CHAPTER 3 Transport Layer

3.1 Introduction and Transport-Layer Services.

1) A transport-layer protocol provides for logical communication between application processes running on different hosts

2) The Internet has two protocols; TCP and UDP

3) UDP; unreliable, connectionless service to the invoking application
   ↓
   User Datagram Protocol

4) TCP (Transmission Control Protocol); reliable, connection-oriented service to the invoking

5) IP provides logical communication between hosts.

6) The IP service model is a best-effort delivery service.

7) IP is an unreliable service. Each host has an IP address

8) Extending host-to-host delivery to process-to-process delivery is called transport-layer multiplexing and demultiplexing.

9) TCP provides reliable data transfer; congestion control.

10) This job of delivering the data in a transport-layer segment to the correct socket is called demultiplexing.

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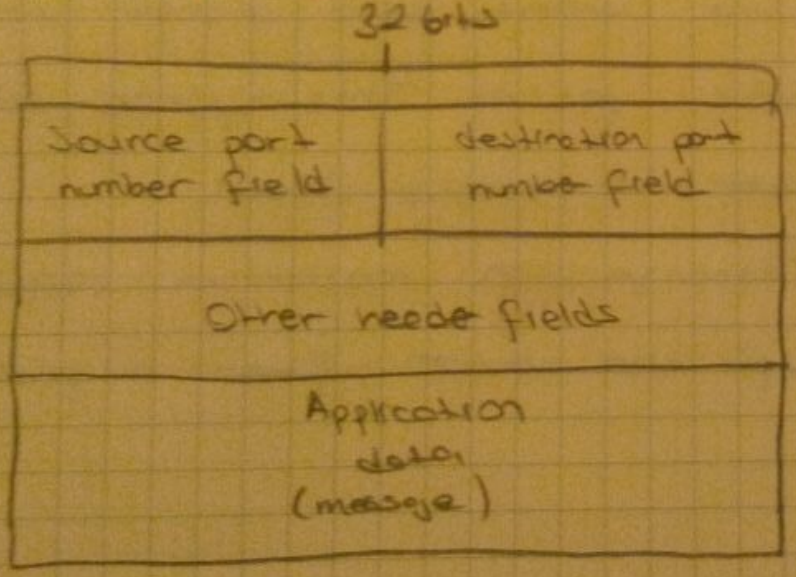
11) The job of gathering data chunks at the source host from different sockets, encapsulating each data chunk with header information to create segments, and passing the segments to the network layer is called multiplexing.

12)



*Each port number is 16-bit number

0 to 65535

13) The port numbers ranging from to 0 to 1023 are called well-known port numbers.

14) HTTP uses port number 80 , FTTP → 21

15) Internet checksum : example (Hata olup olmadığını control ediyoruz)

→ add 2 16-bit integers

1 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0
1 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0] bunları topluyorum

wraparound 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 → burda taşma oluyor. 1'i tekrar sonuçla topluyorum

sum 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 0 → sonra sayımı 1'e tamamlıyorum

checksum 1 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 1

This is an example of the celebrated end-end principle in system design

16) Unidirectional data transfer is data transfer from the sending to the receiving side.

17) Bidirectional data transfer is no difficult but considerably more tedious to explain

18) Positive acknowledgments "OK"

19) Negative " " Please repeat that"

20) In a computer network setting, reliable data transfer protocols

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20) In a computer network setting, reliable data transfer protocols based on such retransmission are known as ARQ (Automatic Repeat reQuest) protocols.

21) The sender simply to resend the current data packet when it receives a garbled ACK or NAK packet. This approach introduces duplicate packets into the sender-to-receiver channel

22) Implementing a time-based retransmission mechanism requires a countdown timer that can interrupt the sender after a given amount of time has expired

23) Packet sequence numbers alternate between 0 and 1, protocol rdt 3.0 is sometimes known as the alternating-bit protocol

24) U → Utilization

$$U_{sender} = \frac{L/R}{RTT + L/R}$$