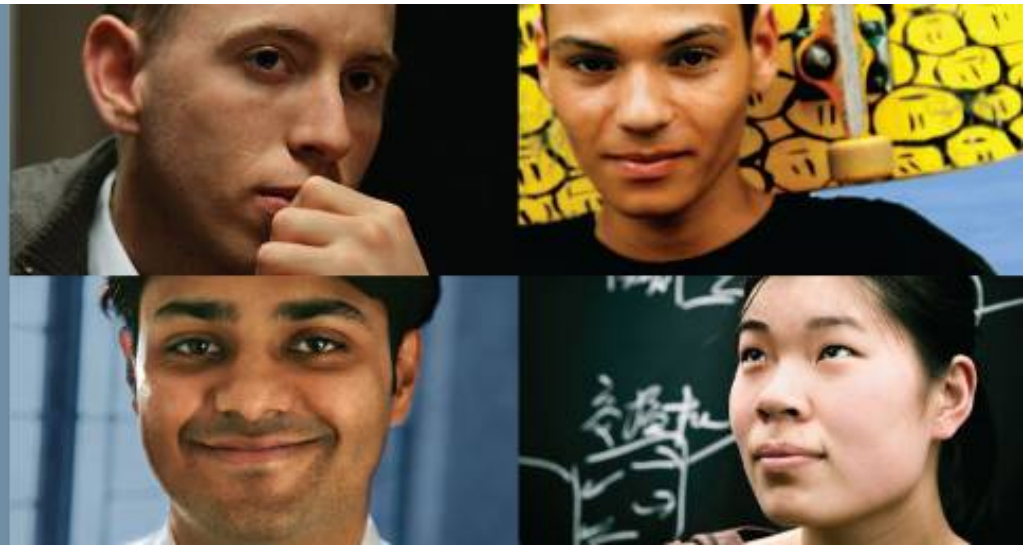
Instructor Materials
Chapter 2
Networks in Our Daily Lives



Networking Essentials

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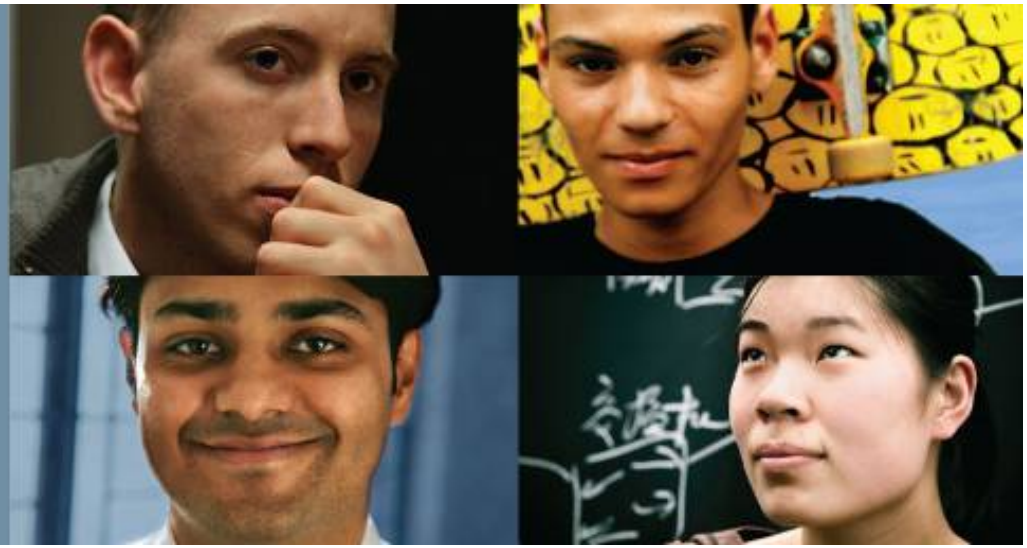
Chapter 2: Networks in Our Daily Lives



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Chapter 2 - Sections & Objectives

- 2.1 Getting Online
  - Explain the basic requirements for getting online.
- 2.2 Other Network Considerations
  - Explain the importance of network representations.
- 2.3 Cabling and Media
  - Build an Ethernet cable.

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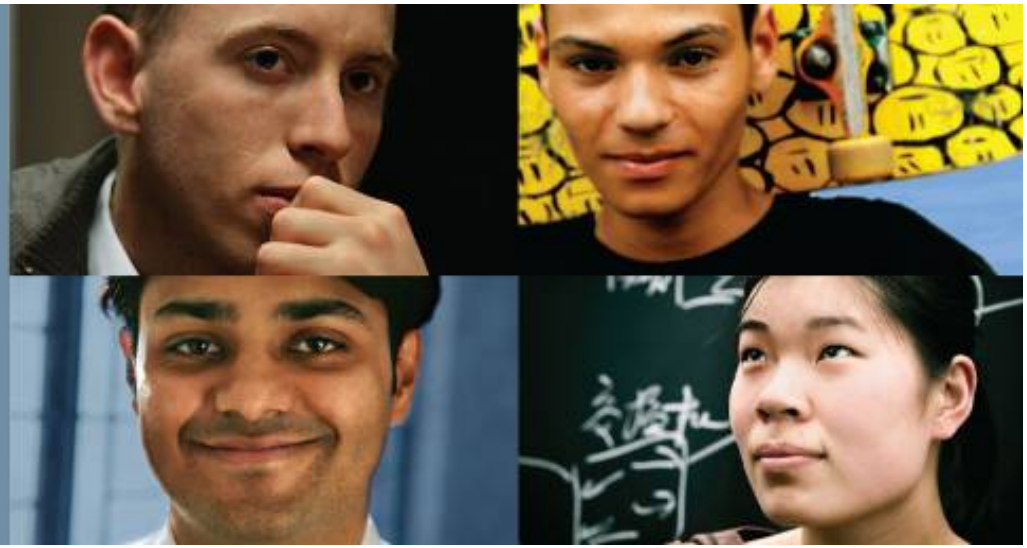
2.1 Getting Online



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Networks are Everywhere

- Mobile phones use radio waves to transmit voice signals to antennas mounted on towers located in specific geographic areas.

- The abbreviations 3G, 4G, and 4G-LTE are used to describe enhanced cell phone networks that are optimized for the fast transmission of data.

- Other networks that are used by smart phones include GPS, Wi-Fi, Bluetooth, and NFC.

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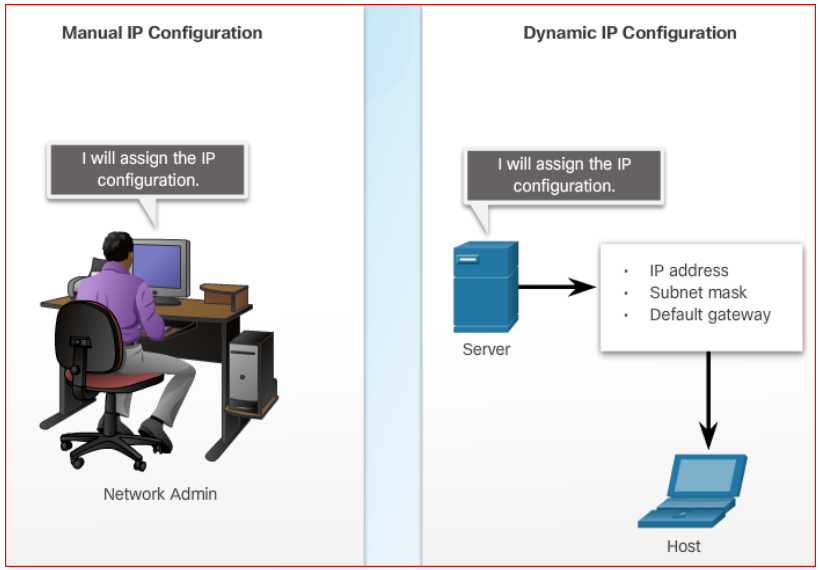
Local Network Connections

- Some examples of network components are personal computers, servers, networking devices, and cabling. These components can be grouped into four categories: hosts, shared peripherals, network devices, and network media.

- There are three parts to the IP configuration which must be correct for the device to send and receive information on the network:
  - **IP address** - identifies the host on the network.
  - **Subnet mask** - identifies the network on which the host is connected.
  - **Default gateway** - identifies the networking device that the host uses to access the Internet or another remote network.

- An IP address can be configured manually or assigned automatically by another device.



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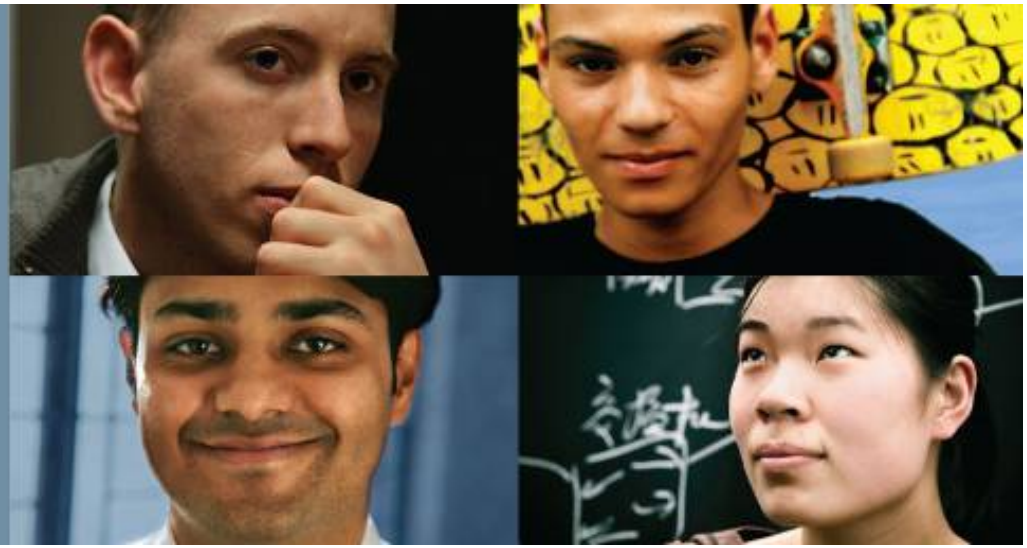
2.2 Other Network Considerations



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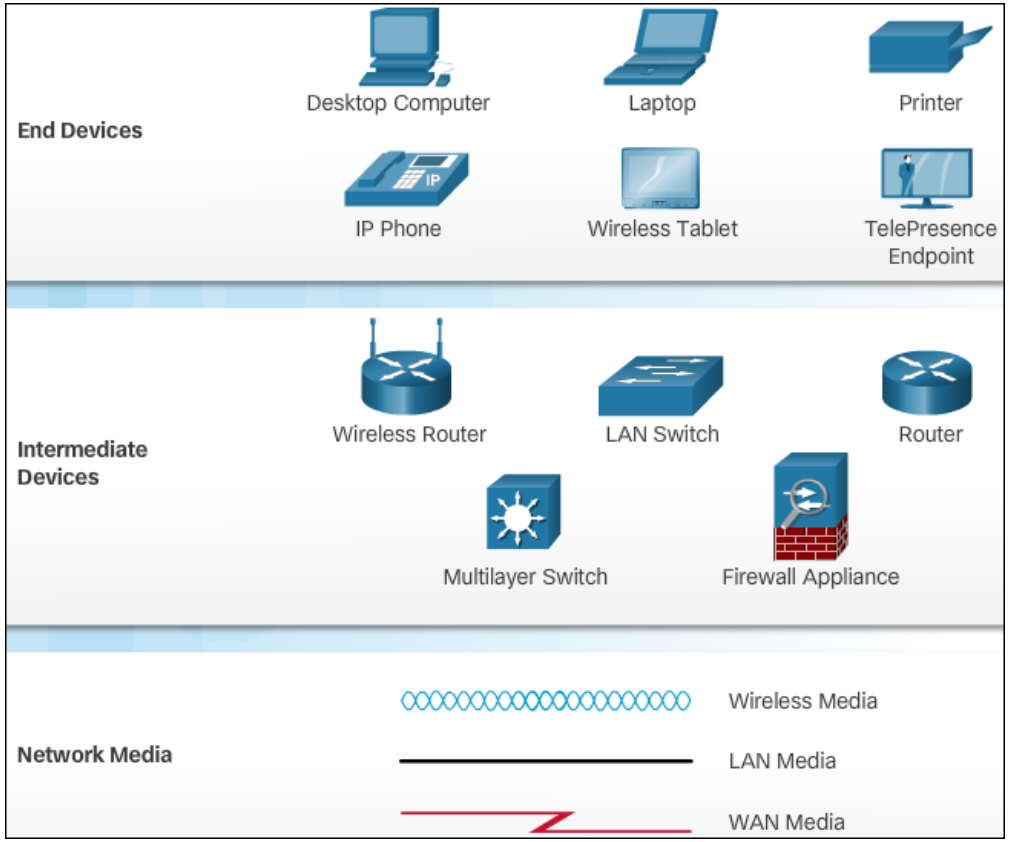
Keeping Track of it All

- As a network grows in size and complexity, it is important that the network is well-planned, logically organized, and appropriately documented.
- When networks are installed, a physical topology is created to record where each host is located and how it is connected to the network. The physical topology also shows where the wiring is installed and the locations of the networking devices that connect the hosts.



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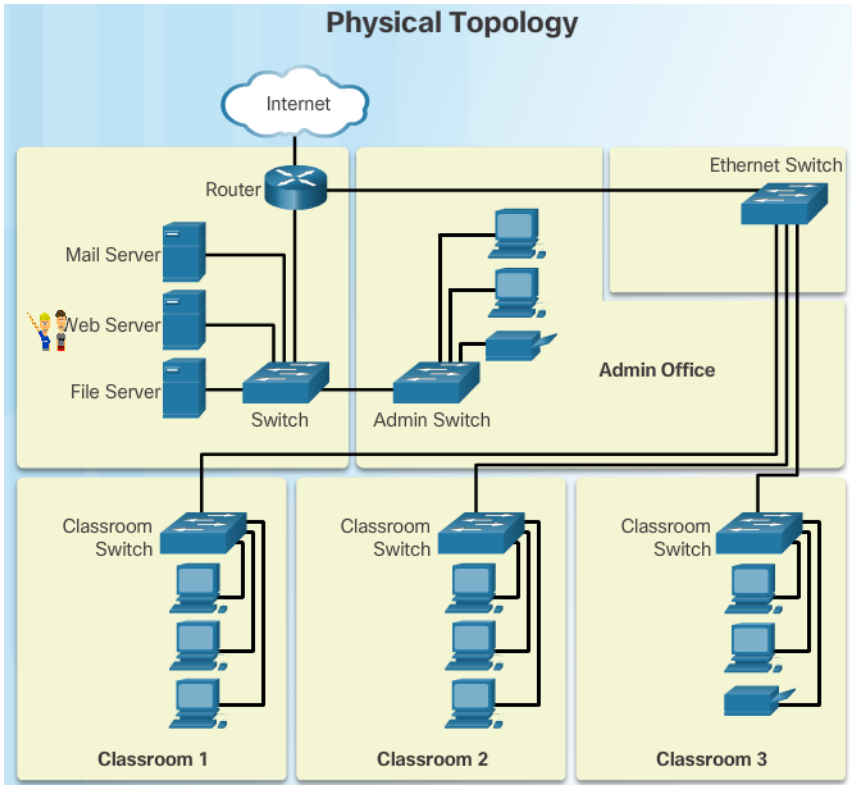
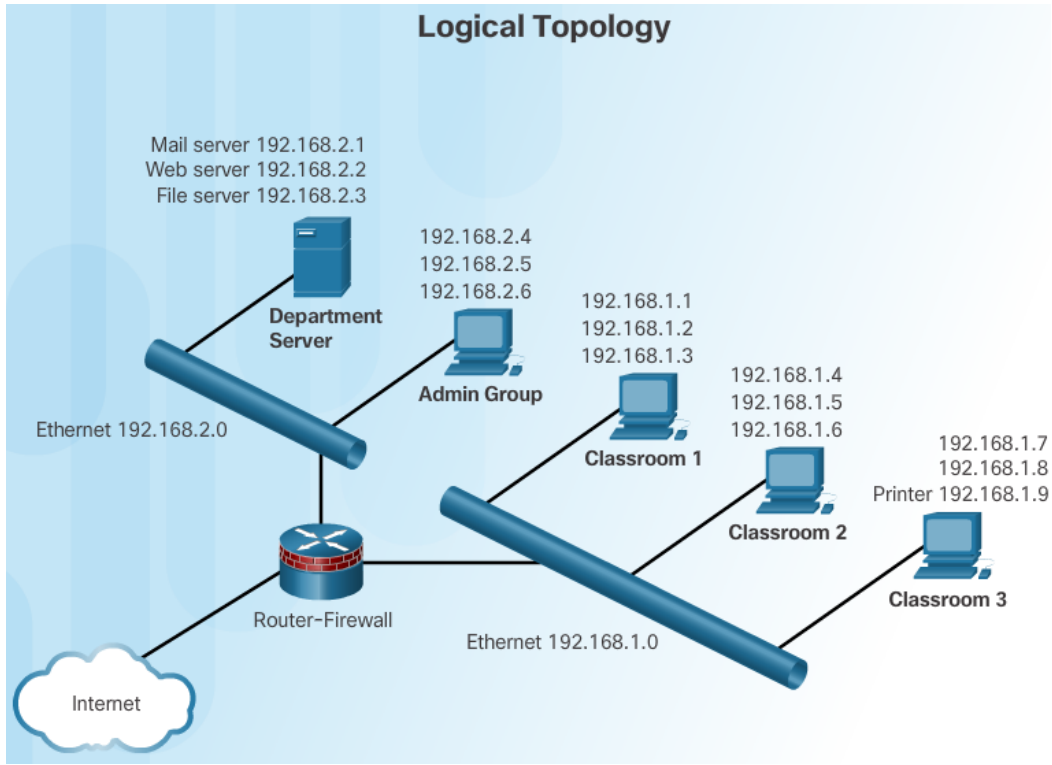
Keeping Track of it All

- A logical topology illustrates the device names, IP addressing, configuration information, and network designations. These are logical pieces of information that may change more frequently than the physical topology of a network.
- The icons in the image are used to create both physical and logical topologies.





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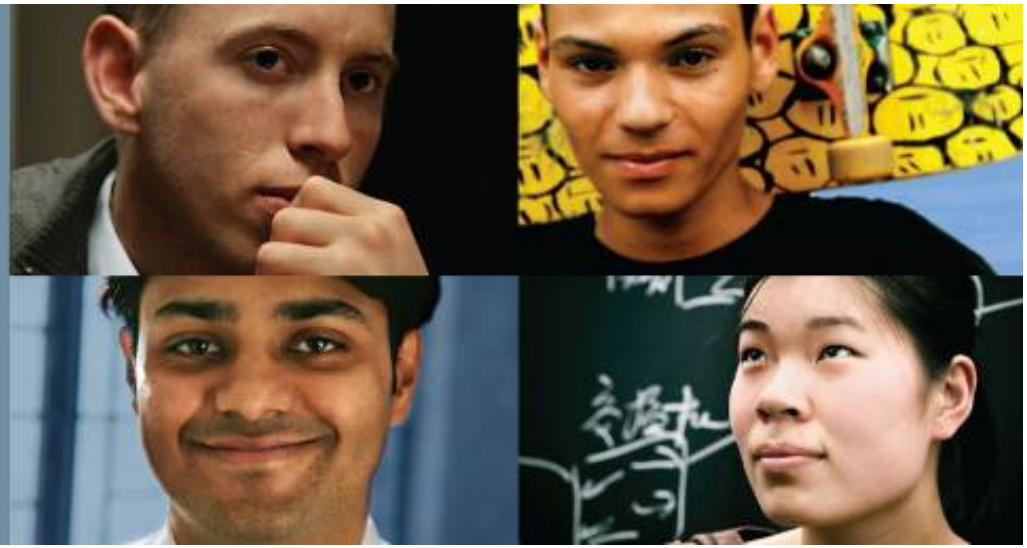
2.3 Cabling and Media



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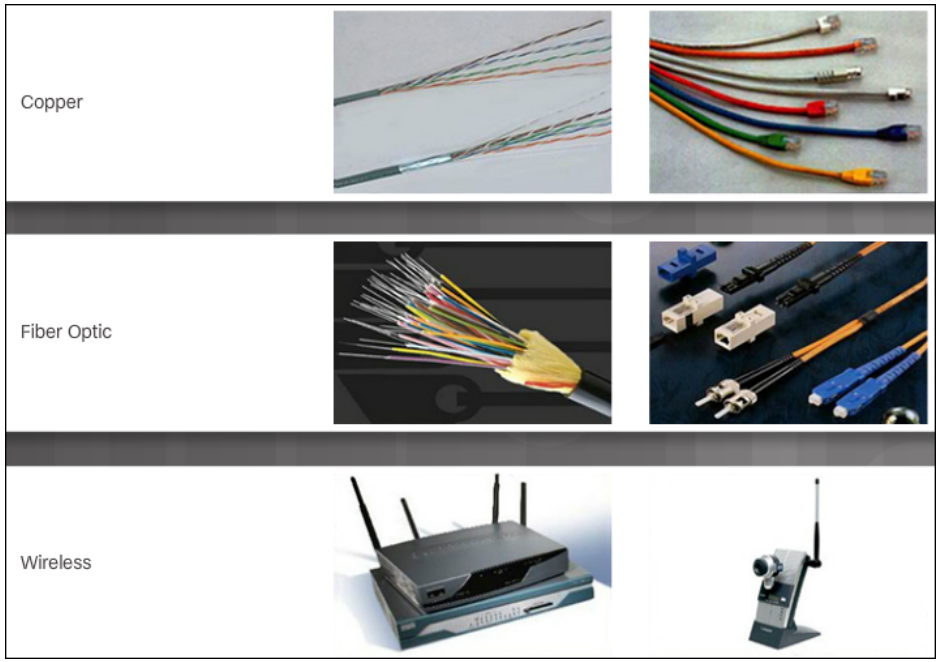
Types of Network Media



- Modern networks primarily use three types of media to interconnect devices and to provide the pathway over which data can be transmitted:
  - Copper wires within cables
  - Glass or plastic fibers (fiber-optic cable)
  - Wireless transmission

- **Twisted-Pair (TP)** is a type of copper cable. TP is the most common type of network cabling.
- **Coaxial Cable** is usually made of copper or aluminum. It is used by cable television companies to provide service, and for satellite communication systems.
- **Fiber-optic** cables are made of glass or plastic. They have a very high bandwidth, so they can carry vast amounts of data. Fiber-optic is used in backbone networks, large enterprise environments, and large data centers.

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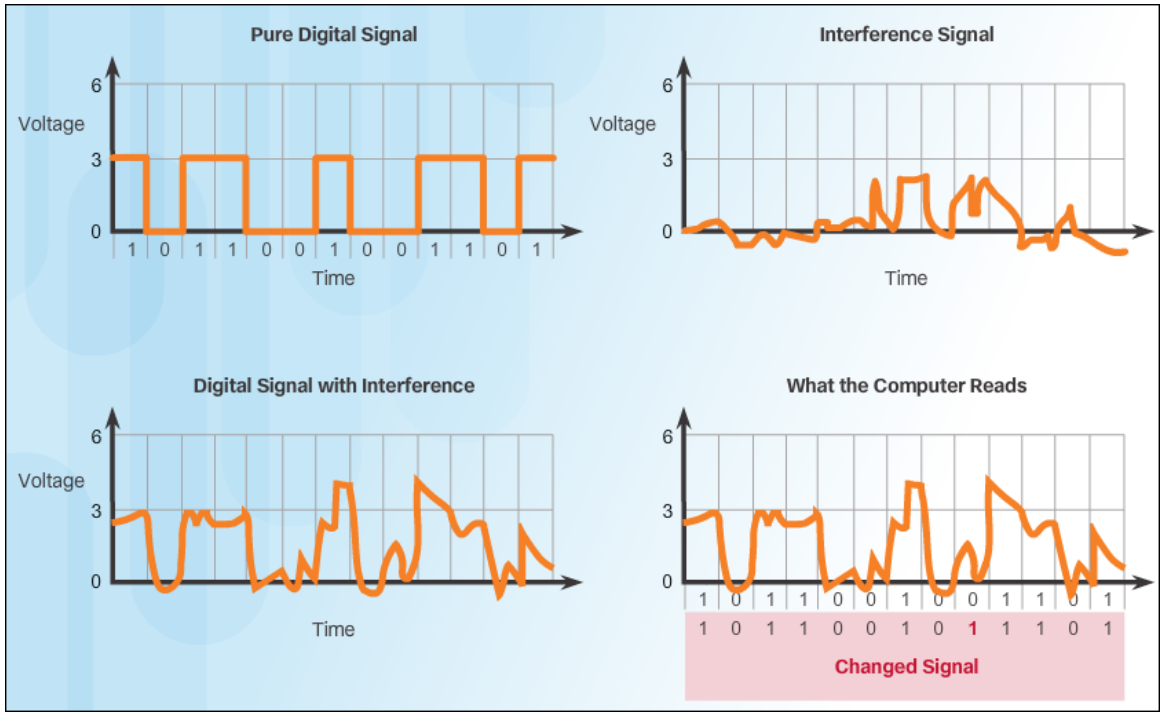
Ethernet Cabling

- Data transmission over copper cable is sensitive to **electromagnetic interference (EMI)**, which can reduce the data throughput rate. Another source of interference, known as **crosstalk**, occurs when long lengths of cables are bundled together. The electrical impulses from one cable may cross over to an adjacent cable.

- There are two commonly installed types of twisted-pair cable: **Unshielded twisted-pair (UTP)** and **Shielded twisted-pair (STP)**.



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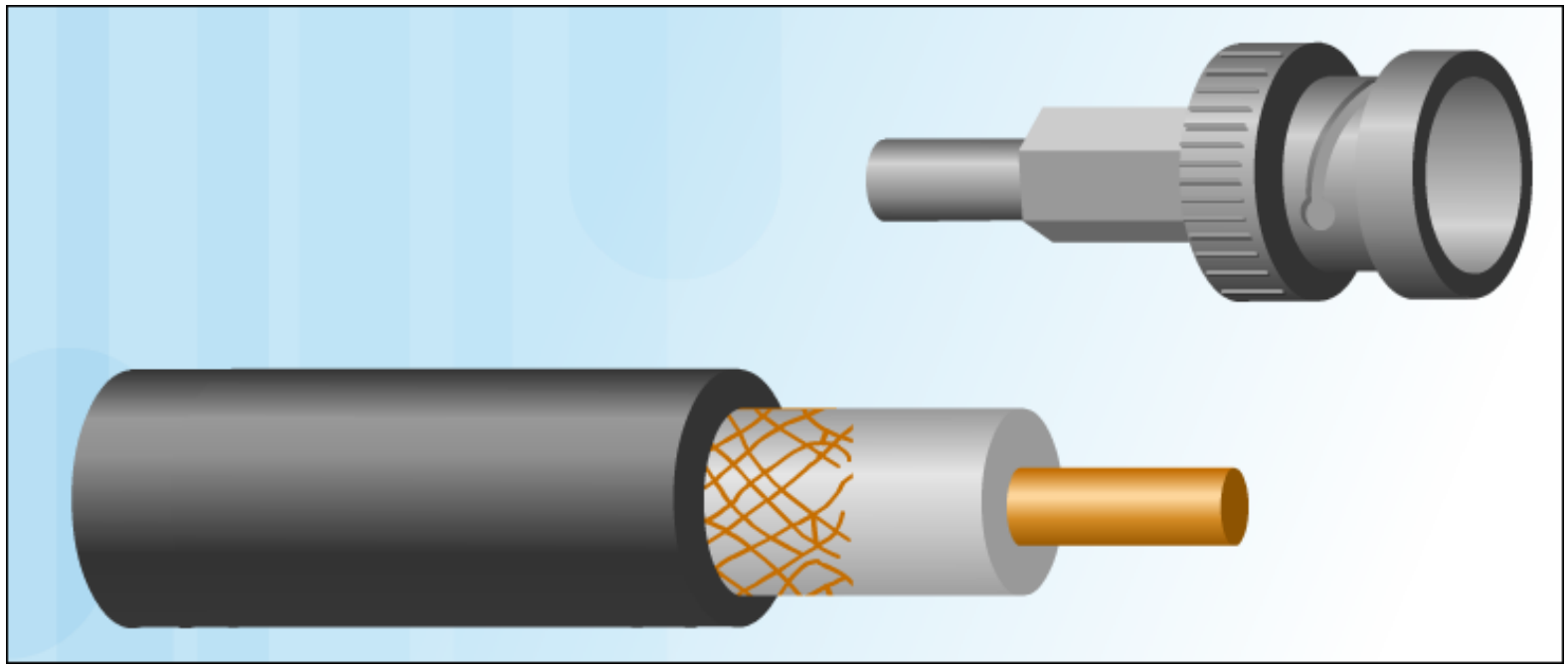
Other Types of Network Cabling



- Like twisted-pair, coaxial cable (or coax) carries data in the form of electrical signals. It has better shielding than UTP and can carry more data. Coaxial cable is usually constructed of either copper or aluminum.
- **Fiber-optic cable** is constructed of either glass or plastic, neither of which conducts electricity. It is immune to EMI and RFI, and is suitable for installation in environments where interference is a problem.

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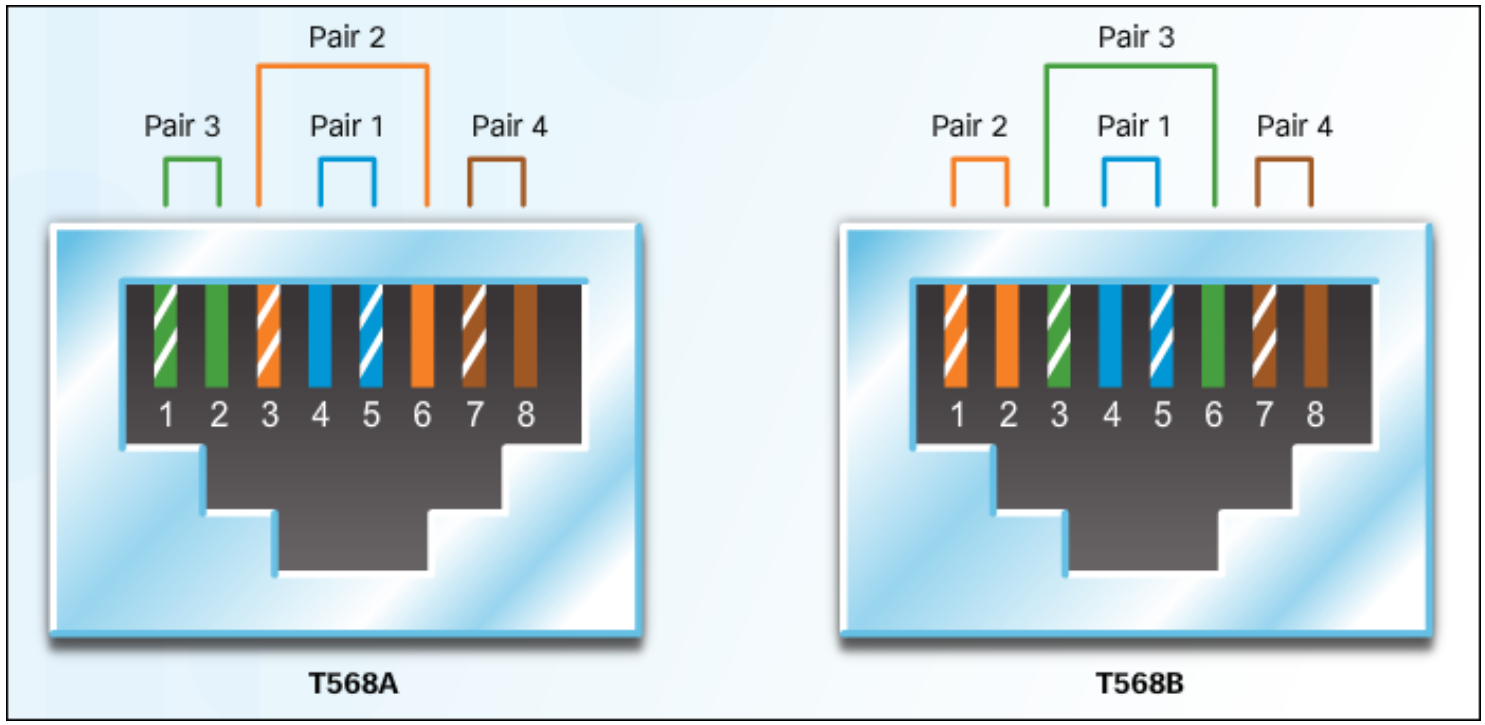
Do the Colors Matter?

- There are two wiring schemes, called T568A and T568B. Each wiring scheme defines the pinout, or order of wire connections, on the end of the cable.
- Ethernet NICs and ports on networking devices send data over UTP cables. Specific pins on the connector are associated with a transmit function and a receive function. The interfaces on each device transmit and receive data on designated wires within the cable.



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