Pantheon Report

Generated at 2019-03-18 22:40:45 (UTC).
Tested in mahimahi: mm-delay 30 mm-link 12mbps.trace 12mbps.trace
--uplink-queue=droptail --uplink-queue-args=bytes=90000
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 @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa9e93b032143ceddbfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0edbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 5ce721187ad823da20955337730c746486ca4966
third_party/pantheon-tunnel @ f8663f58d27af9d42717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b23c091a55f8ec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08d8f9b24e2f49f74ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cf942
third_party/scream-reproduce @ f099118d1421a3131bf11ff1964974e1da3dbb2
M src/ScreeClient
M src/ScreeServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f91a26
M src/examples/simplim.cc
M src/examples/sproutb2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9d6e4735770d143a1fa2851
local test in mahimahi, 3 runs of 30s each per scheme
(mean of all runs by scheme)
local test in mahimahi, 3 runs of 30s each per scheme

![Graph showing performance metrics for various schemes](image-url)
<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>11.69</td>
<td>88.73</td>
<td>1.89</td>
</tr>
<tr>
<td>Copa</td>
<td>3</td>
<td>11.01</td>
<td>48.30</td>
<td>0.15</td>
</tr>
<tr>
<td>TCP Cubic</td>
<td>3</td>
<td>11.93</td>
<td>88.23</td>
<td>0.50</td>
</tr>
<tr>
<td>FillP</td>
<td>3</td>
<td>11.74</td>
<td>65.28</td>
<td>0.92</td>
</tr>
<tr>
<td>FillP-Sheep</td>
<td>3</td>
<td>10.80</td>
<td>54.09</td>
<td>0.79</td>
</tr>
<tr>
<td>Indigo</td>
<td>3</td>
<td>11.21</td>
<td>39.58</td>
<td>0.13</td>
</tr>
<tr>
<td>Indigo-MusesC3</td>
<td>3</td>
<td>11.53</td>
<td>55.57</td>
<td>0.19</td>
</tr>
<tr>
<td>Indigo-MusesC5</td>
<td>3</td>
<td>10.70</td>
<td>87.96</td>
<td>8.58</td>
</tr>
<tr>
<td>Indigo-MusesD</td>
<td>3</td>
<td>7.18</td>
<td>88.54</td>
<td>2.60</td>
</tr>
<tr>
<td>Indigo-MusesT</td>
<td>3</td>
<td>11.29</td>
<td>90.33</td>
<td>13.68</td>
</tr>
<tr>
<td>LEDBAT</td>
<td>3</td>
<td>10.83</td>
<td>88.85</td>
<td>0.22</td>
</tr>
<tr>
<td>PCC-Allegro</td>
<td>3</td>
<td>9.97</td>
<td>38.35</td>
<td>0.81</td>
</tr>
<tr>
<td>PCC-Expr</td>
<td>3</td>
<td>11.00</td>
<td>80.37</td>
<td>1.17</td>
</tr>
<tr>
<td>QUIC Cubic</td>
<td>3</td>
<td>11.74</td>
<td>89.55</td>
<td>0.92</td>
</tr>
<tr>
<td>SCReAM</td>
<td>3</td>
<td>0.21</td>
<td>31.85</td>
<td>0.09</td>
</tr>
<tr>
<td>Sprout</td>
<td>3</td>
<td>6.24</td>
<td>55.38</td>
<td>0.13</td>
</tr>
<tr>
<td>TaoVA-100x</td>
<td>3</td>
<td>11.17</td>
<td>33.37</td>
<td>0.62</td>
</tr>
<tr>
<td>TCP Vegas</td>
<td>3</td>
<td>11.90</td>
<td>38.30</td>
<td>0.34</td>
</tr>
<tr>
<td>Verus</td>
<td>3</td>
<td>10.56</td>
<td>89.32</td>
<td>24.30</td>
</tr>
<tr>
<td>PCC-Vivace</td>
<td>3</td>
<td>10.79</td>
<td>61.00</td>
<td>0.34</td>
</tr>
<tr>
<td>WebRTC media</td>
<td>3</td>
<td>0.05</td>
<td>41.17</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Run 1: Statistics of TCP BBR

Start at: 2019-03-18 22:02:21
End at: 2019-03-18 22:02:51

# 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: 11.68 Mbit/s (97.4% utilization)
95th percentile per-packet one-way delay: 88.916 ms
Loss rate: 1.84%

-- Flow 1:
Average throughput: 11.68 Mbit/s
95th percentile per-packet one-way delay: 88.916 ms
Loss rate: 1.84%
Run 1: Report of TCP BBR — Data Link
Run 2: Statistics of TCP BBR

Start at: 2019-03-18 22:14:51
End at: 2019-03-18 22:15:21

# 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: 11.69 Mbit/s (97.4% utilization)
95th percentile per-packet one-way delay: 88.720 ms
Loss rate: 1.91%
-- Flow 1:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 88.720 ms
Loss rate: 1.91%
Run 2: Report of TCP BBR — Data Link

![Graph showing network performance metrics]

- Average capacity 12.00 Mbit/s (shaded region)
- Time (s) on x-axis
- Throughput (Mbit/s) on y-axis
- Two lines indicating flow ingress and egress with specified mean values

![Graph showing packet round-trip delay]

- Time (s) on x-axis
- Packet round-trip delay on y-axis
- Flow 1 (95th percentile 88.72 ms)
Run 3: Statistics of TCP BBR

End at: 2019-03-18 22:27:51

# 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: 11.69 Mbit/s (97.4% utilization)
95th percentile per-packet one-way delay: 88.546 ms
Loss rate: 1.91%
-- Flow 1:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 88.546 ms
Loss rate: 1.91%
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 11.90 Mbit/s)**

**Flow 1 egress (mean 11.69 Mbit/s)**

Per-packet one-way delay (ms)

Time (s)

**Flow 1 (95th percentile 88.55 ms)**
Run 1: Statistics of Copa

Start at: 2019-03-18 22:06:31
End at: 2019-03-18 22:07:01

# 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: 11.09 Mbit/s (92.4% utilization)
  95th percentile per-packet one-way delay: 48.687 ms
  Loss rate: 0.35%
-- Flow 1:
  Average throughput: 11.09 Mbit/s
  95th percentile per-packet one-way delay: 48.687 ms
  Loss rate: 0.35%
Run 1: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.11 Mbit/s)  Flow 1 egress (mean 11.09 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 48.69 ms)
Run 2: Statistics of Copa

Start at: 2019-03-18 22:19:01
End at: 2019-03-18 22:19:31

# 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: 11.01 Mbit/s (91.8% utilization)
95th percentile per-packet one-way delay: 46.592 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 11.01 Mbit/s
95th percentile per-packet one-way delay: 46.592 ms
Loss rate: 0.06%
Run 2: Report of Copa — Data Link
Run 3: Statistics of Copa

End at: 2019-03-18 22:32:01

# 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: 10.92 Mbit/s (91.0% utilization)
95th percentile per-packet one-way delay: 49.630 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 10.92 Mbit/s
95th percentile per-packet one-way delay: 49.630 ms
Loss rate: 0.03%
Run 3: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.91 Mbit/s)  Flow 1 egress (mean 10.92 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 49.63 ms)

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Run 1: Statistics of TCP Cubic

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 22:38:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.93 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 88.455 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 11.93 Mbit/s
95th percentile per-packet one-way delay: 88.455 ms
Loss rate: 0.50%
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 11.97 Mbit/s)  Flow 1 egress (mean 11.93 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 88.45 ms)
Run 2: Statistics of TCP Cubic

Start at: 2019-03-18 22:14:15
End at: 2019-03-18 22:14:45

# 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: 11.93 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 88.115 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 11.93 Mbit/s
95th percentile per-packet one-way delay: 88.115 ms
Loss rate: 0.50%
Run 2: Report of TCP Cubic — Data Link

![Graph showing throughput over time with shaded region indicating average capacity of 12.00 Mbps.]

Average capacity 12.00 Mbps (shaded region)

![Graph showing per packet one way delay over time for Flow 1 with a 95th percentile of 88.11 ms.]

Flow 1 ingress (mean 11.97 Mbps)  Flow 1 egress (mean 11.93 Mbps)

Flow 1 (95th percentile 88.11 ms)
Run 3: Statistics of TCP Cubic

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 22:38:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.93 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 88.121 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 11.93 Mbit/s
95th percentile per-packet one-way delay: 88.121 ms
Loss rate: 0.50%
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 11.97 Mbit/s)  Flow 1 egress (mean 11.93 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 88.12 ms)
Run 1: Statistics of FillP

Start at: 2019-03-18 22:07:43
End at: 2019-03-18 22:08:13

# Below is generated by plot.py at 2019-03-18 22:38:30
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.73 Mbit/s (97.7% utilization)
  95th percentile per-packet one-way delay: 63.412 ms
  Loss rate: 0.91%
-- Flow 1:
  Average throughput: 11.73 Mbit/s
  95th percentile per-packet one-way delay: 63.412 ms
  Loss rate: 0.91%
Run 1: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (MB/s)

Time (s)

Flow 1 ingress (mean 11.82 Mbit/s)  Flow 1 egress (mean 11.73 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 63.41 ms)
Run 2: Statistics of FillP

Start at: 2019-03-18 22:20:12
End at: 2019-03-18 22:20:42

# Below is generated by plot.py at 2019-03-18 22:38:30
# 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: 64.600 ms
  Loss rate: 0.92%
-- Flow 1:
  Average throughput: 11.75 Mbit/s
  95th percentile per-packet one-way delay: 64.600 ms
  Loss rate: 0.92%
Run 2: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.84 Mbit/s)  Flow 1 egress (mean 11.75 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 64.60 ms)
Run 3: Statistics of FillP

Start at: 2019-03-18 22:32:42

# Below is generated by plot.py at 2019-03-18 22:38:31
# 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: 67.814 ms
Loss rate: 0.94%
--- Flow 1:
Average throughput: 11.75 Mbit/s
95th percentile per-packet one-way delay: 67.814 ms
Loss rate: 0.94%
Run 3: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.85 Mbit/s)  Flow 1 egress (mean 11.75 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 67.81 ms)
Run 1: Statistics of FillP-Sheep

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

# Below is generated by plot.py at 2019-03-18 22:38:31
# 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: 54.258 ms
  Loss rate: 0.81%
-- Flow 1:
  Average throughput: 10.86 Mbit/s
  95th percentile per-packet one-way delay: 54.258 ms
  Loss rate: 0.81%
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 10.94 Mbit/s)  Flow 1 egress (mean 10.86 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 54.26 ms)
Run 2: Statistics of FillP-Sheep

Start at: 2019-03-18 22:12:28
End at: 2019-03-18 22:12:58

# Below is generated by plot.py at 2019-03-18 22:38:40
# 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: 54.799 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 10.95 Mbit/s
95th percentile per-packet one-way delay: 54.799 ms
Loss rate: 0.78%
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 11.62 Mbit/s)  Flow 1 egress (mean 10.95 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 54.80 ms)
Run 3: Statistics of FillP-Sheep


# Below is generated by plot.py at 2019-03-18 22:38:40
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.58 Mbit/s (88.1% utilization)
  95th percentile per-packet one-way delay: 53.213 ms
  Loss rate: 0.77%
-- Flow 1:
  Average throughput: 10.58 Mbit/s
  95th percentile per-packet one-way delay: 53.213 ms
  Loss rate: 0.77%
Run 3: Report of FillP-Sheep — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.64 Mbit/s)  Flow 1 egress (mean 10.58 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 53.21 ms)
Run 1: Statistics of Indigo

Start at: 2019-03-18 22:10:06
End at: 2019-03-18 22:10:36

# Below is generated by plot.py at 2019-03-18 22:38:40
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.66 Mbit/s (97.1% utilization)
  95th percentile per-packet one-way delay: 36.784 ms
  Loss rate: 0.13%
-- Flow 1:
  Average throughput: 11.66 Mbit/s
  95th percentile per-packet one-way delay: 36.784 ms
  Loss rate: 0.13%
Run 1: Report of Indigo — Data Link
Run 2: Statistics of Indigo

End at: 2019-03-18 22:23:06

# Below is generated by plot.py at 2019-03-18 22:38:46
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.49 Mbit/s (87.4% utilization)
  95th percentile per-packet one-way delay: 39.815 ms
  Loss rate: 0.13%
-- Flow 1:
  Average throughput: 10.49 Mbit/s
  95th percentile per-packet one-way delay: 39.815 ms
  Loss rate: 0.13%
Run 2: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

0 2 4 6 8 10 12

Time (s)

0 5 10 15 20 25 30 35

Flow 1 ingress (mean 10.49 Mbit/s)
Flow 1 egress (mean 10.49 Mbit/s)

Per-packet one way delay (ms)

30 40 50 60 70 80 90

Time (s)

0 5 10 15 20 25 30

Flow 1 (95th percentile 39.81 ms)
Run 3: Statistics of Indigo

Start at: 2019-03-18 22:35:06
End at: 2019-03-18 22:35:36

# 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: 11.48 Mbit/s (95.7% utilization)
95th percentile per-packet one-way delay: 42.149 ms
Loss rate: 0.13%

-- Flow 1:
Average throughput: 11.48 Mbit/s
95th percentile per-packet one-way delay: 42.149 ms
Loss rate: 0.13%
Run 3: Report of Indigo — Data Link

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

![Graph 2: Per-packet end-to-end delay (ms)]
Run 1: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:09:30
End at: 2019-03-18 22:10:00

# Below is generated by plot.py at 2019-03-18 22:38:54
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.63 Mbit/s (96.9% utilization)
  95th percentile per-packet one-way delay: 62.791 ms
  Loss rate: 0.21%
-- Flow 1:
  Average throughput: 11.63 Mbit/s
  95th percentile per-packet one-way delay: 62.791 ms
  Loss rate: 0.21%
Run 1: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.64 Mbit/s)  Flow 1 egress (mean 11.63 Mbit/s)

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

Flow 1 (95th percentile 62.79 ms)
Run 2: Statistics of Indigo-MusesC3

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

# Below is generated by plot.py at 2019-03-18 22:38:54
# 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: 64.291 ms
  Loss rate: 0.25%
-- Flow 1:
  Average throughput: 11.62 Mbit/s
  95th percentile per-packet one-way delay: 64.291 ms
  Loss rate: 0.25%
Run 2: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.63 Mbit/s)  Flow 1 egress (mean 11.62 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 64.29 ms)
Run 3: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:34:30
End at: 2019-03-18 22:35:00

# Below is generated by plot.py at 2019-03-18 22:38:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.34 Mbit/s (94.5% utilization)
95th percentile per-packet one-way delay: 39.620 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 11.34 Mbit/s
95th percentile per-packet one-way delay: 39.620 ms
Loss rate: 0.12%
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 11.34 Mbit/s)  Flow 1 egress (mean 11.34 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 39.62 ms)
Run 1: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:01:09
End at: 2019-03-18 22:01:40

# Below is generated by plot.py at 2019-03-18 22:39:01
# 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: 88.009 ms
  Loss rate: 10.93%
-- Flow 1:
  Average throughput: 10.82 Mbit/s
  95th percentile per-packet one-way delay: 88.009 ms
  Loss rate: 10.93%
Run 1: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 12.14 Mbit/s)  Flow 1 egress (mean 10.82 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 88.01 ms)
Run 2: Statistics of Indigo-MusesC5

End at: 2019-03-18 22:14:09

# Below is generated by plot.py at 2019-03-18 22:39:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.56 Mbit/s (88.0% utilization)
95th percentile per-packet one-way delay: 87.716 ms
Loss rate: 7.81%
-- Flow 1:
Average throughput: 10.56 Mbit/s
95th percentile per-packet one-way delay: 87.716 ms
Loss rate: 7.81%
Run 2: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbits (shaded region)

Flow 1 ingress (mean 11.44 Mbit/s)  Flow 1 egress (mean 10.56 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 87.72 ms)
Run 3: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:26:09
End at: 2019-03-18 22:26:39

# 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: 10.71 Mbit/s (89.2% utilization)
95th percentile per-packet one-way delay: 88.166 ms
Loss rate: 6.99%
-- Flow 1:
Average throughput: 10.71 Mbit/s
95th percentile per-packet one-way delay: 88.166 ms
Loss rate: 6.99%
Run 3: Report of Indigo-MusesC5 — Data Link
Run 1: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:05:55
End at: 2019-03-18 22:06:25

# Below is generated by plot.py at 2019-03-18 22:39:10
# Datalink statistics
   -- Total of 1 flow:
   Average capacity: 12.00 Mbit/s
   Average throughput: 11.67 Mbit/s (97.2% utilization)
   95th percentile per-packet one-way delay: 89.679 ms
   Loss rate: 1.29%
   -- Flow 1:
   Average throughput: 11.67 Mbit/s
   95th percentile per-packet one-way delay: 89.679 ms
   Loss rate: 1.29%
Run 2: Statistics of Indigo-MusesD

End at: 2019-03-18 22:18:55

# Below is generated by plot.py at 2019-03-18 22:39:10
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.67 Mbit/s (38.9% utilization)
95th percentile per-packet one-way delay: 88.433 ms
Loss rate: 3.17%
-- Flow 1:
Average throughput: 4.67 Mbit/s
95th percentile per-packet one-way delay: 88.433 ms
Loss rate: 3.17%
Run 2: Report of Indigo-MusesD — Data Link

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

- **Flow 1 ingress (mean 4.82 Mbit/s)**
- **Flow 1 egress (mean 4.67 Mbit/s)**

![Graph showing per packet one-way delay over time.]

- **Flow 1 (95th percentile 88.43 ms)**

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Run 3: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:30:55
End at: 2019-03-18 22:31:25

# Below is generated by plot.py at 2019-03-18 22:39:10
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.20 Mbit/s (43.3% utilization)
95th percentile per-packet one-way delay: 87.494 ms
Loss rate: 3.33%
-- Flow 1:
Average throughput: 5.20 Mbit/s
95th percentile per-packet one-way delay: 87.494 ms
Loss rate: 3.33%
Run 3: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 5.38 Mbit/s)  Flow 1 egress (mean 5.20 Mbit/s)

Per-packet one-way delay (ms)

Flow 1 (95th percentile 87.49 ms)
Run 1: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:10:41
End at: 2019-03-18 22:11:12

# Below is generated by plot.py at 2019-03-18 22:39:15
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.30 Mbit/s (94.2% utilization)
  95th percentile per-packet one-way delay: 90.433 ms
  Loss rate: 13.21%
-- Flow 1:
  Average throughput: 11.30 Mbit/s
  95th percentile per-packet one-way delay: 90.433 ms
  Loss rate: 13.21%
Run 1: Report of Indigo-MusesT — Data Link
Run 2: Statistics of Indigo-MusesT


# 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: 11.31 Mbit/s (94.3% utilization)
    95th percentile per-packet one-way delay: 90.525 ms
    Loss rate: 15.99%
-- Flow 1:
    Average throughput: 11.31 Mbit/s
    95th percentile per-packet one-way delay: 90.525 ms
    Loss rate: 15.99%
Run 2: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 13.46 Mbit/s)  Flow 1 egress (mean 11.31 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 90.53 ms)
Run 3: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:35:41
End at: 2019-03-18 22:36:11

# Below is generated by plot.py at 2019-03-18 22:39:23
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.26 Mbit/s (93.8% utilization)
95th percentile per-packet one-way delay: 90.042 ms
Loss rate: 11.84%
-- Flow 1:
Average throughput: 11.26 Mbit/s
95th percentile per-packet one-way delay: 90.042 ms
Loss rate: 11.84%
Run 3: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 12.76 Mbit/s)  Flow 1 egress (mean 11.26 Mbit/s)

Per-packet one way delay (ms)

Flow 1 (95th percentile 90.04 ms)
Run 1: Statistics of LEDBAT

Start at: 2019-03-18 22:04:09
End at: 2019-03-18 22:04:39

# Below is generated by plot.py at 2019-03-18 22:39:24
# 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: 88.858 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 10.82 Mbit/s
95th percentile per-packet one-way delay: 88.858 ms
Loss rate: 0.22%
Run 1: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.84 Mbit/s)  Flow 1 egress (mean 10.82 Mbit/s)

Packet delay (ms)

Time (s)

Flow 1 (95th percentile 88.86 ms)
Run 2: Statistics of LEDBAT

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

# Below is generated by plot.py at 2019-03-18 22:39:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.83 Mbit/s (90.3% utilization)
95th percentile per-packet one-way delay: 88.809 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 10.83 Mbit/s
95th percentile per-packet one-way delay: 88.809 ms
Loss rate: 0.21%
Run 2: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

**Throughput (Mbps)**

**Time (s)**

- **Flow 1 ingress** (mean 10.84 Mbit/s)
- **Flow 1 egress** (mean 10.83 Mbit/s)

**Per Packet one way delay (ms)**

- **Flow 1 (95th percentile 88.81 ms)**
Run 3: Statistics of LEDBAT

Start at: 2019-03-18 22:29:08
End at: 2019-03-18 22:29:39

# Below is generated by plot.py at 2019-03-18 22:39:29
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.83 Mbit/s (90.2% utilization)
  95th percentile per-packet one-way delay: 88.894 ms
  Loss rate: 0.22%
-- Flow 1:
  Average throughput: 10.83 Mbit/s
  95th percentile per-packet one-way delay: 88.894 ms
  Loss rate: 0.22%
Run 3: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.84 Mbit/s)  Flow 1 egress (mean 10.83 Mbit/s)

Per Packet one way Delay (ms)

Time (s)

Flow 1 (95th percentile 80.89 ms)
Run 1: Statistics of PCC-Allegro

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

# Below is generated by plot.py at 2019-03-18 22:39:31
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.41 Mbit/s (86.8% utilization)
  95th percentile per-packet one-way delay: 36.673 ms
  Loss rate: 0.72%
-- Flow 1:
  Average throughput: 10.41 Mbit/s
  95th percentile per-packet one-way delay: 36.673 ms
  Loss rate: 0.72%
Run 1: Report of PCC-Allegro — Data Link

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

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

Flow 1 ingress (mean 10.48 Mbit/s)  Flow 1 egress (mean 10.41 Mbit/s)

Flow 1 (95th percentile 36.67 ms)
Run 2: Statistics of PCC-Allegro

End at: 2019-03-18 22:20:07

# Below is generated by plot.py at 2019-03-18 22:39:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.15 Mbit/s (76.2% utilization)
95th percentile per-packet one-way delay: 33.021 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 9.15 Mbit/s
95th percentile per-packet one-way delay: 33.021 ms
Loss rate: 0.90%
Run 2: Report of PCC-AlLEGRO — Data Link
Run 3: Statistics of PCC-Allegro

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 22:39:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.36 Mbit/s (86.3% utilization)
95th percentile per-packet one-way delay: 45.362 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 10.36 Mbit/s
95th percentile per-packet one-way delay: 45.362 ms
Loss rate: 0.82%
Run 3: Report of PCC-Allegro — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 10.43 Mbit/s)  Flow 1 egress (mean 10.36 Mbit/s)

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

Flow 1 (95th percentile 45.36 ms)
Run 1: Statistics of PCC-Expr

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 22:39:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.89 Mbit/s (90.8% utilization)
95th percentile per-packet one-way delay: 83.488 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 10.89 Mbit/s
95th percentile per-packet one-way delay: 83.488 ms
Loss rate: 0.53%
Run 1: Report of PCC-Expr — Data Link

![Graph 1](chart1.png)

*Average capacity 12.00 Mbit/s (shaded region)*

*Flow 1 ingress (mean 10.94 Mbit/s)  Flow 1 egress (mean 10.89 Mbit/s)*

![Graph 2](chart2.png)

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

*Flow 1 (95th percentile 83.49 ms)*
Run 2: Statistics of PCC-Expr


# Below is generated by plot.py at 2019-03-18 22:40:00
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.27 Mbit/s (93.9% utilization)
  95th percentile per-packet one-way delay: 91.071 ms
  Loss rate: 2.69%
-- Flow 1:
  Average throughput: 11.27 Mbit/s
  95th percentile per-packet one-way delay: 91.071 ms
  Loss rate: 2.69%
Run 2: Report of PCC-Expr — 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 11.57 Mbit/s)  Flow 1 egress (mean 11.27 Mbit/s)

Per Packet one-way Delay (ms)

0  10  20  30  40  50  60  70  80  90  100  Time (s)

Flow 1 (95th percentile 91.07 ms)
Run 3: Statistics of PCC-Expr

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

# Below is generated by plot.py at 2019-03-18 22:40:00
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.83 Mbit/s (90.2% utilization)
95th percentile per-packet one-way delay: 66.556 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 10.83 Mbit/s
95th percentile per-packet one-way delay: 66.556 ms
Loss rate: 0.29%
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 10.85 Mbit/s)  Flow 1 egress (mean 10.83 Mbit/s)

Packet per segment (ms)

Time (s)

Flow 1 (95th percentile 66.56 ms)
Run 1: Statistics of QUIC Cubic

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

# Below is generated by plot.py at 2019-03-18 22:40:00
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.74 Mbit/s (97.8% utilization)
  95th percentile per-packet one-way delay: 89.547 ms
  Loss rate: 0.89%
-- Flow 1:
  Average throughput: 11.74 Mbit/s
  95th percentile per-packet one-way delay: 89.547 ms
  Loss rate: 0.89%
Run 1: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.83 Mbit/s)  Flow 1 egress (mean 11.74 Mbit/s)

Per Gadget one way delay (ms)

Flow 1 (95th percentile 89.55 ms)
Run 2: Statistics of QUIC Cubic

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

# Below is generated by plot.py at 2019-03-18 22:40:00
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.73 Mbit/s (97.8% utilization)
  95th percentile per-packet one-way delay: 89.579 ms
  Loss rate: 0.92%
-- Flow 1:
  Average throughput: 11.73 Mbit/s
  95th percentile per-packet one-way delay: 89.579 ms
  Loss rate: 0.92%
Run 2: Report of QUIC Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.83 Mbit/s)  Flow 1 egress (mean 11.73 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 89.58 ms)
Run 3: Statistics of QUIC Cubic

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 22:40:00
# 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: 89.526 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 11.75 Mbit/s
95th percentile per-packet one-way delay: 89.526 ms
Loss rate: 0.94%
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 11.85 Mbit/s)  Flow 1 egress (mean 11.75 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 89.53 ms)
Run 1: Statistics of SCReAM

Start at: 2019-03-18 22:11:17
End at: 2019-03-18 22:11:47

# Below is generated by plot.py at 2019-03-18 22:40:00
# 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: 31.853 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 31.853 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 oneway delay (ms)

Time (s)

Flow 1 (95th percentile 31.85 ms)
Run 2: Statistics of SCReAM

End at: 2019-03-18 22:24:17

# Below is generated by plot.py at 2019-03-18 22:40:00
# 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: 31.846 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 31.846 ms
Loss rate: 0.13%
Run 2: Report of SCReAM — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

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

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

Time (s)

Flow 1 (95th percentile 31.85 ms)
Run 3: Statistics of SCReAM

Start at: 2019-03-18 22:36:17
End at: 2019-03-18 22:36:47

# Below is generated by plot.py at 2019-03-18 22:40:00
# 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: 31.840 ms
  Loss rate: 0.00%
-- Flow 1:
  Average throughput: 0.21 Mbit/s
  95th percentile per-packet one-way delay: 31.840 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 0.21 Mbit/s)  Flow 1 egress (mean 0.21 Mbit/s)

Per packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 31.84 ms)
Run 1: Statistics of Sprout

Start at: 2019-03-18 22:11:52
End at: 2019-03-18 22:12:22

# Below is generated by plot.py at 2019-03-18 22:40:03
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 6.47 Mbit/s (53.9% utilization)
95th percentile per-packet one-way delay: 55.666 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 6.47 Mbit/s
95th percentile per-packet one-way delay: 55.666 ms
Loss rate: 0.20%
Run 1: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Throughput (Mbit/s)

Flow 1 ingress (mean 6.47 Mbit/s)  Flow 1 egress (mean 6.47 Mbit/s)

Per packet round-trip delay (ms)

Flow 1 (95th percentile 55.67 ms)
Run 2: Statistics of Sprout

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

# Below is generated by plot.py at 2019-03-18 22:40:03
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 6.04 Mbit/s (50.3% utilization)
95th percentile per-packet one-way delay: 55.202 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 6.04 Mbit/s
95th percentile per-packet one-way delay: 55.202 ms
Loss rate: 0.14%
Run 2: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 6.04 Mbit/s) Flow 1 egress (mean 6.04 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 55.20 ms)
Run 3: Statistics of Sprout

Start at: 2019-03-18 22:36:52  
End at: 2019-03-18 22:37:22

# 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: 6.21 Mbit/s (51.7% utilization)  
95th percentile per-packet one-way delay: 55.271 ms  
Loss rate: 0.04%  
-- Flow 1:  
Average throughput: 6.21 Mbit/s  
95th percentile per-packet one-way delay: 55.271 ms  
Loss rate: 0.04%
Run 3: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 6.20 Mbit/s)  Flow 1 egress (mean 6.21 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 55.27 ms)
Run 1: Statistics of TaoVA-100x

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 22:40:29
# 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: 33.293 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 11.16 Mbit/s
95th percentile per-packet one-way delay: 33.293 ms
Loss rate: 0.58%
Run 1: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

0 5 10 15 20 25 30 35
0 2 4 6 8 10 12

Time (s)

Flow 1 ingress (mean 11.22 Mbit/s)  Flow 1 egress (mean 11.16 Mbit/s)

Per-packet one-way delay (ms)

0 5 10 15 20 25 30 35
30 40 50 60 70 80 90

Time (s)

Flow 1 (95th percentile 33.29 ms)
Run 2: Statistics of TaoVA-100x

Start at: 2019-03-18 22:15:26
End at: 2019-03-18 22:15:56

# Below is generated by plot.py at 2019-03-18 22:40:30
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.17 Mbit/s (93.1% utilization)
95th percentile per-packet one-way delay: 33.227 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 11.17 Mbit/s
95th percentile per-packet one-way delay: 33.227 ms
Loss rate: 0.71%
Run 2: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.24 Mbit/s)  Flow 1 egress (mean 11.17 Mbit/s)

Per-packet oneway delay (ms)

Time (s)

Flow 1 (95th percentile 33.23 ms)
Run 3: Statistics of TaoVA-100x

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

# Below is generated by plot.py at 2019-03-18 22:40:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.17 Mbit/s (93.1% utilization)
95th percentile per-packet one-way delay: 33.580 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 11.17 Mbit/s
95th percentile per-packet one-way delay: 33.580 ms
Loss rate: 0.58%
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 11.23 Mbit/s) Flow 1 egress (mean 11.17 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 33.58 ms)
Run 1: Statistics of TCP Vegas

Start at: 2019-03-18 22:04:45
End at: 2019-03-18 22:05:15

# Below is generated by plot.py at 2019-03-18 22:40:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.91 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 38.502 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 11.91 Mbit/s
95th percentile per-packet one-way delay: 38.502 ms
Loss rate: 0.25%
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 11.93 Mbit/s)  Flow 1 egress (mean 11.91 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 38.50 ms)
Run 2: Statistics of TCP Vegas

Start at: 2019-03-18 22:17:14
End at: 2019-03-18 22:17:44

# Below is generated by plot.py at 2019-03-18 22:40:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.89 Mbit/s (99.1% utilization)
95th percentile per-packet one-way delay: 37.964 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 11.89 Mbit/s
95th percentile per-packet one-way delay: 37.964 ms
Loss rate: 0.53%
Run 2: Report of TCP Vegas — Data Link

![Graph showing average capacity and throughput](image1)

**Average capacity 12.00 Mbit/s (shaded region)**

![Graph showing per-packet one-way delay](image2)

**Flow 1 ingress (mean 11.95 Mbit/s)  Flow 1 egress (mean 11.89 Mbit/s)**

**Flow 1 (95th percentile 37.96 ms)**

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Run 3: Statistics of TCP Vegas

End at: 2019-03-18 22:30:14

# Below is generated by plot.py at 2019-03-18 22:40:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.91 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 38.431 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 11.91 Mbit/s
95th percentile per-packet one-way delay: 38.431 ms
Loss rate: 0.25%
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 11.93 Mbit/s)  Flow 1 egress (mean 11.91 Mbit/s)

Per-packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 38.43 ms)
Run 1: Statistics of Verus

Start at: 2019-03-18 22:08:54
End at: 2019-03-18 22:09:24

# Below is generated by plot.py at 2019-03-18 22:40:31
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 9.33 Mbit/s (77.7% utilization)
  95th percentile per-packet one-way delay: 90.169 ms
  Loss rate: 44.41%
-- Flow 1:
  Average throughput: 9.33 Mbit/s
  95th percentile per-packet one-way delay: 90.169 ms
  Loss rate: 44.41%
Run 1: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 16.76 Mbit/s)
- Flow 1 egress (mean 9.33 Mbit/s)

Per packet one-way delay (ms)

- Flow 1 (95th percentile 90.17 ms)
Run 2: Statistics of Verus

End at: 2019-03-18 22:21:54

# Below is generated by plot.py at 2019-03-18 22:40:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.66 Mbit/s (97.2% utilization)
95th percentile per-packet one-way delay: 88.306 ms
Loss rate: 3.92%
-- Flow 1:
Average throughput: 11.66 Mbit/s
95th percentile per-packet one-way delay: 88.306 ms
Loss rate: 3.92%
Run 2: Report of Verus — Data Link
Run 3: Statistics of Verus

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 22:40:42
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.69 Mbit/s (89.0% utilization)
  95th percentile per-packet one-way delay: 89.484 ms
  Loss rate: 24.56%
-- Flow 1:
  Average throughput: 10.69 Mbit/s
  95th percentile per-packet one-way delay: 89.484 ms
  Loss rate: 24.56%
Run 3: Report of Verus — Data Link

![Graph showing average capacity and throughput over time, with shaded region indicating an average capacity of 12.00 Mbit/s.]

- **Flow 1 ingress** (mean 14.16 Mbit/s)
- **Flow 1 egress** (mean 10.69 Mbit/s)

![Graph showing per packet round-trip delay distribution, with several distinct latency bands and a 95th percentile of 89.48 ms.]
Run 1: Statistics of PCC-Vivace

Start at: 2019-03-18 22:03:33
End at: 2019-03-18 22:04:03

# Below is generated by plot.py at 2019-03-18 22:40:42
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.71 Mbit/s (89.3% utilization)
95th percentile per-packet one-way delay: 73.927 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 10.71 Mbit/s
95th percentile per-packet one-way delay: 73.927 ms
Loss rate: 0.44%
Run 1: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 10.75 Mbit/s)  Flow 1 egress (mean 10.71 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 73.93 ms)
Run 2: Statistics of PCC-Vivace

Start at: 2019-03-18 22:16:03
End at: 2019-03-18 22:16:33

# Below is generated by plot.py at 2019-03-18 22:40:43
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.81 Mbit/s (90.1% utilization)
  95th percentile per-packet one-way delay: 38.622 ms
  Loss rate: 0.11%
-- Flow 1:
  Average throughput: 10.81 Mbit/s
  95th percentile per-packet one-way delay: 38.622 ms
  Loss rate: 0.11%
Run 2: Report of PCC-Vivace — Data Link

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

- **Flow 1 ingress** (mean 10.81 Mbit/s)
- **Flow 1 egress** (mean 10.81 Mbit/s)

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

- **Flow 1** (95th percentile 38.62 ms)
Run 3: Statistics of PCC-Vivace

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

# Below is generated by plot.py at 2019-03-18 22:40:43
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.85 Mbit/s (90.4% utilization)
  95th percentile per-packet one-way delay: 70.449 ms
  Loss rate: 0.47%
-- Flow 1:
  Average throughput: 10.85 Mbit/s
  95th percentile per-packet one-way delay: 70.449 ms
  Loss rate: 0.47%
Run 3: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mb/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 10.89 Mb/s)  Flow 1 egress (mean 10.85 Mb/s)

Per-packet on-way delay (ms)

Time (s)

Flow 1 (95th percentile 70.45 ms)
Run 1: Statistics of WebRTC media

Start at: 2019-03-18 22:05:20
End at: 2019-03-18 22:05:50

# Below is generated by plot.py at 2019-03-18 22:40:43
# 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: 41.065 ms
  Loss rate: 0.00%
-- Flow 1:
  Average throughput: 0.05 Mbit/s
  95th percentile per-packet one-way delay: 41.065 ms
  Loss rate: 0.00%
Run 1: Report of WebRTC media — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 0.05 Mbit/s)  \hspace{1cm}  Flow 1 egress (mean 0.05 Mbit/s)

Per Packet one way delay (ms)

Flow 1 (95th percentile 41.06 ms)
Run 2: Statistics of WebRTC media

Start at: 2019-03-18 22:17:50
End at: 2019-03-18 22:18:20

# Below is generated by plot.py at 2019-03-18 22:40:43
# 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: 41.954 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 41.954 ms
Loss rate: 0.00%
Run 2: 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)

Flow 1 (95th percentile 41.95 ms)

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Run 3: Statistics of WebRTC media

Start at: 2019-03-18 22:30:20
End at: 2019-03-18 22:30:50

# Below is generated by plot.py at 2019-03-18 22:40:43
# 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: 40.502 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 40.502 ms
Loss rate: 0.00%
Run 3: 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 40.50 ms)