

# Compsys Recap: application and transport layer

Kap.2 & kap.3





# Agenda

- HTTP
- HURTIG! gennemgang af CDN og Peer to Peer
- UDP VS TCP
- TCP recap
- congestion control
- eksamens opgaver

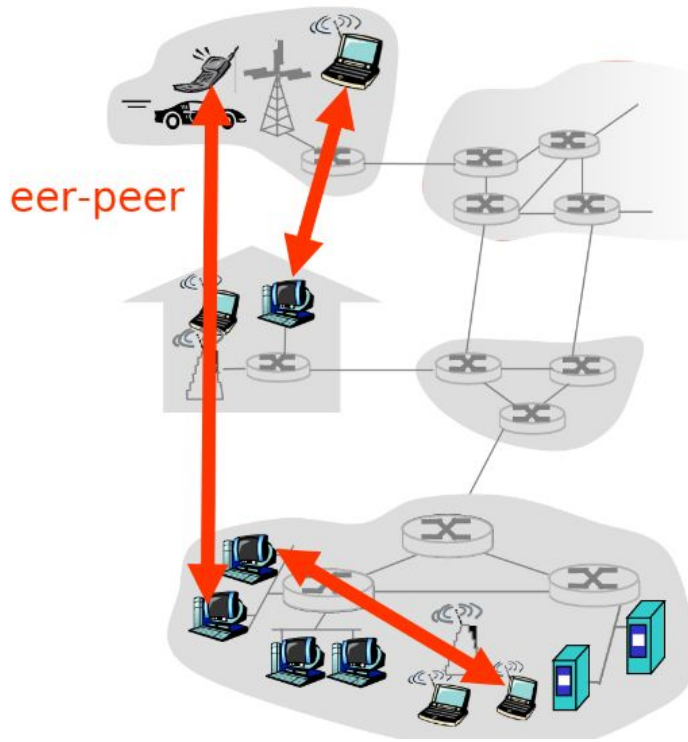


# HTTP

- Stateless protocol
- Request message formats
- Response message formats
- persistent vs non persistent

Look it up

# CDN og peer To peer

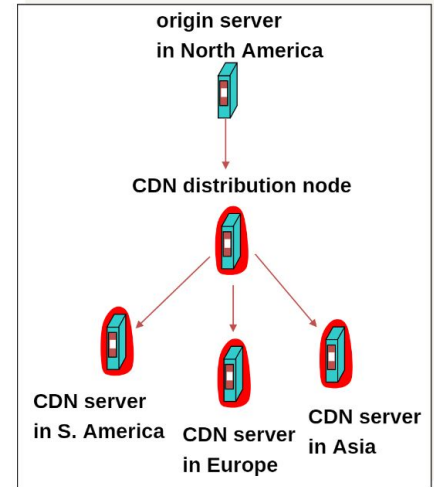


## Content Distribution Networks (CDNs)

- Content providers are CDN customers

### Content replication

- CDN company installs thousands of servers throughout Internet
  - In large datacenters
  - Or, close to users
- CDN replicates customers' content
- When provider updates content, CDN updates servers



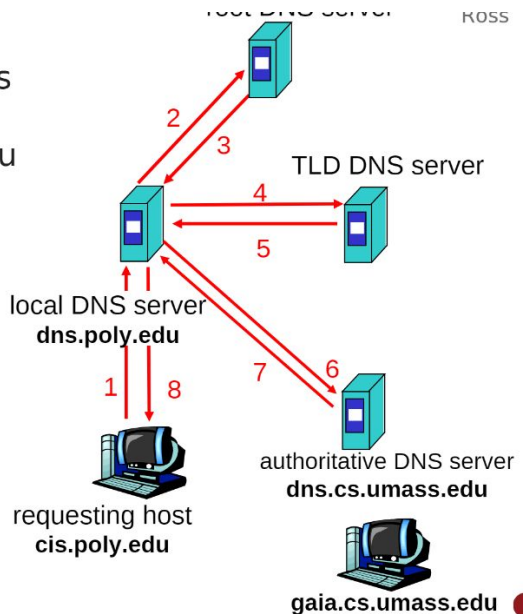


# DNS

- host at cis.poly.edu wants IP address for gaia.cs.umass.edu

## Iterated query

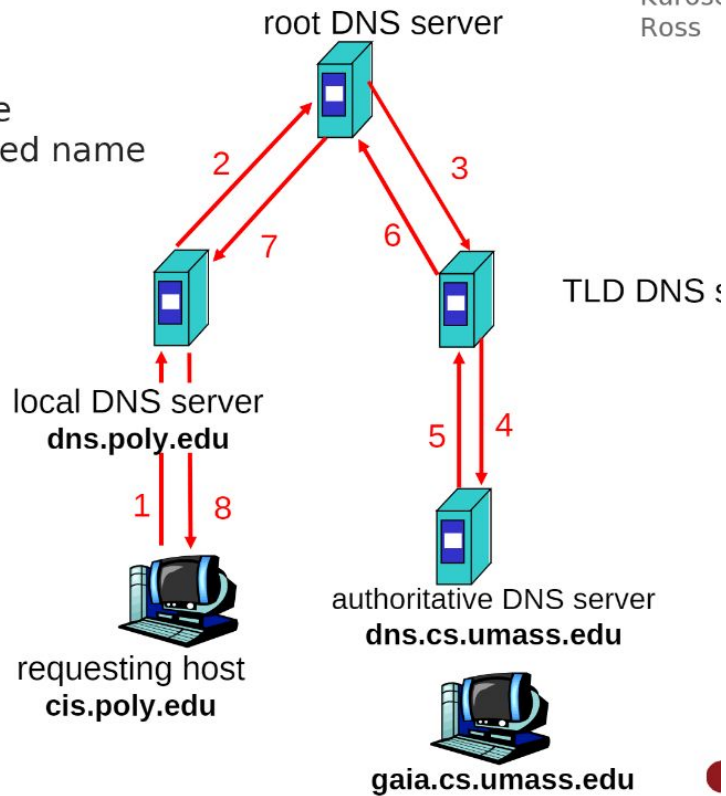
- contacted server replies with name of server to contact
- "I don't know this name, but ask this server"



## query

n of name  
n contacted name

?





# UDP vs TCP

## Internet transport protocols services

### TCP service:

- *connection-oriented*: setup required between client and server processes
- *reliable transport*: between sending and receiving process
- *flow control*: sender won't overwhelm receiver
- *congestion control*: throttle sender when network overloaded
- *does not provide*: timing, minimum throughput guarantees, security

### UDP service:

- unreliable data transfer between sending and receiving process
- does not provide: connection setup, reliability, flow control, congestion control, timing, throughput guarantee, or security

Q: why bother? Why is there a UDP?

## User Datagram Protocol (UDP)

- Datagram messaging service
  - Demultiplexing of messages: port numbers
  - Detecting corrupted messages: checksum
- Lightweight communication between processes
  - Send messages to and receive them from a socket
  - Avoid overhead and delays of ordered, reliable delivery

SRC port	DST port
checksum	length
DATA	



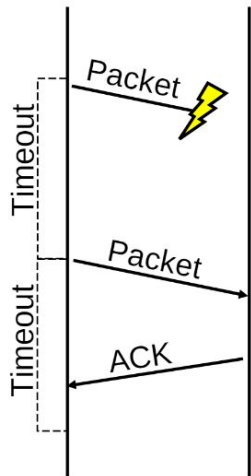
# TCP i “dybden”

## TCP Support for Reliable Delivery

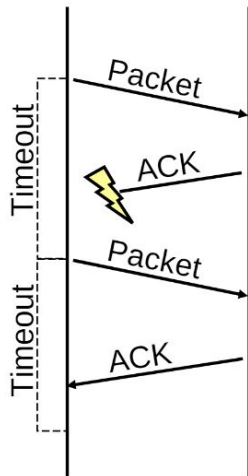
- **Detect bit errors:** checksum
  - Used to detect corrupted data at the receiver
  - ...leading the receiver to drop the packet
- **Detect missing data:** sequence number
  - Used to detect a gap in the stream of bytes
  - ... and for putting the data back in order
- **Recover from lost data:** retransmission
  - Sender re-transmits lost or corrupted data
  - Two main ways to detect lost packets

# packet loss

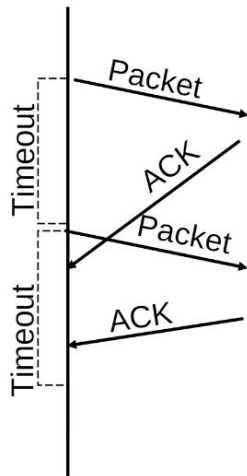
## Reasons for Retransmission



Packet lost



ACK lost  
DUPLICATE  
PACKET



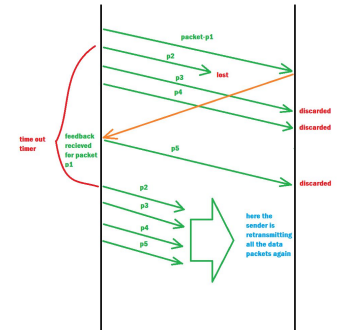
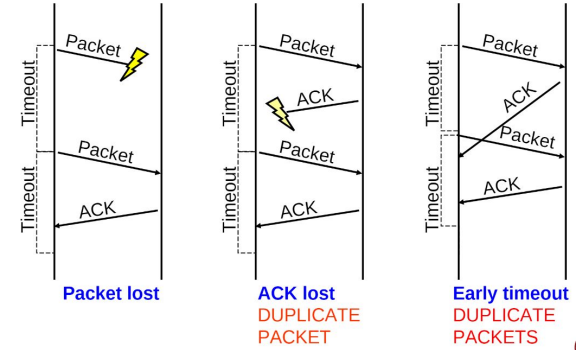
Early timeout  
DUPLICATE  
PACKETS





# Fast retransmit

- Triple duplicate ack instead of timeout
- Two main ways:
  - GBN (go back N)
  - SR (selective repeat)





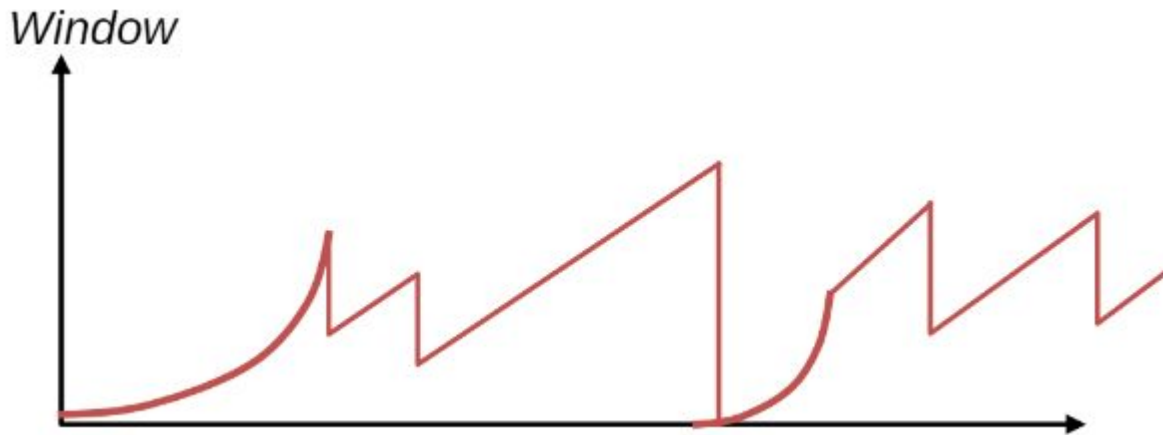
# Good to read up on about TCP

- Teardown and setup phase
- seq and ack numbers
- packet loss detection
- re-transmission protocols
  - Go back N
  - Selective repeat
- congestion and flow control



# Congestion control

- Slow start / ssthresh
- congestion control (additive increase)
- packetloss( multiplicative decrease)
- timeout vs triple duplicate ack





# Exams set

RE-exam 2021- 2022

if time TCP question from exam 2021-2022