Coupled congestion control for RTP media

draft-welzl-rmcat-coupled-cc-04

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REDUCING INTERNET TRANSPORT LATENCY

Context, background

- Having multiple congestion controlled flows from the same sender compete on the same bottleneck is detrimental
  - By first combining their congestion controllers in the sender, we can better control fairness (with priorities) and get less delay and loss

- Two elements: 1) shared bottleneck detection (sbd), 2) coupled congestion control
  - In rtcweb, 1) can sometimes be very easy: same 6-tuple. But measurement-based sbd enables broader application of 2) (same sender, different receivers)

What's new in -04?

- Minor update
  - Extended SBD section
  - Added a note about window based congestion controllers
- Papers, code etc. available via:
 http://heim.ifi.uio.no/safiquli/coupled-cc/index.html

Shared bottlenecks

- Coupled CC only makes sense across a common bottleneck
  - This was ignored in prior work
  - But how to know?

1. Multiplexing (same 5-, actually 6-tuple)
   - but only for same source/destination hosts
2. Configuration (e.g. common wireless uplink)
3. Measurement
   - Never 100% reliable, but: <u>different receivers possible!</u>
   - Historically considered impractical, but recent work:
     David Hayes, Simone Ferlin-Oliveira, Michael Welzl: "Practical Passive Shared Bottleneck Detection Using Shape Summary Statistics", IEEE LCN 2014, 8-11 September 2014

Some simulation results
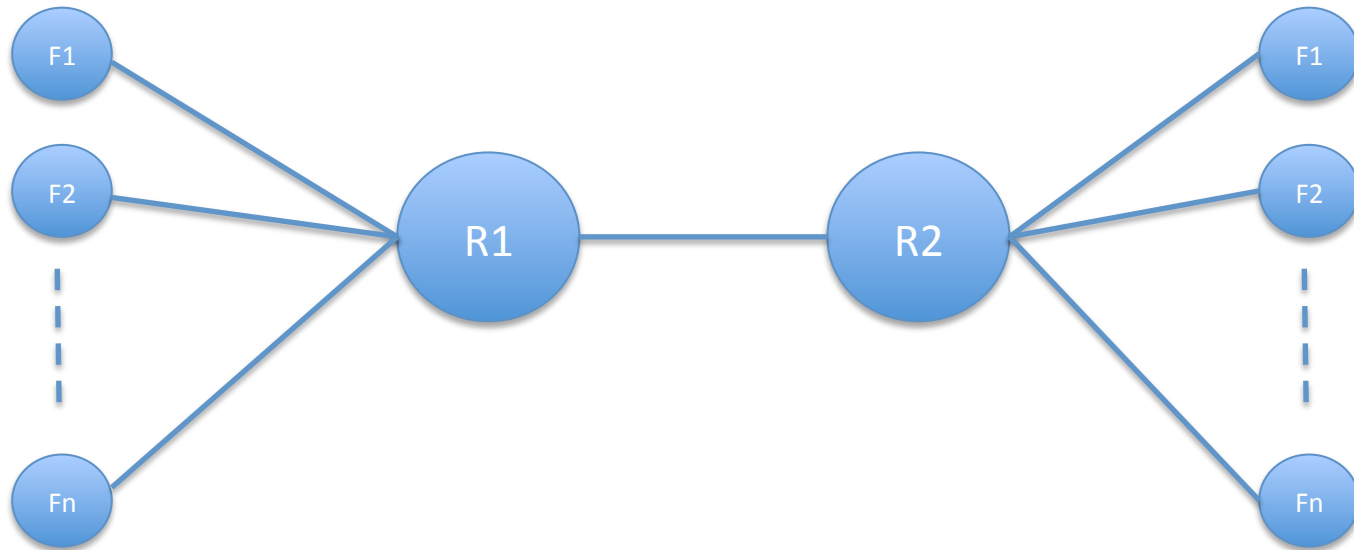
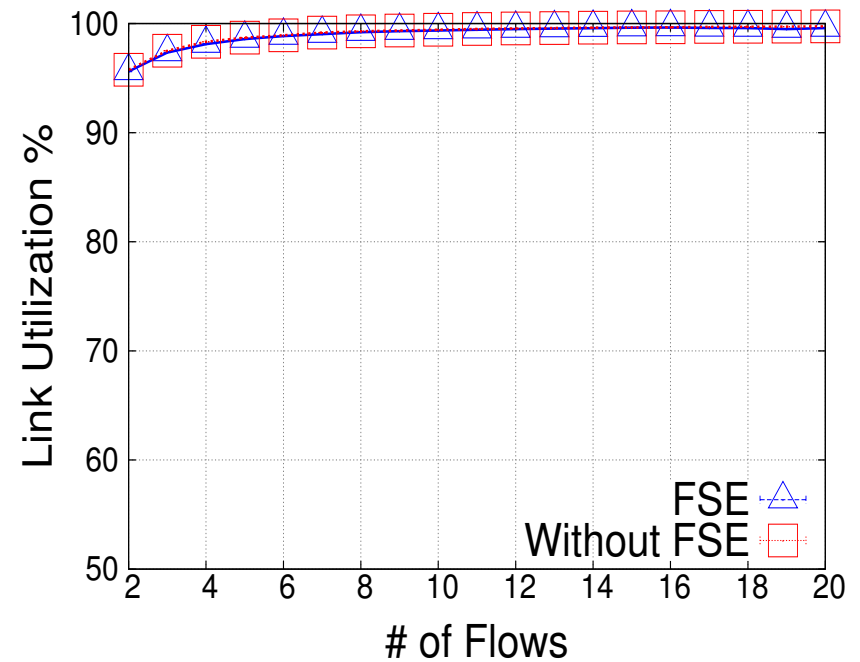- Bottleneck – 10 Mbps
- Packet Size – 1500 Bytes
- RTT – 100 ms
- All tests carried out 10 times with random start times picked from first second

Multiple LEDBAT flows
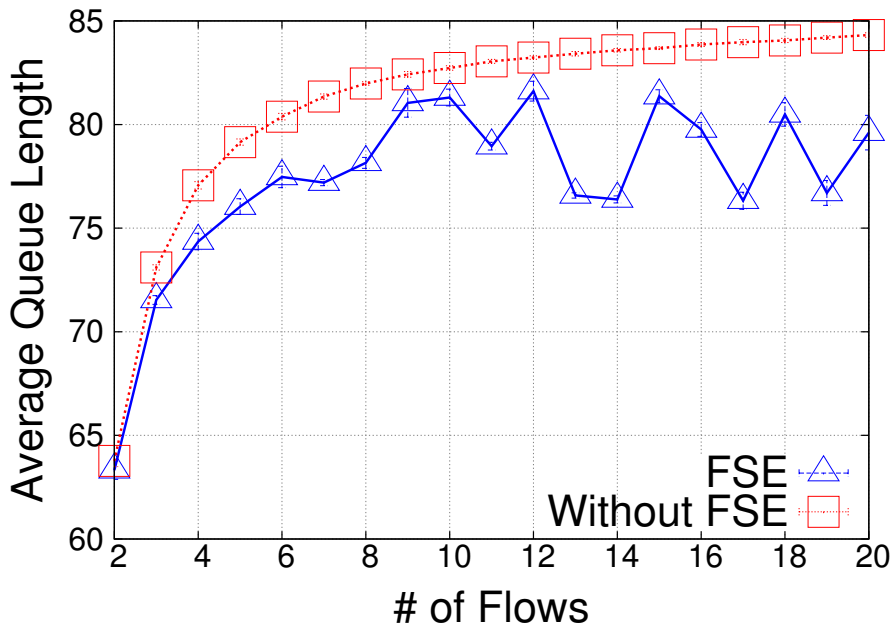
Average Queue Length of LEDBAT Flows – with and without FSE

Link Utilization of LEDBAT Flows – with and without FSE

Next step

- Working with SCTP and LEDBAT
- Working with one of the RMCAT congestion controllers

Q&A