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Ports and Addresses

2.6.1

IP Addresses

Congratulations, you have performed a basic device configuration! Of course, the fun is not over yet. If you want your end devices to communicate with each other, you must ensure that each of them has an appropriate IP address and is correctly connected. You will learn about IP addresses, device ports and the media used to connect devices in this topic.

The use of IP addresses is the primary means of enabling devices to locate one another and establish end-to-end communication on the internet. Each end device on a network must be configured with an IP address. Examples of end devices include these:

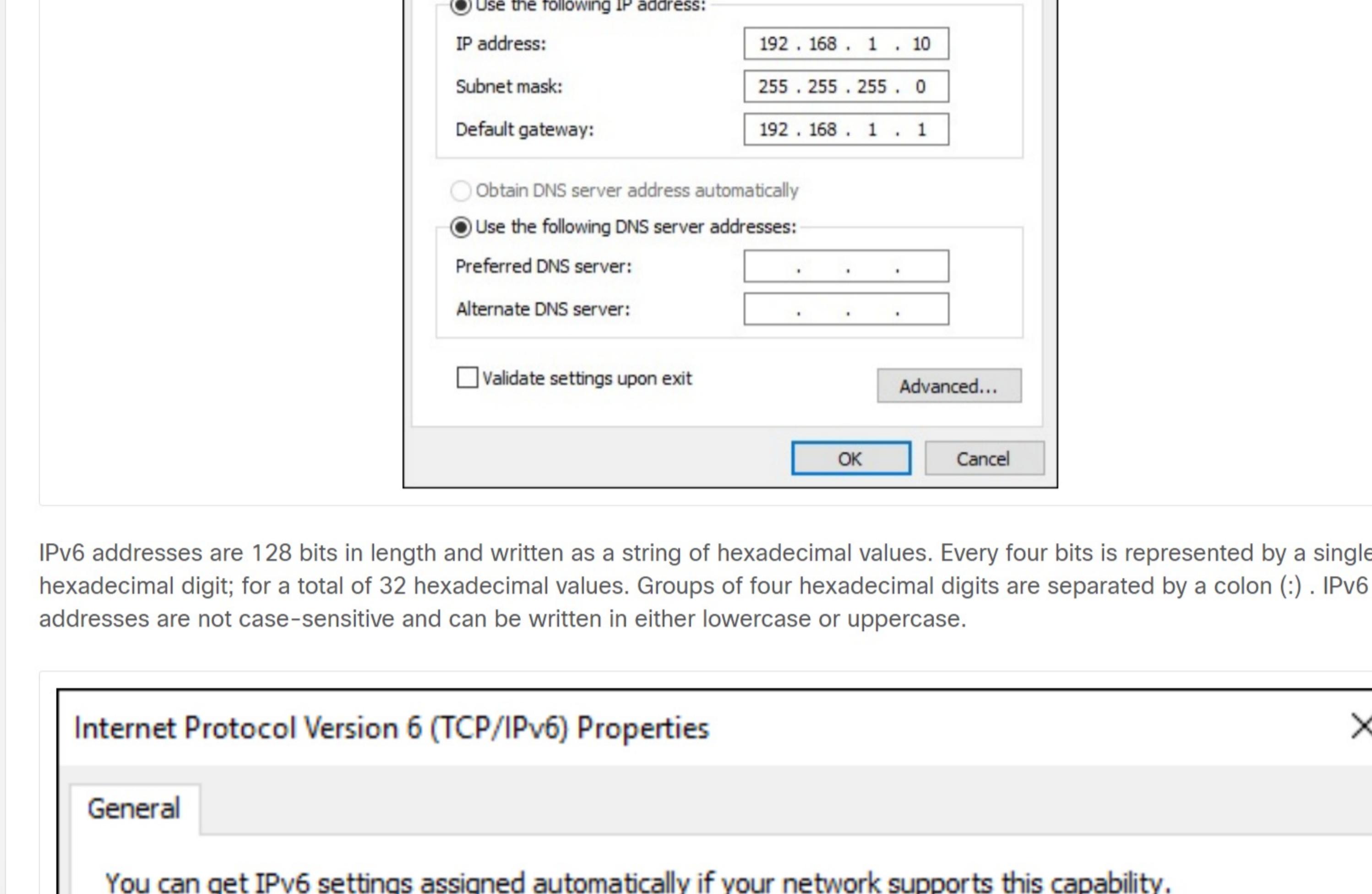
- Computers (work stations, laptops, file servers, web servers)
- Network printers
- VoIP phones
- Security cameras
- Smart phones
- Mobile handheld devices (such as wireless barcode scanners)

The structure of an IPv4 address is called dotted decimal notation and is represented by four decimal numbers between 0 and 255. IPv4 addresses are assigned to individual devices connected to a network.

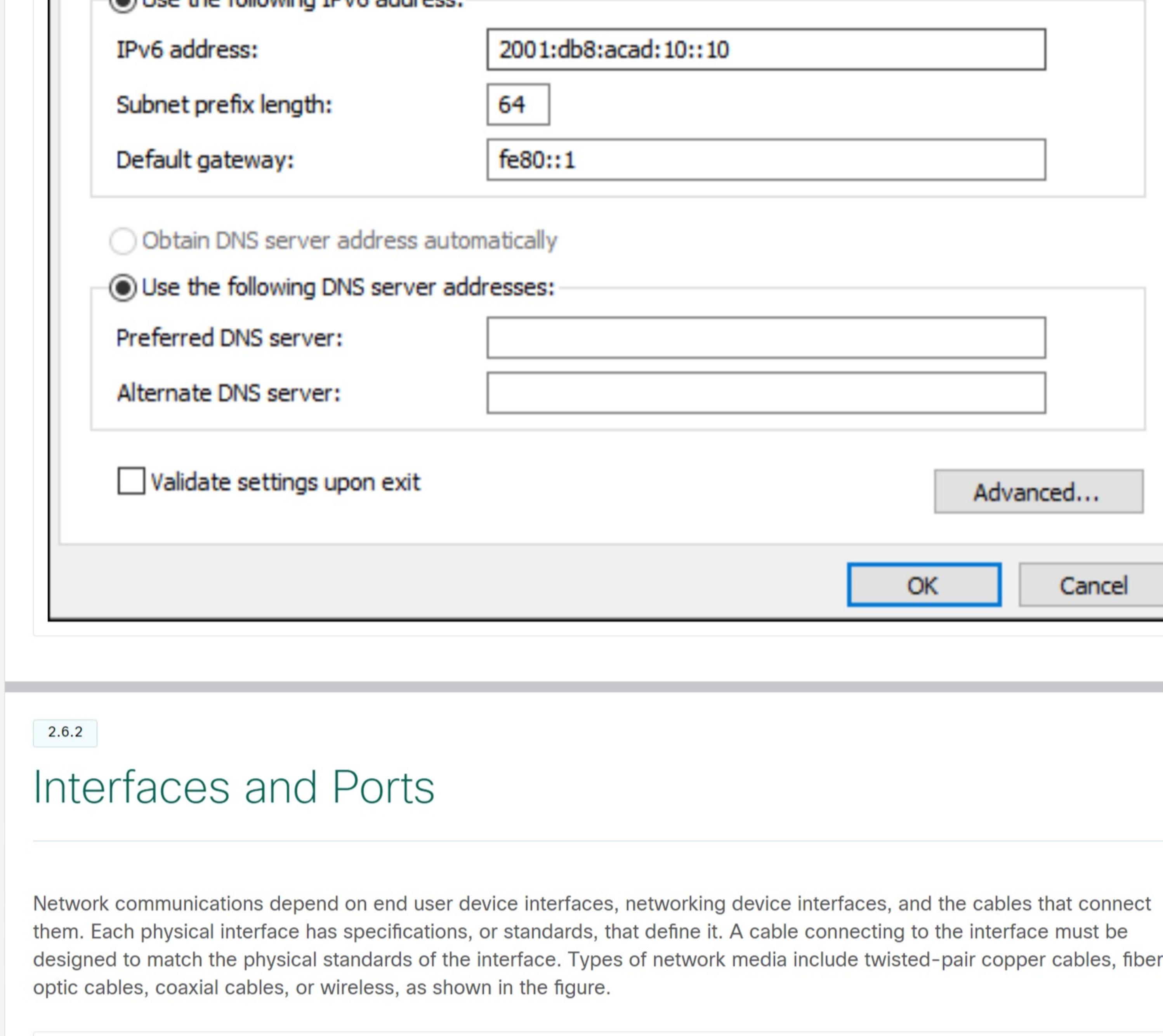
Note: IP in this course refers to both the IPv4 and IPv6 protocols. IPv6 is the most recent version of IP and is replacing the more common IPv4.

With the IPv4 address, a subnet mask is also necessary. An IPv4 subnet mask is a 32-bit value that differentiates the network portion of the address from the host portion. Coupled with the IPv4 address, the subnet mask determines to which subnet the device is a member.

The example in the figure displays the IPv4 address (192.168.1.10), subnet mask (255.255.255.0), and default gateway (192.168.1.1) assigned to a host. The default gateway address is the IP address of the router that the host will use to access remote networks, including the internet.



IPv6 addresses are 128 bits in length and written as a string of hexadecimal values. Every four bits is represented by a single hexadecimal digit; for a total of 32 hexadecimal values. Groups of four hexadecimal digits are separated by a colon (:). IPv6 addresses are not case-sensitive and can be written in either lowercase or uppercase.



2.6.2

Interfaces and Ports

Network communications depend on end user device interfaces, networking device interfaces, and the cables that connect them. Each physical interface has specifications, or standards, that define it. A cable connecting to the interface must be designed to match the physical standards of the interface. Types of network media include twisted-pair copper cables, fiber-optic cables, coaxial cables, or wireless, as shown in the figure.



Different types of network media have different features and benefits. Not all network media have the same characteristics. Not all media are appropriate for the same purpose. These are some of the differences between various types of media:

- Distance the media can successfully carry a signal
- Environment in which the media is to be installed
- Amount of data and the speed at which it must be transmitted
- Cost of the media and installation

Not only does each link on the internet require a specific network media type, but each link also requires a particular network technology. For example, Ethernet is the most common local-area network (LAN) technology used today. Ethernet ports are found on end-user devices, switch devices, and other networking devices that can physically connect to the network using a cable.

Cisco IOS Layer 2 switches have physical ports for devices to connect. These ports do not support Layer 3 IP addresses. Therefore, switches have one or more switch virtual interfaces (SVIs). These are virtual interfaces because there is no physical hardware on the device associated with it. An SVI is created in software.

The virtual interface lets you remotely manage a switch over a network using IPv4 and IPv6. Each switch comes with one SVI appearing in the default configuration "out-of-the-box." The default SVI is interface VLAN1.

Note: A Layer 2 switch does not need an IP address. The IP address assigned to the SVI is used to remotely access the switch. An IP address is not necessary for the switch to perform its operations.

2.6.3

Check Your Understanding - Ports and Addresses

Check your understanding of ports and addresses by choosing the BEST answer to the following questions.

1. What is the structure of an IPv4 address called?

- dotted-binary format
- dotted-decimal format
- dotted-hexadecimal format

2. How is an IPv4 address represented?

- four binary numbers between 0 and 1 separated by colons.
- four decimal numbers between 0 and 255 separated by periods.
- thirty-two hexadecimal numbers separated by colons.
- thirty-two hexadecimal numbers separated by periods.

3. What type of interface has no physical port associated with it?

- console
- Ethernet
- serial
- switch virtual interface (SVI)

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