

Pantheon Report

Generated at 2018-09-05 21:22:03 (UTC).

Tested in mahimahi: mm-delay 50 mm-link 108Mbps.trace 108Mbps.trace
--uplink-queue=droptail --uplink-queue-args=packets=1 --downlink-queue=droptail
--downlink-queue-args=packets=1

Repeated the test of 4 congestion control schemes 3 times.

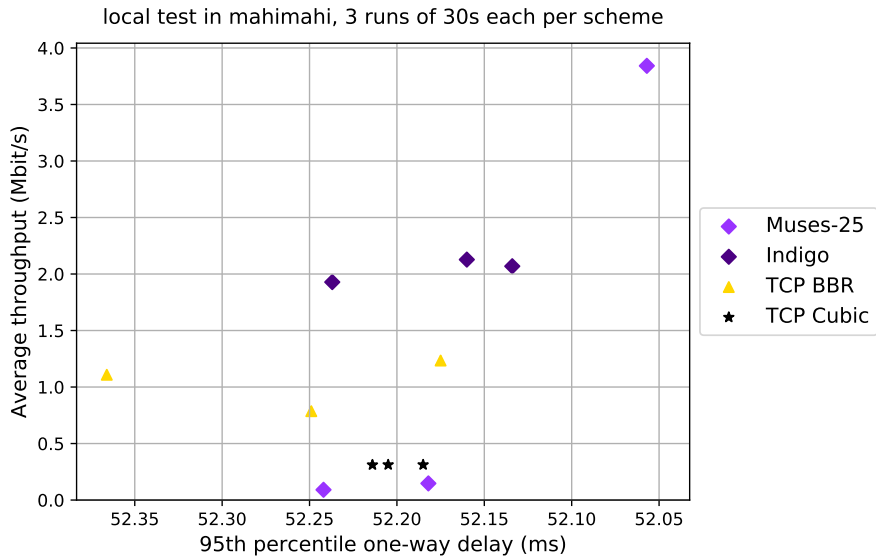
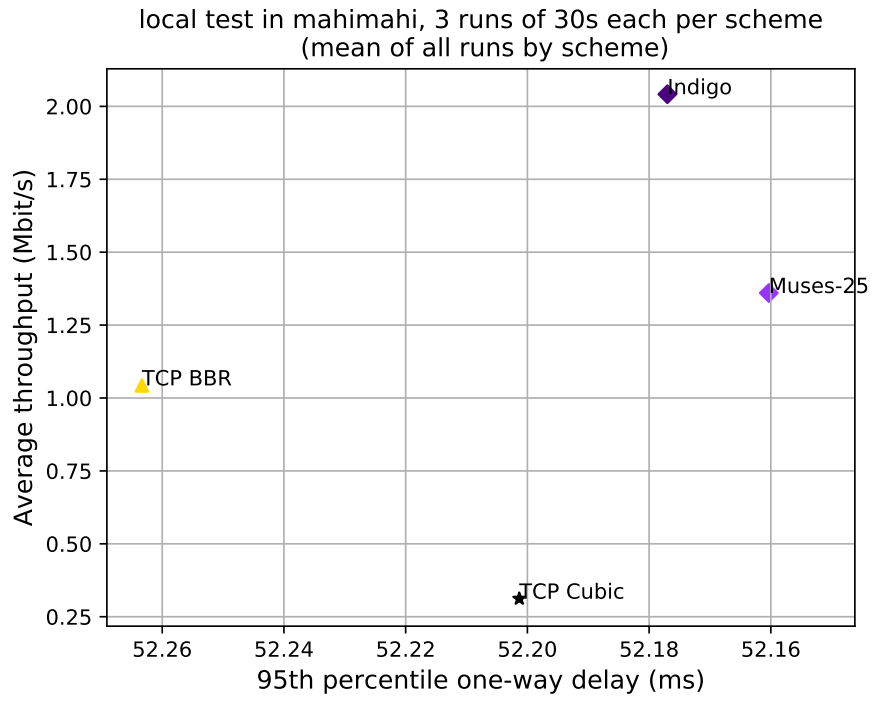
Each test lasted for 30 seconds running 1 flow.

System info:

```
Linux 4.15.0-1018-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
net.ipv4.tcp_mem = 536870912 536870912 536870912
```

Git summary:

```
branch: muses @ 18b9165265c8ba2915c862e8713fd9ad82c1ac21
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ a28d20fb82a95a965a3da65fd1eb71b8994e9b84
third_party/pantheon-tunnel @ cbfce6db5ff5740dafa1771f813cd646339e1952
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	1.04	52.26	44.60
TCP Cubic	3	0.31	52.20	8.33
Indigo	3	2.04	52.18	97.44
Muses-25	3	1.36	52.16	78.48

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 21:15:44

End at: 2018-09-05 21:16:14

Below is generated by plot.py at 2018-09-05 21:21:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.23 Mbit/s (1.1% utilization)

95th percentile per-packet one-way delay: 52.175 ms

Loss rate: 44.31%

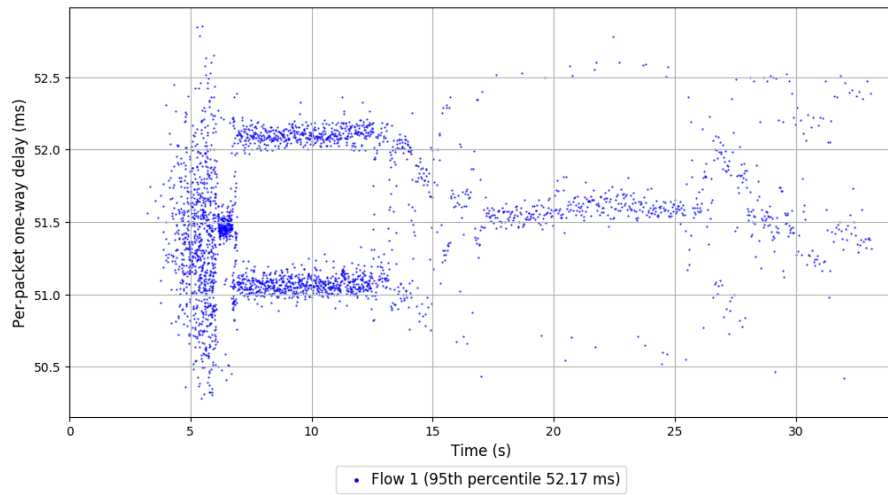
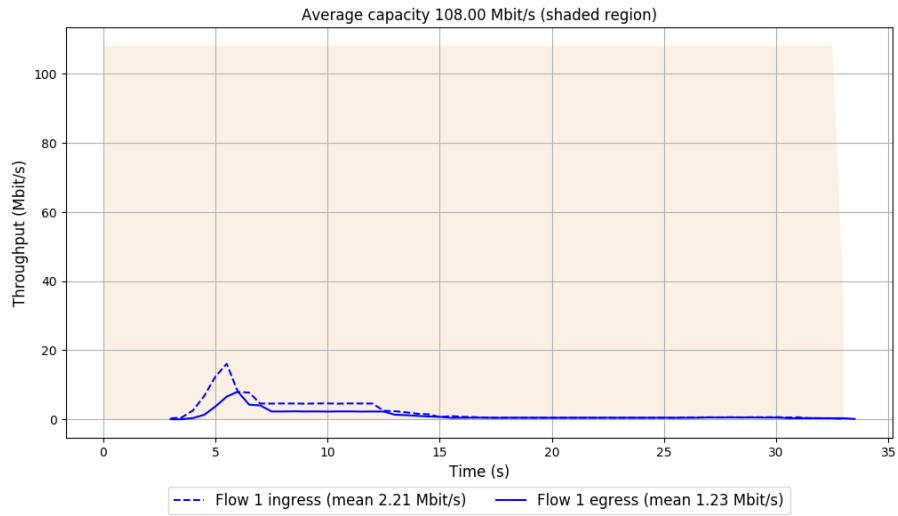
-- Flow 1:

Average throughput: 1.23 Mbit/s

95th percentile per-packet one-way delay: 52.175 ms

Loss rate: 44.31%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 21:18:12

End at: 2018-09-05 21:18:42

Below is generated by plot.py at 2018-09-05 21:21:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.11 Mbit/s (1.0% utilization)

95th percentile per-packet one-way delay: 52.366 ms

Loss rate: 46.26%

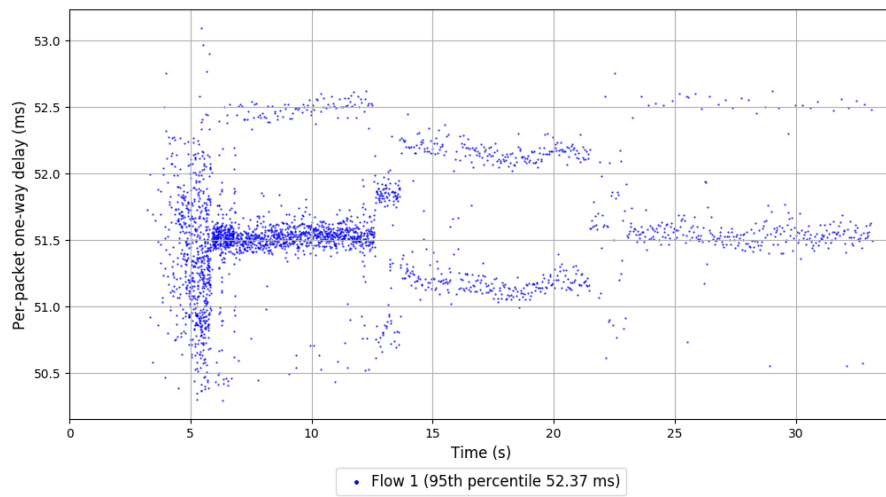
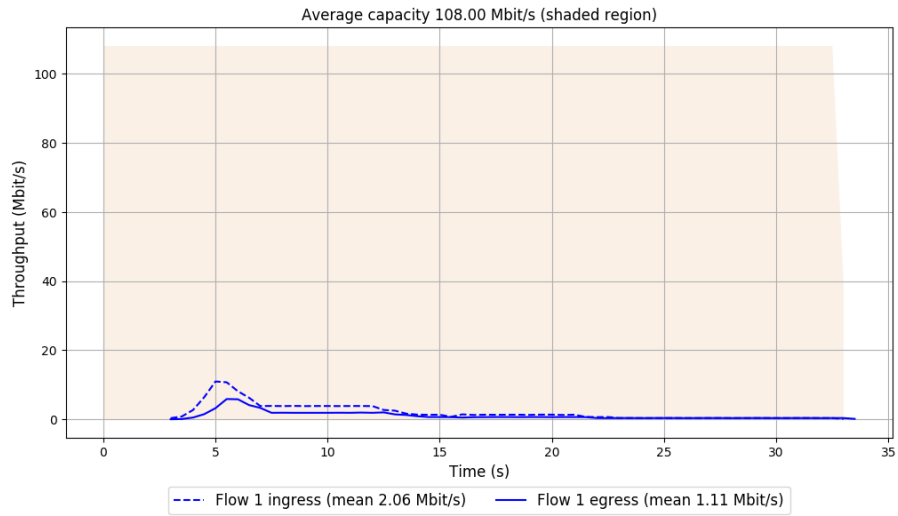
-- Flow 1:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 52.366 ms

Loss rate: 46.26%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-05 21:20:39

End at: 2018-09-05 21:21:09

Below is generated by plot.py at 2018-09-05 21:21:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.79 Mbit/s (0.7% utilization)

95th percentile per-packet one-way delay: 52.249 ms

Loss rate: 43.22%

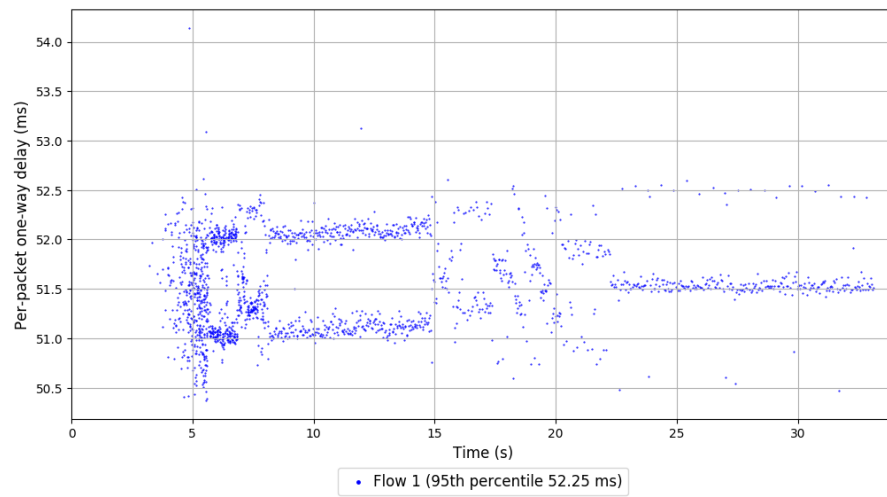
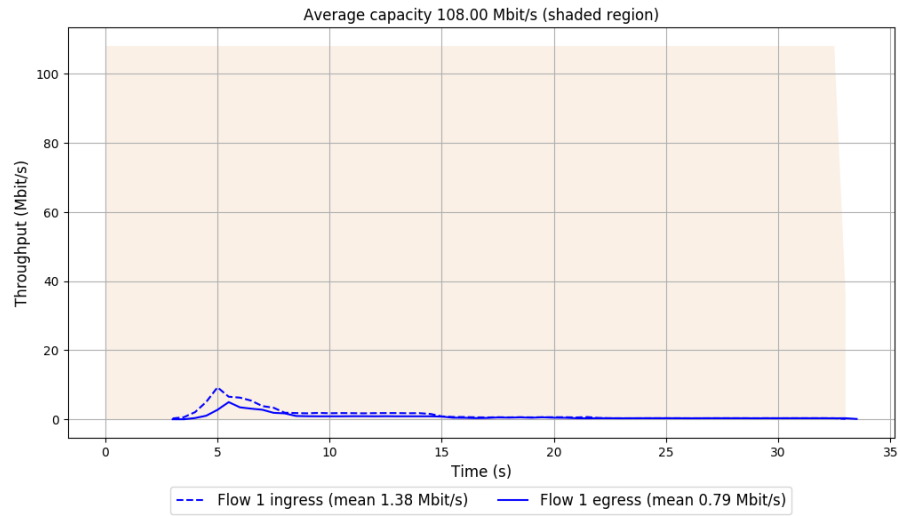
-- Flow 1:

Average throughput: 0.79 Mbit/s

95th percentile per-packet one-way delay: 52.249 ms

Loss rate: 43.22%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 21:14:31

End at: 2018-09-05 21:15:01

Below is generated by plot.py at 2018-09-05 21:21:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.31 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 52.205 ms

Loss rate: 8.37%

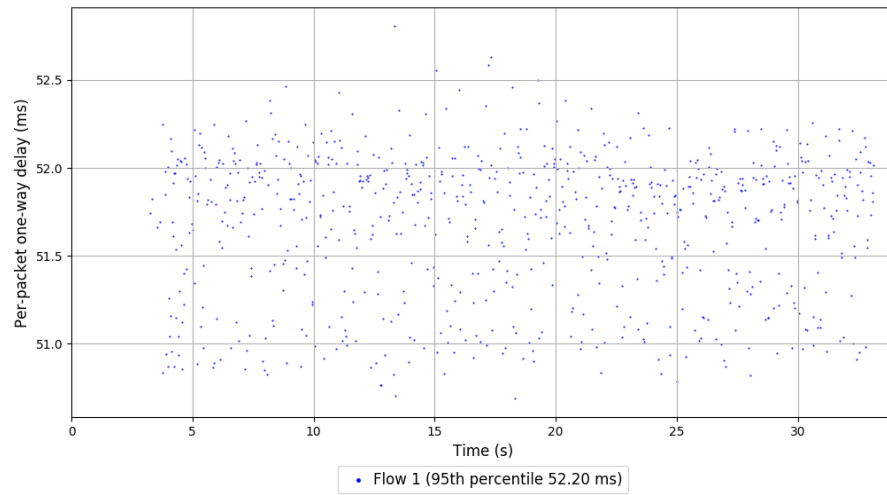
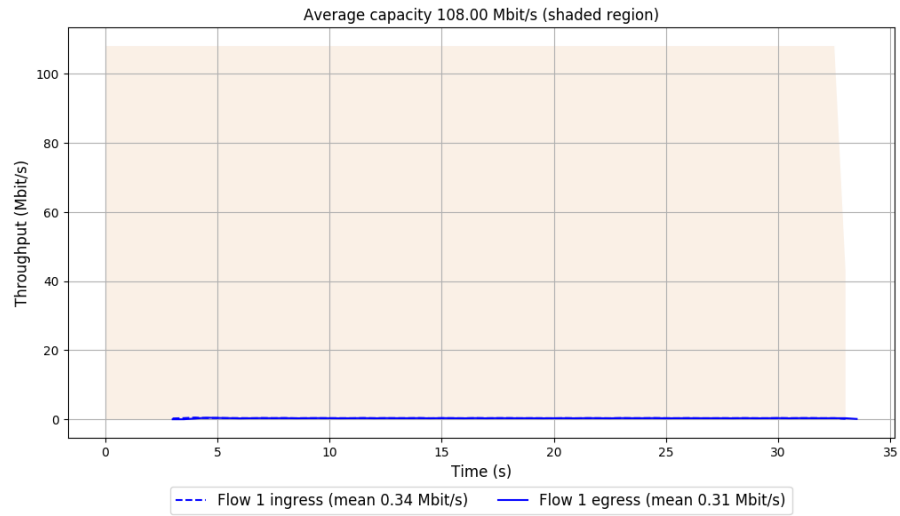
-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 52.205 ms

Loss rate: 8.37%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-05 21:16:59

End at: 2018-09-05 21:17:29

Below is generated by plot.py at 2018-09-05 21:21:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.31 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 52.214 ms

Loss rate: 7.95%

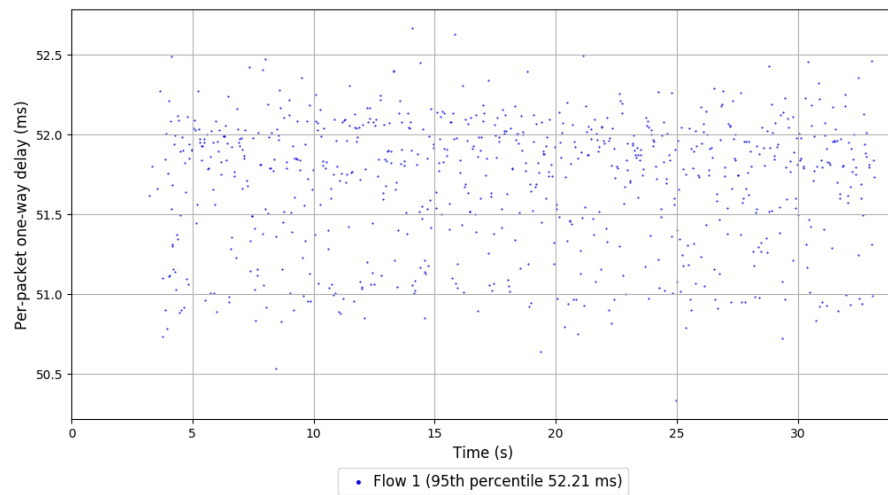
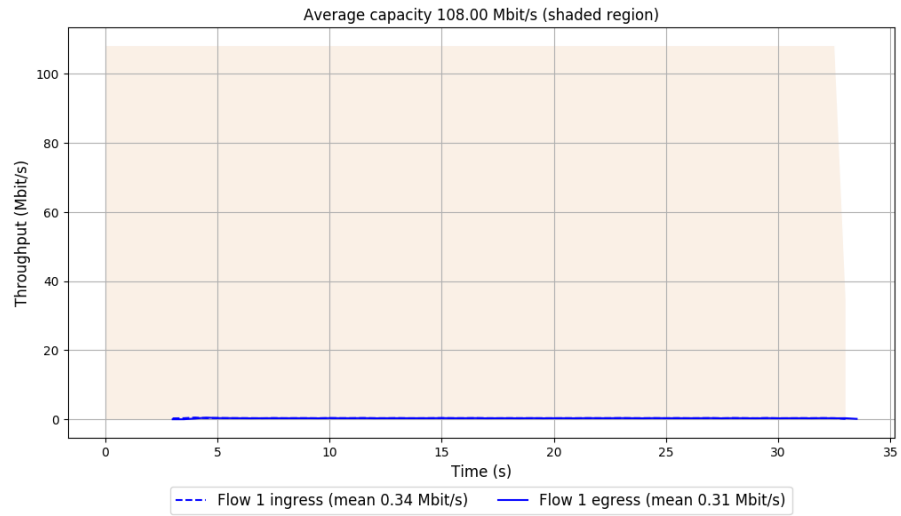
-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 52.214 ms

Loss rate: 7.95%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-05 21:19:26

End at: 2018-09-05 21:19:56

Below is generated by plot.py at 2018-09-05 21:21:44

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.31 Mbit/s (0.3% utilization)

95th percentile per-packet one-way delay: 52.185 ms

Loss rate: 8.68%

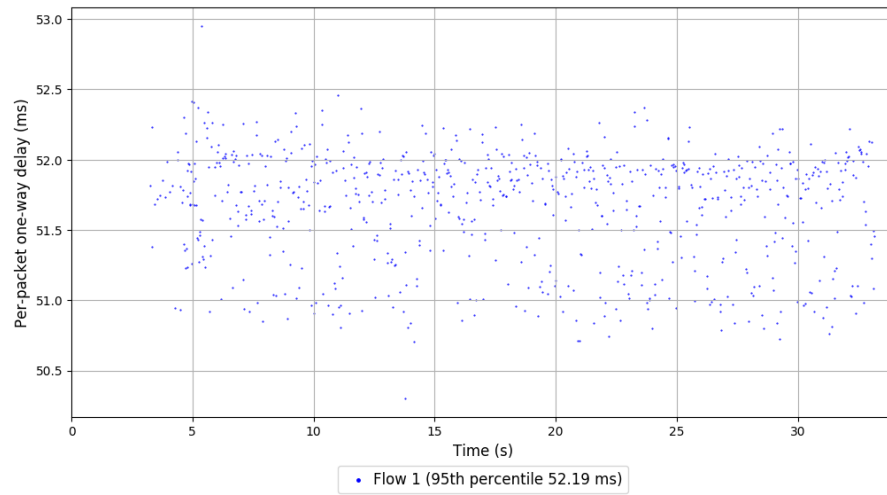
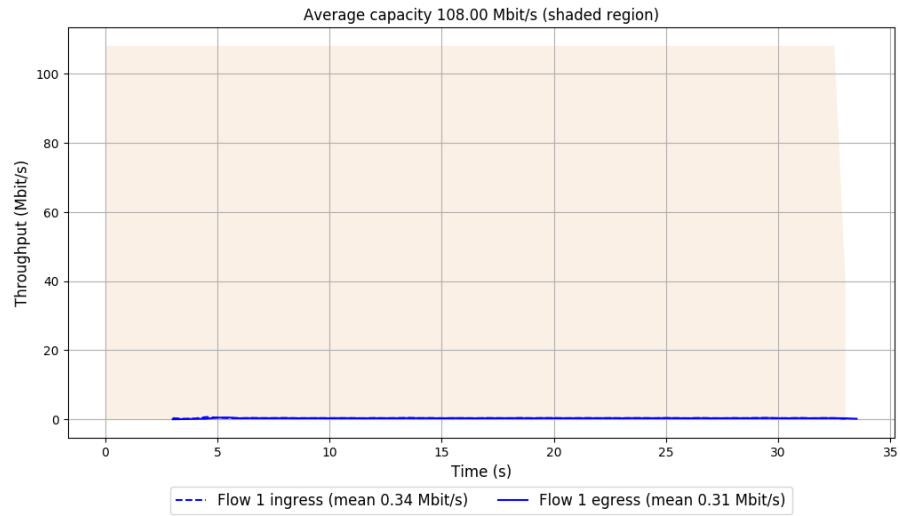
-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 52.185 ms

Loss rate: 8.68%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-09-05 21:13:53

End at: 2018-09-05 21:14:23

Below is generated by plot.py at 2018-09-05 21:21:53

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 1.93 Mbit/s (1.8% utilization)

95th percentile per-packet one-way delay: 52.237 ms

Loss rate: 97.40%

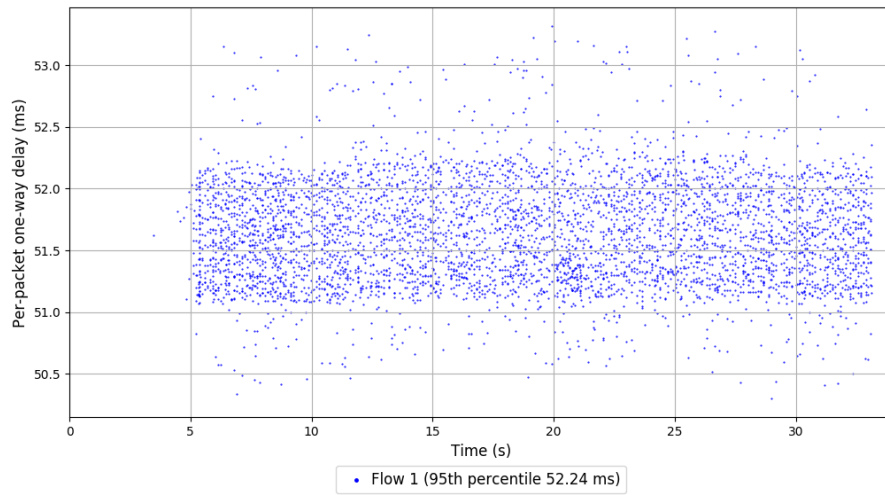
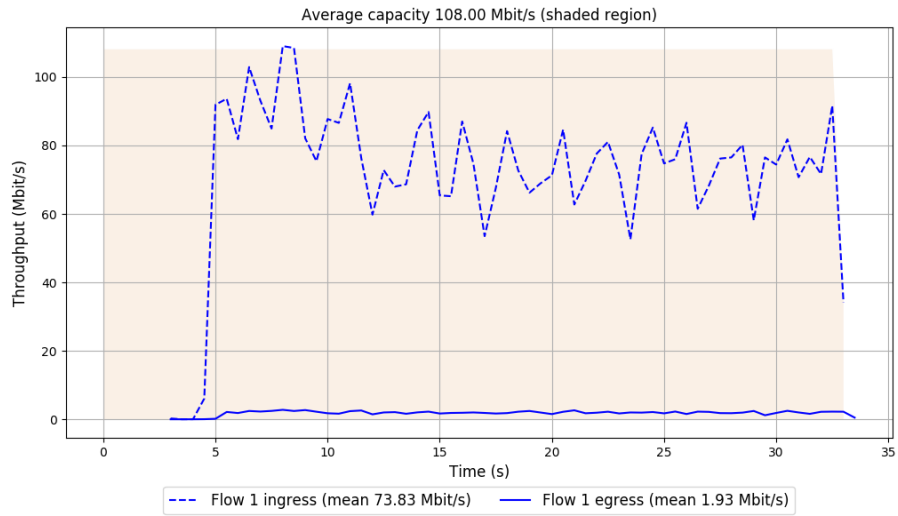
-- Flow 1:

Average throughput: 1.93 Mbit/s

95th percentile per-packet one-way delay: 52.237 ms

Loss rate: 97.40%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-05 21:16:21

End at: 2018-09-05 21:16:51

Below is generated by plot.py at 2018-09-05 21:21:55

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 2.07 Mbit/s (1.9% utilization)

95th percentile per-packet one-way delay: 52.134 ms

Loss rate: 97.47%

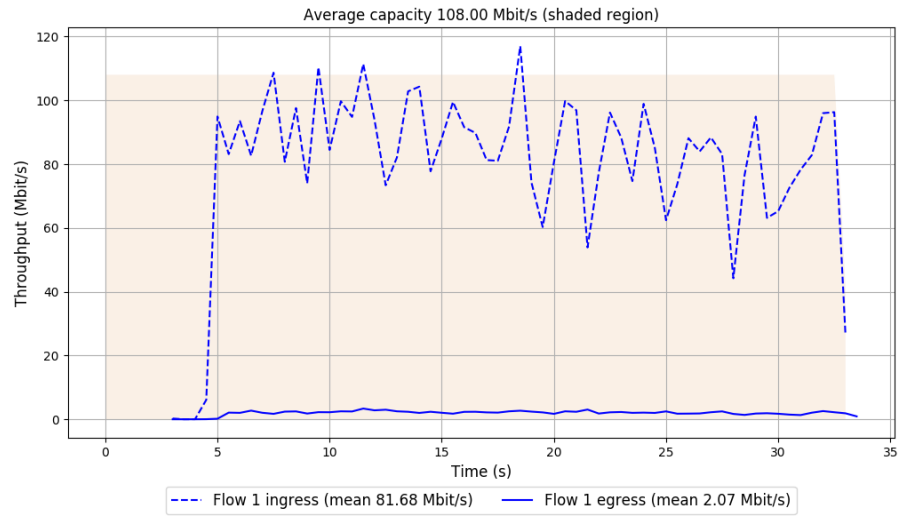
-- Flow 1:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 52.134 ms

Loss rate: 97.47%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-05 21:18:48

End at: 2018-09-05 21:19:18

Below is generated by plot.py at 2018-09-05 21:22:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 2.13 Mbit/s (2.0% utilization)

95th percentile per-packet one-way delay: 52.160 ms

Loss rate: 97.44%

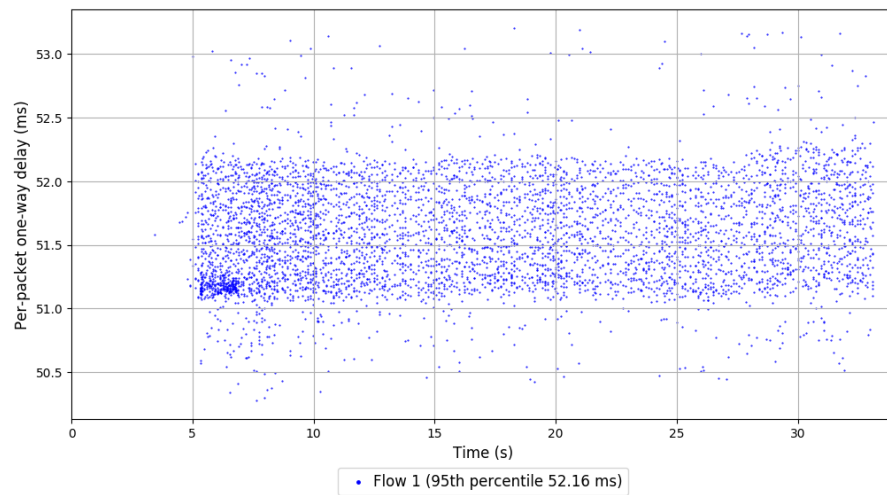
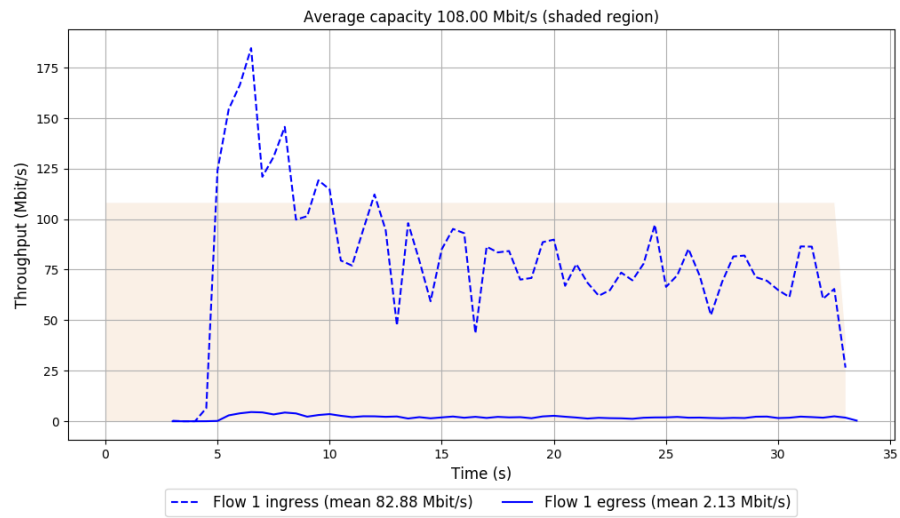
-- Flow 1:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 52.160 ms

Loss rate: 97.44%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-05 21:15:08

End at: 2018-09-05 21:15:38

Below is generated by plot.py at 2018-09-05 21:22:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 3.84 Mbit/s (3.6% utilization)

95th percentile per-packet one-way delay: 52.057 ms

Loss rate: 54.67%

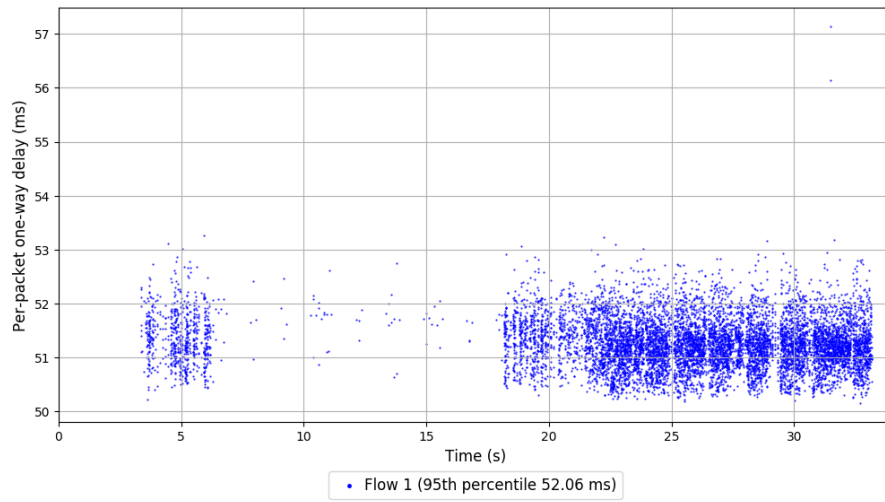
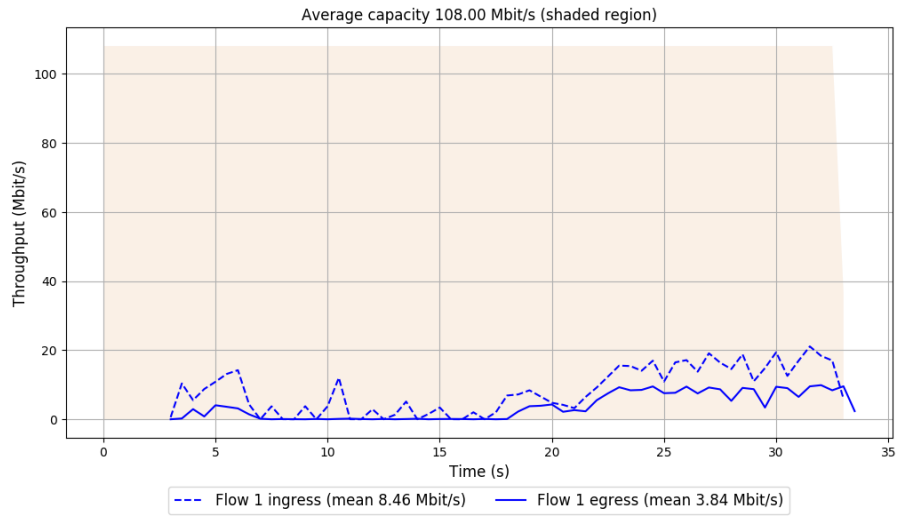
-- Flow 1:

Average throughput: 3.84 Mbit/s

95th percentile per-packet one-way delay: 52.057 ms

Loss rate: 54.67%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-05 21:17:35

End at: 2018-09-05 21:18:05

Below is generated by plot.py at 2018-09-05 21:22:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.09 Mbit/s (0.1% utilization)

95th percentile per-packet one-way delay: 52.242 ms

Loss rate: 91.77%

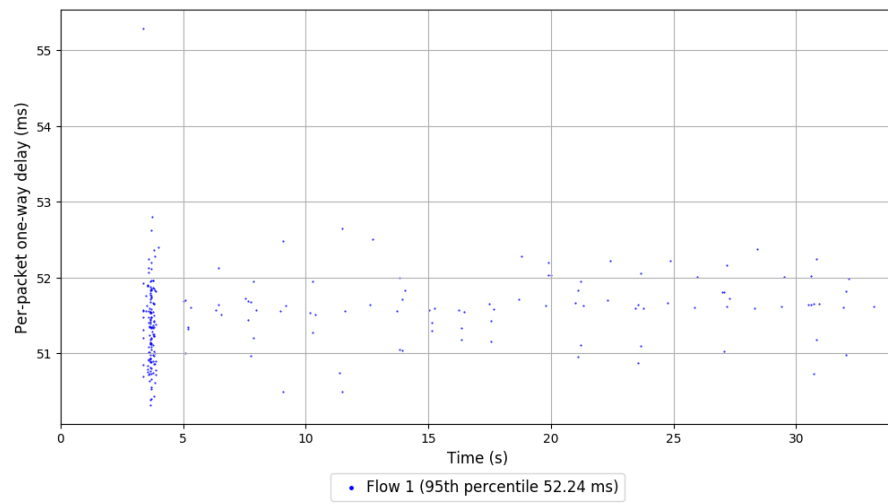
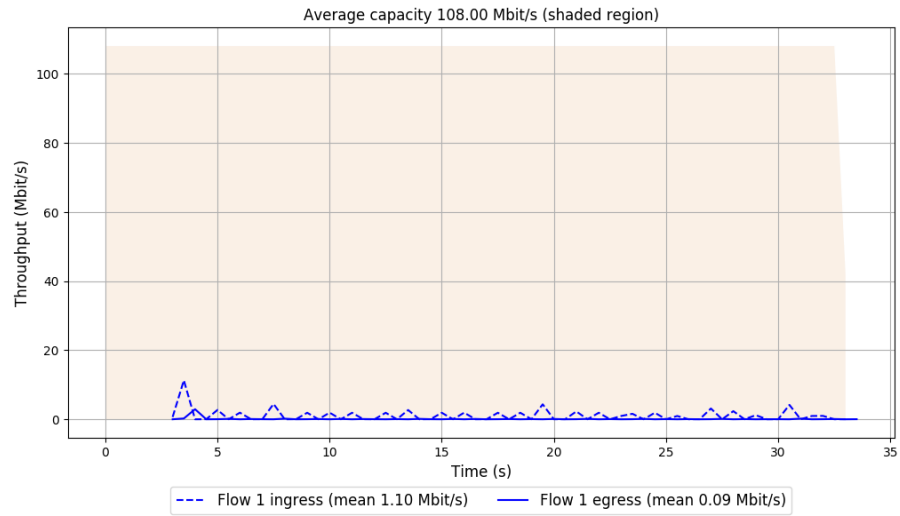
-- Flow 1:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 52.242 ms

Loss rate: 91.77%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-09-05 21:20:03

End at: 2018-09-05 21:20:33

Below is generated by plot.py at 2018-09-05 21:22:02

Datalink statistics

-- Total of 1 flow:

Average capacity: 108.00 Mbit/s

Average throughput: 0.15 Mbit/s (0.1% utilization)

95th percentile per-packet one-way delay: 52.182 ms

Loss rate: 89.01%

-- Flow 1:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 52.182 ms

Loss rate: 89.01%

Run 3: Report of Muses-25 — Data Link

