

Fundamentals of Computer Networks - 120 MCQ

Sessions 1 & 2: Internetworking, OSI, Ethernet, Wireless

- Which layer of the OSI model is responsible for providing end-to-end communication with reliable delivery and flow control?
A) Network Layer
B) **Transport Layer**
C) Session Layer
D) Data Link Layer
- What is the primary difference between Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP) cabling?
A) UTP is capable of higher speeds than STP.
B) UTP uses a different number of wire pairs than STP.
C) **STP includes a foil or braided mesh shielding to reduce electromagnetic interference (EMI).**
D) STP is more flexible and easier to install than UTP.
- In the context of CAT5e cabling, what does the 'e' signify?
A) **Enhanced**
B) Ethernet
C) Economic
D) External
- Which of the following is a function of the OSI Presentation Layer?
A) Establishing, managing, and terminating sessions.
B) Routing packets across an internetwork.
C) **Data encryption, compression, and translation.**
D) Framing and MAC addressing.
- The process of a data packet moving through the layers of the OSI model, with headers being added at each layer, is known as:
A) De-encapsulation
B) Segmentation
C) **Encapsulation**
D) Multiplexing
- Which IEEE standard defines the protocol for Wi-Fi?
A) 802.3
B) 802.1Q
C) **802.11**
D) 802.5
- What does the term "internetworking" refer to?
A) The internal network of a single organization.
B) The global system of interconnected computer networks that uses the TCP/IP protocol suite.
C) **The practice of connecting different computer networks by using intermediary devices like routers.**
D) The technology used for wireless communication between devices.
- Which category of UTP cable is rated for transmission speeds up to 10 Gbps at 500 MHz and is commonly used for 10GBASE-T Ethernet?
A) CAT5e
B) CAT6

- C) **CAT6a**
 - D) CAT7
9. A MAC address is associated with which layer of the OSI model?
- A) Layer 1 (Physical)
 - B) **Layer 2 (Data Link)**
 - C) Layer 3 (Network)
 - D) Layer 4 (Transport)
10. In an Ethernet frame, what is the purpose of the Frame Check Sequence (FCS)?
- A) To specify the source and destination IP addresses.
 - B) To identify the upper-layer protocol.
 - C) **To detect errors in the frame using a CRC.**
 - D) To synchronize the timing between sender and receiver.
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Session 3: Internet Protocol & TCP/IP Model

11. Which protocol operates at the Transport layer of the TCP/IP model and provides connectionless, unreliable datagram services?
- A) IP
 - B) TCP
 - C) **UDP**
 - D) ARP
12. In the TCP/IP model, which layer corresponds to the top three layers (Application, Presentation, Session) of the OSI model?
- A) Transport Layer
 - B) Internet Layer
 - C) Network Access Layer
 - D) **Application Layer**
13. What is the primary purpose of the Internet Protocol (IP)?
- A) To guarantee the delivery of data packets.
 - B) **To provide logical addressing and path determination across an internetwork.**
 - C) To manage sessions between applications.
 - D) To define the physical characteristics of the network medium.
14. Which of the following is a key difference between TCP and UDP?
- A) TCP is faster than UDP because it does not perform error checking.
 - B) **TCP establishes a connection before transmitting data, whereas UDP is connectionless.**
 - C) TCP is used for broadcasting, while UDP is used for unicasting.
 - D) UDP provides flow control, but TCP does not.
15. What process does TCP use to establish a connection?
- A) Two-Way Handshake
 - B) **Three-Way Handshake**
 - C) Four-Way Handshake
 - D) Connection is established automatically without a handshake.
16. Which of the following applications is most likely to use UDP?
- A) File transfer (FTP)
 - B) Email (SMTP)
 - C) **Voice over IP (VoIP)**
 - D) Web Browse (HTTP)
17. The TCP/IP model consists of how many layers?
- A) 7

- B) 5
 - C) **4**
 - D) 3
18. What information is contained in a TCP header but not in a UDP header?
- A) Source Port
 - B) Destination Port
 - C) Checksum
 - D) **Sequence Number and Acknowledgment Number**
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Sessions 4 & 5: IP Subnetting & VLSM

19. What is the primary reason for using subnetting?
- A) To increase the speed of the network.
 - B) **To divide a large network into smaller, more manageable broadcast domains.**
 - C) To combine multiple small networks into one large network.
 - D) To eliminate the need for routers.
20. For the IP address 192.168.5.85 /24, what are the network and host parts?
- A) Network: 192.168.0.0, Host: 5.85
 - B) Network: 192.168.5.85, Host: 0
 - C) **Network: 192.168.5.0, Host: 0.0.0.85**
 - D) Network: 192.0.0.0, Host: 168.5.85
21. For the IP address 10.128.240.50 /30, what are the network and host parts?
- A) Network: 10.128.240.0, Host: 50
 - B) **Network: 10.128.240.48, Host: 2**
 - C) Network: 10.128.240.32, Host: 18
 - D) Network: 10.128.240.40, Host: 10
22. A company needs to create a subnet that can accommodate at least 28 hosts. Starting with the network 192.168.1.0/24, what is the most efficient subnet mask to use for this requirement?
- A) /24 (255.255.255.0)
 - B) /25 (255.255.255.128)
 - C) **/26 (255.255.255.192)**
 - D) /27 (255.255.255.224)
23. Using Variable Length Subnet Masking (VLSM), you need to create a subnet for 52 hosts from the network 192.168.1.0/24. What subnet mask should you use?
- A) /27 (255.255.255.224)
 - B) **/26 (255.255.255.192)**
 - C) /25 (255.255.255.128)
 - D) /24 (255.255.255.0)
24. What is the broadcast address for the network 172.16.48.0 /20?
- A) 172.16.48.255
 - B) 172.16.55.255
 - C) **172.16.63.255**
 - D) 172.16.255.255
25. How many usable host addresses are available on a /29 subnet?
- A) 8
 - B) **6**
 - C) 4
 - D) 2
26. Given the IP address 192.168.10.131 and subnet mask 255.255.255.240, what is the subnet ID?
- A) 192.168.10.112

- B) **192.168.10.128**
 - C) 192.168.10.130
 - D) 192.168.10.144
27. VLSM is used to:
- A) Use the same subnet mask for all subnets.
 - B) **Conserve IP addresses by using different subnet masks for different subnets.**
 - C) Increase the number of broadcast domains without subnetting.
 - D) Simplify routing tables.
28. You are asked to create four subnets from the network 192.168.1.0/24 with requirements of 52, 28, 15, and 5 hosts. Which subnet would you allocate first when using VLSM?
- A) The subnet requiring 5 hosts.
 - B) **The subnet requiring 52 hosts.**
 - C) The subnet requiring 15 hosts.
 - D) The order of allocation does not matter.
29. An IP address of 10.1.1.1 with a subnet mask of 255.255.255.252 is typically used for what purpose?
- A) A large LAN segment with up to 254 hosts.
 - B) **A point-to-point link between two routers.**
 - C) A management network for switches.
 - D) A DMZ network.
30. Which of the following is a private IP address range?
- A) 172.32.0.0 /16
 - B) **192.168.0.0 /16**
 - C) 11.0.0.0 /8
 - D) 193.1.1.0 /24
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Session 6: Router IOS & Subnetting

31. You need to create 10 subnets from the Class C network 195.1.1.0, with each subnet supporting at least 12 hosts. What subnet mask should you use?
- A) 255.255.255.224
 - B) **255.255.255.240**
 - C) 255.255.255.248
 - D) 255.255.255.192
32. Using the subnet mask from the previous question (255.255.255.240), what is the IP address of the first host on subnet 2 (the third subnet)?
- A) 195.1.1.32
 - B) 195.1.1.31
 - C) 195.1.1.49
 - D) **195.1.1.33**
33. You are asked to divide the network 152.152.0.0 /16 to provide at least 500 hosts in each subnet. How many bits must be borrowed from the host portion?
- A) 6
 - B) **7**
 - C) 8
 - D) 9
34. What is the resulting subnet mask for the network 152.152.0.0 /16 if you need to create subnets with at least 500 hosts each?
- A) /22 (255.255.252.0)
 - B) **/23 (255.255.254.0)**

- C) /24 (255.255.255.0)
 - D) /25 (255.255.255.128)
35. In a Cisco router's IOS, which mode must you be in to configure global parameters like the router's hostname?
- A) User EXEC mode
 - B) Privileged EXEC mode
 - C) Interface configuration mode
 - D) **Global configuration mode**
36. Which command saves the running configuration to the startup configuration on a Cisco router?
- A) `save running-config`
 - B) `write startup-config`
 - C) `copy running-config startup-config`
 - D) `config memory`
37. What is the purpose of the Cisco IOS command `show ip interface brief` ?
- A) To display the full IP configuration of all interfaces.
 - B) **To provide a summary of the status and IP address of each interface.**
 - C) To show the routing table.
 - D) To display debugging information for IP packets.
38. The configuration register value `0x2142` is used for what purpose on a Cisco router?
- A) Normal boot sequence.
 - B) **To bypass the startup configuration file during boot (password recovery).**
 - C) To load the IOS from ROMMON.
 - D) To initiate a remote debug session.
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Session 7 & 8: Routing Concepts and Protocols

39. What is a primary advantage of dynamic routing over static routing?
- A) It is more secure.
 - B) It uses less CPU and memory.
 - C) **It automatically adjusts to network topology changes.**
 - D) It is simpler to configure for small networks.
40. Which statement accurately describes static routing?
- A) **Routes are manually configured and maintained by a network administrator.**
 - B) Routers exchange routing information with their neighbors.
 - C) It is best suited for large, complex, and changing networks.
 - D) It has a lower administrative overhead than dynamic routing.
41. Routing protocols are used to:
- A) Assign IP addresses to hosts.
 - B) **Enable routers to learn about available networks and determine the best path to them.**
 - C) Secure communications between devices.
 - D) Translate private IP addresses to public IP addresses.
42. What metric is used by the Routing Information Protocol (RIP) to determine the best path?
- A) Bandwidth
 - B) Delay
 - C) **Hop count**
 - D) Cost
43. Which of the following is a link-state routing protocol?
- A) RIPv2

- B) EIGRP
 - C) BGP
 - D) **OSPF**
44. What is a key characteristic of a distance-vector routing protocol?
- A) It has a complete map of the network topology.
 - B) It sends frequent, full routing table updates only to its neighbors.
 - C) **It learns about the network from the perspective of its neighbors ("routing by rumor").**
 - D) It converges very quickly and is not prone to routing loops.
45. The `telnet` command is used to:
- A) Securely manage a router remotely.
 - B) **Establish a clear-text remote terminal session with a device.**
 - C) Test connectivity by sending ICMP echo requests.
 - D) Resolve a hostname to an IP address.
46. Which command would you use on a Cisco router to see the routing table?
- A) `show running-config`
 - B) `show interfaces`
 - C) `show ip route`
 - D) `debug ip packet`
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Sessions 9 & 10: Routing Protocol Implementation

47. In OSPF, what is the role of the Designated Router (DR) on a multi-access network segment?
- A) To assign IP addresses to all other routers.
 - B) **To reduce the number of adjacencies by being a central point for LSU updates.**
 - C) To act as the gateway of last resort for the segment.
 - D) To maintain the master copy of the router's IOS.
48. What is the administrative distance of a static route pointing to an interface?
- A) 1
 - B) **0**
 - C) 90
 - D) 110
49. EIGRP is considered an "advanced distance-vector" or "hybrid" protocol because:
- A) It only uses hop count as a metric.
 - B) **It uses a complex composite metric (bandwidth, delay, reliability, load) and the DUAL algorithm to ensure loop-free paths.**
 - C) It is a pure link-state protocol.
 - D) It is an exterior gateway protocol.
50. Which command correctly configures a static default route on a Cisco router?
- A) `ip route 0.0.0.0 0.0.0.0 192.168.1.1`
 - B) `ip default-route 0.0.0.0 0.0.0.0 Serial0/0`
 - C) `ip route 0.0.0.0 0.0.0.0 <next-hop-ip or exit-interface>`
 - D) `static route default via 192.168.1.1`
51. How does RIPv2 differ from RIPv1?
- A) RIPv2 is a link-state protocol, while RIPv1 is distance-vector.
 - B) RIPv2 has a maximum hop count of 100.
 - C) **RIPv2 supports VLSM by sending the subnet mask in its updates.**
 - D) RIPv2 uses a different port number than RIPv1.

52. What is the administrative distance of EIGRP (internal)?
A) 120
B) 110
C) **90**
D) 1
53. To enable the OSPF routing process on a Cisco router, which command is used in global configuration mode?
A) enable ospf 1
B) ospf process-id 10
C) router ospf 1
D) ip routing ospf
54. In EIGRP, what is a "successor"?
A) A backup route stored in the topology table.
B) **The best, loop-free path to a destination network.**
C) A neighboring router that has formed an adjacency.
D) The router with the lowest IP address.
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Session 11: Layer 2 Switching & STP

55. What problem is the Spanning Tree Protocol (STP) designed to solve?
A) Slow network performance due to collisions.
B) **Broadcast storms and MAC table instability caused by Layer 2 loops.**
C) Inefficient routing paths in a Layer 3 network.
D) Security vulnerabilities at the access layer.
56. In the context of STP, what is the "Root Bridge"?
A) The switch with the most physical ports.
B) The switch located in the physical center of the network.
C) **The switch that serves as the central reference point for the spanning-tree calculation.**
D) The switch with the highest IP address.
57. How is the Root Bridge elected in STP?
A) The switch with the highest MAC address becomes the Root Bridge.
B) The administrator manually configures one switch as the Root.
C) **The switch with the lowest Bridge ID (Priority + MAC address) becomes the Root Bridge.**
D) The switch that has been powered on the longest.
58. What are the port states in the original 802.1D STP?
A) Root, Designated, Blocked
B) Forwarding, Learning, Discarding
C) **Blocking, Listening, Learning, Forwarding, Disabled**
D) Active, Standby, Listening, Forwarding
59. What is the default bridge priority number for a Cisco switch in STP?
A) 0
B) 100
C) 65535
D) **32768**
60. To make a specific switch more likely to become the Root Bridge, an administrator should:
A) Increase its priority number.
B) **Decrease its priority number.**

- C) Assign it the highest IP address in the management VLAN.
 - D) Connect it to the fastest links.
61. Which type of Spanning Tree Protocol provides faster convergence than the original 802.1D and is an IEEE standard?
- A) PVST+
 - B) **RSTP (802.1w)**
 - C) MSTP (802.1s)
 - D) IGRP
62. What is the primary function of a Layer 2 switch?
- A) To route traffic between different IP subnets.
 - B) **To forward Ethernet frames between devices on the same LAN based on MAC addresses.**
 - C) To provide wireless access to the network.
 - D) To translate private IP addresses to public ones.
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Session 12: Virtual LANs (VLANs)

63. What is the main purpose of a VLAN?
- A) To physically segment a network.
 - B) **To logically segment a switched network into separate broadcast domains.**
 - C) To increase the physical speed of switch ports.
 - D) To connect different networks over the internet.
64. For PCs in different VLANs to communicate, what device is required?
- A) A Layer 2 switch
 - B) A hub
 - C) **A Layer 3 switch or a router**
 - D) A bridge
65. What protocol is used to carry traffic for multiple VLANs over a single link between switches?
- A) VTP
 - B) STP
 - C) **IEEE 802.1Q**
 - D) CDP
66. In a VTP (VLAN Trunking Protocol) environment, what is the function of a switch in "Server" mode?
- A) It only receives and forwards VTP advertisements but cannot be configured locally.
 - B) **It can create, modify, and delete VLANs, and it propagates this information to other switches in the VTP domain.**
 - C) It does not participate in VTP but forwards VTP advertisements.
 - D) It acts as a client for all VLAN information.
67. A switch port configured to carry traffic for only one VLAN is called a(n):
- A) **Access port**
 - B) Trunk port
 - C) Root port
 - D) Designated port
68. What is the "normal range" for VLAN IDs?
- A) 1 - 1000
 - B) **1 - 1005**
 - C) 1 - 4094
 - D) 1006 - 4094

69. What is the process of routing between different VLANs called?
- A) VTP Pruning
 - B) **Inter-VLAN Routing**
 - C) Trunking
 - D) VLAN Hopping
70. A switch configured in VTP "Client" mode has which of the following characteristics?
- A) **It synchronizes its VLAN database with the VTP server but cannot create, change, or delete VLANs locally.**
 - B) It can create local VLANs that are not advertised to the rest of the VTP domain.
 - C) It is the master source for VLAN information.
 - D) It ignores VTP messages.
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Session 13: Infrastructure Security

71. What is the primary function of port security on a switch?
- A) To encrypt data on a specific port.
 - B) **To restrict input to an interface by limiting the MAC addresses that are allowed to send traffic.**
 - C) To prevent physical access to the switch.
 - D) To configure a port for a specific VLAN.
72. What is a common access layer threat mitigation technique?
- A) Using only static routing.
 - B) **Implementing DHCP snooping and Dynamic ARP Inspection (DAI).**
 - C) Disabling all switch ports.
 - D) Increasing the STP bridge priority.
73. An IPv4 standard access control list (ACL) filters traffic based on what criteria?
- A) Source and destination IP address.
 - B) **Source IP address only.**
 - C) Source and destination port numbers.
 - D) The protocol type (TCP, UDP, ICMP).
74. An extended IPv4 ACL can filter traffic based on:
- A) Source IP address only.
 - B) Destination IP address only.
 - C) **Source/destination IP address, protocol, and source/destination port numbers.**
 - D) MAC address only.
75. What is the purpose of the "deny any any" statement implicitly placed at the end of every ACL?
- A) To permit all traffic that was not explicitly permitted.
 - B) **To block all traffic that was not explicitly permitted.**
 - C) To log all traffic passing through the interface.
 - D) To generate a debug message for unhandled packets.
76. What does AAA stand for in the context of network security?
- A) Access, Authorize, and Administer
 - B) **Authentication, Authorization, and Accounting**
 - C) Any, Any, Any
 - D) Address, Allow, and Account
77. Which protocol provides centralized authentication, authorization, and accounting services, but encrypts only the password in the access-request packet?
- A) TACACS+
 - B) **RADIUS**

- C) Kerberos
 - D) SSH
78. Which of the following is considered a best practice for "device hardening"?
- A) Enabling Telnet access for all users.
 - B) **Disabling unused ports and services, and changing default passwords.**
 - C) Setting the STP priority to the highest value.
 - D) Using RIPv1 for routing.
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Session 14: NAT, IPv6, WAN Technologies

79. What is the primary purpose of Network Address Translation (NAT)?
- A) **To translate private, non-routable IP addresses into public, routable IP addresses.**
 - B) To secure network traffic through encryption.
 - C) To segment a network into multiple broadcast domains.
 - D) To assign IP addresses to hosts automatically.
80. What is Port Address Translation (PAT), also known as NAT Overload?
- A) A one-to-one mapping of a private IP address to a public IP address.
 - B) **A many-to-one mapping where multiple private IP addresses are mapped to a single public IP address using different port numbers.**
 - C) A method for translating IPv4 to IPv6.
 - D) A dynamic pool of public IPs used for translation.
81. How many bits are in an IPv6 address?
- A) 32
 - B) 48
 - C) 64
 - D) **128**
82. What is the correct abbreviated form of the IPv6 address
2001:0DB8:0000:0000:0000:FF00:0042:8329 ?
- A) 2001:DB8:0:0:0:FF00:42:8329
 - B) **2001:DB8::FF00:42:8329**
 - C) 2001:DB8:0:0::FF:42:8329
 - D) 2001:DB8::FF:42:8329
83. Which of the following is a common WAN technology that encapsulates network-layer packets into a point-to-point link?
- A) Ethernet
 - B) **Point-to-Point Protocol (PPP)**
 - C) Spanning Tree Protocol (STP)
 - D) VLAN Trunking Protocol (VTP)
84. In IPv6, the concept of NAT is largely unnecessary because:
- A) IPv6 has built-in security that prevents the need for address hiding.
 - B) **The vast address space of IPv6 provides enough globally unique addresses for all devices.**
 - C) IPv6 uses MAC addresses for routing.
 - D) IPv6 packets cannot be translated.
85. Which command enables IPv6 routing on a Cisco router?
- A) `ip routing`
 - B) `ipv6 enable`
 - C) `ipv6 unicast-routing`
 - D) `router ipv6 enable`

86. What is a key feature of an IPv6 link-local address?
- A) It is globally routable.
 - B) It is assigned by a DHCPv6 server.
 - C) **It is automatically configured on any IPv6-enabled interface and is used for communication on the local link only.**
 - D) It always starts with the prefix 2001::/16 .
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Session 15: WAN Protocols

87. The Point-to-Point Protocol (PPP) operates at which layer of the OSI model?
- A) Layer 1
 - B) **Layer 2**
 - C) Layer 3
 - D) Layer 4
88. What is the purpose of Multilink PPP (MLPPP)?
- A) To provide authentication for PPP links.
 - B) **To bundle multiple physical PPP links into a single logical link for increased bandwidth.**
 - C) To encrypt data transmitted over a PPP link.
 - D) To connect multiple sites in a full mesh topology.
89. PPPoE (Point-to-Point Protocol over Ethernet) is commonly used by:
- A) Routers on a corporate LAN.
 - B) **Internet Service Providers (ISPs) to manage customer DSL connections.**
 - C) Switches to create VLANs.
 - D) Web servers to handle HTTP requests.
90. What is a Generic Routing Encapsulation (GRE) tunnel?
- A) A protocol used for Layer 2 switching.
 - B) **A tunneling protocol that can encapsulate a wide variety of network layer protocols inside a virtual point-to-point link over an IP network.**
 - C) A physical connection method for WANs.
 - D) An authentication protocol for PPP.
91. BGP (Border Gateway Protocol) is considered what type of routing protocol?
- A) Link-State Interior Gateway Protocol
 - B) Distance-Vector Interior Gateway Protocol
 - C) **Path-Vector Exterior Gateway Protocol**
 - D) Hybrid Interior Gateway Protocol
92. What is eBGP (External BGP) used for?
- A) **To exchange routing information between different Autonomous Systems (AS).**
 - B) To exchange routing information within the same Autonomous System (AS).
 - C) To create tunnels between sites.
 - D) To manage switches in a campus network.
93. In a PPP session establishment, which phase involves configuring network layer protocols like IP?
- A) Link Establishment Phase (LCP)
 - B) Authentication Phase (PAP/CHAP)
 - C) **Network-Layer Protocol Phase (NCP)**
 - D) Link Termination Phase
94. When configuring a simple eBGP peering session, what is a critical piece of information that must be specified for a neighbor?
- A) The neighbor's MAC address.

- B) **The neighbor's IP address and its remote AS number.**
 - C) The bandwidth of the link to the neighbor.
 - D) The neighbor's hostname.
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Sessions 16 & 17: SDN and Virtual Networking

- 95. What is the fundamental concept behind Software-Defined Networking (SDN)?
 - A) Combining the router and switch into a single device.
 - B) **Decoupling the network's control plane from the data plane.**
 - C) Using only virtual routers and switches.
 - D) A new physical cabling standard.
 - 96. In the SDN architecture, what is the role of the Controller?
 - A) To forward data packets to their destination.
 - B) **To provide a centralized view of the network and make decisions about how traffic should flow.**
 - C) To physically connect network devices.
 - D) To provide power to network devices.
 - 97. What is a "southbound interface" in the context of SDN?
 - A) An interface that connects the controller to the business applications.
 - B) A user interface for managing the network.
 - C) **An interface that enables communication between the SDN controller and the network devices (e.g., switches, routers).**
 - D) An interface used for communication between multiple SDN controllers.
 - 98. Which of the following is a key benefit of SDN?
 - A) Reduced physical security.
 - B) Increased network complexity.
 - C) **Increased network agility and programmability.**
 - D) Dependence on proprietary hardware.
 - 99. What does "virtual networking" primarily refer to?
 - A) **The abstraction of physical network resources to create logical, software-based networks.**
 - B) Connecting to the internet via Wi-Fi.
 - C) Building a network using only fiber optic cables.
 - D) The use of the TCP/IP protocol suite.
 - 100. In the context of use-cases, what is a "Virtual Customer Edge" (VCE)?
 - A) A physical router installed at the customer's premises.
 - B) A software-based firewall.
 - C) **A virtualized network function that provides edge routing services for a customer, often deployed in a service provider's cloud.**
 - D) A type of VPN client.
 - 101. How can SDN and virtualization contribute to datacenter optimization?
 - A) By increasing the physical server footprint.
 - B) By requiring more manual configuration of individual devices.
 - C) **By enabling automated provisioning of network resources, traffic steering, and dynamic load balancing.**
 - D) By eliminating the need for network security.
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Sessions 18, 19, & 20: OpenFlow and OpenDaylight

102. What is OpenFlow?
- A) A type of routing protocol like OSPF or BGP.
 - B) **A communications protocol (a southbound API) that gives the SDN controller direct access to the forwarding plane of network devices.**
 - C) A complete SDN controller platform.
 - D) A network virtualization overlay technology.
103. The primary function of the OpenDaylight (ODL) controller is to:
- A) Function as a high-speed data plane switch.
 - B) **Provide a modular, open-source platform for building and managing SDN solutions.**
 - C) Replace the need for physical network cabling.
 - D) Act as a RADIUS server for AAA.
104. In the OpenDaylight architecture, what is the purpose of the Model-Driven Service Abstraction Layer (MD-SAL)?
- A) It is the graphical user interface.
 - B) **It provides a common data model and API for services and plugins, decoupling them from the underlying protocols.**
 - C) It directly installs flow rules on switches.
 - D) It is a tool for emulating networks.
105. What is Mininet used for in the context of SDN lab assignments?
- A) It is a hardware-based SDN switch.
 - B) It is an alternative SDN controller to OpenDaylight.
 - C) **It is a network emulator that creates a realistic virtual network of hosts, switches, and links on a single machine.**
 - D) It is a protocol for encrypting controller-switch communication.
106. What is the role of the OpenFlow plugin in OpenDaylight?
- A) To manage user authentication.
 - B) **To translate instructions from MD-SAL into OpenFlow messages to be sent to the switches.**
 - C) To provide a graphical user interface.
 - D) To cluster multiple OpenDaylight instances.
107. What is Open vSwitch (OVS)?
- A) A physical switch designed for SDN.
 - B) **A production-quality, multilayer virtual switch licensed under the open-source Apache 2.0 license.**
 - C) A network monitoring tool.
 - D) A protocol for inter-controller communication.
108. The L2Switch application in OpenDaylight is a simple application that:
- A) Performs Layer 3 routing.
 - B) **Makes an OpenFlow-enabled switch behave like a traditional Layer 2 learning switch.**
 - C) Implements firewall rules on the controller.
 - D) Manages VTEPs for VXLAN tunnels.
109. What is "Service Function Chaining" (SFC) in an SDN context?
- A) A method for physically connecting network services.
 - B) **A technique for steering traffic through an ordered sequence of network services (e.g., firewall, load balancer) that are implemented as virtual functions.**
 - C) The process of linking multiple SDN controllers together.
 - D) A feature of the Spanning Tree Protocol.
110. In OpenDaylight, what is the primary purpose of Group Based Policy (GBP)?
- A) To directly manage flow rules on a per-device basis.
 - B) **To define network policy based on application-level or business logic ("intents")**

- rather than low-level network constructs like IP addresses.**
- C) To manage user access to the OpenDaylight controller itself.
D) To configure routing protocols like BGP.
111. The OVSDB protocol is primarily used for:
A) Forwarding data packets in Open vSwitch.
B) **Managing and configuring Open vSwitch instances remotely.**
C) Communicating between the SDN controller and business applications.
D) Encrypting traffic between virtual machines.
112. What problem does LISP (Locator/ID Separation Protocol) aim to solve?
A) The shortage of MAC addresses.
B) **The overloading of the core Internet routing table by separating a device's identity from its location.**
C) The lack of security in IPv4.
D) The slow convergence of STP.
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Comprehensive / Mixed-Topic Questions

113. A packet is being sent from a host on VLAN 10 to a server on VLAN 20. Which sequence of devices and lookups is most likely to occur?
A) Host -> L2 Switch (MAC lookup) -> Server
B) Host -> L2 Switch (MAC lookup) -> L2 Switch (MAC lookup) -> Server
C) **Host -> L2 Switch (MAC lookup) -> Router/L3 Switch (IP lookup) -> L2 Switch (MAC lookup) -> Server**
D) Host -> Router (IP lookup) -> L3 Switch (IP lookup) -> Server
114. You have configured an extended ACL to deny Telnet traffic from network 10.1.1.0/24 to a server at 192.168.5.10. Which of the following ACL entries is correct?
A) `access-list 1 deny 10.1.1.0 0.0.0.255`
B) `access-list 101 deny ip 10.1.1.0 0.0.0.255 host 192.168.5.10`
C) `access-list 101 deny tcp 10.1.1.0 0.0.0.255 host 192.168.5.10 eq 23`
D) `access-list 101 permit tcp 10.1.1.0 0.0.0.255 host 192.168.5.10 eq 23`
115. A network administrator wants to provide redundant paths between switches but prevent Layer 2 loops. Which protocol should be enabled?
A) VTP
B) **STP**
C) OSPF
D) NAT
116. Comparing EIGRP and OSPF, which statement is generally true?
A) OSPF is a Cisco-proprietary protocol, while EIGRP is an open standard.
B) OSPF uses a composite metric, while EIGRP uses cost based on bandwidth.
C) **EIGRP can be easier to configure in simple hub-and-spoke topologies, while OSPF's hierarchical area design scales well in large, complex networks.**
D) EIGRP is a link-state protocol, and OSPF is a distance-vector protocol.
117. A user on host 192.168.10.20/24 wants to connect to a web server on the internet. The company uses a single public IP address, 203.0.113.5. What technology makes this possible?
A) Static Routing
B) DHCP
C) **PAT (Port Address Translation)**
D) eBGP
118. Which technology is foundational to the concept of separating the control and data planes in modern networking?

- A) VLANs
- B) **SDN**
- C) IPv6
- D) PPP

119. A router needs to send a packet to the destination 10.50.60.70. It has the following routes in its table. Which route will it choose?
- 10.50.60.0/24 via 192.168.1.1 (OSPF)
 - 10.50.0.0/16 via 192.168.2.1 (EIGRP)
 - 0.0.0.0/0 via 192.168.3.1 (Static)
- A) The EIGRP route because it has a better administrative distance.
 - B) The static route because it is the default.
 - C) **The OSPF route because it is the most specific match (longest prefix).**
 - D) The router will load balance between the OSPF and EIGRP routes.
120. In an OpenDaylight-managed network, an administrator wants to ensure all guest traffic is first sent through a firewall and then a web filter. This is a use case for:
- A) L2Switch Application
 - B) **Service Function Chaining (SFC)**
 - C) OpenFlow Plugin
 - D) VTP