Evaluation of NADA in *ns3-rmcat*

draft-ietf-rmcat-nada-04

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Outline

- NADA implementation in ns3-rmcat
- Performance in rmcat-wired test cases with different traffic sources
- Performance in rmcat-wifi test cases with CBR-like traffic source
- Summary of known issues

NADA Implementation in *ns3-rmcat*

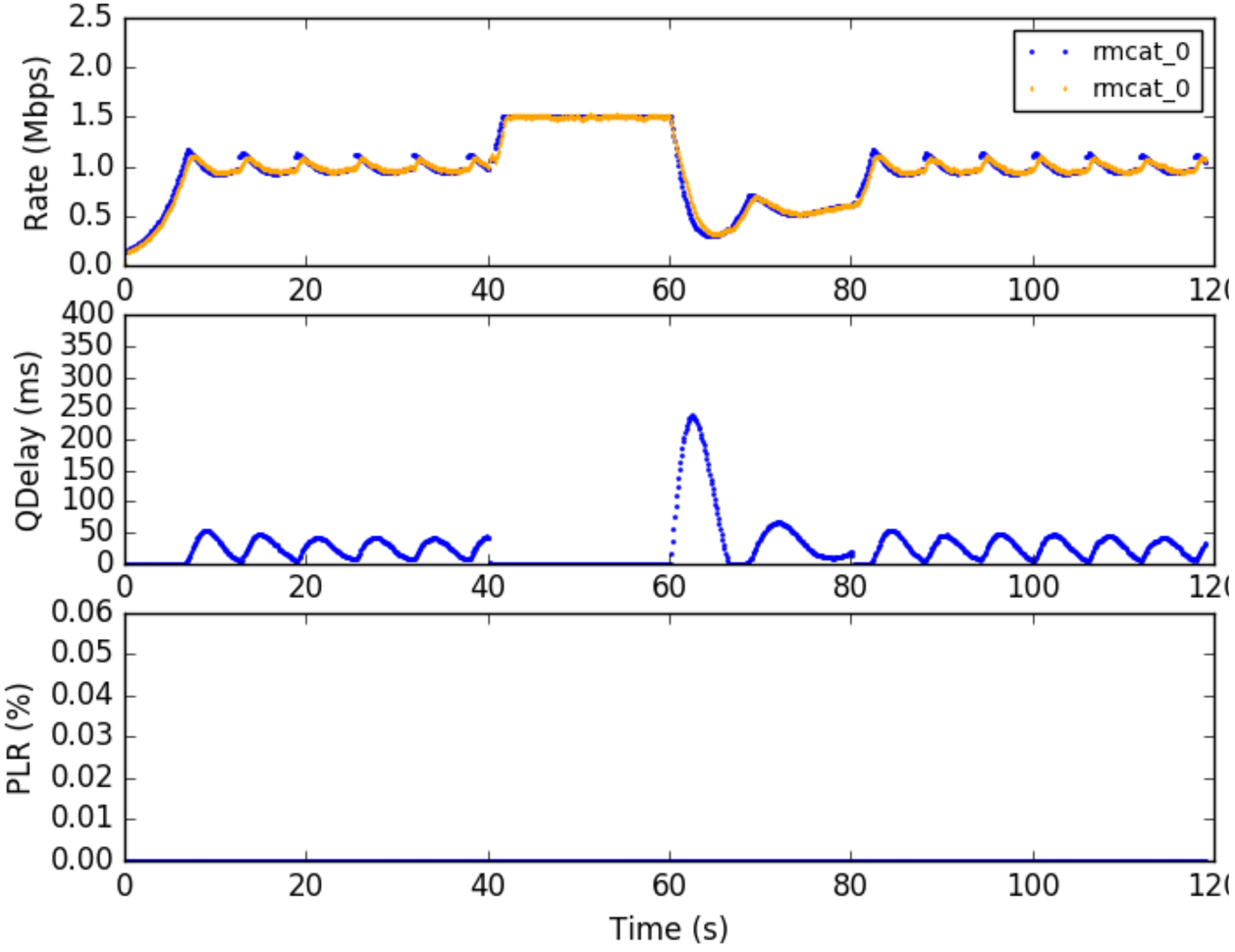
- Congestion control algorithm closely follow descriptions in draft (-04)
- This time also includes the rate shaping buffer module
- All logics moved to sender side: acting on per-packet feedback
- Works with four variants of traffic sources provided by *Syncodec*:
  - CBR-like (SYNCODEC_TYPE_PERFECT)
  - Based on statistical model (SYNCODEC_TYPE_STATS)
  - Trace-driven (SYNCODEC_TYPE_TRACE)
  - Content sharing (SYNCODEC_TYPE_SHARING)

Basic Test Cases

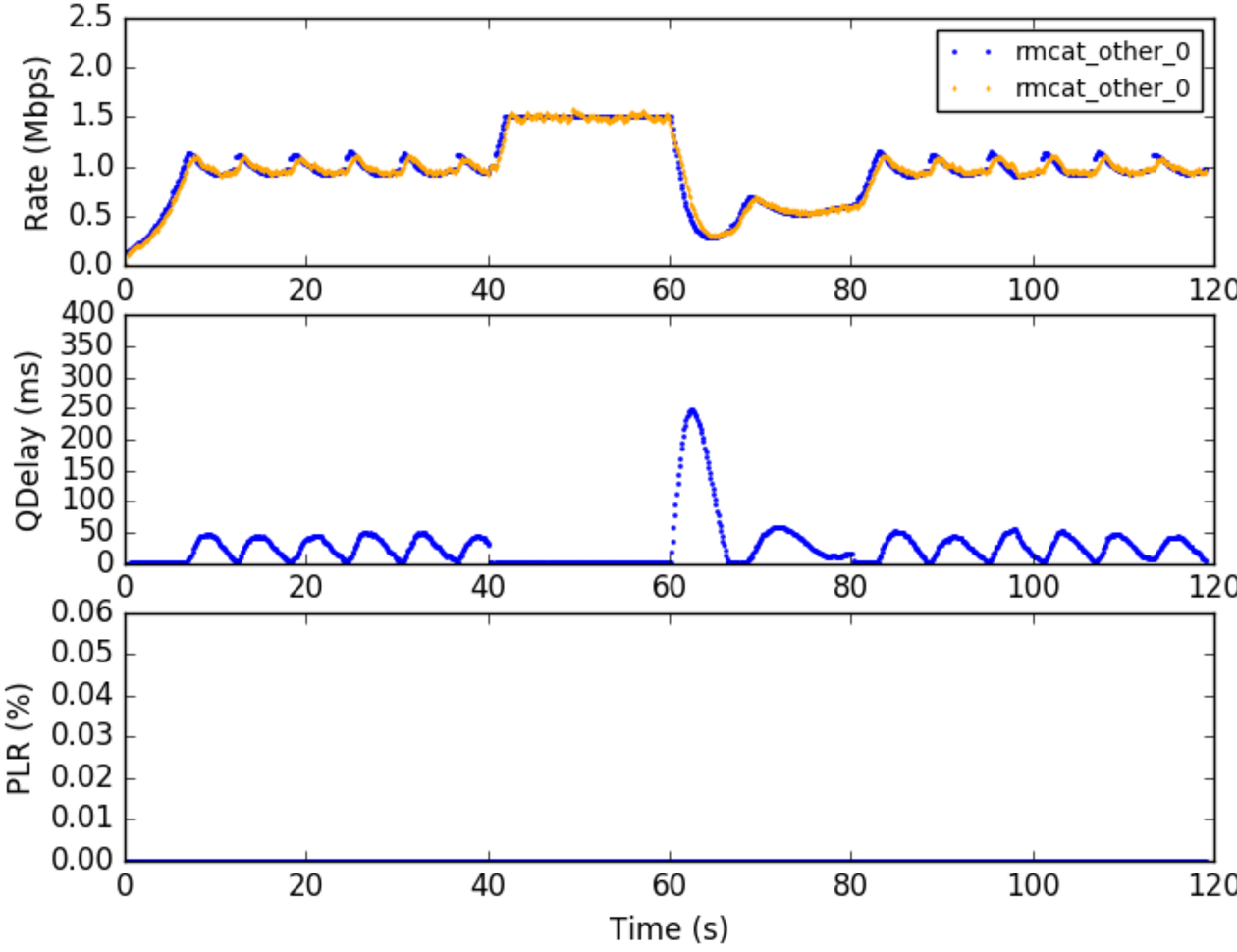
draft-ietf-rmcat-eval-test-04

5.1: Variable Available Capacity with a Single Flow

Traffic Source: CBR-like

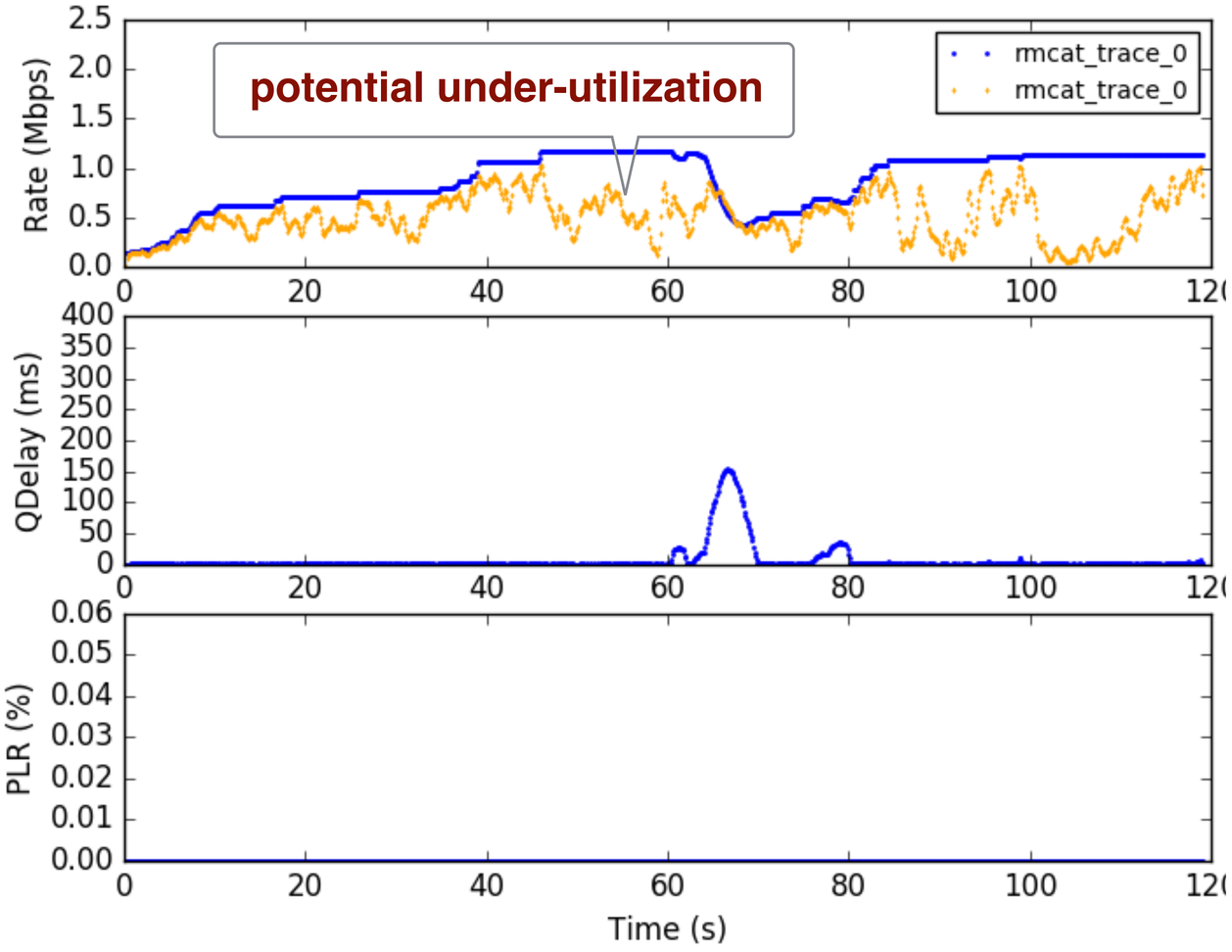


Traffic Source: Statistical Model

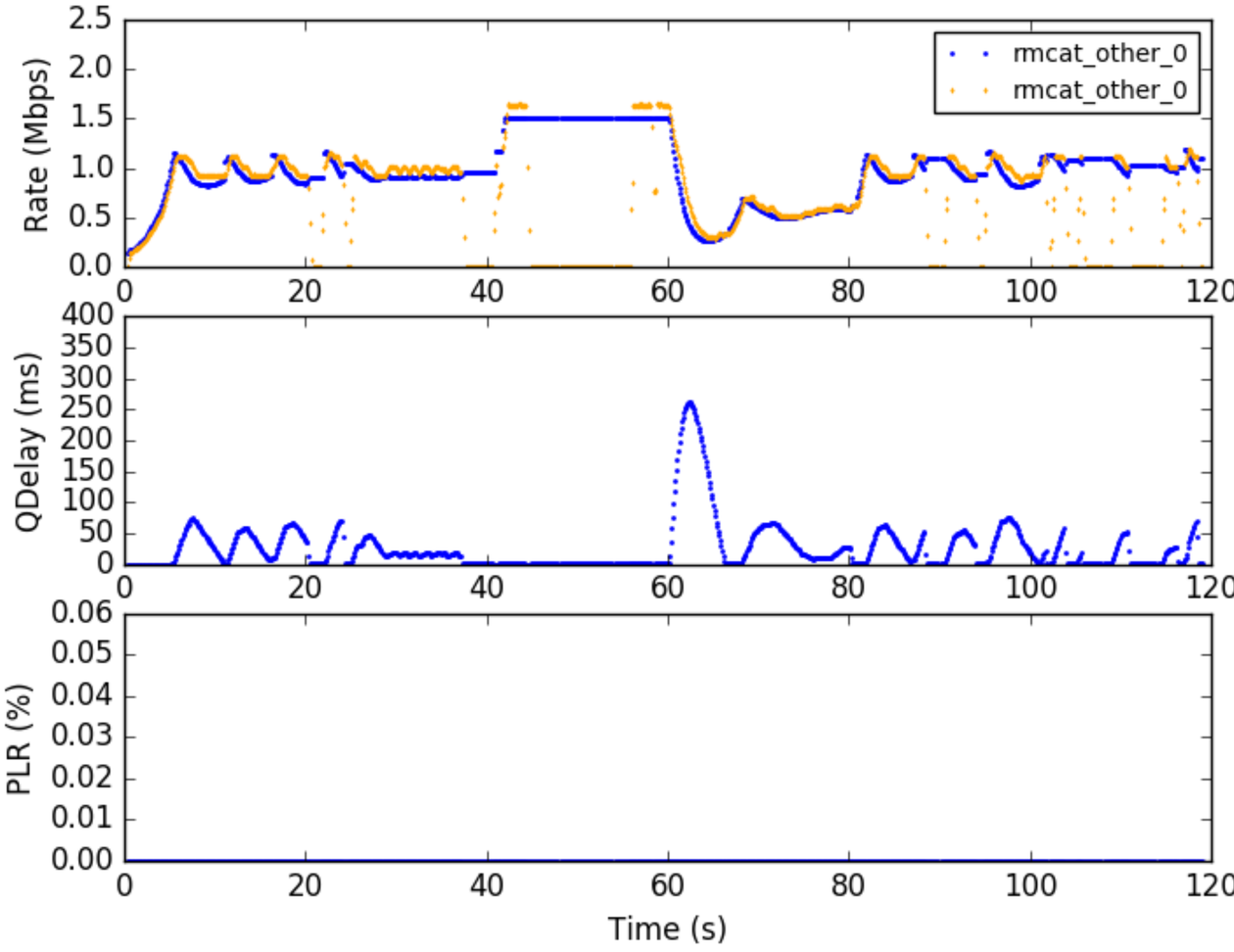


5.1: Variable Available Capacity with a Single Flow

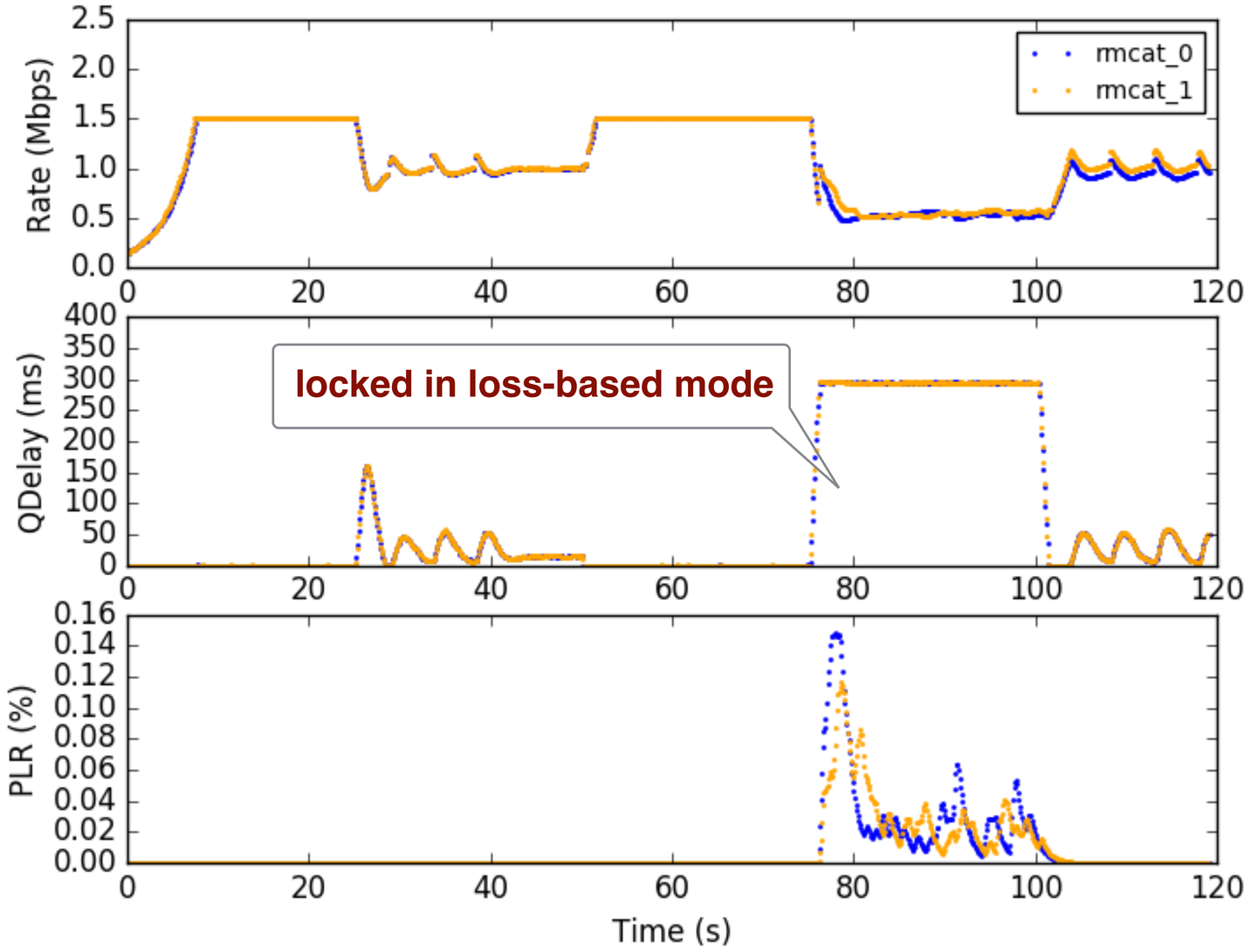
Traffic Source: Trace-driven



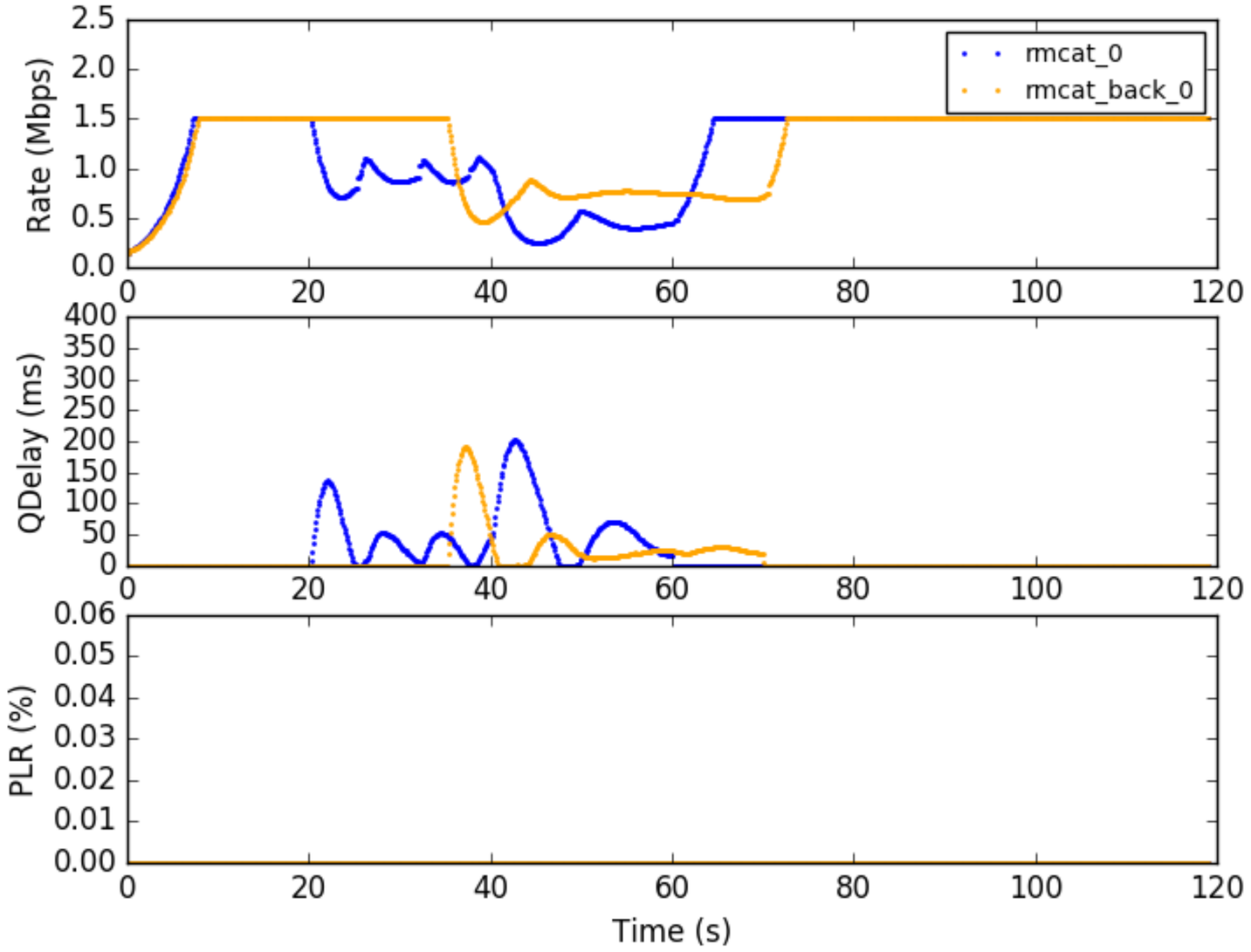
Traffic Source: Content Sharing



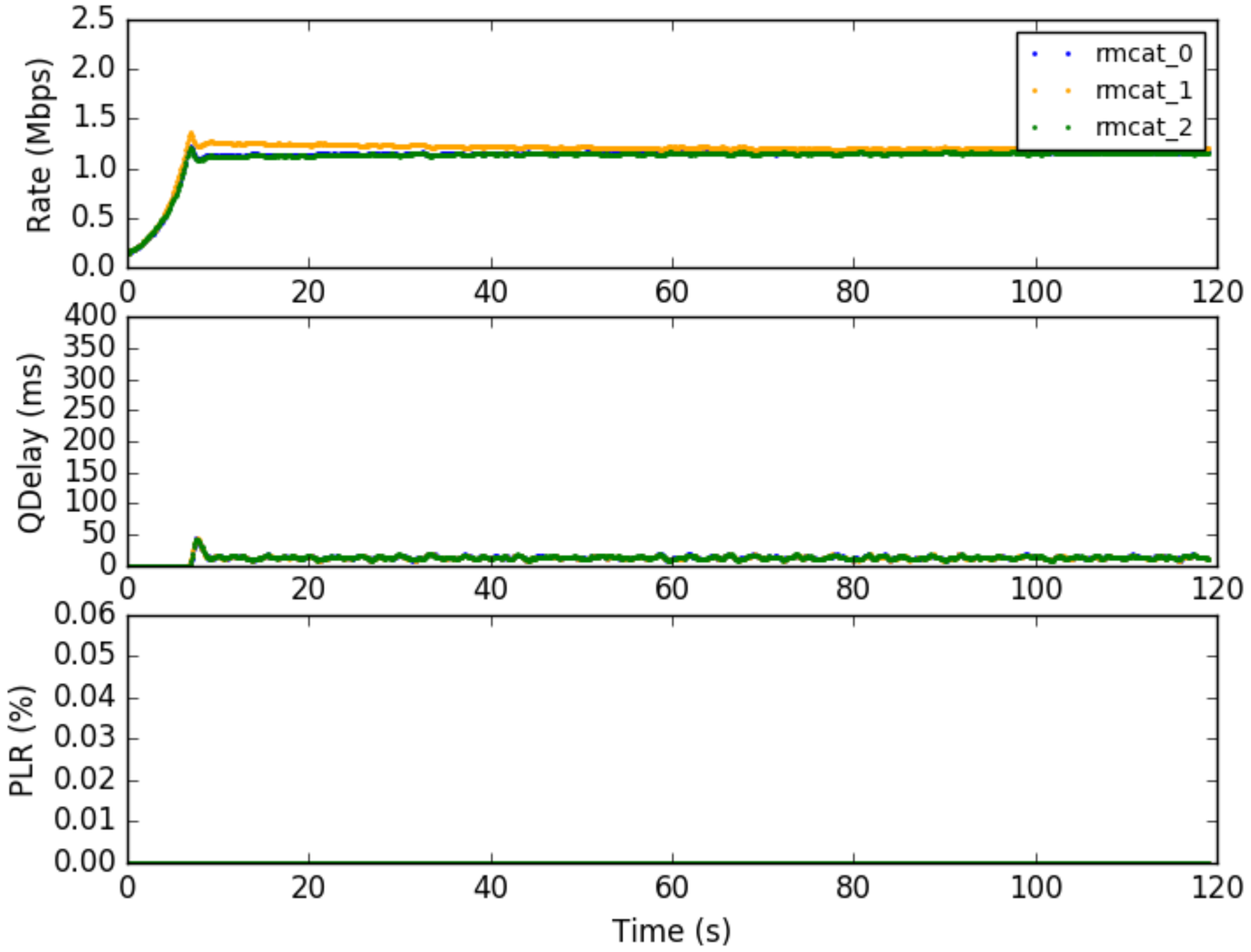
5.2: Variable Available Capacity with Multiple Flows



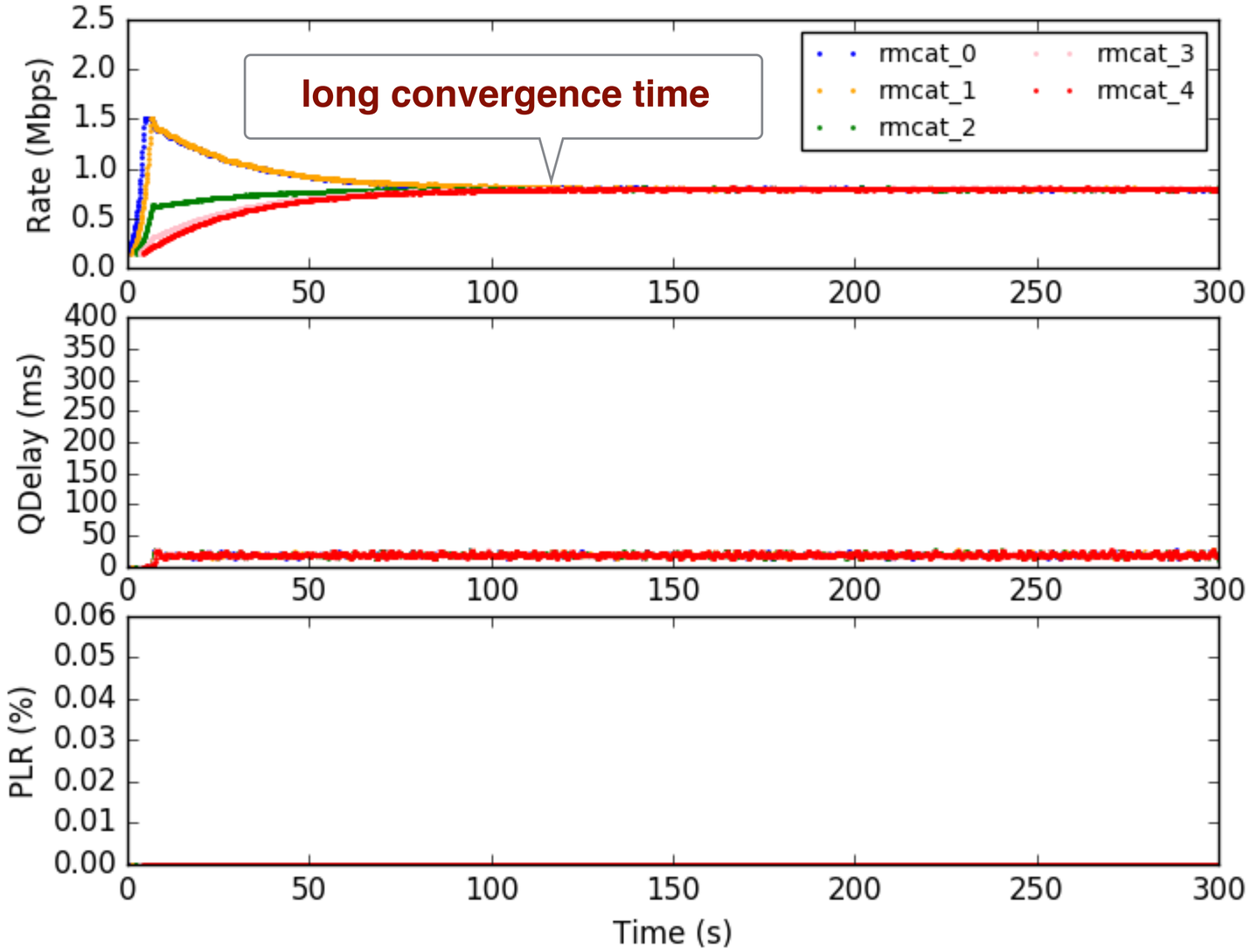
5.3: Congested Feedback Link with Bi-directional Flows



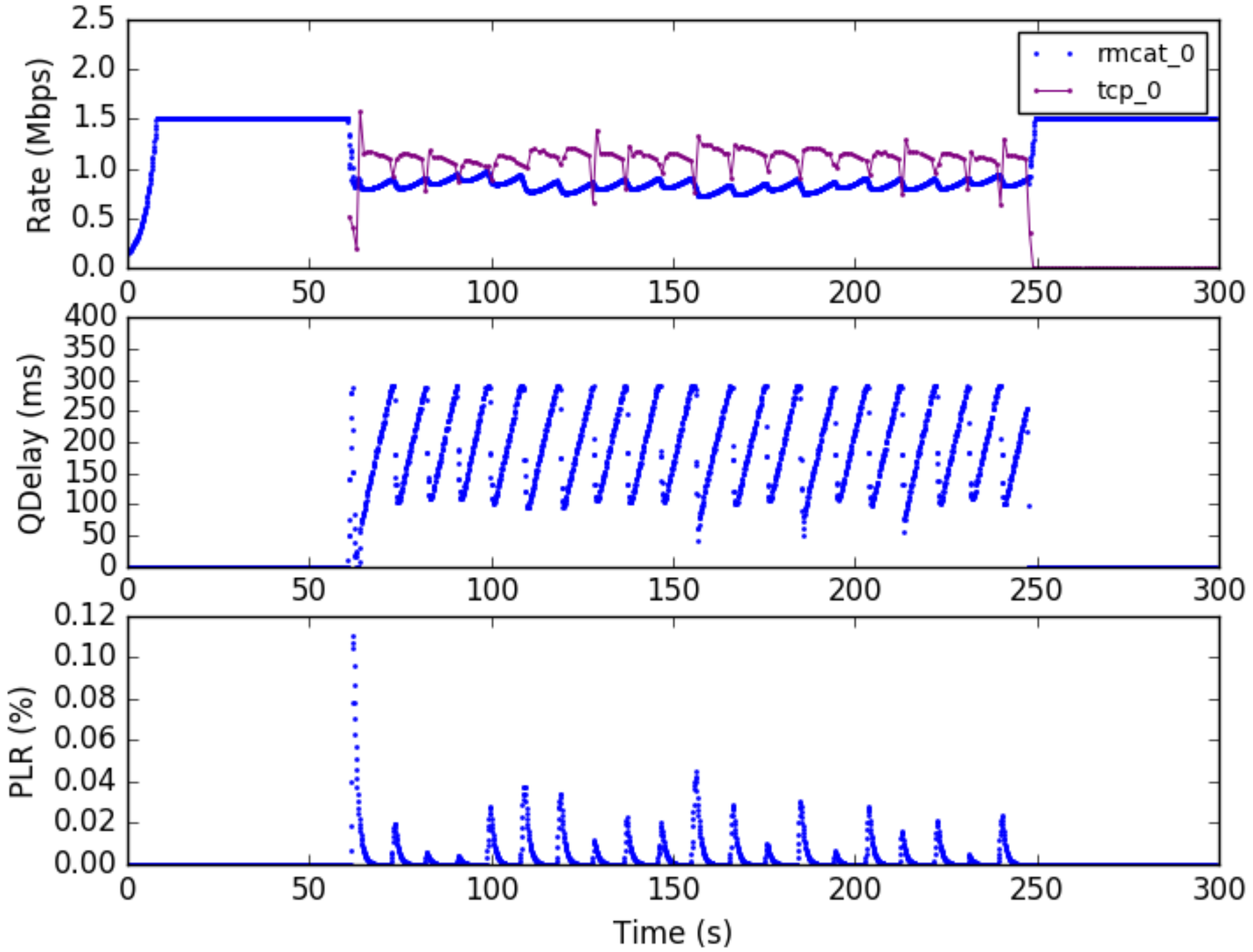
5.4: Multiple Competing RMCAT Flows



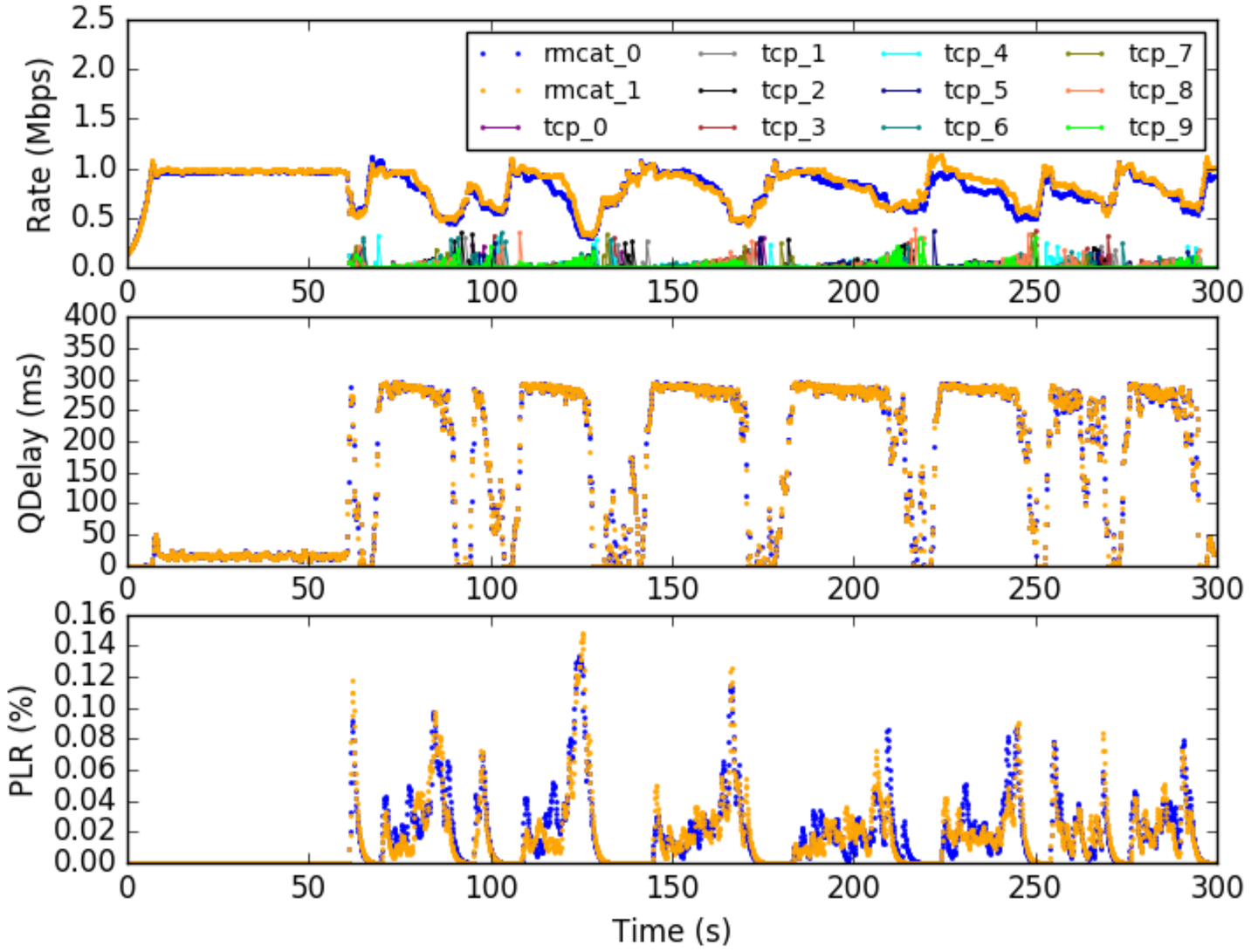
5.5: Round Trip Time Fairness



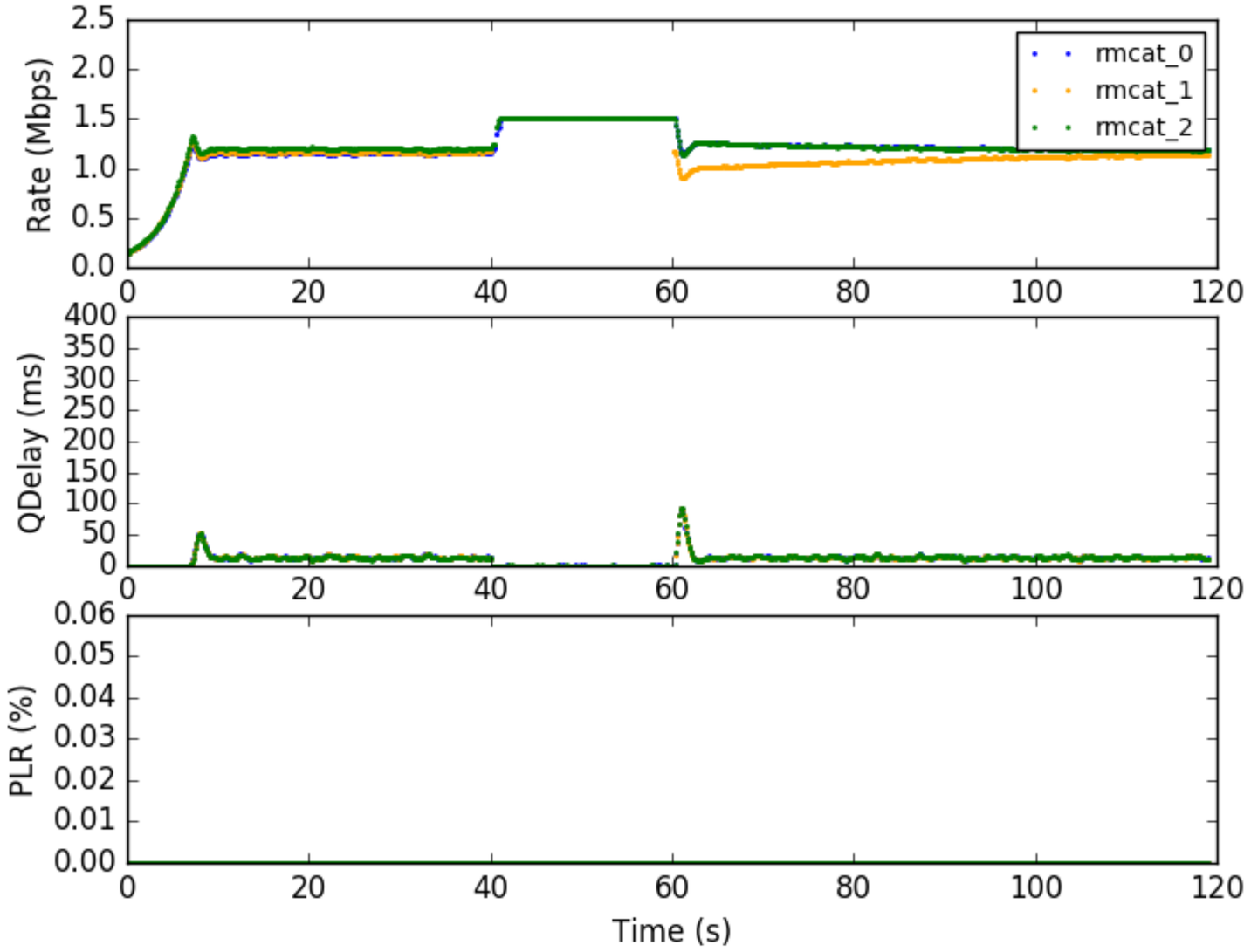
5.6: RMCAT Flow Competing with a Long TCP Flow



5.7: RMCAT Flow Competing with Short TCP Flows



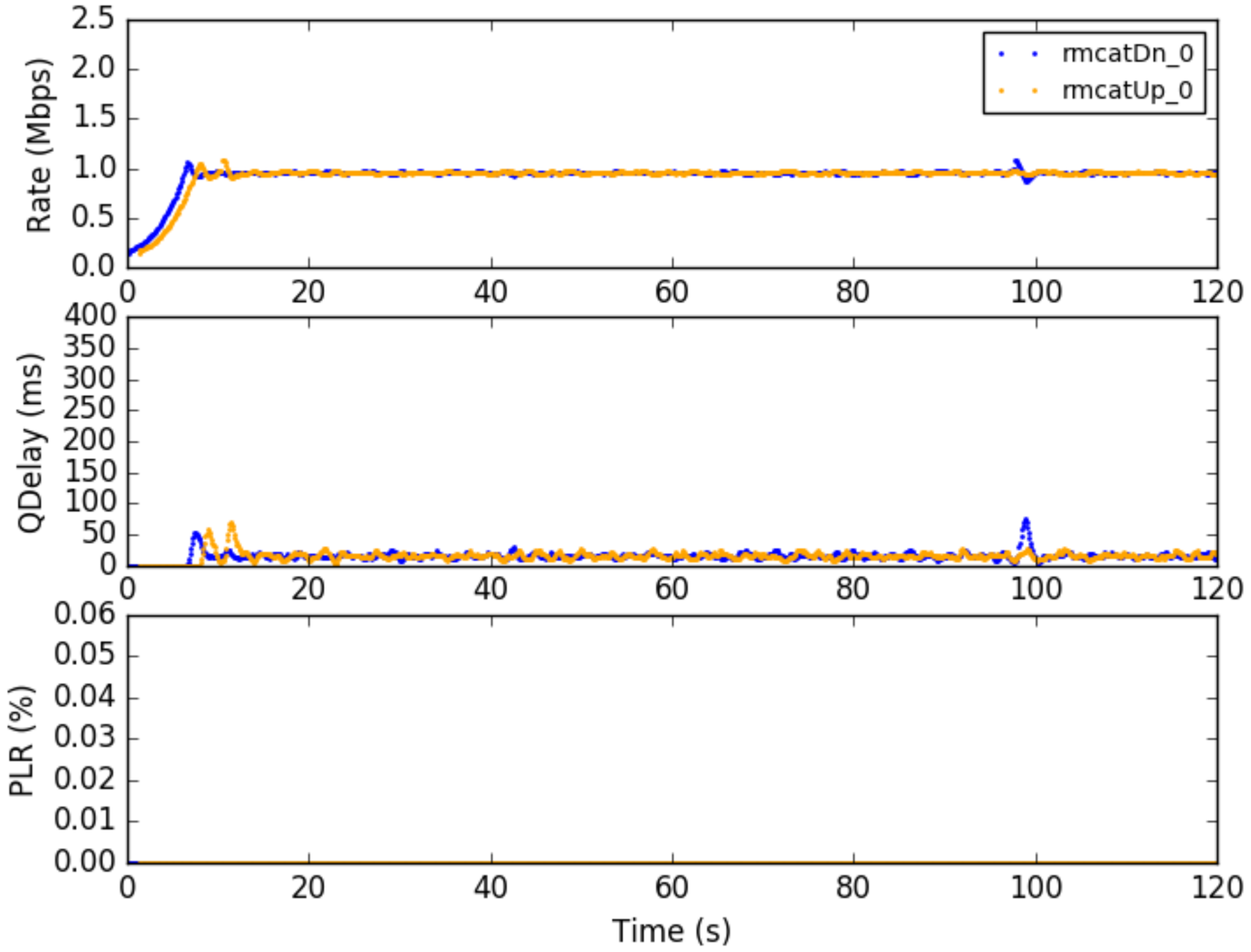
5.8: Media Pause and Resume



Wifi Test Cases

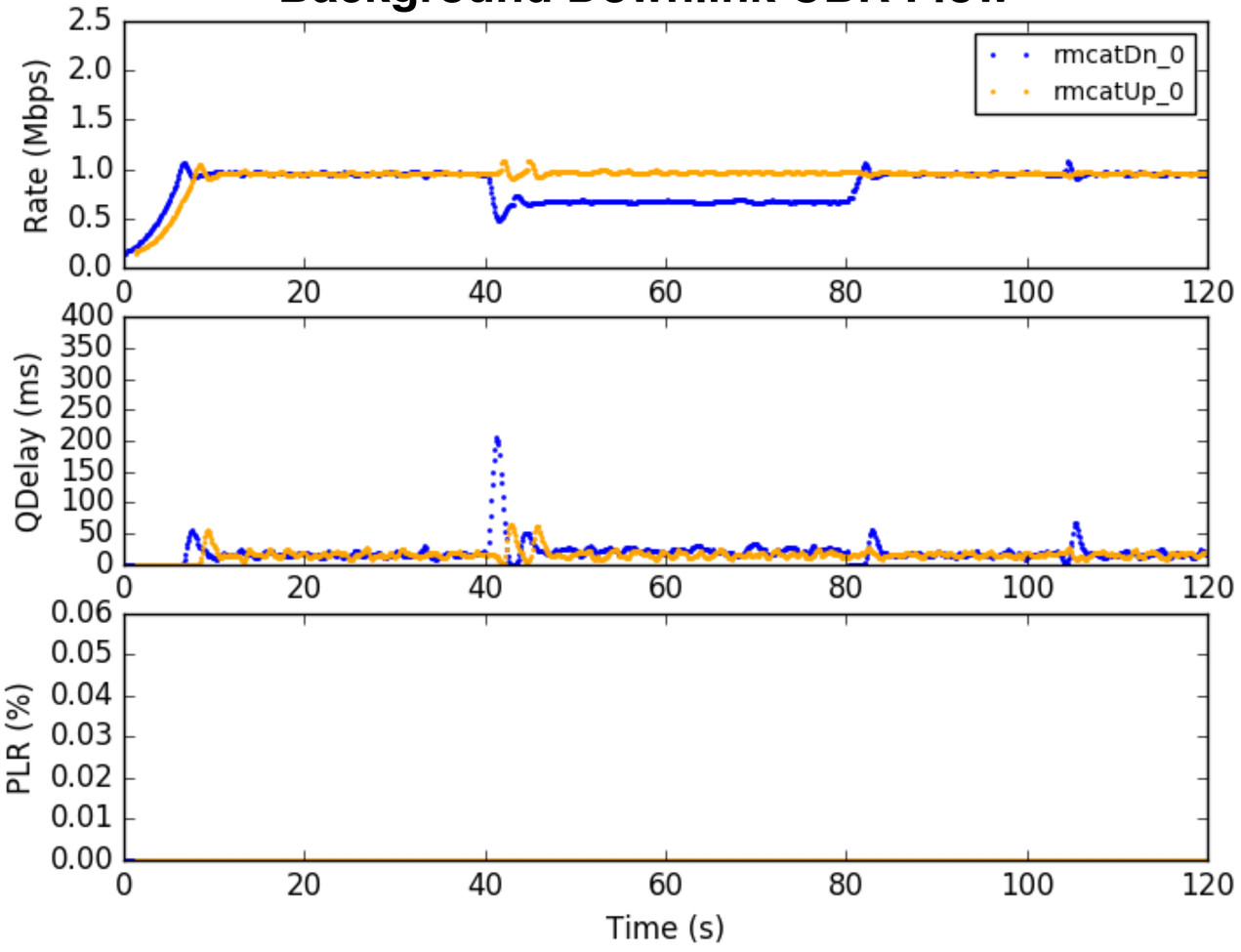
draft-ietf-rmcat-wireless-tests-03

4.1: Bottleneck in Wired Network — Bidirectional RMCAT Flows

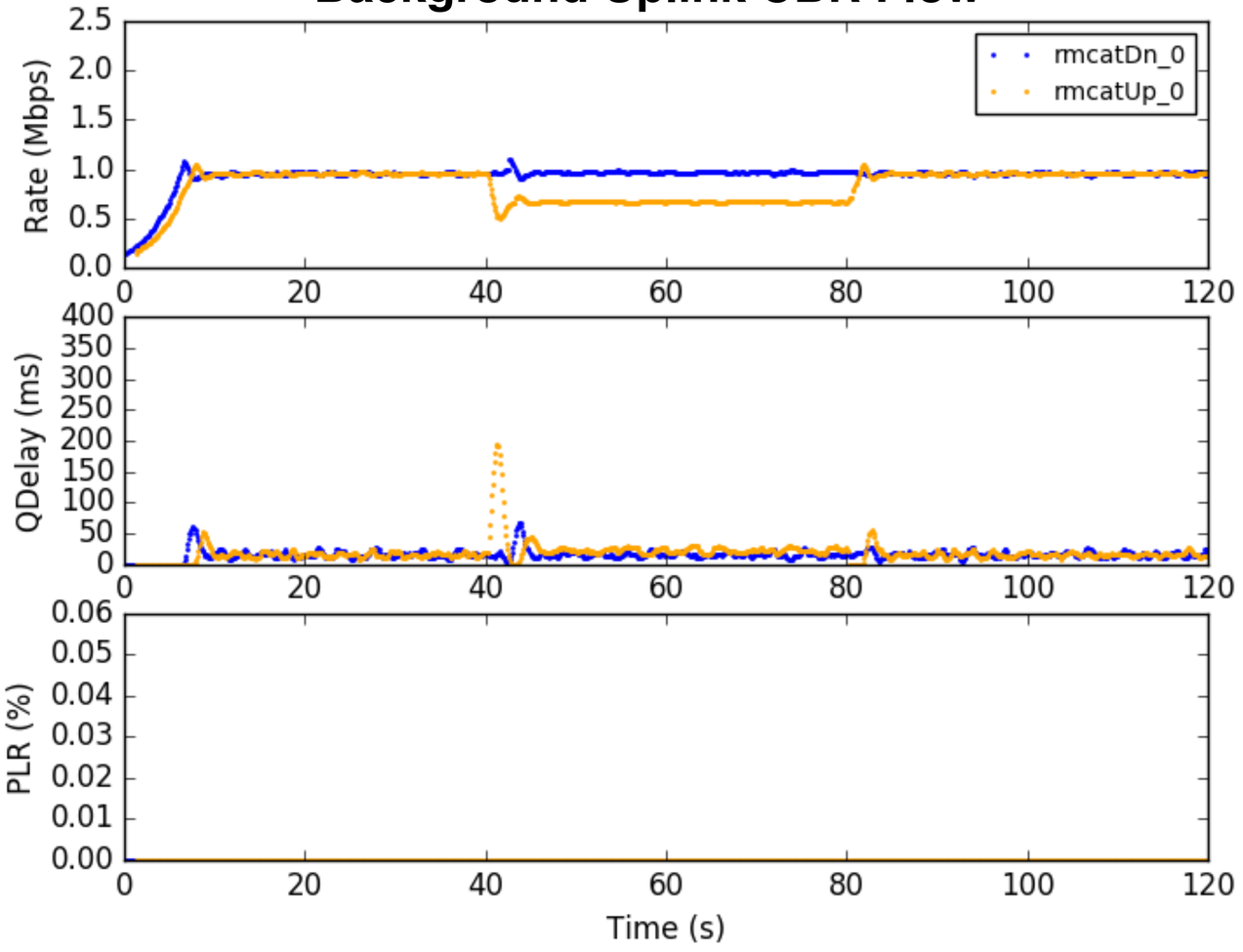


4.1: Bottleneck in Wired Network — Bidirectional RMCAT Flows w. Background CBR Flow

Background Downlink CBR Flow

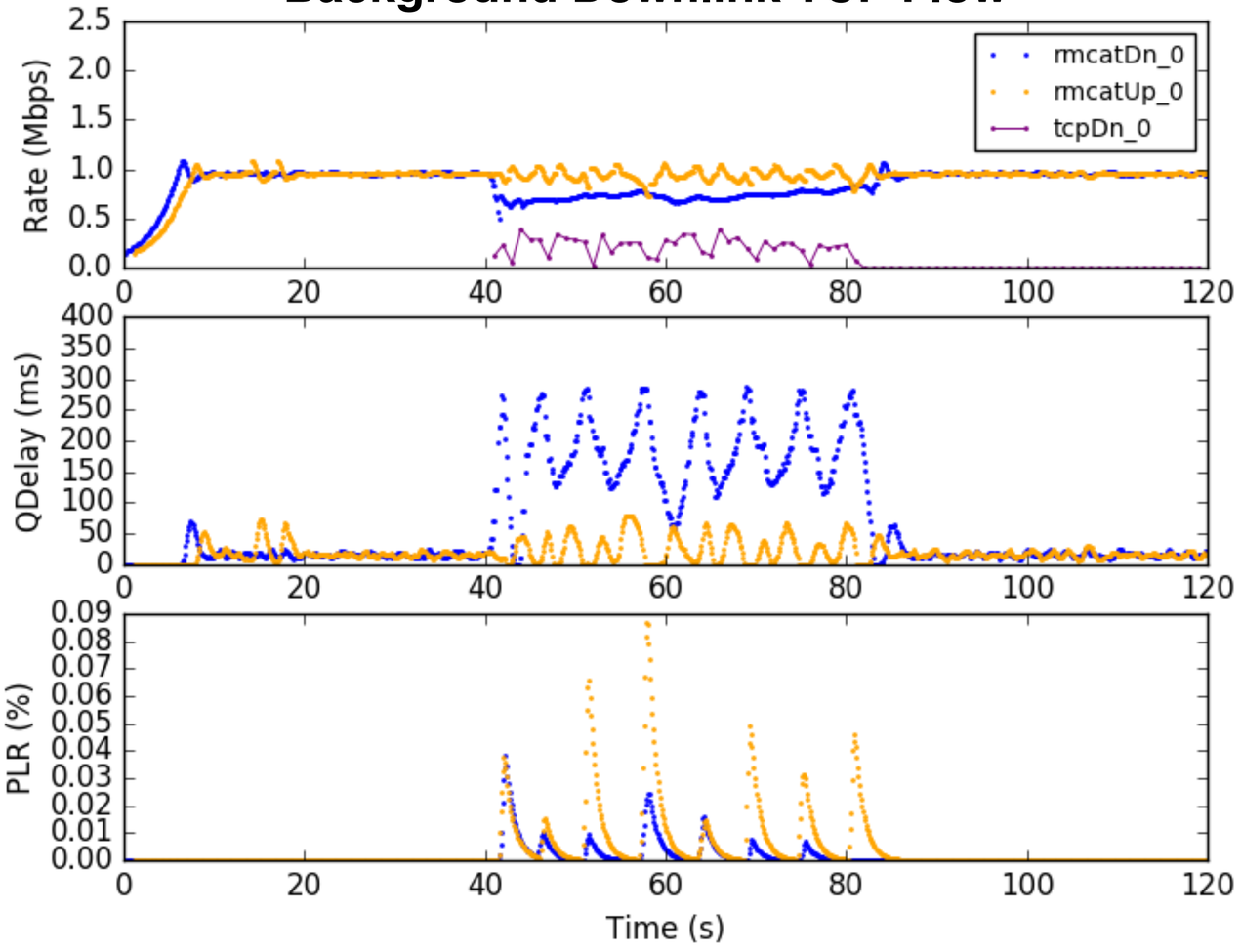


Background Uplink CBR Flow

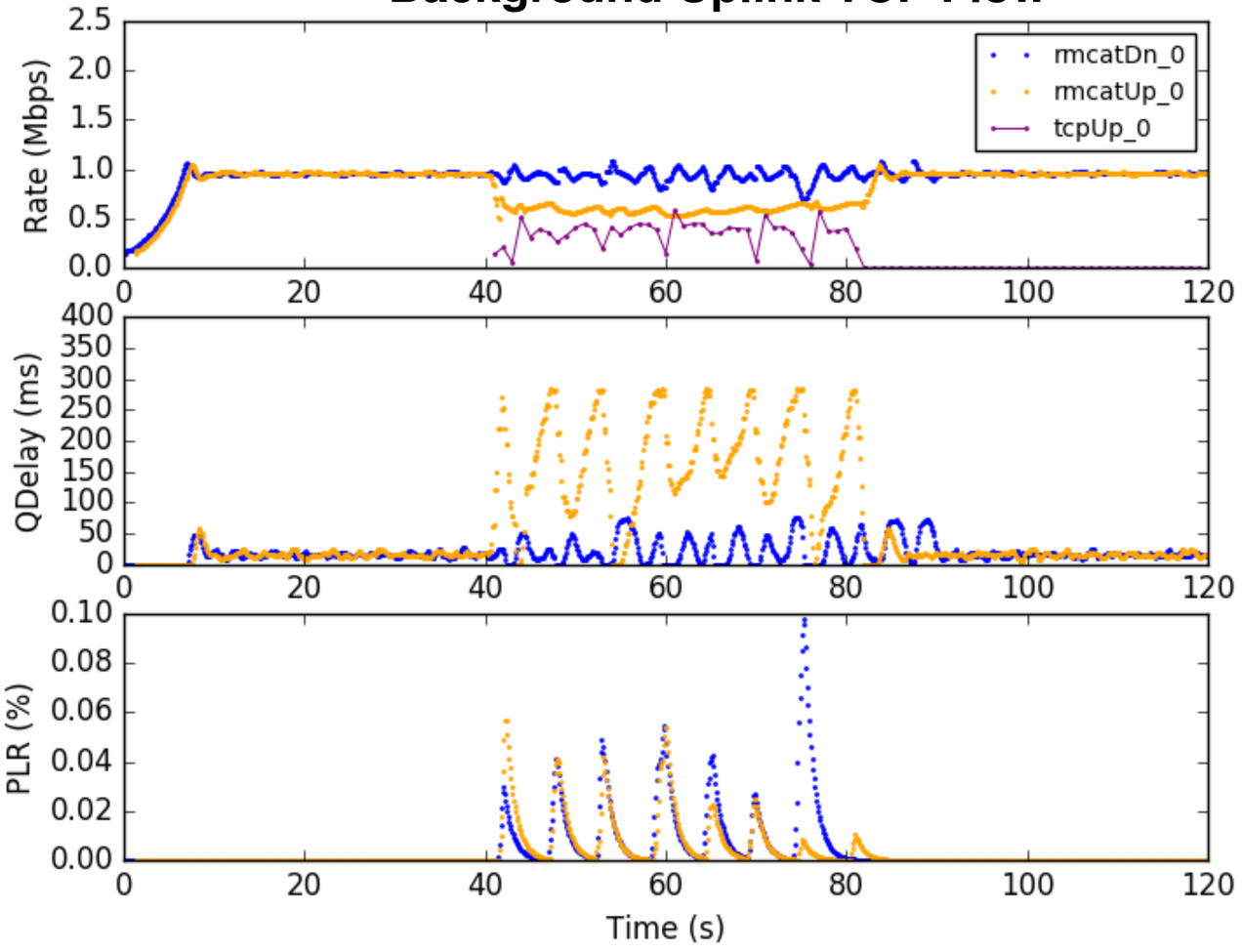


4.1: Bottleneck in Wired Network — Bidirectional RMCAT Flows w. Background TCP Flow

Background Downlink TCP Flow

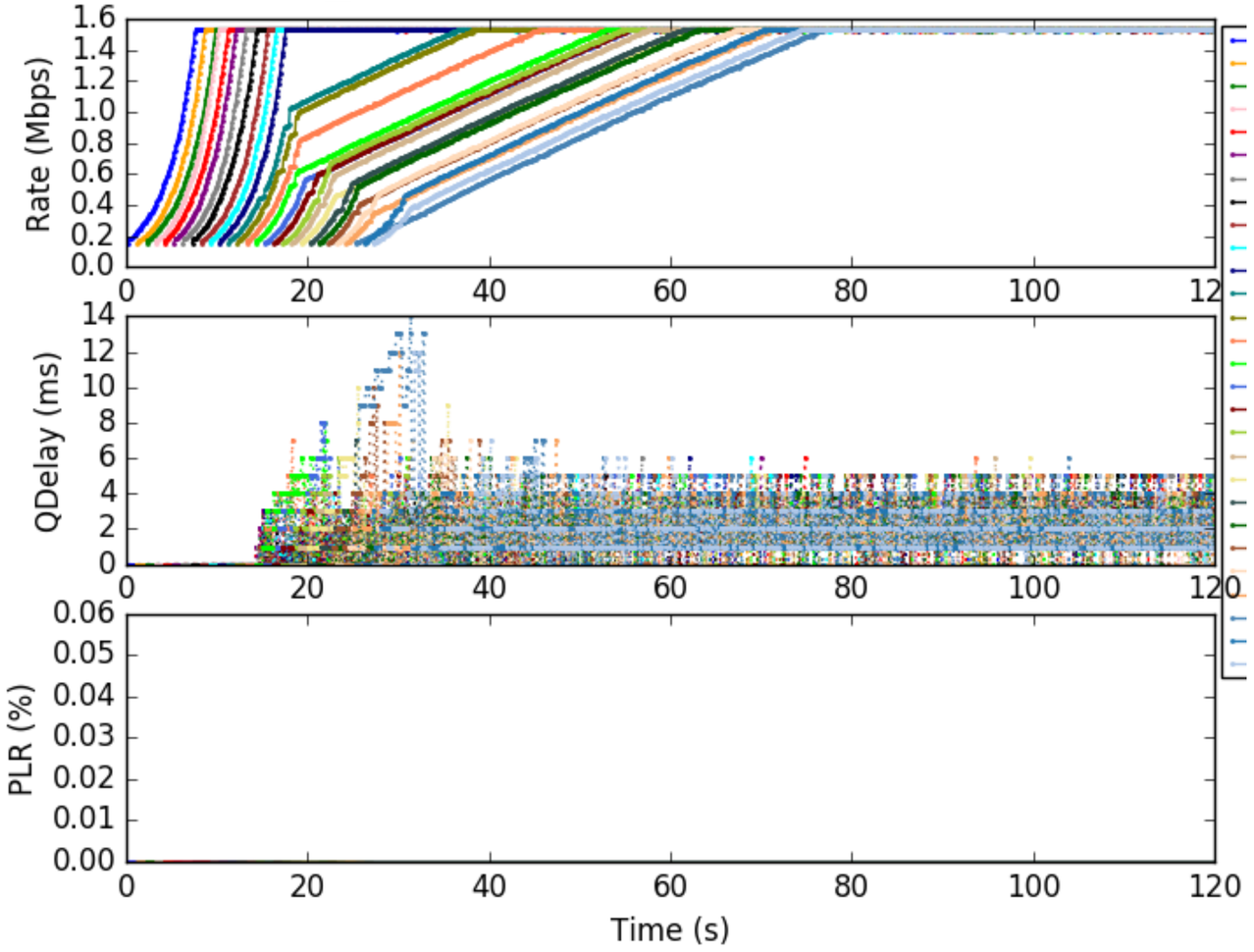


Background Uplink TCP Flow

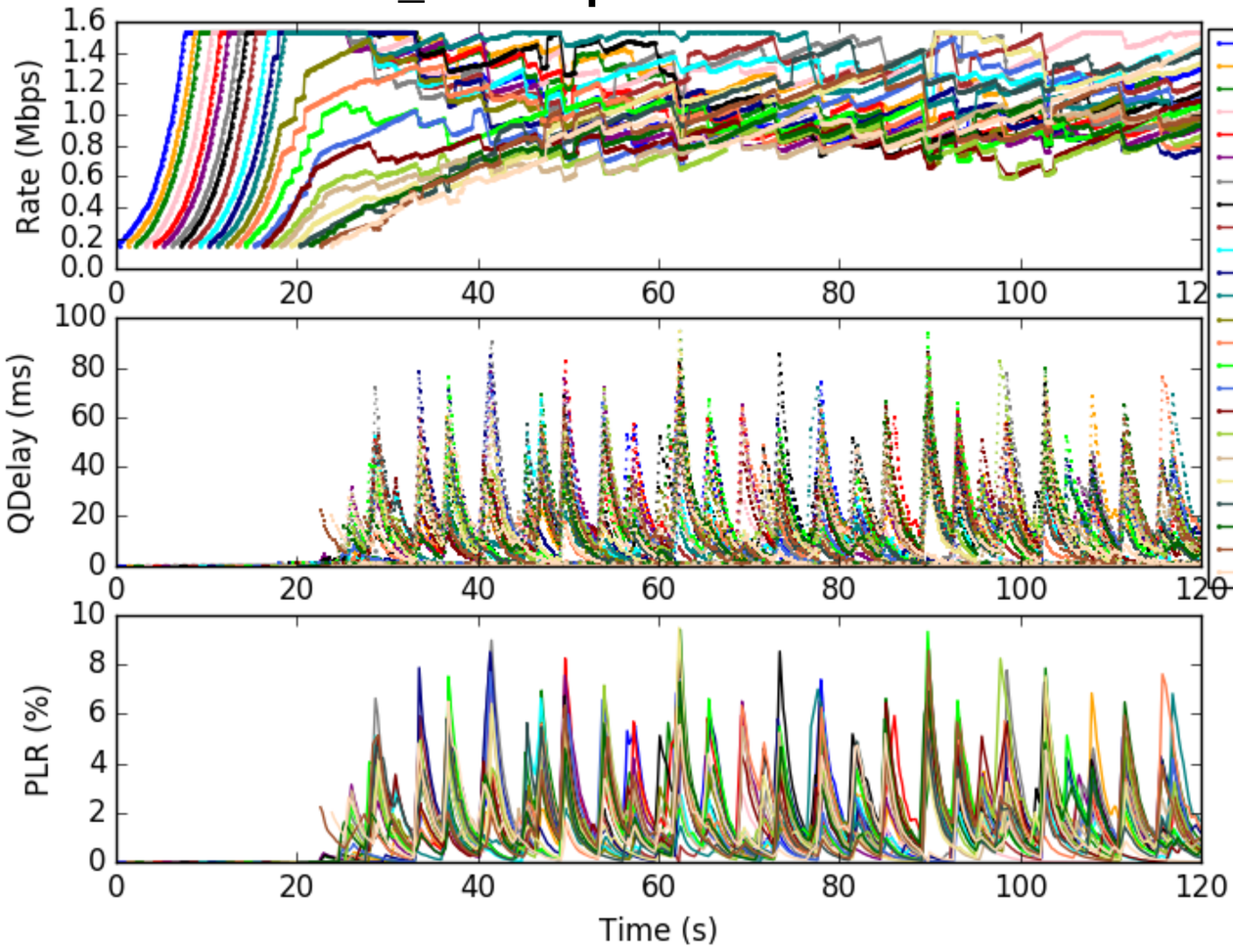


4.2: Bottleneck in Wi-Fi Network — Multiple Downlink/Uplink RMCAT Flows

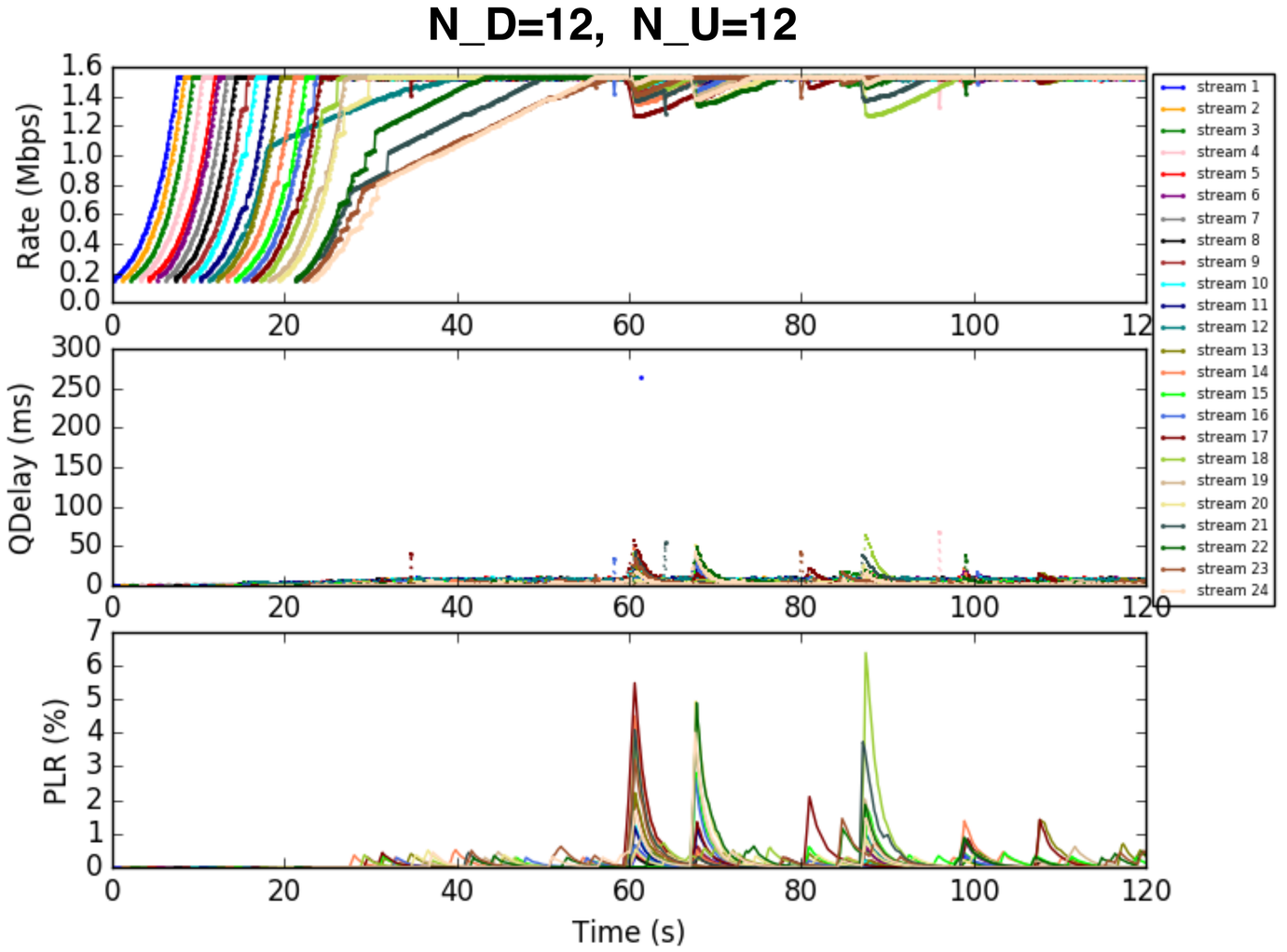
N_D=24 Downlink RMCAT Flows



N_U=24 Uplink RMCAT Flows

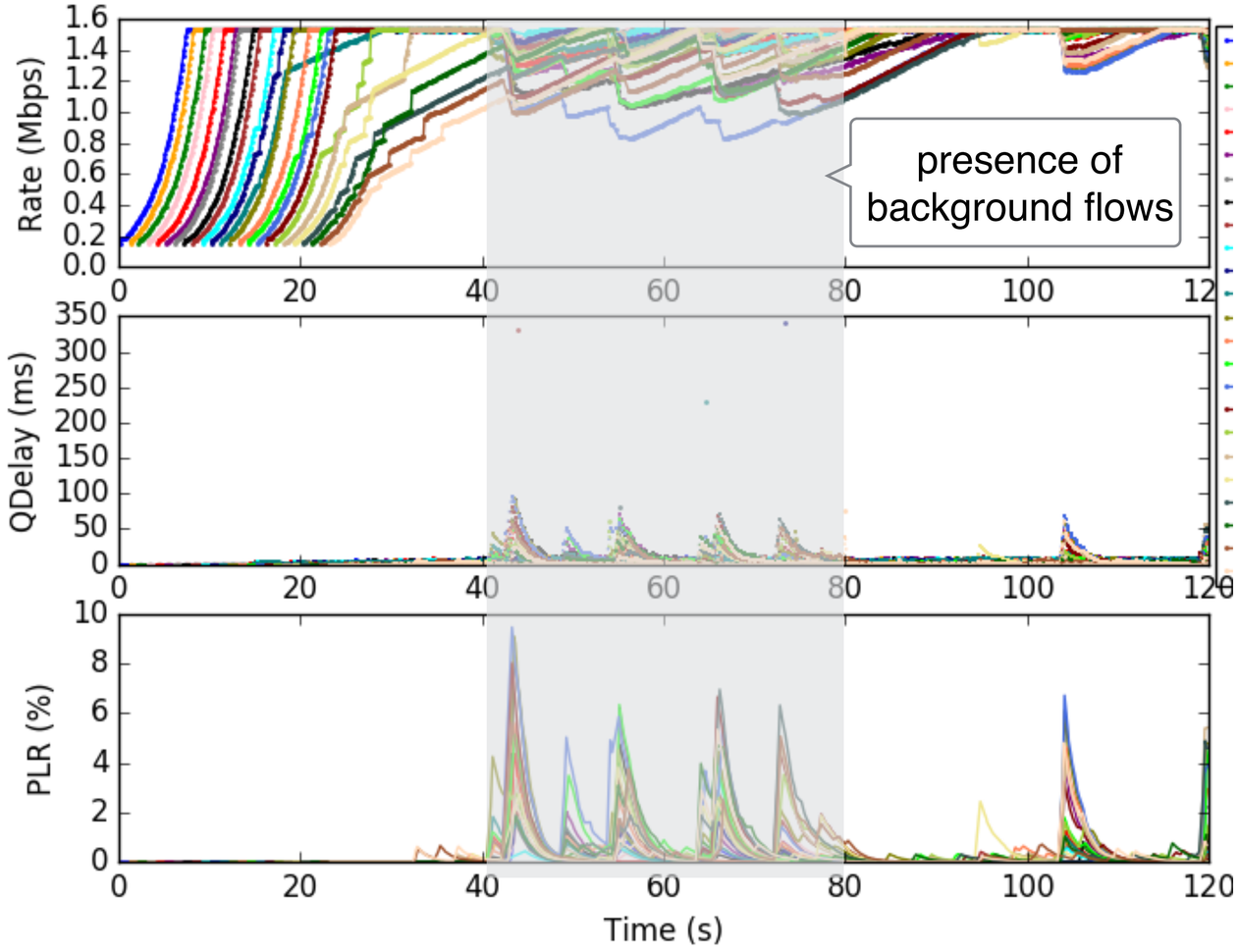


4.2: Bottleneck in Wi-Fi Network — Multiple Bidirectional RMCAT Flows

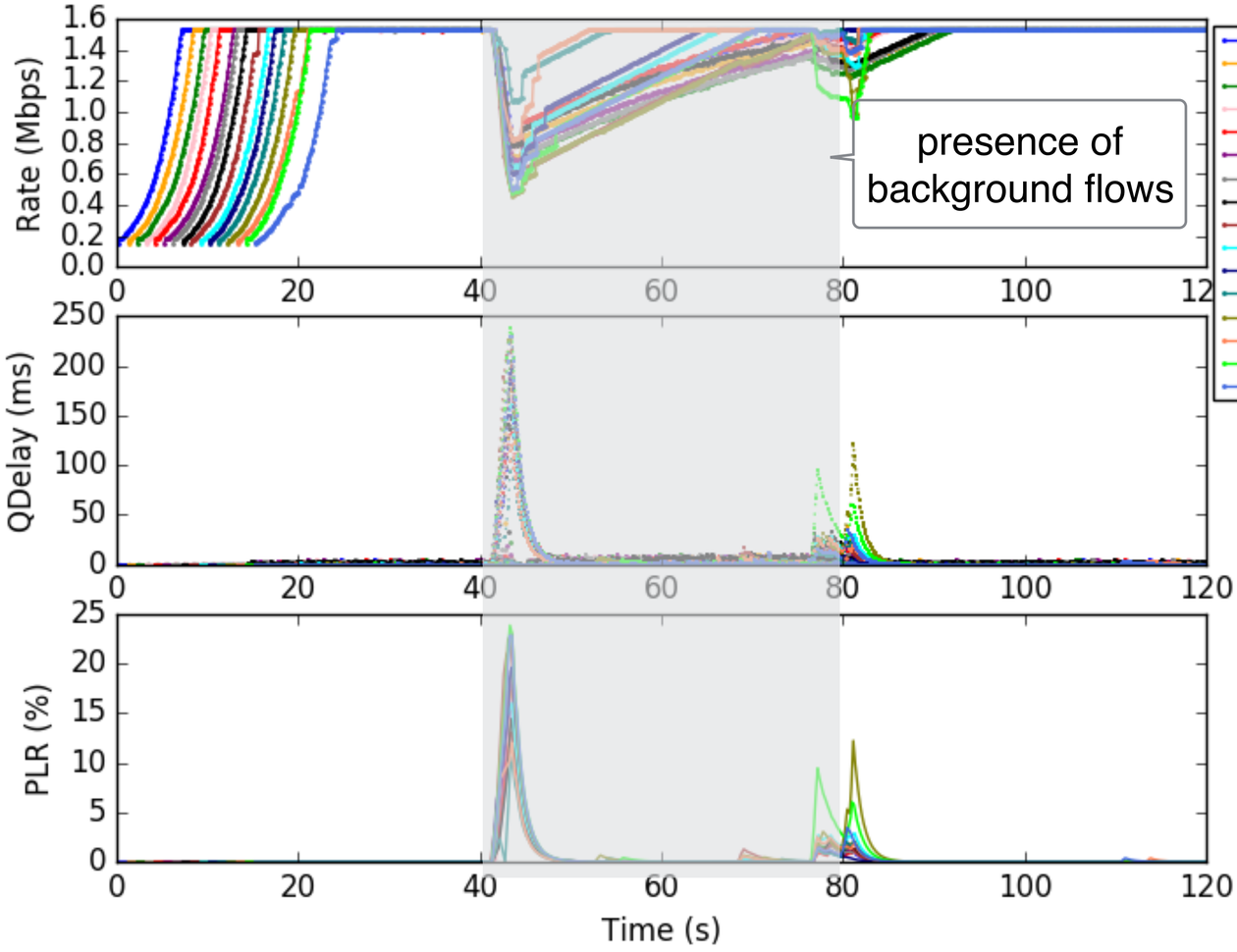


4.2: Bottleneck in Wi-Fi Network — Multiple Bidirectional RMCAT Flows w. Background Flows

12 Pairs of RMCAT Flows w. 4 CBR Flows



8 Pairs of RMCAT Flows w. 4 TCP Flows



Rate of each CBR flow: 600Kbps

Summary of Known Issues

- Occasionally the algorithm may get stuck in loss-based mode
- When working with trace-based traffic source, may under-utilize the available bandwidth
- In the presence of a fully utilized bottleneck, incoming new flows may take a long time (~60 seconds) to converge to equilibrium rate