Todd Lammle's CompTIA Network+ Chapter 2: OSI Specifications Instructor: Mansour Rousta Zadeh

Chapter 2 Objectives

The Following CompTIA Network+ Exam Objectives Are Covered in This Chapter:

4.1 Explain the function of each layer of the OSI model

- **Layer 1 – physical**
- **Layer 2 – data link**
- **Layer 3 – network**
- **Layer 4 – transport**
- **Layer 5 – session**
- **Layer 6 – presentation**
- **Layer 7 – application**

Internetworking Models

- In the late 1970s, the *Open Systems Interconnection (OSI) reference model* was created by the International Organization for Standardization (ISO) to break through this barrier.

- The OSI model was meant to help vendors create interoperable network devices and software in the form of protocols so that different vendor networks could work with each other.

- The OSI model is the primary architectural model for networks. It describes how data and network information are communicated from an application on one computer through the network media to an application on another computer. The OSI reference model breaks this approach into layers.
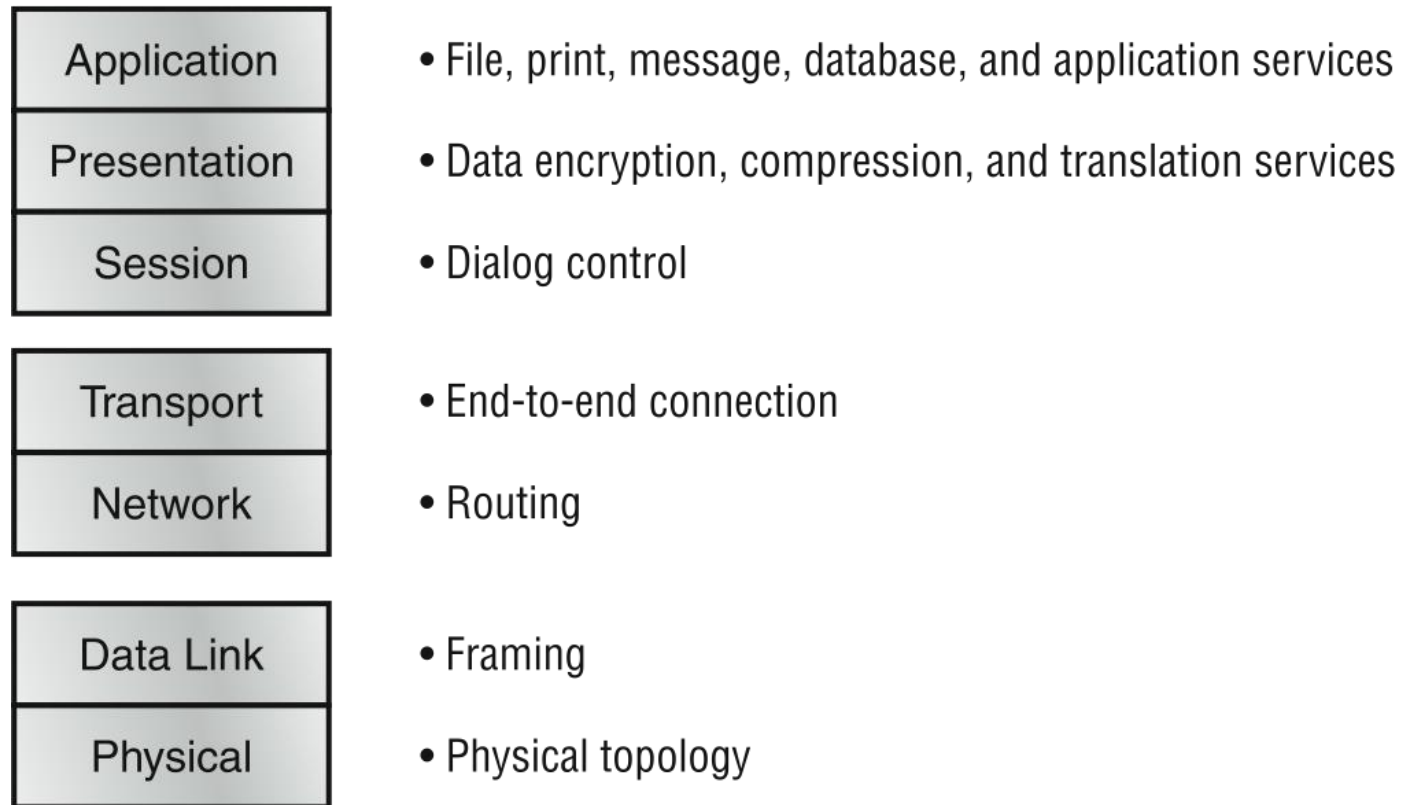
Advantages of Reference Models

Advantages of using the OSI layered model include, but are not limited to, the following:

- It divides the network communication process into smaller and simpler components, thus aiding component development, design, and troubleshooting.
- It allows multiple-vendor development through standardization of network components.
- It encourages industry standardization by defining what functions occur at each layer of the model.
- It allows various types of network hardware and software to communicate.
- It prevents changes in one layer from affecting other layers, so it doesn't hamper development and makes application programming easier.
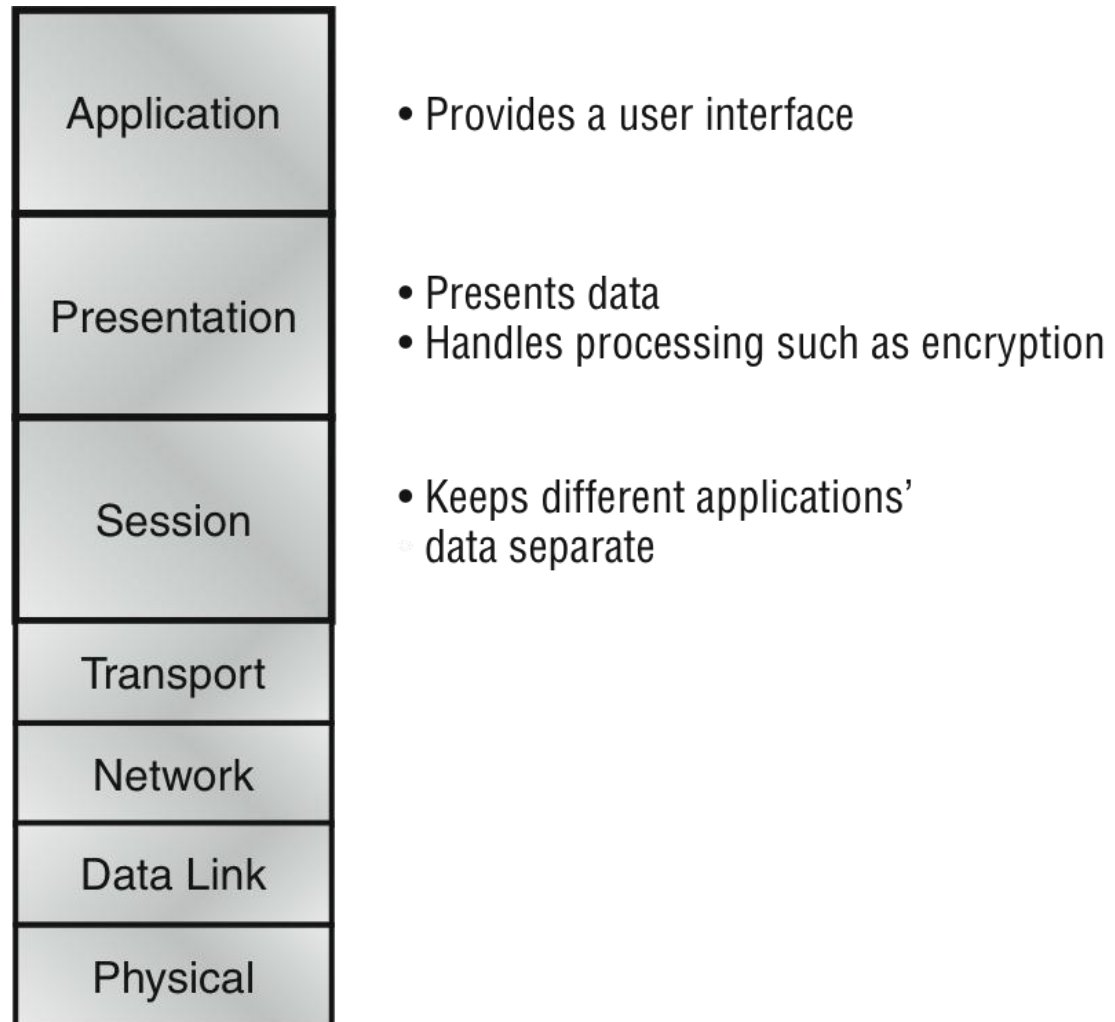
The OSI Model

- The OSI model has seven layers:
  - Application (Layer 7)
  - Presentation (Layer 6)
  - Session (Layer 5)
  - Transport (Layer 4)
  - Network (Layer 3)
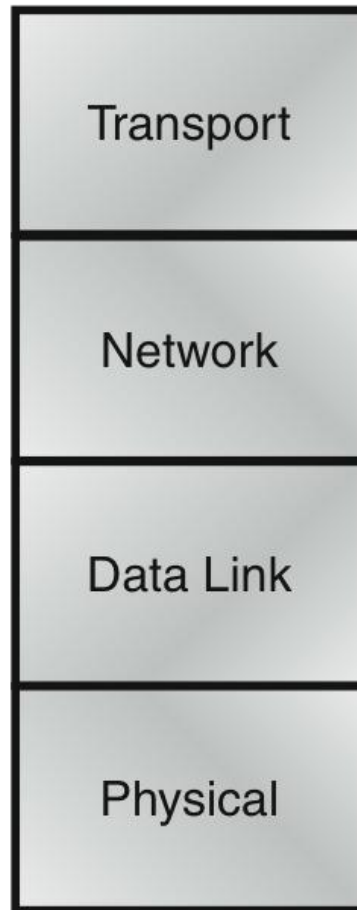 - Data Link (Layer 2)
  - Physical (Layer 1)

OSI Layer Functions

Layer	Function
Application	• File, print, message, database, and application services
Presentation	• Data encryption, compression, and translation services
Session	• Dialog control
Transport	• End-to-end connection
Network	• Routing
Data Link	• Framing
Physical	• Physical topology

The Upper Layers

Layer
Application
Presentation
Session
Transport
Network
Data Link
Physical

- Provides a user interface

- Presents data
- Handles processing such as encryption

- Keeps different applications' data separate

The Lower Layers

Transport

- Provides reliable or unreliable delivery
- Performs error correction before retransmit

Network

- Provides logical addressing, which routers use for path determination

Data Link

- Combines packets into bytes and bytes into frames
- Provides access to media using MAC address
- Performs error detection not correction

Physical

- Moves bits between devices
- Specifies voltage, wire speed, and pin-out of cables

Reliability

Reliable data transport employs a connection-oriented communications session between systems, and the protocols involved ensure that the following will be achieved:

- The segments delivered are acknowledged back to the sender upon their reception.

- Any segments not acknowledged are retransmitted.

- Segments are sequenced back into their proper order upon arrival at their destination.

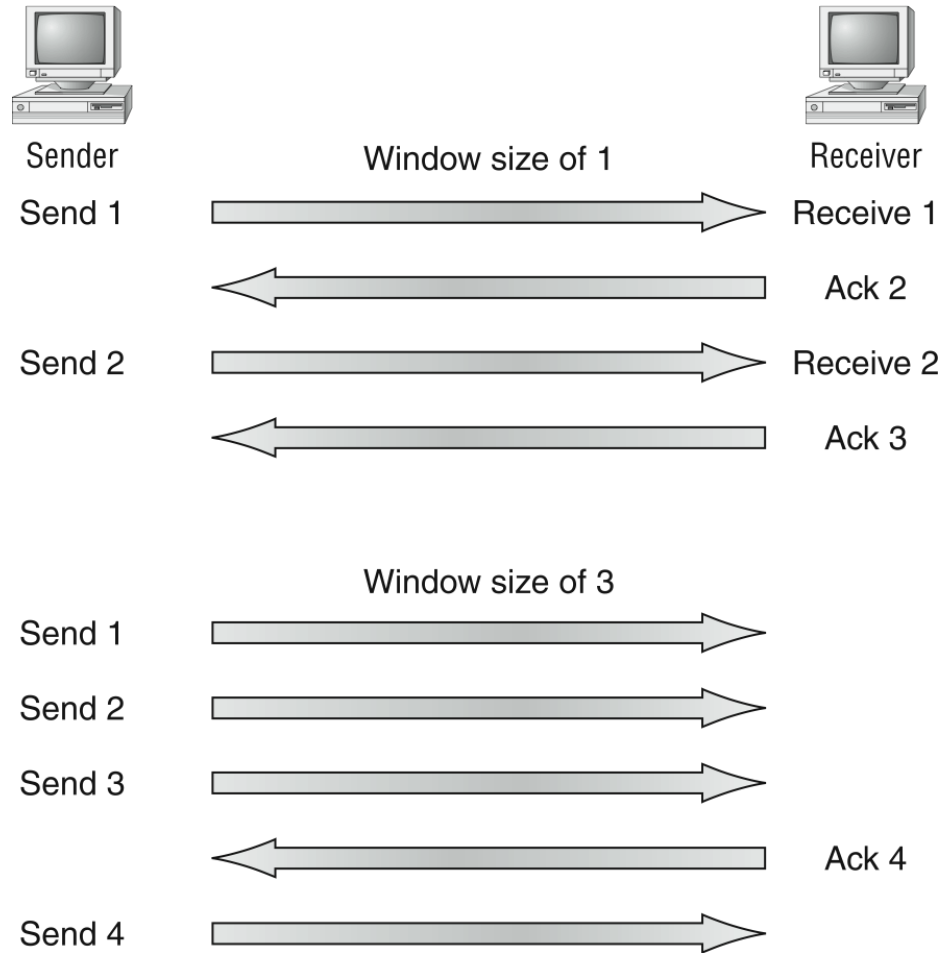- A manageable data flow is maintained in order to avoid congestion, overloading, and data loss.
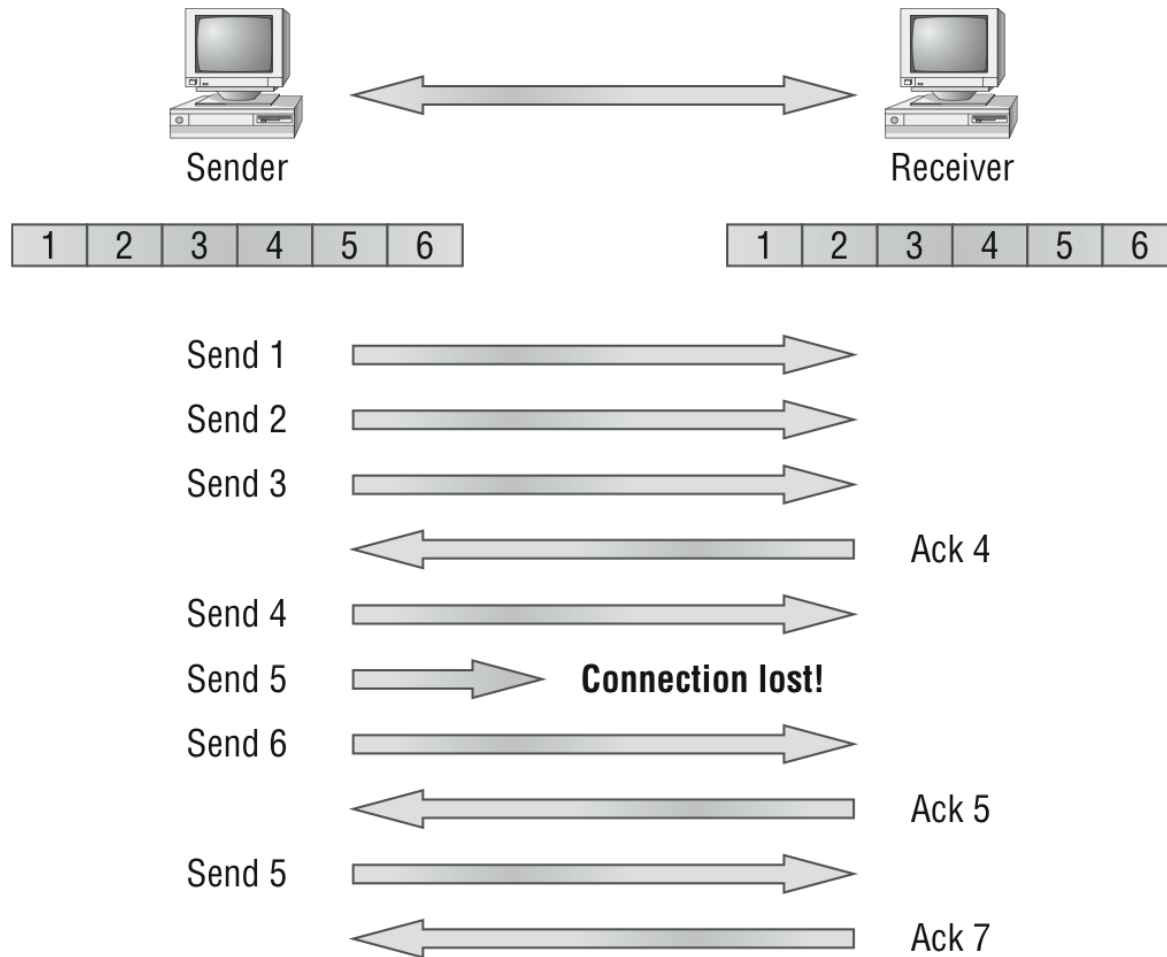
A Connection Oriented Session at Layer 4
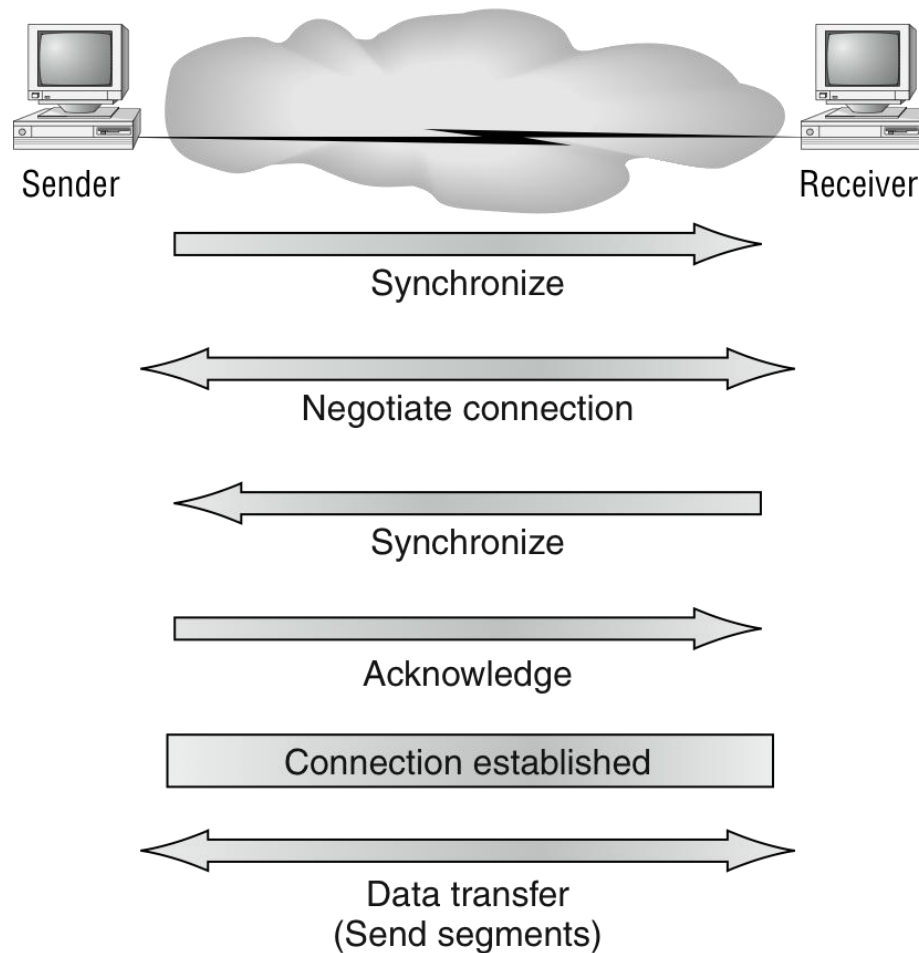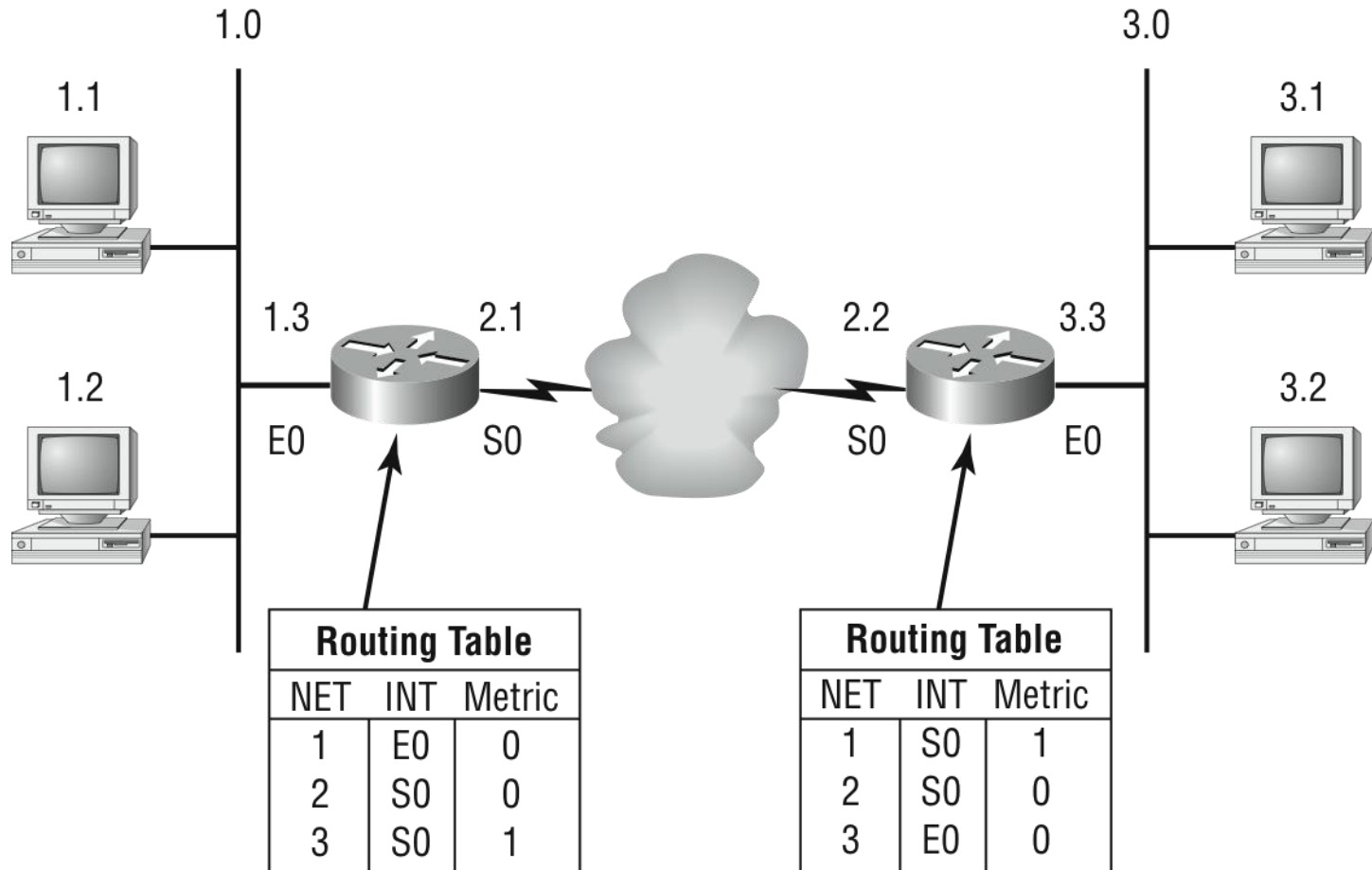
Flow Control at Layer 4
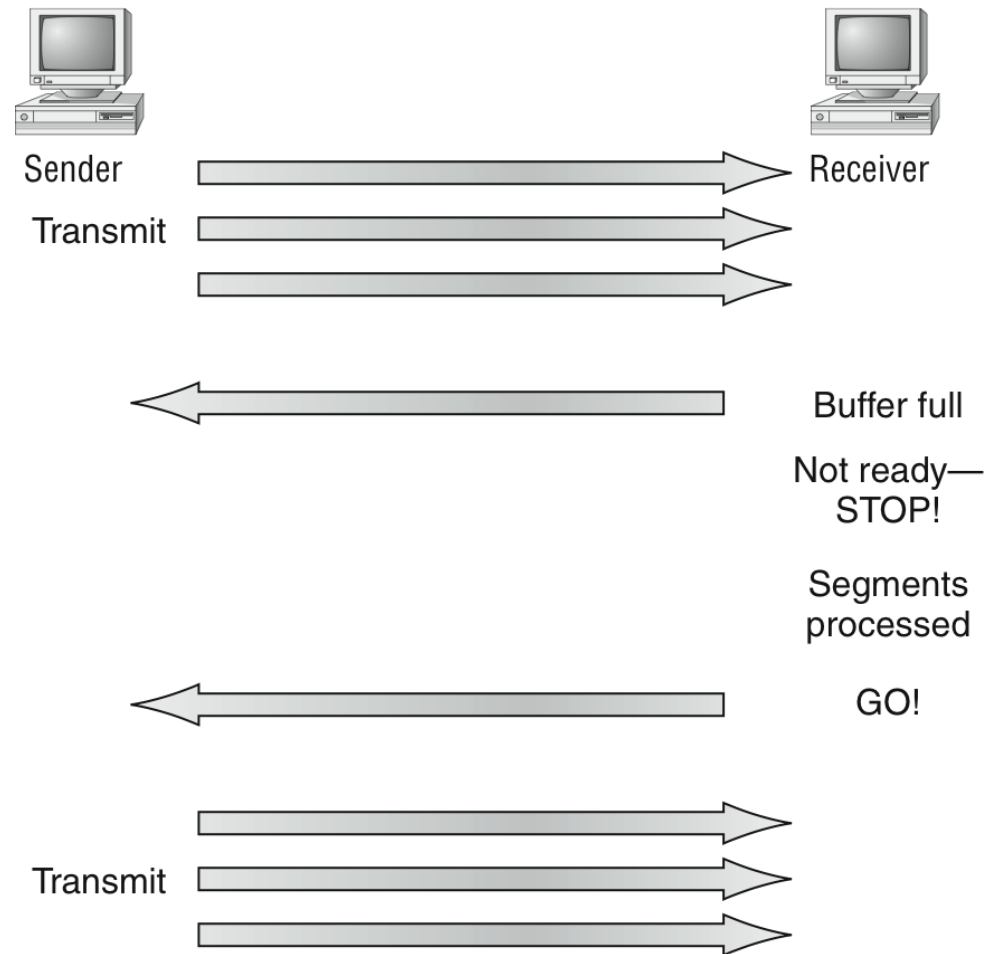
Windowing Flow Control

Acknowledgements

Routing at Layer 3

Routers at Layer 3

FastEthernet0/0   Serial0

WAN Services

FastEthernet0/1
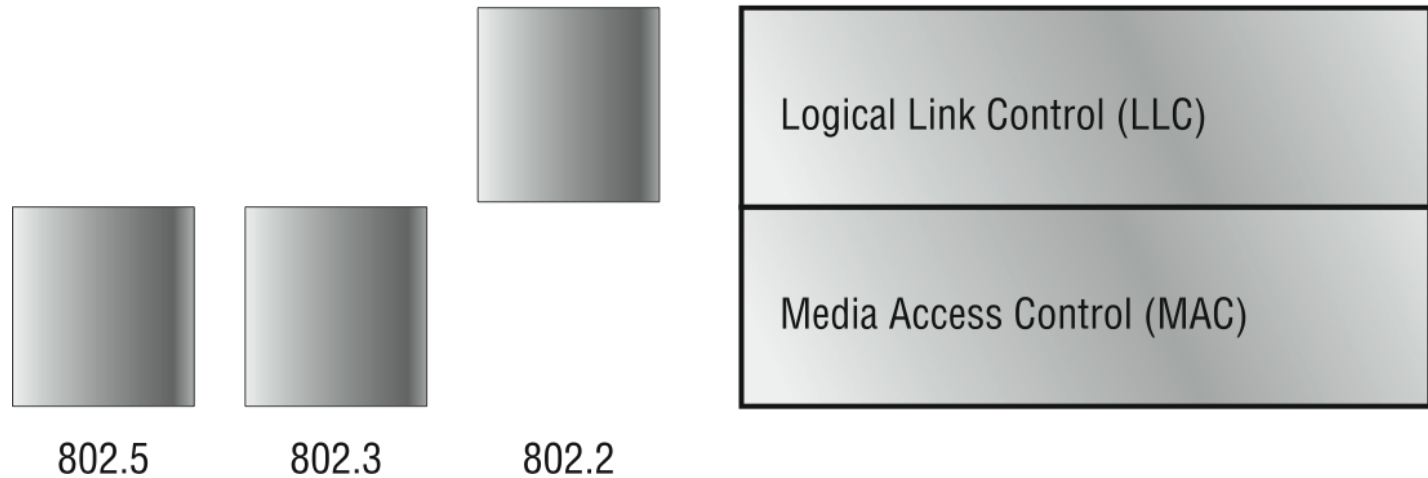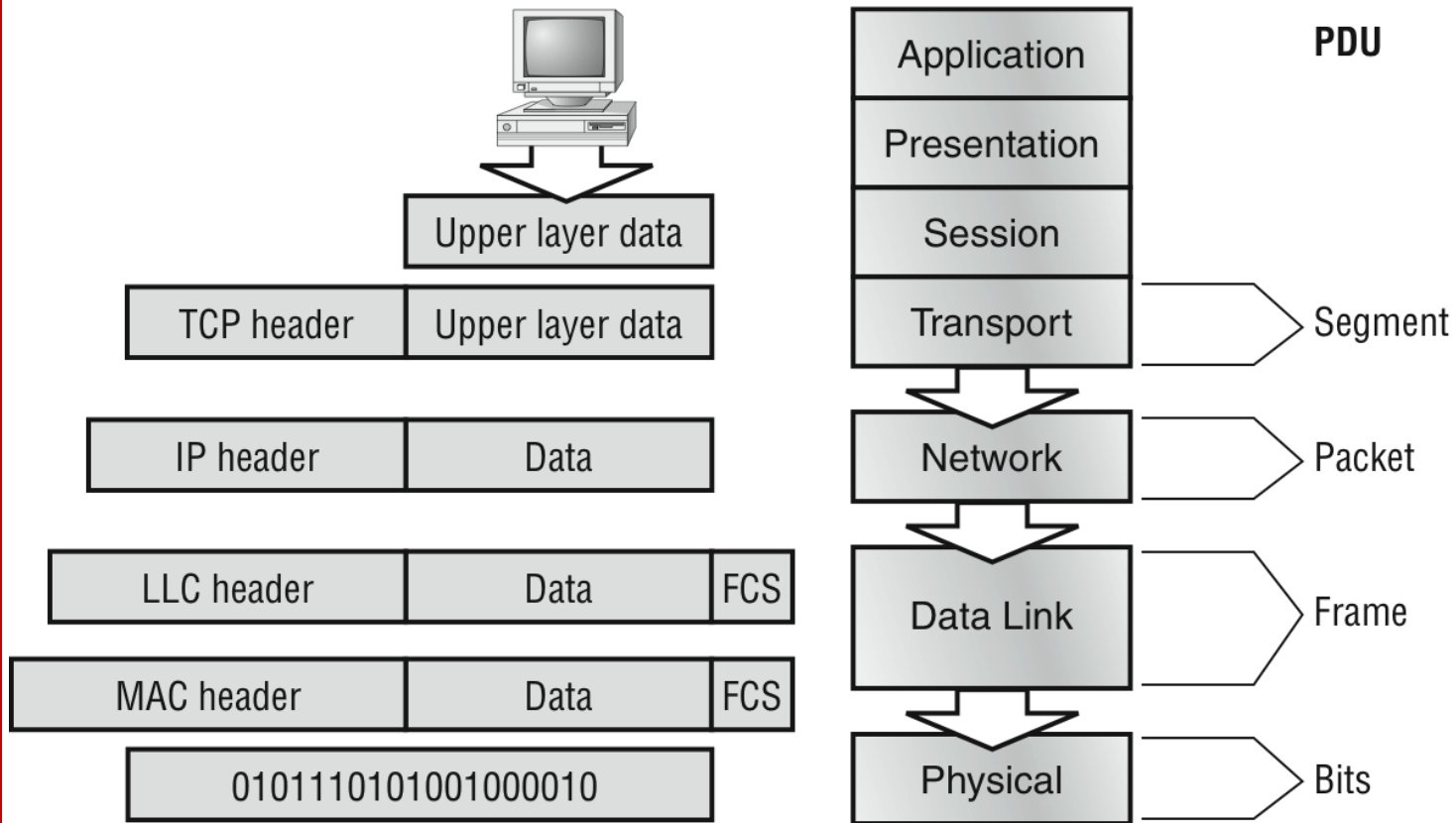
Internet
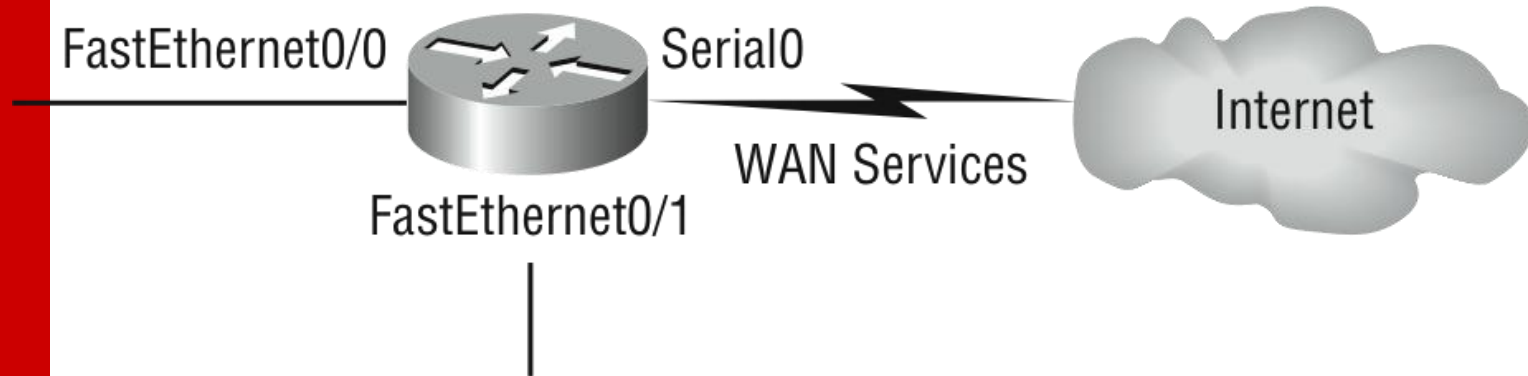
Each router interface is a broadcast domain.
Routers break up broadcast domains by
default and provide WAN services.

Data Link Layer (Layer 2)

802.5   802.3   802.2

Logical Link Control (LLC)

Media Access Control (MAC)

Data Encapsulation

Summary

- Summary
- Exam Essentials Section
- Written Labs
- Review Questions