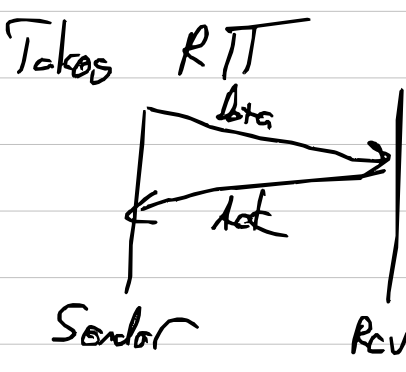
Lecture 6 → ECN to L4S

Fundamentals of TCP
Loss = Congestion

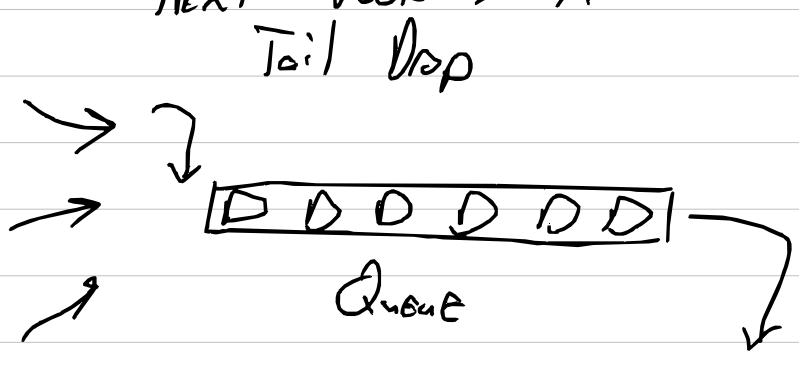
How to detect
Timeout RTO ∴
Fast Retransmit New Reno +
SACK → Cover Later

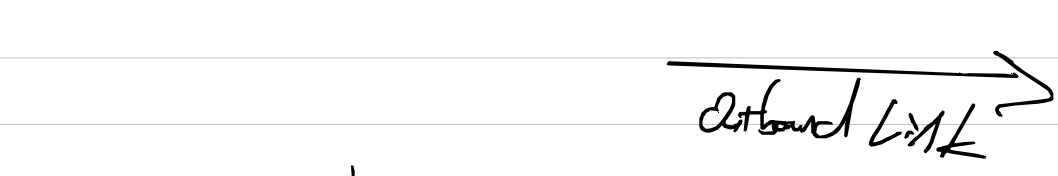
Takes RTT



Must experience loss

Next week → AQM
Tail Drop





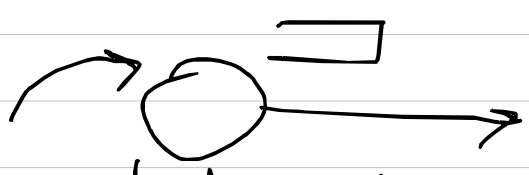
Queue has built up
Vegas → Detect earlier

ECN → What if know earlier?

Two bits → ToS field

Wireshark Demo / Discuss

1 bit ECN or No
1 bit Congested ← Congestion Experienced



Router checks if ECN enabled
If $|Q| > X$

Codepoints AQM next Monday
00
01
10
11] ECN Enabled OK Congestion

CE → Don't drop me bro
I am early signalling
De facto priority (loss)

What is the threshold for CE?
Internet Shrug?

Up to provider

Threshold → Persistent

Dilemma → AQM Persistent / Consistent vs. Transient

But also note
Send & detect congestion → Who needs to know?

Sender but only recv knows
ECN-Echo option CWR Congestion Window Reduced (CWR) Flag / option
Still take RTT
but it is earlier and explicit Ack

SYN / Setup
No good if other side does not talk ECN

Retrospective ECN
Extra bit?

Why L4S?

Hyper-bolize much → Abstract
Not peer reviewed

Briscoe → Firebrand Good Way

L4S Low Latency Low Loss
Scalable

FQ-CoDel / PIE > Schedulers → Link-wise

DCTCP → What? Talk about on Wednesday
Wednesday focus w/others
Scalable Congestion Control

L4S Twerk ECN Congestion Signal
→ Loss

ECN Marks → Limit
2 per RTT

Dual Queue Coupled Framework
Dual PI 2

Priority Queue

L4S Queue → Priority Shallow

TCP Prague
Adjust a little not a lot
Fall back to Reno

Revisit as well on Wednesday