Mid Semester Assignment (Spring - 2020)
Cloud Computing

Name: Faisal Karim Afridi	**ID #: 13163**

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Instructor: M Omer Rauf

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.

Ans 1 a) Following are the characteristics of cloud computing:

- The resources can be modified or extended as per the use. It analyzes the storage usage and allows the user to release or increase the assigned resources.
- The user can access resources using multiple platforms through internet no matter wherever or whenever.
- The resources that are provided by cloud are secure and only authorized person can access them.
- Cloud resources are distributed among multiple no of users while keeping the data of every user secure. It is the same as multiple tenants using the same architecture of an apartment while maintaining every individual's privacy.
- Cloud computing allows its users to flexibly deliver services through any device and paying for only the resources they need, when they need them.

Ans 1 b) Following are the key properties of Cloud Computing:

1. **Programmable:** In Cloud Computing processes are automated such as backing up the crashed data with its duplicate.
2. **Powerful:** The processing power and storage of a Cloud Computing is much more times greater than that of a single desktop PC.
3. **Multiple-Tenancy:** It refers to sharing of data across multiple numbers of users. As various types of data are stored in cloud, data mining and analysis are required to access information in an intelligent manner.
4. **Self Healing:** As backups are available for every document in the cloud. Incase any document crashes there will be it's duplicate ready to run.
5. **Measured usage:** The ability of a cloud platform to keep track of the actual usage of its IT resources by each cloud consumer with which the cloud provider charges the cloud consumer.

Ans 2 a) A cloud service model represents a combination of IT resources offered by a cloud services provider. Following are the three common models that have available:

- **Infrastructure-as-a-Service (IaaS):**
  A cloud service where infrastructure is offered as a service. IaaS provides access to resources such as virtual machines or virtual storages etc.
- **Platform-as-a-Service (PaaS):**
  A cloud service where Platform is offered as a service. PaaS provides services with the help of which one can make and deliver entire web applications.
- **Software-as-a-Service (SaaS):**
  A cloud where Software is offered as a service. SaaS provides web based software as a service where user can use the provider's services.

Ans 2 b) By deployment model we meant how the services are offer by service providers, they can be of multiple types which are:

a) **Public Cloud:** The deployment model of cloud services where everyone from the general public is elligble to use the services offered by the cloud.
b) **Private Cloud:** The deployment model of cloud services where only selected person can access and avail the services provided by the cloud.
c) **Community Cloud:** The deployment model of cloud services where individuals from one community can use and access cloud services.
d) **Hybrid Cloud:** The deployment model of cloud services where the mixture of public and private clouds both comes into being, As certain critical activities are performed privately and non-critical ones are performed publicly.

Ans 3 a) Following are some of the roles and boundries of a cloud:

- **Cloud Provider:** A company or an organzation that provides cloud-based IT resoureces as a service
- **Cloud Customer:** An organzation or an individual that avails the services provided by an organzation.
- **Cloud Service Owner:** An organzation or an individual that owns the cloud.
- **Cloud Resources Administration:** The individual or an organzation who is responsible for administrating cloud resources provided by the cloud.
- **Organizational boundary:** Physical perimeter that surrounds a set of IT resources that are owned and governed by an organization.
- **Trust boundary:** A logical perimeter that typically spans beyond physical boundaries to represent the extent to which IT resources are trusted.

Ans 3 b) Following are some of the Challenges and Risks in Cloud Computing:

- **Cloud Migration:** It is the process of moving data, applications, and other important information of an organization from its on-premises to the cloud infrastructure. Cloud migration enables all the computing capabilities those were performed earlier by devices installed on-premises

- **Incompatibility:**
  During moving workloads from on-premises to the cloud, the common issue the incompatibility between on-premises infrastructure and the services which are companies going to buy from the public cloud providers

- **Data security:**
  CSP(Cloud Service Provider) are responsible for providing clouds' security, but they're not sure about securing for your apps, servers, and security of data.

- **Lack of expertise:**
  With the quick advancements and improvements in cloud technologies, more and more organizations are clouds to place their workloads. Organizations can deal with this challenge by providing cloud technologies training to their system admins along with staff members.

- **Downtime:**
  Businesses want to have complete data accessibility and availability when their data is stored on cloud anytime from anywhere. The main challenge most organizations face is they can access their data from cloud only through internet connection.

- **Bandwidth Cost:**
  Though organizations and businesses can save money on hardware using cloud, but they have to pay extra for the bandwidth they use to access their workloads.