Congestion Control Workshop

Summary

July 28, 2012
What can we do?

• Absent changes to the network can we actually do something?  
  Yes

• Is there work in the area of measurements that can we do to create “incentives” to make updates in the network happen?  
  Yes

• Is it useful to develop a congestion control mechanism that assumes the problem is in the end host (browser) only? (Where there is idle capacity in the network.)  
  Yes

• There is a wide range of normal delay variation in non congested networks
  Investigate range and distribution to help design delay based algorithms
Two Solution Tracks

- Requires longer timeframe to deploy
- Improve network entities for those cases where network is congested.
- Examples
  - Get ECN deployed
  - Queue segregation
  - Classification of traffic (e.g., DPI, QoS signaling)
- Applicable to today’s timeframe
- Avoiding self-inflicted queuing.
- Approach: Ensure that the network does not get congested. Solution focuses on idle networks.
- Congestion control for real-time media that browsers send.
- Example:
  - Change the way TCP is used in browsers (avoid opening many concurrent TCP connections, interworking with DASH, use SPDY)
  - Single congestion manager on end host or browser
Design Aspects for Short-Term Approach

• Media is inherently variable. Codecs have limited scope for adaption
  Focus on traffic characteristics of media (voice, video, data)
  Different to TCP bulk transfer applications
  Congestion controller needs to be aware of these limitations
  Codecs may be bursty
  Possibility to link congestion with current encoding
  What information (if any) gets exchanged between codec and congestion control algorithm?

• Startup behavior?
Design Aspects for Short-Term Approach

- Feedback signals come in various forms:
  RTCP, delay, loss, correlation between signal and jitter, etc.
  Use explicit congestion signal, if available (obvious). Example: ECN
  Need algorithm that reacts to all signals including delay, loss, ECN, etc.

- Delay-based and Loss-based Algorithms
  Achieve low latency with algorithm design
  Delay based algorithms are needed in this mode (unless you have things like ECN)
  Needs to not fail when competing with TCP in case of losses