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8th sec A

Question1 part(a)

Essential characteristics:

There are 5 essential characteristics:

On-demand self-service.

Broad network access.

Resource pooling.

Rapid elasticity.

Measured service.

On-demand self-service:

A consumer can seek computing capabilities one-sidedly, such as server time and network storage. Which is needed automatically without and human interaction in between each service provider.

Broad network access:

Capabilities are there on the network and can be accessed through standard mechanisms which are already defined in it.

For example: (mobile phones, tablets, laptops, and workstations).

Resource pooling:

In resource pooling the computational resources of a provider are pooled to give an aggregate of consumers and it can be utilized by multi-tenancy pattern with various substantial and essential resources dynamically that are allocated and reallocated as the consumer requires.

Rapid elasticity:

Rapid elasticity's capabilities can be provided automatically, in some cases, to cover quickly inward and outward comparable with the need. The capabilities to the customer are there to provide often seems to be unlimited and can be adjusted at any size or any time.

Measured service:

Cloud computing systems controls resources automatically by using advantages and metering capabilities at some level of abstraction different to the type of service. For example, storage, processing, bandwidth and users with active accounts.

Question 1-part b

- **Cloud computing is user centric.**

Clouds definitely provide a valuable service to the end user and these are becoming the next personal servers and also computing devices. Users create an environment through which they can save their data on it and can even recover from it in case if the data losses from the device.

- **Task centric.**

Task centric is based on that what the user needs rather than achieving it through any specific software or hardware. User do not have to buy or install anything before using a cloud computing service.

- **Powerful.**

Powerful means that we can gather many computers to make a single virtual personal computer and work on it with the help of cloud, and can execute tasks which are not possible to achieve with a single PC.

- **Accessible.**

Accessible means that user can carry out the information from cloud and can carry out from multiple repositories. The data information can be carried out by a PC.

- **Intelligent.**

Cloud computing is intelligent because all the data is saved in the cloud. data mining and analysis are necessary for cloud to access the data in intelligent manner.

- **Programmable.**

Programmable mean that the task necessary with cloud computing must automated, if the data is stored in one single PC in the cloud and that PC goes offline, so the cloud will redistribute the PC's data in tot the new PC from which the cloud id accessed.

Question 2-part a

- **SaaS.**

SaaS or software as a service is a model that provide quick access to cloud-based web applications. The developer controls the whole computing stack through which a web browser can be accessed. These applications run on the cloud and can be used by free with a limited access and can be used by paid licensed subscription.

SaaS does not need to be installed or downloaded in the existing computing infrastructure. This removes the need for installing application on each of the computers with the maintenance and support taken over by the developer.

For example, google G suit, Microsoft office 365, drop box etc.

- **IaaS.**

IaaS or infrastructure as a service is basically an essential provision of computing resources over the cloud. IaaS cloud provider can give the entire set of computing infrastructure such as storage, servers, networking hardware including maintenance and support.

Businesses can make computing resources of their requirement without need to install hardware on their premises optional.

For example, google compute engine, amazon web services, Microsoft azure etc.

- **PaaS.**

PaaS or platform as a service is actually cloud base through which different applications for business are developed, tested and organized. Running on PaaS simplifies the process of enterprise software development. PaaS provides a good space for developing and testing application in virtual runtime environment.

The whole set of resources given in the form of servers, storage and networking are easily manageable by the company or by the platform provider.

For example, Google App Engine and AWS elastic beanstalk.

Question 2-part b

There are different cloud deployment models:

- Private Cloud
- Public Cloud
- Hybrid Cloud
- Community Cloud

Private Cloud

Private cloud is a cloud in which deployment model is only for single organization, whether the company's on-site data center is physically located, or the third-party provider hosts or manages it. private cloud shares no resources with other organizations, and the company is entirely responsible for the management, maintenance and the regular updates. Which can be more expensive than public cloud

Public cloud

A cloud is said to be public when the services are made by the third-party providers over a network that is used publicly, which means the hardware, software and the network devices shares the same as the other client of the same provider. Public and private clouds differentiate as one has the responsibility over cloud's hosting and management. And as the public cloud rents a space on the cloud from a third-party provider, cost and the maintenance will be assumed as a whole of the infrastructure. The client who is paying for such service has no responsibility of management of the cloud, it is only used to store the data as the client pays for it.

Hybrid Cloud

As the name clarifies it that it is the combination of private and public cloud deployment models. It provides the benefits of both infrastructure to the company.

Companies are capable of shifting data and applications between private and public clouds, depending on the purposes.

Hybrid model offers cloud bursting option in which resources can be shifted if any problem occurs.

Community Cloud

Community cloud is that cloud in which the infrastructure is shared in between many organizations with a specific community and common interests. Such as security, compliance, regulations etc. whether managed and hosted internally or by the third-party. This cloud is used by the organizations that have common interests.

Question 3-part a

Roles:

- **Cloud provider**

Cloud provider is the one who provides cloud-based IT resources to the organization. Making cloud services available to cloud consumers is the responsibility of the organization, which assumes the role of cloud provider.

- **Cloud consumer**

Cloud consumer can be an organization or a human who has a contract with the cloud provider to use the IT resources provided by the him.

- **Cloud service owner**

Cloud service owner is the person or the organization that owns a cloud service legally. The cloud service owner can be the cloud consumer when it launches its own service in a cloud or a cloud provider becomes a cloud service owner if it launches its own cloud service for other cloud consumers to use.

- **Cloud resource administrator**

A cloud resource administrator is the person or organization that is responsible for a cloud-based IT resources along with cloud service's administration.

- **Additional resource**

Additional resources have different supplementary roles:

- a. Cloud auditor.
- b. Cloud broker.
- c. Cloud carrier.

Boundaries

- **Organizational boundary**

Organizational boundary of cloud consumer and cloud provider is a set of IT resources which are surrounded and shown by physical perimeter.

- **Trust boundary**

Trust boundary is a part of cloud environment in which the role of cloud consumer accesses the cloudbased IT resources.

Question 3-part b

Risks of Cloud Computing:

- **Availability risk.**
- **Maintenance risk.**
- **Business and client risk.**

Challenges of Cloud Computing:

- **Portability.**
- **Performance.**
- **Interoperability.**