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