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Cisco CCNA Data Center

Data Center Networking Concepts

- **Network Architectures**
  - Describe data center network architectures (spine-leaf, three-tier, etc.)
  - Compare and contrast traditional networks with spine-leaf architectures
  - Describe the use and roles of virtual networking (overlay, underlay)
- **OSI and TCP/IP Models**
  - Explain OSI and TCP/IP models and their relevance to data center networking
  - Describe Ethernet LAN switching concepts
- **IP Addressing (IPv4 and IPv6)**
  - Describe IPv4 and IPv6 addressing schemes
  - Explain the principles and operations of routing and routing protocols

- **VLANs and Trunks**
    - Explain the purpose and functionality of VLANs
    - Configure and verify VLANs and trunking protocols (802.1Q)
- **Nexus Switches**
    - Introduce Cisco Nexus product family
    - Configure and verify basic features on Nexus switches (Nexus OS, NX-OS)

Data Center Storage Networking

- **Fibre Channel Storage Area Network (SAN)**
    - Describe Fibre Channel protocols and architectures
    - Configure and verify Fibre Channel switch features (FCoE, FC zoning)
- **Storage Connectivity**
    - Describe initiator/target connections and their configurations
    - Configure and verify NAS connectivity

Data Center Unified Fabric (UCS Fabric)

- **Cisco UCS**
    - Describe Cisco UCS components and architecture
    - Describe Ethernet and Fibre Channel over Ethernet (FCoE) connections

- **UCS Configuration**
    - Configure and verify UCS connectivity
    - Describe the process to set up an out-of-band management network

Data Center Virtualization

- **Virtual Machines**
    - Describe virtualization in data center environments
    - Describe the benefits of using virtual machines
- **Virtual Networking**
    - Describe the benefits of virtual networking (overlay, underlay)
    - Describe the different components and features of Cisco ACI

Data Center Automation and Orchestration

- **Automation Tools**
    - Explain how automation and orchestration enhance scalability and agility
    - Describe the concepts of orchestration using Cisco UCS Director
- **Scripting and APIs**
    - Describe the benefits of scripting (Python, Perl) and APIs
    - Describe how to utilize API-based management and automation tools

Data Center Application Centric Infrastructure (ACI)

- **ACI Architecture**
  - Describe the architecture and components of ACI
  - Describe the fabric discovery process
- **ACI Configuration**
  - Describe fabric policies and the configuration process
  - Describe integration of APIC controller with VMware and other virtualization solutions

Data Center Security

- **Network Security**
  - Describe the features of Cisco TrustSec and microsegmentation
  - Describe how VXLANs can be used for security
- **Data Security**
  - Describe the features and benefits of data-at-rest encryption
  - Describe the role of storage protocols (Fibre Channel, FCoE, iSCSI)

Data Center Infrastructure Management (DCIM)

- **DCIM Tools**
  - Describe how DCIM tools help manage data center operations
  - Describe how Cisco Intersight simplifies data center management

Data Center Troubleshooting

- **Troubleshooting Methodologies**
  - Identify and describe common data center protocols
  - Troubleshoot data center topologies and technologies
- **Network Issues**
  - Troubleshoot Layer 2 connectivity issues
  - Troubleshoot issues related to VLANs, trunks, STP

Data Center Design Best Practices

- **Design Principles**
  - Describe high availability designs and redundancy strategies
  - Describe scalability requirements and considerations
- **Data Center Technologies**
  - Describe the design considerations for storage and network technologies
  - Describe the considerations for automation and orchestration technologies

Additional Topics

- **Cloud Computing**
  - Describe the principles and types of cloud environments
  - Describe the basics of virtualization and cloud computing technologies

- **Network Programmability**
    - Describe the basics of software-defined networking (SDN)
    - Describe the basics of network programmability in a data center environment