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## Assignment 2

**Q1. What is SOA? Explain its advantages.**

**Ans:**

1. SOA as "Service-oriented architecture", a software design style where services are provided to the other components by application components through a communication protocol over a network.
2. Service Oriented Architecture is an architectural style/pattern for creating and using business processes as "services".
3. An approach for building distributed computing systems based on encapsulating business functions as services that can be easily accessed in a loosely coupled fashion.
4. Application's business logic or individual functions are modularized and presented as services to client/consumer applications
5. A service in SOA may depend on other SOA services.

**Adventages:**

1. **Service reusability:** In SOA, applications are made from existing services. Thus, services can be reused to make many applications.
2. **Easy maintenance:** As services are independent of each other they can be updated and modified easily without affecting other services.
3. **Platform independent:** SOA allows making a complex application by combining services picked from different sources, independent of the platform.
4. **Availability:** SOA facilities are easily available to anyone on request.
5. **Reliability:** SOA applications are more reliable because it is easy to debug small services rather than huge codes
6. **Scalability:** Services can run on different servers within an environment, this increases scalability.

**Q2. Explain Federated cloud Architecture.**

**Ans:**

The architecture has three basic components

**1. Cloud Exchange**

The Cloud Exchange act as a moderator between cloud coordinator and cloud broker. The cloud exchange maps the demands of the cloud broker to the available services offered by the coordinator. The cloud exchange has the track record of what is the current cost, demand patterns and available cloud providers and this information is periodically updated by the cloud coordinator.

The cloud brokers interact with cloud exchange to gain information about the existing SLA policies, availability of resources offered by the cloud providers.

Following are the services offered by cloud exchange to both cloud broker and cloud coordinator.

1. Database Repository: Cloud exchange act as a database repository or directory where cloud broker announces their resources, service and the price they offer for the services. The customer then analyzes this repository to search the most appropriate service and price suiting them and place a request for the service.
2. Dealer: The cloud exchanger always updates policies of its participants, they always act as a third party between broker and coordinator.
3. Bank: Cloud exchanger facilitates the financial transaction between cloud vendors and its clients thus maintaining the trust.

**2. Cloud Coordinator**

The cloud controller manages the cloud enterprises and their membership. The cloud coordinator allocates the cloud resources to the remote users based on the quality of service they demand and the credits they have in the cloud bank. Based on the policies of SLA the marketing and pricing policies are developed by the cloud coordinator.

**3. Cloud Broker**

On behalf of the customer, it is the cloud broker who interacts with the cloud coordinator, analyzes the SLA agreement, resources offered by different cloud providers in cloud exchange. Cloud broker finalized the most appropriate deal for their client.

**Q3. Compare Public, Private and Hybrid cloud.**

**Ans:**

**Public Cloud:**

1. The data of multiple organizations in stored in a shared environment.
2. anyone can use the public cloud services.
3. The cloud service provider manages the services, where the organization merely uses them.
4. The CSP has to provide the hardware, set-up the application and provide the network accessibility according to the SLA.

**Private Cloud:**

1. There’s only the data of a single organization stored in the cloud.
2. only the organization itself can use the private cloud services.
3. The organization must have their own administrators managing their private cloud services.
4. Can be quite expensive, since the hardware, applications and network have to be provided and managed by the organization itself.

**Hybrid Cloud:**

1. The data stored in the public cloud is usually multi-tenant, which means the data from multiple organizations is stored in a shared environment. The data stored in private cloud is kept private by the organization.
2. The services running on a private cloud can be accessed only the organization's users, while the services running on public cloud can be accessed by anyone.
3. The organization itself must manage the private cloud, while the public cloud is managed by the CSP.
4. The private cloud services must be provided by the organization, including the hardware, applications and network, while the CSP manages the public cloud services.

**Q4. Write a note on Aneka Framework.**

**Ans:**

Aneka is the product of Manjarasoft. Aneka is used for developing, deploying and managing cloud capplications. Aneka can be integrated with existing cloud technologies. Aneka includes extensible set of APIs associated with programming models like MapReduce. These APIs supports different types of cloud models like private, public, hybrid cloud.

Aneka framework:

1. Aneks is a software platform for developing cloud computing applications.

2. In Aneka cloud applications are executed.

3. Aneka is a pure PaaS solution for cloud computing.

4. Aneka is a cloud middleware product.

5. Aneks can be deployed on a network of computers, a multicore server, datacenters, virtual cloud infrastructures, or a mixture of these.

**Aneka container can be classified into three major categories:**

**1. Fabric services:** Fabric Services define the lowest level of the software stack representing the Aneka Container. They provide access to the resource-provisioning subsystem and to the monitoring facilities implemented in Aneka.

**2. Foundation services:** Fabric Services are fundamental services of the Aneka Cloud and define the basic infrastructure management features of the system. Foundation Services are related to the logical management of the distributed system built on top of the infrastructure and provide supporting services for the execution of distributed applications.

**3. Application services:** Application Services manage the execution of applications and constitute a layer that differentiates according to the specific programming model used for developing distributed applications on top of Aneka.

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**Q5. What is map reduce. Explain its use.**

**Ans:**

1. MapReduce is a programming model or pattern within the Hadoop framework that is used to access big data stored in the Hadoop File System (HDFS). It is a core component, integral to the functioning of the Hadoop framework.
2. MapReduce is an emerging programming framework for data-intensive applications proposed by Google. MapReduce borrows ideas from functional programming [12], where the programmer defines Map and Reduce tasks to process large sets of distributed data.
3. The MapReduce framework has two parts
4. A function called "Map," which allows different points of the distributed cluster to distribute their work.
5. A function called "Reduce," which is designed to reduce the final form of the clusters' results into one output

**Uses:**

1. Easy to use for programmers that don't need to worry about the details of distributed computing.
2. A large set of problems can be expressed in Map reduce programming model.
3. Flexible and scalable in large clusters of machines. The fault tolerance is elegant and works.