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Key ideas (from Feb 23)

- TCP Friendliness:
 - new protocol mixed TCP, they should split the bandwidth fairly
 - defines fairness by the TCP performance equation from Padhye (!)
- F&F argue they want traffic to respond to feedback, be congestion reactive

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What was the cause of congestion collapse in UDP offered and ac [Jacobson88a]? TCP \Rightarrow TCP was non-10 12 congestion reactive => is; Dotted high loss and lots of retranmission (retx of packets that are already in the net and so are not TCP useful) UDP accepted What is cng. collapse for F&F? \Rightarrow transmission of packets that are not useful 12

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Other Examples of Collapse

- classic collapse (unnecessary pkt retx)
- collapse from undelivered packets
- fragmentation based collapse – ex. retransmission unit >> loss unit
- increased control traffic
- collapse from stale packets
- ex. sending audio that misses deadline
- \Rightarrow common thread: fewer useful bytes of data

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- router could penalize non-reactive flows

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Flows that must be regulated

- Unresponsive: - fail to reduce load in response to increased loss
- Not TCP friendly

 long-term usage exceeds that of TCP under same conditions
- Using disproportionate bandwidth

 use disproportionately more bandwidth than other flows during congestion
- Assumptions:
- We can monitor a flow's arrival rate 8c Floyd99b: CSci551 SP2006 © John Heidemann



Identifying Unresponsive and Disporportionate Flows

- Need to measure over multiple RTTs
- Flows are *unresponsive* if drops don't cause rate reduction
 - -p up by 4 => T down by 2 (if responsive)
- Flows are *disporportionate* if they use more bandwidth than others

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