

2)How Cloud Computing Works?

Cloud computing helps users in easily accessing computing resources like storage, and processing over internet rather than local hardware. Here we discussing how it works in nutshell:

Infrastructure: Cloud computing depends on remote network servers hosted on internet for store, manage, and process the data.

On-Demand Access: Users can access cloud services and resources based on-demand they can scale up or down the without having to invest for physical hardware.

Types of Services: Cloud computing offers various benefits such as cost saving, scalability, reliability and accessibility it reduces capital expenditures, improves efficiency.

4)Cloud computing goals

Cloud computing encompasses several goals that aim to improve how organizations manage and utilize technology resources. Here are the primary goals:

Cost Efficiency: Reduce capital expenditures by allowing organizations to pay for resources on a subscription or usage basis, minimizing the need for significant upfront investment in hardware and software.

Scalability: Enable businesses to scale resources up or down easily based on demand, allowing for flexibility and efficient resource management.

Accessibility: Provide remote access to data and applications from any device with an internet connection, facilitating collaboration and improving productivity.

Disaster Recovery and Backup: Enhance data protection and recovery capabilities, allowing organizations to quickly recover from data loss or system failures.

Performance Optimization: Leverage the latest hardware and software technologies without the need for frequent upgrades, ensuring optimal performance for applications.

Security: Improve security through centralized management, regular updates, and advanced security measures offered by cloud providers, although this can vary by provider.

5) Cloud computing challenges

1. Data Security and Privacy

Data security is a major concern when switching to cloud computing. User or organizational data stored in the cloud is critical and private. Even if the cloud service provider assures data integrity, it is your responsibility to carry out user authentication and authorization, identity management, data encryption, and access control. Security issues on the cloud include identity theft, data breaches, malware infections, and a lot more which eventually decrease the trust amongst the users of your applications. This can in turn lead to potential loss in revenue alongside reputation and stature. Also, dealing with cloud computing requires sending and receiving huge amounts of data at high speed, and therefore is susceptible to data leaks.

2. Cost Management

Even as almost all cloud service providers have a “Pay As You Go” model, which reduces the overall cost of the resources being used, there are times when there are huge costs incurred to the enterprise using cloud computing. When there is under optimization of the resources, let's say that the servers are not being used to their full potential, add up to the hidden costs. If there is a degraded application performance or sudden spikes or overages in the usage, it adds up to the overall cost. Unused resources are one of the other main reasons why the costs go up. If you turn on the services or an instance of cloud and forget to turn it off during the weekend or when there is no current use of it, it will increase the cost without even using the resources.

3. Multi-Cloud Environments

Due to an increase in the options available to the companies, enterprises not only use a single cloud but depend on multiple cloud service providers. Most of these companies use hybrid cloud tactics and close to 84% are dependent on multiple clouds. This often ends up being hindered and difficult to manage for the infrastructure team. The process most of the time ends up being highly complex for the IT team due to the differences between multiple cloud providers.

4. Performance Challenges

Performance is an important factor while considering cloud-based solutions. If the performance of the cloud is not satisfactory, it can drive away users and decrease profits. Even a little latency while loading an app or a web page can result in a huge drop in the percentage of users. This latency can be a product of inefficient load balancing, which means that the server cannot efficiently split the incoming traffic so as to provide the best user experience. Challenges also arise in the case of fault tolerance, which means the operations continue as required even when one or more of the components fail.

5. Interoperability and Flexibility

When an organization uses a specific cloud service provider and wants to switch to another cloud-based solution, it often turns up to be a tedious procedure since applications written for one cloud with the application stack are required to be re-written for the other cloud. There is a lack of flexibility from switching from one cloud to another due to the complexities involved. Handling data movement, setting up the security from scratch and network also add up to the issues encountered when changing cloud solutions, thereby reducing flexibility.

6. High Dependence on Network

Since cloud computing deals with provisioning resources in real-time, it deals with enormous amounts of data transfer to and from the servers. This is only made possible due to the availability of the high-speed network. Although these data and resources are exchanged over the network, this can prove to be highly vulnerable in case of limited bandwidth or cases when there is a sudden outage. Even when the enterprises can cut their hardware costs, they need to ensure that the internet bandwidth is high as well there are zero network outages, or else it can result in a potential business loss. It is therefore a major challenge for smaller enterprises that have to maintain network bandwidth that comes with a high cost.

6)Leveraging cloud computing

Leveraging cloud computing means using cloud-based services to improve business performance. This can be done by accessing applications and storage over the internet.

Benefits of cloud computing

Scalability

Businesses can scale up their cloud resources as they grow.

Cost efficiency

Businesses can pay for what they use, and don't need to invest in their own infrastructure.

Collaboration

Businesses can share resources and applications from anywhere with an internet connection.

Disaster recovery

Businesses can quickly recover data and applications in the event of a disruption.

Access to advanced technologies

Businesses can access technologies like artificial intelligence (AI), machine learning (ML), and big data analytics.

7) Economics of Cloud Computing

Economics of Cloud Computing is based on the PAY AS YOU GO method. Users/Customers must have to pay only for their way of the usage of the cloud services. It is definitely beneficial for the users. So the Cloud is economically very convenient for all. Another side is to eliminate some indirect costs which is generated by assets such as license of the software and their support. In the cloud, users can use software applications on a subscription basis without any cost because the property of the software providing service remains to the cloud provider.

Economical background of the cloud is more useful for developers in the following ways:

Pay as you go model offered by cloud providers.

Scalable and Simple.

Cloud Computing Allows:

Reduces the capital costs of infrastructure.

Removes the maintenance cost.

Removes the administrative cost.

What is Capital Cost?

It is cost occurred in the purchasing infrastructure or the assets that is important in the production of goods. It takes a long time to generate profit.

In the case of start-ups, there is no extra budget for the infrastructure and its maintenance. So cloud can minimize expenses of any small organization in terms of economy. It leads to the developers can only focus on the development logic and not on the maintenance of the infrastructure.

There are three different Pricing Strategies that are introduced by Cloud Computing: Tiered Pricing, Per-unit Pricing, and Subscription-based Pricing. These are explained as following below.

Tiered Pricing: Cloud Services are offered in the various tiers. Each tier offers to fix service agreements at a specific cost. Amazon EC2 uses this kind of pricing.

Per-unit Pricing: The model is based upon the unit-specific service concept. Data transfer and memory allocation include in this model for specific units. Go Grid uses this kind of pricing in terms of RAM/hour.

Subscription-based Pricing: In this model, users are paying periodic subscription fees for the usage of the software.

8) Total cost of ownership in cloud computing

The Total Cost of Ownership (TCO) in cloud computing refers to the comprehensive cost of adopting, operating, and maintaining cloud infrastructure over its entire lifecycle. It goes beyond the initial purchase price and includes various factors that contribute to the overall expenses. Here are the key components of TCO in cloud computing:

Components of Cloud TCO

Initial Costs: These include expenses related to planning, assessment, data migration, application adaptation, initial fees from Cloud Service Providers (CSPs), consultant fees, training, and security measures².

Operational Costs: Ongoing expenses such as monthly or annual subscription fees charged by CSPs, compute resources, data storage, data transfer, networking, and maintenance³.

Management Costs: Costs associated with monitoring, maintenance, support, and ongoing training for skill enhancement.

Scaling Costs: Expenses incurred when scaling resources up or down based on demand.

Exit Costs: Costs involved in transitioning away from a cloud provider or platform, including data transfer and migration to a new system total cost of ownership in cloud computing