

UNIT IV: Networking for Cloud Computing

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- ▶ • Introduction to Cloud Networking
- ▶ • Data Center Environments
- ▶ • Networking Issues in Data Centers
- ▶ • Transport Layer Issues in DCNs
- ▶ • Cloud Service Providers

Introduction to Networking for Cloud Computing

- ▶ • Importance of Networking in Cloud
- ▶ • Role in Resource Sharing
- ▶ • Support for Scalability and Availability

Cloud Networking Architecture

- ▶ • Physical Infrastructure
- ▶ • Virtual Networks
- ▶ • Software Defined Networking (SDN)
- ▶ • Network Virtualization

Overview of Data Center Environment

- ▶ • Definition of Data Centers
- ▶ • Components of Data Centers
- ▶ • Importance in Cloud Computing

Data Center Infrastructure

- ▶ • Servers and Storage Systems
- ▶ • Networking Equipment
- ▶ • Power and Cooling Systems

Data Center Network (DCN) Architecture

- ▶ • Three-Tier Architecture
- ▶ • Spine-Leaf Architecture
- ▶ • Fat-Tree Topology

Characteristics of Data Centers

- ▶ • High Availability
- ▶ • Scalability
- ▶ • Reliability
- ▶ • Energy Efficiency

Networking Issues in Data Center

- ▶ • Traffic Congestion
- ▶ • Load Balancing
- ▶ • Network Scalability
- ▶ • Resource Allocation

Bandwidth Management in DCNs

- ▶ • Efficient Resource Utilization
- ▶ • Traffic Engineering
- ▶ • Bottleneck Reduction

Latency and Throughput Challenges

- ▶ • Minimizing Network Delays
- ▶ • Improving Data Transfer Rates
- ▶ • Quality of Service

Fault Tolerance in Data Center

- ▶ • Redundancy Mechanisms
- ▶ • Failover Strategies
- ▶ • Disaster Recovery

Transport Layer in Data Center Networks



- ▶ • Role of Transport Layer
- ▶ • TCP in Cloud Networks
- ▶ • Reliable Data Transfer

Transport Layer Issues in DCNs

- ▶ • TCP Incast Problem
- ▶ • Queue Buildup
- ▶ • Packet Loss

TCP Incast Problem

- ▶ • Causes of TCP Incast
- ▶ • Impact on Performance
- ▶ • Mitigation Techniques

Congestion Control Mechanisms

- ▶ • ECN (Explicit Congestion Notification)
- ▶ • DCTCP
- ▶ • Rate Control Algorithms

Cloud Service Providers Overview

- ▶ • Definition
- ▶ • Services Offered
- ▶ • Market Leaders

Major Cloud Service Providers



- ▶ • Amazon Web Services (AWS)
- ▶ • Microsoft Azure
- ▶ • Google Cloud Platform

Services Offered by CSPs

- ▶ • Compute Services
- ▶ • Storage Services
- ▶ • Networking Services
- ▶ • Security Services

Challenges Faced by Cloud Providers

- ▶ • Security and Privacy
- ▶ • Compliance Requirements
- ▶ • Cost Management

Summary

- ▶ • Cloud Networking Concepts
- ▶ • Data Center Issues
- ▶ • Transport Layer Challenges
- ▶ • Cloud Service Providers