Congestion Control and Avoidance

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Problem statement

- Send as many packets as possible without overloading the network
- Adjust sending rate after detecting congestion
- Reduce reaction and detection time

Current approaches

- Implemented in the endhosts
  - Neither sender nor receiver relay on any notification from the network when adjusting the rate
- Classification:
  - Loss-based
  - Delay-based
  - Combination

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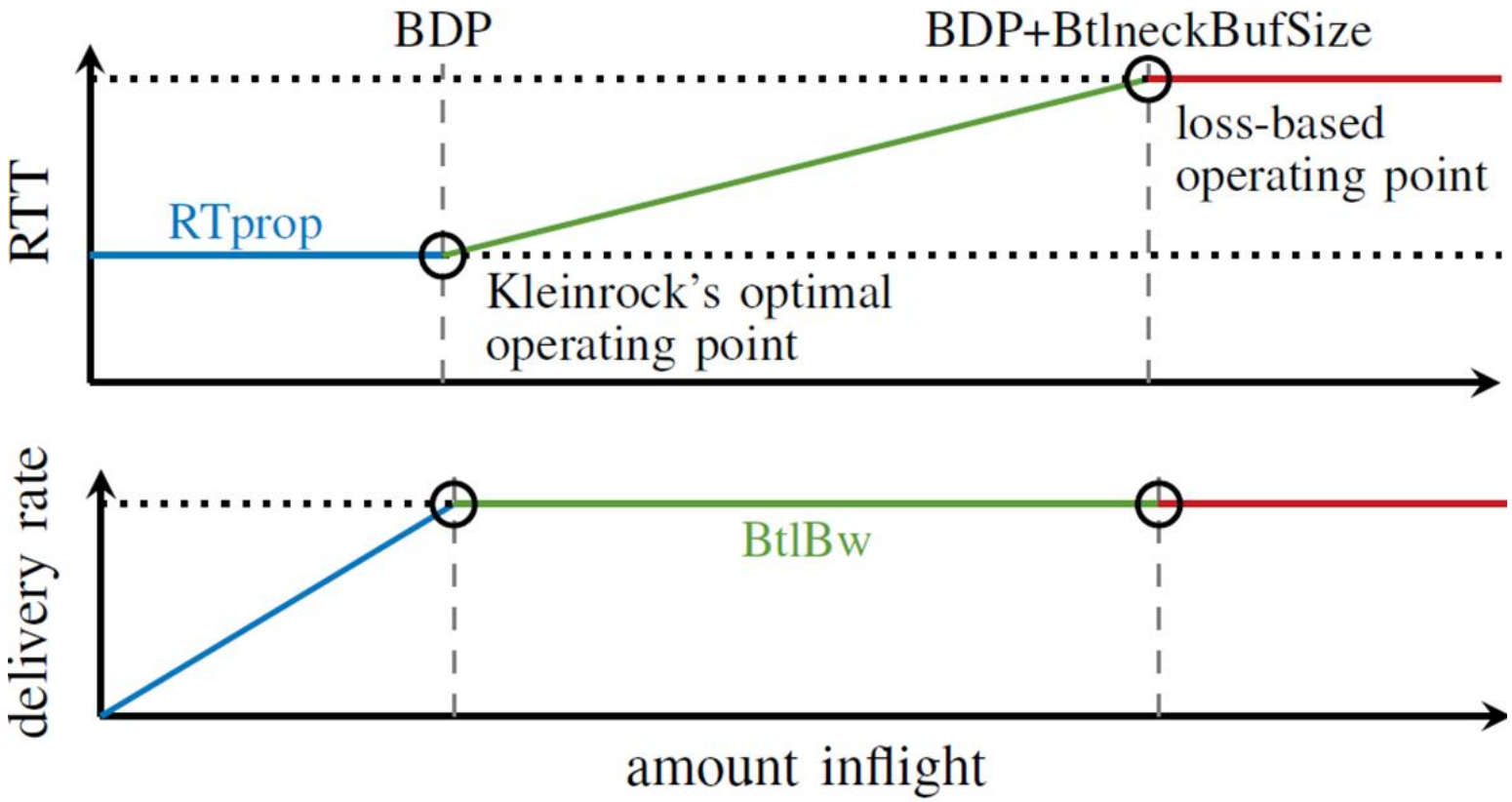
BDP
BDP+BtlneckBufSize
RTT
RTprop
loss-based
operating point
Kleinrock's optimal
operating point
delivery rate
BtlBw
amount inflight

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Loss-based algorithms

- congestion is only detected when the bottleneck is already overloaded
- Consequences:
  - Larger delays
  - Bufferbloat
  - Packets need to be dropped

Delay-based algorithms

- delay as indicator of congestion
- based on precise RTT measurement
  - Estimating base RTT value is difficult
  - Not able to get a fair share when competing with loss based flows

Measuring in the Dataplane

- More accurate measurements
  - More optimal delay-based congestion control
  - Measurements should be performed periodically
- More measurements (e.g. queue size)
- Faster reaction times
- Improved algorithms

Plan

- Literature Survey of current approaches
- Testbed experiments
  - Determine effect of dataplane measurements on quality of congestion control
  - Find points of improvements
- Create own approach
  - Test different metrics

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Questions/Comments/Suggestions?

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