud Service Model[10]

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II. CONCLUSION

In this study, we looked at key concepts in cloud computing such as cloud computing design, service models, and cloud types, Cloud computing is a technology that allows you to increase the limit or add capabilities on a constant basis without having to invest in new infrastructure, hire new people, or authorise new code.The Internet and what it brought with it was the initiator of major changes in the world of information systems, their implementation, use and maintenance. The appearance of Cloud computing, i.e., computing in the Cloud, as the last type of web-oriented information system implementation model, brought many innovations. As we have seen, there are different Cloud models, and each of them as a separate unit introduced some new approaches to the implementation ofinformation systems that use the Internet as a medium of communication.

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