Unit I: Virtualization Techniques and Distributed Computing

Virtualization Techniques:
- Virtualization is the process of creating virtual instances or representations of physical hardware, softwar
e, or resources.
- It allows for efficient resource utilization, isolation, and flexibility.
- Types of virtualization include:
  - Server Virtualization: Running multiple virtual servers on a single physical server.
  - Storage Virtualization: Pooling and managing storage resources.
  - Network Virtualization: Creating multiple virtual networks within a physical network.
  - Desktop Virtualization: Running virtual desktops on a central server.
- Benefits of virtualization:
  - Cost savings through resource optimization.
  - Enhanced scalability and flexibility.
  - Improved disaster recovery and backup solutions.

Concept of VLAN (Virtual Local Area Network):
- VLAN is a network technology that divides a physical network into multiple logical networks.
- It isolates broadcast domains, improving network security and efficiency.
- Benefits of VLANs include simplified network management, enhanced security, and efficient bandwidth u
tilization.

Concept of SLAN (Secure Local Area Network) and VSAN (Virtual Storage Area Network):
- SLAN refers to a secure version of a Local Area Network (LAN).
- It incorporates security measures to protect data and resources within a LAN.
- VSAN is a virtualized storage networking technology:
  - It enhances storage management in virtualized environments.
  - Benefits include improved scalability, simplified storage management, and resource optimization.

Overview of Distributed Computing:
- Distributed computing involves multiple interconnected computers working together to solve complex pro
blems.
- Parallel Computing:
  - Involves multiple processors working on a single task simultaneously.
  - Improves performance and efficiency for compute-intensive tasks.
- Parallel Computer Architecture:
  - Focuses on designing computers optimized for parallel processing.
  - Utilizes multi-core processors and parallel algorithms.
- Distributed Systems:
  - Consist of interconnected computers that share resources and coordinate tasks.
  - Improve fault tolerance and scalability.
- Differences and Similarities Among Computing Types:
  - Different types of computing include centralized, distributed, grid, and cloud computing.
  - Differences lie in resource ownership, task distribution, and communication methods.
  - Similarities include resource sharing and coordination.

Unit II: Cloud Computing

Introduction to Cloud Computing:
- Cloud computing delivers computing services, such as storage, processing, and networking, over the int
ernet.
- Key characteristics include:
  - On-demand self-service.
  - Broad network access.

  - Resource pooling.
  - Rapid elasticity.
  - Measured service (pay-as-you-go).

Migrating into a Cloud:
- Cloud migration involves moving applications, data, and services to cloud infrastructure.
- Broad approaches to migration:
  - Rehosting: Lift and shift existing applications to the cloud.
  - Refactoring: Optimize applications for cloud-native environments.
  - Rebuilding: Re-create applications using cloud-native services.
- The Seven-Step Model of Migration guides the migration process.
- Cloud middleware facilitates the integration of cloud services.
- Quality of Service (QoS) issues in the cloud pertain to performance, availability, and security.
- Data migration and streaming in the cloud involve moving data to and from cloud environments.
- Interoperability ensures that different cloud services and platforms work together seamlessly.

Unit III: Understanding Cloud Architecture

Exploring Cloud Computing Stack:
- The cloud computing stack includes Infrastructure as a Service (IaaS), Platform as a Service (PaaS), an d Software as a Service (SaaS).
- Each layer offers different levels of control and services.

Workload Distribution Architecture:
- Workload distribution in the cloud involves distributing tasks and resources efficiently.
- Load balancing and auto-scaling optimize workload distribution.

Capacity Planning:
- Capacity planning estimates resource requirements to meet current and future workload demands.
- Cloud services enable dynamic and scalable capacity planning.

Cloud Bursting Architecture:
- Cloud bursting dynamically scales workloads to the public cloud during demand spikes.
- It optimizes costs and ensures high performance.

Disk Provisioning Architecture:
- Disk provisioning allocates and manages storage resources in the cloud.
- Techniques include thin provisioning and thick provisioning.

Dynamic Failure Detection and Recovery Architecture:
- Cloud environments use mechanisms to detect failures and recover resources for high availability.

Service Level Agreements (SLAs):
- SLAs define terms of service between cloud providers and consumers, specifying performance metrics a nd commitments.

Service Oriented Architecture (SOA):
- SOA organizes software components as reusable services.
- Promotes flexibility, scalability, and reusability in cloud-based applications.

These comprehensive notes cover the key topics in your syllabus, enabling you to answer a wide range of MCQs related to virtualization techniques, distributed computing, cloud computing, and cloud architecture .