Impact of New CC on Cross Traffic

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TCP Round Table

November 2007

The question:

- How to assess the impact of new CC on cross-traffic (web-traffic, multimedia, other long transfers using different CC).

Approaches from the literature:

- Look at response functions. (Sending rate as a function of packet drop rate, for a single flow with fixed RTTs.)
  - Example: RFC 3649, HSTCP.
- Compare aggregate throughput of TCP flows with aggregate throughput of NewCC flows.
  - X-axis: Number of web sessions.
  - Scenario includes reverse-path traffic.
  - Examples: RFC 4828, TFRC-SP, Figures 12-21.
  - The two aggregates being compared could include both long-lived and web traffic.

Congested links with different ranges of RTTs.

- Look at a range of congested links:
  - A local network (e.g., within a single institution), a transoceanic link, and a satellite link, as well as a congested link with a standard range of round-trip times.
    - Why? To evaluate proposals where the level of aggressiveness is a function of the RTT.

Make sure there is a realistic range of connection sizes!

- This includes medium-size flows slow-starting up to large windows, and then terminating.
  - This introduces typical cases of transient delay and packet drops.

Make sure that flows have staggered start times:

- So that some flows start out when the queue is already high from another flow slow-starting.
  - (E.g., for delay-based congestion control.)

Some NewCC mechanisms need to be tested for fairness under a range of queue mechanisms.

- E.g., RFC 4828, TFRC-SP.
  - The fairness is quite different for Drop-Tail queues in packets, Drop-Tail queues in bytes, AQM in packet mode, and AQM in byte mode.

Bandwidth stolen from TCP:

- Let there be two groups of flows, A and B.
  - Case 1: Groups A and B both use TCP.
  - Case 2: Group A uses TCP, group B uses NewCC.
- Compare Group A's fraction of bandwidth in Case 1 with Group A's fraction of the bandwidth in Case 2.
  - The difference between the two fractions is the fraction of the bandwidth slolen from group A by the NewCC.
- Example: RFC 3649, HSTCP.

Approaches from the literature, for proposals for faster start-ups:

- Plot drop rates for regular traffic when a fraction of the traffic is using NewCC.
    - X-axis: Number of web sessions.
    - Example: SAF07 paper for Quick-Start.

- Plot flow completion times for regular traffic, with and without NewCC enabled for other traffic.
    - Example: SAF07 paper for Quick-Start.

Approaches from the literature:
slowly-responding CC.

A benefit of testbeds:

- In addition to queueing delay, testbeds might exhibit delay due to router CPU delay, delay at firewalls, etc.

  - This would be very interesting, particularly for evaluating delay-based congestion control.

The impact on streaming media?

- Measure the average queueing delay, and the average packet drop rates, with and without the NewCC.

- Include streaming media, and look at the delay and packet drop rates experienced by those flows?

Stress-testing fairness of delay-based congestion control?

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