3. Explain the benefits of cloud computing, such as cost savings, scalability, flexibility, and accessibility

**Scalability**

Scalability refers to the ability of a cloud computing system to handle an increasing amount of workload or traffic without sacrificing performance or reliability. A computer can quickly increase or decrease power, storage, and other resources to adapt to increased demand.

Ex: If a company experiences a sudden surge in traffic to its website, with a scalable cloud computing   
 system, the company can quickly and easily add servers to its infrastructure to handle the increased   
 traffic

**Cost Savings:**

Because you pay only for the resources used, cloud computing is often more affordable than traditional IT solutions. You don't need to invest in expensive infrastructure, software, or hardware, or pay for ongoing maintenance and upgrades. Many cloud service providers also offer flexible pricing structures that allow you to pay for what you use and when you use it.

Ex: Company looking to migrate its on-premises email and collaboration software to the cloud. In the   
 traditional on-premises model, the company would need to purchase and maintain its email servers,   
 storage infrastructure, and software licenses.

**Flexibility**:

With cloud computing, you can use any internet-connected device to access your data and applications from anywhere. This means work can be done from anywhere with an internet connection, including home or travelling.

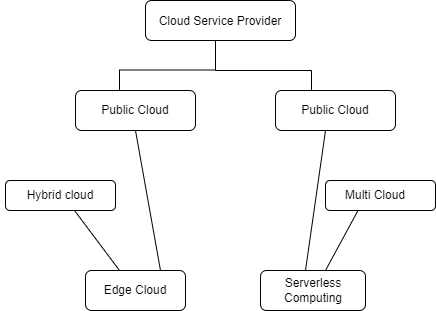
Ex: For a company that needs to quickly launch a new application to support a new product line, with   
 cloud computing, the company can quickly provision the necessary computing resources, including   
 compute instances, storage and networking, in minutes or hours.

**Accessibility**

Accessibility in cloud computing refers to the ability of users to access computing resources and services from anywhere, using any device with an internet connection. Cloud computing enables users to access their applications, data, and services from any location, without the need for dedicated on-premises infrastructure. This allows users to work remotely, collaborate with colleagues from different locations, and access resources on the go.

Ex: A company that has employees working from different locations around the world. With cloud   
 computing, employees can access the company's resources and services from anywhere, using any   
 device with an internet connection. The company can provision virtual desktops, applications, and data   
 on the cloud, which can be accessed securely from any location.

7. Discuss emerging trends in cloud computing, such as hybrid cloud, edge computing and serverless computing



**Hybrid Cloud**

A hybrid cloud is a cloud computing platform that combines multiple different clouds, such as public, private, or community clouds, but connects them using portable technology to transport data and applications. Workloads can switch between public and private clouds as needed in a hybrid cloud environment, giving enterprises access to the scale and cost-effectiveness of public clouds while still maintaining the security and control of private clouds.

Organizations that need to balance the benefits of public and private clouds, such as those with highly sensitive data or compliance requirements, or those that must support periods of peak demand, frequently employ hybrid clouds.

For instance, a company might employ a private cloud to store and process confidential information before switching to a public cloud during peak usage times to shut down processing or storage resources.

**Edge computing**

Edge computing is a distributed computing paradigm that reduces latency and boosts network efficiency by moving computation and data storage closer to the point of demand. Instead of being sent to a centralized cloud or data center, edge computing performs data processing and analysis on local devices or servers that are positioned closer to the devices.

**Benefits**

Reduced latency: Edge computing can significantly reduce the amount of time it takes for data to travel   
 from the source to the processing center and back, resulting in faster response times and reduced   
 latency.

Improved security: Edge computing can provide an additional layer of security by keeping sensitive data   
 on local devices rather than transmitting it to a remote location for processing.

Better performance: Edge computing can improve the performance of applications and services by   
 processing data locally, which can reduce the amount of data that needs to be transmitted over   
 the network and improve overall system responsiveness.

For instance, Instead of transmitting all of the temperature data for the entire house to a central processing facility for analysis, if the smart home system notices an unexpected temperature change in a particular room, it might use edge computing to process that data locally and assess whether there is a problem. This can speed up system reaction times and decrease the amount of data that needs to be transmitted over the network.

**Serverless computing**

The cloud service provider oversees the infrastructure and automatically distributes resources as needed to run and scale applications in a serverless computing environment. Under this model, managing servers, operating systems, or other infrastructure parts is not a concern for the user. Instead, the cloud provider charges the user based on the actual usage of computing resources, such as memory, processing power, and storage.

**Benefits**

Enhanced scalability: Serverless computing may scale up or down automatically depending on the need   
 for computing resources. As a result, the customer can save time and money by not having to worry   
 about manually scaling the infrastructure to handle more demand.

Reduced infrastructure management: The necessity for the user to manage servers, operating systems,   
 and other infrastructure components is removed by serverless computing. As a result, infrastructure   
 maintenance takes less time and money, freeing up developers to concentrate on creating and   
 distributing code.

For instance, a serverless function can be called to authenticate the user and create a token that is returned to the client when the user logs into the web application. Similar to this, a serverless function that processes files and stores them in cloud storage services like Amazon S3 or Google Cloud Storage can be activated when a user uploads a file.