

Mid Semester Assignment (Spring - 2020)
Cloud Computing

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Semester: 8th

Date: 15, April, 2020

Time: 6 days

Total Marks: 30

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

Question No. 2: (10)

- a. Explain in detail different service models of cloud computing.
- b. Explain in detail different deployment models of cloud computing.

Question No. 3: (10)

- a. Explain in detail roles and boundaries in cloud.
- b. Explain in detail cloud risk and challenges.

Question no 1

Part (A)

Essential Characteristics of cloud computing

Essential Characteristics:

- On-Demand Self-Service.

A consumer can provision computing capabilities, such as server time and network storage, as a manufacturing organization can provision additional computing resources as needed without going through the cloud service provider. This can be a cache, space, virtual machine instances, database instances, and so on

- Board network access.

Eventuality are available over the network and accessed through standard mechanism which are pre define. Such as the internet or local network area (LAN). For example, Mobile phones, tablet, laptop and workstation.

- Resource Pooling.

Resource pooling also known as multi-tenancy. It allows multiple customer to share the same application or the same physical infrastructure while retaining privacy and security over their information. There is an individual sense of location that the consumer usually have no control or knowledge over the exact location of the resource that are provided but the customer maybe able to specify the location at higher level. For example Country, state and city

- Rapid elasticity and Scalability.

The best things about cloud computing is the ability to quickly provision resources in the cloud as manufacturing organizations need them. And then to make sure that when they don't need them. Rapid elasticity can be facilitated automatically comparable with the need. It is a key feature of cloud computing.

- Measured Service.

Control and optimize resource automatically by using leverage and metering potentialities at some level of thought different to type of service. For example storage, processing, bandwidth and user with active accounts.

Question no. 1

Part (B)

1. Cloud computing is user centric:

User create their environment on cloud service to save their data on the cloud service, thus the user can recover the data easily. Every data which is available on the cloud service and you can access that and share with the user you choose and select.

2. Task Centric:

Cloud computing is gaining popularity and becoming traditional application for the mostly people without any complaining as compare to the documents that cloud create. User don't have to buy or install anything before using a cloud computing service.

3. Intelligent:

All the data is save in the cloud computing, to access that data, data mining and analysis are required in an intelligent manners,

4. Powerful:

In order of being powerful mean that the combination of several computers to make a single virtual personal computer and can work on it with the help of cloud and can perform work that is impossible on a single computer device.

5. Accessible:

User can always and anywhere access his data saved in the cloud computing from any computing device User are not restricted to cloud, cloud is unlimited source of data.

6. Programmable:

It means that the information that is present on one computer must be present on other computer in cloud, in case a computer one computer disconnect so the cloud will automatically reallocate that computer's data to another new computer in the cloud.

Question no. 2

Part (A)

Explain in detail different service models of cloud computing.

Answer:

Choosing the right model for the business require the knowledge that which model you can use and have a good impact on the business. Cloud service models come in three type;

SaaS (Software as a service)

IaaS (Infrastructure as a service)

PaaS (Platform as a service)

- **SaaS (Software as a service):**

Software as a service is a model which allows to use software application as a service to end users. It give the quick access to cloud based web application without installing any infrastructure. It can be used for free limited time or Licensed paid service.

SaaS is accessible as it does not require hardware which keeps the cost low.

SaaS model is accessible from everywhere that there is internet access, which is great benefit for this.

Signing up for the service to get access to best and Strong computing resources which is the quick process.

For example Google, Facebook, Microsoft service.

- **IaaS (Infrastructure as a service):**

Consumer can get resources within the clouds which are essentials for the business and organization. IaaS can give any computing infrastructure such as storage, server, networking hardware and maintenance along with support.

IaaS cloud provider are used by google compute engine, web amazon service, amazon web service and Microsoft azure.

- **PaaS (Platform as a service):**

PaaS is cloud based service through which different application for business are developed, tested and organized. PaaS simplifies the process of enterprise software development.

PaaS provides a big space for developing and testing application in run time environment.

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

For example Google app engine, AWS elastic beanstalk.

Question no.2

Part (B)

Explain in detail deployment models of cloud computing.

Answer:

Cloud is the afterlife of computing. Cloud computing models boost Creativity and also provide a tough edge to Business. Deployment models of cloud are Divided based on their location. It allows the organization rental access to a different type of services from cloud services provider, which include the payment for everything which service is providing without spending resources on expensive IT.

There are different cloud deployment models:

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

Private Cloud:

Private cloud infrastructure used by stand alone organizations. It have the best level of security. The data is backed up by a firewall and internally and cannot be shared any resources with any other organizations. Private clouds are Best for Companies that have Strong security requirements, high management demands, and availability requirements.

Advantages:

- High Security and privacy
- More Possibilities For Customizations
- Enhanced Reliability

Disadvantages:

- Remote location can be difficult
- High cost for investment
- Operating expenses responsible for maintenance

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.

Advantages:

1. Time reduction in developing, testing and launching of new products.
2. Cost effectiveness
3. Payment on scalability

Disadvantages:

1. Higher security risks due to shared resources.
2. Networks performance can be affected.
3. Lack of customization

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.

Advantages:

1. Flexibility and control.
2. Cost effectiveness.
3. Enhanced organizational agility.

Disadvantages:

1. More maintenance is required.
2. Initial costs for activating both infrastructures can be really high for many organizations.
3. Data and application integration.

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 no 3.

Part (A)

Answer:

The roles of cloud computing are:

- Cloud provider
- Cloud customer
- Cloud service
- Cloud administrator

1) Cloud provider: It is an organization that provides cloud based on the IT resources available to cloud customers under SLA and guaranteeing required management and the duties of administrative management is to deliver and ensure the on- going operation of cloud.

2) Cloud customer: It means that the individual or the organization signs a formal contract with a cloud provider to use its resources.

3) Cloud service owner: It means that an individual who owns this cloud service legally.

4) Cloud administrator: It is individual or an organization which is responsible for making a cloud which is based on IT resources.

Boundary:

Boundaries of Cloud are:

- Organizational boundary
- Trust boundary

1) Organizational boundary: Organization boundary is that which is surrounded by a set of IT resources and which is owned and governed by an organization.

2) Trust boundary: Trust Boundary is that which span beyond physical boundaries which represents the IT resources that is trust worthy.

Question no.3

Part (B)

The challenges are:

- Security and Privacy
- Service Quality
- Downtime and Accessibility.
- Access the data
- Transition to the cloud
- The risks in cloud computing are:
 - Privacy and security in the cloud
 - Cloud software service continuity
 - Loss of data in the cloud

Risks of Cloud Computing:

The risk involving cloud computing are:

1. If the server is slow there might be a chance of server to timeout and the cloud developer might lose a customer.
2. If the cloud storage get corrupted there is a chance that the stored data might be lost.
3. There a risk of security breaches if the server is not much secured and maintained, due to which there is a chance of data lost and the server might get hacked.

Challenges of Cloud Computing:

There are many challenges that can be faced during cloud computing:

1. It requires constant internet connection which means that if there is a shortage in electricity the server might disconnect.
2. Cloud requires high speed internet connection which means that a low speed internet connection might slow down the server.
3. As there are limited features on cloud it might be challenging for the developer to add those feature that can satisfy the customer.