Communicating over the Network

Network Fundamentals – Chapter 2

Cisco | Networking Academy®
Mind Wide Open™

Version 4.0

Objectives

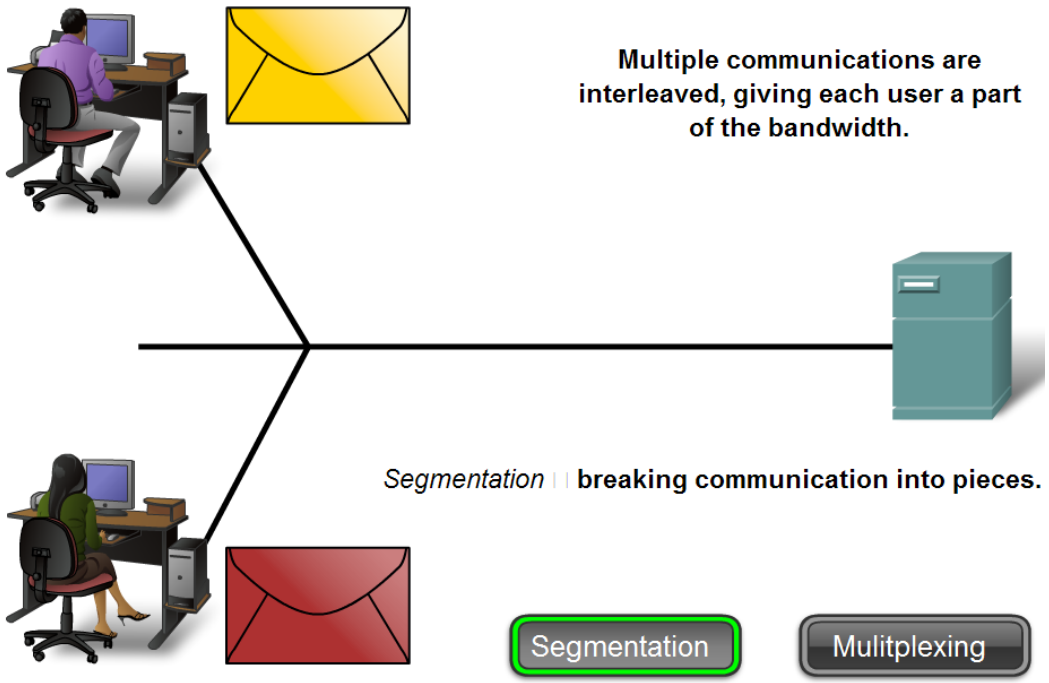
- Describe the structure of a network, including the devices and media that are necessary for successful communications.
- Explain the function of protocols in network communications.
- Explain the advantages of using a layered model to describe network functionality.
- Describe the role of each layer in two recognized network models: The TCP/IP model and the OSI model.
- Describe the importance of addressing and naming schemes in network communications.

Network Structure

- Define the elements of communication
  - 3 common elements of communication
    - Message source
    - The channel
    - Message destination
- Define a network
  - Data or information networks capable of carrying many different types of communications

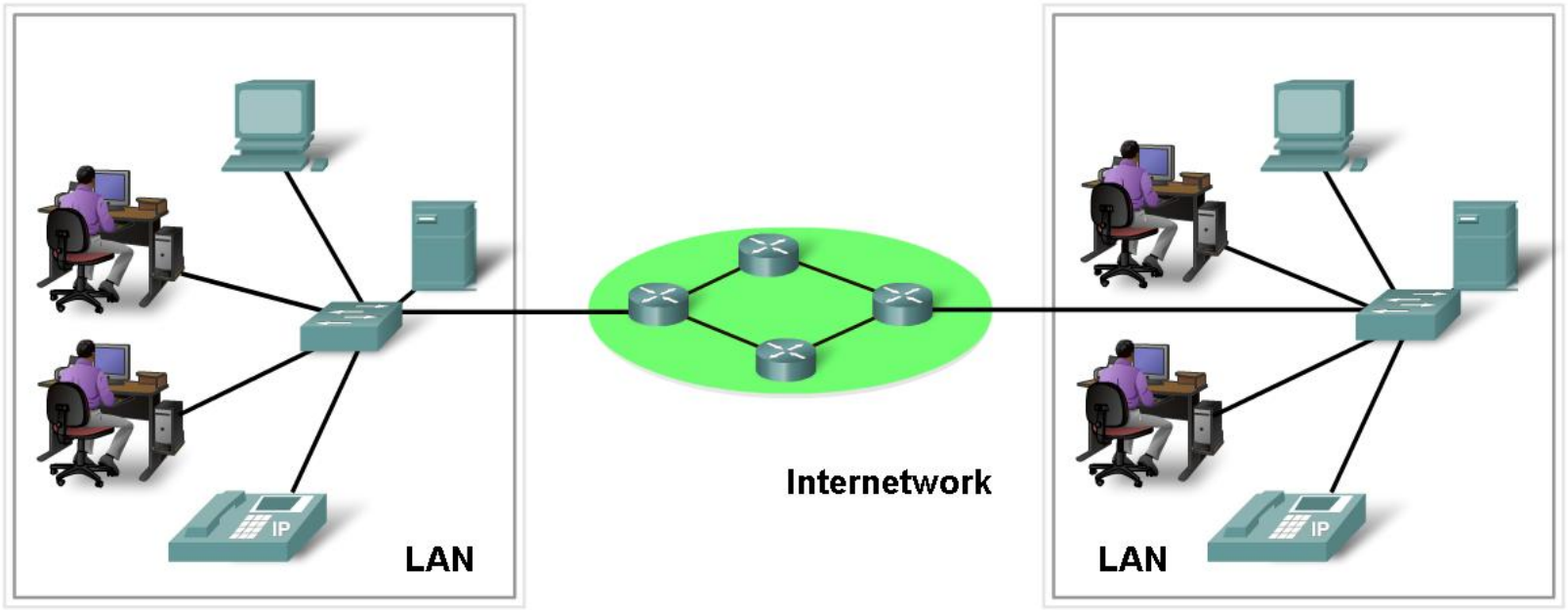
Network Structure

- Describe how messages are communicated
  - Data is sent across a network in small “chunks” called segments



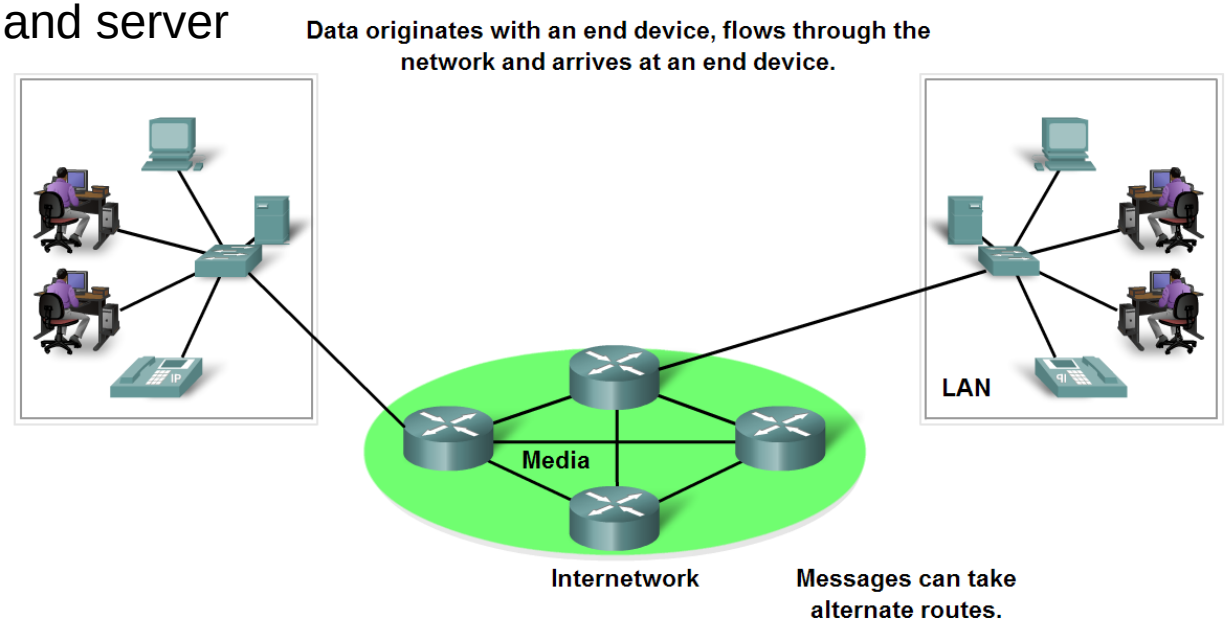
Network Structure

- Define the components of a network
  - Network components
    - Hardware
    - Software



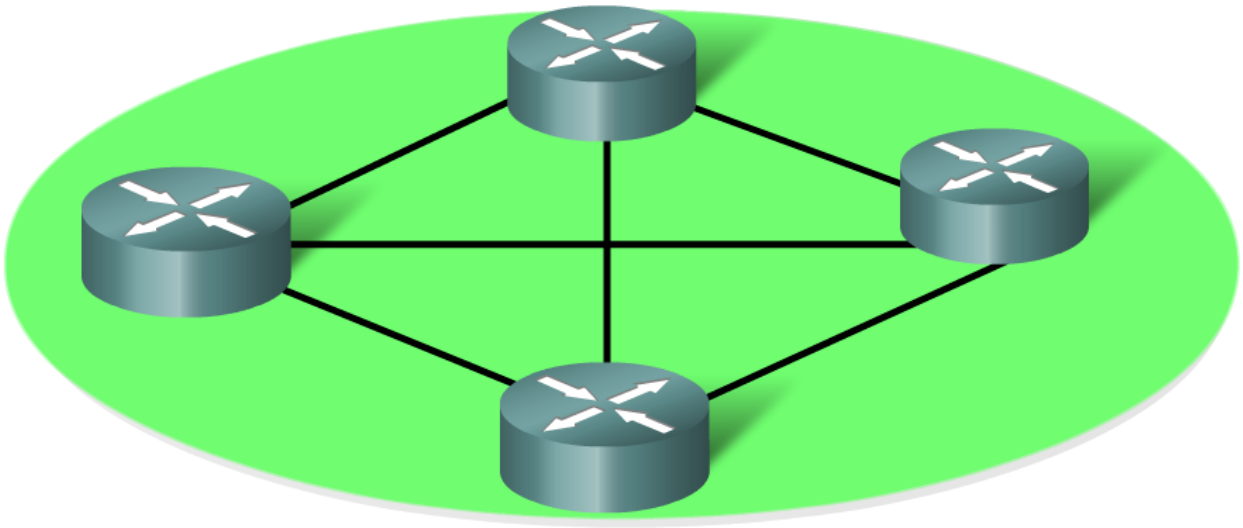
Network Structure

- End Devices and their Role in the Network
  - End devices form interface with human network & communications network
  - Role of end devices:
    - Client
    - Server
    - Both client and server



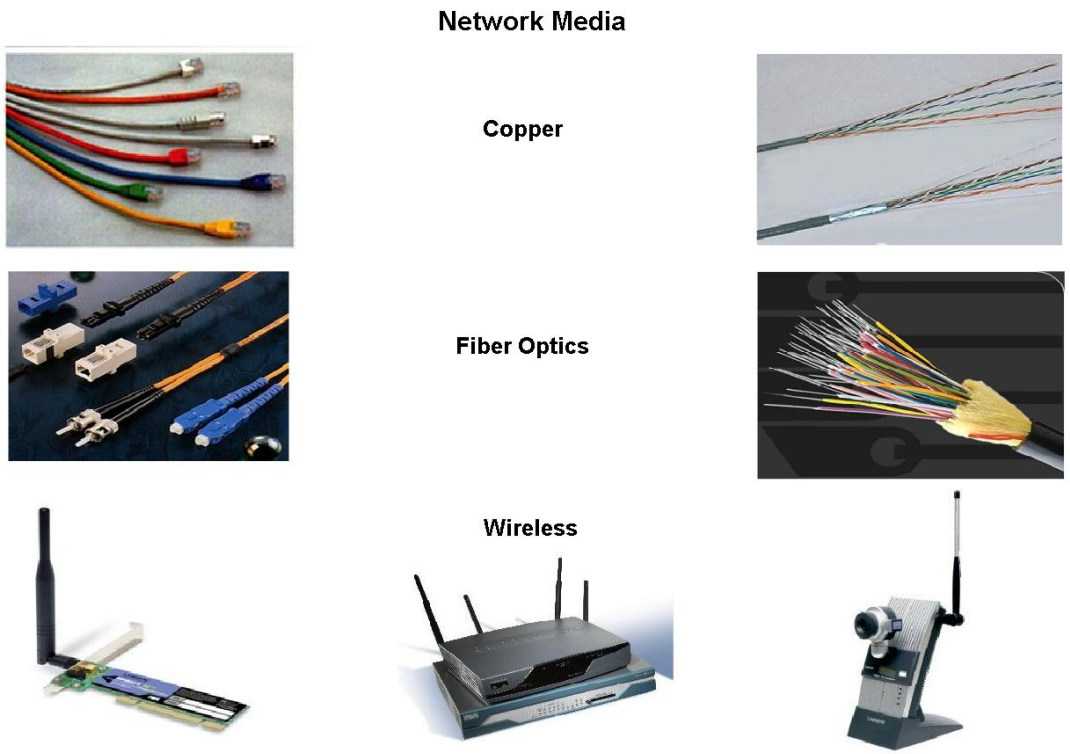
Network Structure

- Identify the role of an intermediary device in a data network and be able to contrast that role with the role of an end device
  - Role of an intermediary device
    - Provides connectivity and ensures data flows across network



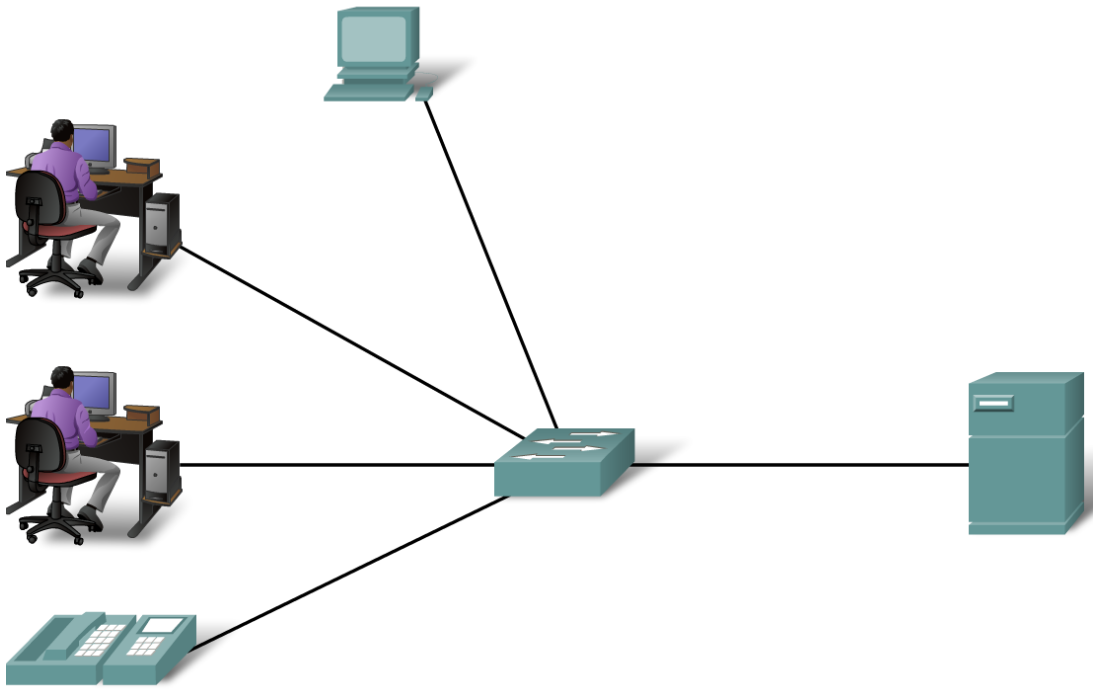
Network Structure

- Define network media and criteria for making a network media choice
  - Network media – this is the channel over which a message travels



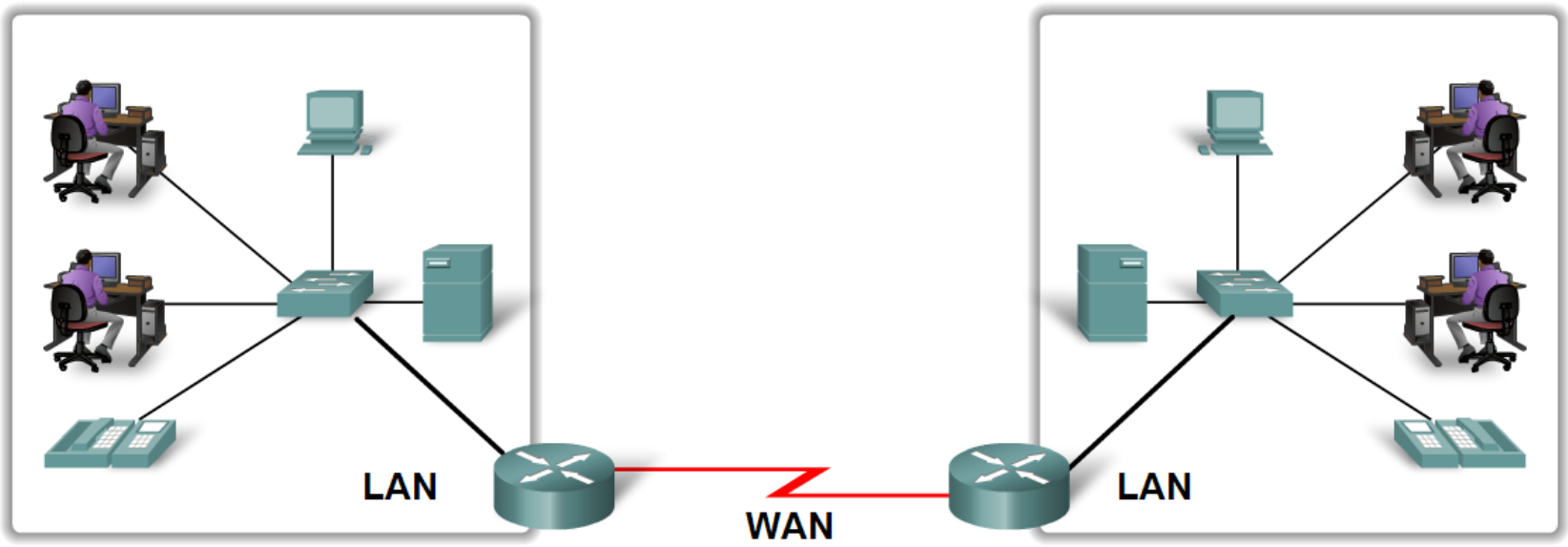
Network Types

- Define Local Area Networks (LANs)
  - A network serving a home, building or campus is considered a Local Area Network (LAN)



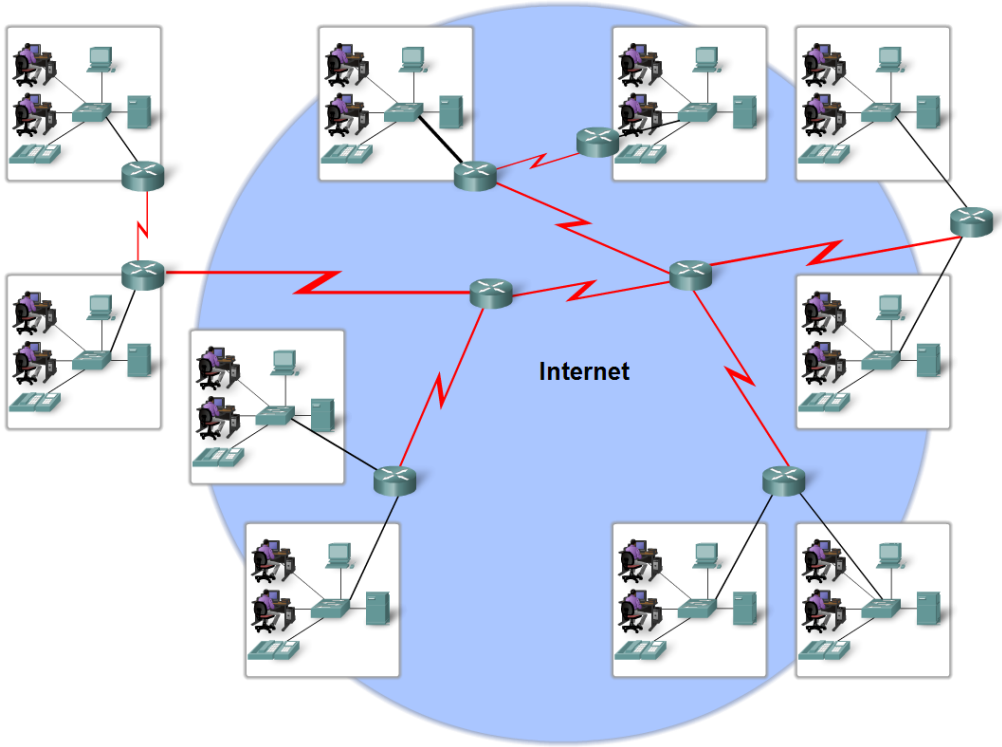
Network Types

- Define Wide Area Networks (WANs)
  - LANs separated by geographic distance are connected by a network known as a Wide Area Network (WAN)



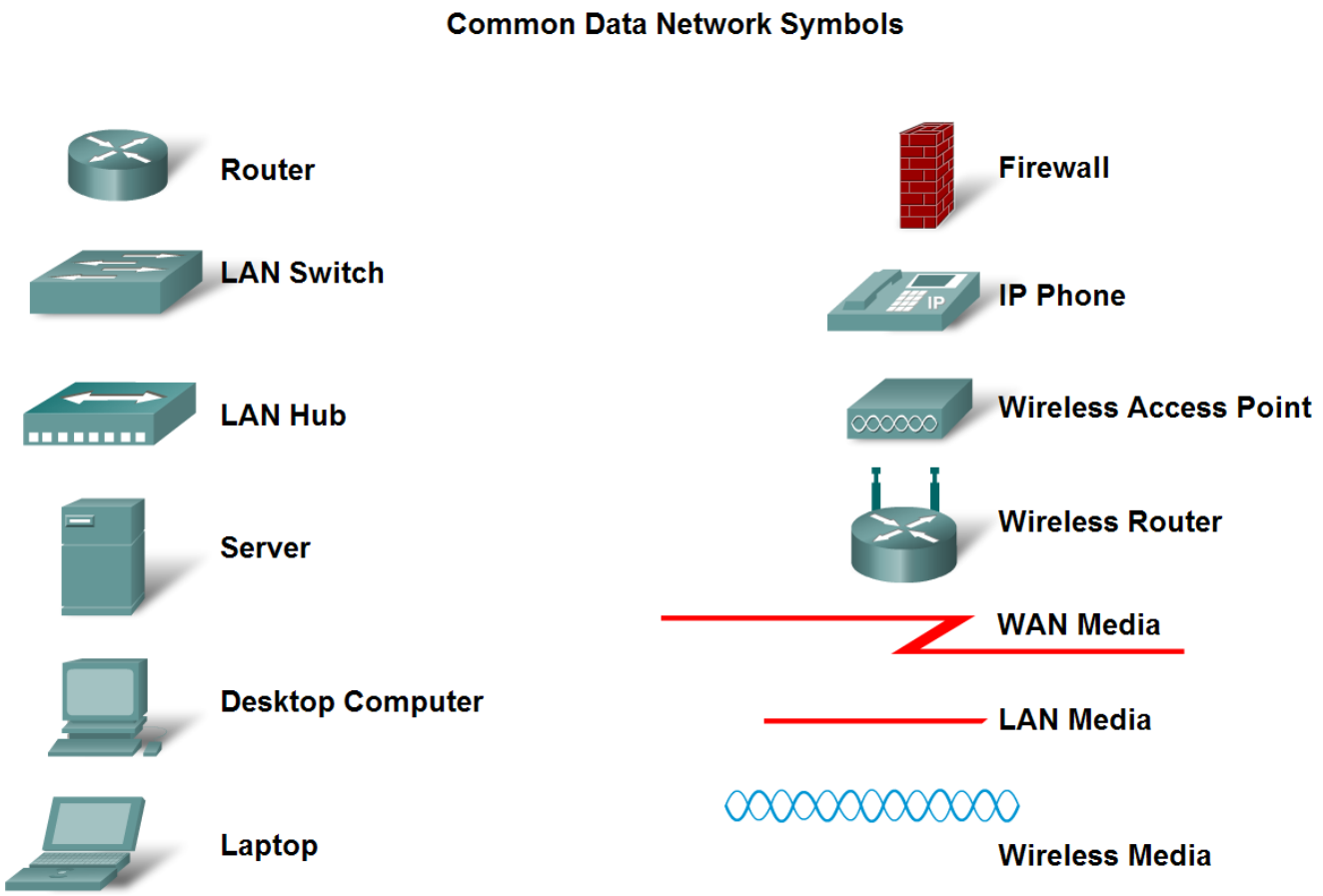
Network Types

- Define the Internet
  - The internet is defined as a global mesh of interconnected networks



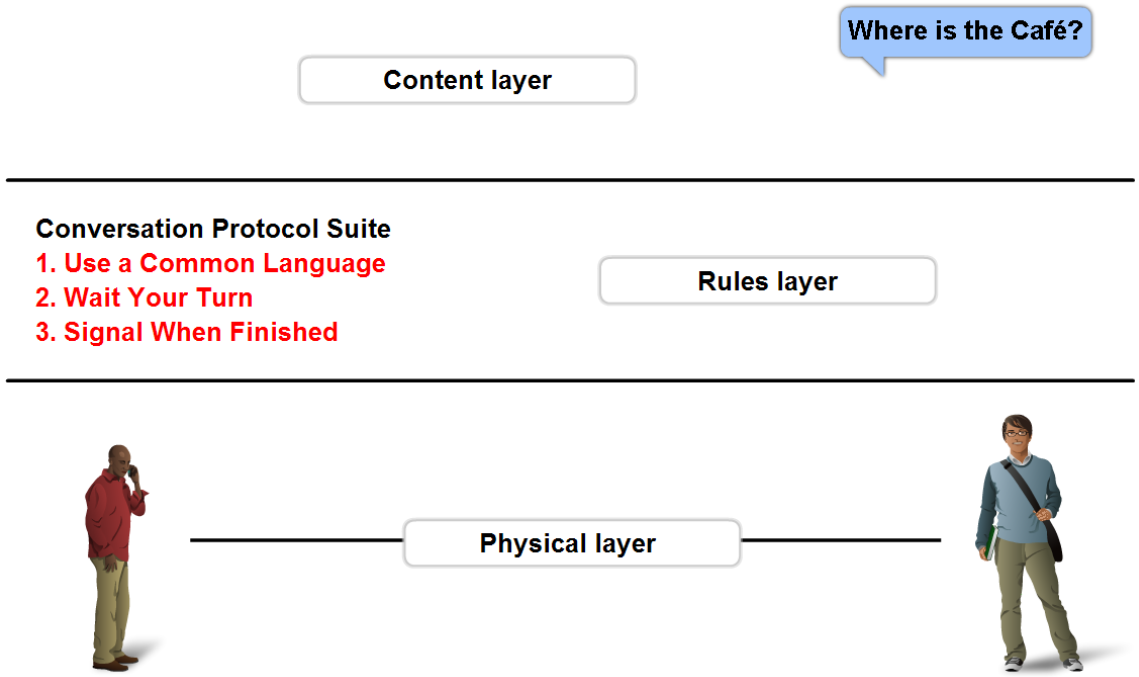
Network Types

- Describe network representations



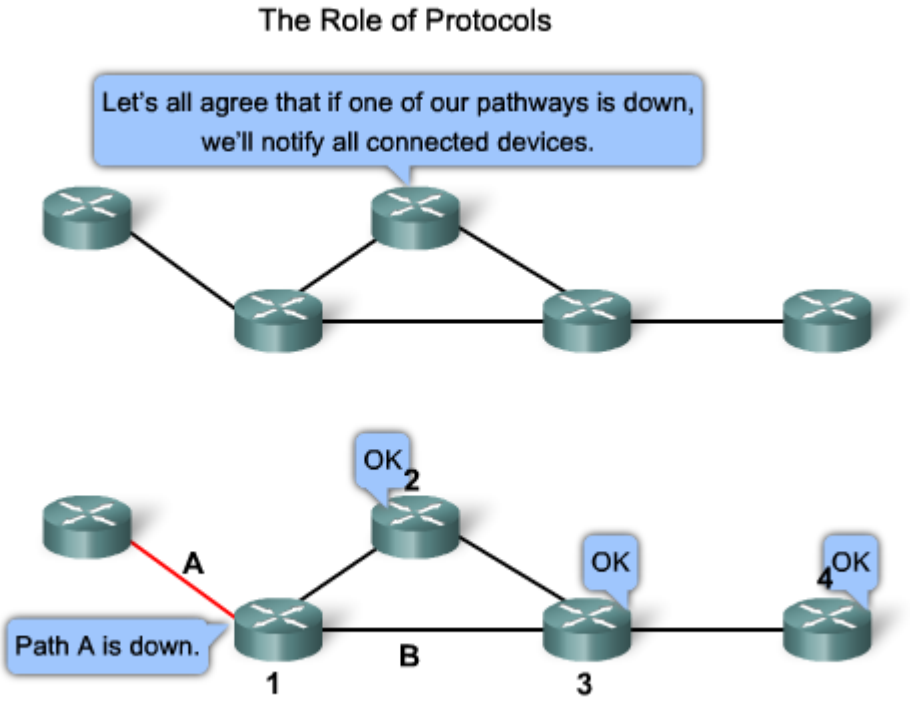
Function of Protocol in Network Communication

- The importance of protocols and how they are used to facilitate communication over data networks
  - A protocol is a set of predetermined rules



Function of Protocol in Network Communication

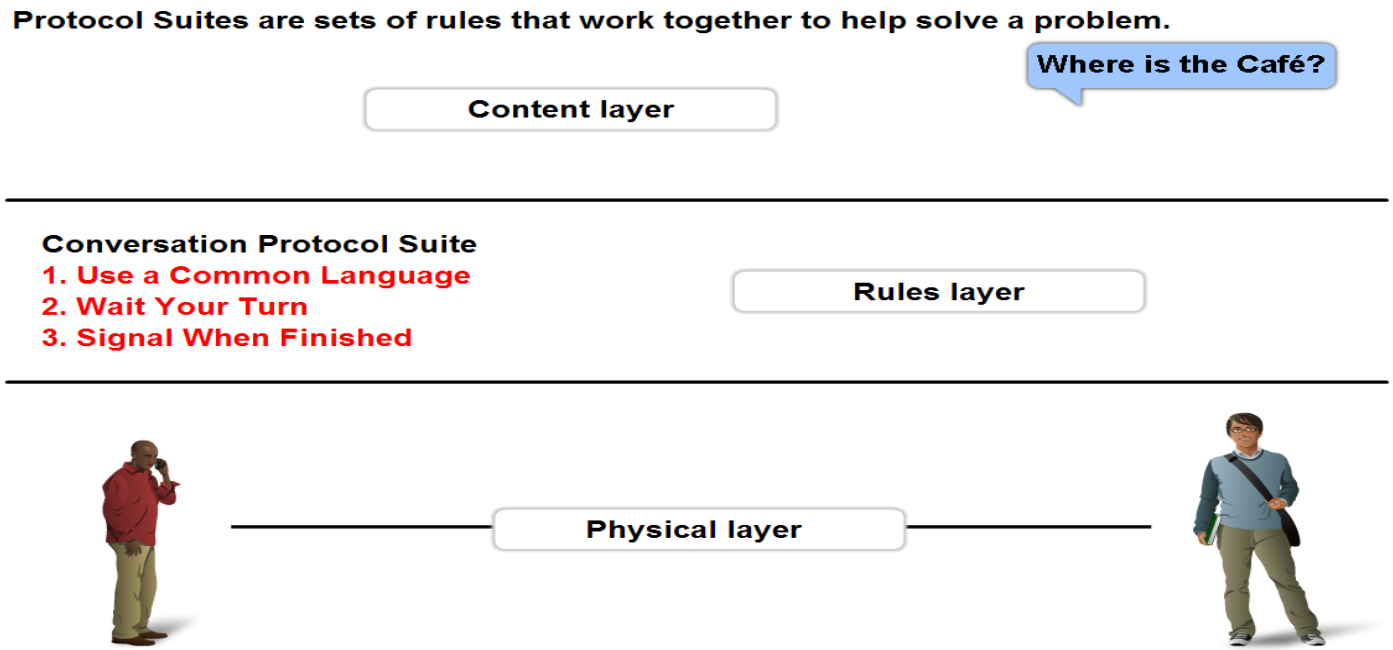
- Explain network protocols
  - Network protocols are used to allow devices to communicate successfully



The process by which networking devices share information about pathways to other networks

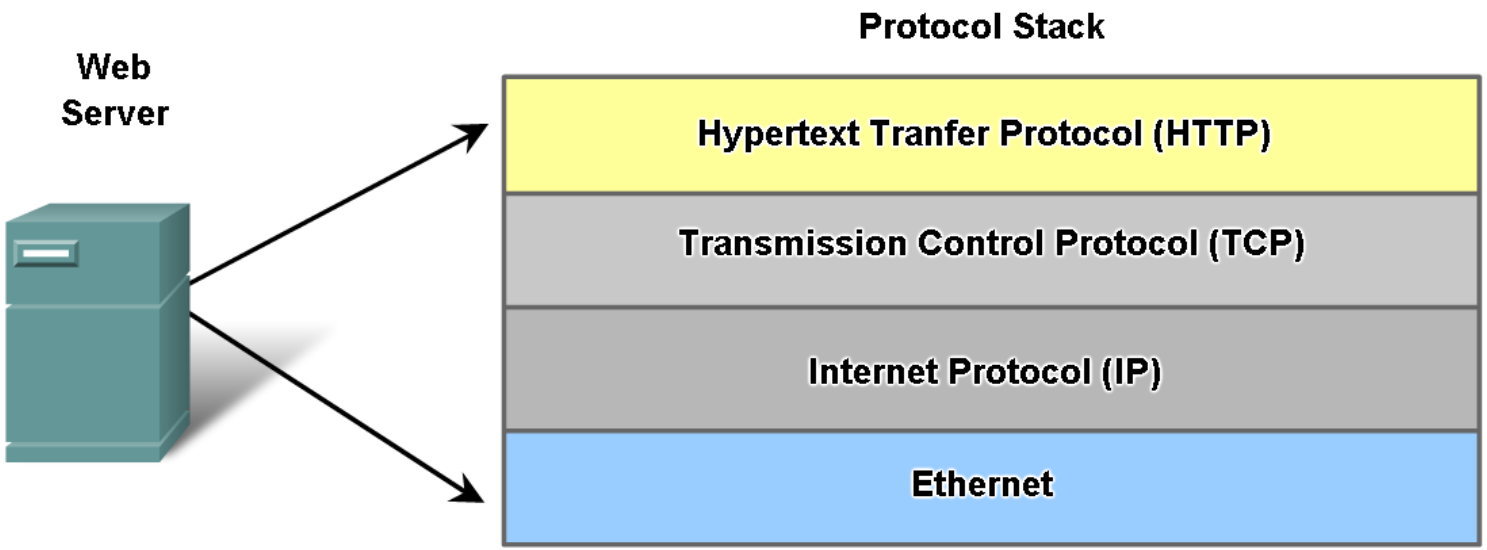
Function of Protocol in Network Communication

- Describe Protocol suites and industry standards
  - A standard is a process or protocol that has been endorsed by the networking industry and ratified by a standards organization



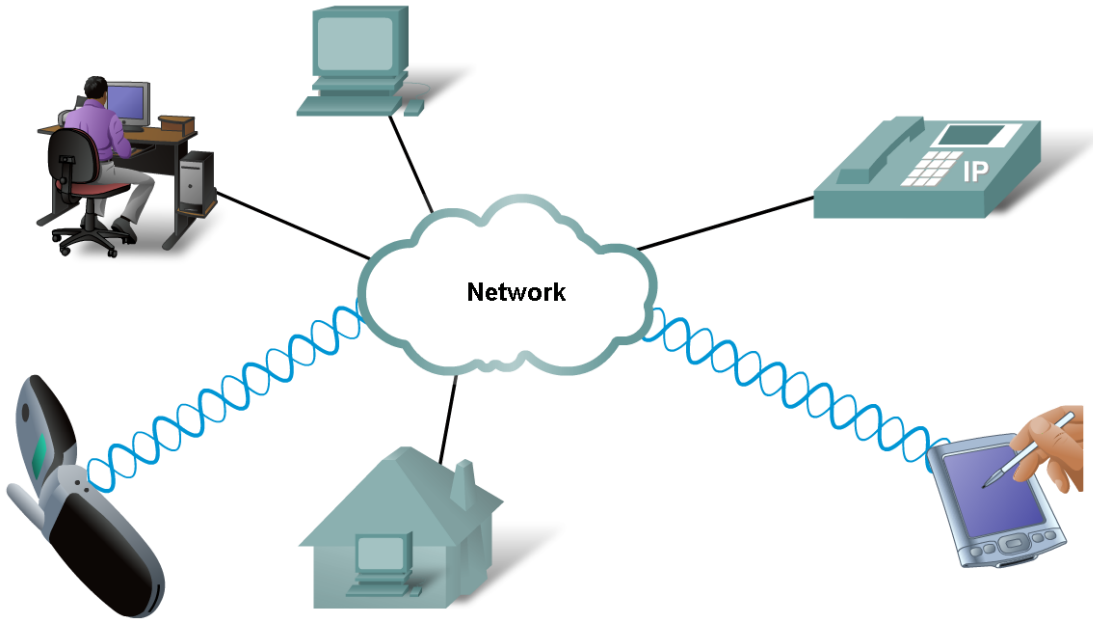
Function of Protocol in Network Communication

- Define different protocols and how they interact



Function of Protocol in Network Communication

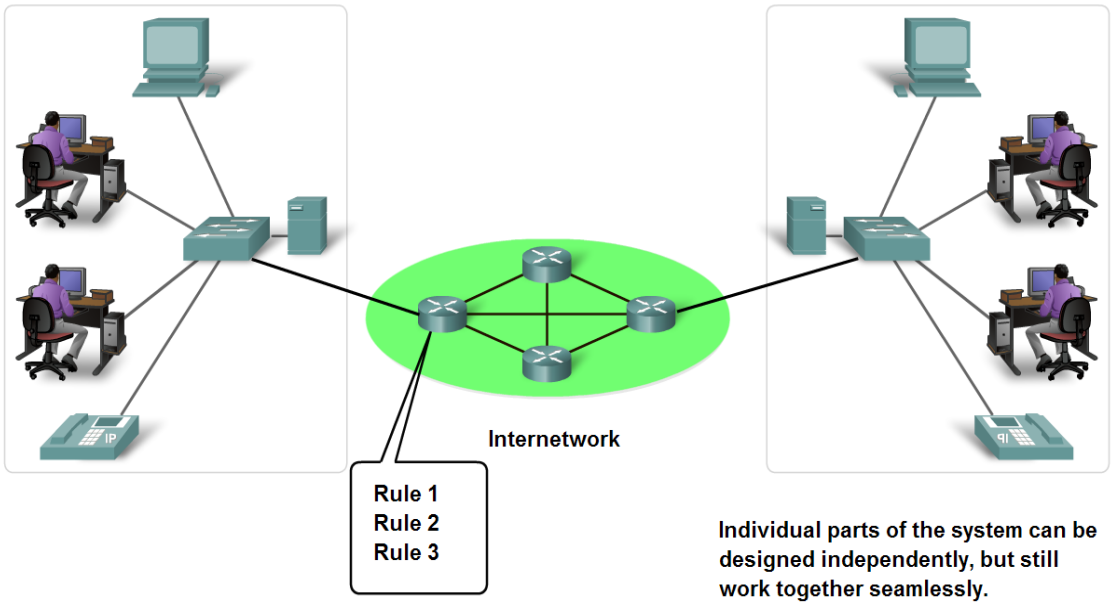
- Technology independent Protocols
  - Many diverse types of devices can communicate using the same sets of protocols
  - This is because protocols specify network functionality, not the underlying technology to support this functionality



Layers with TCP/IP and OSI Model

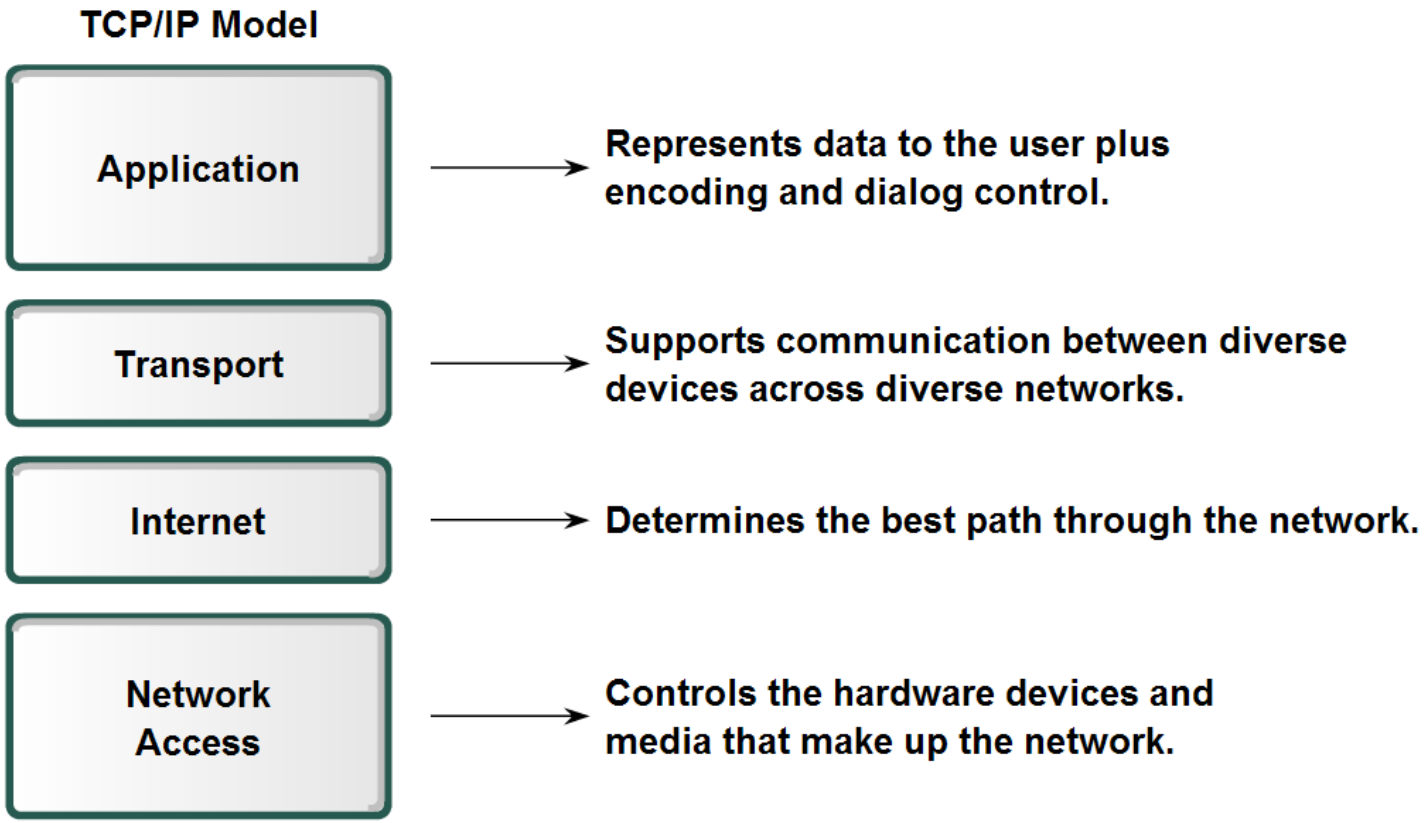
- Explain the benefits of using a layered model
  - Benefits include
    - Assists in protocol design
    - Fosters competition
    - Changes in one layer do not affect other layers
    - Provides a common language

Using a layered model helps in the design of complex, multi-use, multi-vendor networks.



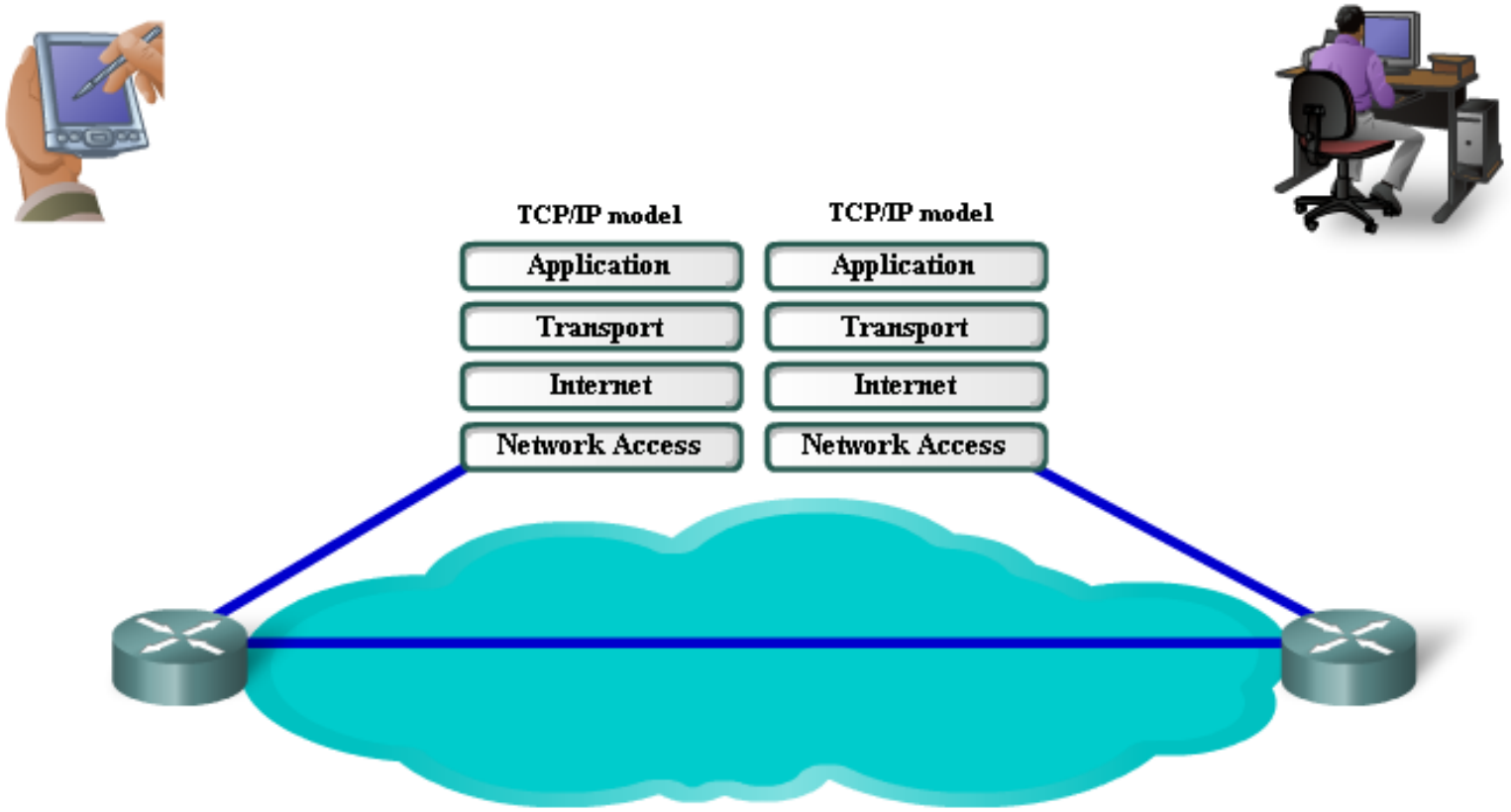
Layers with TCP/IP and OSI Model

- Describe TCP/IP Mode



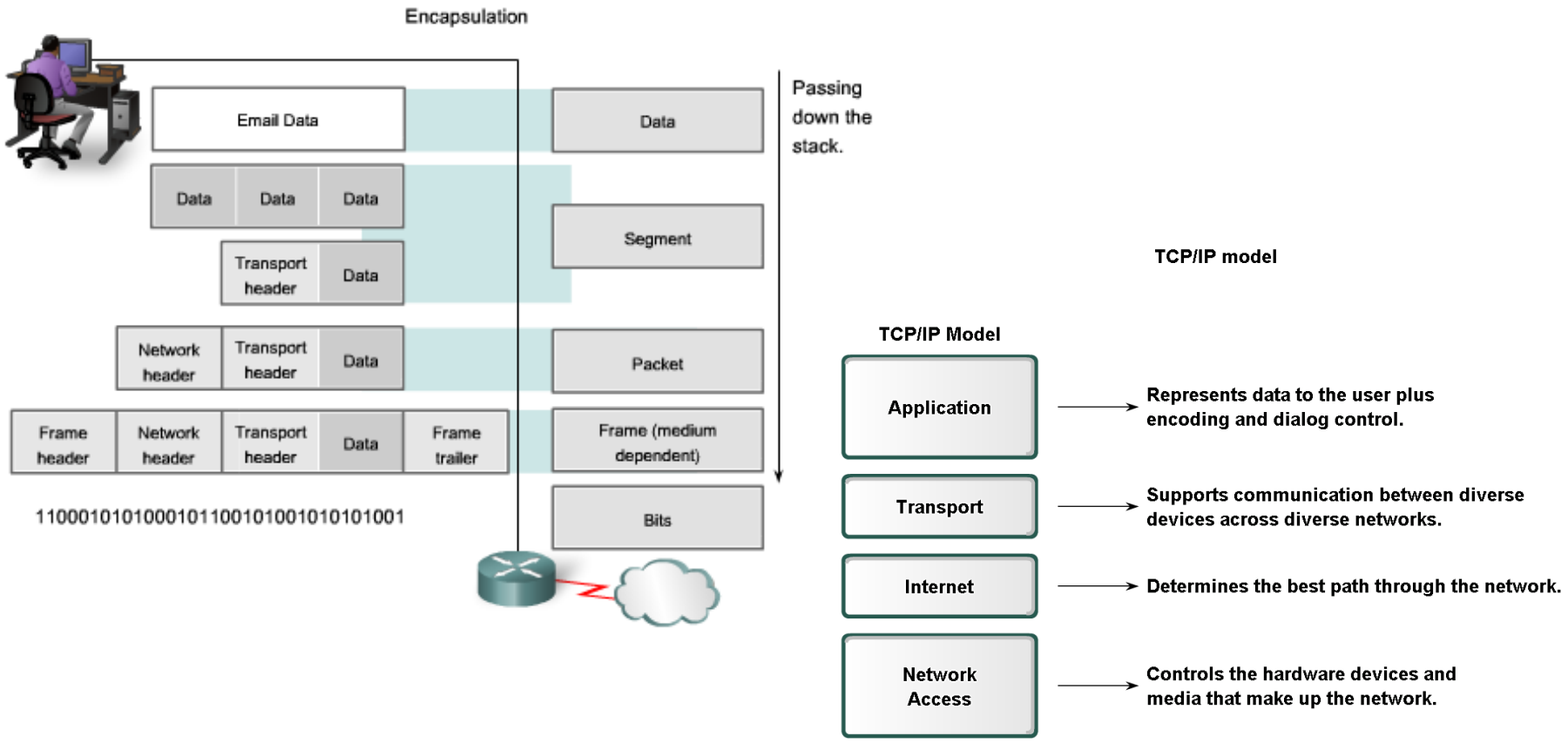
Layers with TCP/IP and OSI Model

- Describe the Communication Process



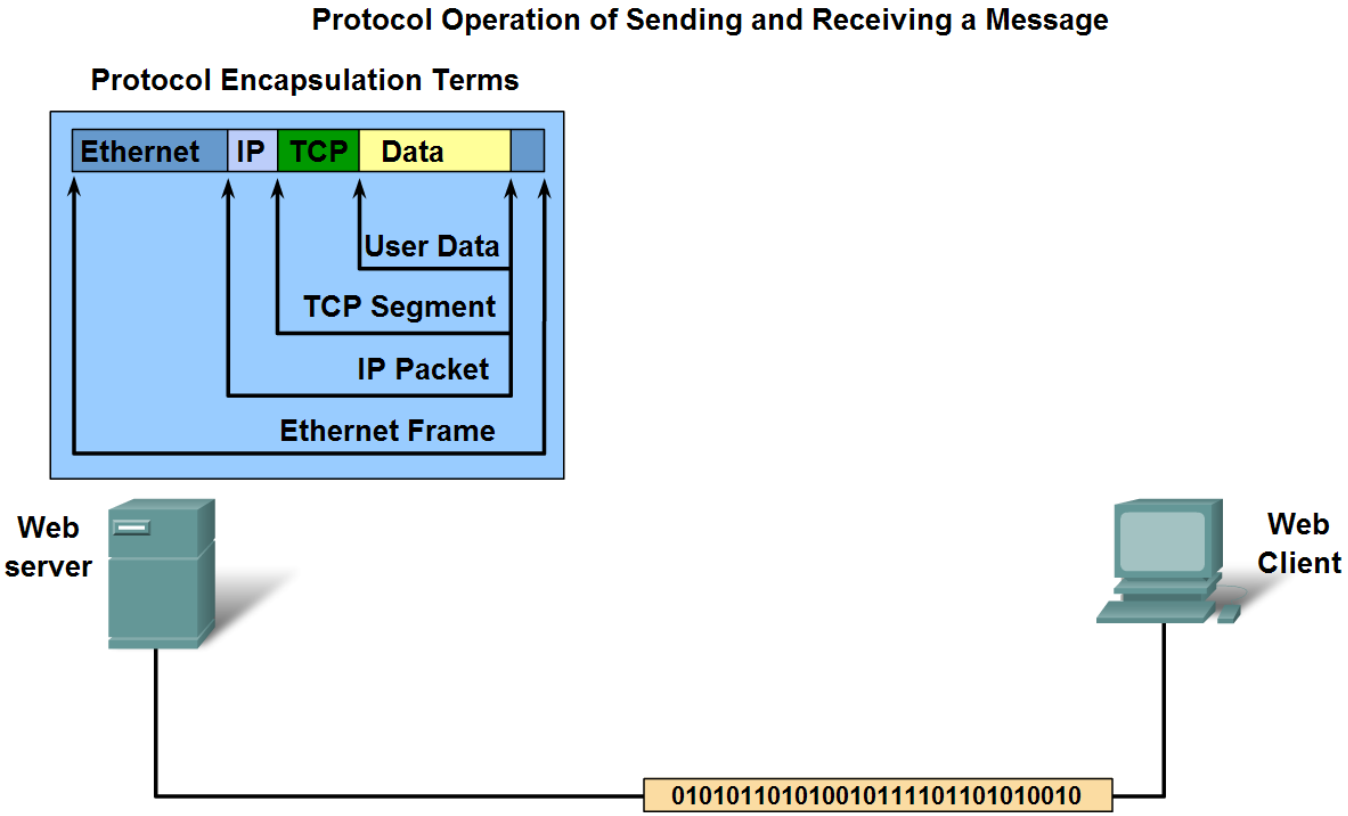
Layers with TCP/IP and OSI Model

- Explain protocol data units (PDU) and encapsulation



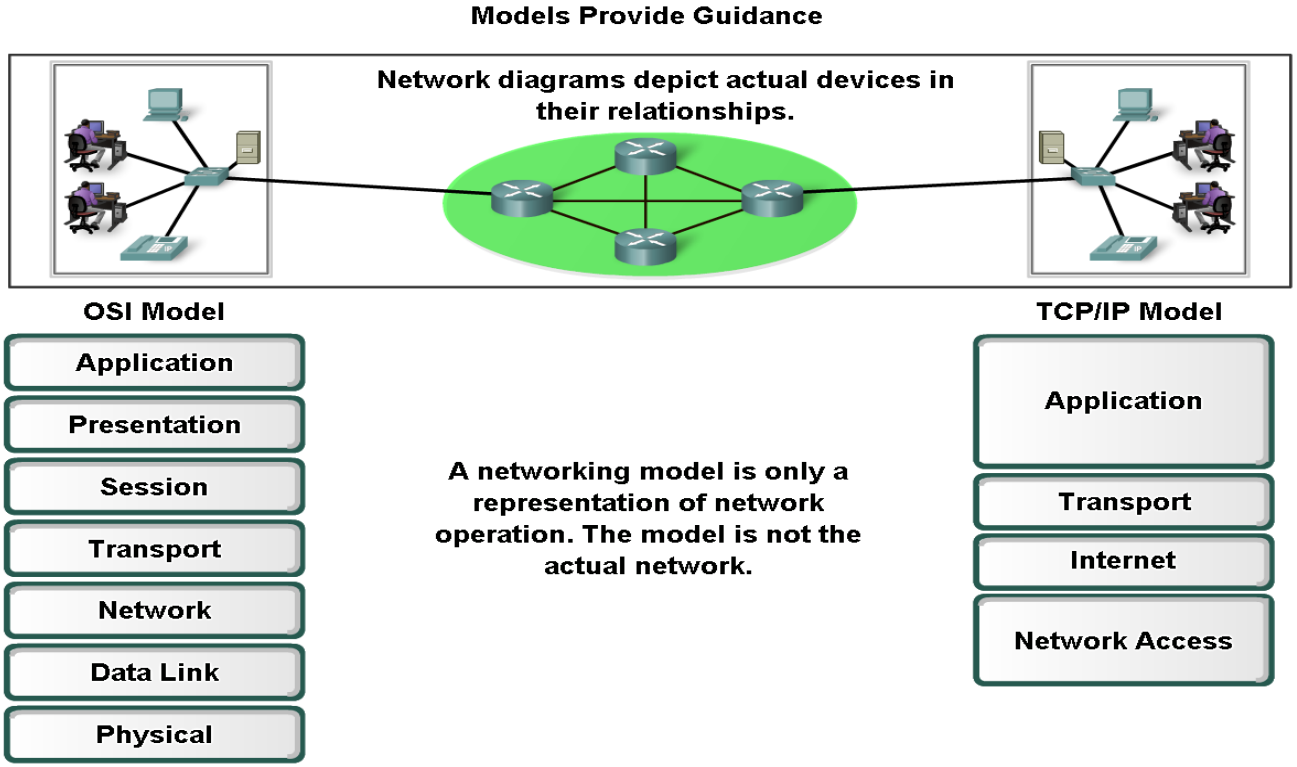
Layers with TCP/IP and OSI Model

- Describe the process of sending and receiving messages



Layers with TCP/IP and OSI Model

- Explain protocol and reference models
  - A protocol model provides a model that closely matches the structure of a particular protocol suite
  - A reference model provides a common reference for maintaining consistency within all types of network protocols and services

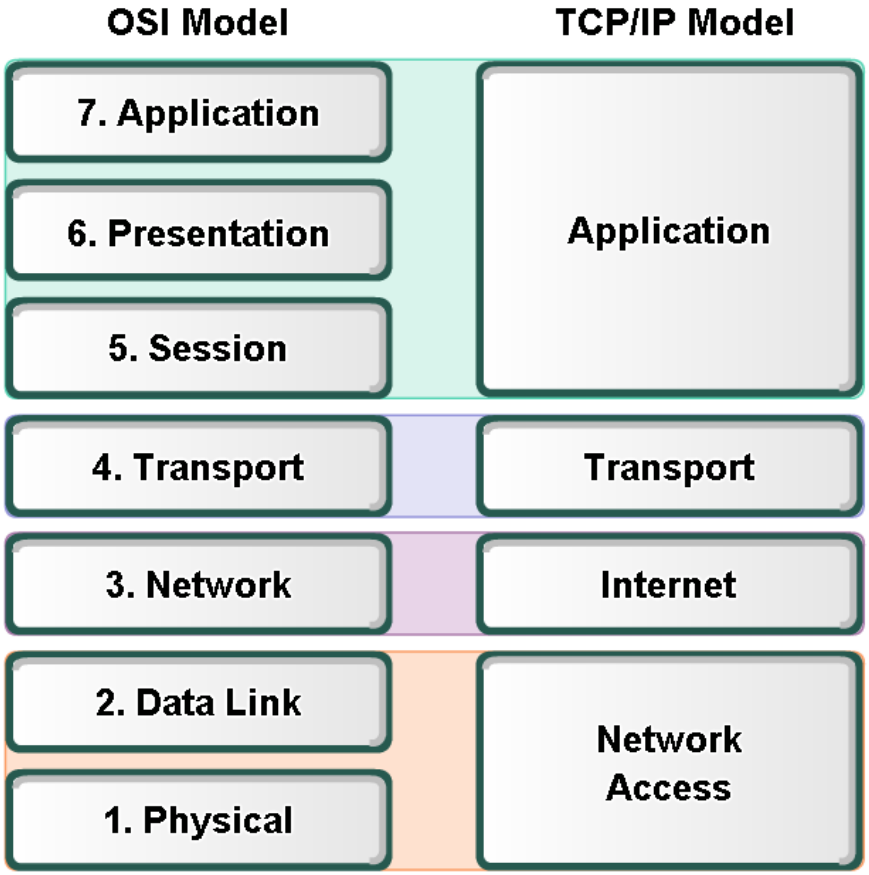


Layers with TCP/IP and OSI Model

- Define OSI

Layers with TCP/IP and OSI Model

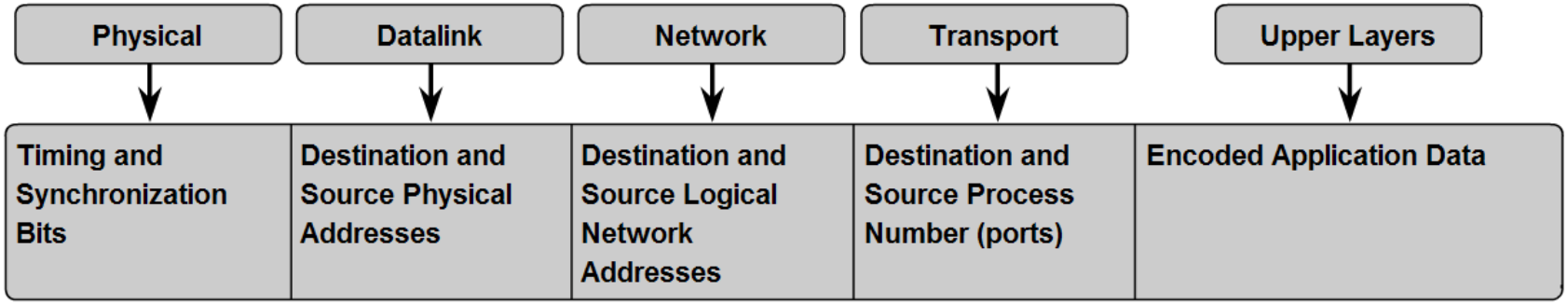
- Compare OSI and TCP/IP model



The key parallels are in the Transport and Network layers.

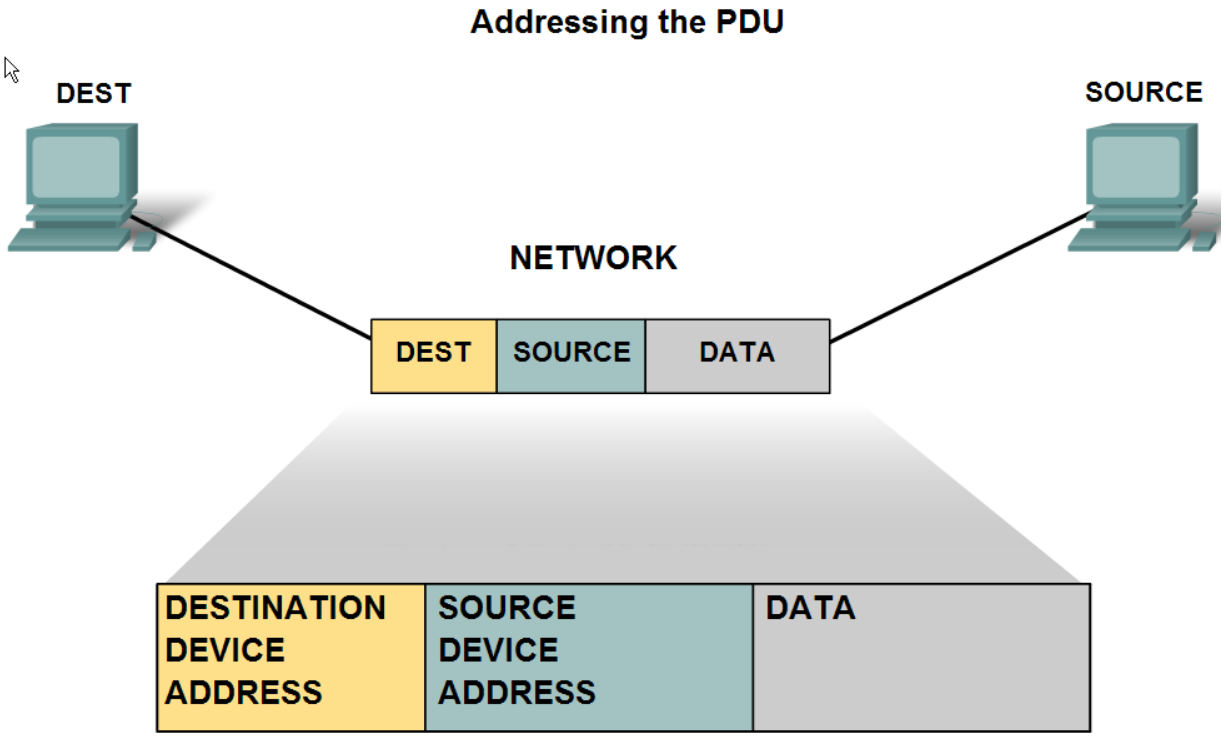
Addressing and Naming Schemes

- Explain how labels in encapsulation headers are used to manage communication in data networks



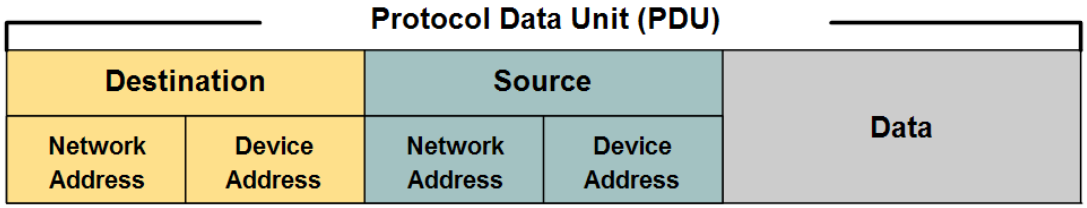
Addressing and Naming Schemes

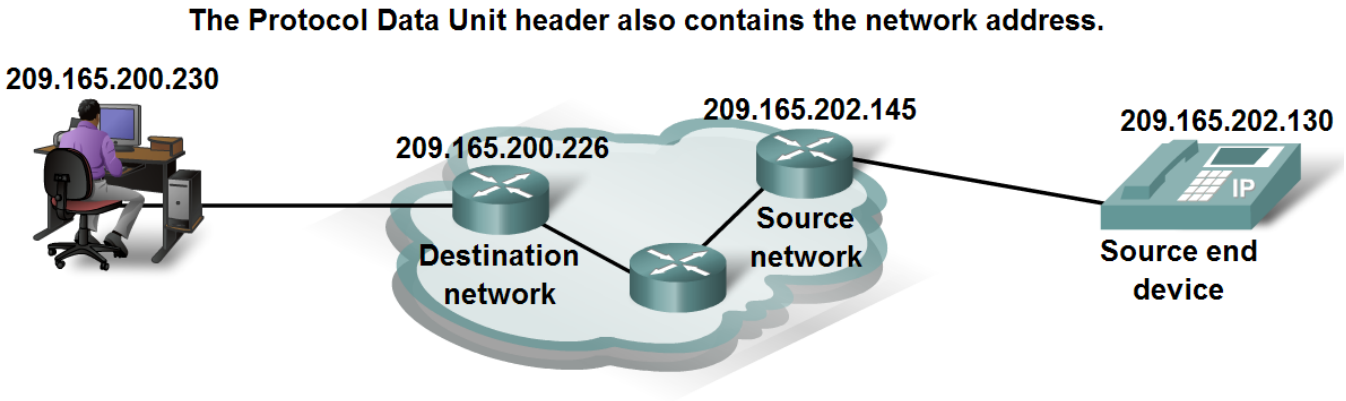
- Describe examples of Ethernet MAC Addresses, IP Addresses, and TCP/UDP Port numbers



Addressing and Naming Schemes

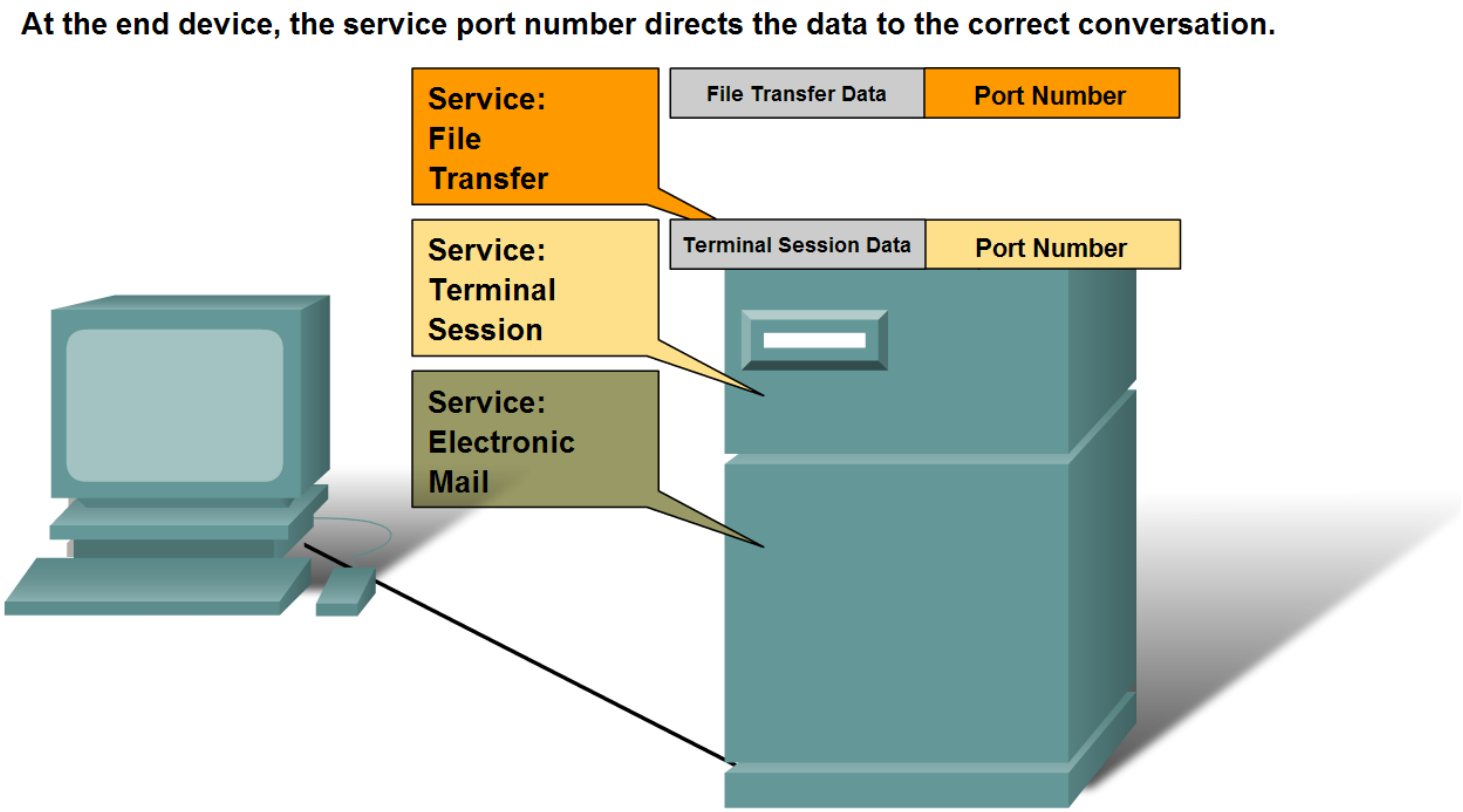
- Explain how labels in encapsulation headers are used to manage communication in data networks





Addressing and Naming Schemes

- Describe how information in the encapsulation header is used to identify the source and destination processes for data communication



Summary

In this chapter, you learned to:

- Describe the structure of a network, including the devices and media that are necessary for successful communications.
- Explain the function of protocols in network communications.
- Explain the advantages of using a layered model to describe network functionality.
- Describe the role of each layer in two recognized network models: The TCP/IP model and the OSI model.
- Describe the importance of addressing and naming schemes in network communications.