

# Update on NADA: Evaluation over WiFi Test Cases

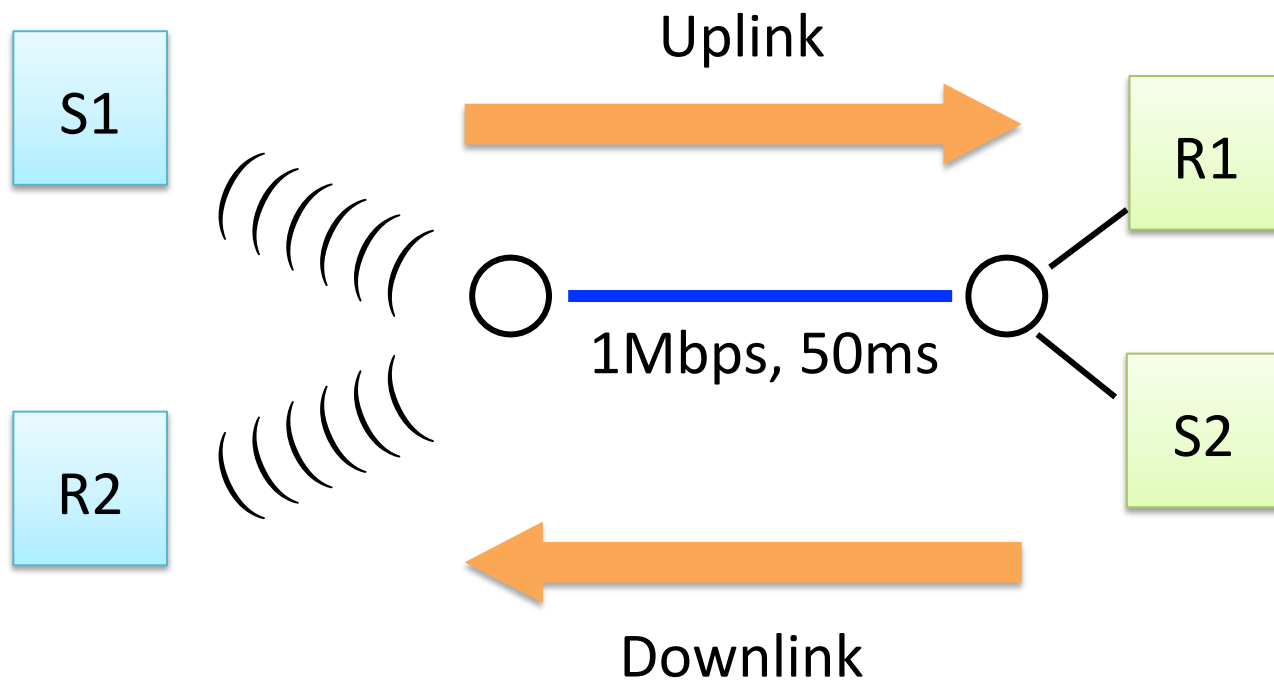
draft-ietf-rmcat-nada-00

X. Zhu, R. Pan, M. A. Ramalho, S. Mena,  
C. Ganzhorn, P. E. Jones, S. D'Aronco and J. Fu

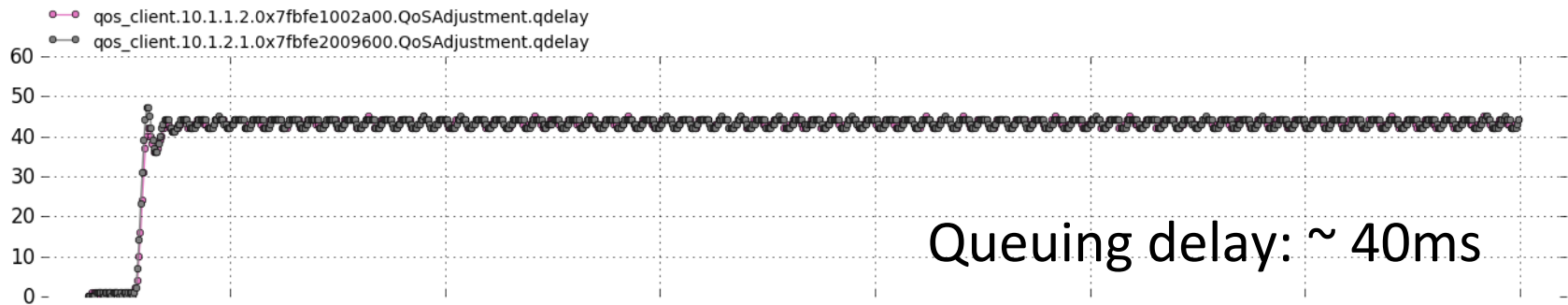
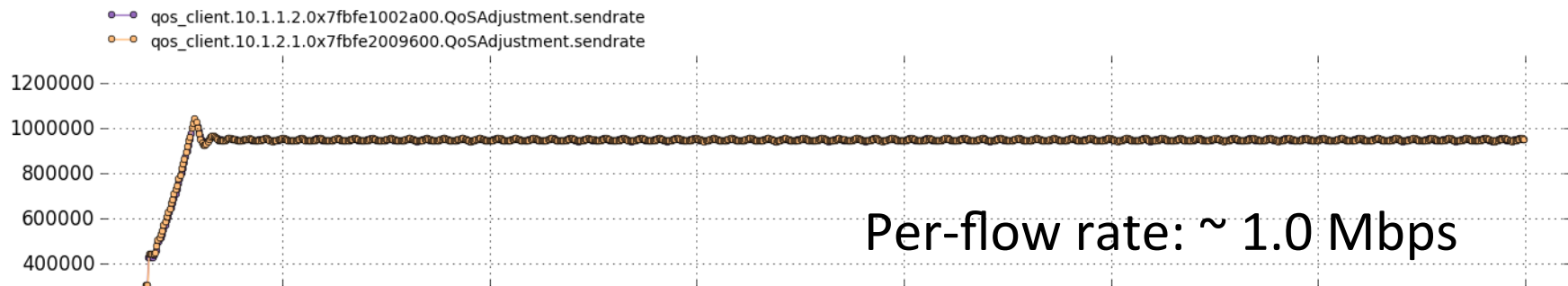
# Test Setup

- NADA implementation in ns-3:
  - $R_{\min} = 120\text{Kbps}$ ,  $R_{\max} = 3.6\text{Mbps}$
- Wi-Fi module in ns-3:
  - IEEE 802.11g, PHY Rate = 54Mbps
- Subset of tests from draft-fu-rmcat-wifi-test-case-01:
  - Bidirectional flows over a wired bottleneck
  - Sixteen (16) flows sharing wireless downlink
  - Sixteen (16) flows over wireless uplink
  - Eight (8) pairs of bidirectional flows over wireless

# Test Case 3.2: Bidirectional Flows over Wired Bottleneck

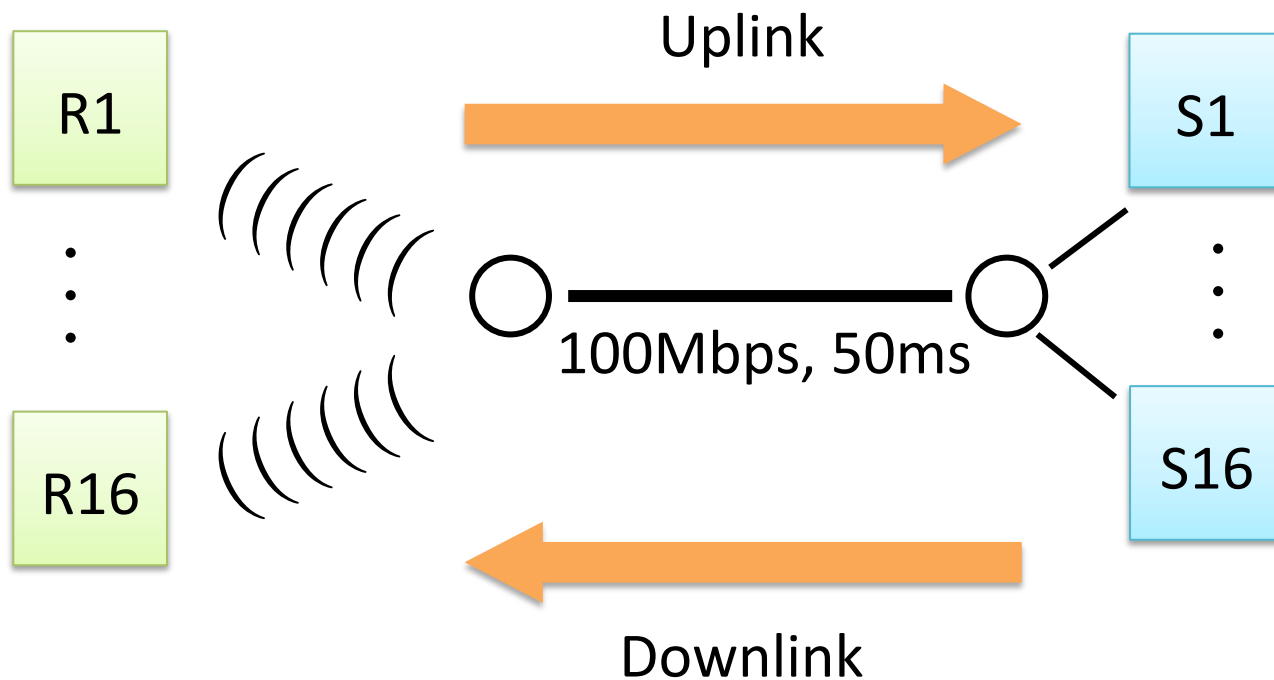


# Test Case 3.2: Bidirectional Flows over Wired Bottleneck

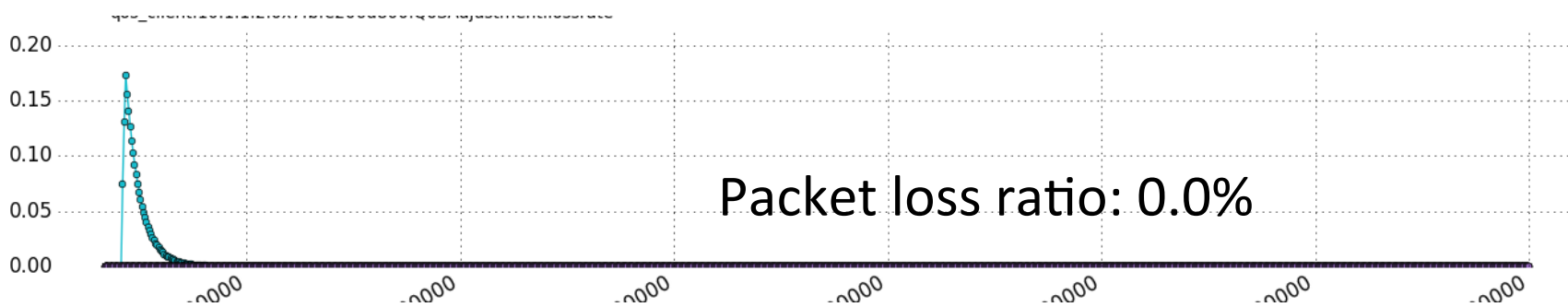
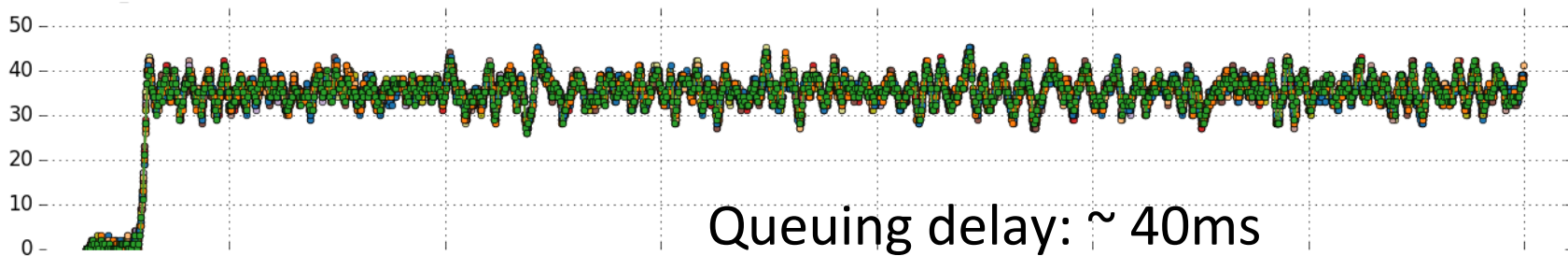
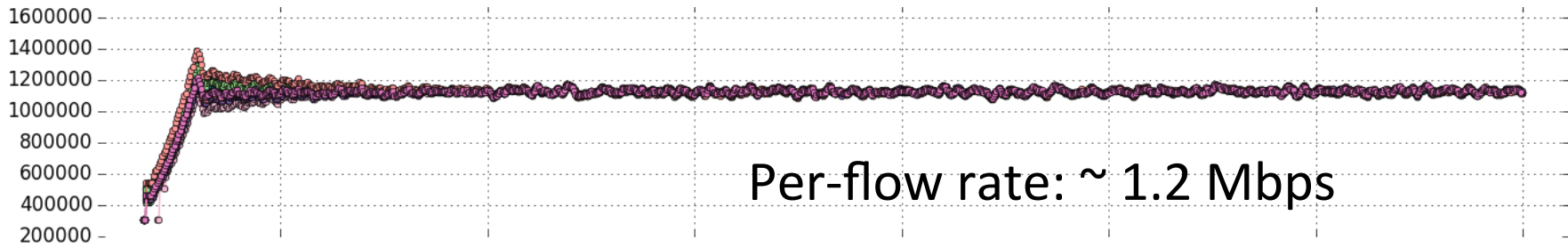


Bottleneck BW = 1Mbps

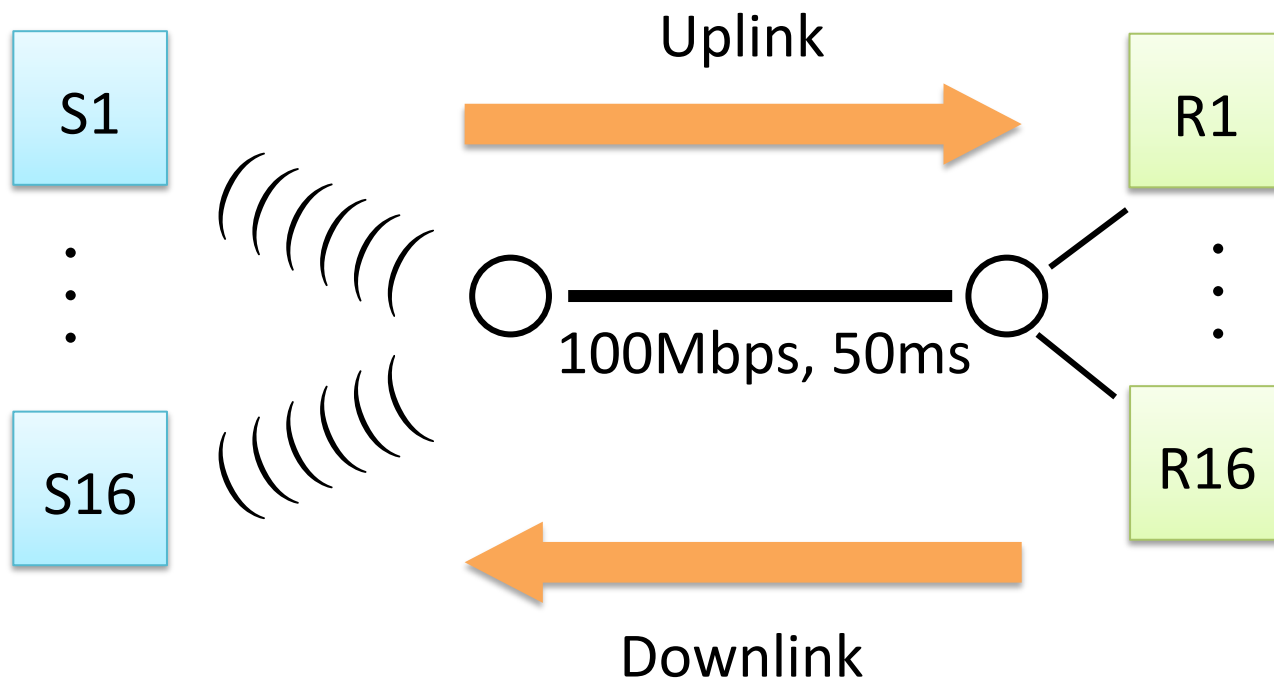
# Test Case 4.2: Sixteen (16) Flows Sharing Wireless Downlink Bottleneck



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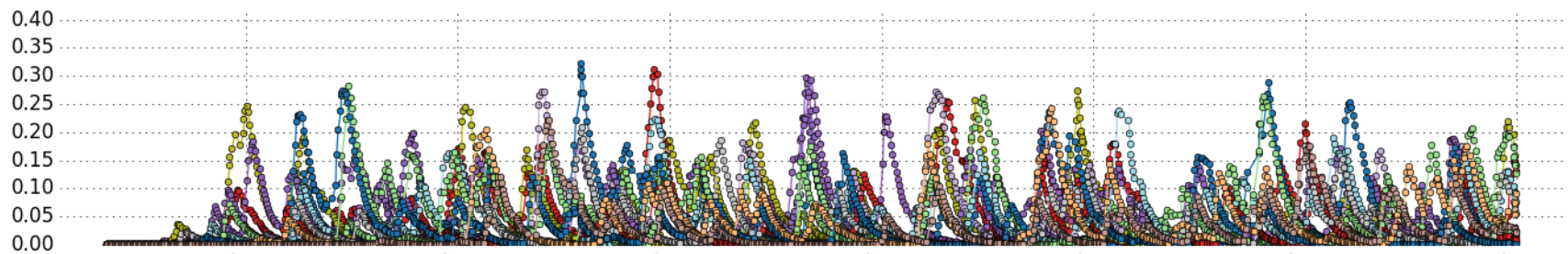
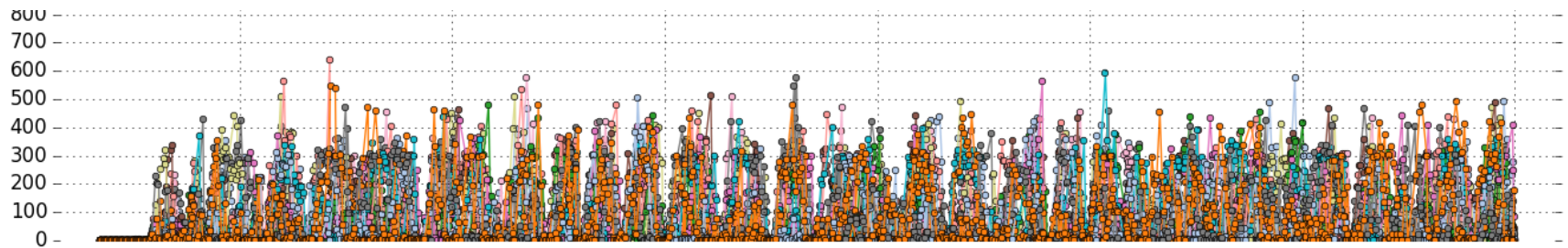
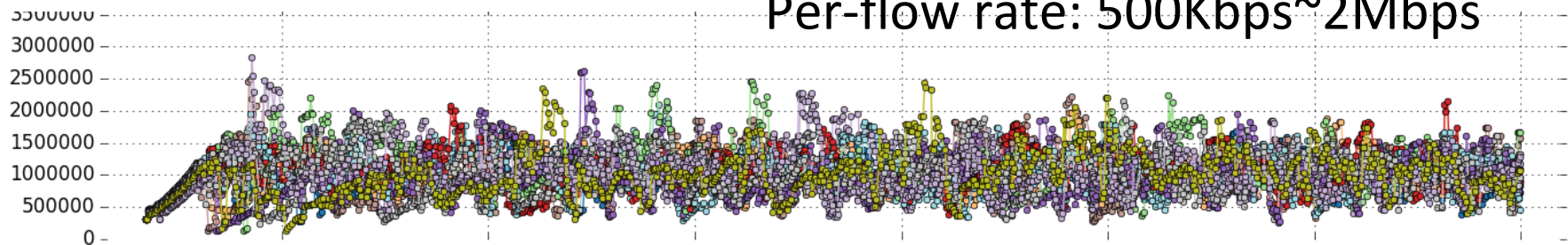


# Test Case 4.3: Sixteen (16) Flows Sharing Wireless Uplink Bottleneck



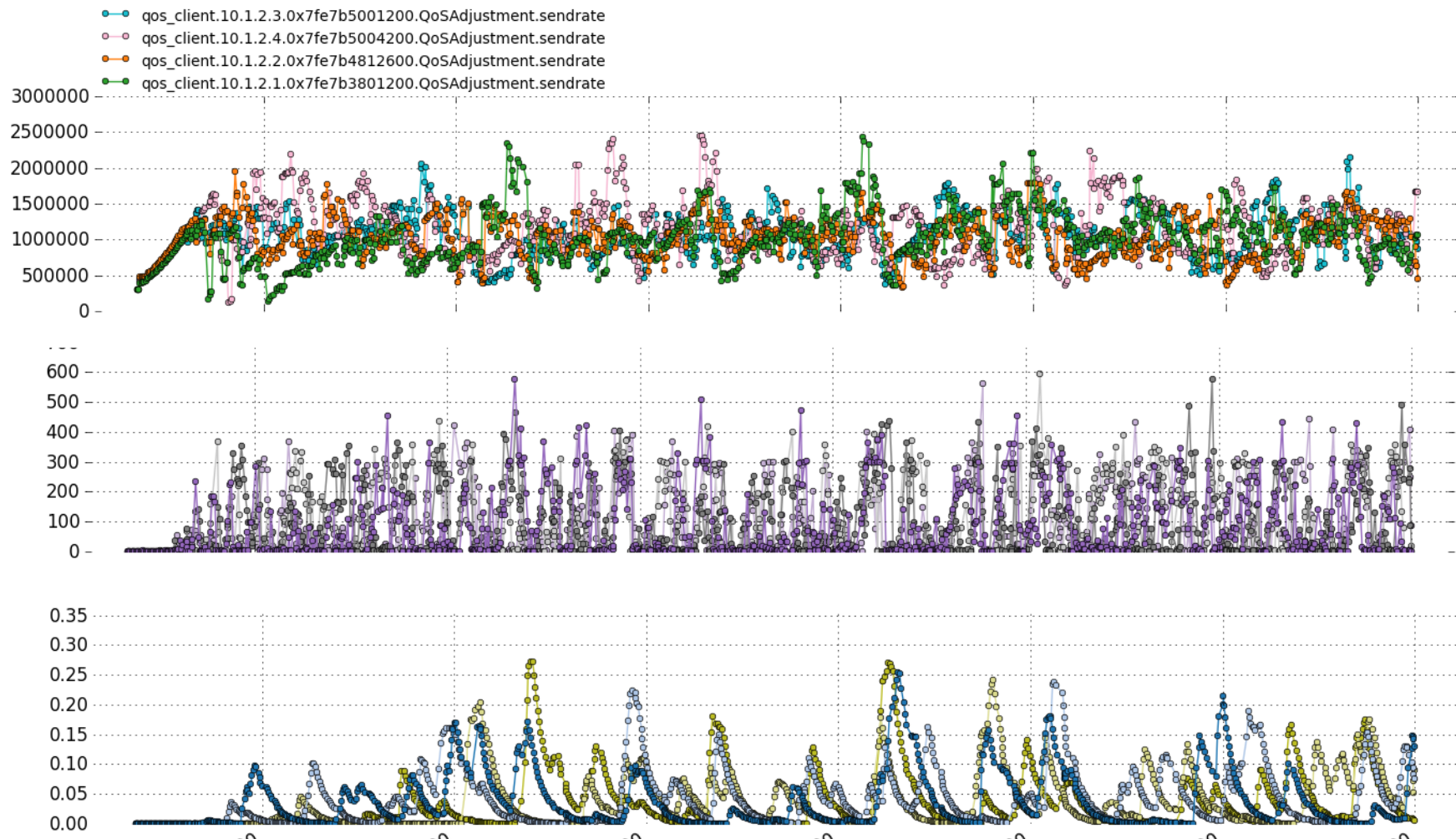
# Test Case 4.3: Sixteen (16) Flows Sharing Wireless Uplink Bottleneck

Per-flow rate: 500Kbps~2Mbps

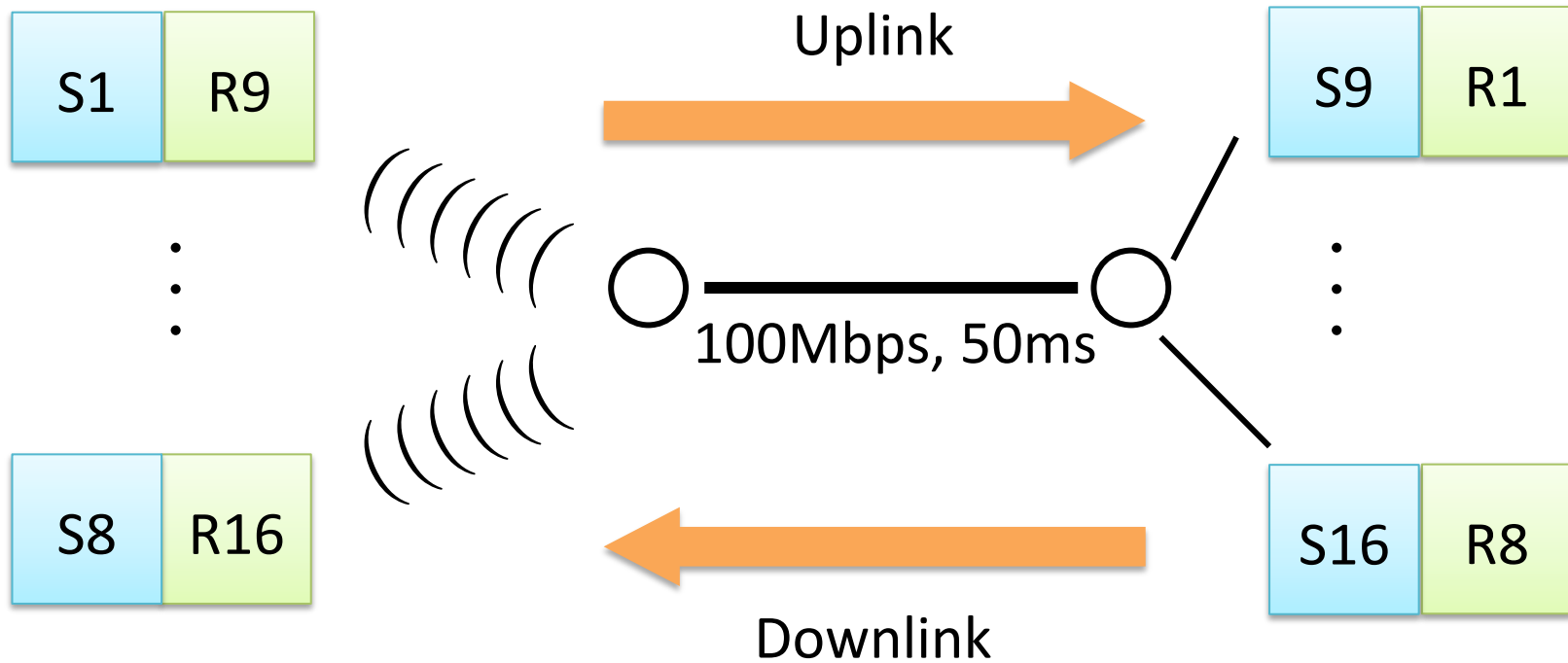




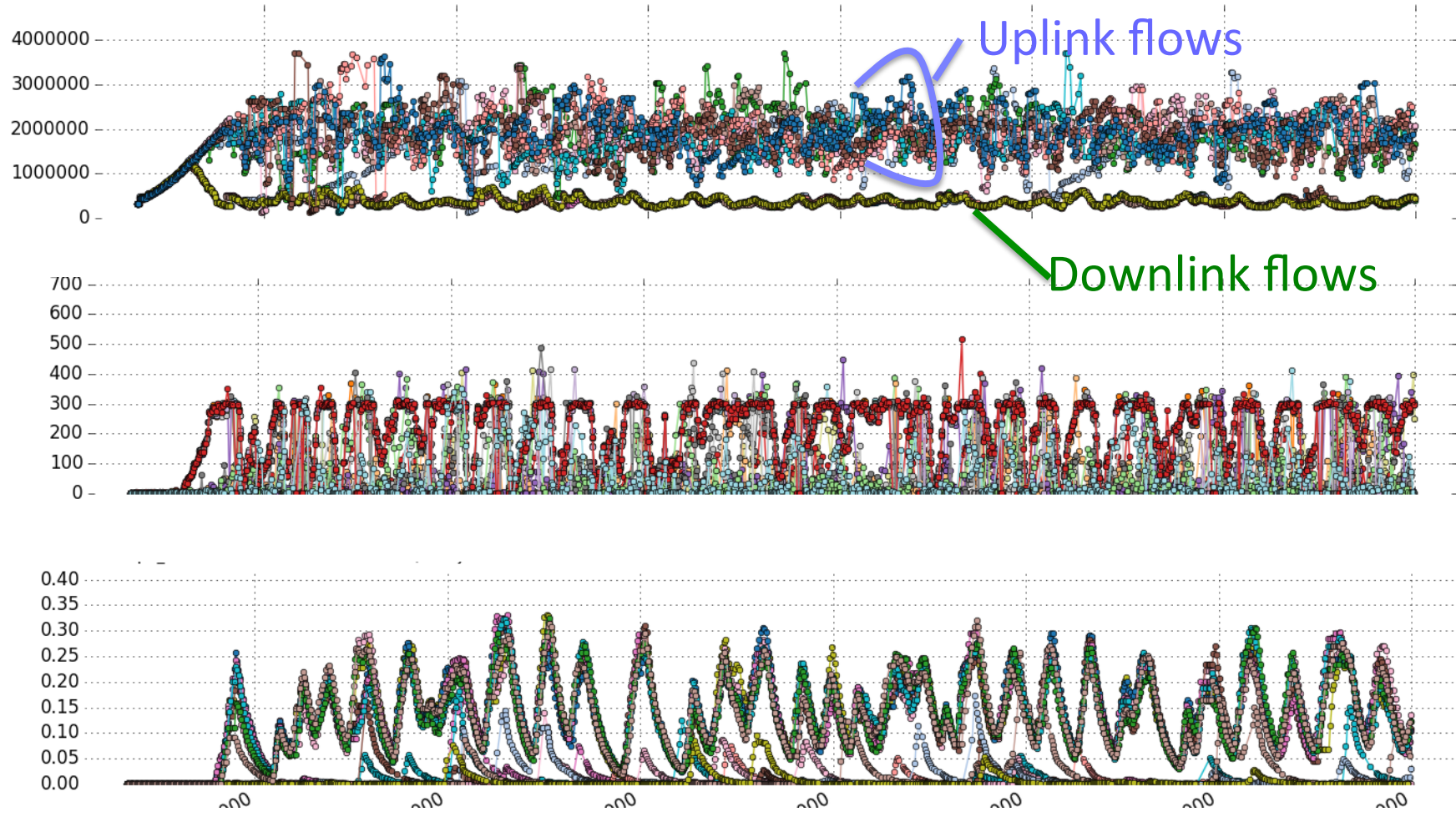
# Test Case 4.3: Sixteen (16) Flows Sharing Wireless Uplink Bottleneck



# Test Case 4.4: Eight (8) Pairs of Bidirectional Flows



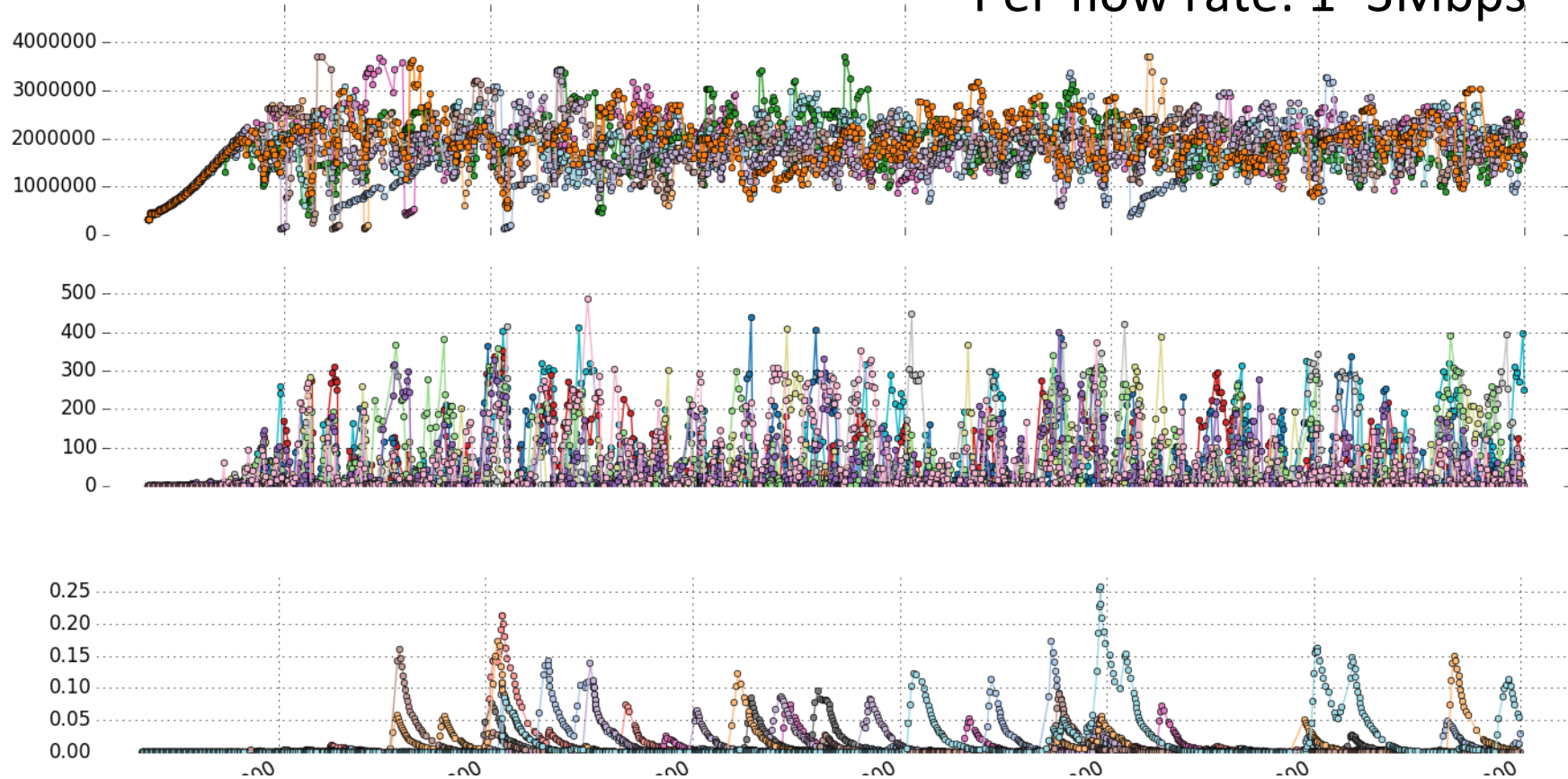
# Test Case 4.4: Eight (8) Pairs of Bidirectional Flows



# Test Case 4.4: Eight (8) Pairs of Bidirectional Flows: Uplink Flows

- qos\_client.10.1.2.13.0x7f8ec2848800.QoSAdjustment.sendrate
- qos\_client.10.1.2.12.0x7f8ec2846a00.QoSAdjustment.sendrate
- qos\_client.10.1.2.9.0x7f8ec3839e00.QoSAdjustment.sendrate
- qos\_client.10.1.2.14.0x7f8ec2849600.QoSAdjustment.sendrate
- qos\_client.10.1.2.10.0x7f8ec2844e00.QoSAdjustment.sendrate
- qos\_client.10.1.2.11.0x7f8ec2845c00.QoSAdjustment.sendrate
- qos\_client.10.1.2.15.0x7f8ec284b400.QoSAdjustment.sendrate
- qos\_client.10.1.2.16.0x7f8ec284c200.QoSAdjustment.sendrate

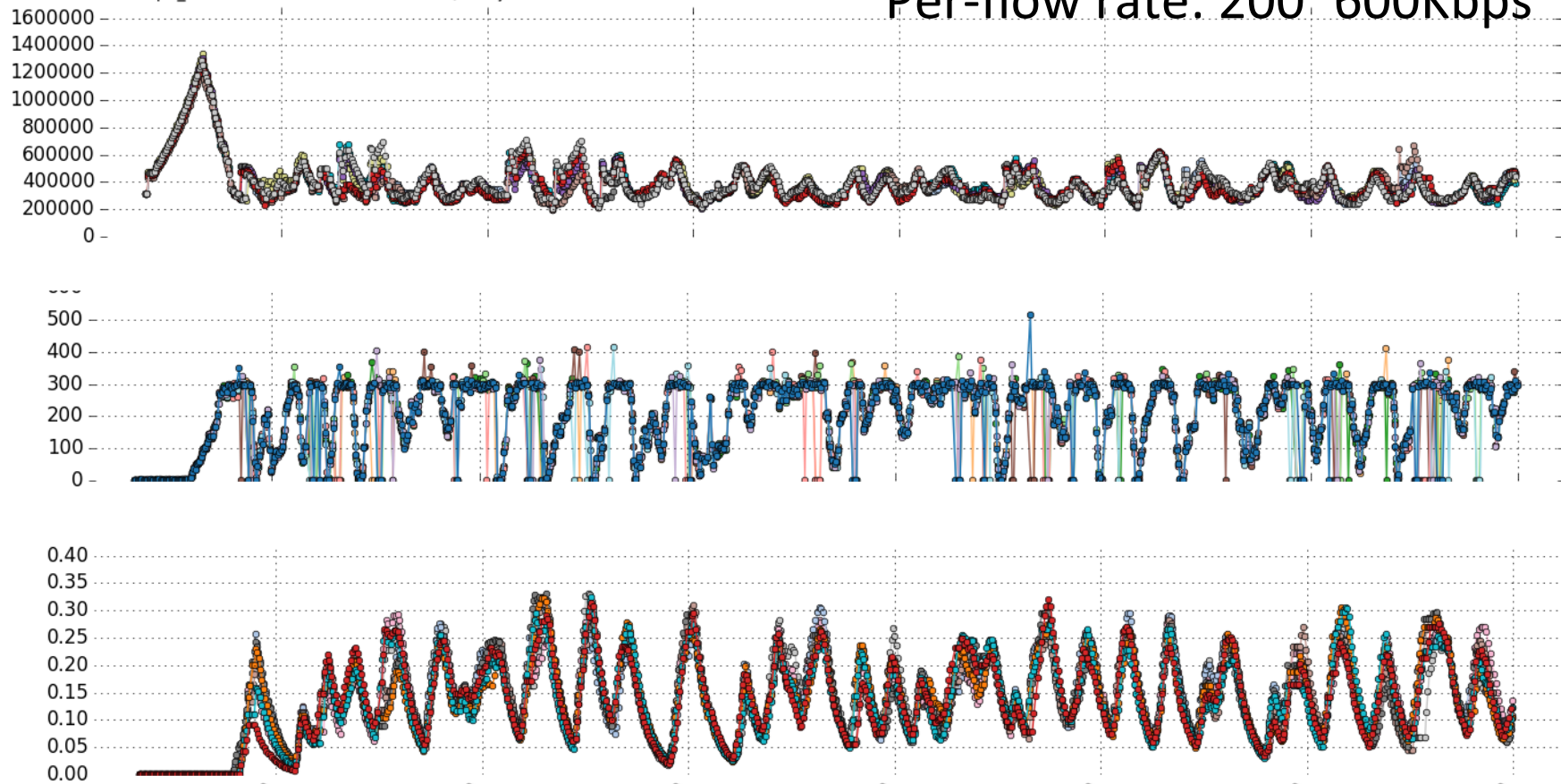
Per-flow rate: 1~3Mbps



# Test Case 4.4: Eight (8) Pairs of Bidirectional Flows: Downlink Flows

- qos\_client.10.1.1.2.0x7f8ec3838600.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec3839000.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec401ce00.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec401b600.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec2843400.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec401dc00.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec401c000.QoSAdjustment.sendrate
- qos\_client.10.1.1.2.0x7f8ec2840400.QoSAdjustment.sendrate

Per-flow rate: 200~600Kbps



# Summary of Observations

- Bottleneck at wired link: behavior similar to that over wired-only networks
- Bottleneck at wireless hop:
  - Downlink only: less overall congestion and more stable and fair share of bandwidth
  - Uplink only: high delay and packet loss ratio due to contention
  - Bidirectional: uplink streams obtain have an unfair advantage over downlink streams
- *Note: unfairness between uplink/downlink streams independent of the congestion control scheme in use*

# Other Work In Progress

- Analysis of impact of parameter values
- Fine-tuning of algorithm behavior regarding:
  - Packet loss ratio estimation
  - Switching between delay- and loss-driven adaptation
  - Bandwidth sharing vs. TCP
- Evaluation with more realistic traffic sources
  - Trace-based synthetic traffic source
  - Integrated with live video encoder
- More wireless-based tests