Start Me Up: Determining and Sharing TCP’s Initial Congestion Window

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Motivation

• Each TCP connection maintains states in a data structure called Transport Control Block (TCB)
• Sharing TCB across parallel connections and combining their congestion controllers between two endpoints can be beneficial
  – Reduce the Flow Completion Time (FCT) of short flows: skipping slow start, immediately using large cwnd, applying priorities
• Do parallel connections follow the same route?
  – When they are encapsulated, e.g. VPNs; more in [1]

The Problem

• **Short flows joining an aggregate can immediately increase their cwnds**
  
  – *Lead to sudden bursts* – *if not paced*
The Solution

- **Timer based pacing used by prior works**
- **Our approach:**
  - Maintain the ack-clock of TCP
  - Using the ACKs of conn 1 to clock packet transmissions of connection 2 over the course of the first RTT when connection 2 joins
  - Similarly, we make use of the ACKs of connections 1 and 2 to clock packet transmissions of connection 3
FCTs of Short Flows

FCT of short flows coupled with our ack-clocked mechanism reduces the FCT