Module 8 : Network Access

1) A network switch is equipment that allows two or more IT devices, such as computers, to communicate with one another.
2) The switch loads a power-on self-test (POST) program stored in ROM.

- POST checks the CPU subsystem.
- It tests the CPU, DRAM, and the portion of the flash device that makes up the flash file system.
- The switch loads the boot loader software.

3) You can access the CLI through a console connection, through Telnet, a SSH, or by using the browser.
4) Explain and configure CIOS

- Connect the switch to putty

- Enter privileged EXEC mode and set a hostname for the switch
- Assign a password to the switch
- Configure telnet and console access passwords
- Configure ip address and with telnet access
- Configure network management ip address
- Assign a default gateway to the switch
- Disable unused open ports
- Save your system configuration settings
- Configure netflow to manage your cisco switch

5) A switch port enables the device to send and receive data packets as well as communicate with other networked devices.
6) Enter the old password

- Enter and confirm the new password
- Switch to privileged EXEC mode with the enable command.
- Save the configure setting.

7) To set separate password for each user, use the following commands

- switch(config)# username [Username] password [Password] Or
- switch(config)# username [Username] secret [Password]

8) Set the enable secret password

- switch(config)# enable secret [Password]

9) Select “System Settings” from the HOME Menu of your Nintendo Switch console.

- Select “Internet”, and then “Internet Settings”.

- Your Nintendo Switch console will automatically search for nearby Wi-Fi signals.
- Select your network from the list of networks located under “Registered Networks”.
- Select “Change Settings”, then scroll down and select "IP Address Settings".
- Select "Manual".
- Select "IP Address" with the A button, and then hold down the B Button to delete the existing IP address (it defaults to zeros).
- Enter the IP address you found on the network device, add 20 to the last section of digits and then select "OK".

10) To verify the IP address set on a switch, we can use the show int Vlan 1 command.

11) A virtual local area network (VLAN) is a virtualized connection that connects multiple devices and network nodes from different LANs into one logical network.
12) VTP stands for VLAN Trunking Protocol. It is a layer-2 protocol. In a small network, the number of switches is less, so we can configure VLANs individually.
13) A customer data platform (CDP) is software that collects and unifies first-party customer data—from multiple sources—to build a single, coherent, complete view of each customer.
14) VLANs are identified by a VLAN ID (a number between 0 – 4095).
15) The basic function of STP is to prevent bridge loops and the broadcast radiation that results from them.

16) IPv4 allows for a variation of the network and host segments of an IP address.
17) A subnet mask is a 32-bit number used in IPv4 (or 128-bit for IPv6) that divides your IP address into network and host portions.
18) based on base 10 and the place values are based on the powers of 10. Binary system: where there are only two possible values for each digit, zero or one. Octal system: the value of each place is based on the powers of 8. Hexadecimal system: the value of each place is based on the powers of 16.
19) The crucial difference between a public and private IP address is that the public IP can be seen by other devices on the Internet, while the private IP cannot.

20) Subnet masks (IPv4) and prefixes (IPv6) identify the range of IP addresses that make up a subnet, or group of IP addresses on the same network.

21) Gather the Required Equipment.

- Power Off the Devices.
- Identify Ethernet Ports.
- Connect the Ethernet Cable.
- Power on the Devices.
- Verify the Connection.
- Configure Network Settings.

22) Show ip route

23) Use the traceroute command to diagnose ip routing problems.

24) Enhanced Interior Gateway Routing Protocol (EIGRP) is an advanced distance-vector routing protocol that is used on a computer network for automating routing decisions and configuration.

25) An OSPF broadcast interface is connected to a shared network, like Ethernet.
26) An area is a logical collection of OSPF networks, routers, and links that have the same area identification.
27) In an OSPF broadcast network, OSPF elects one router to serve as the designated router (DR) and another router on the segment to act as the backup designated router (BDR).
28) OSPF is a link-state routing protocol that sends information about directly connected links to all the routers in the AS network.
29) An IPv6 address is a 128-bit alphanumeric value that identifies an endpoint device in an Internet Protocol Version 6 (IPv6) network.

30) 6to4 tunnels enable isolated IPv6 sites to communicate across an automatic tunnel over an IPv4 network that does not support IPv6.
31) Wireless communication is one of the most desired modes of communication (connectivity) between two or more devices.
32) A wireless device has some sort of network connectivity. A cell phone is wireless, and a laptop or PDA would be wireless if they had a wireless modem.
33) Wi-Fi security is the protection of devices and networks connected in a wireless environment.
34) WPA2 employs AES encryption, while WPA verifies users' initial login credentials using pre-shared keys.
35) Connect the management port of the switch to the RJ45 port of the PC with

an Ethernet cable like Cat5e and Cat6 cables.

- Power on the PC.
- Type the username and password (admin/admin) in the login interface, then move on to the configuration menu as shown below.

36) The User mode is normal mode where the process has limited access.

- Privileged Exec mode is an escalated operating mode. It is also called Enable mode.
- The Global Configuration mode allows users to make changes to the router's global configuration settings, such as the hostname and the enable secret password.

37) Switches are key building blocks for any network.

38) The Secure Shell (SSH) protocol is a method for securely sending commands to a computer over an unsecured network.

39) Assign a local login (operator) and enable (manager) password.

- Generate the switch public and private key pair.
- Provide the switch public key to clients.
- Enable SSH on the switch and anticipate SSH client contact behavior.
- Configure the switch for SSH authentication.

40) TELNET stands for Teletype Network. It is a type of protocol that enables one computer to connect to the local computer.

41) show interfaces status

42) Brainstorm VLAN Groupings.

- Prepare Unique VLAN IDs.

- Create a Logical Network Diagram or Map.
- Purchase Additional Equipment.
- Connect Network Devices to Appropriate Switch Ports.
- Configure Switch Ports.
- Set up VLAN Specifications via Network Switch Settings.

43) One of the simplest ways to test VLAN connectivity is to use the ping command to send packets between devices on different VLANs.

44) Cable the network as shown in the topology.

- Initialize and reload the switches as necessary.
- Configure basic settings for each switch.
- Configure PC hosts.
- Test connectivity.

45) VLANs are very cost-effective.

- It offers more flexibility than other networking solutions, as they can be configured based on port, protocol, or subnet criteria.
- It reduces the amount of administrative oversight that would be required.

46) A static VLAN is a group of ports designated by the switch as belonging to the same broadcast domain.

47) Dynamic VLANs, as opposed to Static VLANs, do not require the administrator to individually configure each port, but instead, a central server called the VAMPS (VLAN Member Policy Server).

48) There are several STP timers, as this list shows: hello — The hello time is the time between each bridge protocol data unit (BPDU) that is sent on a port.

49) This is where each switch will insert the cost of its shortest path to the root bridge.

50) Select Wired > Settings > Spanning Tree. Under Spanning Tree Mode, select Disable, STP, or RSTP. Tap Save.

51) To check the status of spanning-tree instance interface, use the show interfaces command: user@host> show interfaces interface-name.

- You can determine the status of the interface as follows: If the BPDU Error field is none, the interface is enabled.

52) Port security allows the network administrator to specify which MAC addresses can access a particular port and how many devices can connect to that port at a time.

- Open the command prompt (Start > Run > cmd) and use netstat -ano | find /i "<port_number>".

53) Class A : 255.0.0.0

- Class B : 255.255.0.0
- Class C : 255.255.255.0

54) Classless Inter-Domain Routing (CIDR) is an IP address allocation method that improves data routing efficiency on the internet.

55) Class A: First Octet Value 0-126.

- Class B: First Octet Value 128-191.
- Class C: First Octet Value 192-233.
- Class D: First Octet Value 224-239.

56) Classful addressing uses fixed-length subnet masks, but classless uses variable length subnet masks (VLSM).

57) A VLSM (short for “variable length subnet mask”) is a computer networking

technique to divide an IP network into subnets with different subnet masks.

58) Network administrators use static routing, or *nonadaptive routing*, to define a route when there is a single route or a preferred route for traffic to reach a destination.

59) A default route, or gateway of last resort, allows traffic to be forwarded, even without a specific route to a particular network.

60) IP routing is the process that defines the shortest path through which data travels to reach from source to destination.

61) Access your device WebUI by typing your Routers Private or Public IP in your browser (my router has private IP 192.168. 1.1)

- Next, navigate to Network - Vlan - Port Based.
- Now you'll need to add a new VLAN and change the first VLAN (ID:1) configuration.

62) Routing metrics are the values or criteria that routing protocols use to compare and select the best routes among multiple options.

63) The OSPF cost is calculated based on the link's bandwidth and is used by the OSPF algorithm to determine the best path between two routers.

64) IPv6 offers a substantially expanded address space in contrast to IPv4, meeting the growing need for internet-connected devices and users.

65) An IPv6 address is a 128-bit alphanumeric value that identifies an

endpoint device in an Internet Protocol Version 6 (IPv6) network.

66) Routing in IPv6 is almost identical to IPv4 routing under CIDR.

67) A wireless access point (WAP) is a networking device that allows wireless-capable devices to connect to a wired network.

68) A wireless communication service that operates on the mobile network (i.e., the 2G, 3G, and 4G cellular communications network) using IP transmissions.

69) A Independent Basic Service Set (IBSS) forms an ad hoc, independent, self-contained network with station-to-station traffic flowing directly, receiving data transmitted by another station, and only filtering traffic based on the MAC address of the receiver (see

Figure 5.3). FIGURE 5.3. An ad hoc self-contained network.

70) Avoid using the default password.

- Don't let your wireless device announce its presence.
- Change your device's SSID name. Encrypt your data.
- Protect against malware and Internet attacks.

71) Administrators can change security settings, install software and hardware, access all files on the computer, and make changes to other user accounts.

72) Right-click My Computer.

- Choose Properties > Computer Name and then click Change. The Computer Name Changes dialog box opens.
- In the Computer Name field, enter the new host name of the Domain Controller and then click OK.

- Restart the computer.

73) Open Microsoft Word.

- Select the page size. Go to the “Page Layout” tab and click on “Size” from the “Page Setup” group. ...
- Design your banner. Use Word's shapes, text boxes, and other formatting options to customize it.
- Add graphics or logos. Go to the “Insert” tab and select the “Picture” option.

74) The copy running-configuration startup-configuration.

- write erase command followed by the reload command.
- Show running configuration.

75) “System Settings” from the HOME Menu of your Nintendo Switch console.

- Select “Internet”, and then “Internet Settings”.

- Select your network from the list of networks located under “Registered Networks”.
- Select “Change Settings”, then scroll down and select "IP Address Settings".

76) Open the SSH configuration file /etc/ssh/sshd_config.

- Disable non-admin SSH tunneling.
- Disable agent forwarding (which is enabled by default).
- Update authentication methods.
- If SSH is not going to be used for other purposes on your system, consider restricting use to an explicit list of allowed HSTS users.

77) Open the Control Panel. Go to “Programs” and select “Turn Windows features on or off.” Check the box next to “Telnet Client” and click “OK.”

78) Layer 3 switches offer hardware-based switching, which makes them well-suited for handling large amounts of network traffic.

79) The assignment of IP addresses happens dynamically within a given address range. As a result, a device connected to the network doesn't have a forever address.

80) IEEE 802.1Q is the networking standard that supports Virtual LANs (VLANs) on an Ethernet network.

81) The switchport mode command allows us to configure the trunking operational mode on a Layer 2 interface on a Cisco IOS device.

82) The remove-vlan all command to remove all VLANs from the Ethernet port. Enter the remove-vlan Vlan

command to remove the VLANs from the Ethernet port.

83) Inter-VLAN routing is the process of forwarding network traffic from one VLAN to another VLAN.

84) A process where a router can forward data via a different route for a given destination based on the current conditions of the communication circuits within a system.

85) They are formed when an error occurs in the operation of the routing algorithm, and as a result, in a group of nodes, the path to a particular destination forms a loop.

86) Enter global configuration mode and create VLANs using the `VLAN <vlan_id>` command.

87) VLAN traffic by setting different path costs on a trunk and associating the

path costs with different sets of VLANs, blocking different ports for different VLANs.

88) Port Aggregation Protocol (PAgP) is a Cisco proprietary protocol which is used for the automated, logical aggregation of Ethernet switch ports, known as an EtherChannel.

89) EtherChannel Configuration

- Up to eight ports can be configured, and all of these ports should be the same type (Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet).
- Set all ports to function at the same Speed and Duplex settings.
- Ensure that all ports are enabled and that none have been configured using the shutdown.

90) This can be done by checking the LACP counters using the 'show Lacp counters' command.

91) Both LACP and PAGP protocols are used for link aggregation.

92) IPv4 allows for a variation of the network and host segments of an IP address, known as subnetting , can be used to physically and logically design a network.

- Right-click the Windows Start button and select Command Prompt.

93) The first IP address is called the network address and the last IP address is called the broadcast address.

94) A classful network is an obsolete network addressing architecture used in the Internet from 1981 until the introduction of Classless Inter-Domain Routing (CIDR) in 1993.

95) Routing protocols are the means by which routers exchange next-hop reachability information with each other.

- Routed protocols are the traffic that routers direct from source to destination.
- Hope that helps.

96) An interior gateway protocol (IGP) or Interior routing protocol is a type of routing protocol used for exchanging routing table information between gateways (commonly routers) within an autonomous system.

97) Distance vector protocols send their entire routing table to directly connected neighbors.

- Link state protocols send information about directly connected links to all the routers in the network.

- Distance vector protocols have slow convergence and suffer from the count-to-infinity problem.

98) Define the OSPF process:

- Define network statements:
- Verify neighbor adjacencies:
- Configure point-to-point OSPF:
- Configure broadcast OSPF and DR/BDR selection:
- Configure the Router ID:

99) A wildcard mask is a mask of bits that indicates which parts of an IP address are available for examination.

100) There are four different types of IP addresses: public, private, static, and dynamic.

101) Enable IPv6 Globally.

- Enable IPv6 on Interface.
- Configure EUI-64 Format Global Unicast Address.

- Configure Manual Global Unicast Address.
- IPv6 Ping.
- Manual Link Local Address Configuration.
- Auto IPv6 Address Configuration.
- Enable DHCPv6 Client.

102) These protocols are specifically designed to support routing on IPv6 networks.

103) The IPv4 address of GigabitEthernet 1/0/2 on Router A is 2.1. 1.1/24, and the corresponding 6to4 prefix is 2002:0201:0101::/48. Host A must use this prefix.

- The IPv4 address of GigabitEthernet 1/0/2 on Router B is 5.1. 1.1/24, and the corresponding 6to4 prefix is 2002:0501:0101::/48.

104) The 802 committee within IEEE oversees the development of industry protocols for wireless networks, including Ethernet networks.

105) The topology of a wireless network is simply the way network components are arranged.