



Communicating over the Network



Network Fundamentals – Chapter 2

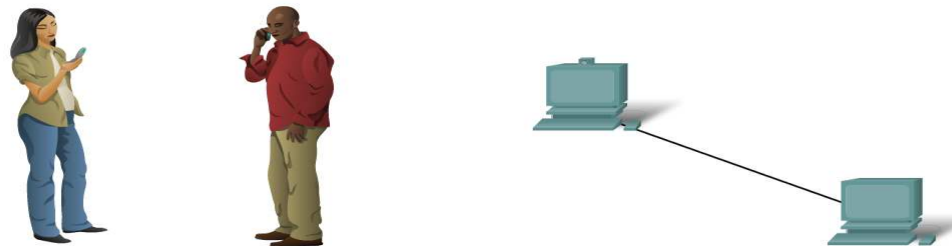
Cisco | Networking Academy®
Mind Wide Open™

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.

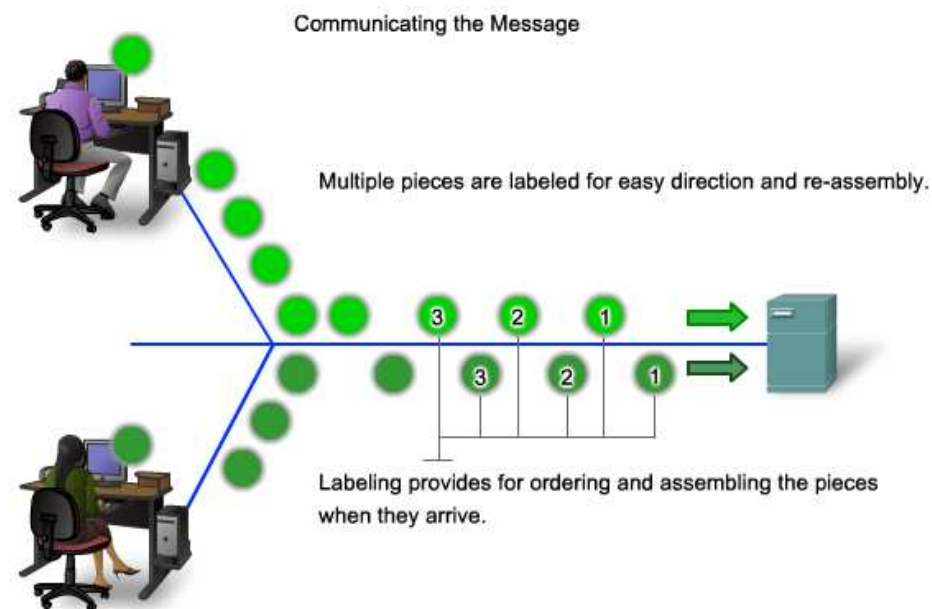
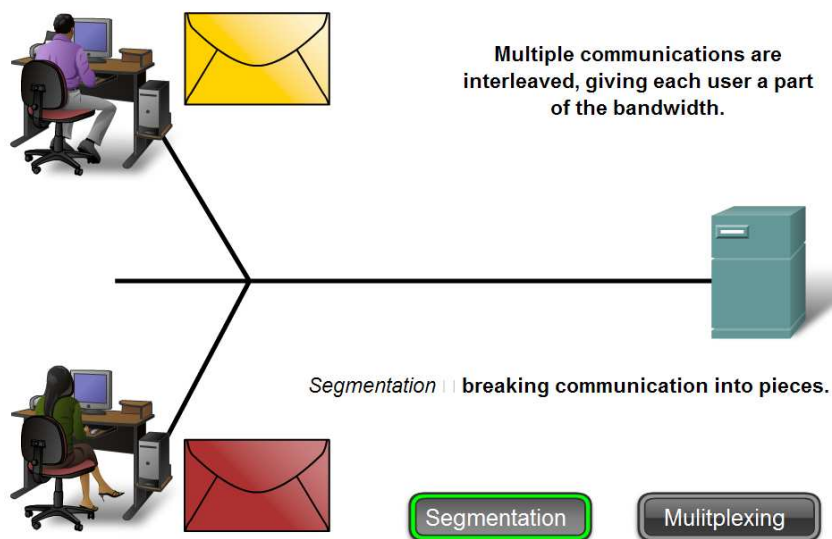
Network Structure

- Define the elements of communication
 - 3 common elements of communication
 - message source
 - the channel
 - message destination



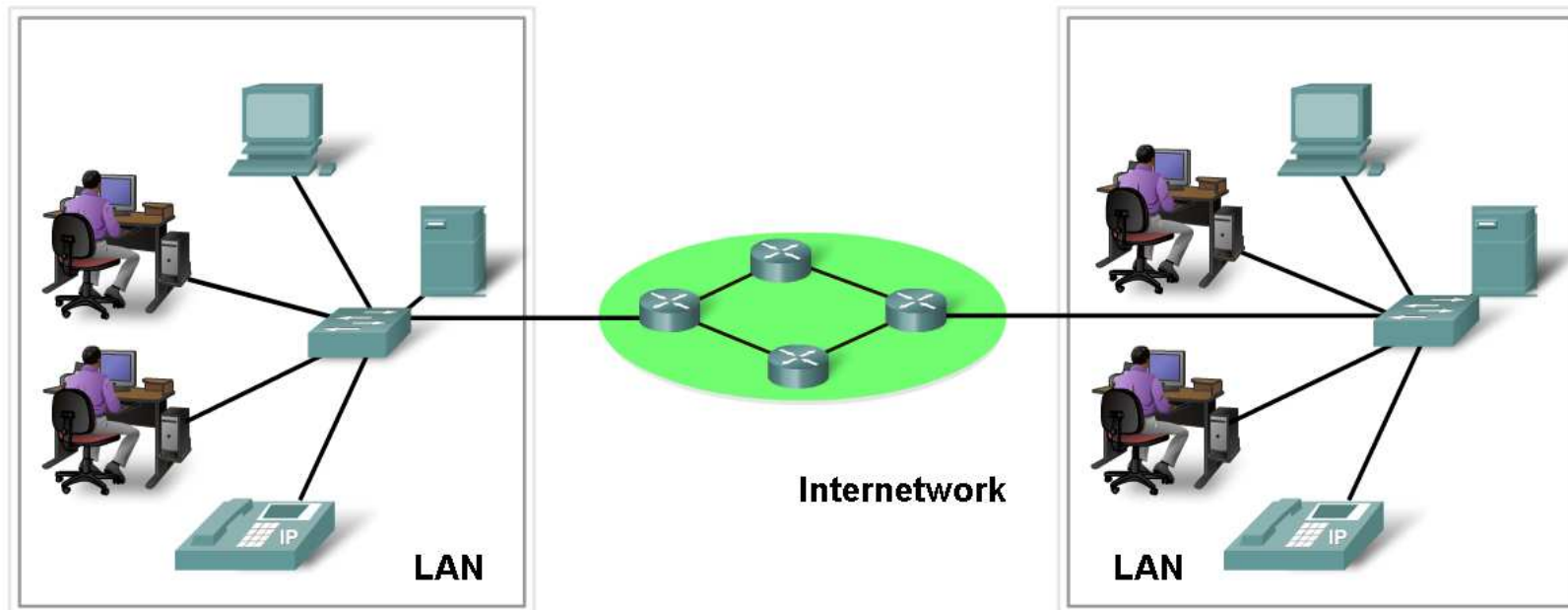
- Define a network
 - data or information networks capable of carrying many different types of communications

Network Structure



Network Structure

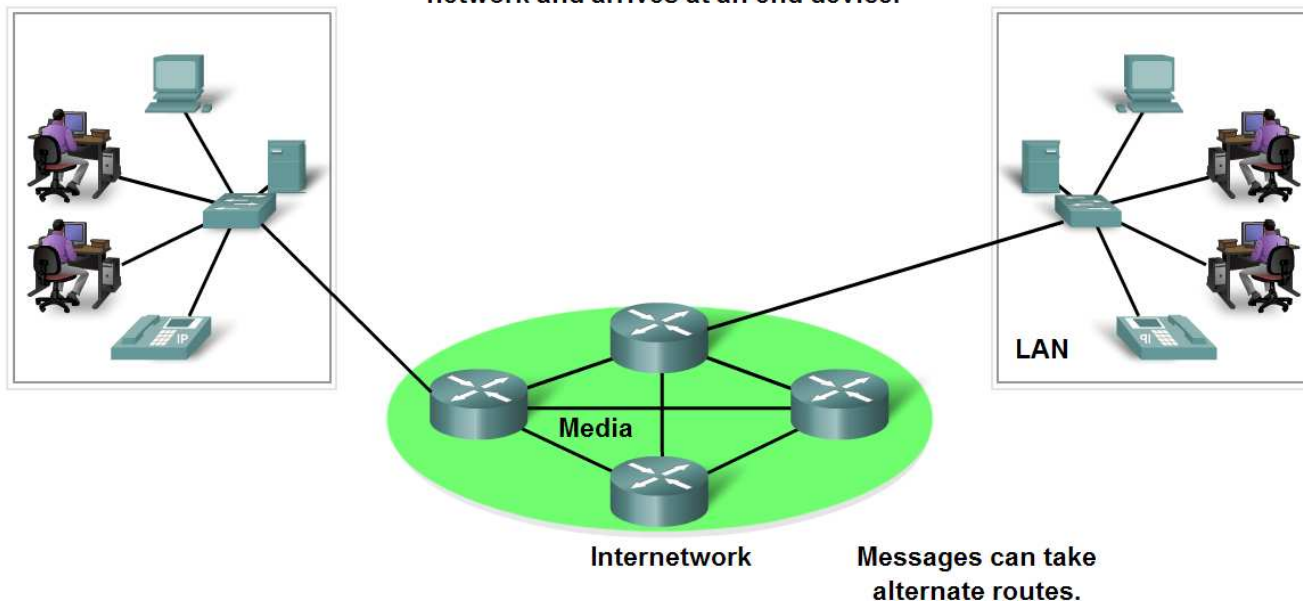
- Network components
 - hardware (media and devices)
 - software



Network Structure

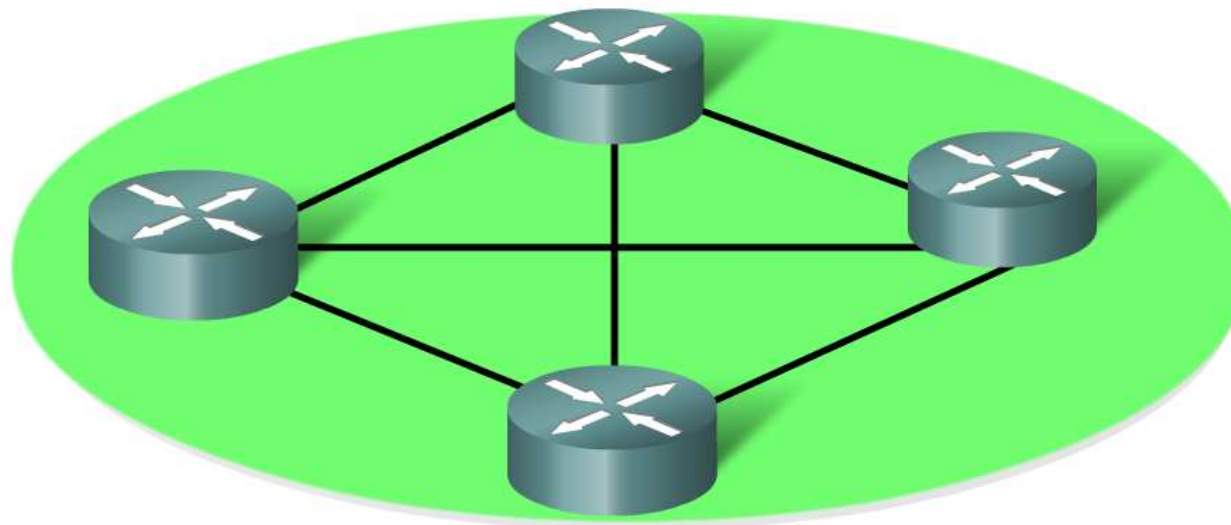
- End Devices and their Role in the Network
 - End devices form interface with human network & communications network
 - Role of end devices:
 - client
 - server
 - both client and server

Data originates with an end device, flows through the network and arrives at an end device.



Network Structure

- Role of an intermediary device
 - provides connectivity and ensures data flows across network



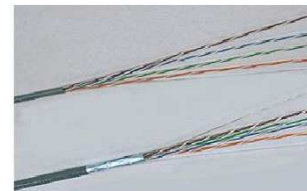
Network Structure

Network media

this is the channel over which a message travels

Network Media

Copper



Fiber Optics

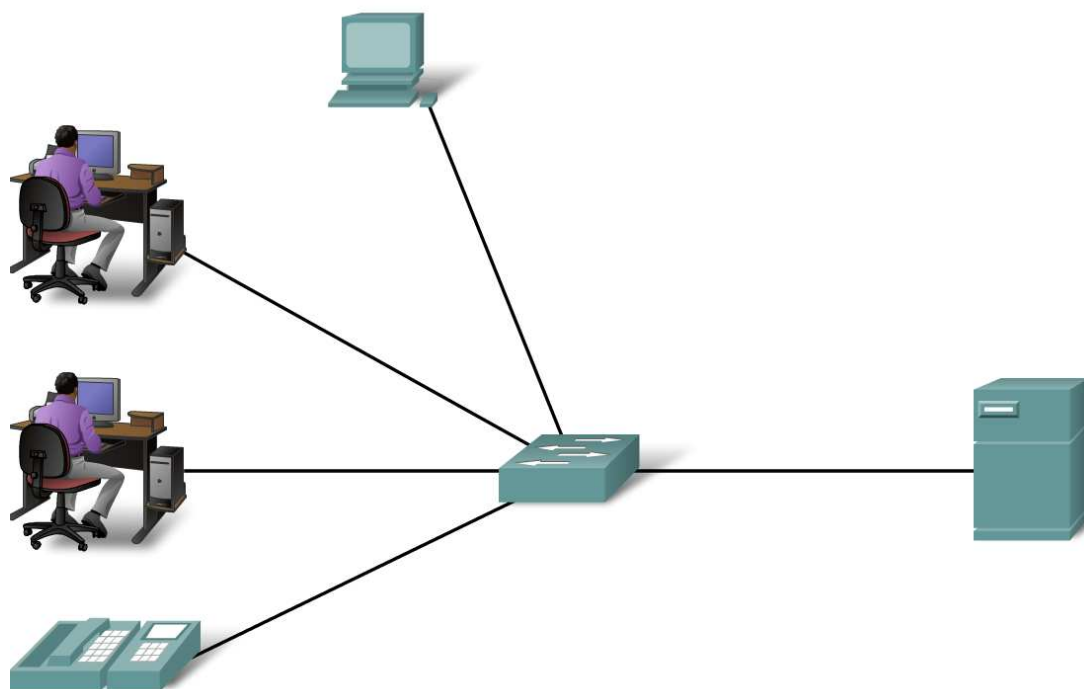


Wireless



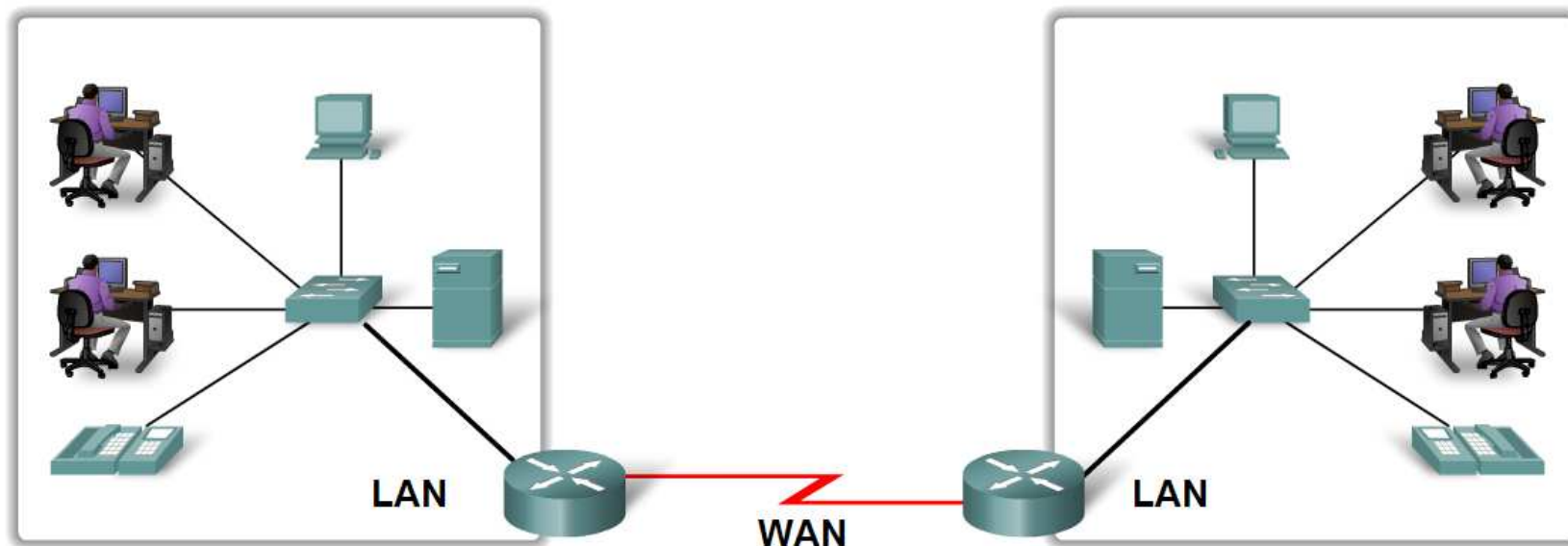
Network Types

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



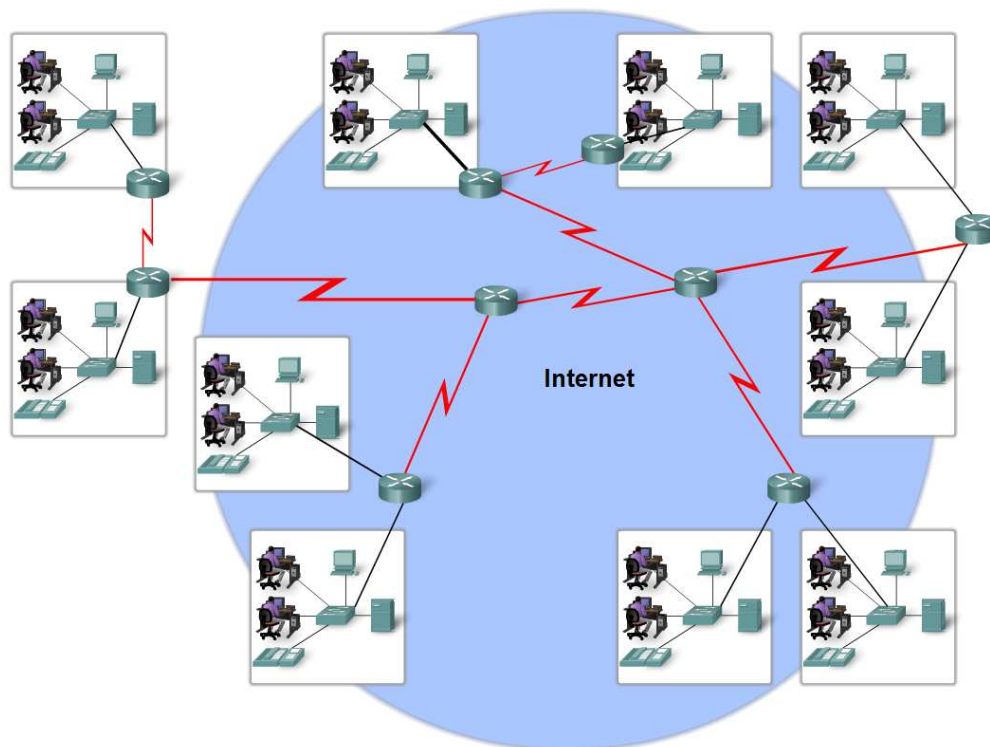
Network Types

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



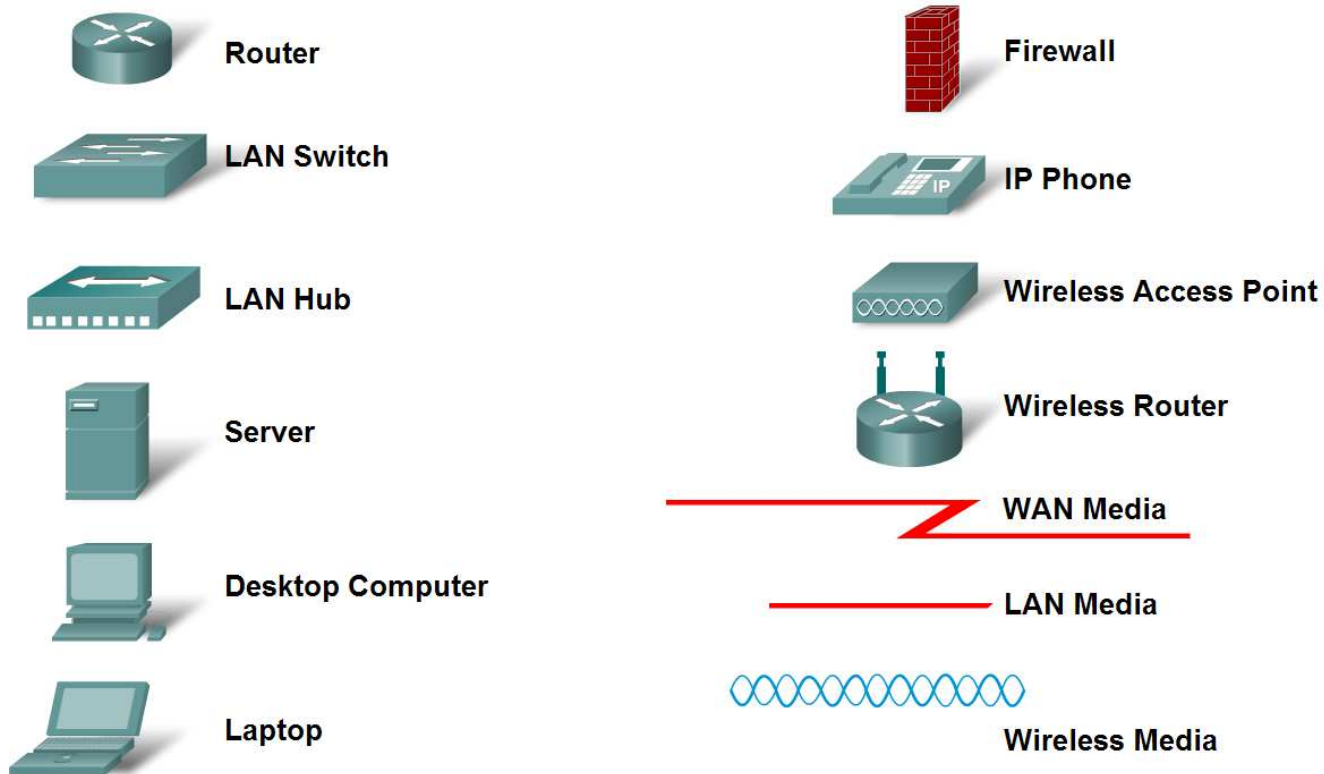
Network Types

The internet is defined as a
global mesh of interconnected networks



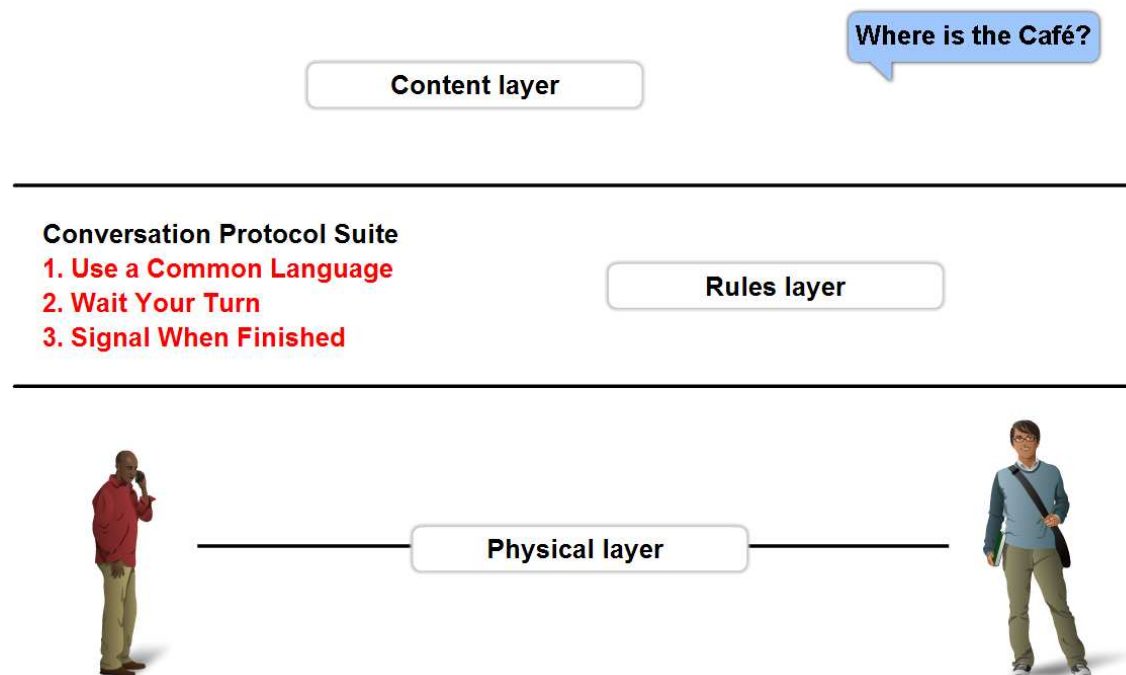
Network Types

Common Data Network Symbols



Function of Protocol in Network Communication

A protocol is a set of predetermined rules



Function of Protocol in Network Communication

Network protocols are used to allow devices to communicate successfully

Protocols provide:

The format or structure of the message

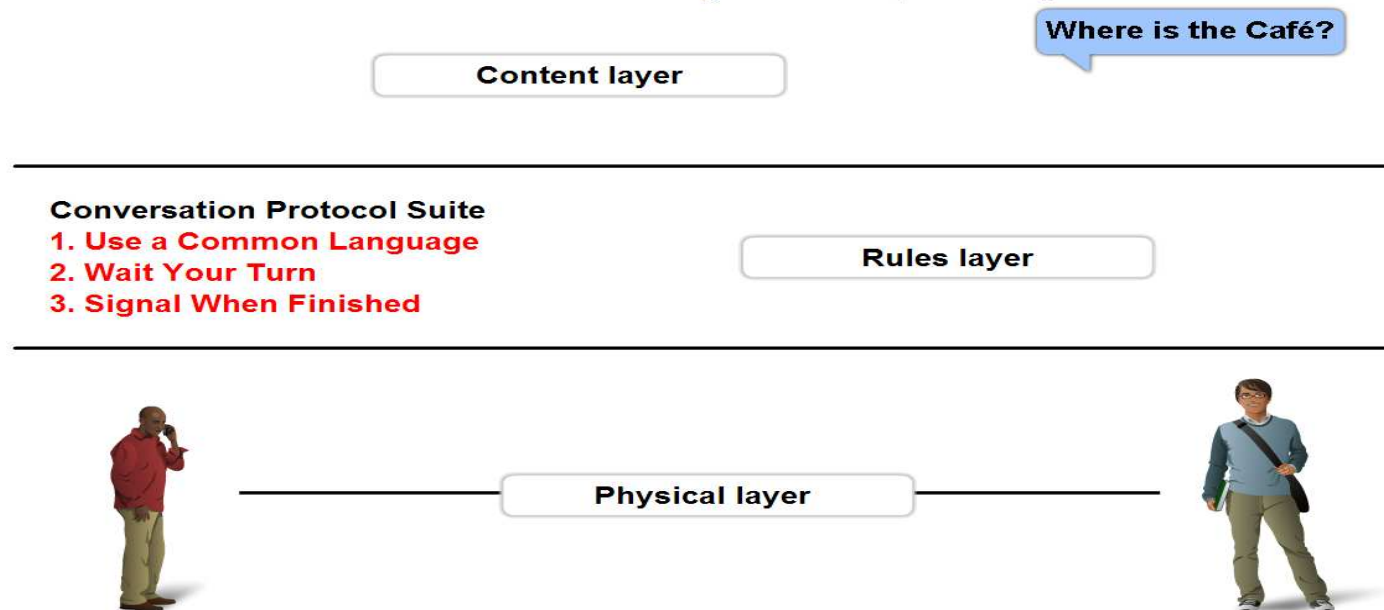
The process by which networking devices share information about pathways to other networks

How and when error and system messages are passed between devices

The setting up and termination of data transfer sessions

Function of Protocol in Network Communication

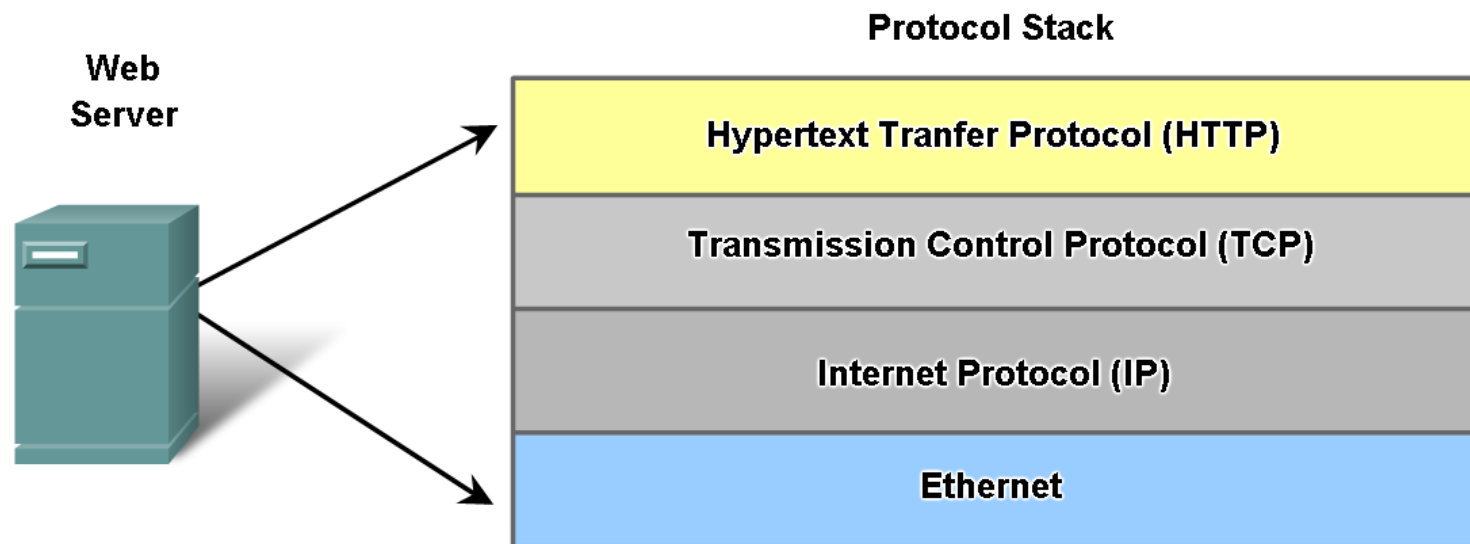
Protocol Suites are sets of rules that work together to help solve a problem.



A standard is

a process or protocol that has been endorsed by the networking industry and ratified by a standards organization

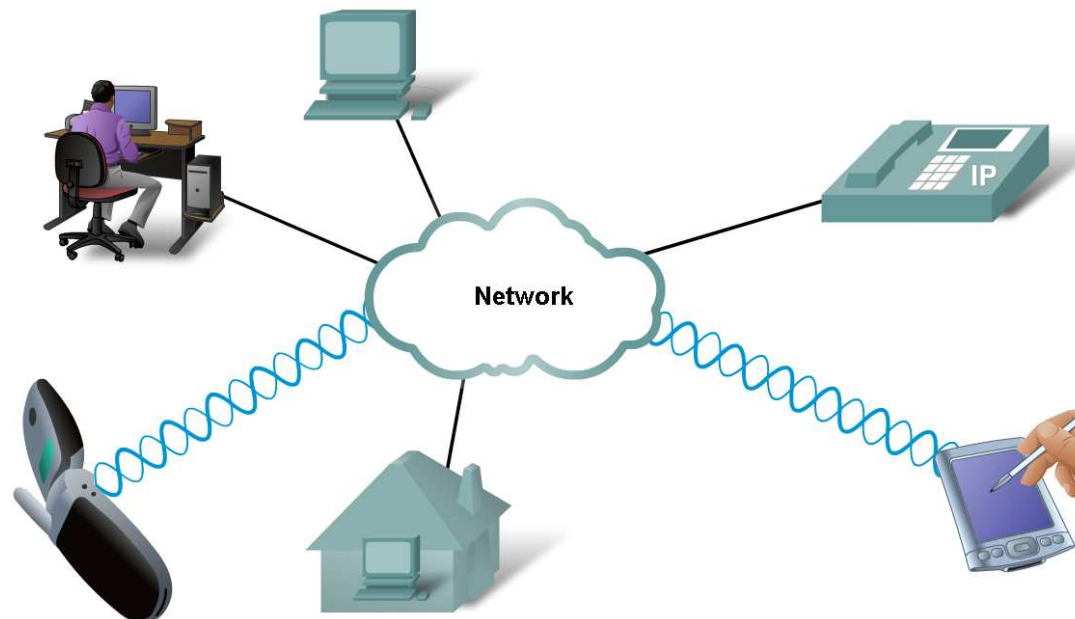
Function of Protocol in Network Communication



Function of Protocol in Network Communication

- Technology independent Protocols

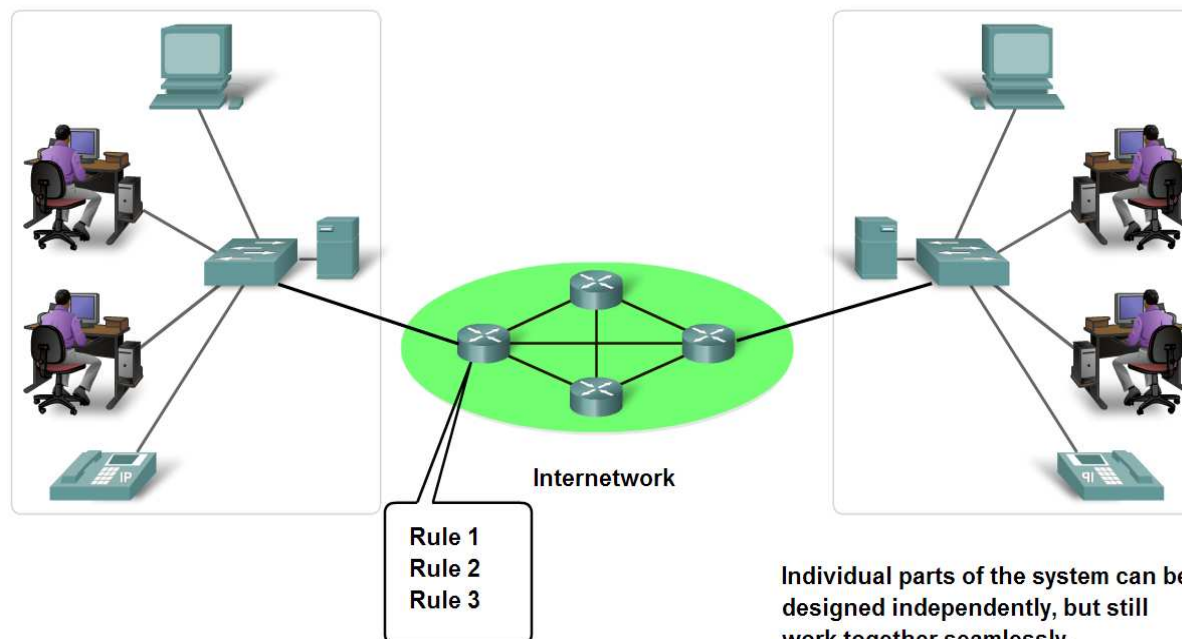
-Many diverse types of devices can communicate using the same sets of protocols. This is because protocols specify network functionality, not the underlying technology to support this functionality.



Layers with TCP/IP and OSI Model

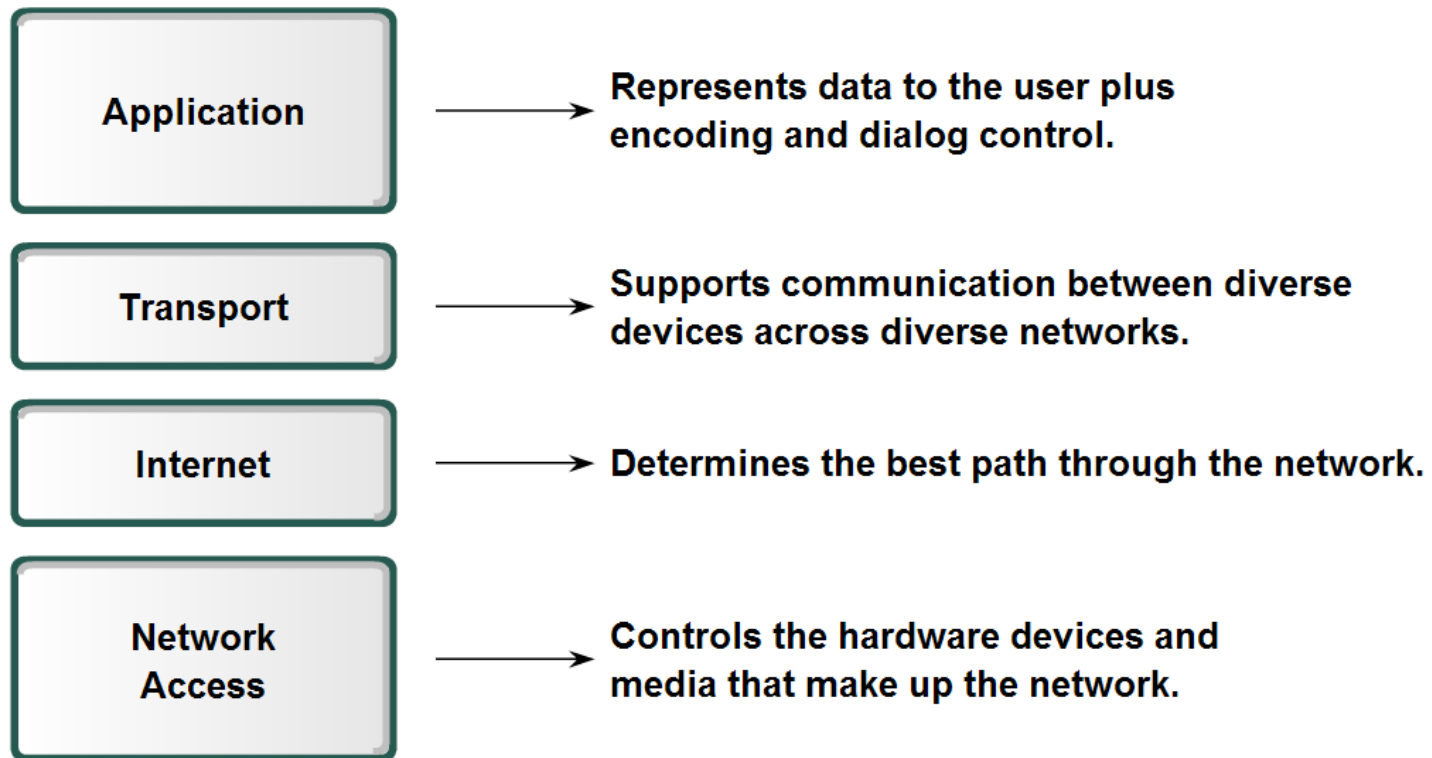
- Explain the benefits of using a layered model
 - assists in protocol design (wspiera tworzenie protokołów)
 - changes in one layer do not affect other layers (separuje protokoły w warstwach)
 - provides a common language (opisujący właściwości protokołów)

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

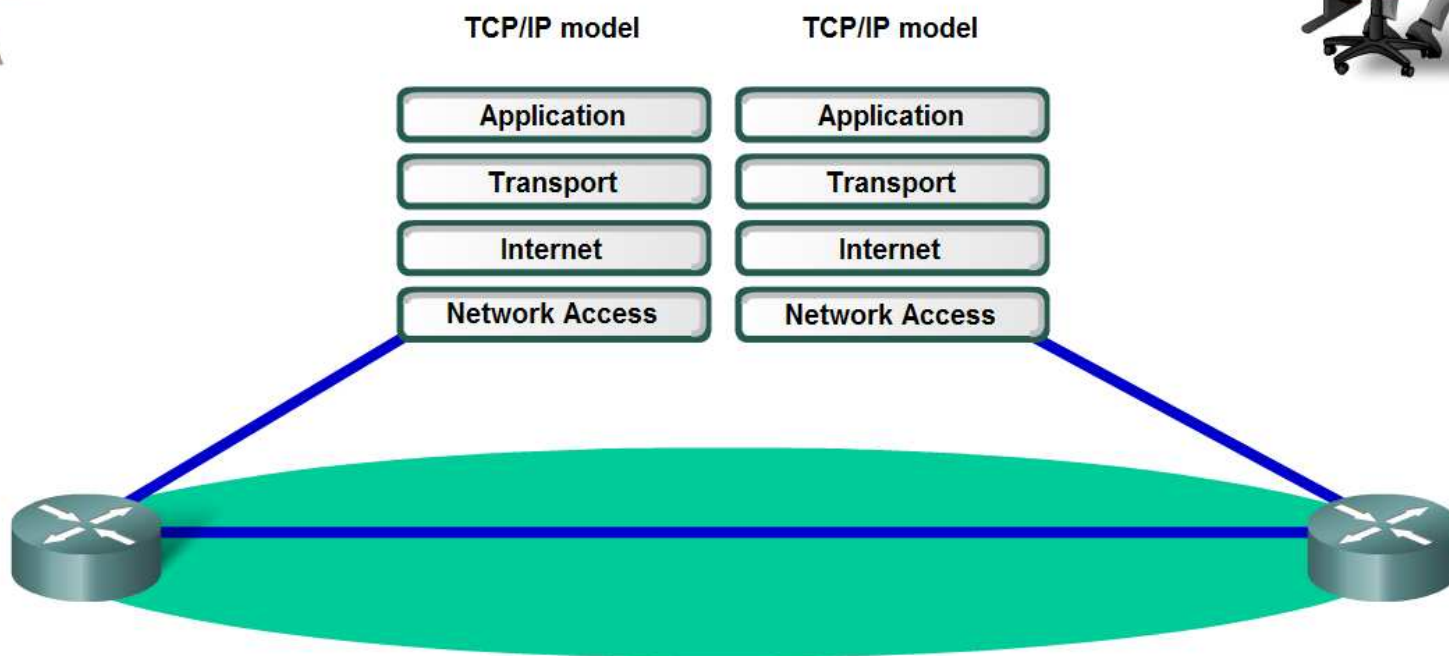


Layers with TCP/IP and OSI Model

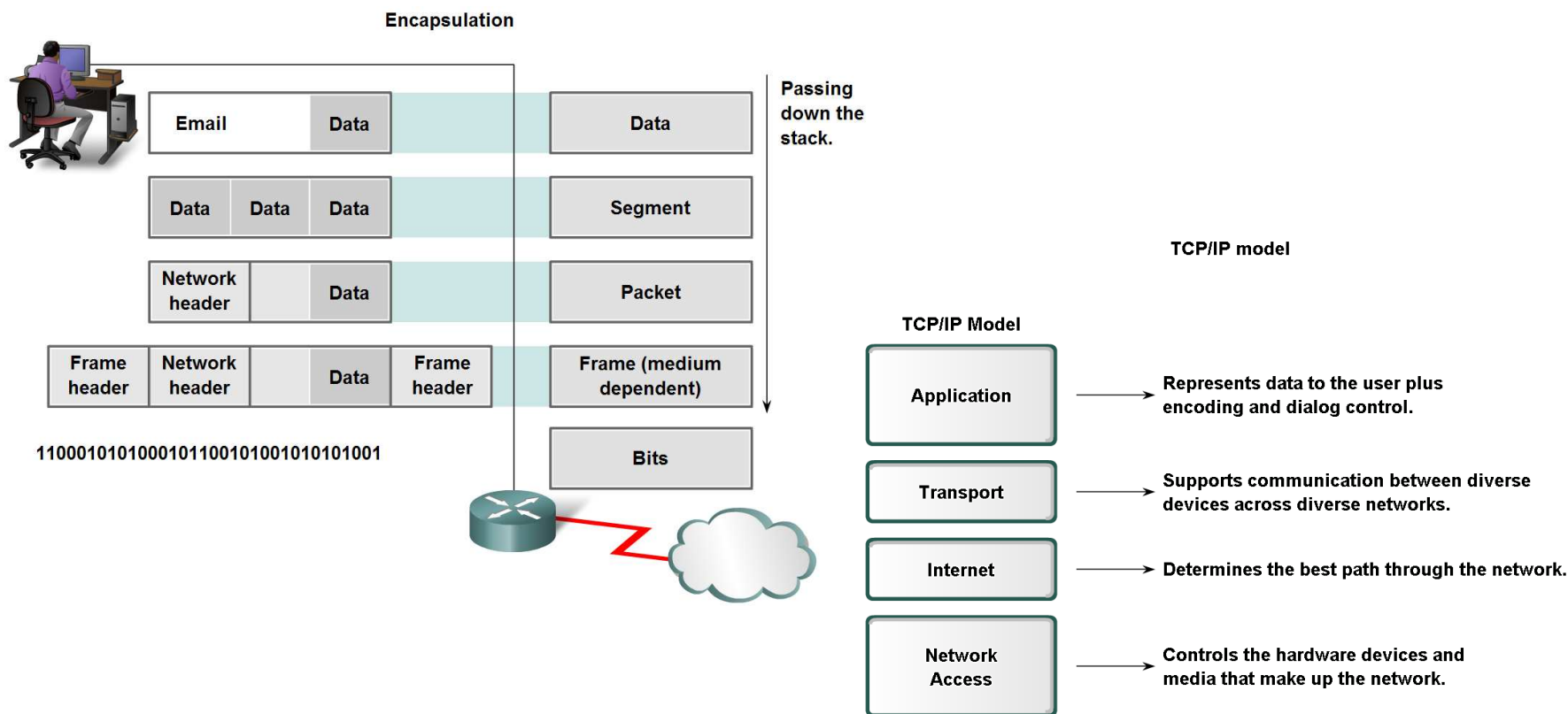
TCP/IP Model



Layers with TCP/IP and OSI Model



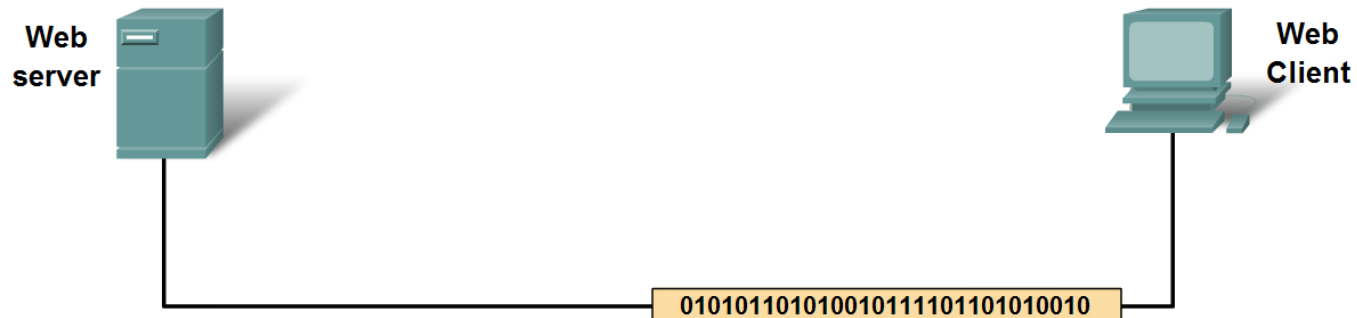
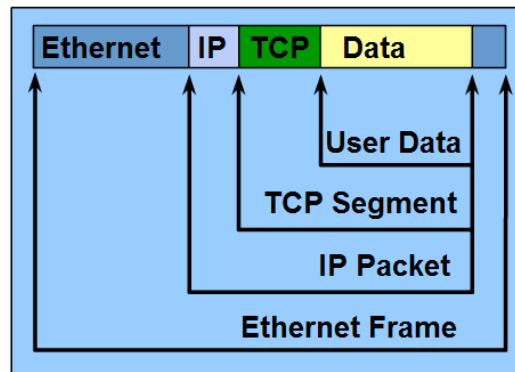
Layers with TCP/IP and OSI Model



Layers with TCP/IP and OSI Model

Protocol Operation of Sending and Receiving a Message

Protocol Encapsulation Terms



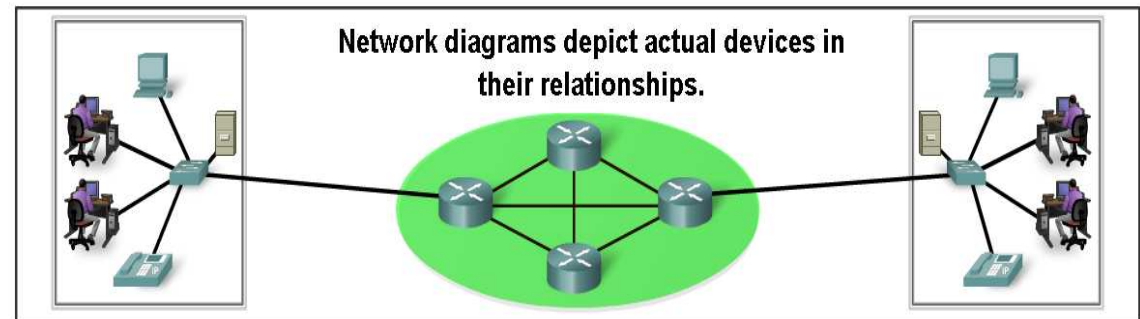
Layers with TCP/IP and OSI Model

- 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.

Models Provide Guidance

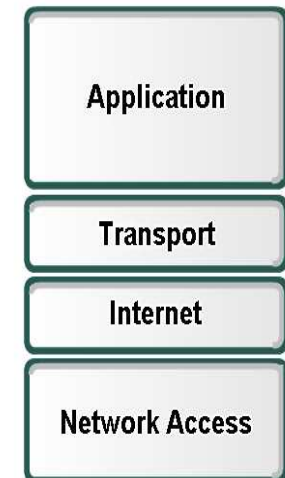


Network diagrams depict actual devices in their relationships.

OSI Model



TCP/IP Model



A networking model is only a representation of network operation. The model is not the actual network.

Layers with TCP/IP and OSI Model

7. Application

6. Presentation

5. Session

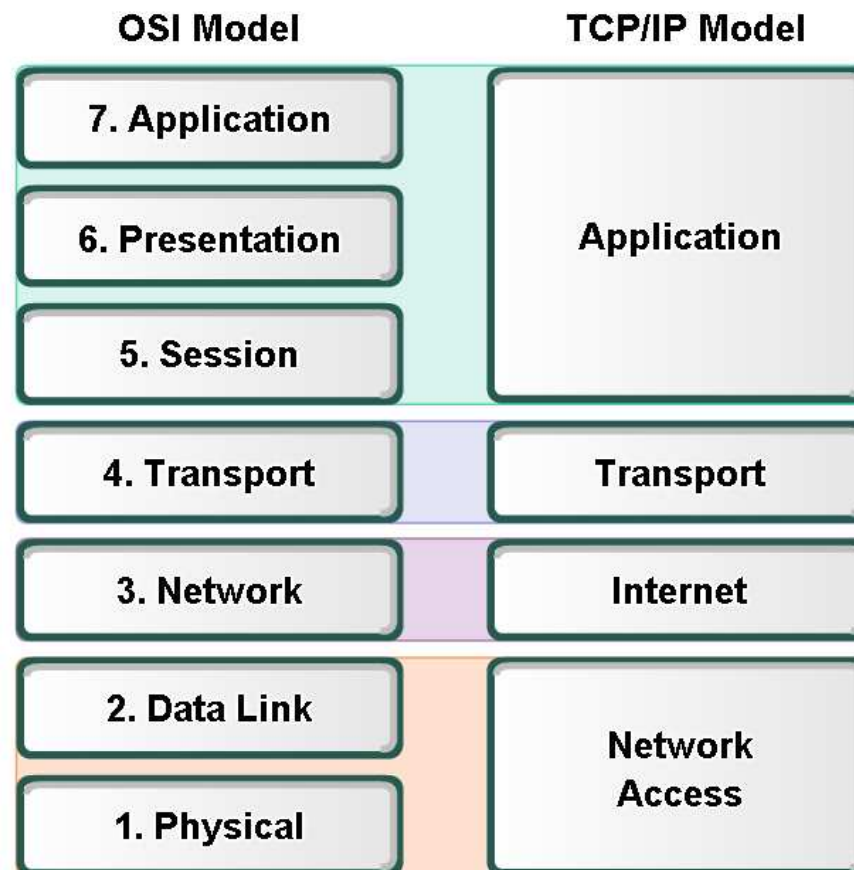
4. Transport

3. Network

2. Data Link

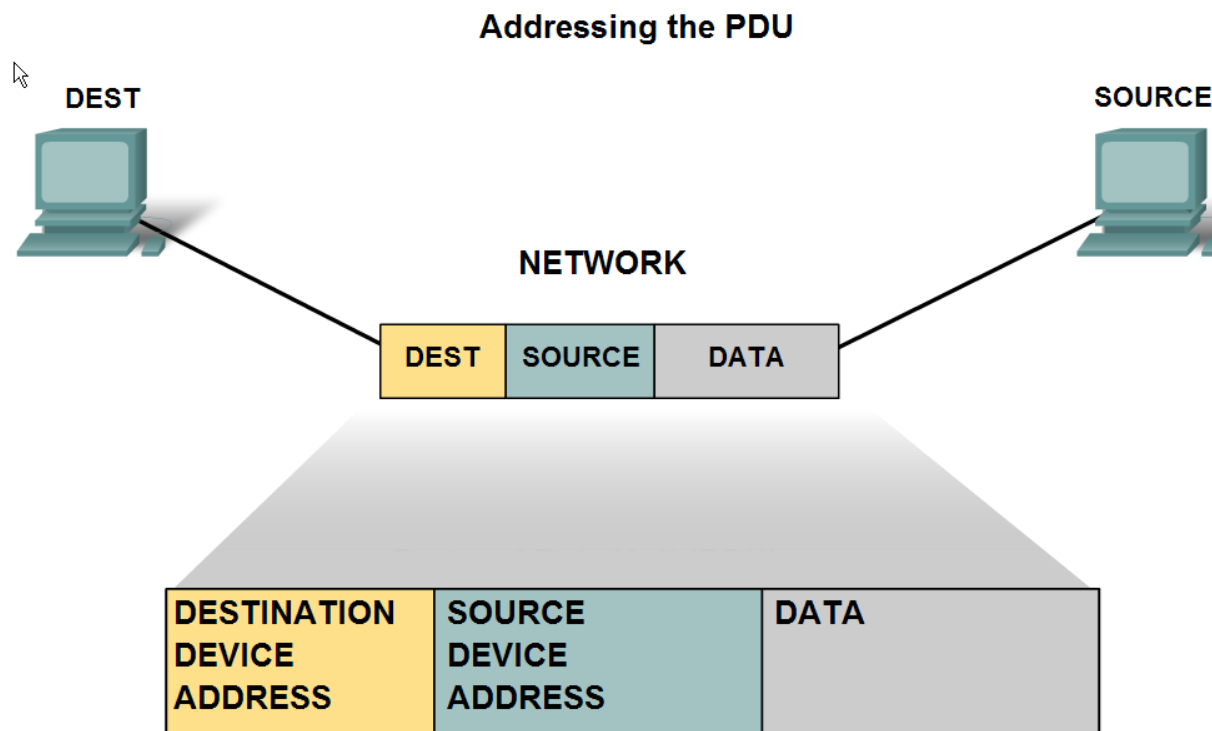
1. Physical

Layers with TCP/IP and OSI Model



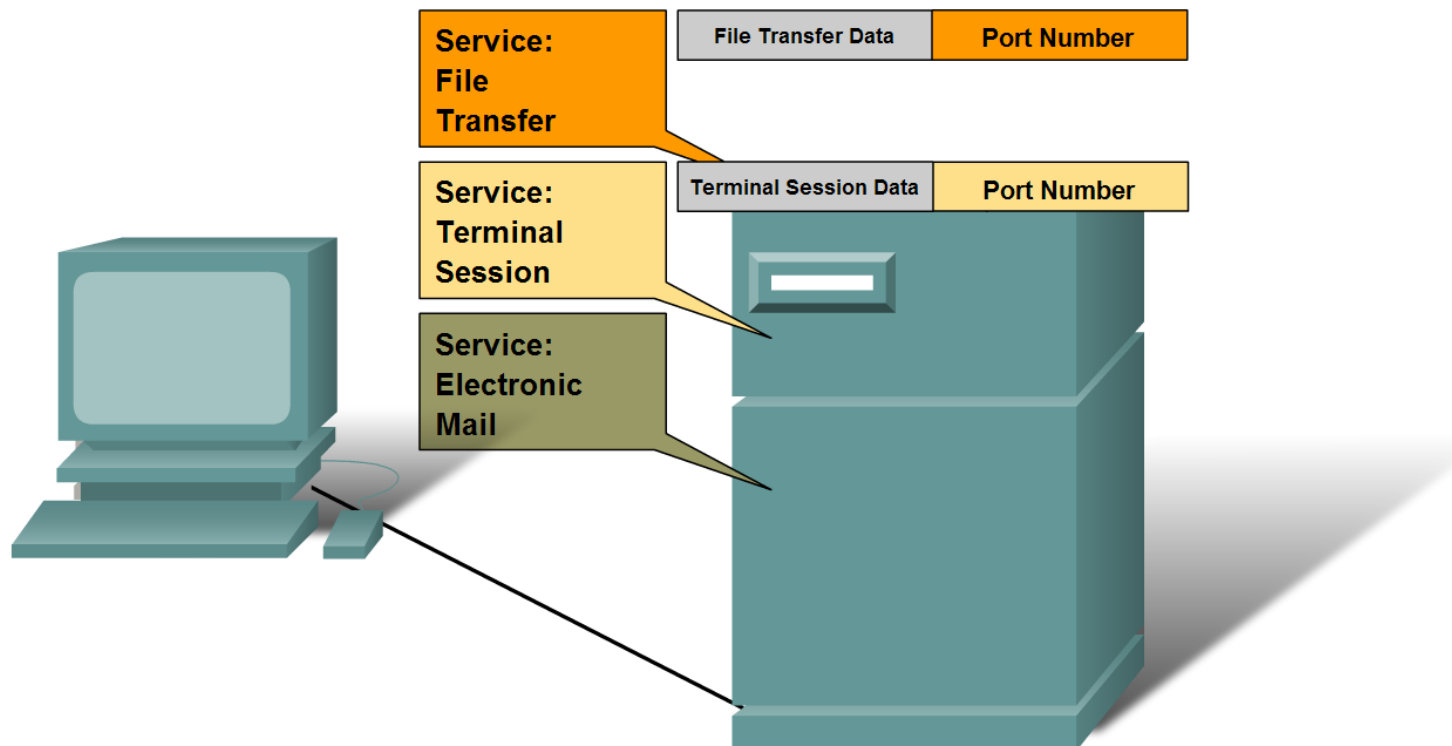
The key parallels are in the Transport and Network layers.

Addressing and Naming Schemes



Addressing and Naming Schemes

At the end device, the service port number directs the data to the correct conversation.



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.

