

OSI Transport Layer



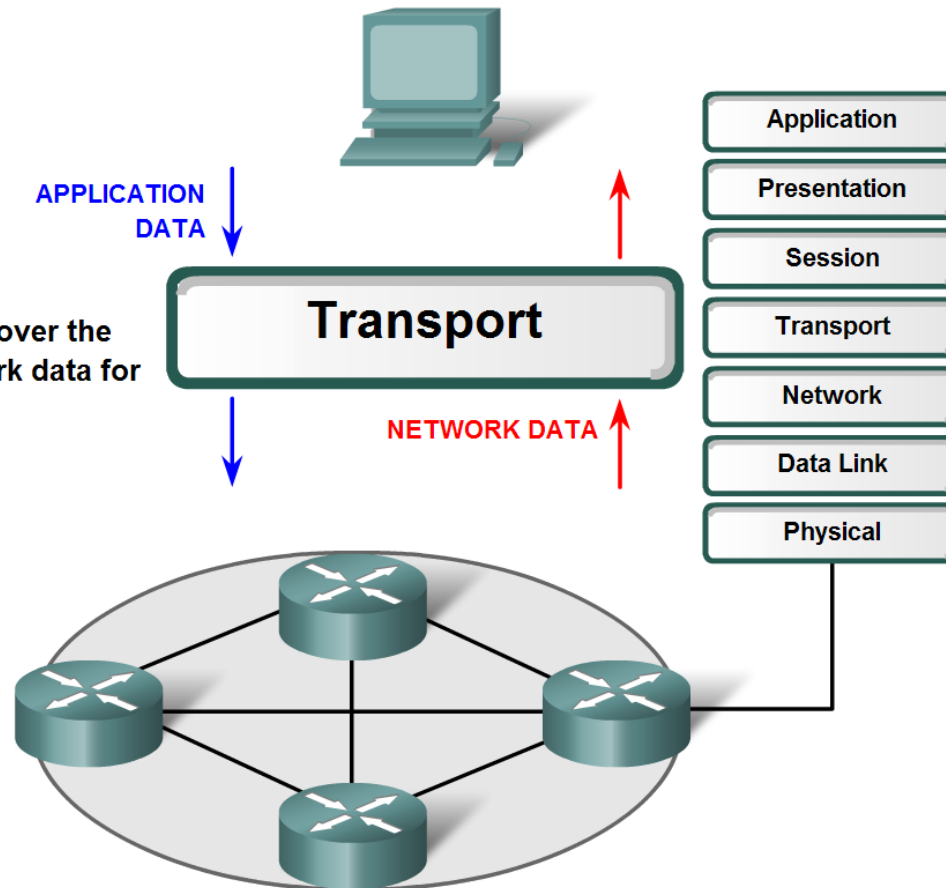
Network Fundamentals

Transport Layer Role and Services

- Explain the purpose of the Transport layer

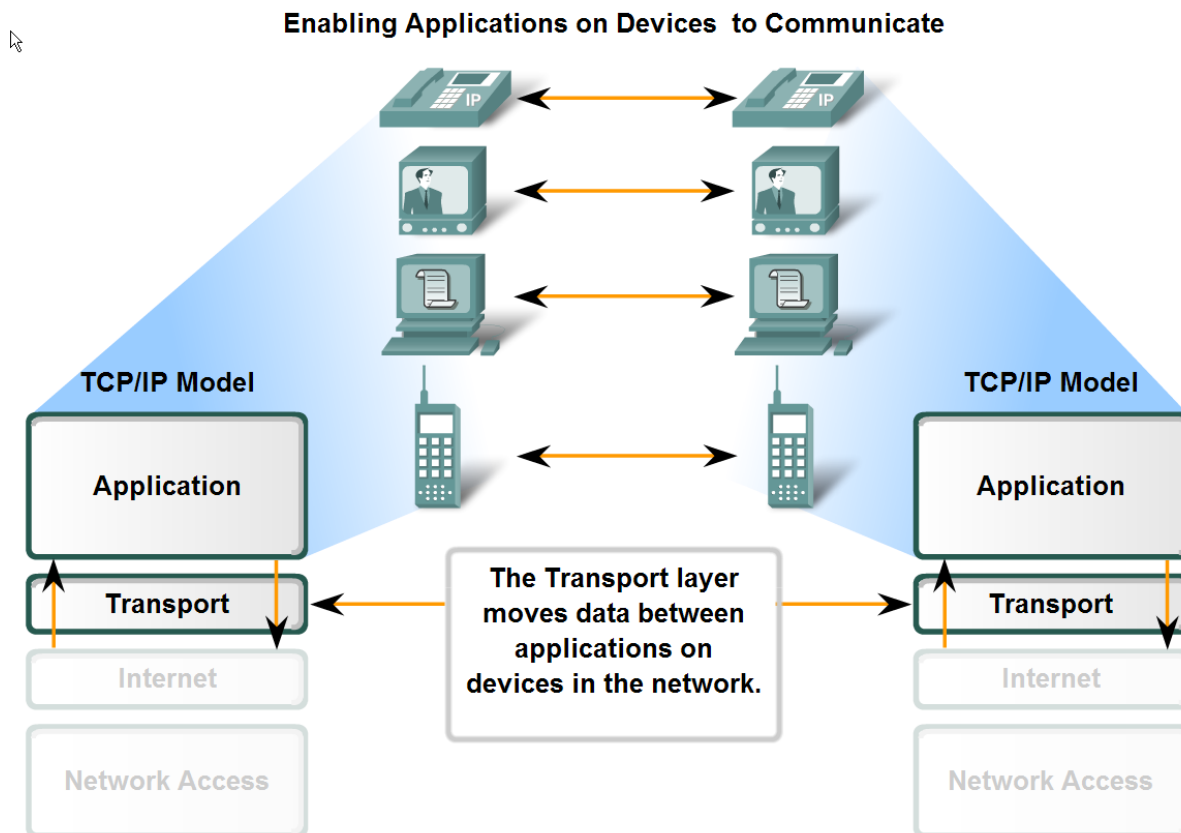
The OSI Transport Layer

The Transport layer prepares application data for transport over the network and processes network data for use by applications.



Transport Layer Role and Services

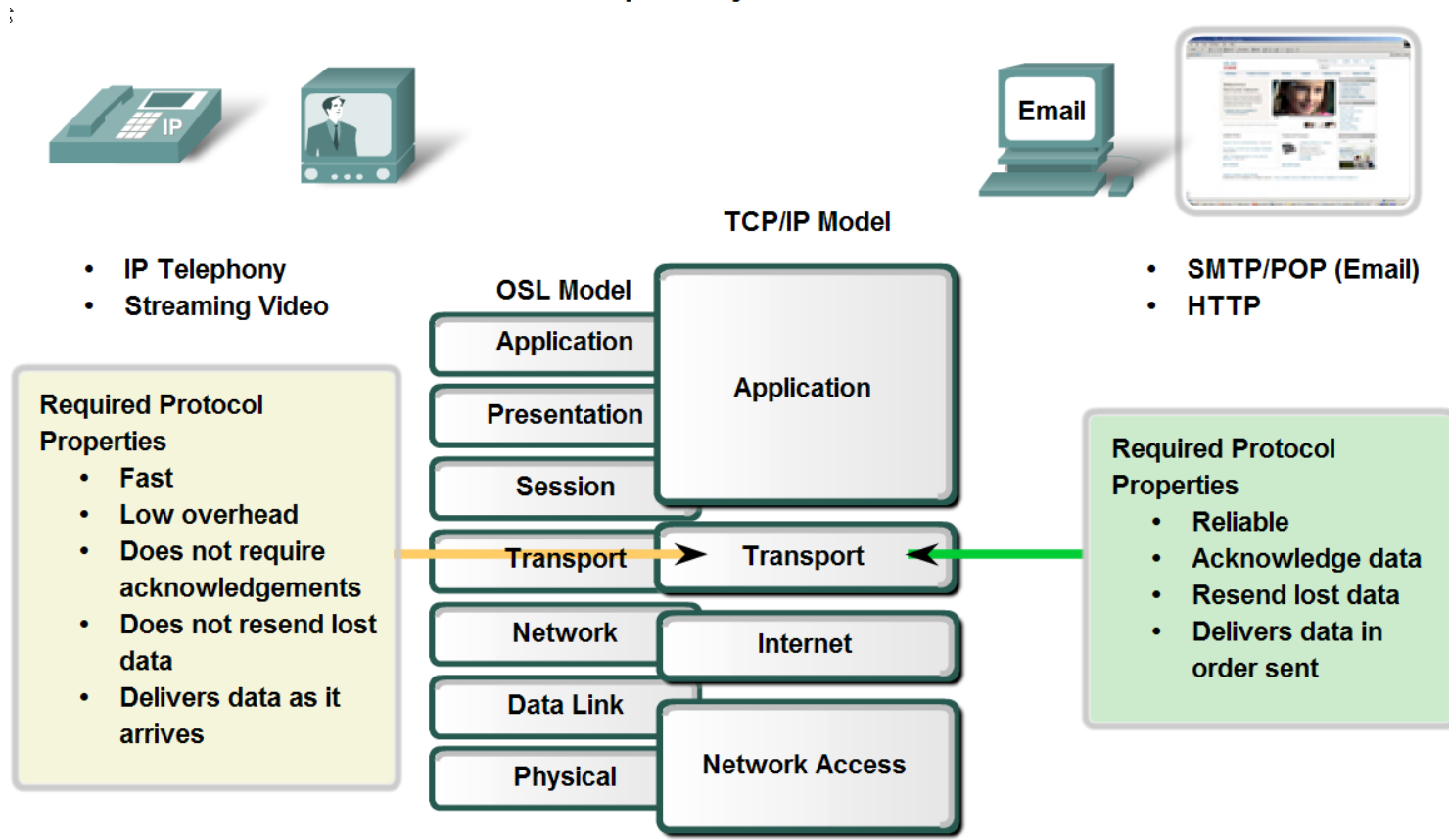
- Major functions of the transport layer and the role it plays in data networks



Transport Layer Role and Services

- Supporting Reliable Communication

Transport Layer Protocols



Application developers choose the appropriate Transport Layer protocol based on the nature of the application.

Transport Layer Role and Services

- Identify the basic characteristics of the UDP and TCP protocols

TCP and UDP Headers

TCP SEGMENT & HEADER FIELDS

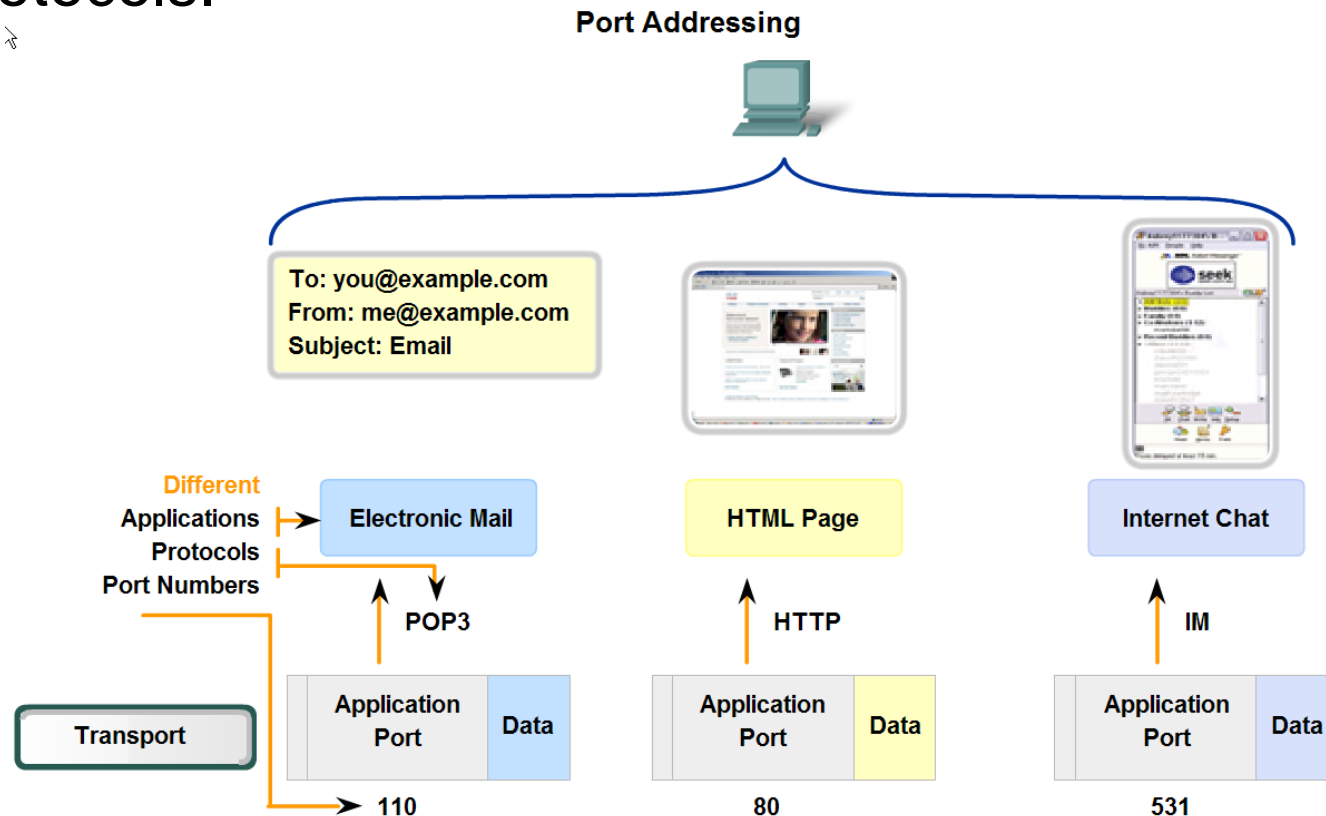


UDP SEGMENT & HEADER FIELDS



Transport Layer Role and Services

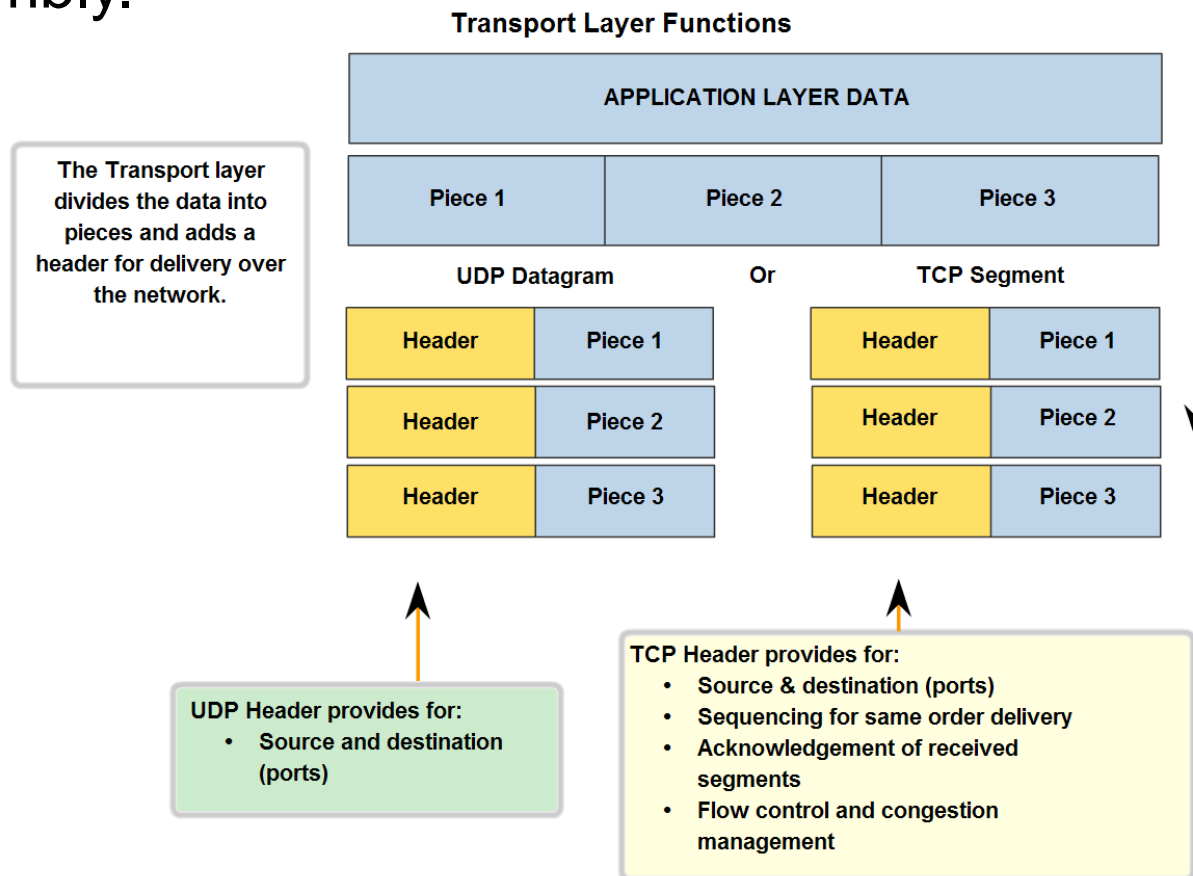
- Identify how a port number is represented and describe the role port numbers play in the TCP and UDP protocols.



Data for different applications is directed to the correct application because each application has a unique port number.

Transport Layer Role and Services

- Describe the role of segments in the transport layer and the two principle ways segments can be marked for reassembly.



Application and Operation of TCP Mechanisms

- Trace the steps that show how the TCP reliability mechanism works as part of a session

TCP Segment Header Fields

Bit 0	15	31
Source Port Number		Destination Port Number
Sequence Number		
Acknowledgement Number		
H.Length	(Reserved)	Flags
TCP Checksum		Window Size
TCP Checksum		Urgent Pointer
Options (if any)		
Data.....		

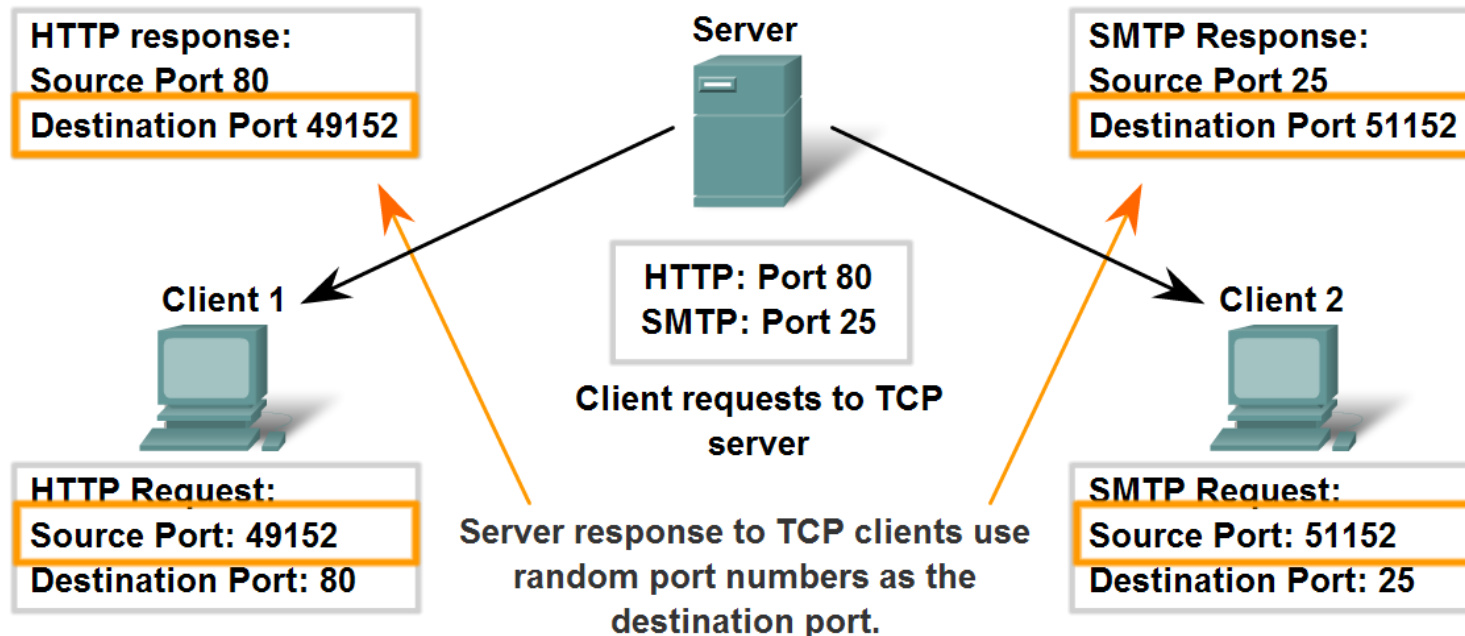
The fields of the TCP header enable TCP to provide connection-oriented, reliable data communications.

Application and Operation of TCP Mechanisms

- Describe the role of port numbers in establishing TCP sessions and directing segments to server process



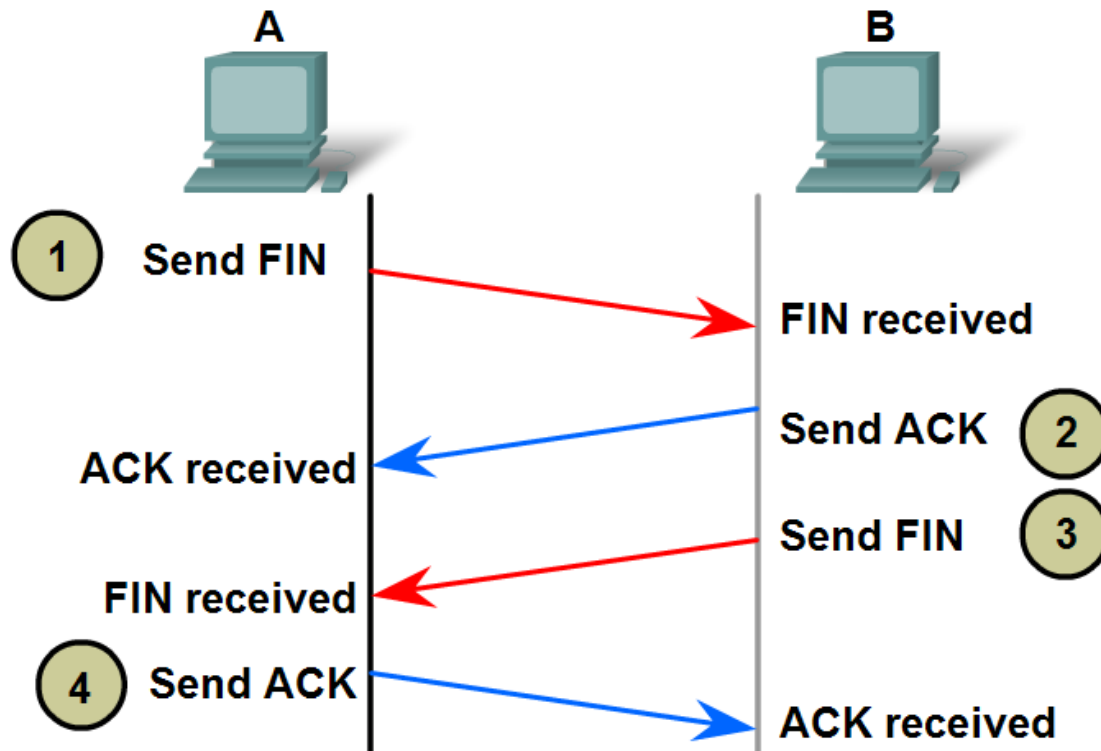
Clients Sending TCP Requests



Application and Operation of TCP Mechanisms

- Trace the steps in the handshake in the establishment of TCP sessions

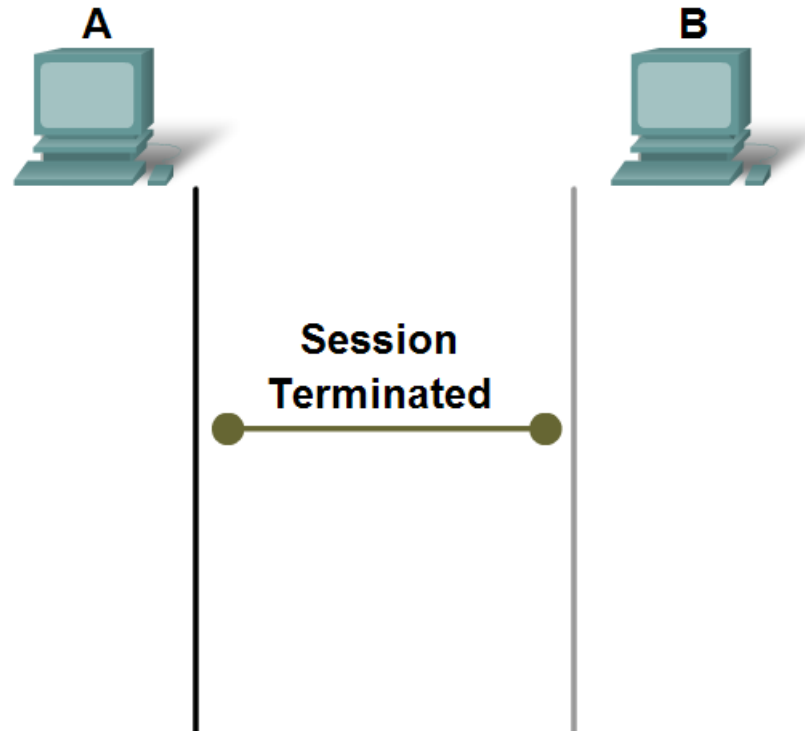
TCP Connection Establishment and Termination



Application and Operation of TCP Mechanisms

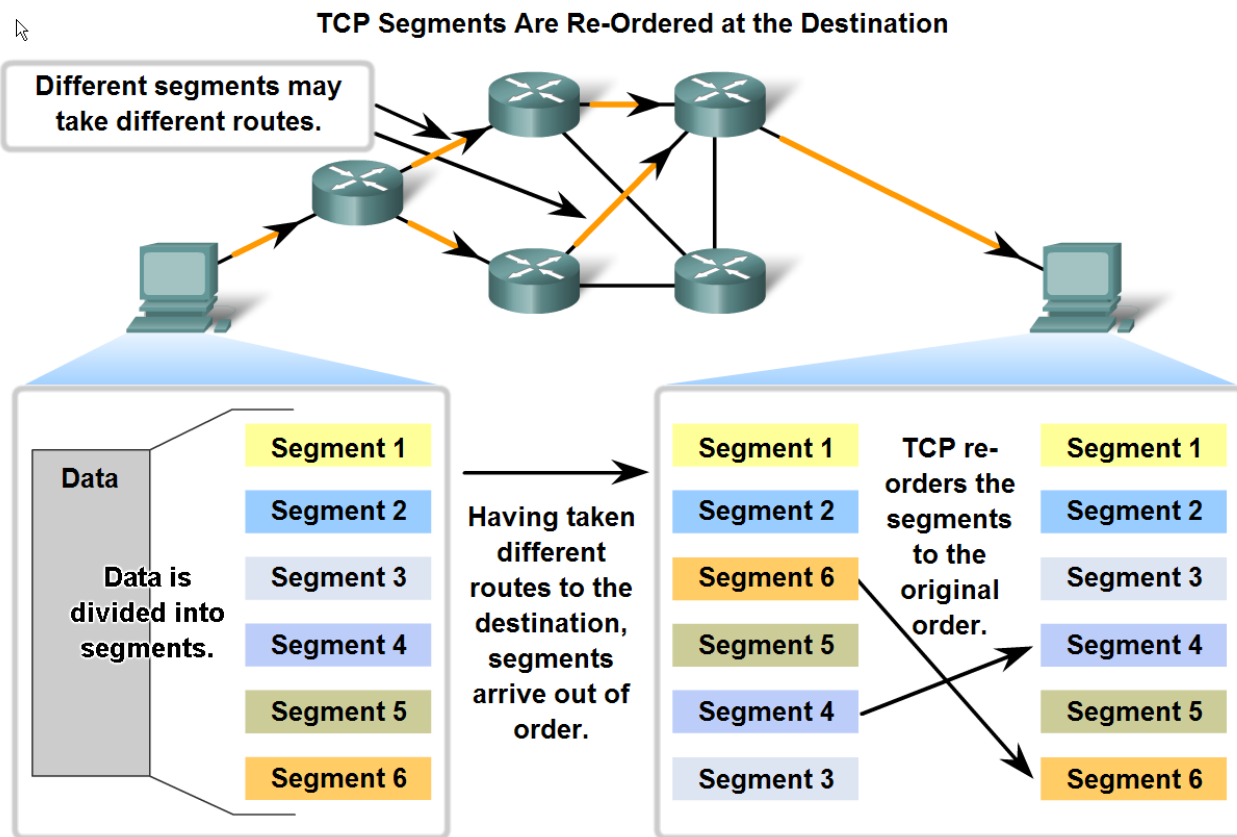
- Trace the steps in the handshake in the termination of TCP sessions

TCP Connection Establishment and Termination



Managing TCP Sessions

- Describe how TCP sequence numbers are used to reconstruct the data stream with segments placed in the correct order

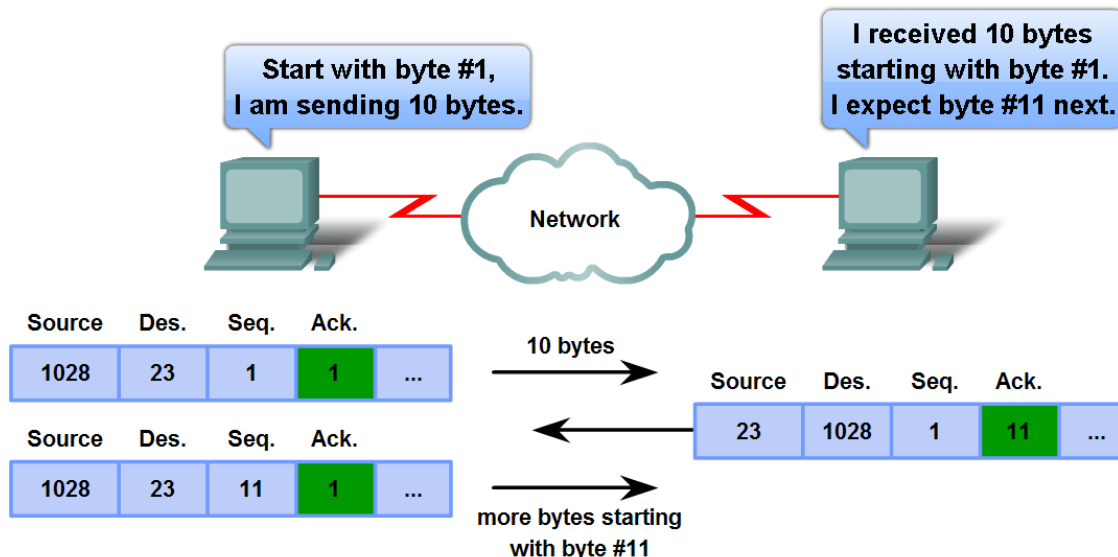


Managing TCP Sessions

- Trace the steps used by the TCP protocol in which sequence numbers and acknowledgement numbers are used to manage exchanges in a conversation

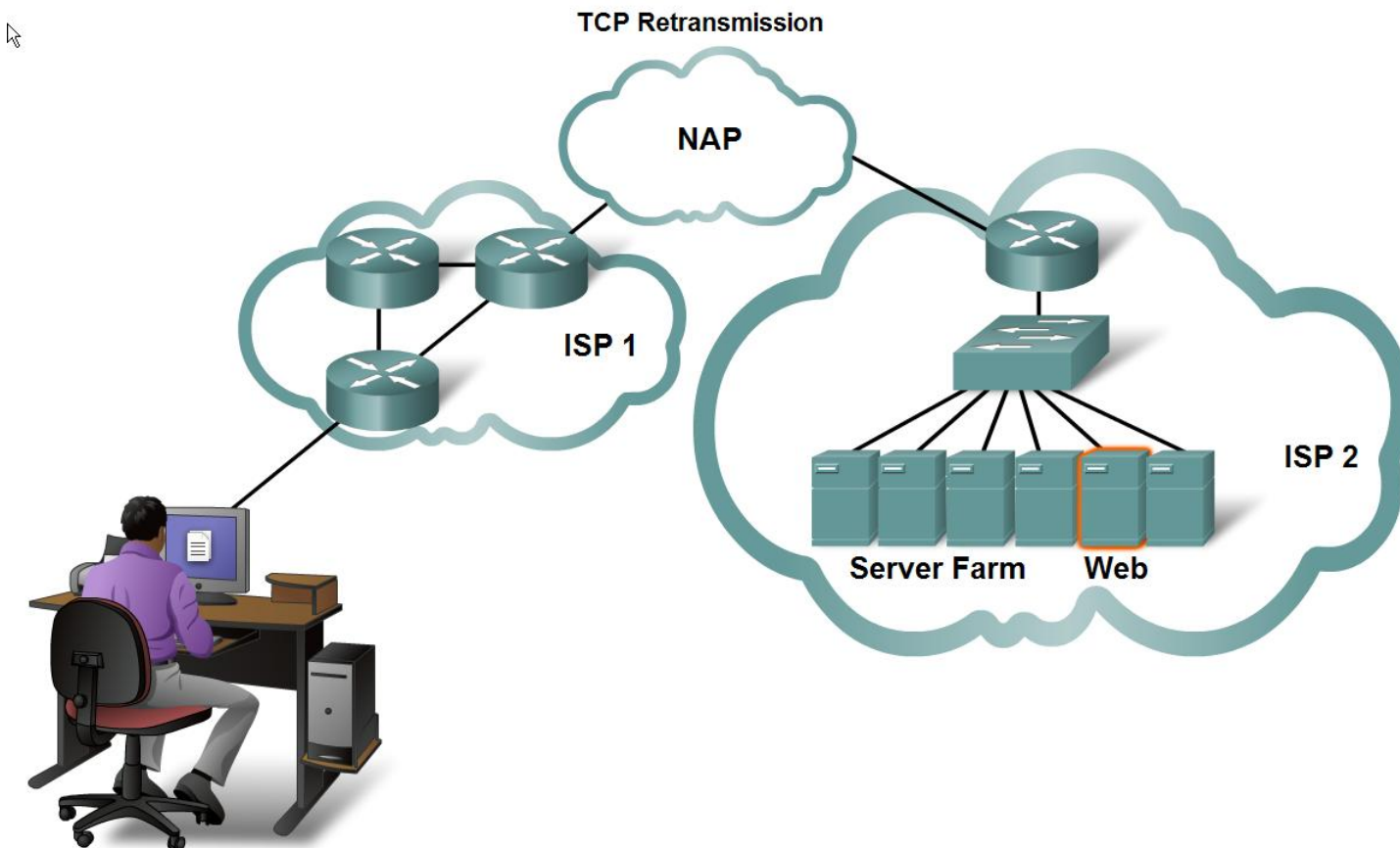
Acknowledgement of TCP Segments

Source Port	Destination Port	Sequence Number	Acknowledgement Numbers	...
-------------	------------------	-----------------	-------------------------	-----



Managing TCP Sessions

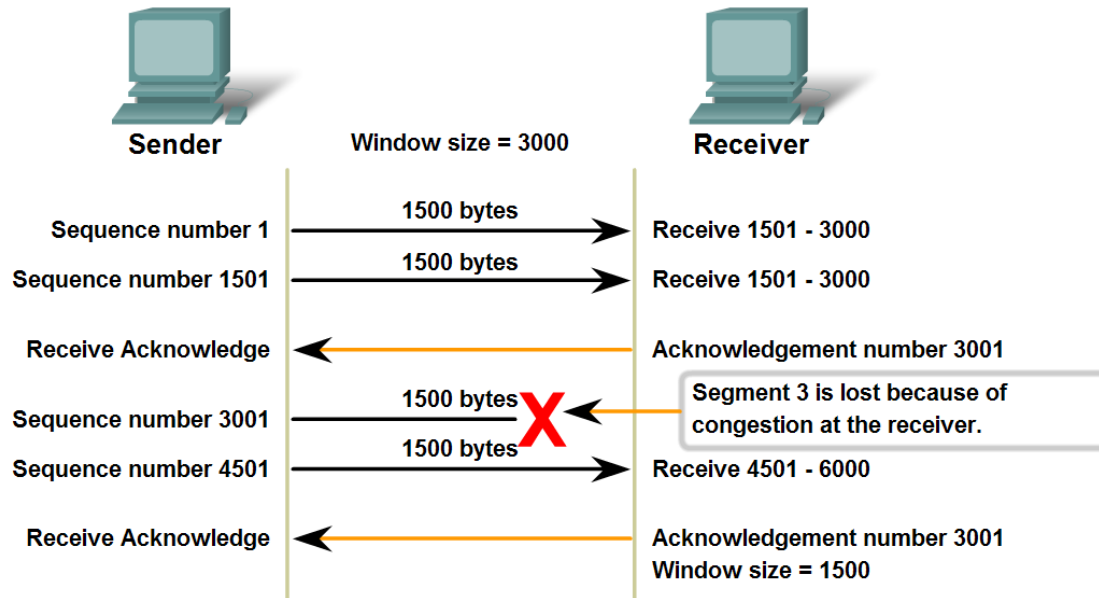
- Describe the retransmission remedy for lost data employed by TCP



Managing TCP Sessions

- Describe the mechanisms in TCP that manage the interrelationship between window size, data loss and congestion during a session

TCP Congestion and Flow Control

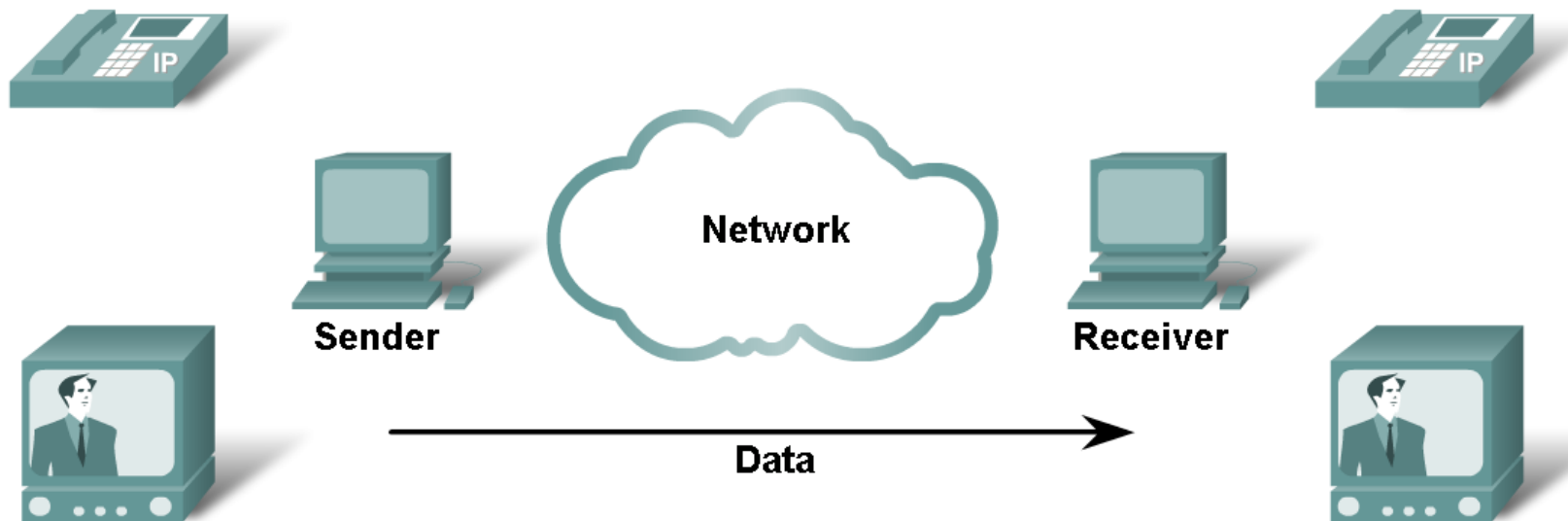


If segments are lost because of congestion, the Receiver will acknowledge the last received sequential segment and reply with a reduced window size.

UDP Protocol

- Describe the characteristics of the UDP protocol and the types of communication for which it is best suited

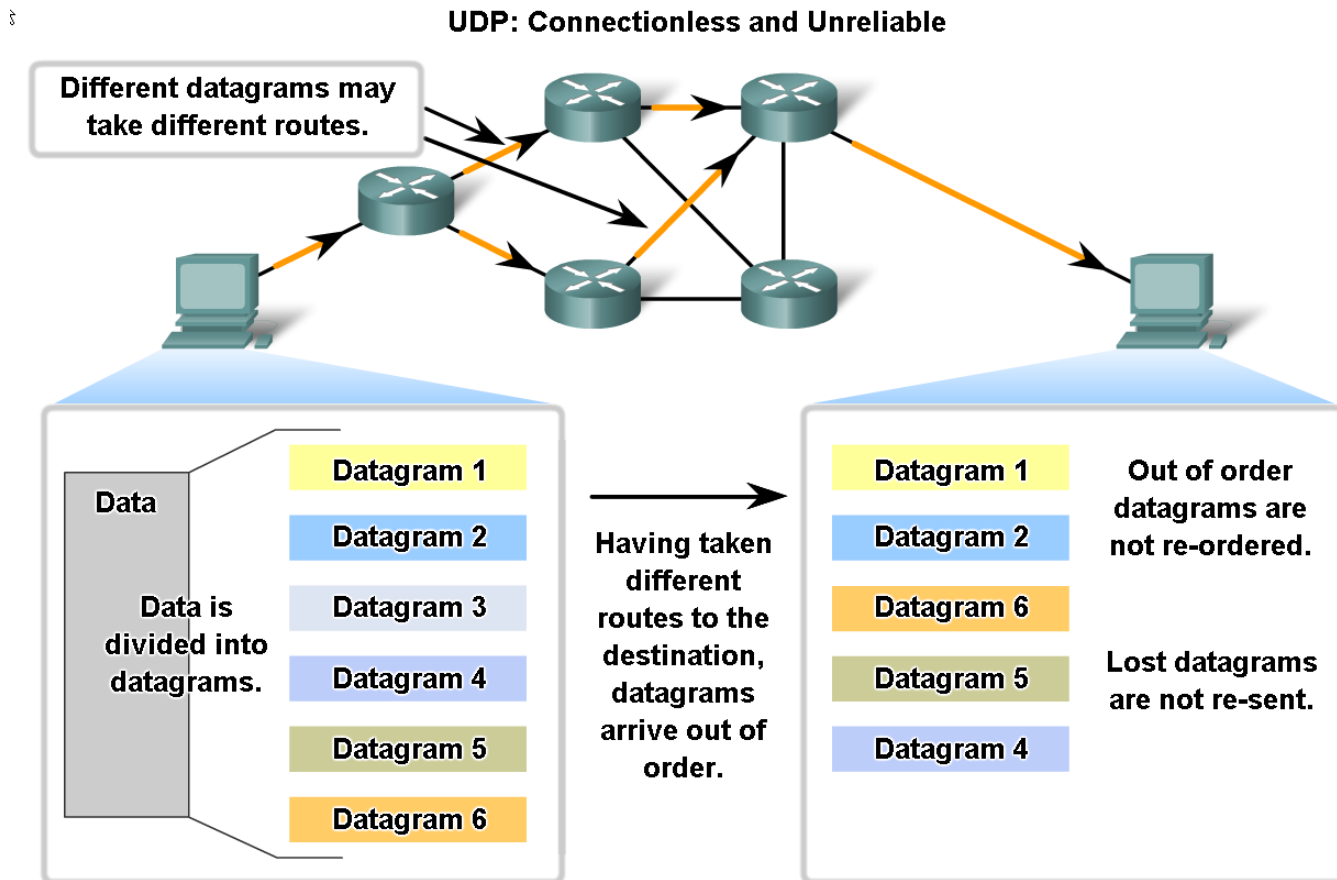
UDP Low Overhead Data Transport



UDP does not establish a connection before sending data.

UDP Protocol

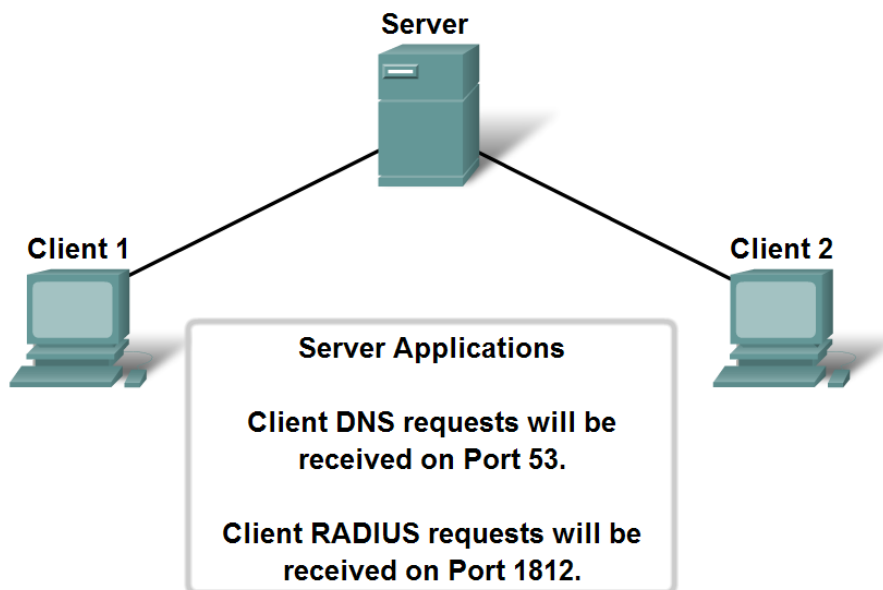
- Describe in detail the process specified by the UDP protocol to reassemble PDUs at the destination device



UDP Protocol

- Describe how servers use port numbers to identify a specified application layer process and direct segments to the proper service or application

UDP Server Listening for Requests



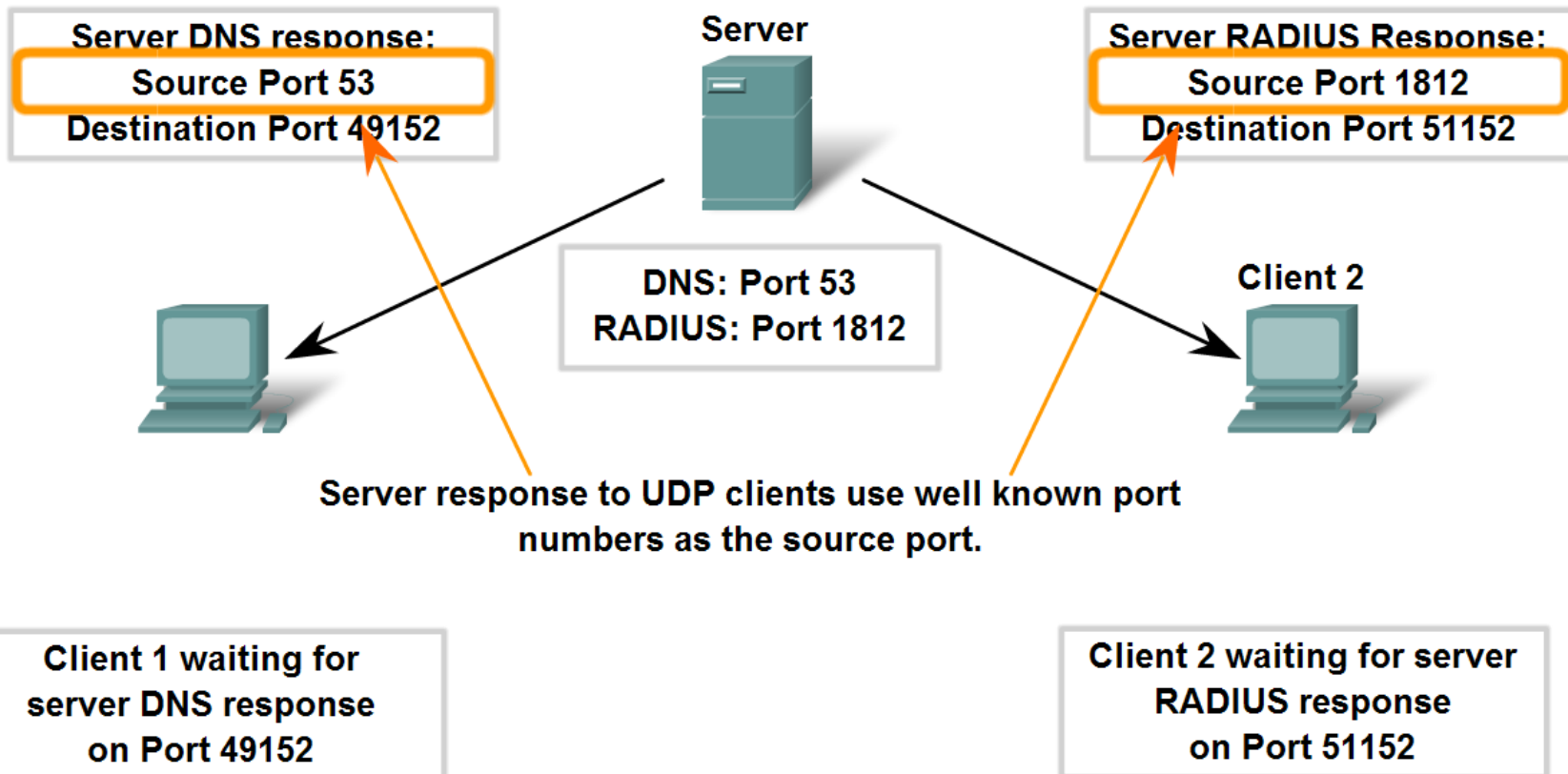
Client requests to servers have well known ports numbers as the destination port.

UDP Protocol

- Trace the steps as the UDP protocol and port numbers are utilized in client-server communication.



Clients Sending UDP Requests



Thank You