

Pantheon Report

Generated at 2018-08-28 06:10:48 (UTC).

Data path: Stanford on `eno1` (*remote*) → AWS California 1 on `ens5` (*local*).

Repeated the test of 4 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

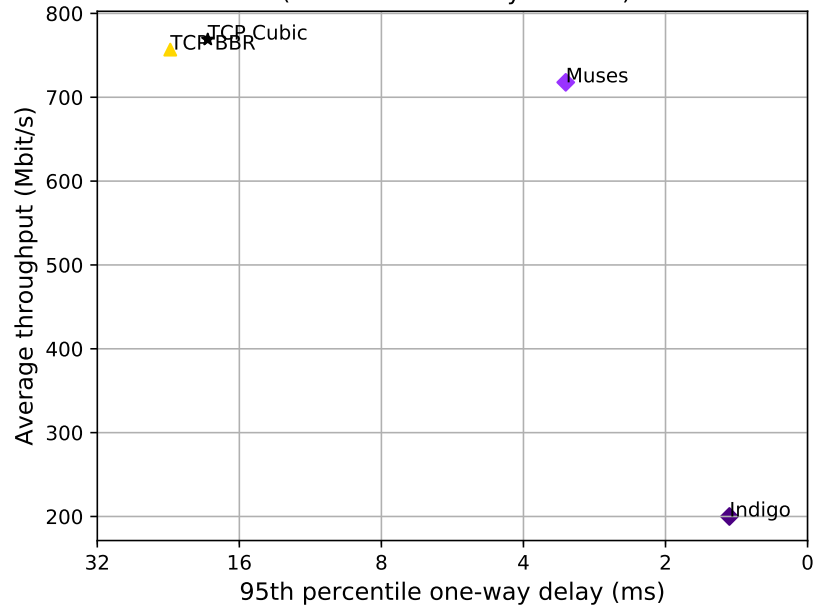
System info:

```
Linux 4.15.0-1019-aws
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
```

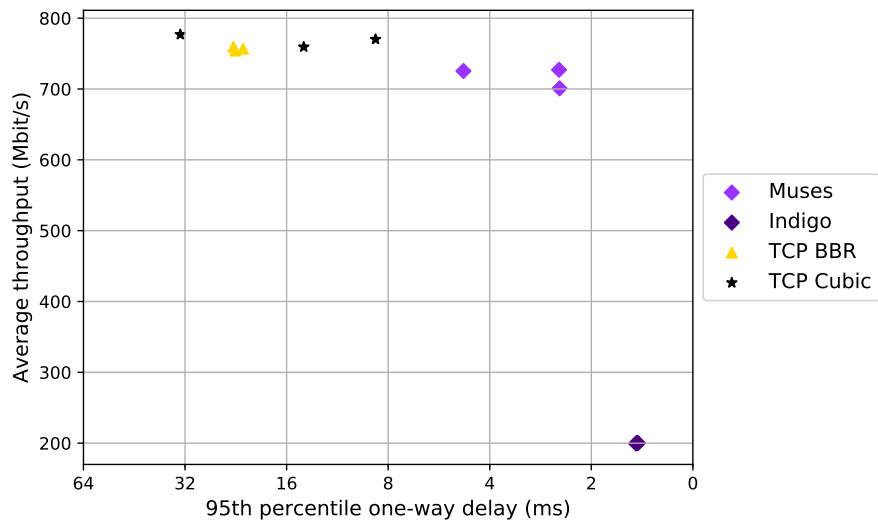
Git summary:

```
branch: muses @ 86ef433b09b2f4ecae1186d6940af93bcf0969cd
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b261c9e99c63be452bc16f94ce0caa99a4c9d39a
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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
```

test from Stanford to AWS California 1, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from Stanford to AWS California 1, 3 runs of 30s each per scheme



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	756.85	22.41	0.08
TCP Cubic	3	768.84	18.67	0.08
Indigo	3	200.00	1.10	0.05
Muses	3	717.79	3.25	0.07

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 05:41:16

End at: 2018-08-28 05:41:46

Local clock offset: 0.767 ms

Remote clock offset: 0.025 ms

Below is generated by plot.py at 2018-08-28 06:08:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 756.82 Mbit/s

95th percentile per-packet one-way delay: 21.532 ms

Loss rate: 0.03%

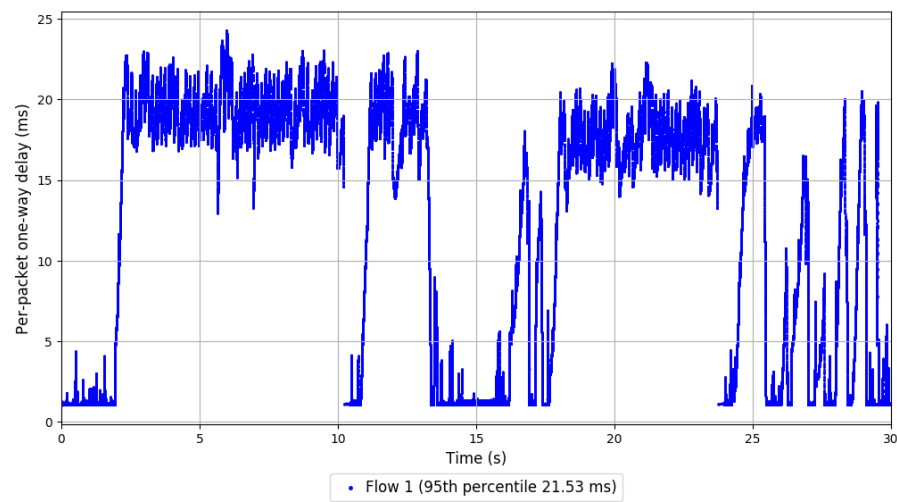
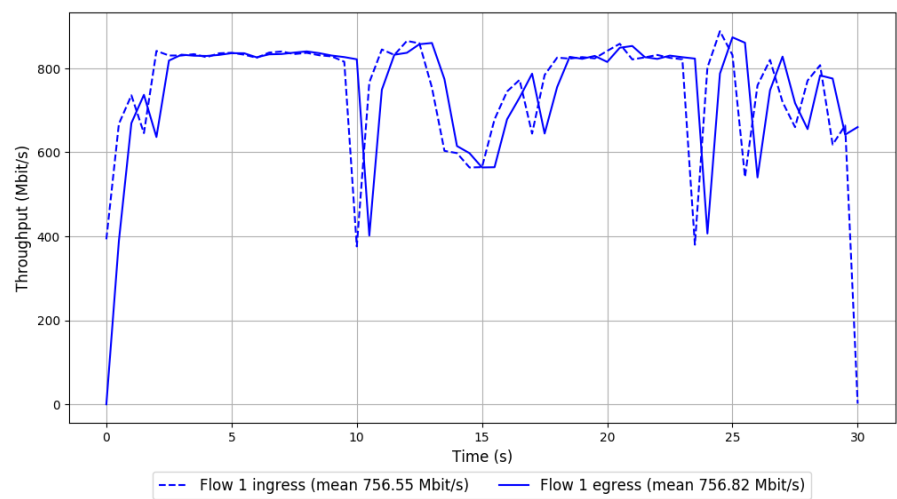
-- Flow 1:

Average throughput: 756.82 Mbit/s

95th percentile per-packet one-way delay: 21.532 ms

Loss rate: 0.03%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-28 05:47:47

End at: 2018-08-28 05:48:17

Local clock offset: 0.733 ms

Remote clock offset: 0.183 ms

Below is generated by plot.py at 2018-08-28 06:08:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 754.24 Mbit/s

95th percentile per-packet one-way delay: 22.705 ms

Loss rate: 0.14%

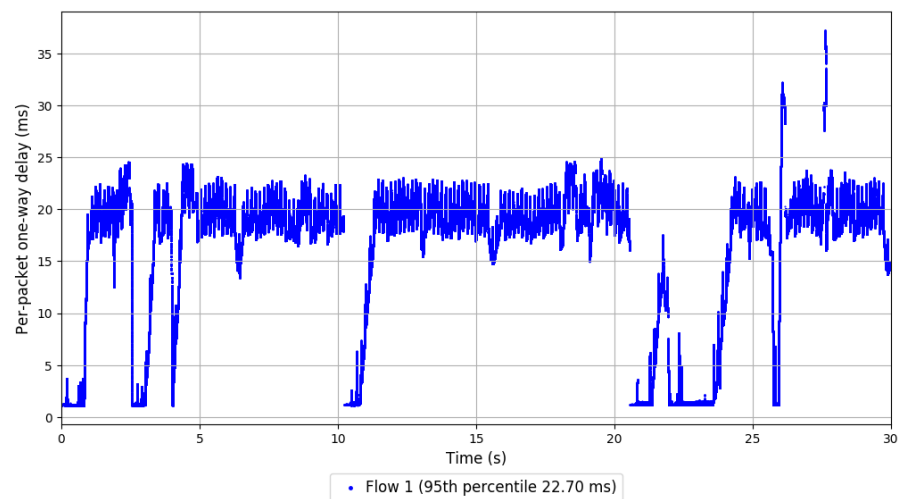
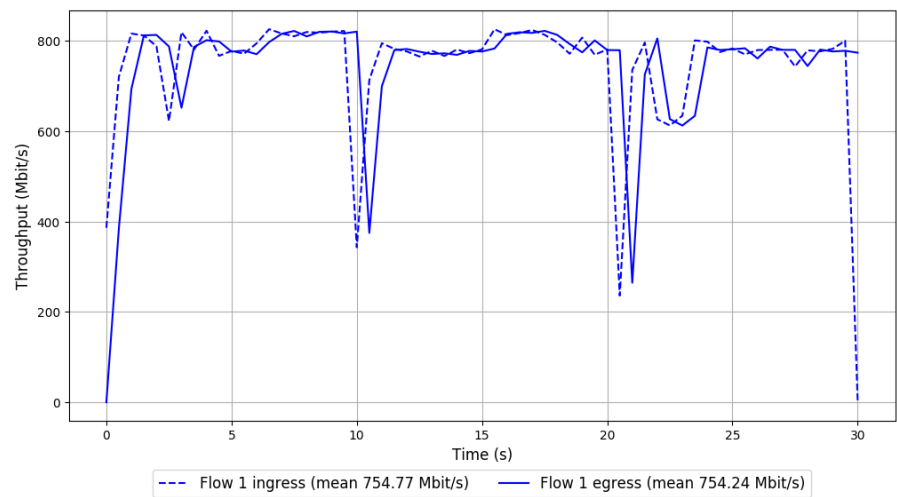
-- Flow 1:

Average throughput: 754.24 Mbit/s

95th percentile per-packet one-way delay: 22.705 ms

Loss rate: 0.14%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 05:54:17

End at: 2018-08-28 05:54:47

Local clock offset: 0.741 ms

Remote clock offset: 0.684 ms

Below is generated by plot.py at 2018-08-28 06:08:06

Datalink statistics

-- Total of 1 flow:

Average throughput: 759.48 Mbit/s

95th percentile per-packet one-way delay: 23.003 ms

Loss rate: 0.07%

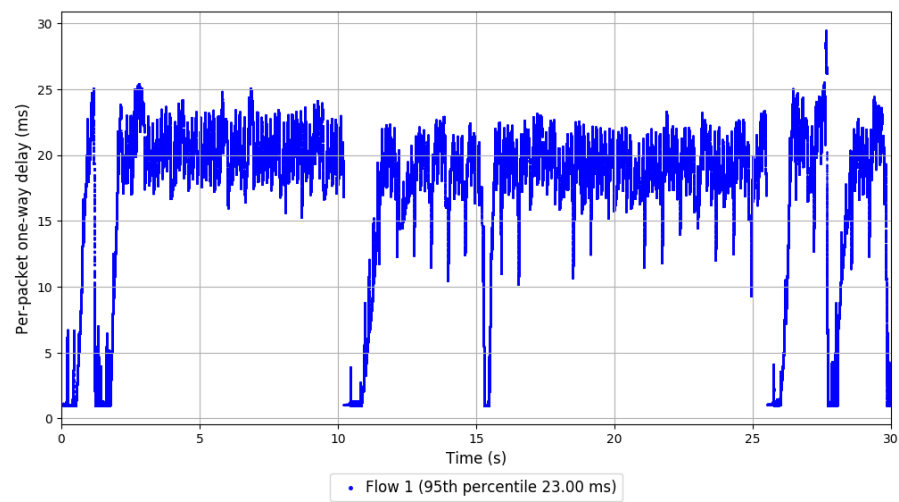
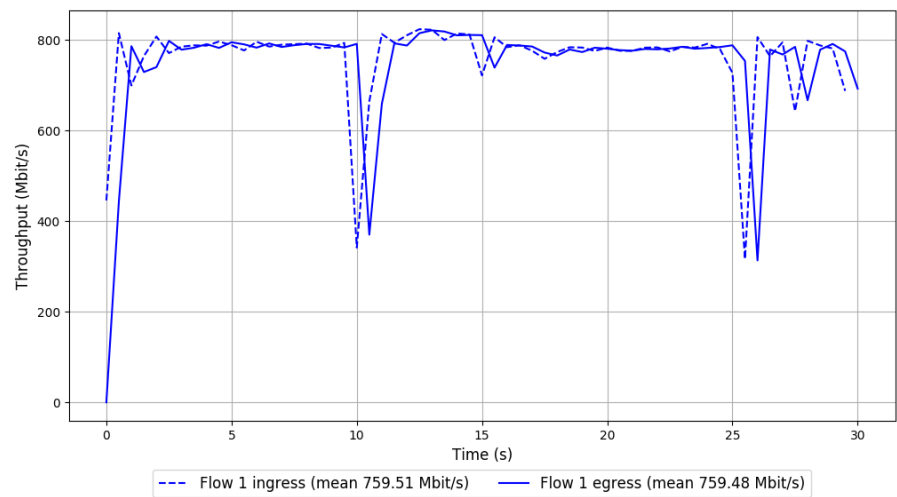
-- Flow 1:

Average throughput: 759.48 Mbit/s

95th percentile per-packet one-way delay: 23.003 ms

Loss rate: 0.07%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 05:44:40

End at: 2018-08-28 05:45:10

Local clock offset: 0.739 ms

Remote clock offset: 0.136 ms

Below is generated by plot.py at 2018-08-28 06:08:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 770.22 Mbit/s

95th percentile per-packet one-way delay: 8.721 ms

Loss rate: 0.09%

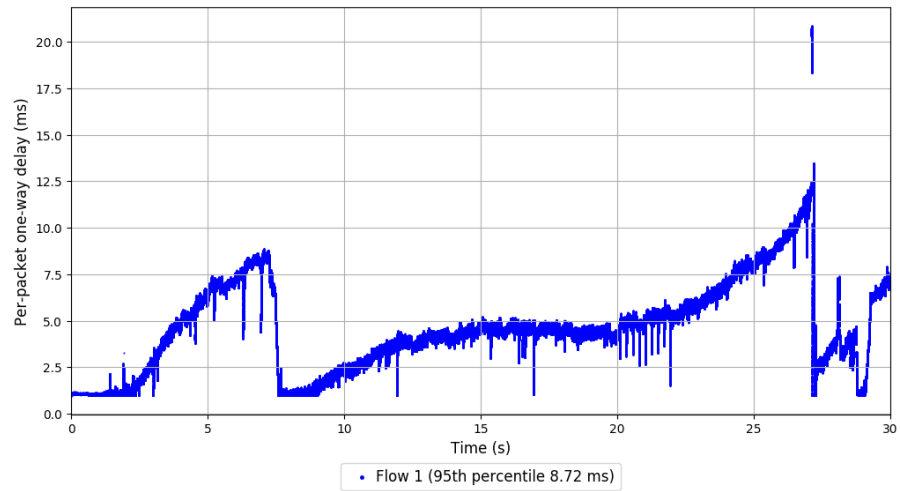
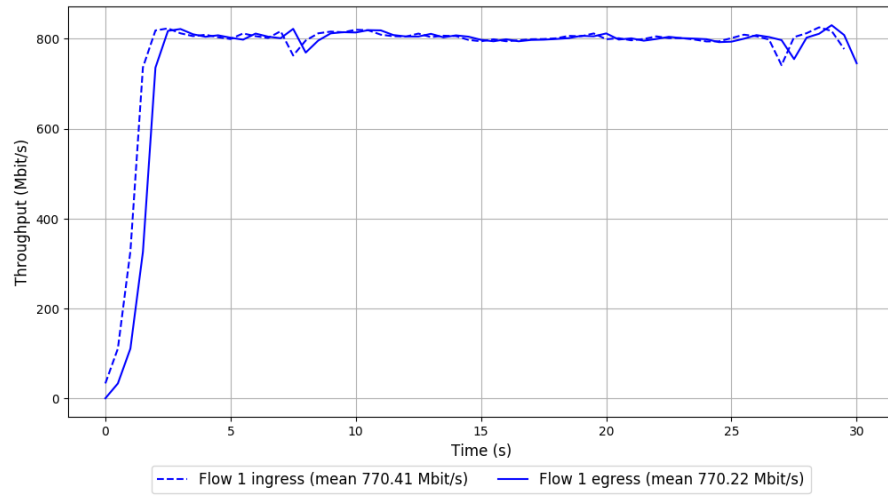
-- Flow 1:

Average throughput: 770.22 Mbit/s

95th percentile per-packet one-way delay: 8.721 ms

Loss rate: 0.09%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 05:51:10

End at: 2018-08-28 05:51:40

Local clock offset: 0.734 ms

Remote clock offset: 0.428 ms

Below is generated by plot.py at 2018-08-28 06:08:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 776.91 Mbit/s

95th percentile per-packet one-way delay: 33.047 ms

Loss rate: 0.08%

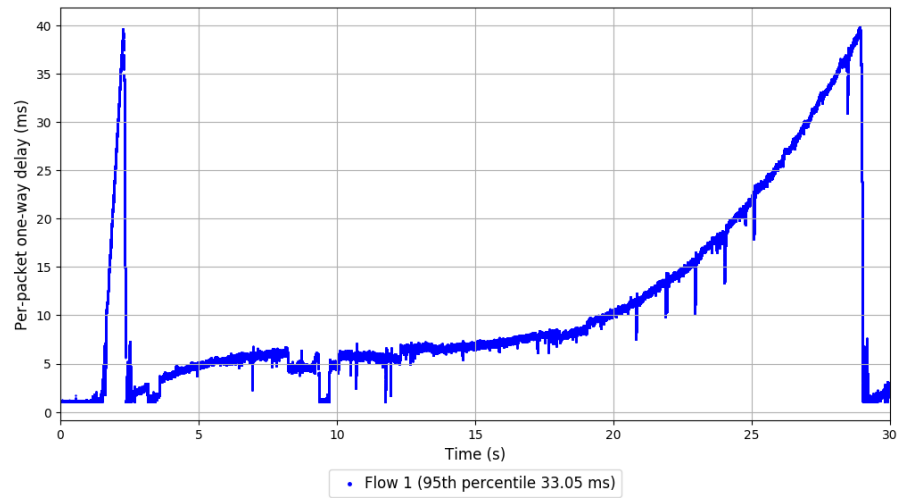
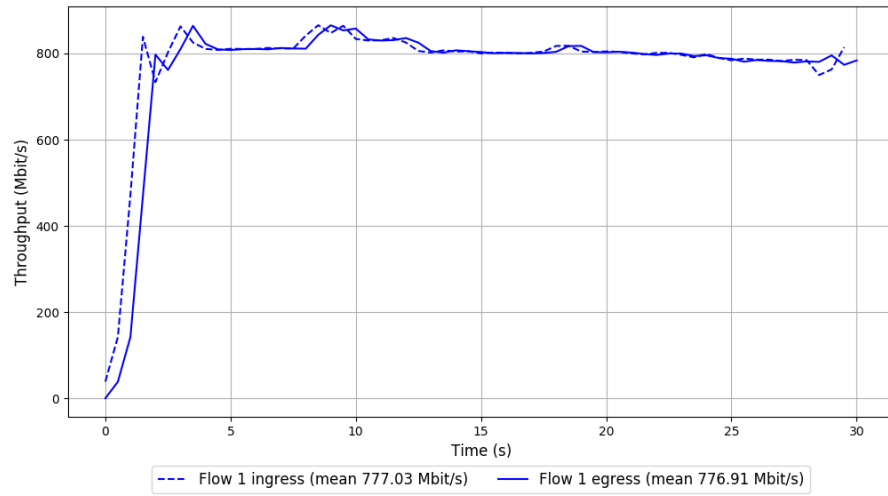
-- Flow 1:

Average throughput: 776.91 Mbit/s

95th percentile per-packet one-way delay: 33.047 ms

Loss rate: 0.08%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 05:57:41

End at: 2018-08-28 05:58:11

Local clock offset: 0.768 ms

Remote clock offset: 0.756 ms

Below is generated by plot.py at 2018-08-28 06:08:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 759.39 Mbit/s

95th percentile per-packet one-way delay: 14.234 ms

Loss rate: 0.07%

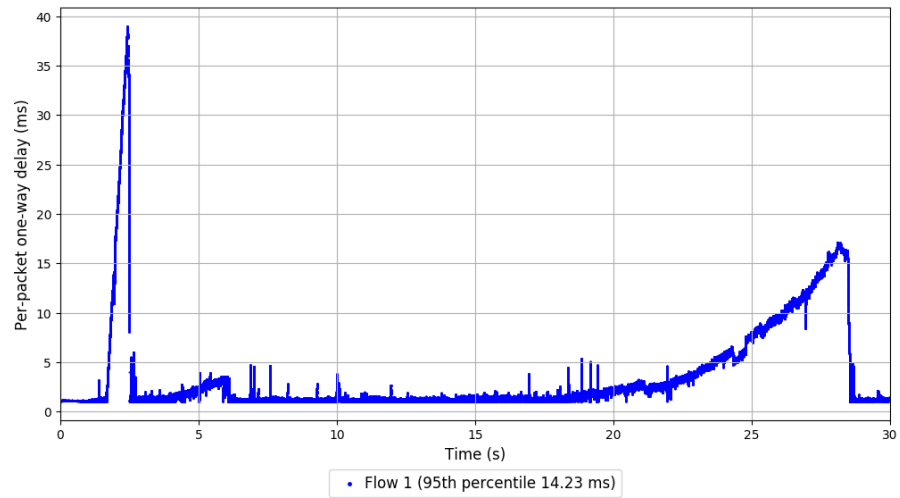
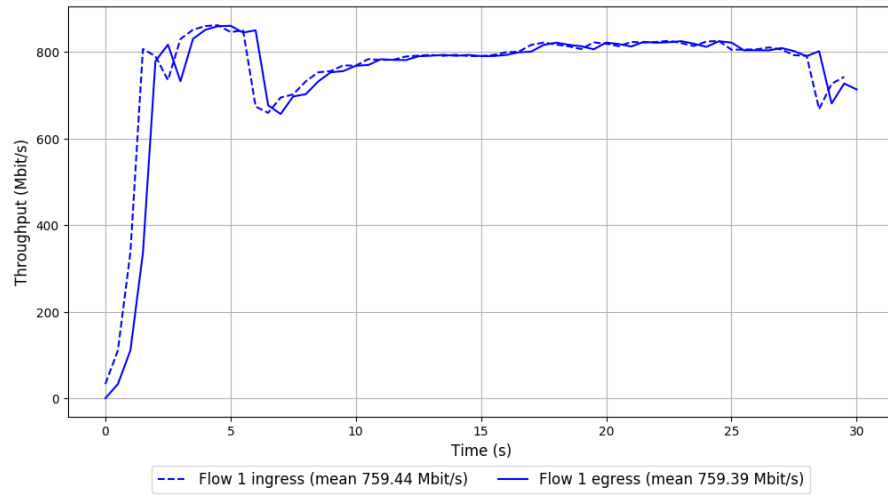
-- Flow 1:

Average throughput: 759.39 Mbit/s

95th percentile per-packet one-way delay: 14.234 ms

Loss rate: 0.07%

Run 3: Report of TCP Cubic — Data Link

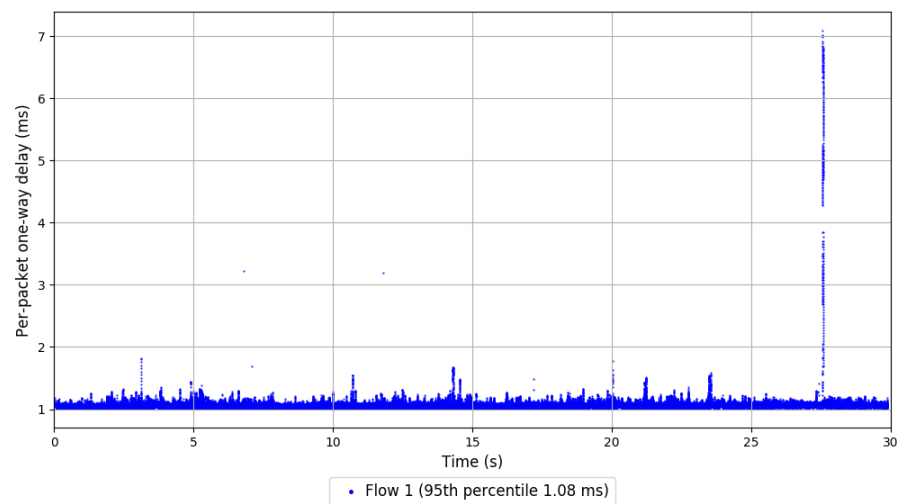
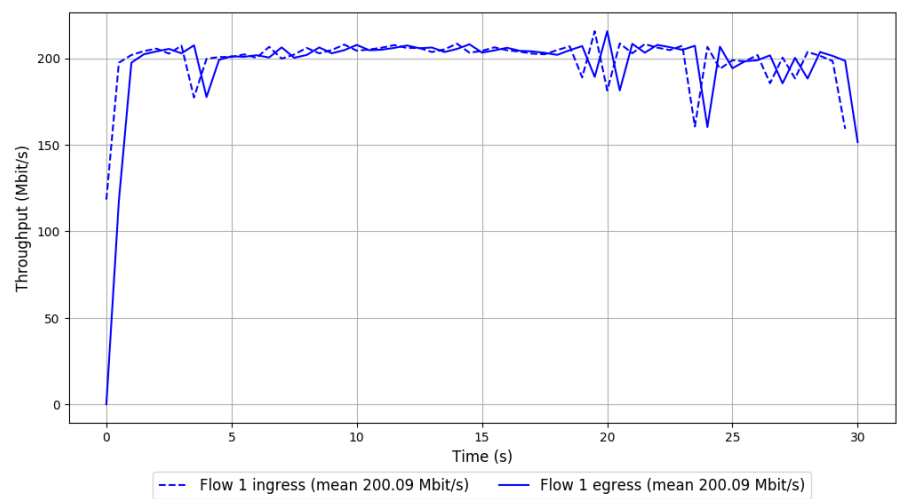


```
Run 1: Statistics of Indigo

Start at: 2018-08-28 05:39:50
End at: 2018-08-28 05:40:20
Local clock offset: 0.74 ms
Remote clock offset: 0.021 ms

# Below is generated by plot.py at 2018-08-28 06:08:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 200.09 Mbit/s
95th percentile per-packet one-way delay: 1.082 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 200.09 Mbit/s
95th percentile per-packet one-way delay: 1.082 ms
Loss rate: 0.07%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-28 05:46:21

End at: 2018-08-28 05:46:51

Local clock offset: 0.644 ms

Remote clock offset: 0.088 ms

Below is generated by plot.py at 2018-08-28 06:08:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 200.47 Mbit/s

95th percentile per-packet one-way delay: 1.102 ms

Loss rate: 0.06%

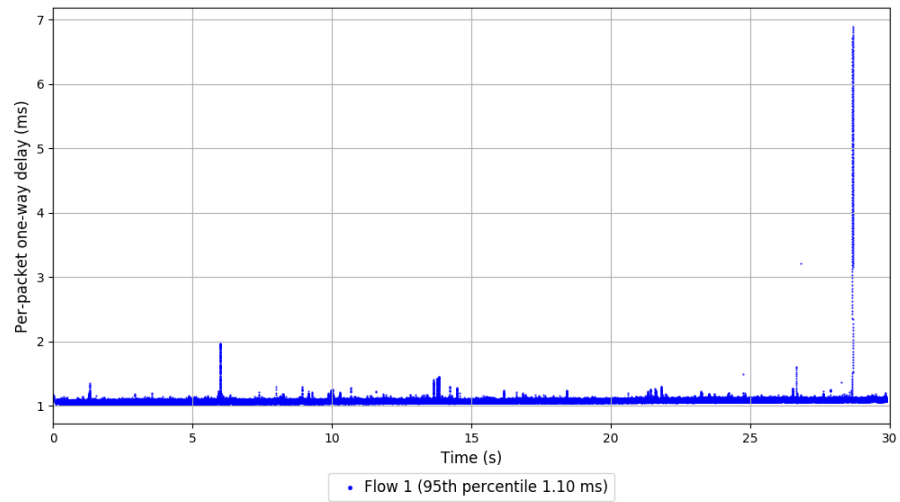
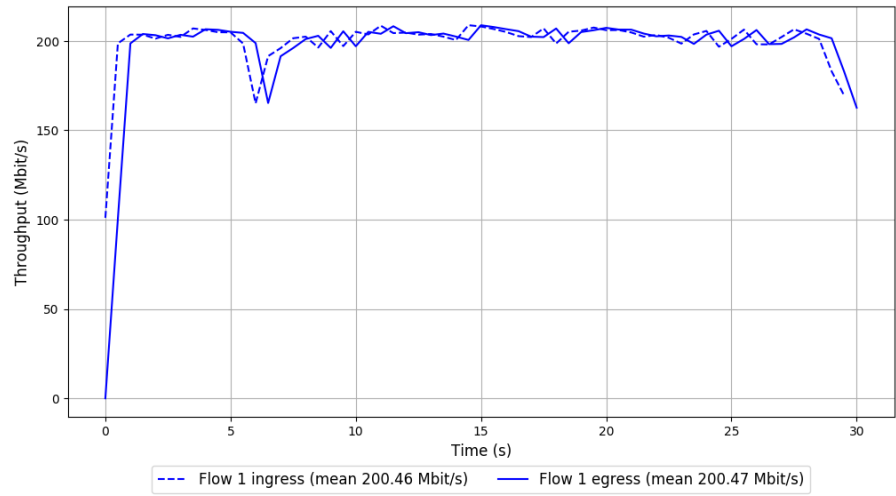
-- Flow 1:

Average throughput: 200.47 Mbit/s

95th percentile per-packet one-way delay: 1.102 ms

Loss rate: 0.06%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-08-28 05:52:51

End at: 2018-08-28 05:53:21

Local clock offset: 0.734 ms

Remote clock offset: 0.545 ms

Below is generated by plot.py at 2018-08-28 06:08:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 199.43 Mbit/s

95th percentile per-packet one-way delay: 1.117 ms

Loss rate: 0.02%

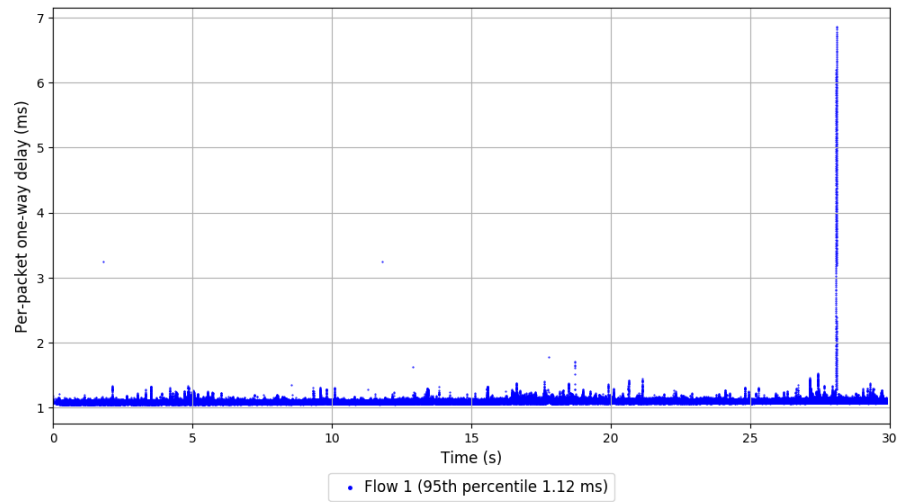
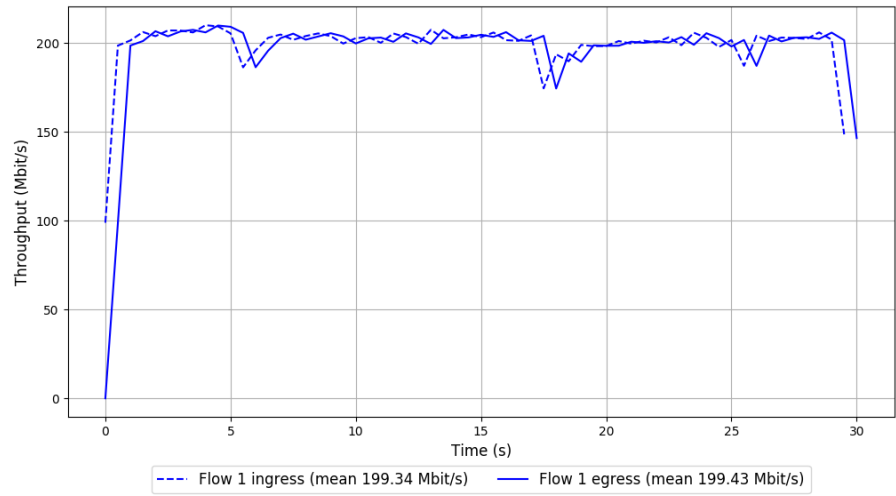
-- Flow 1:

Average throughput: 199.43 Mbit/s

95th percentile per-packet one-way delay: 1.117 ms

Loss rate: 0.02%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses

Start at: 2018-08-28 05:42:57

End at: 2018-08-28 05:43:27

Local clock offset: 0.758 ms

Remote clock offset: 0.05 ms

Below is generated by plot.py at 2018-08-28 06:10:06

Datalink statistics

-- Total of 1 flow:

Average throughput: 725.40 Mbit/s

95th percentile per-packet one-way delay: 4.786 ms

Loss rate: 0.06%

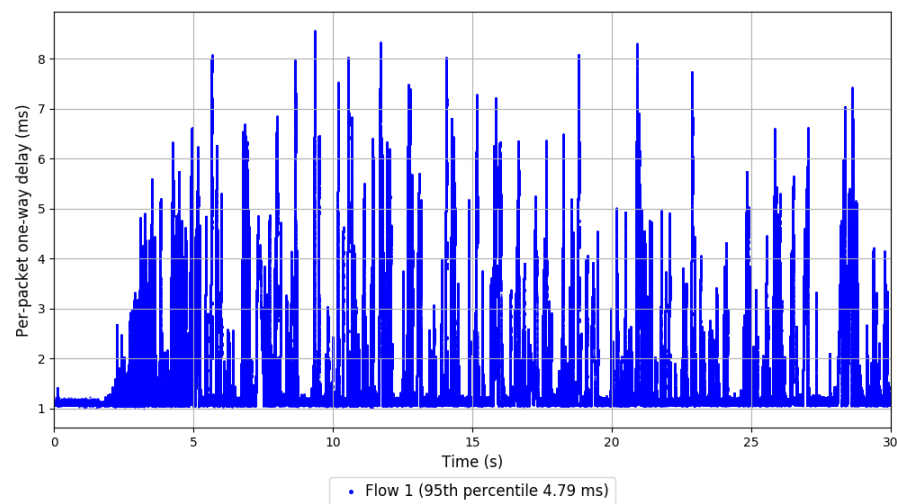
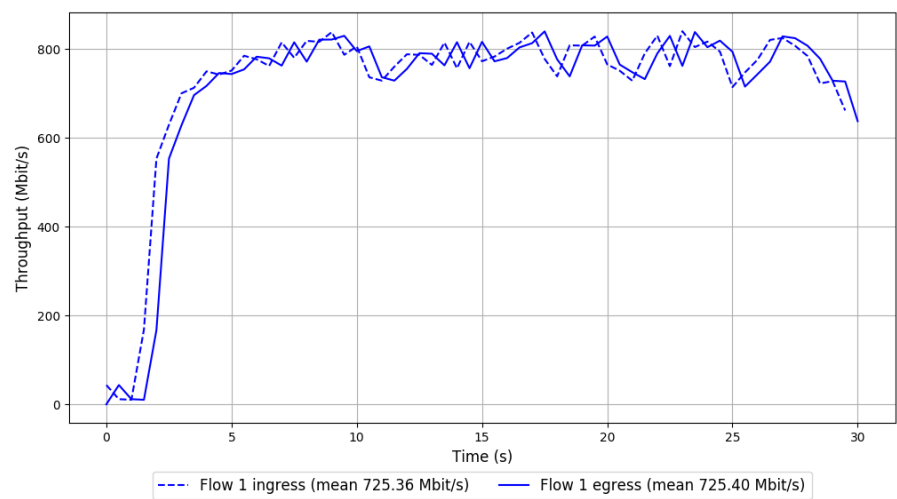
-- Flow 1:

Average throughput: 725.40 Mbit/s

95th percentile per-packet one-way delay: 4.786 ms

Loss rate: 0.06%

Run 1: Report of Muses — Data Link



Run 2: Statistics of Muses

Start at: 2018-08-28 05:49:28

End at: 2018-08-28 05:49:58

Local clock offset: 0.727 ms

Remote clock offset: 0.355 ms

Below is generated by plot.py at 2018-08-28 06:10:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 700.91 Mbit/s

95th percentile per-packet one-way delay: 2.484 ms

Loss rate: 0.08%

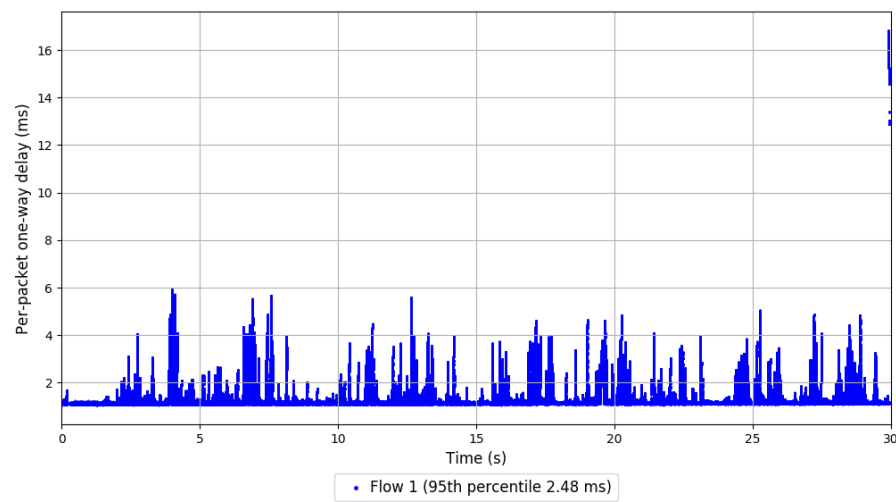
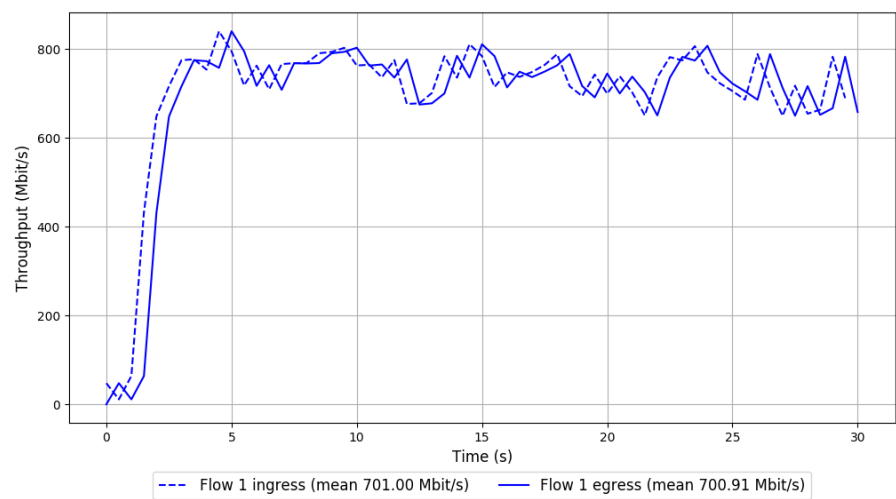
-- Flow 1:

Average throughput: 700.91 Mbit/s

95th percentile per-packet one-way delay: 2.484 ms

Loss rate: 0.08%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 05:55:58

End at: 2018-08-28 05:56:28

Local clock offset: 0.759 ms

Remote clock offset: 0.677 ms

Below is generated by plot.py at 2018-08-28 06:10:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 727.07 Mbit/s

95th percentile per-packet one-way delay: 2.493 ms

Loss rate: 0.07%

-- Flow 1:

Average throughput: 727.07 Mbit/s

95th percentile per-packet one-way delay: 2.493 ms

Loss rate: 0.07%

Run 3: Report of Muses — Data Link

