Pantheon Report

Tested in mahimahi: mm-delay 10 mm-link 12mbps.trace 10-every-200.trace
Repeated the test of 21 congestion control schemes 3 times.
Each test lasted for 30 seconds running 1 flow.

System info:
Linux 4.15.0-1028-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912

Git summary:
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcb2d0942c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdf90c077e64d
third_party/libutp @ b3465b942e2826f2b17eaab4a906ce6bb7cf3c3f
third_party/muses @ 3ce721187ad823da2095337730c746486ca496e
third_party/pantheon-tunnel @ f866d3f58d27af942717625ee3a354cc2e802bd
third_party/pcc @ 1af958fa0d66d18b623c091a55fec872b4981e1
   M receiver/src/buffer.h
   M receiver/src/core.cpp
   M sender/src/buffer.h
   M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cf42
third_party/scream-reproduce @ f09918d1421aa3131bf11ff1964974e1da3bd2
   M src/ScreamClient
   M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
   M src/examples/cellsim.cc
   M src/examples/sproutbt2.cc
   M src/network/sproutcomm.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
   M src/verus.hpp
   M tools/plot.py
third_party/vivace @ 2ba8f86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6ff9dde4735770d143a1fa2851
local test in mahimahi, 3 runs of 30s each per scheme
(mean of all runs by scheme)
<table>
<thead>
<tr>
<th>scheme</th>
<th># runs</th>
<th>mean avg tput (Mbit/s) flow 1</th>
<th>mean 95th-%ile delay (ms) flow 1</th>
<th>mean loss rate (%) flow 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP BBR</td>
<td>3</td>
<td>1.34</td>
<td>13.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Copa</td>
<td>3</td>
<td>3.45</td>
<td>87.89</td>
<td>0.02</td>
</tr>
<tr>
<td>TCP Cubic</td>
<td>3</td>
<td>10.17</td>
<td>4062.73</td>
<td>18.42</td>
</tr>
<tr>
<td>FillP</td>
<td>3</td>
<td>11.64</td>
<td>150.09</td>
<td>0.29</td>
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<td>FillP-Sheep</td>
<td>3</td>
<td>10.66</td>
<td>62.68</td>
<td>0.08</td>
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<td>Indigo</td>
<td>3</td>
<td>2.47</td>
<td>57.60</td>
<td>0.32</td>
</tr>
<tr>
<td>Indigo-MusesC3</td>
<td>3</td>
<td>1.58</td>
<td>13.91</td>
<td>0.13</td>
</tr>
<tr>
<td>Indigo-MusesC5</td>
<td>3</td>
<td>2.23</td>
<td>54.60</td>
<td>1.19</td>
</tr>
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<td>Indigo-MusesD</td>
<td>3</td>
<td>2.41</td>
<td>28.30</td>
<td>0.48</td>
</tr>
<tr>
<td>Indigo-MusesT</td>
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<td>1.49</td>
<td>13.69</td>
<td>0.06</td>
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<td>LEDBAT</td>
<td>3</td>
<td>5.96</td>
<td>140.59</td>
<td>0.95</td>
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<td>PCC-Allegro</td>
<td>3</td>
<td>4.00</td>
<td>12.44</td>
<td>0.04</td>
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<tr>
<td>PCC-Expr</td>
<td>3</td>
<td>5.94</td>
<td>13.24</td>
<td>0.05</td>
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<td>QUIC Cubic</td>
<td>3</td>
<td>8.53</td>
<td>91.03</td>
<td>0.18</td>
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<td>SCReAM</td>
<td>3</td>
<td>0.22</td>
<td>11.78</td>
<td>0.09</td>
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<td>Sprout</td>
<td>3</td>
<td>1.07</td>
<td>28.09</td>
<td>0.24</td>
</tr>
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<td>TaoVA-100x</td>
<td>3</td>
<td>2.91</td>
<td>77.90</td>
<td>0.05</td>
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<tr>
<td>TCP Vegas</td>
<td>3</td>
<td>3.82</td>
<td>35.47</td>
<td>0.02</td>
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<td>Verus</td>
<td>3</td>
<td>7.98</td>
<td>585.12</td>
<td>0.40</td>
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<td>PCC-Vivace</td>
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<td>4.21</td>
<td>12.27</td>
<td>0.03</td>
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<tr>
<td>WebRTC media</td>
<td>3</td>
<td>0.05</td>
<td>19.26</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Run 1: Statistics of TCP BBR

Start at: 2019-03-18 22:04:40
End at: 2019-03-18 22:05:10

# Below is generated by plot.py at 2019-03-18 22:37:15
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.35 Mbit/s (11.2% utilization)
95th percentile per-packet one-way delay: 13.134 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 13.134 ms
Loss rate: 0.00%
Run 1: Report of TCP BBR — Data Link

![Graph 1: Average capacity 12.00 Mbps (shaded region)]

- Flow 1 ingress (mean 1.35 Mbps)
- Flow 1 egress (mean 1.35 Mbps)

![Graph 2: Per-packet end-to-end delay (ms)]

- Flow 1 (95th percentile 13.13 ms)
Run 2: Statistics of TCP BBR

Start at: 2019-03-18 22:17:01
End at: 2019-03-18 22:17:31

# Below is generated by plot.py at 2019-03-18 22:37:15
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.20 Mbit/s (10.0% utilization)
95th percentile per-packet one-way delay: 12.931 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 12.931 ms
Loss rate: 0.10%
Run 2: Report of TCP BBR — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 1.20 Mbit/s)  Flow 1 egress (mean 1.20 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 12.93 ms)
Run 3: Statistics of TCP BBR


# Below is generated by plot.py at 2019-03-18 22:37:15
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.48 Mbit/s (12.3% utilization)
95th percentile per-packet one-way delay: 13.023 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 13.023 ms
Loss rate: 0.05%
Run 3: Report of TCP BBR — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 1.48 Mbit/s)
- Flow 1 egress (mean 1.48 Mbit/s)

- Flow 1 (95th percentile 13.52 ms)
Run 1: Statistics of Copa

Start at: 2019-03-18 22:00:33
End at: 2019-03-18 22:01:03

# Below is generated by plot.py at 2019-03-18 22:37:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.86 Mbit/s (23.8% utilization)
95th percentile per-packet one-way delay: 84.676 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 84.676 ms
Loss rate: 0.00%
Run 1: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.86 Mbit/s)  Flow 1 egress (mean 2.86 Mbit/s)

Flow 1 (95th percentile 84.68 ms)
Run 2: Statistics of Copa

Start at: 2019-03-18 22:12:54

# Below is generated by plot.py at 2019-03-18 22:37:21
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 3.15 Mbit/s (26.2% utilization)
  95th percentile per-packet one-way delay: 73.588 ms
  Loss rate: 0.04%
-- Flow 1:
  Average throughput: 3.15 Mbit/s
  95th percentile per-packet one-way delay: 73.588 ms
  Loss rate: 0.04%
Run 2: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 3.13 Mbit/s)  Flow 1 egress (mean 3.15 Mbit/s)

Per-packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 73.59 ms)
Run 3: Statistics of Copa

Start at: 2019-03-18 22:25:15
End at: 2019-03-18 22:25:45

# Below is generated by plot.py at 2019-03-18 22:37:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.33 Mbit/s (36.1% utilization)
95th percentile per-packet one-way delay: 105.413 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 4.33 Mbit/s
95th percentile per-packet one-way delay: 105.413 ms
Loss rate: 0.02%
Run 3: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 4.33 Mbit/s)  Flow 1 egress (mean 4.33 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 105.41 ms)
Run 1: Statistics of TCP Cubic

Start at: 2019-03-18 22:07:37
End at: 2019-03-18 22:08:07

# Below is generated by plot.py at 2019-03-18 22:37:27
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.17 Mbit/s (84.7% utilization)
  95th percentile per-packet one-way delay: 4063.688 ms
  Loss rate: 18.42%
-- Flow 1:
  Average throughput: 10.17 Mbit/s
  95th percentile per-packet one-way delay: 4063.688 ms
  Loss rate: 18.42%
Run 1: Report of TCP Cubic — Data Link

![Graph showing throughput and packet delay over time]

- Average capacity 12.00 Mbit/s (shaded region)
- Flow 1 ingress (mean 12.46 Mbit/s)
- Flow 1 egress (mean 10.17 Mbit/s)

![Graph showing packet delay over time]

- Flow 1 95th percentile 4063.69 ms
Run 2: Statistics of TCP Cubic

End at: 2019-03-18 22:20:28

# Below is generated by plot.py at 2019-03-18 22:37:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.17 Mbit/s (84.7% utilization)
95th percentile per-packet one-way delay: 4063.347 ms
Loss rate: 18.42%
-- Flow 1:
Average throughput: 10.17 Mbit/s
95th percentile per-packet one-way delay: 4063.347 ms
Loss rate: 18.42%
Run 2: Report of TCP Cubic — Data Link

![Graph showing throughput over time and packet delay over time for Flow 1. The average capacity is 12.00 Mbits.](image)

Flow 1 ingress (mean 12.46 Mbit/s)  
Flow 1 egress (mean 10.17 Mbit/s)

Flow 1 (95th percentile 4063.35 ms)
Run 3: Statistics of TCP Cubic

Start at: 2019-03-18 22:32:19
End at: 2019-03-18 22:32:49

# Below is generated by plot.py at 2019-03-18 22:37:35
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.17 Mbit/s (84.7% utilization)
  95th percentile per-packet one-way delay: 4061.142 ms
  Loss rate: 18.42%
-- Flow 1:
  Average throughput: 10.17 Mbit/s
  95th percentile per-packet one-way delay: 4061.142 ms
  Loss rate: 18.42%
Run 3: Report of TCP Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 12.46 Mbit/s)  Flow 1 egress (mean 10.17 Mbit/s)

Per-packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 4061.14 ms)
Run 1: Statistics of FillP

Start at: 2019-03-18 22:05:16
End at: 2019-03-18 22:05:46

# Below is generated by plot.py at 2019-03-18 22:37:40
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.54 Mbit/s (96.2% utilization)
95th percentile per-packet one-way delay: 157.804 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 11.54 Mbit/s
95th percentile per-packet one-way delay: 157.804 ms
Loss rate: 0.00%
Run 1: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.54 Mbit/s)  Flow 1 egress (mean 11.54 Mbit/s)

Per-packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 157.80 ms)
Run 2: Statistics of FillP

Start at: 2019-03-18 22:17:36
End at: 2019-03-18 22:18:06

# Below is generated by plot.py at 2019-03-18 22:37:41
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.75 Mbit/s (97.9% utilization)
95th percentile per-packet one-way delay: 146.981 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 11.75 Mbit/s
95th percentile per-packet one-way delay: 146.981 ms
Loss rate: 0.45%
Run 2: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.80 Mbit/s)  Flow 1 egress (mean 11.75 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 146.98 ms)
Run 3: Statistics of FillP

End at: 2019-03-18 22:30:28

# Below is generated by plot.py at 2019-03-18 22:37:46
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.62 Mbit/s (96.8% utilization)
  95th percentile per-packet one-way delay: 145.493 ms
  Loss rate: 0.42%
-- Flow 1:
  Average throughput: 11.62 Mbit/s
  95th percentile per-packet one-way delay: 145.493 ms
  Loss rate: 0.42%
Run 3: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 11.68 Mbit/s)  Flow 1 egress (mean 11.62 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 145.49 ms)
Run 1: Statistics of FillP-Sheep

Start at: 2019-03-18 22:02:55
End at: 2019-03-18 22:03:25

# Below is generated by plot.py at 2019-03-18 22:37:46
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.86 Mbit/s (90.5% utilization)
95th percentile per-packet one-way delay: 62.432 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 10.86 Mbit/s
95th percentile per-packet one-way delay: 62.432 ms
Loss rate: 0.10%
Run 1: Report of FillP-Sheep — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 10.87 Mbit/s)  Flow 1 egress (mean 10.86 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 62.43 ms)
Run 2: Statistics of FillP-Sheep

Start at: 2019-03-18 22:15:16
End at: 2019-03-18 22:15:46

# Below is generated by plot.py at 2019-03-18 22:37:48
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.30 Mbit/s (85.8% utilization)
95th percentile per-packet one-way delay: 60.831 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 10.30 Mbit/s
95th percentile per-packet one-way delay: 60.831 ms
Loss rate: 0.06%
Run 2: Report of FillP-Sheep — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.30 Mbit/s)  Flow 1 egress (mean 10.30 Mbit/s)

Packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 60.83 ms)
Run 3: Statistics of FillP-Sheep

End at: 2019-03-18 22:28:07

# Below is generated by plot.py at 2019-03-18 22:37:53
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.82 Mbit/s (90.2% utilization)
  95th percentile per-packet one-way delay: 64.785 ms
  Loss rate: 0.09%
-- Flow 1:
  Average throughput: 10.82 Mbit/s
  95th percentile per-packet one-way delay: 64.785 ms
  Loss rate: 0.09%
Run 3: Report of FillP-Sheep — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 10.82 Mbit/s)  Flow 1 egress (mean 10.82 Mbit/s)

Per-packet one way delay (ms)

Flow 1 (95th percentile 64.78 ms)
Run 1: Statistics of Indigo

Start at: 2019-03-18 22:02:19
End at: 2019-03-18 22:02:49

# Below is generated by plot.py at 2019-03-18 22:37:53
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.66 Mbit/s (22.1% utilization)
  95th percentile per-packet one-way delay: 61.327 ms
  Loss rate: 0.14%
-- Flow 1:
  Average throughput: 2.66 Mbit/s
  95th percentile per-packet one-way delay: 61.327 ms
  Loss rate: 0.14%
Run 1: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 2.66 Mbit/s)  Flow 1 egress (mean 2.66 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 61.33 ms)
Run 2: Statistics of Indigo

Start at: 2019-03-18 22:14:40
End at: 2019-03-18 22:15:10

# Below is generated by plot.py at 2019-03-18 22:37:53
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.47 Mbit/s (20.6% utilization)
95th percentile per-packet one-way delay: 57.912 ms
Loss rate: 0.49%

-- Flow 1:
Average throughput: 2.47 Mbit/s
95th percentile per-packet one-way delay: 57.912 ms
Loss rate: 0.49%
Run 2: Report of Indigo — Data Link

![Graph showing throughput and packet delay](image)

- Flow 1 ingress (mean 2.46 Mbit/s)
- Flow 1 egress (mean 2.47 Mbit/s)
Run 3: Statistics of Indigo

Start at: 2019-03-18 22:27:02

# Below is generated by plot.py at 2019-03-18 22:37:53
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.27 Mbit/s (18.9% utilization)
  95th percentile per-packet one-way delay: 53.556 ms
  Loss rate: 0.32%
-- Flow 1:
  Average throughput: 2.27 Mbit/s
  95th percentile per-packet one-way delay: 53.556 ms
  Loss rate: 0.32%
Run 3: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.28 Mbit/s)  Flow 1 egress (mean 2.27 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 53.56 ms)
Run 1: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:11:08
End at: 2019-03-18 22:11:38

# Below is generated by plot.py at 2019-03-18 22:37:53
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.60 Mbit/s (13.3% utilization)
95th percentile per-packet one-way delay: 13.968 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 13.968 ms
Loss rate: 0.05%
Run 1: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 1.60 Mbit/s)  Flow 1 egress (mean 1.60 Mbit/s)

Per-packet one-way delay

Flow 1 (95th percentile 13.97 ms)
Run 2: Statistics of Indigo-MusesC3


# Below is generated by plot.py at 2019-03-18 22:37:53
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 1.55 Mbit/s (12.9% utilization)
  95th percentile per-packet one-way delay: 13.723 ms
  Loss rate: 0.24%
-- Flow 1:
  Average throughput: 1.55 Mbit/s
  95th percentile per-packet one-way delay: 13.723 ms
  Loss rate: 0.24%
Run 2: Report of Indigo-MusesC3 — Data Link

![Graph showing throughput over time with shaded region indicating average capacity of 12.00 Mbit/s. Two lines represent flow ingress (mean 1.56 Mbit/s) and egress (mean 1.55 Mbit/s).]

![Graph showing per-packet one-way delay over time with a line indicating 95th percentile of 13.72 ms.]

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Run 3: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:35:51
End at: 2019-03-18 22:36:21

# Below is generated by plot.py at 2019-03-18 22:37:55
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.59 Mbit/s (13.3% utilization)
95th percentile per-packet one-way delay: 14.045 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 14.045 ms
Loss rate: 0.10%
Run 3: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 1.60 Mbit/s)  Flow 1 egress (mean 1.59 Mbit/s)

Per-packet end-to-end delay (ms)

Flow 1 (95th percentile 14.54 ms)
Run 1: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:08:48
End at: 2019-03-18 22:09:18

# Below is generated by plot.py at 2019-03-18 22:37:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.11 Mbit/s (17.6% utilization)
  95th percentile per-packet one-way delay: 47.238 ms
  Loss rate: 2.26%
-- Flow 1:
  Average throughput: 2.11 Mbit/s
  95th percentile per-packet one-way delay: 47.238 ms
  Loss rate: 2.26%
Run 1: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.16 Mbit/s)  Flow 1 egress (mean 2.11 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 47.24 ms)
Run 2: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:21:08

# Below is generated by plot.py at 2019-03-18 22:37:58
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.22 Mbit/s (18.5% utilization)
95th percentile per-packet one-way delay: 53.606 ms
Loss rate: 1.11%
-- Flow 1:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 53.606 ms
Loss rate: 1.11%
Run 2: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.24 Mbit/s)  Flow 1 egress (mean 2.23 Mbit/s)

Per packet one way delay (ms)

Flow 1 (95th percentile 53.61 ms)
Run 3: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:33:30
End at: 2019-03-18 22:34:00

# Below is generated by plot.py at 2019-03-18 22:37:59
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.37 Mbit/s (19.7% utilization)
  95th percentile per-packet one-way delay: 62.959 ms
  Loss rate: 0.19%
-- Flow 1:
  Average throughput: 2.37 Mbit/s
  95th percentile per-packet one-way delay: 62.959 ms
  Loss rate: 0.19%
Run 3: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

**Throughput (Mbit/s)**

- **Flow 1 ingress (mean 2.37 Mbit/s)**
- **Flow 1 egress (mean 2.37 Mbit/s)**

**Per packet end-to-end delay (ms)**

- **Flow 1 (95th percentile 62.96 ms)**
Run 1: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:09:58
End at: 2019-03-18 22:10:28

# Below is generated by plot.py at 2019-03-18 22:38:00
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.44 Mbit/s (20.3% utilization)
95th percentile per-packet one-way delay: 29.068 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 29.068 ms
Loss rate: 0.29%
Run 1: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 2.44 Mbit/s)
- Flow 1 egress (mean 2.44 Mbit/s)

Per-packet end-to-end delay (ms)
- Flow 1 (95th percentile 29.07 ms)
Run 2: Statistics of Indigo-MusesD


# Below is generated by plot.py at 2019-03-18 22:38:02
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.42 Mbit/s (20.1% utilization)
  95th percentile per-packet one-way delay: 28.856 ms
  Loss rate: 0.58%
-- Flow 1:
  Average throughput: 2.42 Mbit/s
  95th percentile per-packet one-way delay: 28.856 ms
  Loss rate: 0.58%
Run 2: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

- Flow 1 ingress (mean 2.43 Mbit/s)
- Flow 1 egress (mean 2.42 Mbit/s)

Per packet one-way delay (ms)

Time (s)

- Flow 1 (95th percentile 28.56 ms)
Run 3: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:34:40
End at: 2019-03-18 22:35:11

# Below is generated by plot.py at 2019-03-18 22:38:03
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.38 Mbit/s (19.8% utilization)
95th percentile per-packet one-way delay: 26.983 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 26.983 ms
Loss rate: 0.57%
Run 3: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Flow 1 ingress (mean 2.39 Mbit/s)  Flow 1 egress (mean 2.38 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 26.98 ms)
Run 1: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:03:30
End at: 2019-03-18 22:04:00

# Below is generated by plot.py at 2019-03-18 22:38:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.49 Mbit/s (12.4% utilization)
95th percentile per-packet one-way delay: 13.703 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 13.703 ms
Loss rate: 0.03%
Run 1: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 1.49 Mbit/s)  Flow 1 egress (mean 1.49 Mbit/s)

Per Pkt. delivery delay (ms)

Flow 1 (95th percentile 13.70 ms)
Run 2: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:15:51
End at: 2019-03-18 22:16:21

# Below is generated by plot.py at 2019-03-18 22:38:06
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.50 Mbit/s (12.5% utilization)
95th percentile per-packet one-way delay: 13.589 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 13.589 ms
Loss rate: 0.11%
Run 2: Report of Indigo-MusesT — Data Link
Run 3: Statistics of Indigo-MusesT

End at: 2019-03-18 22:28:43

# Below is generated by plot.py at 2019-03-18 22:38:07
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 1.47 Mbit/s (12.3% utilization)
  95th percentile per-packet one-way delay: 13.777 ms
  Loss rate: 0.03%
-- Flow 1:
  Average throughput: 1.47 Mbit/s
  95th percentile per-packet one-way delay: 13.777 ms
  Loss rate: 0.03%
Run 3: Report of Indigo-MusesT — Data Link
Run 1: Statistics of LEDBAT

Start at: 2019-03-18 22:11:43
End at: 2019-03-18 22:12:13

# Below is generated by plot.py at 2019-03-18 22:38:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.96 Mbit/s (49.7% utilization)
95th percentile per-packet one-way delay: 140.559 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 5.96 Mbit/s
95th percentile per-packet one-way delay: 140.559 ms
Loss rate: 0.92%
Run 1: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 6.02 Mbit/s)  Flow 1 egress (mean 5.96 Mbit/s)

Packet per way delay (ms)

Time (s)

Flow 1 (95th percentile 140.56 ms)
Run 2: Statistics of LEDBAT

Start at: 2019-03-18 22:24:04
End at: 2019-03-18 22:24:34

# Below is generated by plot.py at 2019-03-18 22:38:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.96 Mbit/s (49.6% utilization)
95th percentile per-packet one-way delay: 140.384 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 5.96 Mbit/s
95th percentile per-packet one-way delay: 140.384 ms
Loss rate: 0.93%
Run 3: Statistics of LEDBAT

Start at: 2019-03-18 22:36:26
End at: 2019-03-18 22:36:56

# Below is generated by plot.py at 2019-03-18 22:38:17
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.96 Mbit/s (49.7% utilization)
95th percentile per-packet one-way delay: 140.834 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 5.96 Mbit/s
95th percentile per-packet one-way delay: 140.834 ms
Loss rate: 1.00%
Run 3: Report of LEDBAT — Data Link
Run 1: Statistics of PCC-Allegro

Start at: 2019-03-18 22:01:09
End at: 2019-03-18 22:01:39

# Below is generated by plot.py at 2019-03-18 22:38:17
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 3.13 Mbit/s (26.1% utilization)
  95th percentile per-packet one-way delay: 12.501 ms
  Loss rate: 0.03%
-- Flow 1:
  Average throughput: 3.13 Mbit/s
  95th percentile per-packet one-way delay: 12.501 ms
  Loss rate: 0.03%
Run 1: Report of PCC-Allegro — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 3.13 Mbit/s)  Flow 1 egress (mean 3.13 Mbit/s)

Per-packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 12.50 ms)
Run 2: Statistics of PCC-Allegro

End at: 2019-03-18 22:14:00

# Below is generated by plot.py at 2019-03-18 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.39 Mbit/s (36.6% utilization)
95th percentile per-packet one-way delay: 12.380 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 12.380 ms
Loss rate: 0.05%
Run 2: Report of PCC-Allegro — Data Link

![Graph showing throughput and delay over time for different flows.]

- Average capacity 12.00 Mbit/s (shaded region)
- Throughput (Mbps)
- Time (s)
- Flow 1 ingress (mean 4.39 Mbit/s)
- Flow 1 egress (mean 4.39 Mbit/s)

- Per-packet one-way delay (ms)
- Flow 1 (95th percentile 12.38 ms)
Run 3: Statistics of PCC-Allegro

End at: 2019-03-18 22:26:21

# Below is generated by plot.py at 2019-03-18 22:38:19
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.48 Mbit/s (37.3% utilization)
95th percentile per-packet one-way delay: 12.426 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 4.48 Mbit/s
95th percentile per-packet one-way delay: 12.426 ms
Loss rate: 0.04%
Run 3: Report of PCC-Allegro — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 4.48 Mbit/s)  Flow 1 egress (mean 4.48 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 12.43 ms)
Run 1: Statistics of PCC-Expr

Start at: 2019-03-18 22:06:26
End at: 2019-03-18 22:06:56

# Below is generated by plot.py at 2019-03-18 22:38:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.72 Mbit/s (47.6% utilization)
95th percentile per-packet one-way delay: 13.281 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 5.72 Mbit/s
95th percentile per-packet one-way delay: 13.281 ms
Loss rate: 0.07%
Run 1: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 5.72 Mbit/s)  Flow 1 egress (mean 5.72 Mbit/s)

Flow 1 (95th percentile 13.28 ms)
Run 2: Statistics of PCC-Expr

End at: 2019-03-18 22:19:17

# Below is generated by plot.py at 2019-03-18 22:38:34
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 7.14 Mbit/s (59.5% utilization)
  95th percentile per-packet one-way delay: 13.304 ms
  Loss rate: 0.05%
-- Flow 1:
  Average throughput: 7.14 Mbit/s
  95th percentile per-packet one-way delay: 13.304 ms
  Loss rate: 0.05%
Run 2: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Flow 1 ingress (mean 7.14 Mbit/s)  Flow 1 egress (mean 7.14 Mbit/s)

Packet to packet delay (ms)

Flow 1 (95th percentile 13.30 ms)
Run 3: Statistics of PCC-Expr

Start at: 2019-03-18 22:31:09

# Below is generated by plot.py at 2019-03-18 22:38:35
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.95 Mbit/s (41.3% utilization)
95th percentile per-packet one-way delay: 13.140 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 4.95 Mbit/s
95th percentile per-packet one-way delay: 13.140 ms
Loss rate: 0.04%
Run 3: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 4.95 Mbit/s)  Flow 1 egress (mean 4.95 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 13.14 ms)
Run 1: Statistics of QUIC Cubic

Start at: 2019-03-18 22:01:44
End at: 2019-03-18 22:02:14

# Below is generated by plot.py at 2019-03-18 22:38:37
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 8.54 Mbit/s (71.1% utilization)
95th percentile per-packet one-way delay: 91.335 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 8.54 Mbit/s
95th percentile per-packet one-way delay: 91.335 ms
Loss rate: 0.18%
Run 1: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 8.55 Mbit/s)  Flow 1 egress (mean 8.54 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 91.33 ms)
Run 2: Statistics of QUIC Cubic

Start at: 2019-03-18 22:14:05
End at: 2019-03-18 22:14:35

# Below is generated by plot.py at 2019-03-18 22:38:37
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.53 Mbit/s (71.1% utilization)
  95th percentile per-packet one-way delay: 91.619 ms
  Loss rate: 0.17%
-- Flow 1:
  Average throughput: 8.53 Mbit/s
  95th percentile per-packet one-way delay: 91.619 ms
  Loss rate: 0.17%
Run 2: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s) vs. Throughput (Mbit/s)

Flow 1 ingress (mean 8.55 Mbit/s)  Flow 1 egress (mean 8.53 Mbit/s)

Per packet one way delay (ms)

Flow 1 (95th percentile 91.62 ms)
Run 3: Statistics of QUIC Cubic

Start at: 2019-03-18 22:26:26
End at: 2019-03-18 22:26:56

# Below is generated by plot.py at 2019-03-18 22:38:38
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.53 Mbit/s (71.1% utilization)
  95th percentile per-packet one-way delay: 90.133 ms
  Loss rate: 0.20%
-- Flow 1:
  Average throughput: 8.53 Mbit/s
  95th percentile per-packet one-way delay: 90.133 ms
  Loss rate: 0.20%
Run 3: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 8.55 Mbit/s)  Flow 1 egress (mean 8.53 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 90.13 ms)
Run 1: Statistics of SCReAM

Start at: 2019-03-18 22:09:23
End at: 2019-03-18 22:09:53

# Below is generated by plot.py at 2019-03-18 22:38:38
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 0.22 Mbit/s (1.8% utilization)
  95th percentile per-packet one-way delay: 11.795 ms
  Loss rate: 0.13%
-- Flow 1:
  Average throughput: 0.22 Mbit/s
  95th percentile per-packet one-way delay: 11.795 ms
  Loss rate: 0.13%
Run 1: Report of SCReAM — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 0.22 Mbit/s)  Flow 1 egress (mean 0.22 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 11.79 ms)
Run 2: Statistics of SCReAM


# Below is generated by plot.py at 2019-03-18 22:38:38
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 0.22 Mbit/s (1.8% utilization)
  95th percentile per-packet one-way delay: 11.772 ms
  Loss rate: 0.13%
-- Flow 1:
  Average throughput: 0.22 Mbit/s
  95th percentile per-packet one-way delay: 11.772 ms
  Loss rate: 0.13%
Run 2: Report of SCReAM — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 0.22 Mbit/s)  Flow 1 egress (mean 0.22 Mbit/s)

Per-packet delay (ms)

Flow 1 (95th percentile 11.77 ms)
Run 3: Statistics of SCReAM

Start at: 2019-03-18 22:34:05
End at: 2019-03-18 22:34:35

# Below is generated by plot.py at 2019-03-18 22:38:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.22 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 11.759 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 11.759 ms
Loss rate: 0.00%
Run 3: Report of SCReAM — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 0.22 Mbit/s)  Flow 1 egress (mean 0.22 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 11.76 ms)
Run 1: Statistics of Sprout

Start at: 2019-03-18 22:07:02
End at: 2019-03-18 22:07:32

# Below is generated by plot.py at 2019-03-18 22:38:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.89 Mbit/s (7.4% utilization)
95th percentile per-packet one-way delay: 25.240 ms
Loss rate: 0.68%
-- Flow 1:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 25.240 ms
Loss rate: 0.68%
Run 1: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 0.90 Mbit/s)   Flow 1 egress (mean 0.89 Mbit/s)

Per Packet One Way Delay (ms)

Time (s)

Flow 1 (95th percentile 25.24 ms)
Run 2: Statistics of Sprout

End at: 2019-03-18 22:19:53

# Below is generated by plot.py at 2019-03-18 22:38:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.17 Mbit/s (9.7% utilization)
95th percentile per-packet one-way delay: 29.511 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 29.511 ms
Loss rate: 0.00%
Run 2: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 1.17 Mbit/s)  Flow 1 egress (mean 1.17 Mbit/s)

Per-packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 29.51 ms)
Run 3: Statistics of Sprout

End at: 2019-03-18 22:32:14

# Below is generated by plot.py at 2019-03-18 22:38:43
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.16 Mbit/s (9.7% utilization)
95th percentile per-packet one-way delay: 29.519 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 29.519 ms
Loss rate: 0.05%
Run 3: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 1.16 Mbit/s)  Flow 1 egress (mean 1.16 Mbit/s)

Per-packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 29.52 ms)
Run 1: Statistics of TaoVA-100x

Start at: 2019-03-18 22:05:51
End at: 2019-03-18 22:06:21

# Below is generated by plot.py at 2019-03-18 22:38:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.92 Mbit/s (24.4% utilization)
95th percentile per-packet one-way delay: 30.693 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 2.92 Mbit/s
95th percentile per-packet one-way delay: 30.693 ms
Loss rate: 0.06%
Run 1: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.92 Mbit/s)  Flow 1 egress (mean 2.92 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 30.69 ms)
Run 2: Statistics of TaoVA-100x

Start at: 2019-03-18 22:18:12
End at: 2019-03-18 22:18:42

# Below is generated by plot.py at 2019-03-18 22:38:51
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.97 Mbit/s (24.8% utilization)
95th percentile per-packet one-way delay: 189.586 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 2.97 Mbit/s
95th percentile per-packet one-way delay: 189.586 ms
Loss rate: 0.03%
Run 2: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.97 Mbit/s)  Flow 1 egress (mean 2.97 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 189.59 ms)
Run 3: Statistics of TaoVA-100x

Start at: 2019-03-18 22:30:33
End at: 2019-03-18 22:31:03

# Below is generated by plot.py at 2019-03-18 22:38:52
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.84 Mbit/s (23.7% utilization)
  95th percentile per-packet one-way delay: 13.435 ms
  Loss rate: 0.06%
-- Flow 1:
  Average throughput: 2.84 Mbit/s
  95th percentile per-packet one-way delay: 13.435 ms
  Loss rate: 0.06%
Run 3: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.84 Mbit/s)  Flow 1 egress (mean 2.84 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 13.44 ms)
Run 1: Statistics of TCP Vegas

Start at: 2019-03-18 22:04:05
End at: 2019-03-18 22:04:35

# Below is generated by plot.py at 2019-03-18 22:38:52
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.84 Mbit/s (40.3% utilization)
  95th percentile per-packet one-way delay: 45.744 ms
  Loss rate: 0.03%
-- Flow 1:
  Average throughput: 4.84 Mbit/s
  95th percentile per-packet one-way delay: 45.744 ms
  Loss rate: 0.03%
Run 1: Report of TCP Vegas — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Throughput (Mbit/s)

Flow 1 ingress (mean 4.82 Mbit/s)  Flow 1 egress (mean 4.84 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 45.74 ms)
Run 2: Statistics of TCP Vegas

Start at: 2019-03-18 22:16:26
End at: 2019-03-18 22:16:56

# Below is generated by plot.py at 2019-03-18 22:38:52
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.96 Mbit/s (41.3% utilization)
  95th percentile per-packet one-way delay: 47.265 ms
  Loss rate: 0.03%
-- Flow 1:
  Average throughput: 4.96 Mbit/s
  95th percentile per-packet one-way delay: 47.265 ms
  Loss rate: 0.03%
Run 2: Report of TCP Vegas — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 4.96 Mbit/s)  Flow 1 egress (mean 4.96 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 47.27 ms)
Run 3: Statistics of TCP Vegas

End at: 2019-03-18 22:29:18

# Below is generated by plot.py at 2019-03-18 22:38:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.66 Mbit/s (13.8% utilization)
95th percentile per-packet one-way delay: 13.398 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 13.398 ms
Loss rate: 0.00%
Run 3: Report of TCP Vegas — Data Link

![Graph showing throughput and delay over time]

Average capacity 12.00 Mb/s (shaded region)

Throughput (Mb/s)

Time (s)

Flow 1 ingress (mean 1.66 Mb/s)  Flow 1 egress (mean 1.66 Mb/s)

White space between graphs

Per-packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 13.40 ms)
Run 1: Statistics of Verus

End at: 2019-03-18 22:00:28

# Below is generated by plot.py at 2019-03-18 22:38:56
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 7.17 Mbit/s (59.8% utilization)
95th percentile per-packet one-way delay: 319.358 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 7.17 Mbit/s
95th percentile per-packet one-way delay: 319.358 ms
Loss rate: 0.44%
Run 1: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 7.21 Mbit/s)  Flow 1 egress (mean 7.17 Mbit/s)

Per packet one way delay (ms)

Flow 1 (95th percentile 319.36 ms)
Run 2: Statistics of Verus

Start at: 2019-03-18 22:12:19
End at: 2019-03-18 22:12:49

# Below is generated by plot.py at 2019-03-18 22:39:03
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 8.25 Mbit/s (68.8% utilization)
95th percentile per-packet one-way delay: 612.420 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 8.25 Mbit/s
95th percentile per-packet one-way delay: 612.420 ms
Loss rate: 0.16%
Run 2: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 8.27 Mbit/s)  Flow 1 egress (mean 8.25 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 612.42 ms)
Run 3: Statistics of Verus

Start at: 2019-03-18 22:24:40
End at: 2019-03-18 22:25:10

# Below is generated by plot.py at 2019-03-18 22:39:05
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 8.53 Mbit/s (71.0% utilization)
95th percentile per-packet one-way delay: 823.589 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 8.53 Mbit/s
95th percentile per-packet one-way delay: 823.589 ms
Loss rate: 0.61%
Run 3: Report of Verus — Data Link

![Graph 1: Throughput (Mbps)](image1)

- **Average capacity 12.00 Mbps (shaded region)**

![Graph 2: Packet delay (ms)](image2)

- **Flow 1 ingress (mean 8.57 Mbps)**
- **Flow 1 egress (mean 8.53 Mbps)**
- **Flow 1 (95th percentile 823.59 ms)**
Run 1: Statistics of PCC-Vivace

Start at: 2019-03-18 22:10:33
End at: 2019-03-18 22:11:03

# Below is generated by plot.py at 2019-03-18 22:39:06
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.34 Mbit/s (44.5% utilization)
95th percentile per-packet one-way delay: 12.306 ms
Loss rate: 0.00%

-- Flow 1:
Average throughput: 5.34 Mbit/s
95th percentile per-packet one-way delay: 12.306 ms
Loss rate: 0.00%
Run 1: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

0 5 10 15 20 25 30 35
Time (s)

Flow 1 ingress (mean 5.34 Mbit/s)  Flow 1 egress (mean 5.34 Mbit/s)

Per packet one-way delay (ms)

0 10 20 30 40 50
Time (s)

Flow 1 (95th percentile 12.31 ms)
Run 2: Statistics of PCC-Vivace


# Below is generated by plot.py at 2019-03-18 22:39:06  
# Datalink statistics  
-- Total of 1 flow:  
Average capacity: 12.00 Mbit/s  
Average throughput: 2.89 Mbit/s (24.0% utilization)  
95th percentile per-packet one-way delay: 12.323 ms  
Loss rate: 0.05%  
-- Flow 1:  
Average throughput: 2.89 Mbit/s  
95th percentile per-packet one-way delay: 12.323 ms  
Loss rate: 0.05%
Run 2: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Flow 1 ingress (mean 2.89 Mbit/s)  Flow 1 egress (mean 2.89 Mbit/s)

Per-packet end-to-end delay (ms)

Flow 1 (95th percentile 12.32 ms)
Run 3: Statistics of PCC-Vivace

Start at: 2019-03-18 22:35:16
End at: 2019-03-18 22:35:46

# Below is generated by plot.py at 2019-03-18 22:39:06
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.39 Mbit/s (36.6% utilization)
  95th percentile per-packet one-way delay: 12.196 ms
  Loss rate: 0.05%
-- Flow 1:
  Average throughput: 4.39 Mbit/s
  95th percentile per-packet one-way delay: 12.196 ms
  Loss rate: 0.05%
Run 3: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 4.39 Mbit/s)  Flow 1 egress (mean 4.39 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 12.20 ms)
Run 1: Statistics of WebRTC media

Start at: 2019-03-18 22:08:13
End at: 2019-03-18 22:08:43

# Below is generated by plot.py at 2019-03-18 22:39:06
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.05 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 19.502 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 19.502 ms
Loss rate: 0.00%
Run 1: Report of WebRTC media — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (MBit/s)

Time (s)

Flow 1 ingress (mean 0.05 Mbit/s)  
Flow 1 egress (mean 0.05 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 19.50 ms)
Run 2: Statistics of WebRTC media

Start at: 2019-03-18 22:20:33
End at: 2019-03-18 22:21:03

# Below is generated by plot.py at 2019-03-18 22:39:06
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.05 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 19.327 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 19.327 ms
Loss rate: 0.00%
Run 2: Report of WebRTC media — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (MBit/s)

Flow 1 ingress (mean 0.05 Mbit/s)  Flow 1 egress (mean 0.05 Mbit/s)

Per packet one way delay (ms)

Flow 1 (95th percentile 19.33 ms)
Run 3: Statistics of WebRTC media

End at: 2019-03-18 22:33:25

# Below is generated by plot.py at 2019-03-18 22:39:06
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 0.05 Mbit/s (0.4% utilization)
  95th percentile per-packet one-way delay: 18.945 ms
  Loss rate: 0.00%
-- Flow 1:
  Average throughput: 0.05 Mbit/s
  95th percentile per-packet one-way delay: 18.945 ms
  Loss rate: 0.00%
Run 3: Report of WebRTC media — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 0.05 Mbit/s)
- Flow 1 egress (mean 0.05 Mbit/s)

Per-packet one-way delay (ms)

- Flow 1 (95th percentile 18.95 ms)