CLOUD COMPUTING

1. What is the history behind cloud computing?

Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user.The term is generally used to describe data centre's available to many users over the Internet.Large clouds, predominant today, often have functions distributed over multiple locations from central servers. If the connection to the user is relatively close, it may be designated an edge server.
Cloud computing was popularized with Amazon.com releasing its Elastic Compute Cloud product in 2006.
The cloud symbol was used to represent networks of computing equipment in the original ARPANET by as early as 1977, and the CSNET by 1981 both predecessors to the Internet itself. The word *cloud* was used as a metaphor for the Internet and a standardized cloud-like shape was used to denote a network on telephony schematics. With this simplification, the implication is that the specifics of how the endpoints of a network are connected are not relevant to understanding the diagram.

The term *cloud* was used to refer to platforms for distributed computing as early as 1993, when Apple spin-off General Magic and AT&T used it in describing their (paired) Telescript and PersonaLink technologies In *Wired's* April 1994 feature "Bill and Andy's Excellent Adventure II", Andy Hertzfeld commented on Typescript, General Magic's distributed programming language:

"The beauty of Telescript ... is that now, instead of just having a device to program, we now have the entire Cloud out there, where a single program can go and travel to many different sources of information and create a sort of a virtual service. No one had conceived that before. The example Jim White [the designer of Telescript, X.400 and ASN.1 uses now is a date-arranging service where a software agent goes to the flower store and orders flowers and then goes to the ticket shop and gets the tickets for the show, and everything is communicated to both parties."

2. Advantages and Disadvantages of CC.

As we all know that Cloud computing is trending technology. Almost every company switched their services on the cloud to rise the company growth.

1) Back-up and restore data

Once the data is stored in the cloud, it is easier to get back-up and restore that data using the cloud.

2) Improved collaboration

Cloud applications improve collaboration by allowing groups of people to quickly and easily share information in the cloud via shared storage.

3) Excellent accessibility

Cloud allows us to quickly and easily access store information anywhere, anytime in the whole world, using an internet connection. An internet cloud infrastructure increases organization productivity and efficiency by ensuring that our data is always accessible.

4) Low maintenance cost

Cloud computing reduces both hardware and software maintenance costs for organizations.

5) Mobility

Cloud computing allows us to easily access all cloud data via mobile.

6) IServices in the pay-per-use model

Cloud computing offers Application Programming Interfaces (APIs) to the users for access services on the cloud and pays the charges as per the usage of service.

7) Unlimited storage capacity

Cloud offers us a huge amount of storing capacity for storing our important data such as documents, images, audio, video, etc. in one place.

8) Data security

Data security is one of the biggest advantages of cloud computing. Cloud offers many advanced features related to security and ensures that data is securely stored and handled.

Disadvantages of Cloud Computing

A list of the disadvantage of cloud computing is given below -

1) Internet Connectivity

As you know, in cloud computing, every data (image, audio, video, etc.) is stored on the cloud, and we access these data through the cloud by using the internet connection. If you do not have good internet connectivity, you cannot access these data. However, we have no any other way to access data from the cloud.

2) Vendor lock-in

Vendor lock-in is the biggest disadvantage of cloud computing. Organizations may face problems when transferring their services from one vendor to another. As different vendors provide different platforms, that can cause difficulty moving from one cloud to another.

3) Limited Control

As we know, cloud infrastructure is completely owned, managed, and monitored by the service provider, so the cloud users have less control over the function and execution of services within a cloud infrastructure.

4) Security

Although cloud service providers implement the best security standards to store important information. But, before adopting cloud technology, you should be aware that you will be sending all your organization's sensitive information to a third party, i.e., a cloud computing service provider. While sending the data on the cloud, there may be a chance that your organization's information is hacked by Hackers.

3. Types of CC.

1 Infrastructure as a Service
(IaaS)
2 Platform as a Service
(PaaS)

3 Software as a Service
(SaaS)
4 Functions as a Service
(FaaS)

4. Different types of cloud deployment models.

Private Cloud

It is a cloud-based infrastructure used by stand-alone organizations. It offers greater control over security. The data is backed up by a firewall and internally, and can be hosted internally or externally. Private clouds are perfect for organizations that have high-security requirements, high management demands, and availability requirements.

Public Cloud

This type of cloud services is provided on a network for public use. Customers have no control over the location of the infrastructure. It is based on a shared cost model for all the users, or in the form of a licensing policy such as pay per user. Public deployment models in the cloud are perfect for organizations with growing and fluctuating demands. It is also popular among businesses of all sizes for their web applications, webmail, and storage of non-sensitive data.

Community Cloud

It is a mutually shared model between organizations that belong to a particular community such as banks, government organizations, or commercial enterprises. Community members generally share similar issues of privacy, performance, and security. This type of deployment model of cloud computing is managed and hosted internally or by a third-party vendor.

Hybrid Cloud

This model incorporates the best of both private and public clouds, but each can remain as separate entities. Further, as part of this deployment of cloud computing model, the internal, or external providers can provide resources. A hybrid cloud is ideal for scalability, flexibility, and security. A perfect example of this scenario would be that of an organization who uses the private cloud to secure their data and interacts with its customers using the public cloud.

5. What is virtualization and its types?

Virtualization is a technique of how to separate a service from the underlying physical delivery of that service. It is the process of creating a virtual version of something like computer hardware. It was initially developed during the mainframe era. It involves using specialized software to create a virtual or software-created version of a computing

resource rather than the actual version of the same resource. With the help of Virtualization, multiple operating systems and applications can run on same machine and its same hardware at the same time, increasing the utilization and flexibility of hardware.

Types of Virtualization:

1. Application Virtualization:
Application virtualization helps a user to have a remote access of an application from a server. The server stores all personal information and other characteristics of the application but can still run on a local workstation through internet. Example of this would be a user who needs to run two different versions of the same software. Technologies that use application virtualization are hosted applications and packaged applications.
2. Network Virtualization:
The ability to run multiple virtual networks with each has a separate control and data plan. It co-exists together on top of one physical network. It can be managed by individual parties that potentially confidential to each other. Network virtualization provides a facility to create and provision virtual networks—logical switches, routers, firewalls, load balancer, Virtual Private Network (VPN), and workload security within days or even in weeks.
3. Desktop Virtualization:
Desktop virtualization allows the users' OS to be remotely stored on a server in the data center.It allows the user to access their desktop virtually, from any location by different machine. Users who wants specific operating systems other than Windows Server will need to have a virtual desktop. Main benefits of desktop virtualization are user mobility, portability, easy management of software installation, updates and patches.
4. Storage Virtualization:
Storage virtualization is an array of servers that are managed by a virtual storage system. The servers aren't aware of exactly where their data is stored, and instead function more like worker bees in a hive. It makes managing storage from multiple sources to be managed and utilized as a single repository. storage virtualization software maintains smooth operations, consistent performance and a continuous suite of advanced functions despite changes, break down and differences in the underlying equipment.

6. Advantages and Disadvantages of VT.

Advantages of Virtualization

1. Cost

Using a virtualization system is actually cheaper due to the fact that it doesn't require any hardware components. Therefore, IT infrastructures consider it inexpensive because there is no investment involved in to create on-site resources or any separate areas of space. The only thing that you need is the license or the access from the third party who maintains all the servers.

2. Efficiency

Virtualization also allows automatic updates to the hardwares and softwares by installing on their third party provider. Due to this IT professionals do not need to spend money for individuals and corporations. In addition to that virtualization reduces the load of resource management for facilitating the efficiencies in the virtual environment.

3. Uptime

Virtualization has the capability to prevent unnecessary downtime by making use of resources the maximum. Even budget friendly virtualization services can offer an uptime of almost 99.9% today. This can be especially beneficial for small businesses which uses data for testing.

4. Deployment

Deploying resources are considerably faster when using the virtualization technology. Time spent on creating local networks or setting up physical machines can be saved significantly. Thus, the only thing that you need is at least a single access to the virtual environment. And also virtual machine deployment is more simple than deploying physical versions.

5. Energy Savings

Using virtualization literally means that the system is more energy efficient since there is no hardware or software that is being used. This helps the companies to neglect the cooling cost of the data centre which can significantly reduce the cost of utility bills. Moreover it is more environment friendly because it reduces carbon footprint.

Disadvantages of Virtualization

1. Implementation

Although it is mentioned that the virtualization is highly cost effective still it needs more investment when it comes to implementation. This is because at some instance the hardwares and softwares are required which means that devices needs to be purchased to make the virtualization possible. This can mainly effect the providers of virtual environment. However it is one time investment which long term benefits.

2. Limitations

Virtualization does involves many limitations. Every server and application out there is not virtualization compatible. Hence, some of the IT infrastructure of the organizations will not be supporting the virtualized solutions. Moreover there are many vendors who has stopped supporting them. For overcoming this individuals and organizations needs to have a hybrid system.

3. Security

Data is a crucial aspect of every organization. Data security is often questioned in a virtualized environment since the server is managed by managed by the third party providers. Therefore, it is important to choose the virtualization solution wisely so that it can provide adequate protection.

4. Availability

Availability is another important aspect of an organization. The data needs to be connected for a prolonged period of time. If not the organization will be going to loose the competition in the industry. The issue with the availability can come from the virtualization servers. The virtualization servers has the tendency to go offline. Hence, the websites which are hosted will also be failed. This is solely controlled by the third party providers, there is nothing the user can do about it.

5. Scalability

Even though you start the business small, there is always a chance for you to grow bigger. If there are no way you could become large, the entities of the same range can achieve it so. As a result they can dominate small businesses stealing resources from them.

7. List all the cloud vendors and their products.

Vendor	IaaS	PaaS	SaaS	Storage
Amazon	EC2 (Elastic Cloud Compute)	Amazon Web Services*	Amazon Web Services*	S3 (Simple Storage Service)
Google	n/a	Google App Engine (Python, Java, Go)	Google Aps	Google Cloud Storage
HP	Enterprise Services Cloud – Compute	Cloud Application Delivery	HP Software as a Service	Enterprise Services Cloud – Compute

IBM	Smart Cloud Enterprise	Smart Cloud Application Services	SaaS products	SmartCloud Enterprise – object storage
Microsoft	Microsoft Private Cloud	Windows Azure (includes .NET, Node.js, Java, PHP)	MS Office 365	Microsoft Private Cloud
JoyentCloud	SmartMachines	Node.js	n/a	n/a
Rackspace	Cloud Servers	Cloud Sites	Email & Apps	Cloud Files
Salesforce.com	n/a	Force.com	Salesforce.com	n/a
VMware**	VMware vSphere, vCloud	VMware vFabric (Java Spring), vCloud API	n/a	n/a