Mid Semester Assignment (Spring - 2020)
Cloud Computing

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Note: Attempt all Questions. Answers should be in your own words. Plagiarism will not be tolerated, if detected, it will lead to failure.

Question No. 1: (10)

a. Explain essential characteristics of cloud computing.

i. **Availability:**

Availability means that cloud computing technology is available anywhere where you have access to internet connection. You can access, manage and constantly update your files if you have an active internet connection. With this feature a number of organizations are turning their projects into cloud computing so that it is easily available and can be managed outside the organization as well.

ii. **Maintenance:**

Another good feature of cloud computing is maintenance. They are easily maintained. Updates are released often which ensures the bug fixes and processing of data is faster. These released updates are compatible with every devices so users don't have to worry about their devices. The servers in which customers data is stored are updated continuously and are taken care of by professionals. There is no downtime or the downtime is very low compared to traditional storage.

iii. **Security:**

Security is the first demand of users when switching between technologies. Cloud computing provides user with a high level security. Their data are stored in multiple servers and are backup continuously. Users are also provided with the feature in which they can choose the backup schedule. In case the serves are damaged, backup is always there and servers creates a snapshot of the data. Cloud computing provides users with real time statistics that shows when the data was modified and accessed along with the location services.

iv. **Resources pooling:**

This means that cloud computing has attracted the resources of the computer to provide services to more customers with the help of several different organizations. These are different physical and virtual products allocated and redistributed depending upon customer demand. The user usually has no control about the location of the available resources but is able to specify at higher level of abstract.

v. **Large Network Access:**

Cloud computing has a very large network that means they provide their services anywhere in

the world with broader features. They are accessed anywhere with any device compatible. They provide their users with standard network.

b. **Explain in detail the key properties of cloud computing.**

i. **Cloud computing is powerful:**

Cloud computers or cloud servers are more powerful than single desktop PC. There processing time is faster and loads data more speedily than PC or Laptops. Thousands of users are connected to cloud computing at the same time to access and manage their data. This power-fullness of cloud computing make it a better choice for users to store their data. Users generally needs a powerful server to manage and manipulate their data.

ii. **Cloud computing is user centric:**

Users are connected to the cloud to access and store their data with an active internet connection. The data maybe anything ranging from messages, audio, documents, pictures and applications. Users can also share their data with any one by authorizing them. Any user that access your data is part of the cloud data.

iii. **Cloud computing is accessible:**

Cloud computing is easily accessible anywhere everywhere in the world. When a particular user store their data on cloud servers, the cloud providers than store that data in multiple servers and take multiple backups at different servers located at different positions. So now the user can access their data from anywhere with a stable internet connection. User have just to enter their credentials to access their data.

iv. **Cloud computing is task centric:**

Cloud computing being a task centric, we do not need to focus on how the application or cloud works or what process it follows. Instead we should focus on how we need it and how the system or server will provide us with. For example, Spreadsheets, emails, image-storage and word-processing etc.

v. **Cloud computing is intelligent:**

As the user data are stored in multiple locations and they are accessible anywhere, so if the user want a specific data, intelligent algorithms are applied and the data is being retrieved to them. Processes like data mining and data analysis are applied to the data to provide user with user centric data. These techniques make the cloud to serve data securely, quickly and user customizable.

Question No. 2: (10)

a. Explain in detail different service models of cloud computing.

i. **Software as a Service:**

Software as a service (SaaS) allows user to use the software application as a service. They are generally license based on membership and are hosted centrally. Some services are cost free and demand advertisements to be shown, while the other charges the user to user their services. Before using the service there are many agreements and policy checking to ensure security. Most well known organizations using software as a service are facebook, youtube and google.

ii. **Platform as a Service:**

Platform as a service (PaaS) is a run-time environment which is generally used for software deployment, development, software modification and development tools. The users are provided with a complete bundle of platform for development and deployment of applications. User can just enter their credentials and start doing their work. The user don't have to worry about the loss of data because it is stored in servers. Examples, Amazon web server and azure.

iii. **Infrastructure as a Service:**

Infrastructure as a service (IaaS) is a complete platform which is provided by cloud computer to the users to perform their tasks. The service provider can modify the platform by the customer demand and need for which the customer has to pay. The customer don't pay any extra amount of money which they are not required. Infrastructure as a service is a type of cloud computing that services the user through the internet. Example, OP source and NTT communication.

b. Explain in detail different deployment models of cloud computing.

i. **Public Cloud:**

In public cloud , the services or resources are made available across the internet. It can either be free or subscription based. Common services such as apps, emails integrate this. The cloud vendor in public cloud is responsible for maintaining and managing the resources between multiple organizations. Public cloud is used when there is predicting computer needs like communication services which are to be used by specific users. Public clouds are highly scalable and flexible because they usually meet unpredictable workloads.

ii. **Private Cloud:**

Unlike public cloud, private cloud is meant for only individual or a single organization in most cases. The services are either located in organization or are hosted by third-parties. Private cloud comes with the feature of customization in which the organization can customize it according to its usage. They are generally used by government agencies which do not share their data with third parties. One great feature of private cloud is secure environments, which cannot be access by other organizations.

iii. **Hybrid Cloud:**

Hybrid cloud is basically a mixture of private cloud and public cloud. In hybrid cloud, organization can share their resources between public and private cloud. An organization can use private cloud for their IT work load and public cloud for resource sharing and to accommodate the network traffic. Hybrid cloud is expensive. In hybrid cloud, additional infrastructure is introduced because organization deals with both public and private clouds.

Question No. 3: (10)

a. Explain in detail roles and boundaries in cloud.

i. **Organizational boundary:**

Organizational boundary is the boundary in which cloud provider is bound to act or the perimeter in which it is allowed to act specified by the laws. Every cloud provider has certain organizational boundaries. They cannot access or cannot manipulate the data of its customers. They cannot sell the data to advertisements agencies for profit. Any means to manipulate the data of users is against the law and they are held accountable for this. These organizations must work in their own perimeters.

ii. **Cloud resource administrator:**

Cloud resource administrator is any individual or organization which is responsible for resource pooling. Cloud resource administrator may be a third-party hired by the organization to manage and manipulate cloud data and resources. Overall responsibility of cloud resource administrator is to manage, make it secure, reliable and flexible the data for users.

iii. **Cloud service owner:**

The organization that legally owns a cloud service is called the cloud service owner. Data management, quality of data and security is the main responsibility of cloud providers. They are also responsible for customer transition, maintenance and support for ongoing service.

iv. **Trust boundary:**

When a cloud -service provider assumes the role of the cloud user to access cloud-based IT resources, it should extend its confidence on the far side the physical limit of the organization to incorporate elements of the cloud atmosphere. A reliable border may be a logical perimeter that typically extends on the far side the physical borders to represent the extent to that IT resources square measure reliable. once analyzing cloud environments, the arrogance limit is most frequently related to the arrogance issued by the organization that acts as a cloud client.

b. Explain in detail cloud risk and challenges.

i. **Security:**

Security of data is the main concern of every organization. There are number of data breaches every year which concerns users. Cloud providers constantly look for loopholes and make sure the data is safe. Professionals works on this issue as the servers stores many important files of users. Security isn't only the responsibility of the cloud provider but it also falls in hand of users. Users should provide a strong password and never share their passwords with other as it can result in data loss or data theft. If there is any data theft, the cloud provider can loss many potential users.

ii. **Downtime:**

Downtime is also a major issue. Network delay or stoppage time can lose customers. No cloud provider completely guarantees a non-stop platform. This is because of the traffic at peak hours. Server timed out is always there because of many users accessing the servers at same time. Servers might get heat up because of many users accessing at same time.

iii. **Cost:**

Usually cloud computing is affordable but when the user want to modify it according to their requirements, it can get costly. For small-scale organizations it can be costly if they change the cloud according to their need .For example, Hybrid cloud is expensive than public and private cloud because it involves two different infrastructures.

iv. **Reliability and Flexibility:**

Reliability and flexibility is also one of the main challenges for customers in the cloud as it can help in elimination data from leaking. To eliminate this challenge, the services provided by the third party should be monitored and to be supervised and should be conducted in terms of performance, robustness and business dependency.