

Virtualization and Cloud Computing

Unit-2

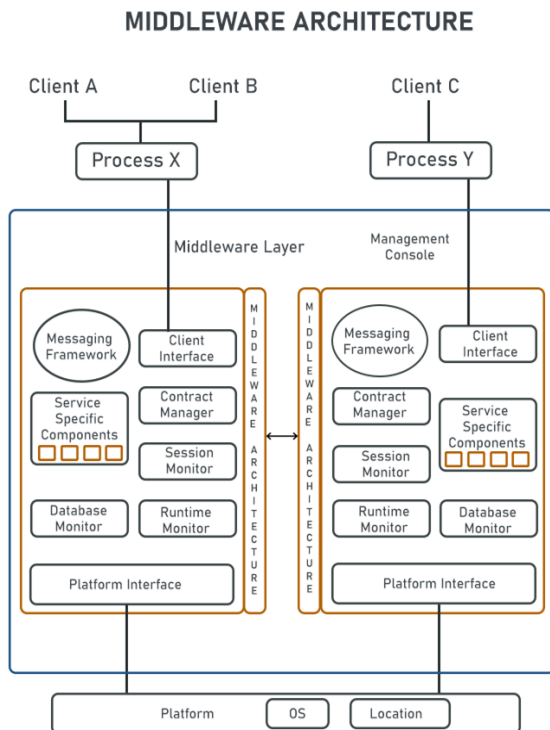
2 Marks Question

Q.1. What is cloud migration?

Ans: Cloud migration refers to the process of moving an organization's IT resources, applications, and data from their on-premises infrastructure or existing cloud environment to a new cloud platform. Cloud migration can involve moving applications, data, and infrastructure, as well as modifying applications to take advantage of cloud-native features.

Q.2. What is cloud middleware?

Ans: Cloud middleware is a type of software that provides a bridge between different applications or services in a cloud environment. It enables communication and coordination between applications, databases, and other software components, making it easier to develop, deploy, and manage applications in a cloud environment.



Q.3. Explain components in cloud middleware?

Ans:

- **Middleware management console**
This console provides an overview of events and activities, transactions, configuration management, and contract rules.
- **Platform interface**
Middleware needs to work across multiple platforms, irrespective of where it resides. This is the interface that is in direct contact with the backend servers.
- **Common messaging framework**
Middleware requires messaging services to communicate with services, applications, and platforms. Most of these frameworks rely on existing standards such as simple object access protocol (SOAP), representational state transfer (REST), or Javascript object notation (JSON).

Q.4. Explain the need of cloud middleware.

Ans: Cloud middleware is needed to enable communication and coordination between different applications and services in a cloud environment. It provides a bridge between the various software components in the cloud, allowing them to work together seamlessly.

Q.5. Explain Cloud Interoperability?

Ans: Cloud interoperability. This term refers to the ability of two or more systems or applications to exchange information and to use the information that has been exchanged together.

10 Marks Question

Q.1. Explain types of cloud deployment?

Ans:

Cloud computing can be deployed in different ways based on the organization's needs. The four primary types of cloud deployment are:

- **Public Cloud:** A public cloud is a cloud environment where computing resources like servers, storage, and applications are provided over the

internet by a third-party cloud provider. Multiple users share these resources, which can be accessed over a public network. Public clouds offer scalability, flexibility, and cost savings, but organizations may have less control and security over their data.

- **Private Cloud:** A private cloud is a cloud environment that is exclusively used by a single organization. It can be located on-premises or in a data center and is accessed over a private network. Private clouds offer greater control, security, and customization but require more IT resources and may be less scalable.
- **Hybrid Cloud:** A hybrid cloud is a combination of public and private clouds, in which computing resources are shared between the two environments. Organizations can use a hybrid cloud to take advantage of the scalability and cost savings of the public cloud while maintaining control and security over their sensitive data in the private cloud. Hybrid clouds require integration between the two environments and may be more complex to manage.
- **Community Cloud:** A community cloud is a cloud environment where computing resources are shared by several organizations with similar interests, such as regulatory compliance or security requirements. A community cloud may be hosted by a third-party cloud provider or internally by the organizations themselves.

Q.2. Explain different service models of cloud.

Ans:

Cloud computing service models refer to the different types of services that are offered by cloud providers. The three primary cloud service models are:

- **Infrastructure as a Service (IaaS):** IaaS provides users with virtualized computing resources, including servers, storage, and networking, over the internet. Users can manage their own operating systems, applications, and data, while the cloud provider is responsible for maintaining the underlying infrastructure. IaaS allows users to scale up or down their computing resources as needed and pay only for what they use.

- Platform as a Service (PaaS): PaaS provides users with a complete platform to develop, run, and manage applications without the need to manage the underlying infrastructure. The cloud provider offers a range of development tools, middleware, databases, and other services required to build and deploy applications. PaaS allows developers to focus on their applications rather than worrying about the underlying infrastructure.
- Software as a Service (SaaS): SaaS provides users with access to software applications over the internet. The cloud provider hosts and manages the application and its underlying infrastructure, and users can access the application using a web browser or other client software. SaaS offers users the flexibility to access applications from anywhere with an internet connection, without the need to install or manage the application locally.

Q.3. Explain features of cloud computing.

Ans:

Certain features of a cloud are essential to enable services that truly represent the cloud computing model and satisfy expectations of consumers, and cloud offerings must be

- (i) self-service
- (ii) per-usage metered and billed
- (iii) elastic
- (iv) customizable.

Q.4. Explain Cloud Infrastructure Management and its features.

Ans:

A key challenge IaaS providers face when building a cloud infrastructure is managing physical and virtual resources, namely servers, storage, and networks.

Features are listed below:

- Virtualization Support-The multi-tenancy aspect of clouds requires multiple customers with disparate requirements to be served by a single hardware infrastructure. Virtualized resources (CPUs, memory, etc.) can be sized and resized with certain flexibility.
- Self-Service, On-Demand Resource Provisioning-Self-service access to resources has been perceived as one the most attractive features of clouds.
- Multiple Backend Hypervisors- Different virtualization models and tools offer different benefits, drawbacks, and limitations. Thus, some virtual infrastructure managers provide a uniform management layer.
- Storage Virtualization- Virtualizing storage means abstracting logical storage from physical storage. By consolidating all available storage devices in a data center
- Multiple Backend Hypervisors- Different virtualization models and tools offer different benefits, drawbacks, and limitations. Thus, some virtual infrastructure managers provide a uniform management layer.
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Q.5. Explain characteristics of Cloud Computing?

Ans:

- On-demand self-services:
The Cloud computing services does not require any human administrators, user themselves are able to provision, monitor and manage computing resources as needed.
- Broad network access:
The Computing services are generally provided over standard networks and heterogeneous devices.
- Rapid elasticity:
The Computing services should have IT resources that are able to scale out and in quickly and on as needed basis. Whenever the user require services it is provided to him and it is scale out as soon as its requirement gets over.
- Resource pooling:
The IT resource (e.g., networks, servers, storage, applications, and services)

present are shared across multiple applications and occupant in an uncommitted manner.

- **Measured service:**

The resource utilization is tracked for each application and occupant, it will provide both the user and the resource provider with an account of what has been used. This is done for various reasons like monitoring billing and effective use of resource.

Q.6. Explain seven step model of cloud migration?

Ans:

The 7-step model of cloud migration is a framework that outlines the process of migrating an organization's IT resources, applications, and data to a new cloud platform. The steps involved in this model are as follows:

1. **Assess:** The first step in the process is to assess the organization's current IT environment and identify which applications and data are suitable for migration to the cloud. This involves analyzing the applications and their dependencies, assessing the performance requirements, and identifying any security or compliance concerns.
2. **Plan:** Once the assessment is complete, the next step is to develop a comprehensive migration plan. This involves determining the migration strategy, selecting the appropriate cloud services, and identifying the resources and skills required for the migration.
3. **Design:** The third step is to design the cloud architecture, which involves determining the optimal configuration for the cloud environment, including the selection of cloud services, network design, and security requirements.
4. **Migrate:** The fourth step is to execute the migration plan. This involves moving the applications and data to the new cloud environment using the

selected migration approach, such as lift-and-shift, re-platforming, or rebuilding applications in the cloud.

5. **Validate:** The fifth step is to validate the migrated applications and data to ensure that they are functioning correctly in the new cloud environment. This involves testing the applications and data to ensure that they meet the performance, security, and compliance requirements.
6. **Optimize:** Once the migrated applications and data have been validated, the next step is to optimize the performance and cost of the cloud environment. This involves monitoring the environment, identifying areas for optimization, and implementing changes to improve performance and reduce costs.
7. **Govern:** The final step is to govern the cloud environment. This involves establishing policies and procedures for managing the cloud environment, including monitoring, security, and compliance requirements, to ensure that the environment continues to meet the organization's needs over time.

Q.7. Explain quality of service issues in cloud computing.

Quality of service (QoS) is an important issue in cloud computing, as it affects the performance and reliability of cloud-based applications and services. Here are some of the key QoS issues that can arise in a cloud computing environment:

- **Performance:** Cloud computing services are often shared among multiple users, which can result in variable performance depending on the level of demand. To ensure consistent performance, cloud providers must monitor resource usage and allocate resources fairly among users.

- **Availability:** Cloud services must be available and accessible at all times, or else users may experience downtime or service disruptions. Cloud providers must ensure that their infrastructure is designed to handle high levels of traffic and can withstand hardware failures or other issues.
- **Security:** Cloud services must be secure to prevent unauthorized access, data breaches, and other security threats. Cloud providers must implement robust security measures and regularly update their security protocols to keep pace with evolving threats.
- **Compliance:** Cloud providers must comply with various legal and regulatory requirements related to data protection, privacy, and other issues. Providers must ensure that their services meet these requirements and provide customers with tools and resources to help them comply as well.
- **Service-level agreements (SLAs):** SLAs are contracts between cloud providers and customers that define the expected QoS levels for cloud services. Providers must ensure that they meet these commitments and provide customers with compensation or other remedies if they fail to do so.