University Question Bank

A comprehensive compilation of important questions

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Questions and Answers

> 1. Explain different Types of Hardware Virtualization Techniques.

Hardware virtualization refers to the creation of a virtualized environment on a physical machine. There are several types of hardware virtualization techniques, including:

- **Full Virtualization (FV)**: This technique completely virtualizes the physical hardware, allowing the guest operating system to run without modifications. Examples include VMware, VirtualBox, and Xen.
- **Paravirtualization (PV)**: This technique requires the guest operating system to be modified to run on top of a virtualized environment. Examples include Xen and KVM.
- **Operating System Virtualization (OSV)**: This technique virtualizes the operating system, allowing multiple operating systems to run on top of a single hypervisor. Examples include VMware and VirtualBox.

- **Platform Virtualization (PV)**: This technique virtualizes the entire platform, including the operating system, the applications, and the hardware. Examples include VMware and VirtualBox.

2. Briefly discuss about cloud computing Platforms and Technologies

Cloud computing is a model of delivering computing services over the internet. Cloud computing platforms and technologies include:

- **IaaS (Infrastructure as a Service)**: Provides virtualized computing resources, including servers, storage, and networking. Examples include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP).
- **PaaS (Platform as a Service)**: Provides a complete development and deployment environment for applications, including tools, libraries, and infrastructure. Examples include Salesforce, Heroku, and Google App Engine.
- **SaaS (Software as a Service)**: Provides software applications over the internet, eliminating the need for local installation and maintenance. Examples include Google Workspace, Microsoft 365, and Salesforce.
- **Containerization**: Enables multiple applications to run on a single host operating system, using containers such as Docker.
- **Serverless Computing**: Allows developers to write code without worrying about server management, using services such as AWS Lambda and Google Cloud Functions.

3. Explain Service Oriented Computing 1

Explain Service Oriented Computing

Service-oriented Computing (SOC) is an architectural paradigm that emphasizes the use of services to support the construction, deployment, and management of software systems. In SOC, applications are designed as a collection of services, where each service represents a specific business capability or function.

- Each service is designed to be:
  - Atomic: Services are self-contained and perform a specific task.
  - Stateless: Services do maintain any internal state.
  - Location-transparent: Services can be accessed from anywhere.
  - Standardized: Services use standardized protocols and interfaces.

The key characteristics of Service-Oriented Computing include:

- Business alignment: Services are aligned with business processes and goals.
- Service discovery: Services are dynamically discovered and bound.
- Service composition: Multiple services are composed together to form a higher-level capability.
- Service governance: Services are governed through policy-based management.

SOC provides several benefits, including:

- Improved flexibility: Services can be reused and rearranged to meet changing business requirements.
- Increased scalability: Services can be scaled independently to meet changing demands.
- Enhanced reusability: Services can be reused across multiple applications and domains.
- Improved maintainability: Services are designed to be modular and self-contained, making them easier to maintain.

4. Explain Distributed system

A distributed system is a system that consists of multiple computers or nodes that are interconnected and communicate with each other. Each node can be a processing unit, a storage unit, or a communication device. Key characteristics include:

- **Decentralization**: Control is distributed among multiple nodes, rather than centralized at one location.
- **Communication**: Nodes communicate with each other to exchange data or coordinate activities.
- **Cooperation**: Nodes work together to achieve a common goal or solve a problem.
- **Autonomy**: Each node can operate independently and make its own decisions.

5. Explain Machine Reference Model of Virtualizing an Execution Environment

The Machine Reference Model (MRM) is a conceptual model that describes the components and relationships between them in a virtualized execution environment. It includes:

- **Virtual Machine (VM)**: A software implementation of a physical machine, capable of running an operating system.
- **Host**: The physical machine that provides the resources and services for the VM.
- **Hypervisor**: Software that creates and manages the VM and provides services to it.
- **Device Driver**: Software that provides abstraction and management of physical devices.

6. Explain how cloud computing provides solution for On-Demand and Dynamic Scaling

Cloud computing provides two key benefits: on-demand allocation of computing resources and dynamic scaling.

On-Demand Allocation: Users can provision and release computing resources as needed, without human intervention or waiting periods.

Dynamic Scaling: Computing resources can be automatically scaled up or down based on changing workloads or demands, without manual intervention.

This provides benefits such as:

- **Increased Agility**: Users can quickly respond to changing business needs.
- **Improved Resource Utilization**: Resources are allocated only when needed, reducing waste.
- **Enhanced Scalability**: Services can be scaled up or down to meet changing demands.

7. Explain different types of Cloud Deployment Models.

There are three major types of cloud deployment models:

- **Public Cloud**: A cloud that is open to the general public and owned by a third-party provider, such as AWS or Azure.
- **Private Cloud**: A cloud that is provisioned behind a company's firewall and managed within the company, such as on-premise private cloud.

- **Hybrid Cloud**: A cloud that combines public and private cloud resources to provide flexibility and scalability, such as using public cloud for development and private cloud for production.

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