CCNA 200-301, Volume 2

Chapter 1

Introduction to TCP/IP Transport and Applications

Objectives

- Compare TCP to UDP
- Explain the role of DHCP and DNS in the network

TCP/IP Transport Layer

Function	Description
Multiplexing using ports	Function that allows receiving hosts to choose the correct application for which the data is destined, based on the port number.
Error recovery (reliability)	Process of numbering and acknowledging data with Sequence and Acknowledgment header fields.
Flow control using windowing	Process that uses window sizes to protect buffer space and routing devices.
Connection establishment and termination	Process used to initialize port numbers and Sequence and Acknowledgment fields.
Ordered data transfer and data segmentation	Continuous stream of bytes from an upper-layer process that is "segmented" for transmission and delivered to upper-layer processes at the receiving device, with the bytes in the same order.

TCP Header Fields

4 Bytes				
Source Port		ort	Destination Port	
Sequence Number				
Acknowledgement Number				
Offset	Reserved	Flag Bits	Window	
Checksum		n	Urgent	

Hannah Sending Packets to Jessie, with Three Applications



Hannah Sending Packets to Jessie, with Three Applications Using Port Numbers to Multiplex



Connections Between Sockets



Popular Applications and Their Well-Known Port Numbers

Port Number	Protocol	Application
20	ТСР	FTP Data
21	ТСР	FTP Control
22	ТСР	SSH
23	ТСР	Telnet
25	ТСР	SMTP
53	UDP, TCP	DNS
67,68	UDP	DHCP (Server, Client)
69	UDP	TFTP
80	ТСР	HTTP (WWW)
110	ТСР	POP3
161	UDP	SNMP
443	ТСР	SSL
514	UDP	Syslog

TCP Connection Establishment



TCP Connection Termination



TCP Acknowledgement Without Errors



TCP Acknowledgment with Errors



TCP Windowing



UDP Header

4 Bytes				
Source Port	Destination Port			
Length	Checksum			

Structure of a URI Used to Retrieve a Web Page



DNS Resolution and Requesting a Web Page



www.cisco.com Web Server 198.133.219.25

Recursive DNS Lookup



Multiple HTTP Get Requests/Responses



Dilemma: How Host A Chooses the App That Should Receive This Data



Browser: TCP port 49124 Browser: TCP port 49125 Browser: TCP port 49126 Email: TCP port 49127 Chat: TCP port 49128

Three Key Fields with Which to Identify the Next Header

