

# Lecture 7 - 2/4/26

Papers: DCTCP, ML for Throughput

Recap → key points

ECN      ECN or bufferbloat?  
 Why reflect/echo?  
 Threshold → CE      fixed or no?  
 Mandatory  
 how react?

L45      Differ from ECN?

TCP Prague  
 Reason small queue?

→ Do to CWND?

Relationship of Queue Size and TBT?

DCTCP      SIGCOMM 2010

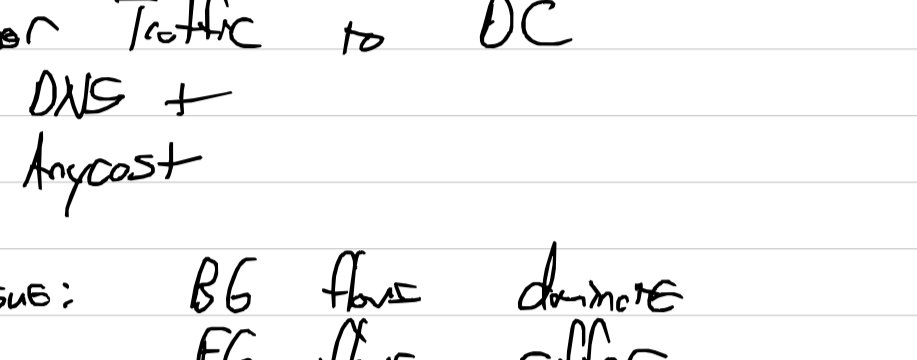
Where?      Microsoft  
                  Data Centers  
                  DC for Microsoft?

BG  
 Data Center      Cluster  
                  Topology

14, 24, 4u      bps      crossbar  
 Switch → Discs      pps      Limitations  
 Switch vs. Router

Aside: Modern DC → SDN

Modern Cloud View



Steer Traffic to DC  
 DNS +  
 Anycast

Issue: BG flows dominate  
 FG flows suffer

What are those?

Switches/etc.      ECN

Switch has queue?      Yes



Key points      DCTCP  
 Multibit      feedback

Fraction of marked packets

Flow lifetime?      Client flow or operational flow?

RTT very low  
 250 μsec → Unbuffered

High BW      1 Gb/s  
                  10 Gb/s

DC → Single admin  
 Homogeneous

Critiques      DC+TCP of past work

Post-work      Delay      Noise vs. Actual  
                            Highly variable in DC

ADM Style      Mark/notify  
                  → DC+TCP

SLA → What is it?

DC-TCP      Simple Switch      if  $|Q| > k$   
                            CE = 1

Consolidated ECN-Echo  
 1:1 vs. down sampled

Sender Control  
 ~ RTT  
 What fraction  $\alpha$  are marked?

$$\alpha = (1-g)\alpha + g \times F$$

Lost value      Fraction

EWMA      FTW

$$CWND = CWND * (1 - \alpha/2)$$

What converge to?

Switchover

Evaluates      Real Machines  
                  94 across 3 racks  
                  80 1 Gb/s  
                  14 10 Gb/s

What does it do?  
 keep the queue small

Adjust small early

ML → TCP +      IISG/ACM To N  
                       2010

SVR      Post + Preh

Preh properties

Sufficient coverage      history  
 File sizes / x-factors

Properties

AB vs. AT  
 Q Delay  
 L Loss

Cross Traffic → What is it?



Prior Measurements      During

AM for AB      M+ help/ptl  
 Q      as we  
 L      are in  
                  it

Perh Post

Floyd Difficulties of Simulating  
 Internet

Playback use UDP?      Traces

Actual TCP?      Self similar

Bursty across time scales  
 LAN/WAN

Not uniform

Lab      85% w/in 10%

WAN

How good does it need to be?

What matters?