Veri İletişimi ve Bilgisayar Ağları
BLM3051

Dr. Öğr. Üyesi Furkan ÇAKMAK

Ders Bilgilendirme Formu – Haftalık Konular

BLM3051
Veri İletişimi
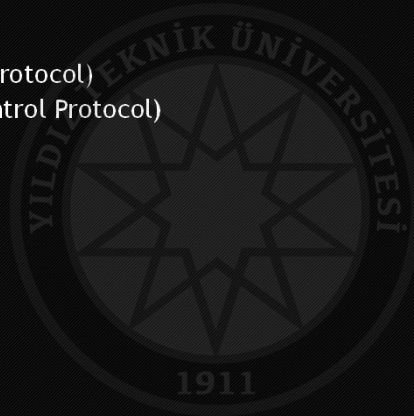ve Bilgisayar
Ağları - 14

Week #	Date	Subjects
1	20.02.2025	Veri İletişimine Giriş, Mimari Modeller
2	27.02.2025	OSI Referans Modeli, Katmanları, Fonksiyonları
3	06.03.2025	Fiziksel Katman, Sinyalleşme
4	13.03.2025	Paralel ve Seri İletişim, Haberleşme Ortamları ve Teknik Özellikleri, Multiplexing (TDM, FDM)
5	20.03.2025	Hata Tespiti ve Düzeltme Yöntemleri
6	27.03.2025	Veri Bağı Kontrol Teknikleri ve Akış Kontrolü
7	03.04.2025	Senkron ve Asenkron Veri Bağı Protokolleri (BSC, HDLC)
8	10.04.2025	Ara Sınav
9	17.04.2025	LAN Teknolojileri, IEEE 802.3, IEEE 802.4, 802.5, 802.11
10	24.04.2025	Geniş Alan Ağlarında Kullanılan Teknolojiler (X.25, ISDN, FR, ATM, xDSL.)
11	01.05.2025	Emek ve Dayanışma Günü
12	08.05.2025	Ağ Katmanı, Anahtarlama, Bağlantılı ve Bağlantısız Servisler, Statik ve Dinamik Routing
13	15.05.2025	Ağ Katmanında Sıkışıklık, Sebepleri ve Çözümleri, IP (Internetworking Protocol)
14	22.05.2025	ICMP, BOOTP, DHCP, Taşıma Katmanı - UDP (User Datagram Protocol), TCP (Transmisson Control Protocol)
15	29.05.2025	Öğrenci Proje Sunumları

Transport Layer

- The Internet
  - UDP (User Datagram Protocol)
  - TCP (Transmission Control Protocol)

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UDP (User Datagram Protocol)

- A Connectionless Protocol
- Nothing beyond sending packets between applications.
  - Letting applications build their own protocols on top
- Sending datagrams
- UDP transmits **segments** consisting of an 8-byte header
- Using only raw IP, not ports
  - So, the transport layer would not know what to do with each incoming packet.

UDP Header

16-bits	16-bits	16-bits	16-bits
Source Port	Destination Port	UDP length	UDP checksum

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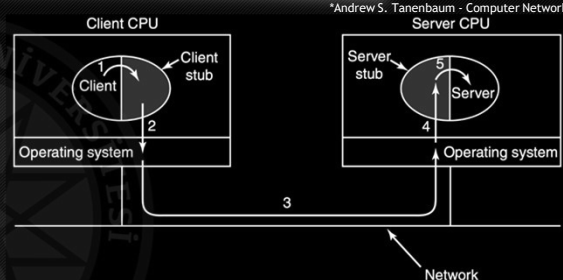# UDP (User Datagram Protocol) (Con't)

- The IPv4 pseudoheader (in IP layer, we are in transport layer)
  - Source and destionation address is 32-bits
  - No checksum (00000000)
  - Protocol = 17
  - UDP length: 16-bits
- UDP does *not* do
  - Flow control
  - Congestion control
  - Retransmission
- UDP does do
  - Optional end-to-end error detection (with Checksum)
  - An interface to the IP protocol with the added feature of demultiplexing multiple processes using the ports

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UDP (User Datagram Protocol) (Con't)

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- DNS (Domain Name System) uses UDP
  - www.ce.yildiz.edu.tr
- Remote Procedure Call
  - Not traditional function call
  - Client – Server relationship
    - The calling procedure is known as the client
    - The called procedure is known as the server
  - **Client stub:** represents the server procedure in the client's address space.
    - Packing the parameters is called **marshaling**.
  - Similarly, the server is bound with a procedure called the server stub.
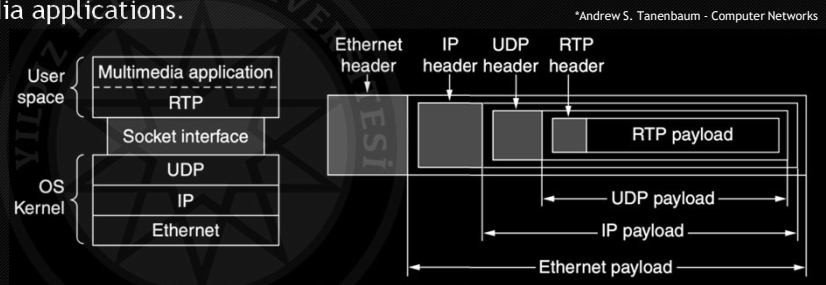
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UDP (User Datagram Protocol) (Con't)

- **Real-Time Transport Protocols**
  - For real-time multimedia applications.
    - Internet radio,
    - Internet telephony,
    - Music-on-demans,
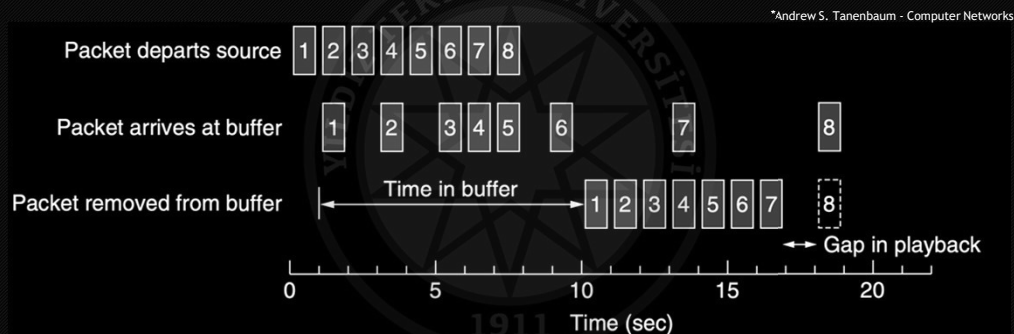   - Videoconferencing,
    - Video-on-demand.

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UDP (User Datagram Protocol) (Con't)

- Jitter and Buffer relationship

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Transport Layer

- The Internet
  - UDP (User Datagram Protocol)
  - **TCP (Transmission Control Protocol)**

TCP (Transmission Control Protocol)

- UDP is a simple protocol
  - But for most Internet applications, reliable, sequenced delivery is needed
- TCP
  - is a reliable end-to-end byte stream over an unreliable internetwork.
  - defined in September 1981.
  - Extensions for high-performance
  - Selective acknowledgements
  - Congestion control
  - Repurposing of header fields for quality of service
  - Improved retransmission timers
  - Explicit congestion notification
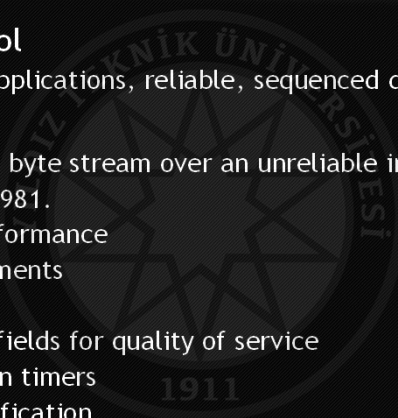
TCP (Transmission Control Protocol) (Con't)

- Well-known ports:
  - Port numbers below 1024 are reserved for standard services
    - Over 700 have been assigned.

Port	Protocol	Use
20, 21	FTP	File transfer
22	SSH	Remote login, replacement for Telnet
25	SMTP	Email
80	HTTP	World Wide Web
110	POP-3	Remote email access
143	IMAP	Remote email access
443	HTTPS	Secure Web (HTTP over SSL/TLS)
543	RTSP	Media player control
631	IPP	Printer sharing

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TCP (Transmission Control Protocol) (Con't)

- All TCP connections are **full duplex** and **point-to-point**.
  - TCP does not support **multicasting** or **broadcasting**.
- A TCP connection is **a byte stream**, NOT **a message stream**.

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IP header   TCP header

A   B   C   D   A B C D

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TCP (Transmission Control Protocol) (Con't)

- **The TCP Segment Header**

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TCP (Transmission Control Protocol) (Con't)
The TCP Segment Header

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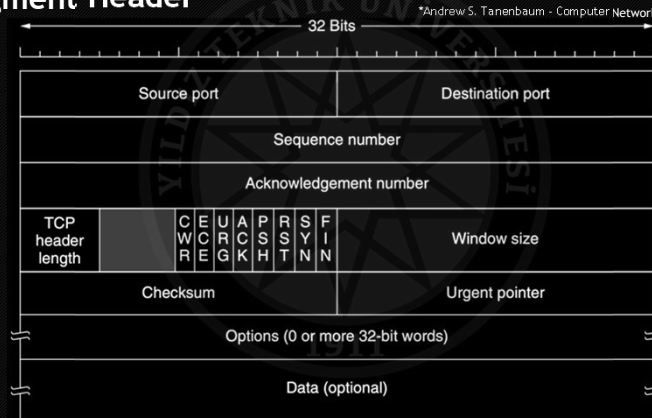
- **TCP header size is 20 bytes**.
- **IP header ize is 20 bytes**.
- **65535-20-20** = 65,495 bytes **data**.
- This connection identifier is called a **5 tuple**
  - The protocol (TCP)
  - Source IP
  - Source port
  - Destination IP
  - Destination port
- TCP segments: 536 + 20 = 556 bytes
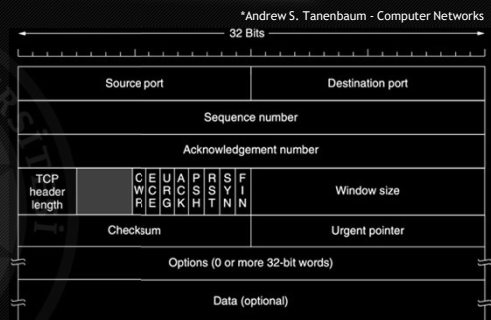
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Thank you for listening...

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