Pantheon Report

Tested in mahimahi: mm-delay 30 mm-link 12mbps.trace 12mbps.trace
--uplink-queue=droptail --uplink-queue-args=bytes=9000
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 @ d6da145932fcee56963885d7e3a17e6a32d4519
third_party/fillp-sheep @ 0e65b22943babcd2b0902c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa9e93b032143cedbfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38d4dfe0edcbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906e6b7f7c3cf
third_party/muses @ 5ce721187ad823da2a0955337730c746486ca4966
third_party/pantheon-tunnel @ f866d3f58d27af942717625ee3a354cc2e802bd
third_party/pcc @ 1acf958fa0d66d2b3c091a55f8ec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8ac0d8f9ab2c4eb24f974ab
third_party/proto-quic @ 77961f1a182733a86f42f1bc8143ebc97f34cf42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a6d18c74f9415f9a26
M src/examples/sproutsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ 9e4b44ae74c6c60a261149af262962939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b78c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9d5e4735770d143a1fa2851
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)</th>
<th>mean 95th-%ile delay (ms)</th>
<th>mean loss rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP BBR</td>
<td>3</td>
<td>11.45</td>
<td>35.55</td>
<td>4.56</td>
</tr>
<tr>
<td>Copa</td>
<td>3</td>
<td>10.27</td>
<td>37.46</td>
<td>20.66</td>
</tr>
<tr>
<td>TCP Cubic</td>
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<td>9.38</td>
<td>34.20</td>
<td>0.19</td>
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<tr>
<td>FillP</td>
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<td>4.70</td>
<td>36.07</td>
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<td>FillP-Sheep</td>
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<td>4.18</td>
<td>35.55</td>
<td>10.90</td>
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<td>Indigo</td>
<td>3</td>
<td>9.27</td>
<td>35.97</td>
<td>65.96</td>
</tr>
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<td>Indigo-MusesC3</td>
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<td>10.70</td>
<td>36.18</td>
<td>0.81</td>
</tr>
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<td>Indigo-MusesC5</td>
<td>3</td>
<td>9.19</td>
<td>35.05</td>
<td>1.58</td>
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<td>Indigo-MusesD</td>
<td>3</td>
<td>4.29</td>
<td>36.05</td>
<td>7.64</td>
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<tr>
<td>Indigo-MusesT</td>
<td>3</td>
<td>11.11</td>
<td>36.88</td>
<td>1.02</td>
</tr>
<tr>
<td>LEDBAT</td>
<td>3</td>
<td>2.89</td>
<td>36.24</td>
<td>2.97</td>
</tr>
<tr>
<td>PCC-Allegro</td>
<td>3</td>
<td>9.89</td>
<td>33.86</td>
<td>0.88</td>
</tr>
<tr>
<td>PCC-Expr</td>
<td>3</td>
<td>11.43</td>
<td>36.94</td>
<td>1.97</td>
</tr>
<tr>
<td>QUIC Cubic</td>
<td>3</td>
<td>10.92</td>
<td>35.99</td>
<td>0.51</td>
</tr>
<tr>
<td>SCReAM</td>
<td>3</td>
<td>0.21</td>
<td>31.71</td>
<td>0.09</td>
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<td>Sprout</td>
<td>3</td>
<td>0.83</td>
<td>36.49</td>
<td>11.94</td>
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<td>TaoVA-100x</td>
<td>3</td>
<td>11.13</td>
<td>33.02</td>
<td>0.80</td>
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<td>TCP Vegas</td>
<td>3</td>
<td>8.59</td>
<td>34.22</td>
<td>0.24</td>
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<tr>
<td>Verus</td>
<td>3</td>
<td>5.33</td>
<td>38.05</td>
<td>96.46</td>
</tr>
<tr>
<td>PCC-Vivace</td>
<td>3</td>
<td>10.88</td>
<td>35.17</td>
<td>0.25</td>
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<tr>
<td>WebRTC media</td>
<td>3</td>
<td>0.05</td>
<td>34.05</td>
<td>7.82</td>
</tr>
</tbody>
</table>
Run 1: Statistics of TCP BBR

Start at: 2019-03-18 22:00:34
End at: 2019-03-18 22:01:04

# 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: 11.45 Mbit/s (95.4% utilization)
  95th percentile per-packet one-way delay: 35.533 ms
  Loss rate: 4.49%
-- Flow 1:
  Average throughput: 11.45 Mbit/s
  95th percentile per-packet one-way delay: 35.533 ms
  Loss rate: 4.49%
Run 1: Report of TCP BBR — Data Link

![Graph 1: Average capacity 12.00 Mbit/s (shaded region)]

- Flow 1 ingress (mean 11.97 Mbit/s)
- Flow 1 egress (mean 11.45 Mbit/s)

![Graph 2: Per-packet one-way delay (ms)]

- Flow 1 (95th percentile 35.53 ms)
Run 2: Statistics of TCP BBR


# 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: 11.48 Mbit/s (95.7% utilization)
    95th percentile per-packet one-way delay: 35.560 ms
    Loss rate: 4.46%
-- Flow 1:
    Average throughput: 11.48 Mbit/s
    95th percentile per-packet one-way delay: 35.560 ms
    Loss rate: 4.46%
Run 2: Report of TCP BBR — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Throughput (Mbit/s)

Flow 1 ingress (mean 12.01 Mbit/s)  Flow 1 egress (mean 11.48 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 35.56 ms)
Run 3: Statistics of TCP BBR

Start at: 2019-03-18 22:25:34
End at: 2019-03-18 22:26:04

# 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: 11.43 Mbit/s (95.2% utilization)
95th percentile per-packet one-way delay: 35.547 ms
Loss rate: 4.73%
-- Flow 1:
Average throughput: 11.43 Mbit/s
95th percentile per-packet one-way delay: 35.547 ms
Loss rate: 4.73%
Run 3: Report of TCP BBR — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.98 Mbit/s)  Flow 1 egress (mean 11.43 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 35.55 ms)
Run 1: Statistics of Copa

Start at: 2019-03-18 22:04:06
End at: 2019-03-18 22:04:36

# 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: 9.73 Mbit/s (81.1% utilization)
  95th percentile per-packet one-way delay: 37.577 ms
  Loss rate: 25.82%
-- Flow 1:
  Average throughput: 9.73 Mbit/s
  95th percentile per-packet one-way delay: 37.577 ms
  Loss rate: 25.82%
Run 1: Report of Copa — Data Link

![Graph showing network throughput and packet delay over time.]

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 13.10 Mbit/s)
- Flow 1 egress (mean 9.73 Mbit/s)

Packet delay (ms)

Flow 1 (95th percentile 37.58 ms)
Run 2: Statistics of Copa

End at: 2019-03-18 22:17:09

# 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: 10.84 Mbit/s (90.3% utilization)
  95th percentile per-packet one-way delay: 37.276 ms
  Loss rate: 14.84%
-- Flow 1:
  Average throughput: 10.84 Mbit/s
  95th percentile per-packet one-way delay: 37.276 ms
  Loss rate: 14.84%
Run 2: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 12.72 Mbit/s)  Flow 1 egress (mean 10.84 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 37.28 ms)
Run 3: Statistics of Copa

Start at: 2019-03-18 22:29:07
End at: 2019-03-18 22:29:37

# 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: 10.23 Mbit/s (85.2% utilization)
  95th percentile per-packet one-way delay: 37.516 ms
  Loss rate: 21.31%
-- Flow 1:
  Average throughput: 10.23 Mbit/s
  95th percentile per-packet one-way delay: 37.516 ms
  Loss rate: 21.31%
Run 3: Report of Copa — Data Link
Run 1: Statistics of TCP Cubic

Start at: 2019-03-18 22:07:45
End at: 2019-03-18 22:08:15

# 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: 9.45 Mbit/s (78.7% utilization)
  95th percentile per-packet one-way delay: 34.221 ms
  Loss rate: 0.21%
-- Flow 1:
  Average throughput: 9.45 Mbit/s
  95th percentile per-packet one-way delay: 34.221 ms
  Loss rate: 0.21%
Run 1: Report of TCP Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 9.46 Mbit/s)  Flow 1 egress (mean 9.45 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 34.22 ms)
Run 2: Statistics of TCP Cubic

End at: 2019-03-18 22:20:43

# 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: 9.53 Mbit/s (79.4% utilization)
  95th percentile per-packet one-way delay: 34.261 ms
  Loss rate: 0.19%
-- Flow 1:
  Average throughput: 9.53 Mbit/s
  95th percentile per-packet one-way delay: 34.261 ms
  Loss rate: 0.19%
Run 2: Report of TCP Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 9.54 Mbit/s)  Flow 1 egress (mean 9.53 Mbit/s)

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

Flow 1 (95th percentile 34.26 ms)
Run 3: Statistics of TCP Cubic

Start at: 2019-03-18 22:32:42
End at: 2019-03-18 22:33:12

# Below is generated by plot.py at 2019-03-18 22:38:20
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 9.16 Mbit/s (76.3% utilization)
  95th percentile per-packet one-way delay: 34.132 ms
  Loss rate: 0.18%
-- Flow 1:
  Average throughput: 9.16 Mbit/s
  95th percentile per-packet one-way delay: 34.132 ms
  Loss rate: 0.18%
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 9.17 Mbit/s)  Flow 1 egress (mean 9.16 Mbit/s)

Packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 34.13 ms)
Run 1: Statistics of FillP

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 22:38:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.61 Mbit/s (38.4% utilization)
95th percentile per-packet one-way delay: 35.980 ms
Loss rate: 15.23%
-- Flow 1:
Average throughput: 4.61 Mbit/s
95th percentile per-packet one-way delay: 35.980 ms
Loss rate: 15.23%
Run 1: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Flow 1 ingress (mean 5.43 Mbit/s)  Flow 1 egress (mean 4.61 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 35.98 ms)
Run 2: Statistics of FillP

End at: 2019-03-18 22:14:12

# Below is generated by plot.py at 2019-03-18 22:38:20
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.73 Mbit/s (39.4% utilization)
  95th percentile per-packet one-way delay: 36.158 ms
  Loss rate: 15.54%
-- Flow 1:
  Average throughput: 4.73 Mbit/s
  95th percentile per-packet one-way delay: 36.158 ms
  Loss rate: 15.54%
Run 2: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

0 1 2 3 4 5 6 7 8 9 10 11 12

Time (s)

Flow 1 ingress (mean 5.59 Mbit/s)  Flow 1 egress (mean 4.73 Mbit/s)

Per packet one-way delay (ms)

30.0 32.5 35.0 37.5 40.0 42.5 45.0 47.5

Flow 1 (95th percentile 36.16 ms)

Time (s)
Run 3: Statistics of FillP

Start at: 2019-03-18 22:26:10
End at: 2019-03-18 22:26:40

# Below is generated by plot.py at 2019-03-18 22:38:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.75 Mbit/s (39.6% utilization)
95th percentile per-packet one-way delay: 36.076 ms
Loss rate: 16.32%
-- Flow 1:
Average throughput: 4.75 Mbit/s
95th percentile per-packet one-way delay: 36.076 ms
Loss rate: 16.32%
Run 3: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

**Flow 1 ingress (mean 5.68 Mbit/s)**  **Flow 1 egress (mean 4.75 Mbit/s)**

Per packet one-way delay (ms)

- Flow 1 (95th percentile 36.08 ms)
Run 1: Statistics of FillP-Sheep

Start at: 2019-03-18 22:05:59
End at: 2019-03-18 22:06:29

# Below is generated by plot.py at 2019-03-18 22:38:20
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.20 Mbit/s (35.0% utilization)
  95th percentile per-packet one-way delay: 35.561 ms
  Loss rate: 11.58%
-- Flow 1:
  Average throughput: 4.20 Mbit/s
  95th percentile per-packet one-way delay: 35.561 ms
  Loss rate: 11.58%
Run 1: Report of FillP-Sheep — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 4.75 Mbit/s)  Flow 1 egress (mean 4.20 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 35.56 ms)
Run 2: Statistics of FillP-Sheep

End at: 2019-03-18 22:18:57

# 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: 4.19 Mbit/s (34.9% utilization)
95th percentile per-packet one-way delay: 35.540 ms
Loss rate: 10.98%
-- Flow 1:
Average throughput: 4.19 Mbit/s
95th percentile per-packet one-way delay: 35.540 ms
Loss rate: 10.98%
Run 2: Report of FillP-Sheep — Data Link

- **Average capacity 12.00 Mbit/s (shaded region)**
- **Flow 1 ingress (mean 4.70 Mbit/s)**
- **Flow 1 egress (mean 4.19 Mbit/s)**

![Throughput vs. Time Graph]

- **Per-packet end-to-end delay (ms)**
- **Flow 1 (95th percentile 35.54 ms)**
Run 3: Statistics of FillP-Sheep

Start at: 2019-03-18 22:30:56
End at: 2019-03-18 22:31:26

# Below is generated by plot.py at 2019-03-18 22:38:28
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.14 Mbit/s (34.5% utilization)
95th percentile per-packet one-way delay: 35.549 ms
Loss rate: 10.14%
-- Flow 1:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 35.549 ms
Loss rate: 10.14%
Run 3: Report of FillP-Sheep — Data Link
Run 1: Statistics of Indigo

Start at: 2019-03-18 22:08:21
End at: 2019-03-18 22:08:51

# 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: 8.85 Mbit/s (73.7% utilization)
95th percentile per-packet one-way delay: 36.030 ms
Loss rate: 68.96%
-- Flow 1:
Average throughput: 8.85 Mbit/s
95th percentile per-packet one-way delay: 36.030 ms
Loss rate: 68.96%
Run 1: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 20.48 Mbit/s)  Flow 1 egress (mean 8.85 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 36.03 ms)
Run 2: Statistics of Indigo

Start at: 2019-03-18 22:20:49
End at: 2019-03-18 22:21:19

# Below is generated by plot.py at 2019-03-18 22:38:45
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.49 Mbit/s (79.1% utilization)
95th percentile per-packet one-way delay: 36.001 ms
Loss rate: 67.77%
-- Flow 1:
Average throughput: 9.49 Mbit/s
95th percentile per-packet one-way delay: 36.001 ms
Loss rate: 67.77%
Run 2: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 29.41 Mbit/s)  Flow 1 egress (mean 9.49 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 36.00 ms)
Run 3: Statistics of Indigo

Start at: 2019-03-18 22:33:18
End at: 2019-03-18 22:33:48

# Below is generated by plot.py at 2019-03-18 22:38:45
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.47 Mbit/s (79.0% utilization)
95th percentile per-packet one-way delay: 35.893 ms
Loss rate: 61.15%
-- Flow 1:
Average throughput: 9.47 Mbit/s
95th percentile per-packet one-way delay: 35.893 ms
Loss rate: 61.15%
Run 3: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 24.36 Mbit/s)  Flow 1 egress (mean 9.47 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 35.89 ms)
Run 1: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:08:57
End at: 2019-03-18 22:09:27

# Below is generated by plot.py at 2019-03-18 22:38:45
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.20 Mbit/s (93.4% utilization)
  95th percentile per-packet one-way delay: 36.815 ms
  Loss rate: 1.11%
-- Flow 1:
  Average throughput: 11.20 Mbit/s
  95th percentile per-packet one-way delay: 36.815 ms
  Loss rate: 1.11%
Run 1: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.32 Mbit/s)  Flow 1 egress (mean 11.20 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 36.81 ms)
Run 2: Statistics of Indigo-MusesC3


# Below is generated by plot.py at 2019-03-18 22:38:45
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.28 Mbit/s (85.7% utilization)
  95th percentile per-packet one-way delay: 35.850 ms
  Loss rate: 0.74%
-- Flow 1:
  Average throughput: 10.28 Mbit/s
  95th percentile per-packet one-way delay: 35.850 ms
  Loss rate: 0.74%
Run 2: Report of Indigo-MusesC3 — 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 10.34 Mbit/s)  Flow 1 egress (mean 10.28 Mbit/s)

Per-packet one-way delay (ms)

30 32 34 36 38 40 42
Time (s)

Flow 1 (95th percentile 35.85 ms)
Run 3: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:33:54
End at: 2019-03-18 22:34:24

# Below is generated by plot.py at 2019-03-18 22:38:45
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.61 Mbit/s (88.4% utilization)
  95th percentile per-packet one-way delay: 35.879 ms
  Loss rate: 0.58%
-- Flow 1:
  Average throughput: 10.61 Mbit/s
  95th percentile per-packet one-way delay: 35.879 ms
  Loss rate: 0.58%
Run 3: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.66 Mbit/s)  Flow 1 egress (mean 10.61 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 35.88 ms)
Run 1: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:06:35
End at: 2019-03-18 22:07:05

# Below is generated by plot.py at 2019-03-18 22:38:47
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 9.42 Mbit/s (78.5% utilization)
  95th percentile per-packet one-way delay: 35.289 ms
  Loss rate: 2.17%
-- Flow 1:
  Average throughput: 9.42 Mbit/s
  95th percentile per-packet one-way delay: 35.289 ms
  Loss rate: 2.17%
Run 1: Report of Indigo-MusesC5 — Data Link
Run 2: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:19:02
End at: 2019-03-18 22:19:32

# Below is generated by plot.py at 2019-03-18 22:38:47
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.65 Mbit/s (72.1% utilization)
  95th percentile per-packet one-way delay: 34.903 ms
  Loss rate: 1.32%
-- Flow 1:
  Average throughput: 8.65 Mbit/s
  95th percentile per-packet one-way delay: 34.903 ms
  Loss rate: 1.32%
Run 2: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 8.76 Mbit/s)  Flow 1 egress (mean 8.65 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 34.90 ms)
Run 3: Statistics of Indigo-MusesC5

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

# Below is generated by plot.py at 2019-03-18 22:38:57
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.50 Mbit/s (79.2% utilization)
95th percentile per-packet one-way delay: 34.970 ms
Loss rate: 1.24%
-- Flow 1:
Average throughput: 9.50 Mbit/s
95th percentile per-packet one-way delay: 34.970 ms
Loss rate: 1.24%
Run 3: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 9.61 Mbit/s)  Flow 1 egress (mean 9.50 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 34.97 ms)
Run 1: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:09:32
End at: 2019-03-18 22:10:02

# Below is generated by plot.py at 2019-03-18 22:38:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.67 Mbit/s (39.0% utilization)
  95th percentile per-packet one-way delay: 36.375 ms
  Loss rate: 6.94%
-- Flow 1:
  Average throughput: 4.67 Mbit/s
  95th percentile per-packet one-way delay: 36.375 ms
  Loss rate: 6.94%
Run 1: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 5.02 Mbit/s)  Flow 1 egress (mean 4.67 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 36.38 ms)
Run 2: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:22:00

# Below is generated by plot.py at 2019-03-18 22:38:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 3.75 Mbit/s (31.3% utilization)
  95th percentile per-packet one-way delay: 35.987 ms
  Loss rate: 9.73%
-- Flow 1:
  Average throughput: 3.75 Mbit/s
  95th percentile per-packet one-way delay: 35.987 ms
  Loss rate: 9.73%
Run 2: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 4.15 Mbit/s)  Flow 1 egress (mean 3.75 Mbit/s)

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

Flow 1 (95th percentile 35.99 ms)
Run 3: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:34:29
End at: 2019-03-18 22:34:59

# Below is generated by plot.py at 2019-03-18 22:38:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.45 Mbit/s (37.0% utilization)
  95th percentile per-packet one-way delay: 35.799 ms
  Loss rate: 6.24%
-- Flow 1:
  Average throughput: 4.45 Mbit/s
  95th percentile per-packet one-way delay: 35.799 ms
  Loss rate: 6.24%
Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 4.74 Mbit/s)  Flow 1 egress (mean 4.45 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 35.80 ms)
Run 1: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:11:18
End at: 2019-03-18 22:11:48

# Below is generated by plot.py at 2019-03-18 22:39:07
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.33 Mbit/s (94.5% utilization)
  95th percentile per-packet one-way delay: 36.889 ms
  Loss rate: 0.99%
-- Flow 1:
  Average throughput: 11.33 Mbit/s
  95th percentile per-packet one-way delay: 36.889 ms
  Loss rate: 0.99%
Run 1: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.43 Mbit/s)  Flow 1 egress (mean 11.33 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 36.59 ms)
Run 2: Statistics of Indigo-MusesT

End at: 2019-03-18 22:24:16

# Below is generated by plot.py at 2019-03-18 22:39:07
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.50 Mbit/s (87.5% utilization)
95th percentile per-packet one-way delay: 36.702 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 10.50 Mbit/s
95th percentile per-packet one-way delay: 36.702 ms
Loss rate: 0.82%
Run 2: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

**Flow 1 ingress** (mean 10.57 Mbit/s)  **Flow 1 egress** (mean 10.50 Mbit/s)

**Per packet inter-way delay (ms)**

**Flow 1** (95th percentile 36.70 ms)
Run 3: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:36:15
End at: 2019-03-18 22:36:45

# Below is generated by plot.py at 2019-03-18 22:39:09
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.51 Mbit/s (95.9% utilization)
  95th percentile per-packet one-way delay: 37.056 ms
  Loss rate: 1.26%
-- Flow 1:
  Average throughput: 11.51 Mbit/s
  95th percentile per-packet one-way delay: 37.056 ms
  Loss rate: 1.26%
Run 3: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.65 Mbit/s)  Flow 1 egress (mean 11.51 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 37.56 ms)
Run 1: Statistics of LEDBAT

Start at: 2019-03-18 22:10:43
End at: 2019-03-18 22:11:13

# Below is generated by plot.py at 2019-03-18 22:39:09
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.67 Mbit/s (22.3% utilization)
  95th percentile per-packet one-way delay: 36.117 ms
  Loss rate: 3.09%
-- Flow 1:
  Average throughput: 2.67 Mbit/s
  95th percentile per-packet one-way delay: 36.117 ms
  Loss rate: 3.09%
Run 1: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 2.76 Mbit/s)
- Flow 1 egress (mean 2.67 Mbit/s)

Per-packet one-way delay (ms)

- Flow 1 (95th percentile 36.12 ms)
Run 2: Statistics of LEDBAT


# Below is generated by plot.py at 2019-03-18 22:39:09
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 2.79 Mbit/s (23.2% utilization)
  95th percentile per-packet one-way delay: 36.187 ms
  Loss rate: 2.97%
-- Flow 1:
  Average throughput: 2.79 Mbit/s
  95th percentile per-packet one-way delay: 36.187 ms
  Loss rate: 2.97%
Run 2: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 2.87 Mbit/s)  Flow 1 egress (mean 2.79 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 36.19 ms)
Run 3: Statistics of LEDBAT

Start at: 2019-03-18 22:35:40
End at: 2019-03-18 22:36:10

# Below is generated by plot.py at 2019-03-18 22:39:09
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.20 Mbit/s (26.7% utilization)
95th percentile per-packet one-way delay: 36.414 ms
Loss rate: 2.86%
-- Flow 1:
Average throughput: 3.20 Mbit/s
95th percentile per-packet one-way delay: 36.414 ms
Loss rate: 2.86%
Run 3: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 3.29 Mbit/s)  Flow 1 egress (mean 3.20 Mbit/s)

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

Flow 1 (95th percentile 36.41 ms)
Run 1: Statistics of PCC-Allegro

Start at: 2019-03-18 22:05:24
End at: 2019-03-18 22:05:54

# Below is generated by plot.py at 2019-03-18 22:39:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.43 Mbit/s (78.6% utilization)
95th percentile per-packet one-way delay: 32.918 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 9.43 Mbit/s
95th percentile per-packet one-way delay: 32.918 ms
Loss rate: 0.92%
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 9.51 Mbit/s)  Flow 1 egress (mean 9.43 Mbit/s)

Packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 32.92 ms)
Run 2: Statistics of PCC-Allegro

Start at: 2019-03-18 22:17:52
End at: 2019-03-18 22:18:22

# Below is generated by plot.py at 2019-03-18 22:39:17
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 9.09 Mbit/s (75.7% utilization)
  95th percentile per-packet one-way delay: 32.670 ms
  Loss rate: 0.84%
-- Flow 1:
  Average throughput: 9.09 Mbit/s
  95th percentile per-packet one-way delay: 32.670 ms
  Loss rate: 0.84%
Run 2: Report of PCC-Allegro — Data Link

![Graph showing throughput and delay over time]

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 9.16 Mbit/s)  Flow 1 egress (mean 9.09 Mbit/s)

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

Flow 1 (95th percentile 32.67 ms)
Run 3: Statistics of PCC-Allegro

Start at: 2019-03-18 22:30:21
End at: 2019-03-18 22:30:51

# Below is generated by plot.py at 2019-03-18 22:39:19
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.16 Mbit/s (93.0\% utilization)
95th percentile per-packet one-way delay: 35.980 ms
Loss rate: 0.88\%
-- Flow 1:
Average throughput: 11.16 Mbit/s
95th percentile per-packet one-way delay: 35.980 ms
Loss rate: 0.88\%
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 11.25 Mbit/s)  Flow 1 egress (mean 11.16 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 35.98 ms)
Run 1: Statistics of PCC-Expr

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

# Below is generated by plot.py at 2019-03-18 22:39:40
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.46 Mbit/s (95.5% utilization)
95th percentile per-packet one-way delay: 36.829 ms
Loss rate: 1.73%
-- Flow 1:
Average throughput: 11.46 Mbit/s
95th percentile per-packet one-way delay: 36.829 ms
Loss rate: 1.73%
Run 1: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.65 Mbit/s)  Flow 1 egress (mean 11.46 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 36.83 ms)
Run 2: Statistics of PCC-Expr

Start at: 2019-03-18 22:12:30
End at: 2019-03-18 22:13:00

# Below is generated by plot.py at 2019-03-18 22:39:40
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.45 Mbit/s (95.4% utilization)
  95th percentile per-packet one-way delay: 37.012 ms
  Loss rate: 1.99%
-- Flow 1:
  Average throughput: 11.45 Mbit/s
  95th percentile per-packet one-way delay: 37.012 ms
  Loss rate: 1.99%
Run 2: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.67 Mbit/s)  Flow 1 egress (mean 11.45 Mbit/s)

Per packet one way delay (ms)

Flow 1 (95th percentile 37.01 ms)
Run 3: Statistics of PCC-Expr


# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.37 Mbit/s (94.8% utilization)
95th percentile per-packet one-way delay: 36.980 ms
Loss rate: 2.20%
-- Flow 1:
Average throughput: 11.37 Mbit/s
95th percentile per-packet one-way delay: 36.980 ms
Loss rate: 2.20%
Run 3: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.62 Mbit/s)  Flow 1 egress (mean 11.37 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 36.98 ms)
Run 1: Statistics of QUIC Cubic

Start at: 2019-03-18 22:10:08
End at: 2019-03-18 22:10:38

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.92 Mbit/s (91.0% utilization)
  95th percentile per-packet one-way delay: 36.072 ms
  Loss rate: 0.50%
-- Flow 1:
  Average throughput: 10.92 Mbit/s
  95th percentile per-packet one-way delay: 36.072 ms
  Loss rate: 0.50%
Run 1: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 10.96 Mbit/s)  Flow 1 egress (mean 10.92 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 36.07 ms)
Run 2: Statistics of QUIC Cubic

End at: 2019-03-18 22:23:05

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.96 Mbit/s (91.3% utilization)
95th percentile per-packet one-way delay: 35.954 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 10.96 Mbit/s
95th percentile per-packet one-way delay: 35.954 ms
Loss rate: 0.48%
Run 2: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.00 Mbit/s)  Flow 1 egress (mean 10.96 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 35.95 ms)
Run 3: Statistics of QUIC Cubic

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

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.87 Mbit/s (90.6% utilization)
  95th percentile per-packet one-way delay: 35.930 ms
  Loss rate: 0.55%
-- Flow 1:
  Average throughput: 10.87 Mbit/s
  95th percentile per-packet one-way delay: 35.930 ms
  Loss rate: 0.55%
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 10.92 Mbit/s)  Flow 1 egress (mean 10.87 Mbit/s)

Per packet one way delay (ms)

Flow 1 (95th percentile 35.93 ms)
Run 1: Statistics of SCReAM

Start at: 2019-03-18 22:07:10
End at: 2019-03-18 22:07:40

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 0.21 Mbit/s (1.8% utilization)
  95th percentile per-packet one-way delay: 31.709 ms
  Loss rate: 0.13%
-- Flow 1:
  Average throughput: 0.21 Mbit/s
  95th percentile per-packet one-way delay: 31.709 ms
  Loss rate: 0.13%
Run 1: Report of SCReAM — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 0.21 Mbit/s)
Flow 1 egress (mean 0.21 Mbit/s)

Per-packet delivery delay (ms)

Time (s)

Flow 1 (95th percentile 31.71 ms)
Run 2: Statistics of SCReAM

End at: 2019-03-18 22:20:08

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.21 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 31.707 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 31.707 ms
Loss rate: 0.00%
Run 2: Report of SCReAM — Data Link

![Graph showing throughput over time with shaded region indicating average capacity of 12.00 Mbit/s.]
Run 3: Statistics of SCReAM

Start at: 2019-03-18 22:32:07
End at: 2019-03-18 22:32:37

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.21 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 31.700 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 31.700 ms
Loss rate: 0.13%
Run 3: Report of SCReAM — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 0.21 Mbit/s)
- Flow 1 egress (mean 0.21 Mbit/s)

Per packet one-way delay (ms)
- Flow 1 (95th percentile 31.70 ms)
Run 1: Statistics of Sprout

Start at: 2019-03-18 22:02:56
End at: 2019-03-18 22:03:26

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.84 Mbit/s (7.0% utilization)
95th percentile per-packet one-way delay: 36.477 ms
Loss rate: 11.28%
-- Flow 1:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 36.477 ms
Loss rate: 11.28%
Run 1: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Flow 1 ingress (mean 0.95 Mbit/s)  Flow 1 egress (mean 0.84 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 36.48 ms)
Run 2: Statistics of Sprout

End at: 2019-03-18 22:15:58

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.75 Mbit/s (6.2% utilization)
95th percentile per-packet one-way delay: 36.515 ms
Loss rate: 12.53%
-- Flow 1:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 36.515 ms
Loss rate: 12.53%
Run 2: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Throughput (Mbit/s)

- Flow 1 ingress (mean 0.85 Mbit/s)
- Flow 1 egress (mean 0.75 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 36.52 ms)
Run 3: Statistics of Sprout

End at: 2019-03-18 22:28:26

# Below is generated by plot.py at 2019-03-18 22:39:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.90 Mbit/s (7.5% utilization)
95th percentile per-packet one-way delay: 36.490 ms
Loss rate: 12.01%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 36.490 ms
Loss rate: 12.01%
Run 3: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 1.02 Mbit/s)  Flow 1 egress (mean 0.90 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 36.49 ms)
Run 1: Statistics of TaoVA-100x

Start at: 2019-03-18 22:11:54
End at: 2019-03-18 22:12:24

# Below is generated by plot.py at 2019-03-18 22:40:05
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.13 Mbit/s (92.8% utilization)
  95th percentile per-packet one-way delay: 33.047 ms
  Loss rate: 0.78%
-- Flow 1:
  Average throughput: 11.13 Mbit/s
  95th percentile per-packet one-way delay: 33.047 ms
  Loss rate: 0.78%
Run 1: Report of TaoVA-100x — Data Link
Run 2: Statistics of TaoVA-100x

End at: 2019-03-18 22:24:52

# Below is generated by plot.py at 2019-03-18 22:40:07
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.14 Mbit/s (92.8% utilization)
95th percentile per-packet one-way delay: 33.023 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 11.14 Mbit/s
95th percentile per-packet one-way delay: 33.023 ms
Loss rate: 0.79%
Run 2: Report of TaoVA-100x — Data Link
Run 3: Statistics of TaoVA-100x

Start at: 2019-03-18 22:36:51
End at: 2019-03-18 22:37:21

# Below is generated by plot.py at 2019-03-18 22:40:08
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.12 Mbit/s (92.7% utilization)
95th percentile per-packet one-way delay: 32.985 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 11.12 Mbit/s
95th percentile per-packet one-way delay: 32.985 ms
Loss rate: 0.82%
Run 3: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.20 Mbit/s)  Flow 1 egress (mean 11.12 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 32.98 ms)
Run 1: Statistics of TCP Vegas

Start at: 2019-03-18 22:03:31
End at: 2019-03-18 22:04:01

# Below is generated by plot.py at 2019-03-18 22:40:08
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.47 Mbit/s (70.6% utilization)
  95th percentile per-packet one-way delay: 34.008 ms
  Loss rate: 0.28%
-- Flow 1:
  Average throughput: 8.47 Mbit/s
  95th percentile per-packet one-way delay: 34.008 ms
  Loss rate: 0.28%
Run 1: Report of TCP Vegas — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 8.48 Mbit/s)  Flow 1 egress (mean 8.47 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 34.01 ms)
Run 2: Statistics of TCP Vegas

Start at: 2019-03-18 22:16:04
End at: 2019-03-18 22:16:34

# Below is generated by plot.py at 2019-03-18 22:40:08
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.58 Mbit/s (71.5% utilization)
  95th percentile per-packet one-way delay: 34.307 ms
  Loss rate: 0.18%
-- Flow 1:
  Average throughput: 8.58 Mbit/s
  95th percentile per-packet one-way delay: 34.307 ms
  Loss rate: 0.18%
Run 2: Report of TCP Vegas — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 8.59 Mbit/s)  Flow 1 egress (mean 8.58 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 34.31 ms)
Run 3: Statistics of TCP Vegas

End at: 2019-03-18 22:29:01

# Below is generated by plot.py at 2019-03-18 22:40:08
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.71 Mbit/s (72.6% utilization)
  95th percentile per-packet one-way delay: 34.357 ms
  Loss rate: 0.27%
-- Flow 1:
  Average throughput: 8.71 Mbit/s
  95th percentile per-packet one-way delay: 34.357 ms
  Loss rate: 0.27%
Run 3: Report of TCP Vegas — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 8.73 Mbit/s)  Flow 1 egress (mean 8.71 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 34.36 ms)
Run 1: Statistics of Verus

Start at: 2019-03-18 22:04:42
End at: 2019-03-18 22:05:12

# Below is generated by plot.py at 2019-03-18 22:40:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.92 Mbit/s (49.3% utilization)
95th percentile per-packet one-way delay: 38.094 ms
Loss rate: 98.46%
-- Flow 1:
Average throughput: 5.92 Mbit/s
95th percentile per-packet one-way delay: 38.094 ms
Loss rate: 98.46%
Run 1: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 38.396 Mbit/s)  Flow 1 egress (mean 5.92 Mbit/s)

Flow 1 (95th percentile 38.09 ms)
Run 2: Statistics of Verus

Start at: 2019-03-18 22:17:15
End at: 2019-03-18 22:17:45

# Below is generated by plot.py at 2019-03-18 22:40:27
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 4.98 Mbit/s (41.5% utilization)
  95th percentile per-packet one-way delay: 37.979 ms
  Loss rate: 94.19%
-- Flow 1:
  Average throughput: 4.98 Mbit/s
  95th percentile per-packet one-way delay: 37.979 ms
  Loss rate: 94.19%
Run 2: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 85.68 Mbit/s)  Flow 1 egress (mean 4.98 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 37.98 ms)
Run 3: Statistics of Verus

Start at: 2019-03-18 22:29:43
End at: 2019-03-18 22:30:13

# Below is generated by plot.py at 2019-03-18 22:40:27
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 5.10 Mbit/s (42.5% utilization)
  95th percentile per-packet one-way delay: 38.091 ms
  Loss rate: 96.74%
-- Flow 1:
  Average throughput: 5.10 Mbit/s
  95th percentile per-packet one-way delay: 38.091 ms
  Loss rate: 96.74%
Run 3: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 155.91 Mbit/s)  Flow 1 egress (mean 5.10 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 38.09 ms)
Run 1: Statistics of PCC-Vivace

Start at: 2019-03-18 22:02:20
End at: 2019-03-18 22:02:50

# Below is generated by plot.py at 2019-03-18 22:40:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.95 Mbit/s (91.2% utilization)
95th percentile per-packet one-way delay: 35.322 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 10.95 Mbit/s
95th percentile per-packet one-way delay: 35.322 ms
Loss rate: 0.30%
Run 1: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 10.97 Mbit/s)  Flow 1 egress (mean 10.95 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 35.32 ms)
Run 2: Statistics of PCC-Vivace

End at: 2019-03-18 22:15:23

# Below is generated by plot.py at 2019-03-18 22:40:27
# Datalink statistics
-- Total of 1 flow:
   Average capacity: 12.00 Mbit/s
   Average throughput: 10.80 Mbit/s (90.0% utilization)
   95th percentile per-packet one-way delay: 34.869 ms
   Loss rate: 0.18%
-- Flow 1:
   Average throughput: 10.80 Mbit/s
   95th percentile per-packet one-way delay: 34.869 ms
   Loss rate: 0.18%
Run 2: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 10.81 Mbit/s)     Flow 1 egress (mean 10.80 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 34.87 ms)
Run 3: Statistics of PCC-Vivace

End at: 2019-03-18 22:27:50

# Below is generated by plot.py at 2019-03-18 22:40:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.90 Mbit/s (90.8% utilization)
95th percentile per-packet one-way delay: 35.333 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 10.90 Mbit/s
95th percentile per-packet one-way delay: 35.333 ms
Loss rate: 0.28%
Run 3: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

0  1  2  3  4  5  6  7  8  9  10  11  12
0   5    10   15   20   25   30   35
Time (s)

Flow 1 ingress (mean 10.92 Mbit/s)  Flow 1 egress (mean 10.90 Mbit/s)

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

0  10  20  30  40  50  60  70  80  90  100
0   5    10   15   20   25   30   35   40
Time (s)

Flow 1 (95th percentile 35.33 ms)
Run 1: Statistics of WebRTC media

Start at: 2019-03-18 22:01:45
End at: 2019-03-18 22:02:15

# Below is generated by plot.py at 2019-03-18 22:40:27
# 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: 33.996 ms
  Loss rate: 7.80%
-- Flow 1:
  Average throughput: 0.05 Mbit/s
  95th percentile per-packet one-way delay: 33.996 ms
  Loss rate: 7.80%
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 34.00 ms)
Run 2: Statistics of WebRTC media

Start at: 2019-03-18 22:14:17
End at: 2019-03-18 22:14:47

# Below is generated by plot.py at 2019-03-18 22:40:27
# 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: 34.631 ms
Loss rate: 7.85%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 34.631 ms
Loss rate: 7.85%
Run 2: Report of WebRTC media — Data Link

![Graph showing throughput over time]

Average capacity 12.00 Mbit/s (shaded region)

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

![Graph showing packet delay over time]

Per packet one-way delay (ms)

- Flow 1 (95th percentile 34.63 ms)
Run 3: Statistics of WebRTC media

Start at: 2019-03-18 22:26:45
End at: 2019-03-18 22:27:15

# Below is generated by plot.py at 2019-03-18 22:40:27
# 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: 33.511 ms
  Loss rate: 7.80%
-- Flow 1:
  Average throughput: 0.05 Mbit/s
  95th percentile per-packet one-way delay: 33.511 ms
  Loss rate: 7.80%
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 33.51 ms)