CLOUD COMPUTING

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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 files, images, documents, or any other storable document.

The following are some of the **Operations** that can be performed with Cloud Computing

- Storage, backup, and recovery of data
- Delivery of software on demand
- Development of new applications and services
- Streaming videos and audio

Architecture Of Cloud Computing

Cloud computing architecture refers to the components and sub-components required for cloud computing. These components typically refer to:

- Front end (Fat client, Thin client)
- Back-end platforms (Servers, Storage)
- Cloud-based delivery and a network (Internet, Intranet, Intercloud)

Front End (User Interaction Enhancement)

The User Interface of Cloud Computing consists of 2 sections of clients. The Thin clients are the ones that use web browsers facilitating portable and lightweight accessibilities and others are known as Fat Clients that use many functionalities for offering a strong user experience.

Back-end Platforms (Cloud Computing Engine)

The core of cloud computing is made at back-end platforms with several servers for storage and processing computing. Management of Applications logic is managed through servers and effective data handling is provided by storage. The combination of these platforms at the backend offers the processing power, and capacity to manage and store data behind the cloud.

Cloud-Based Delivery and Network

On-demand access to the computer and resources is provided over the Internet, Intranet, and Intercloud. The Internet comes with global accessibility, the intranet helps in internal communications of the services within the organization and the intercloud enables interoperability across various cloud services. This dynamic network connectivity ensures an essential component of cloud computing architecture on guaranteeing easy access and data transfer.

Types of Cloud Computing

The following are the types of Cloud Computing:

- **Infrastructure as a Service (IaaS)**
- **Platform as a Service (PaaS)**
- **Software as a Service (SaaS)**

Infrastructure as a Service (IaaS):

- **Flexibility and Control:** IaaS comes up with providing virtualized computing resources such as VMs, Storage, and networks facilitating users with control over the Operating system and applications.

- **Reducing Expenses of Hardware**: IaaS provides business cost savings with the elimination of physical infrastructure investments making it cost-effective.
- **Scalability of Resources:** The cloud provides in scaling of hardware resources up or down as per demand facilitating optimal performance with cost efficiency.

Platform as a Service (PaaS)

- **Simplifying the Development:** Platform as a Service offers application development by keeping the underlying Infrastructure as an Abstraction. It helps the developers to completely focus on application logic (Code) and background operations are completely managed by the AWS platform.
- **Enhancing Efficiency and Productivity:** PaaS lowers the Management of Infrastructure complexity, speeding up the Execution time and bringing the updates quickly to market by streamlining the development process.
- **Automation of Scaling:** Management of resource scaling, guaranteeing the program's workload efficiency is ensured by PaaS.

SaaS (software as a service):

- **Collaboration And Accessibility:** Software as a Service (SaaS) helps users to easily access applications without having the requirement of

local installations. It is fully managed by the AWS Software working as a service over the internet encouraging effortless cooperation and ease of access.

- **Automation of Updates:** SaaS providers manage the handling of software maintenance with automatic latest updates ensuring users gain experience with the latest features and security patches.

Characteristics of Cloud Computing:

- **Scalability:** With Cloud hosting, it is easy to grow and shrink the number and size of servers based on the need. This is done by either increasing or decreasing the resources in the cloud. This ability to alter plans due to fluctuations in business size and needs is a superb benefit of cloud computing, especially when experiencing a sudden growth in demand.
- **Save Money:** An advantage of cloud computing is the reduction in hardware costs. Instead of purchasing in-house equipment, hardware needs are left to the vendor. For companies that are growing rapidly, new hardware can be large, expensive, and inconvenient. Cloud computing alleviates these issues because resources can be acquired quickly and easily. Even better, the cost of repairing or replacing equipment is passed to the vendors. Along with purchase costs, off-site hardware cuts internal power costs and saves space. Large data centers can take up precious office space and produce a large

amount of heat. Moving to cloud applications or storage can help maximize space and significantly cut energy expenditures.

- **Reliability:** Rather than being hosted on one single instance of a physical server, hosting is delivered on a virtual partition that draws its resource, such as disk space, from an extensive network of underlying physical servers. If one server goes offline it will have no effect on availability, as the virtual servers will continue to pull resources from the remaining network of servers.
- **Physical Security:** The underlying physical servers are still housed within data centers and so benefit from the security measures that those facilities implement to prevent people from accessing or disrupting them on-site.
- **Outsource Management:** When you are managing the business, Someone else manages your computing infrastructure. You do not need to worry about management as well as degradation.
- Benefits Of Cloud Computing

Advantages of Cloud Computing:

The following are main advantages of Cloud Computing:

- **Cost Efficiency**: Cloud Computing provides flexible pricing to the users with the principal pay-as-you-go model. It helps in lessening capital expenditures of Infrastructure, particularly for small and medium-sized businesses companies.

- **Flexibility and Scalability**: Cloud services facilitate the scaling of resources based on demand. It ensures the efficiency of businesses in handling various workloads without the need for large amounts of investments in hardware during the periods of low demand.
- **Collaboration and Accessibility**: Cloud computing provides easy access to data and applications from anywhere over the internet. This encourages collaborative team participation from different locations through shared documents and projects in real-time resulting in quality and productive outputs.
- **Automatic Maintenance and Updates**: AWS Cloud takes care of the infrastructure management and keeping with the latest software automatically making updates they is new versions. Through this, AWS guarantee the companies always having access to the newest technologies to focus completely on business operations and innvoations.

Disadvantages Of Cloud Computing

The following are the main disadvantages of Cloud Computing:

- **Security Concerns**: Storing of sensitive data on external servers raised more security concerns which is one of the main drawbacks of cloud computing.

- **Downtime and Reliability**: Even though cloud services are usually dependable, they may also have unexpected interruptions and downtimes. These might be raised because of server problems, Network issues or maintenance disruptions in Cloud providers which negative effect on business operations, creating issues for users accessing their apps.
- **Dependency on Internet Connectivity:** Cloud computing services heavily rely on Internet connectivity. For accessing the cloud resources the users should have a stable and high-speed internet connection for accessing and using cloud resources. In regions with limited internet connectivity, users may face challenges in accessing their data and applications.
- **Cost Management Complexity:** The main benefit of cloud services is their pricing model that coming with Pay as you go but it also leads to cost management complexities. On without proper careful monitoring and utilization of resources optimization, Organizations may end up with unexpected costs as per their use scale. Understanding and Controlled usage of cloud services requires ongoing attention.