

UNIT V: Security in Cloud Computing and Advanced Concepts

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- ▶ • Security in Cloud Computing
- ▶ • Advanced Concepts in Cloud Computing
- ▶ • Challenges and Future Trends

Introduction to Cloud Security

- ▶ • Importance of Security in Cloud Computing
- ▶ • Security Objectives
- ▶ • Need for Secure Cloud Environment

Cloud Security Challenges



- ▶ • Data Breaches
- ▶ • Insider Threats
- ▶ • Account Hijacking
- ▶ • Insecure APIs

Security Requirements in Cloud Computing



- ▶ • Confidentiality
- ▶ • Integrity
- ▶ • Availability (CIA Triad)
- ▶ • Authentication and Authorization

Data Security in Cloud Computing

- ▶ • Data Encryption
- ▶ • Data Backup and Recovery
- ▶ • Data Loss Prevention

Identity and Access Management (IAM)

- ▶ • User Authentication
- ▶ • Role-Based Access Control (RBAC)
- ▶ • Multi-Factor Authentication (MFA)

Network Security in Cloud

- ▶ • Firewalls
- ▶ • Intrusion Detection Systems (IDS)
- ▶ • Intrusion Prevention Systems (IPS)

Virtualization Security

- ▶ • Hypervisor Security
- ▶ • Virtual Machine Isolation
- ▶ • Secure VM Migration

Compliance and Legal Issues

- ▶ • Regulatory Compliance
- ▶ • GDPR
- ▶ • Service Level Agreements (SLAs)

Risk Management in Cloud

- ▶ • Risk Assessment
- ▶ • Threat Modeling
- ▶ • Incident Response Planning

Cloud Security Best Practices

- ▶ • Regular Security Audits
- ▶ • Strong Password Policies
- ▶ • Security Monitoring

Advanced Concepts in Cloud Computing

- ▶ • Emerging Technologies
- ▶ • Evolution of Cloud Services
- ▶ • Innovation Trends

Edge Computing

- ▶ • Definition and Architecture
- ▶ • Benefits
- ▶ • Use Cases

Fog Computing

- ▶ • Concept of Fog Computing
- ▶ • Difference from Cloud and Edge Computing
- ▶ • Applications

Serverless Computing



- ▶ • Function as a Service (FaaS)
- ▶ • Event-Driven Architecture
- ▶ • Advantages

Containerization and Kubernetes

- ▶ • Containers vs Virtual Machines
- ▶ • Kubernetes Orchestration
- ▶ • Benefits

Artificial Intelligence in Cloud



- ▶ • AI as a Service (AlaaS)
- ▶ • Machine Learning Platforms
- ▶ • Cloud-based Analytics

Internet of Things (IoT) and Cloud

- ▶ • IoT–Cloud Integration
- ▶ • Data Processing
- ▶ • Smart Applications

Future Trends in Cloud Computing

- ▶ • Quantum Computing
- ▶ • Green Cloud Computing
- ▶ • Autonomous Cloud

Summary

- ▶ • Cloud Security Mechanisms
- ▶ • Advanced Cloud Technologies
- ▶ • Future Scope of Cloud Computing