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Curriculum Of Networking

OPERATION OF IP DATA NETWORKS

- Recognize the purpose and functions of various network devices such as routers, switches, bridges and hubs
- Select the components required to meet a given network specification
- Identify common applications and their impact on the network
- Describe the purpose and basic operation of the protocols in the OSI and TCP/IP models
- Predict the data flow between two hosts across a network
- Identify the appropriate media, cables, ports, and connectors to connect Cisco network devices to other network devices and hosts in a LAN

LAN SWITCHING TECHNOLOGIES

- Determine the technology and media access control method for Ethernet networks
- Identify basic switching concepts and the operation of Cisco switches
  - ❖ Collision Domains
  - ❖ Broadcast Domains
  - ❖ Ways to switch
    - ▪ Store
    - ▪ Forward
    - ▪ Cut through
  - ❖ CAM Table
- Configure and verify initial switch configuration including remote access management
  - ❖ hostname
  - ❖ mgmt ip address
  - ❖ ip default-gateway
  - ❖ local user and password
  - ❖ enable secret password
  - ❖ console and VTY logins
  - ❖ exec-timeout
  - ❖ service password encryption
  - ❖ copy run start
- Verify network status and switch operation using basic utilities such as
  - ❖ ping
  - ❖ telnet
  - ❖ SSH
- Describe how VLANs create logically separate networks and the need for routing between them
  - ❖ Explain network segmentation and basic traffic management concepts
- Configure and verify VLANs

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- Configure and verify trunking on Cisco switches
  - ❖ dtp (topic)
  - ❖ auto-negotiation
- Identify enhanced switching technologies
  - ❖ RSTP
  - ❖ PVSTP
  - ❖ Etherchannels
- Configure and verify PVSTP operation
  - ❖ Describe root bridge election
  - ❖ Spanning tree mode

IP ADDRESSING (IPv4/IPv6)

- Describe the operation and necessity of using private and public IP addresses for IPv4 addressing
- Identify the appropriate IPv6 addressing scheme to satisfy addressing requirement in a LAN/WAN environment
- Identify the appropriate IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment
- Describe the technological requirements for running IPv6 in conjunction with IPv4
  - ❖ dual stack
- Describe IPv6 addresses
  - ❖ global unicast
  - ❖ multicast
  - ❖ link local
  - ❖ unique local
  - ❖ eui 64
  - ❖ auto-configuration

IP ROUTING TECHNOLOGIES

- Describe basic routing concepts
  - ❖ packet forwarding
  - ❖ router lookup process
  - ❖ Process Switching/Fast Switching/CEF
- Configure and verify utilizing the CLI to set basic Router configuration
- hostname
- local user and password
- enable secret password
- console & VTY logins

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- exec-timeout
- service password encryption
- interface IP Address
  - ❖ loopback
- banner
- motd
- copy run start
- Configure and verify operation status of a device interface
  - ❖ Serial
  - ❖ Ethernet
- Verify router configuration and network connectivity using
  - ❖ ping
    - ▪ extended
- traceroute
- telnet
- SSH
- sh cdp neighbors
- Configure and verify routing configuration for a static or default route given specific
- routing requirements
- Differentiate methods of routing and routing protocols
  - ❖ Static vs. dynamic
  - ❖ Link state vs. distance vector
  - ❖ next hop
  - ❖ ip routing table
  - ❖ Passive Interfaces (how they work)
  - ❖ Admin distance
  - ❖ split horizon
  - ❖ metric
- Configure and verify OSPF
  - ❖ Benefit of single area
  - ❖ Configure OSPv2
  - ❖ Configure OSPv3
  - ❖ Router ID
  - ❖ Passive Interface
  - ❖ Discuss multi-area OSPF
  - ❖ Understand LSA types and purpose
- Configure and verify interVLAN routing (Router on a stick)
  - ❖ sub interfaces

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- ❖ upstream routing
- ❖ encapsulation

- Configure SVI interfaces
- Manage Cisco IOS Files
  - ❖ Boot Preferences
  - ❖ Cisco IOS Images (15)
  - ❖ Licensing
    - ▪ Show license
    - ▪ Change license
- Describe the types, features, and applications of ACLs
  - ❖ standard (editing and sequence numbers)
  - ❖ extended
  - ❖ named
  - ❖ numbered
  - ❖ Log option
- Configure and verify ACLs in a network environment
  - ❖ named, numbered, Log option
- Identify the basic operation of NAT
  - ❖ purpose
  - ❖ pool
  - ❖ static
  - ❖ 1 to 1
  - ❖ overloading
  - ❖ source addressing
  - ❖ one way NAT
- Configure and verify NAT for given network requirements
- Configure and verify NTP as a client
- Recognize High availability (FHRP)
  - ❖ VRRP
  - ❖ HSRP
  - ❖ GLBP
- Configure and verify syslog
  - ❖ Utilize syslog output
- Describe SNMP v2 and v3.

NETWORK DEVICE SECURITY

- Configure and verify network device security Features
  - ❖ Device password security
  - ❖ Enable secret vs. enable

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- ❖ Transport
  - ▪ disable telnet
  - ▪ SSH
- ❖ VTYs
- ❖ physical security
- ❖ service password
- ❖ Describe external authentication methods

- Configure and verify Switch Port Security
- Sticky MAC
- MAC address limitation
- static/dynamic
- violation modes
  - ❖ err disable
  - ❖ shutdown
  - ❖ protect restrict
- Shutdown unused ports
- err disable recovery
- Assign unused ports in unused VLANs
- Putting Native VLAN to other than VLAN 1
- Configure and verify ACLs to filter network traffic
- Configure and verify ACLs to limit telnet and SSH access to the router
- Automation and Programmability
- Explain how automation impacts network management
- Compare traditional networks with controller-based networking
- Describe controller-based and software defined architectures (overlay, underlay & fabric)
  - ❖ Separation of control plane and data plane
  - ❖ North-bound and south-bound APIs
- Compare traditional campus device management with Cisco DNA Center enabled device management
- Describe characteristics of REST-based APIs (CRUD, HTTP verbs, and data encoding)
- Recognize the capabilities of configuration management mechanisms Puppet, Chef, and Ansible
- Interpret JSON encoded data

Partners

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