



Instructor Materials Chapter 1 Ever Wonder How It Works?



Networking Essentials

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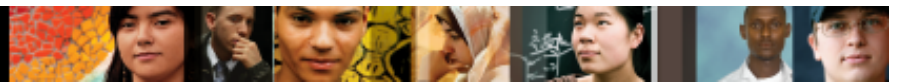


Chapter 1: Ever Wonder How It Works?



Networking Essentials

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Chapter 1 - Sections & Objectives

- 1.1 Communicating in a Connected World
 - Explain the concept of network communication.

- 1.2 Local Networks
 - Explain the roles of devices in a network.

- 1.3 Building a Simple Network
 - Build a functioning network.



1.1 Communicating in a Connected World



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Communicating in a Connected World

What is the Network?

■ Are you Online?

- For most of us, the Internet has become a large part of everyday life.



■ Who owns the Internet?

- No one owns the Internet.
- It is a worldwide collection of interconnected networks exchanging information using common standards over telephone wires, fiber-optic cables, wireless transmissions, and satellite links.



Communicating in a Connected World

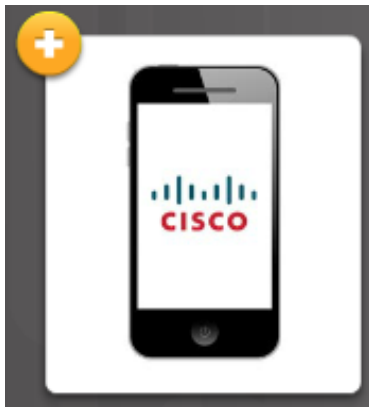
What is the Network?

■ Local Networks

- Local networks come in all sizes from peer-to-peer (two interconnected device), to home networks, SOHO, and large organization networks.

■ Making Connections

- All types of devices connect to local networks.





Communicating in a Connected World

Transmitting Data on the Network

- What Exactly is Data?
 - Data is a value that represents something.
 - Networks to transmit their data in order to share with others or for long-term storage.





Communicating in a Connected World

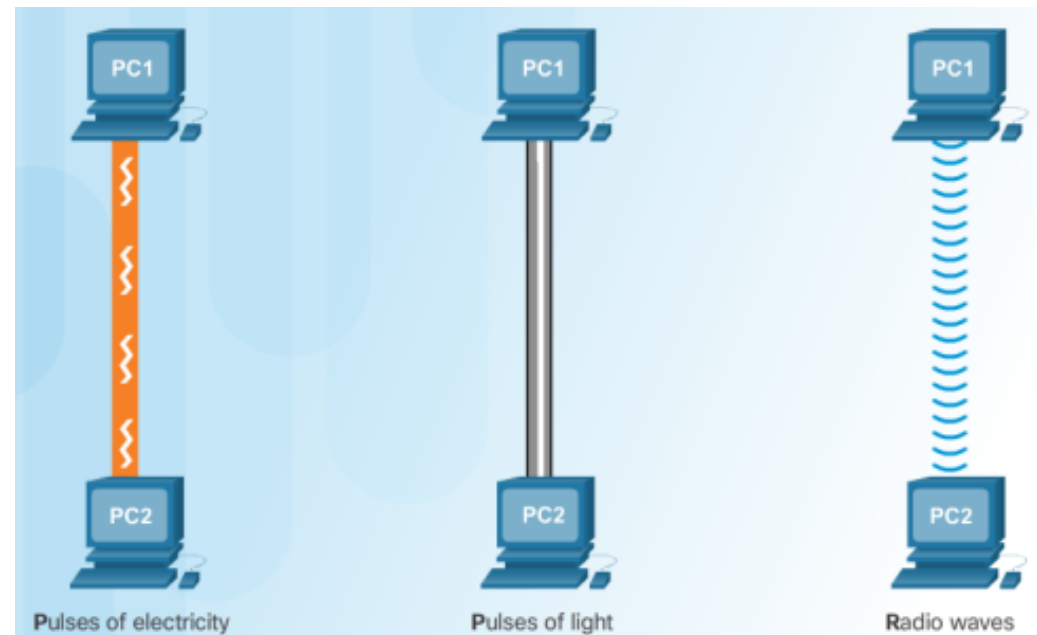
Transmitting Data on the Network

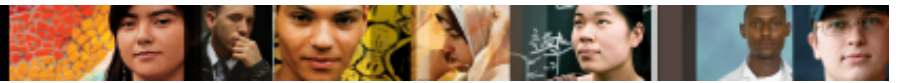
■ The Mighty Bit

- Computers use binary codes to represent and interpret letters, numbers and special characters with bits.
- Each group of eight bits, such as the representations of letters and numbers, is known as a byte.

■ Getting Bits Moving

- Bits are transmitted as signals over copper wire (electrical pulses), fiber-optic cable (light pulses), and wireless (radio waves).





Communicating in a Connected World

It's All About the Speed

■ Measuring Bandwidth

- Digital bandwidth is the amount of data that can flow from one place to another in a given amount of time measured in the number of bits that (theoretically) can be sent across the media in a second.

■ Measuring Throughput

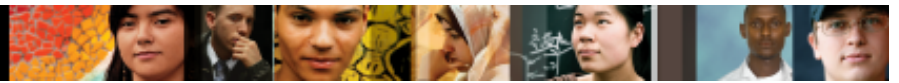
- Throughput is the actual measure of the transfer of bits across the media over a given period of time.
- Many factors influence throughput including the amount of data being sent / received, the types of data being transmitted, and the accumulated latency created by the number of network devices encountered between source and destination.



1.2 Local Networks



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Local Networks

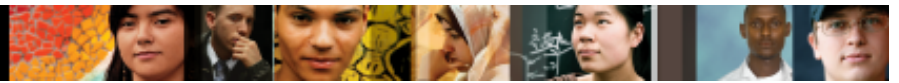
Network Components

■ Clients and Servers

- Servers are hosts that have software installed that enable them to provide information, like email or web pages, to other hosts on the network.
- Clients are computer hosts that have software installed that enable them to request and display the information obtained from the server.

■ Multiple Roles in the Network

- Servers can provide multiple services in a network



Local Networks

Building Blocks of a Network

- Network Infrastructure
 - This is the platform that supports the network containing **end devices**, **intermediate devices** (routers, switches, access points, ...) interconnected using network media (wired and wireless).
- End Devices
 - Includes computers, laptops, printers, tablets, smart devices, ...
 - Form the interface between users and the underlying communication network.



1.3 Building a Simple Network



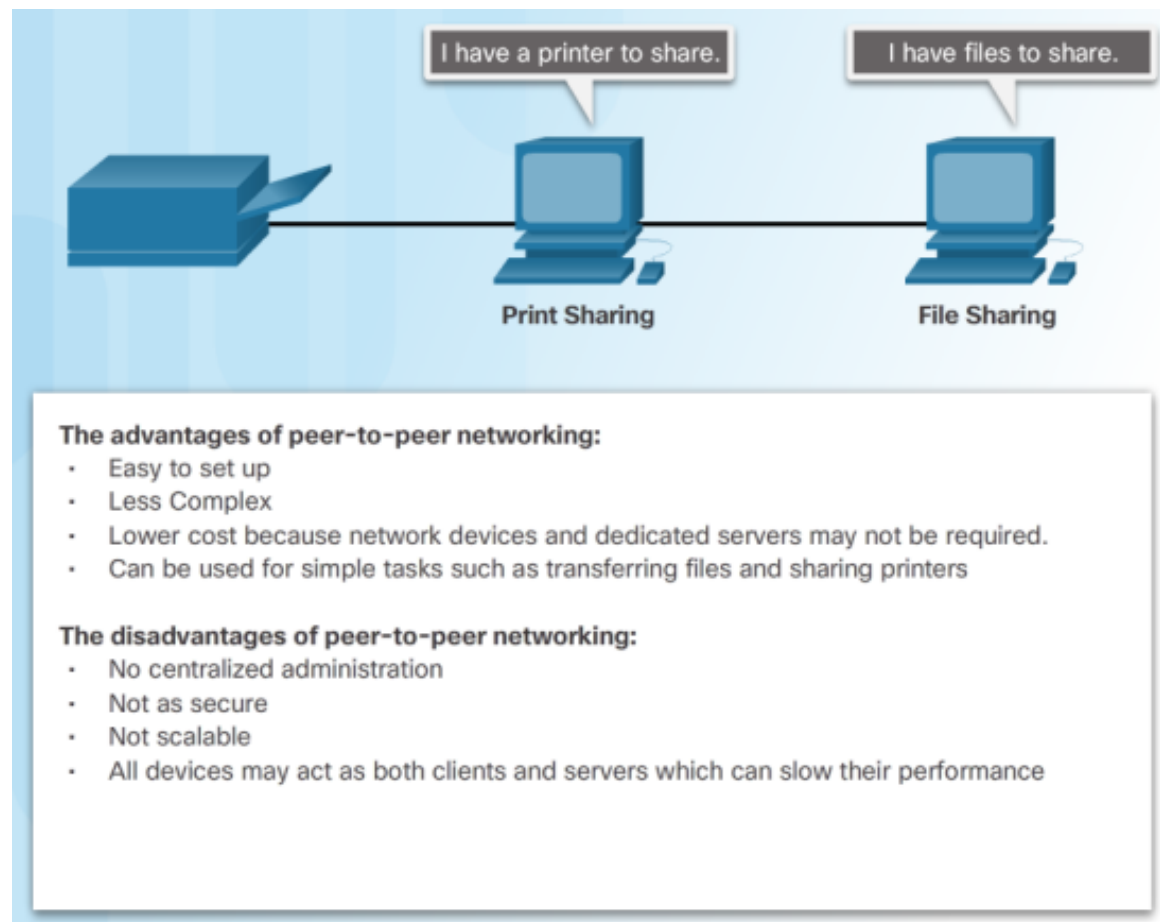
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Building a Simple Network

Peer-to-Peer Networking

- What does Peer-to-Peer mean?
 - Network in which a host can be a client and a server for other hosts.





Building a Simple Network

Does It Work?

- Using the Ping Command
 - Use the **ping** utility to test end-to-end IP connectivity between a source and destination IP address.

- Following the Path
 - Use the **traceroute** utility to display each hop in the path to the destination.

