UNIT III:
Virtualization and Cloud Programming Models

- Virtualization
- Programming Models for Cloud Computing
- MapReduce
- Cloud Haskell
- Software Development in Cloud

Introduction to Virtualization

- Definition of Virtualization
- Importance in Cloud Computing
- Resource Optimization

Types of Virtualization

- Server Virtualization
- Storage Virtualization
- Network Virtualization
- Desktop Virtualization

Virtual Machine Architecture

- Hypervisor Concept
- Type 1 Hypervisor
- Type 2 Hypervisor
- VM Management

Benefits of Virtualization

- Improved Resource Utilization
- Cost Reduction
- Scalability
- Disaster Recovery

Challenges of Virtualization

- Performance Overhead
- Security Issues
- Resource Contention
- VM Sprawl

Programming Models for Cloud Computing

- Definition
- Need for Cloud Programming Models
- Distributed Processing

MapReduce Framework

- Introduction to MapReduce
- Developed by Google
- Parallel Data Processing

MapReduce Architecture

- Input Splitting
- Map Phase
- Shuffle and Sort
- Reduce Phase

Map Function

- Processes Input Data
- Generates Key-Value Pairs
- Supports Parallel Execution

Reduce Function

- Aggregates Intermediate Results
- Produces Final Output
- Enhances Efficiency

Advantages of MapReduce

- Scalability
- Fault Tolerance
- Simplicity
- High Performance

Cloud Haskell Overview

- Functional Programming Model
- Distributed Computing Support
- Built on Haskell Language

Features of Cloud Haskell

- Concurrency Support
- Fault Tolerance
- Message Passing
- Distributed Processes

Cloud Haskell Architecture

- Nodes and Processes
- Communication Mechanism
- Process Monitoring

Software Development in Cloud

- Cloud-based Development Environment
- DevOps Integration
- Continuous Delivery

Cloud Development Tools

- IDEs and SDKs
- Version Control Systems
- CI/CD Pipelines

Challenges in Cloud Software Development

- Security and Privacy
- Vendor Lock-in
- Performance Management

Best Practices for Cloud Development

- Microservices Architecture
- Automation
- Monitoring and Testing

Summary

- Virtualization Concepts
- MapReduce Framework
- Cloud Haskell
- Software Development in Cloud