Pantheon Report

Tested in mahimahi: mm-delay 30 mm-link 12mbps.trace 12mbps.trace
--uplink-queue=droptail --uplink-queue-args=bytes=45000
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 @ d6da1459332fcee56963865d7e17ea6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa98e93b032143cedb5e5862f4
third_party/indigo @ 2601c92e4aa9d58d38cd4dfe0edc9b90c077e64d
third_party/libutp @ b3465b942e2826f2b17e9a06e6bb7cf3cf
third_party/muses @ 5ce721187ad823da2095537730c746486ca4966
third_party/pantheon-tunnel @ f866d3f58d27af9d942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55feca872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8ac0d8faba9b2e4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc97f3c9f42
third_party/scream-reproduce @ f099118d1421a3131bf11ff1964974e1da3b5b2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad8c74f9415f19a26
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af26b9562939f5a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde47357707d143a1fa2851
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>11.68</td>
<td>59.01</td>
<td>2.70</td>
</tr>
<tr>
<td>Copa</td>
<td>3</td>
<td>10.99</td>
<td>51.91</td>
<td>1.09</td>
</tr>
<tr>
<td>TCP Cubic</td>
<td>3</td>
<td>11.91</td>
<td>58.41</td>
<td>0.46</td>
</tr>
<tr>
<td>FillP</td>
<td>3</td>
<td>11.58</td>
<td>59.07</td>
<td>1.83</td>
</tr>
<tr>
<td>FillP-Sheep</td>
<td>3</td>
<td>10.65</td>
<td>51.64</td>
<td>0.55</td>
</tr>
<tr>
<td>Indigo</td>
<td>3</td>
<td>11.67</td>
<td>39.65</td>
<td>0.26</td>
</tr>
<tr>
<td>Indigo-MusesC3</td>
<td>3</td>
<td>11.68</td>
<td>47.61</td>
<td>2.18</td>
</tr>
<tr>
<td>Indigo-MusesC5</td>
<td>3</td>
<td>11.03</td>
<td>54.26</td>
<td>2.40</td>
</tr>
<tr>
<td>Indigo-MusesD</td>
<td>3</td>
<td>6.01</td>
<td>54.04</td>
<td>4.57</td>
</tr>
<tr>
<td>Indigo-MusesT</td>
<td>3</td>
<td>11.73</td>
<td>50.06</td>
<td>2.09</td>
</tr>
<tr>
<td>LEDBAT</td>
<td>3</td>
<td>9.47</td>
<td>59.21</td>
<td>0.70</td>
</tr>
<tr>
<td>PCC-Allegro</td>
<td>3</td>
<td>8.65</td>
<td>33.10</td>
<td>0.93</td>
</tr>
<tr>
<td>PCC-Expr</td>
<td>3</td>
<td>11.11</td>
<td>60.16</td>
<td>1.65</td>
</tr>
<tr>
<td>QUIC Cubic</td>
<td>3</td>
<td>11.72</td>
<td>59.19</td>
<td>0.33</td>
</tr>
<tr>
<td>SCReAM</td>
<td>3</td>
<td>0.21</td>
<td>31.71</td>
<td>0.04</td>
</tr>
<tr>
<td>Sprout</td>
<td>3</td>
<td>6.52</td>
<td>55.74</td>
<td>0.57</td>
</tr>
<tr>
<td>TaoVA-100x</td>
<td>3</td>
<td>11.15</td>
<td>33.09</td>
<td>0.73</td>
</tr>
<tr>
<td>TCP Vegas</td>
<td>3</td>
<td>11.92</td>
<td>37.57</td>
<td>0.33</td>
</tr>
<tr>
<td>Verus</td>
<td>3</td>
<td>7.76</td>
<td>61.17</td>
<td>71.24</td>
</tr>
<tr>
<td>PCC-Vivace</td>
<td>3</td>
<td>10.88</td>
<td>37.11</td>
<td>0.15</td>
</tr>
<tr>
<td>WebRTC media</td>
<td>3</td>
<td>0.05</td>
<td>41.63</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Run 1: Statistics of TCP BBR

Start at: 2019-03-18 22:08:16
End at: 2019-03-18 22:08:46

# Below is generated by plot.py at 2019-03-18 22:37:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.68 Mbit/s (97.3% utilization)
  95th percentile per-packet one-way delay: 59.043 ms
  Loss rate: 2.75%
-- Flow 1:
  Average throughput: 11.68 Mbit/s
  95th percentile per-packet one-way delay: 59.043 ms
  Loss rate: 2.75%
Run 1: Report of TCP BBR — Data Link
Run 2: Statistics of TCP BBR

Start at: 2019-03-18 22:20:44

# Below is generated by plot.py at 2019-03-18 22:37:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.68 Mbit/s (97.3% utilization)
  95th percentile per-packet one-way delay: 58.845 ms
  Loss rate: 2.60%
-- Flow 1:
  Average throughput: 11.68 Mbit/s
  95th percentile per-packet one-way delay: 58.845 ms
  Loss rate: 2.60%
Run 2: Report of TCP BBR — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 11.97 Mbit/s)
- Flow 1 egress (mean 11.68 Mbit/s)

Per-packet one way delay (ms)

- Flow 1 (95th percentile 58.54 ms)
Run 3: Statistics of TCP BBR

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

# Below is generated by plot.py at 2019-03-18 22:37:57
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.67 Mbit/s (97.3% utilization)
  95th percentile per-packet one-way delay: 59.128 ms
  Loss rate: 2.74%
-- Flow 1:
  Average throughput: 11.67 Mbit/s
  95th percentile per-packet one-way delay: 59.128 ms
  Loss rate: 2.74%
Run 3: Report of TCP BBR — Data Link

![Graph of throughput over time with shaded region, showing average capacity of 12.00 Mbps.](image1)

![Graph of per-packet one-way delay with time, showing flow 1 with 95th percentile of 59.13 ms.](image2)
Run 1: Statistics of Copa

Start at: 2019-03-18 22:10:38
End at: 2019-03-18 22:11:08

# Below is generated by plot.py at 2019-03-18 22:38:07
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.93 Mbit/s (91.1% utilization)
  95th percentile per-packet one-way delay: 52.603 ms
  Loss rate: 1.10%
-- Flow 1:
  Average throughput: 10.93 Mbit/s
  95th percentile per-packet one-way delay: 52.603 ms
  Loss rate: 1.10%
Run 1: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.04 Mbit/s)  Flow 1 egress (mean 10.93 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 52.60 ms)
Run 2: Statistics of Copa

End at: 2019-03-18 22:23:37

# Below is generated by plot.py at 2019-03-18 22:38:08
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.99 Mbit/s (91.6% utilization)
95th percentile per-packet one-way delay: 53.830 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 10.99 Mbit/s
95th percentile per-packet one-way delay: 53.830 ms
Loss rate: 1.19%
Run 2: 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 10.99 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 53.83 ms)
Run 3: Statistics of Copa

Start at: 2019-03-18 22:35:35
End at: 2019-03-18 22:36:05

# Below is generated by plot.py at 2019-03-18 22:38:08
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.04 Mbit/s (92.0% utilization)
95th percentile per-packet one-way delay: 49.293 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 11.04 Mbit/s
95th percentile per-packet one-way delay: 49.293 ms
Loss rate: 0.97%
Run 3: Report of Copa — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.14 Mbit/s)  Flow 1 egress (mean 11.04 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 49.29 ms)
Run 1: Statistics of TCP Cubic

Start at: 2019-03-18 22:11:14
End at: 2019-03-18 22:11:44

# Below is generated by plot.py at 2019-03-18 22:38:08
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.90 Mbit/s (99.2% utilization)
  95th percentile per-packet one-way delay: 58.639 ms
  Loss rate: 0.44%
-- Flow 1:
  Average throughput: 11.90 Mbit/s
  95th percentile per-packet one-way delay: 58.639 ms
  Loss rate: 0.44%
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 11.94 Mbit/s)  Flow 1 egress (mean 11.80 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 58.64 ms)
Run 2: Statistics of TCP Cubic


# Below is generated by plot.py at 2019-03-18 22:38:08
# 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: 58.318 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 11.91 Mbit/s
95th percentile per-packet one-way delay: 58.318 ms
Loss rate: 0.48%
Run 2: Report of TCP Cubic — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.95 Mbit/s)  Flow 1 egress (mean 11.91 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 58.32 ms)
Run 3: Statistics of TCP Cubic

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

# 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: 11.91 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 58.281 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 11.91 Mbit/s
95th percentile per-packet one-way delay: 58.281 ms
Loss rate: 0.47%
Run 3: Report of TCP Cubic — Data Link

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

- Flow 1 ingress (mean 11.95 Mbit/s)
- Flow 1 egress (mean 11.91 Mbit/s)

![Graph showing per packet round-trip delay with 95th percentile at 58.28 ms.]

- Flow 1 (95th percentile 58.28 ms)
Run 1: Statistics of FillP

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 22:38:21
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.58 Mbit/s (96.5% utilization)
95th percentile per-packet one-way delay: 59.919 ms
Loss rate: 2.48%
-- Flow 1:
Average throughput: 11.58 Mbit/s
95th percentile per-packet one-way delay: 59.919 ms
Loss rate: 2.48%
Run 1: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.86 Mbit/s)  Flow 1 egress (mean 11.58 Mbit/s)

Packet delay (ms)

Time (s)

Flow 1 (95th percentile 59.92 ms)
Run 2: Statistics of FillP

End at: 2019-03-18 22:14:43

# Below is generated by plot.py at 2019-03-18 22:38:22
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.58 Mbit/s (96.5% utilization)
95th percentile per-packet one-way delay: 59.697 ms
Loss rate: 2.11%
-- Flow 1:
Average throughput: 11.58 Mbit/s
95th percentile per-packet one-way delay: 59.697 ms
Loss rate: 2.11%
Run 2: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.82 Mbit/s)  Flow 1 egress (mean 11.58 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 59.70 ms)
Run 3: Statistics of FillP

Start at: 2019-03-18 22:26:41

# Below is generated by plot.py at 2019-03-18 22:38:23
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.58 Mbit/s (96.5% utilization)
  95th percentile per-packet one-way delay: 57.593 ms
  Loss rate: 0.90%
-- Flow 1:
  Average throughput: 11.58 Mbit/s
  95th percentile per-packet one-way delay: 57.593 ms
  Loss rate: 0.90%
Run 3: Report of FillP — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.68 Mbit/s)
Flow 1 egress (mean 11.58 Mbit/s)

Per packet delivery delay (ms)

Time (s)

Flow 1 (95th percentile 57.59 ms)
Run 1: Statistics of FillP-Sheep

Start at: 2019-03-18 22:04:43
End at: 2019-03-18 22:05:13

# Below is generated by plot.py at 2019-03-18 22:38:23
# 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: 51.892 ms
  Loss rate: 0.52%
-- Flow 1:
  Average throughput: 10.49 Mbit/s
  95th percentile per-packet one-way delay: 51.892 ms
  Loss rate: 0.52%
Run 1: Report of FillP-Sheep — Data Link

![Graph showing network performance metrics](image-url)

- **Average capacity 12.00 Mbit/s (shaded region)**
- **Throughput (Mbps)**
- **Time (s)**

**Graph Legends:**
- Flow 1 ingress (mean 10.54 Mbit/s)
- Flow 1 egress (mean 10.49 Mbit/s)

![Graph showing packet loss](image-url)

- **Pkt. packet error rate (per packet)**
- **Time (s)**

**Graph Legends:**
- Flow 1 (95th percentile 51.89 ms)
Run 2: Statistics of FillP-Sheep

Start at: 2019-03-18 22:17:11
End at: 2019-03-18 22:17:41

# Below is generated by plot.py at 2019-03-18 22:38:32
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.91 Mbit/s (90.9% utilization)
95th percentile per-packet one-way delay: 51.507 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 10.91 Mbit/s
95th percentile per-packet one-way delay: 51.507 ms
Loss rate: 0.61%
Run 2: Report of FillP-Sheep — Data Link
Run 3: Statistics of FillP-Sheep

End at: 2019-03-18 22:30:09

# Below is generated by plot.py at 2019-03-18 22:38:32
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.54 Mbit/s (87.8% utilization)
95th percentile per-packet one-way delay: 51.530 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 10.54 Mbit/s
95th percentile per-packet one-way delay: 51.530 ms
Loss rate: 0.52%
Run 3: Report of FillP-Sheep — Data Link
Run 1: Statistics of Indigo

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

# Below is generated by plot.py at 2019-03-18 22:38:32
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.57 Mbit/s (96.4% utilization)
95th percentile per-packet one-way delay: 39.575 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 11.57 Mbit/s
95th percentile per-packet one-way delay: 39.575 ms
Loss rate: 0.26%
Run 1: Report of Indigo — Data Link

![Graph showing throughput and delay over time](image)

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

**Throughput (Mbit/s)**

**Time (s)**

- **Flow 1 ingress (mean 11.59 Mbit/s)**
- **Flow 1 egress (mean 11.57 Mbit/s)**

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

**Time (s)**

- **Flow 1 (95th percentile 39.58 ms)**
Run 2: Statistics of Indigo


# Below is generated by plot.py at 2019-03-18 22:38:41
# 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: 39.688 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 11.68 Mbit/s
95th percentile per-packet one-way delay: 39.688 ms
Loss rate: 0.27%
Run 2: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.70 Mbit/s)  Flow 1 egress (mean 11.68 Mbit/s)

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

Flow 1 (95th percentile 39.69 ms)
Run 3: Statistics of Indigo

Start at: 2019-03-18 22:34:23
End at: 2019-03-18 22:34:53

# Below is generated by plot.py at 2019-03-18 22:38:42
# 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: 39.681 ms
  Loss rate: 0.25%
-- Flow 1:
  Average throughput: 11.75 Mbit/s
  95th percentile per-packet one-way delay: 39.681 ms
  Loss rate: 0.25%
Run 3: Report of Indigo — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.76 Mbit/s)  Flow 1 egress (mean 11.75 Mbit/s)

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

Flow 1 (95th percentile 39.68 ms)
Run 1: Statistics of Indigo-MusesC3

Start at: 2019-03-18 22:08:51
End at: 2019-03-18 22:09:21

# Below is generated by plot.py at 2019-03-18 22:38:44
# 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: 60.501 ms
  Loss rate: 5.35%
-- Flow 1:
  Average throughput: 11.75 Mbit/s
  95th percentile per-packet one-way delay: 60.501 ms
  Loss rate: 5.35%
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 12.40 Mbit/s)  Flow 1 egress (mean 11.75 Mbit/s)

Per packet one way delay [ms]

Time (s)

Flow 1 (95th percentile 60.50 ms)
Run 2: Statistics of Indigo-MusesC3

End at: 2019-03-18 22:21:50

# Below is generated by plot.py at 2019-03-18 22:38:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.64 Mbit/s (97.0% utilization)
95th percentile per-packet one-way delay: 39.788 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 11.64 Mbit/s
95th percentile per-packet one-way delay: 39.788 ms
Loss rate: 0.46%
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 11.68 Mbit/s)  Flow 1 egress (mean 11.64 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 39.79 ms)
Run 3: Statistics of Indigo-MusesC3

End at: 2019-03-18 22:34:18

# 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: 11.65 Mbit/s (97.1% utilization)
  95th percentile per-packet one-way delay: 42.549 ms
  Loss rate: 0.72%
-- Flow 1:
  Average throughput: 11.65 Mbit/s
  95th percentile per-packet one-way delay: 42.549 ms
  Loss rate: 0.72%
Run 3: Report of Indigo-MusesC3 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.72 Mbit/s)  Flow 1 egress (mean 11.65 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 42.55 ms)
Run 1: Statistics of Indigo-MusesC5

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

# 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: 10.82 Mbit/s (90.1% utilization)
95th percentile per-packet one-way delay: 54.840 ms
Loss rate: 2.57%
-- Flow 1:
Average throughput: 10.82 Mbit/s
95th percentile per-packet one-way delay: 54.840 ms
Loss rate: 2.57%
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 11.09 Mbit/s)  Flow 1 egress (mean 10.82 Mbit/s)

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 54.84 ms)
Run 2: Statistics of Indigo-MusesC5

End at: 2019-03-18 22:23:02

# Below is generated by plot.py at 2019-03-18 22:38:53
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.02 Mbit/s (91.8% utilization)
  95th percentile per-packet one-way delay: 52.776 ms
  Loss rate: 1.67%
-- Flow 1:
  Average throughput: 11.02 Mbit/s
  95th percentile per-packet one-way delay: 52.776 ms
  Loss rate: 1.67%
Run 2: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 11.19 Mbit/s)
- Flow 1 egress (mean 11.02 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 52.78 ms)
Run 3: Statistics of Indigo-MusesC5

Start at: 2019-03-18 22:34:59
End at: 2019-03-18 22:35:29

# 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: 11.25 Mbit/s (93.8% utilization)
  95th percentile per-packet one-way delay: 55.163 ms
  Loss rate: 2.97%
-- Flow 1:
  Average throughput: 11.25 Mbit/s
  95th percentile per-packet one-way delay: 55.163 ms
  Loss rate: 2.97%
Run 3: Report of Indigo-MusesC5 — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.59 Mbit/s)  Flow 1 egress (mean 11.25 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 55.16 ms)
Run 1: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:05:18
End at: 2019-03-18 22:05:48

# 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: 5.32 Mbit/s (44.3% utilization)
95th percentile per-packet one-way delay: 57.053 ms
Loss rate: 6.09%
-- Flow 1:
Average throughput: 5.32 Mbit/s
95th percentile per-packet one-way delay: 57.053 ms
Loss rate: 6.09%
Run 1: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

0.0 — 17.5

Time (s)

0.0 — 35.0

Flow 1 ingress (mean 5.66 Mbit/s)  Flow 1 egress (mean 5.32 Mbit/s)

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

0.0 — 60.0

Time (s)

0.0 — 30.0

Flow 1 (95th percentile 57.05 ms)
Run 2: Statistics of Indigo-MusesD

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

# Below is generated by plot.py at 2019-03-18 22:38:59
# Datalink statistics
-- Total of 1 flow:
 Average capacity: 12.00 Mbit/s
 Average throughput: 7.08 Mbit/s (59.0% utilization)
 95th percentile per-packet one-way delay: 47.635 ms
 Loss rate: 0.87%
-- Flow 1:
 Average throughput: 7.08 Mbit/s
 95th percentile per-packet one-way delay: 47.635 ms
 Loss rate: 0.87%
Run 2: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 7.13 Mbit/s)  Flow 1 egress (mean 7.08 Mbit/s)

Packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 47.63 ms)
Run 3: Statistics of Indigo-MusesD

Start at: 2019-03-18 22:30:15
End at: 2019-03-18 22:30:45

# Below is generated by plot.py at 2019-03-18 22:38:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.64 Mbit/s (47.0% utilization)
95th percentile per-packet one-way delay: 57.434 ms
Loss rate: 6.75%
-- Flow 1:
Average throughput: 5.64 Mbit/s
95th percentile per-packet one-way delay: 57.434 ms
Loss rate: 6.75%
Run 3: Report of Indigo-MusesD — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 6.04 Mbit/s)  Flow 1 egress (mean 5.64 Mbit/s)

Per-packet one way delay (ms)

Time (s)

Flow 1 (95th percentile 57.43 ms)
Run 1: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:11:50
End at: 2019-03-18 22:12:20

# Below is generated by plot.py at 2019-03-18 22:39:04
# 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: 58.218 ms
Loss rate: 4.85%
-- Flow 1:
Average throughput: 11.43 Mbit/s
95th percentile per-packet one-way delay: 58.218 ms
Loss rate: 4.85%
Run 1: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 12.00 Mbit/s)  Flow 1 egress (mean 11.43 Mbit/s)

Flow 1 (95th percentile 58.22 ms)
Run 2: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:24:19
End at: 2019-03-18 22:24:49

# Below is generated by plot.py at 2019-03-18 22:39:05
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.88 Mbit/s (99.0% utilization)
95th percentile per-packet one-way delay: 50.071 ms
Loss rate: 1.14%
-- Flow 1:
Average throughput: 11.88 Mbit/s
95th percentile per-packet one-way delay: 50.071 ms
Loss rate: 1.14%
Run 2: Report of Indigo-MusesT — Data Link

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

Flow 1 ingress (mean 12.00 Mbit/s)   Flow 1 egress (mean 11.88 Mbit/s)

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

Flow 1 (95th percentile 50.07 ms)
Run 3: Statistics of Indigo-MusesT

Start at: 2019-03-18 22:36:46
End at: 2019-03-18 22:37:16

# Below is generated by plot.py at 2019-03-18 22:39:13
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.88 Mbit/s (99.0% utilization)
  95th percentile per-packet one-way delay: 41.906 ms
  Loss rate: 0.27%
-- Flow 1:
  Average throughput: 11.88 Mbit/s
  95th percentile per-packet one-way delay: 41.906 ms
  Loss rate: 0.27%
Run 3: Report of Indigo-MusesT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.90 Mbit/s)  Flow 1 egress (mean 11.88 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 41.91 ms)
Run 1: Statistics of LEDBAT

Start at: 2019-03-18 22:05:54
End at: 2019-03-18 22:06:24

# Below is generated by plot.py at 2019-03-18 22:39:13
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 9.09 Mbit/s (75.8% utilization)
  95th percentile per-packet one-way delay: 59.274 ms
  Loss rate: 0.48%
-- Flow 1:
  Average throughput: 9.09 Mbit/s
  95th percentile per-packet one-way delay: 59.274 ms
  Loss rate: 0.48%
Run 1: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Throughput (Mbit/s)

Flow 1 ingress (mean 9.14 Mbit/s)
Flow 1 egress (mean 9.09 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 59.27 ms)
Run 2: Statistics of LEDBAT

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

# Below is generated by plot.py at 2019-03-18 22:39:14
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 9.66 Mbit/s (80.5% utilization)
  95th percentile per-packet one-way delay: 59.145 ms
  Loss rate: 0.86%
-- Flow 1:
  Average throughput: 9.66 Mbit/s
  95th percentile per-packet one-way delay: 59.145 ms
  Loss rate: 0.86%
Run 2: Report of LEDBAT — Data Link
Run 3: Statistics of LEDBAT

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

# 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: 9.67 Mbit/s (80.6% utilization)
  95th percentile per-packet one-way delay: 59.225 ms
  Loss rate: 0.75%
-- Flow 1:
  Average throughput: 9.67 Mbit/s
  95th percentile per-packet one-way delay: 59.225 ms
  Loss rate: 0.75%
Run 3: Report of LEDBAT — Data Link

Average capacity 12.00 Mbit/s (shaded region)

- Flow 1 ingress (mean 9.73 Mbit/s)
- Flow 1 egress (mean 9.67 Mbit/s)

Per packet end-to-end delay (ms)
- Flow 1 (95th percentile 59.23 ms)
Run 1: Statistics of PCC-Allegro

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 22:39:19
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.19 Mbit/s (76.6% utilization)
95th percentile per-packet one-way delay: 34.149 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 9.19 Mbit/s
95th percentile per-packet one-way delay: 34.149 ms
Loss rate: 0.92%
Run 1: Report of PCC-Allegro — Data Link
Run 2: Statistics of PCC-Allegro

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

# 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: 8.05 Mbit/s (67.1% utilization)
 95th percentile per-packet one-way delay: 32.498 ms
 Loss rate: 0.96%
-- Flow 1:
 Average throughput: 8.05 Mbit/s
 95th percentile per-packet one-way delay: 32.498 ms
 Loss rate: 0.96%
Run 2: Report of PCC-Allegro — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 8.12 Mbit/s)  Flow 1 egress (mean 8.05 Mbit/s)

Per-packet oneway delay (ms)

Flow 1 (95th percentile 32.50 ms)
Run 3: Statistics of PCC-Allegro


# 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: 8.71 Mbit/s (72.6% utilization)
  95th percentile per-packet one-way delay: 32.649 ms
  Loss rate: 0.90%
-- Flow 1:
  Average throughput: 8.71 Mbit/s
  95th percentile per-packet one-way delay: 32.649 ms
  Loss rate: 0.90%
Run 3: Report of PCC-Allegro — Data Link

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

![Graph showing throughput and delay over time](image-url)

- **Flow 1 ingress (mean 8.78 Mbit/s)**
- **Flow 1 egress (mean 8.71 Mbit/s)**

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

- **Flow 1 (95th percentile 32.65 ms)**
Run 1: Statistics of PCC-Expr

Start at: 2019-03-18 22:04:07
End at: 2019-03-18 22:04:37

# Below is generated by plot.py at 2019-03-18 22:39:42
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 10.98 Mbit/s (91.5% utilization)
95th percentile per-packet one-way delay: 58.490 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 10.98 Mbit/s
95th percentile per-packet one-way delay: 58.490 ms
Loss rate: 1.06%
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 11.08 Mbit/s)  Flow 1 egress (mean 10.98 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 58.49 ms)
Run 2: Statistics of PCC-Expr

Start at: 2019-03-18 22:16:35
End at: 2019-03-18 22:17:05

# Below is generated by plot.py at 2019-03-18 22:39:46
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.05 Mbit/s (92.1% utilization)
95th percentile per-packet one-way delay: 61.085 ms
Loss rate: 1.99%
-- Flow 1:
Average throughput: 11.05 Mbit/s
95th percentile per-packet one-way delay: 61.085 ms
Loss rate: 1.99%
Run 2: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Flow 1 ingress (mean 11.26 Mbit/s)  Flow 1 egress (mean 11.05 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 61.09 ms)
Run 3: Statistics of PCC-Expr

Start at: 2019-03-18 22:29:03
End at: 2019-03-18 22:29:33

# Below is generated by plot.py at 2019-03-18 22:39:47
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.29 Mbit/s (94.1% utilization)
  95th percentile per-packet one-way delay: 60.901 ms
  Loss rate: 1.91%
-- Flow 1:
  Average throughput: 11.29 Mbit/s
  95th percentile per-packet one-way delay: 60.901 ms
  Loss rate: 1.91%
Run 3: Report of PCC-Expr — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 11.50 Mbit/s)  Flow 1 egress (mean 11.29 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 60.90 ms)
Run 1: Statistics of QUIC Cubic

Start at: 2019-03-18 22:07:04
End at: 2019-03-18 22:07:34

# Below is generated by plot.py at 2019-03-18 22:39:47
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.71 Mbit/s (97.6% utilization)
95th percentile per-packet one-way delay: 59.228 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 11.71 Mbit/s
95th percentile per-packet one-way delay: 59.228 ms
Loss rate: 0.33%
Run 1: Report of QUIC Cubic — Data Link
Run 2: Statistics of QUIC Cubic

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

# Below is generated by plot.py at 2019-03-18 22:39:47
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.72 Mbit/s (97.6% utilization)
  95th percentile per-packet one-way delay: 59.240 ms
  Loss rate: 0.34%
-- Flow 1:
  Average throughput: 11.72 Mbit/s
  95th percentile per-packet one-way delay: 59.240 ms
  Loss rate: 0.34%
Run 2: Report of QUIC Cubic — Data Link
Run 3: Statistics of QUIC Cubic

Start at: 2019-03-18 22:32:01
End at: 2019-03-18 22:32:31

# Below is generated by plot.py at 2019-03-18 22:39:47
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.72 Mbit/s (97.6% utilization)
  95th percentile per-packet one-way delay: 59.115 ms
  Loss rate: 0.31%
-- Flow 1:
  Average throughput: 11.72 Mbit/s
  95th percentile per-packet one-way delay: 59.115 ms
  Loss rate: 0.31%
Run 3: Report of QUIC Cubic — Data Link
Run 1: Statistics of SCReAM

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

# Below is generated by plot.py at 2019-03-18 22:39:47
# 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: 31.842 ms
  Loss rate: 0.13%
-- Flow 1:
  Average throughput: 0.21 Mbit/s
  95th percentile per-packet one-way delay: 31.842 ms
  Loss rate: 0.13%
Run 1: Report of SCReAM — Data Link
Run 2: Statistics of SCReAM

End at: 2019-03-18 22:19:28

# Below is generated by plot.py at 2019-03-18 22:39:47
# 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: 31.647 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 31.647 ms
Loss rate: 0.00%
Run 2: 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 31.65 ms)
Run 3: Statistics of SCReAM

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

# Below is generated by plot.py at 2019-03-18 22:39:47
# 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: 31.635 ms
  Loss rate: 0.00%
-- Flow 1:
  Average throughput: 0.21 Mbit/s
  95th percentile per-packet one-way delay: 31.635 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 31.64 ms)
Run 1: Statistics of Sprout

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

# Below is generated by plot.py at 2019-03-18 22:39:49
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 6.37 Mbit/s (53.1% utilization)
95th percentile per-packet one-way delay: 56.353 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 6.37 Mbit/s
95th percentile per-packet one-way delay: 56.353 ms
Loss rate: 0.81%
Run 1: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 6.42 Mbit/s)  Flow 1 egress (mean 6.37 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 56.35 ms)
Run 2: Statistics of Sprout

Start at: 2019-03-18 22:12:26
End at: 2019-03-18 22:12:56

# Below is generated by plot.py at 2019-03-18 22:39:49
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 6.49 Mbit/s (54.1% utilization)
  95th percentile per-packet one-way delay: 55.602 ms
  Loss rate: 0.29%
-- Flow 1:
  Average throughput: 6.49 Mbit/s
  95th percentile per-packet one-way delay: 55.602 ms
  Loss rate: 0.29%
Run 2: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Time (s)

Throughput (Mbit/s)

Flow 1 ingress (mean 6.51 Mbit/s)  Flow 1 egress (mean 6.49 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 55.60 ms)
Run 3: Statistics of Sprout

Start at: 2019-03-18 22:24:54
End at: 2019-03-18 22:25:24

# Below is generated by plot.py at 2019-03-18 22:39:51
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 6.71 Mbit/s (55.9% utilization)
  95th percentile per-packet one-way delay: 55.276 ms
  Loss rate: 0.62%
-- Flow 1:
  Average throughput: 6.71 Mbit/s
  95th percentile per-packet one-way delay: 55.276 ms
  Loss rate: 0.62%
Run 3: Report of Sprout — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 6.75 Mbit/s)  Flow 1 egress (mean 6.71 Mbit/s)

Per packet one-way delay (ms)

Time (s)

Flow 1 (95th percentile 55.28 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 22:40:10
# 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: 33.069 ms
  Loss rate: 0.68%
-- Flow 1:
  Average throughput: 11.16 Mbit/s
  95th percentile per-packet one-way delay: 33.069 ms
  Loss rate: 0.68%
Run 1: Report of TaoVA-100x — Data Link
Run 2: Statistics of TaoVA-100x

Start at: 2019-03-18 22:15:24
End at: 2019-03-18 22:15:54

# Below is generated by plot.py at 2019-03-18 22:40:12
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.18 Mbit/s (93.2% utilization)
  95th percentile per-packet one-way delay: 33.165 ms
  Loss rate: 0.69%
-- Flow 1:
  Average throughput: 11.18 Mbit/s
  95th percentile per-packet one-way delay: 33.165 ms
  Loss rate: 0.69%
Run 2: Report of TaoVA-100x — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbps)

Time (s)

Flow 1 ingress (mean 11.25 Mbit/s)  Flow 1 egress (mean 11.18 Mbit/s)

Per packet delivery delay (ms)

Time (s)

Flow 1 (95th percentile 33.16 ms)
Run 3: Statistics of TaoVA-100x


# Below is generated by plot.py at 2019-03-18 22:40:13
# Datalink statistics
-- Total of 1 flow:
   Average capacity: 12.00 Mbit/s
   Average throughput: 11.12 Mbit/s (92.6% utilization)
   95th percentile per-packet one-way delay: 33.045 ms
   Loss rate: 0.82%
-- Flow 1:
   Average throughput: 11.12 Mbit/s
   95th percentile per-packet one-way delay: 33.045 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 33.05 ms)
Run 1: Statistics of TCP Vegas

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 22:40:13
# 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: 37.575 ms
  Loss rate: 0.32%
-- Flow 1:
  Average throughput: 11.91 Mbit/s
  95th percentile per-packet one-way delay: 37.575 ms
  Loss rate: 0.32%
Run 1: Report of TCP Vegas — Data Link
Run 2: Statistics of TCP Vegas

Start at: 2019-03-18 22:13:01

# Below is generated by plot.py at 2019-03-18 22:40:13
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.92 Mbit/s (99.3% utilization)
  95th percentile per-packet one-way delay: 38.493 ms
  Loss rate: 0.33%
-- Flow 1:
  Average throughput: 11.92 Mbit/s
  95th percentile per-packet one-way delay: 38.493 ms
  Loss rate: 0.33%
Run 2: Report of TCP Vegas — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 11.94 Mbit/s)  Flow 1 egress (mean 11.92 Mbit/s)

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

Time (s)

Flow 1 (95th percentile 38.49 ms)
Run 3: Statistics of TCP Vegas

Start at: 2019-03-18 22:25:30
End at: 2019-03-18 22:26:00

# Below is generated by plot.py at 2019-03-18 22:40:13
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 11.92 Mbit/s (99.3% utilization)
  95th percentile per-packet one-way delay: 36.628 ms
  Loss rate: 0.33%
-- Flow 1:
  Average throughput: 11.92 Mbit/s
  95th percentile per-packet one-way delay: 36.628 ms
  Loss rate: 0.33%
Run 3: Report of TCP Vegas — Data Link

![Throughput Graph](image1)

Average capacity 12.00 Mbit/s (shaded region)

![Delay Graph](image2)

Flow 1 ingress (mean 11.95 Mbit/s)  
Flow 1 egress (mean 11.92 Mbit/s)

Flow 1 (95th percentile 36.63 ms)
Run 1: Statistics of Verus

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 22:40:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 7.68 Mbit/s (64.0% utilization)
95th percentile per-packet one-way delay: 61.283 ms
Loss rate: 76.05%
-- Flow 1:
Average throughput: 7.68 Mbit/s
95th percentile per-packet one-way delay: 61.283 ms
Loss rate: 76.05%
Run 1: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Flow 1 ingress (mean 32.03 Mbit/s)  Flow 1 egress (mean 7.68 Mbit/s)

Packet delay (ms)

Flow 1 (95th percentile 61.28 ms)
Run 2: Statistics of Verus

End at: 2019-03-18 22:14:07

# Below is generated by plot.py at 2019-03-18 22:40:16
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 7.52 Mbit/s (62.7% utilization)
  95th percentile per-packet one-way delay: 61.281 ms
  Loss rate: 76.69%
-- Flow 1:
  Average throughput: 7.52 Mbit/s
  95th percentile per-packet one-way delay: 61.281 ms
  Loss rate: 76.69%
Run 2: Report of Verus — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Flow 1 ingress (mean 32.17 Mbit/s)  Flow 1 egress (mean 7.52 Mbit/s)

Per packet one-way delay (ms)

Flow 1 (95th percentile 61.28 ms)
Run 3: Statistics of Verus

Start at: 2019-03-18 22:26:05  
End at: 2019-03-18 22:26:35

# Below is generated by plot.py at 2019-03-18 22:40:25  
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 8.08 Mbit/s (67.3% utilization)
  95th percentile per-packet one-way delay: 60.951 ms
  Loss rate: 60.97%
-- Flow 1:
  Average throughput: 8.08 Mbit/s
  95th percentile per-packet one-way delay: 60.951 ms
  Loss rate: 60.97%
Run 3: Report of Verus — Data Link

![Graph showing throughput and packet delay variations over time](image-url)

- **Average capacity**: 12.00 Mbit/s (shaded region)
- **Throughput (Mbit/s)**
- **Time (s)**
- **Flow 1 ingress (mean 20.64 Mbit/s)**
- **Flow 1 egress (mean 8.08 Mbit/s)**

- **Per packet one-way delay (ms)**
  - Flow 1 (95th percentile 60.95 ms)
Run 1: Statistics of PCC-Vivace

Start at: 2019-03-18 22:07:40
End at: 2019-03-18 22:08:10

# Below is generated by plot.py at 2019-03-18 22:40:26
# 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: 38.482 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 10.87 Mbit/s
95th percentile per-packet one-way delay: 38.482 ms
Loss rate: 0.14%
Run 1: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.88 Mbit/s)  Flow 1 egress (mean 10.87 Mbit/s)

Per packet end-to-end delay (ms)

Flow 1 (95th percentile 38.48 ms)
Run 2: Statistics of PCC-Vivace

Start at: 2019-03-18 22:20:09
End at: 2019-03-18 22:20:39

# Below is generated by plot.py at 2019-03-18 22:40:26
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.89 Mbit/s (90.7% utilization)
  95th percentile per-packet one-way delay: 36.717 ms
  Loss rate: 0.15%
-- Flow 1:
  Average throughput: 10.89 Mbit/s
  95th percentile per-packet one-way delay: 36.717 ms
  Loss rate: 0.15%
Run 2: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

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

Per packet end-to-end delay (ms)

Time (s)

Flow 1 (95th percentile 36.72 ms)
Run 3: Statistics of PCC-Vivace

Start at: 2019-03-18 22:32:36
End at: 2019-03-18 22:33:06

# Below is generated by plot.py at 2019-03-18 22:40:26
# Datalink statistics
-- Total of 1 flow:
  Average capacity: 12.00 Mbit/s
  Average throughput: 10.88 Mbit/s (90.6% utilization)
  95th percentile per-packet one-way delay: 36.126 ms
  Loss rate: 0.17%
-- Flow 1:
  Average throughput: 10.88 Mbit/s
  95th percentile per-packet one-way delay: 36.126 ms
  Loss rate: 0.17%
Run 3: Report of PCC-Vivace — Data Link

Average capacity 12.00 Mbit/s (shaded region)

Throughput (Mbit/s)

Time (s)

Flow 1 ingress (mean 10.88 Mbit/s)  Flow 1 egress (mean 10.88 Mbit/s)

Packet delivery delay (ms)

Flow 1 (95th percentile 36.13 ms)
Run 1: Statistics of WebRTC media

Start at: 2019-03-18 22:03:32
End at: 2019-03-18 22:04:02

# Below is generated by plot.py at 2019-03-18 22:40:26
# 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: 42.305 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 42.305 ms
Loss rate: 0.00%
Run 1: Report of WebRTC media — Data Link
Run 2: Statistics of WebRTC media

Start at: 2019-03-18 22:16:00
End at: 2019-03-18 22:16:30

# Below is generated by plot.py at 2019-03-18 22:40:26
# 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: 41.957 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 41.957 ms
Loss rate: 0.00%
Run 2: Report of WebRTC media — Data Link
Run 3: Statistics of WebRTC media


# Below is generated by plot.py at 2019-03-18 22:40:26
# 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: 40.641 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 40.641 ms
Loss rate: 0.00%
Run 3: Report of WebRTC media — Data Link

![Graph showing throughput and delay over time](image)

- 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 per-packet one-way delay](image)

- Flow 1 (95th percentile 40.64 ms)