

Pantheon Report

Generated at 2018-09-03 09:45:10 (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.

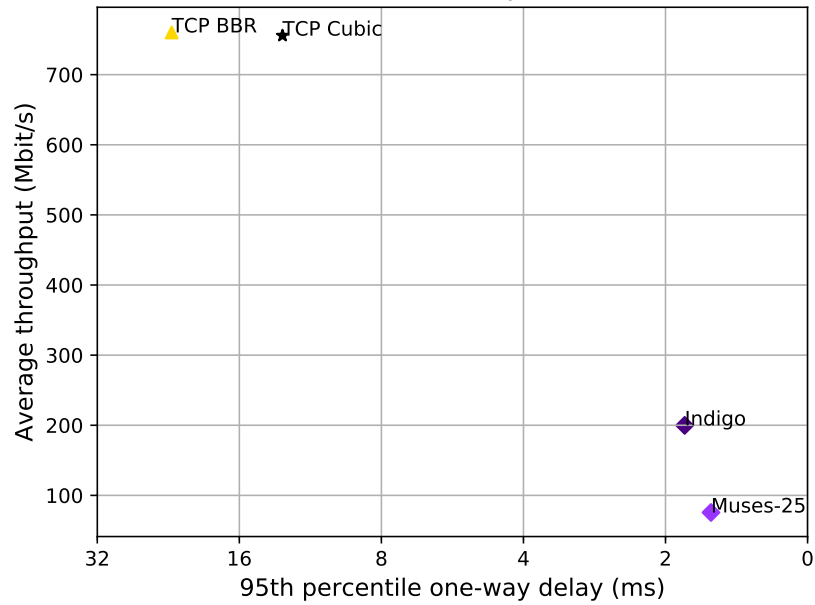
System info:

```
Linux 4.15.0-1020-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
net.ipv4.tcp_mem = 536870912 536870912 536870912
```

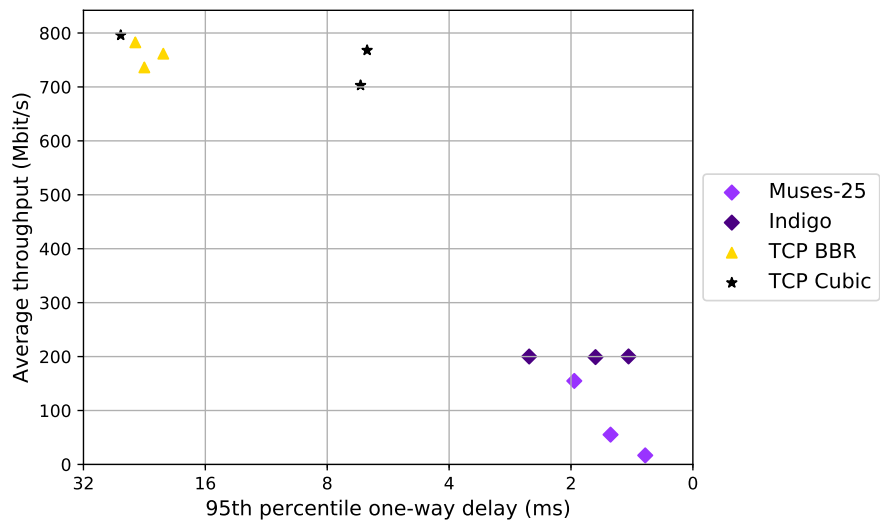
Git summary:

```
branch: muses @ f309f5459e2c5237279a184e52ece7a2b47ef1c9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b8d5019b83a3a678804d830fcfe1da7b3a63421b
third_party/pantheon-tunnel @ cbfce6db5ff5740dfe1771f813cd646339e1952
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	760.18	22.26	0.11
TCP Cubic	3	755.65	12.96	0.08
Indigo	3	199.80	1.73	0.06
Muses-25	3	75.62	1.36	0.04

Run 1: Statistics of TCP BBR

Start at: 2018-09-03 09:20:15

End at: 2018-09-03 09:20:45

Local clock offset: 14.559 ms

Remote clock offset: 0.262 ms

Below is generated by plot.py at 2018-09-03 09:45:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 761.67 Mbit/s

95th percentile per-packet one-way delay: 20.323 ms

Loss rate: 0.13%

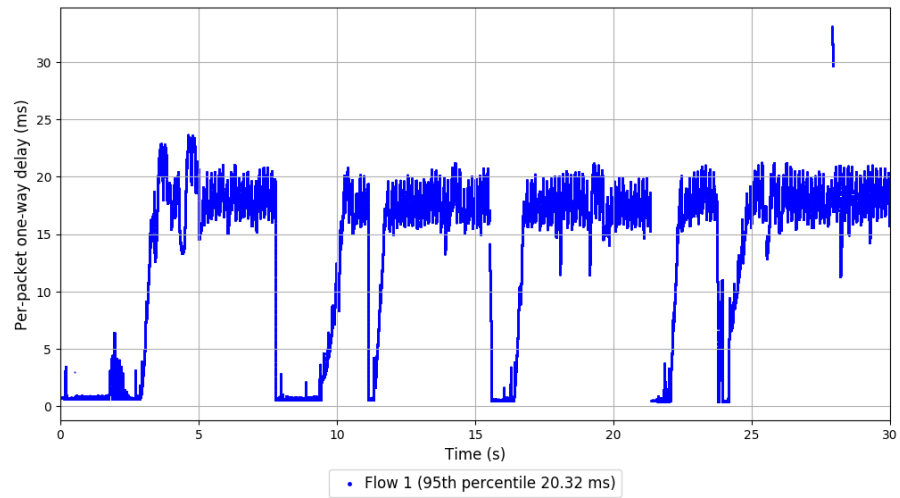
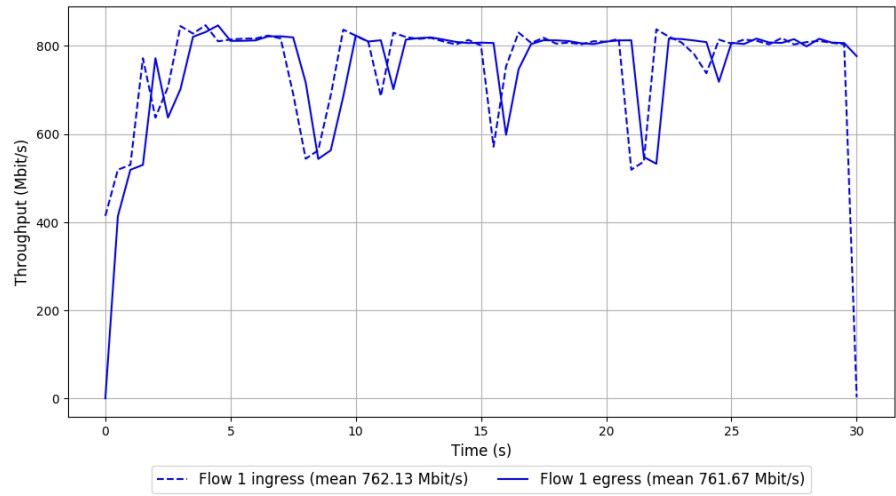
-- Flow 1:

Average throughput: 761.67 Mbit/s

95th percentile per-packet one-way delay: 20.323 ms

Loss rate: 0.13%

Run 1: Report of TCP BBR — Data Link

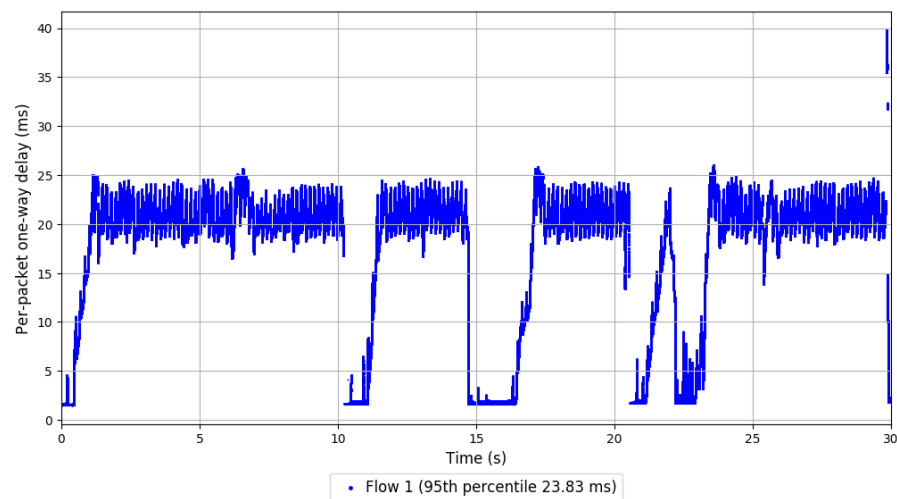
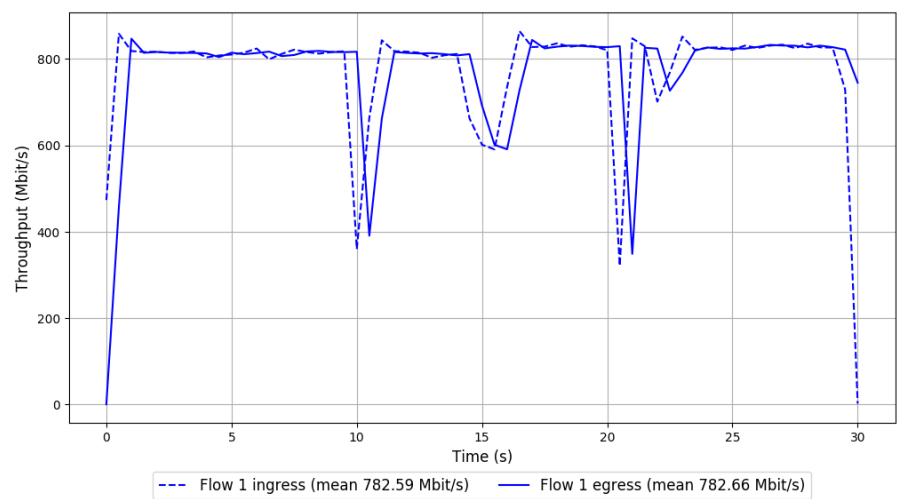


Run 2: Statistics of TCP BBR

Start at: 2018-09-03 09:26:26
End at: 2018-09-03 09:26:56
Local clock offset: 10.248 ms
Remote clock offset: -0.573 ms

Below is generated by plot.py at 2018-09-03 09:45:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 782.66 Mbit/s
95th percentile per-packet one-way delay: 23.826 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 782.66 Mbit/s
95th percentile per-packet one-way delay: 23.826 ms
Loss rate: 0.06%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-03 09:32:32

End at: 2018-09-03 09:33:02

Local clock offset: 7.331 ms

Remote clock offset: -1.056 ms

Below is generated by plot.py at 2018-09-03 09:45:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 736.21 Mbit/s

95th percentile per-packet one-way delay: 22.636 ms

Loss rate: 0.15%

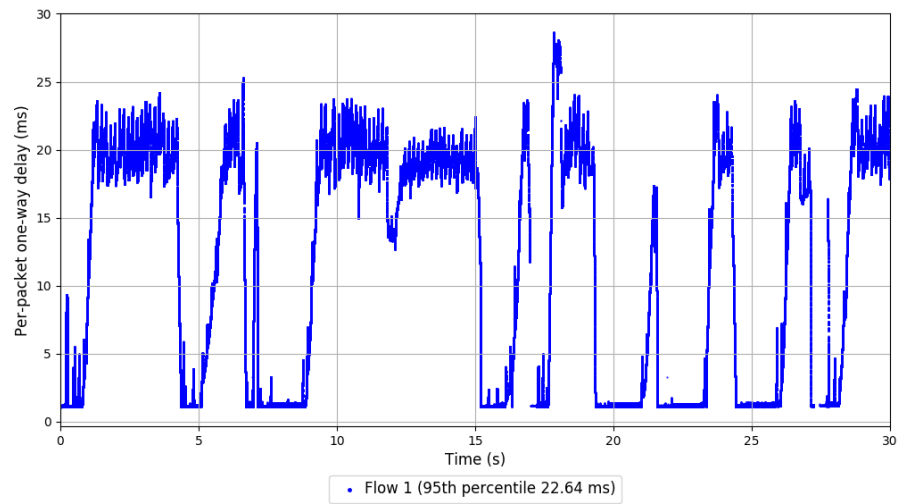
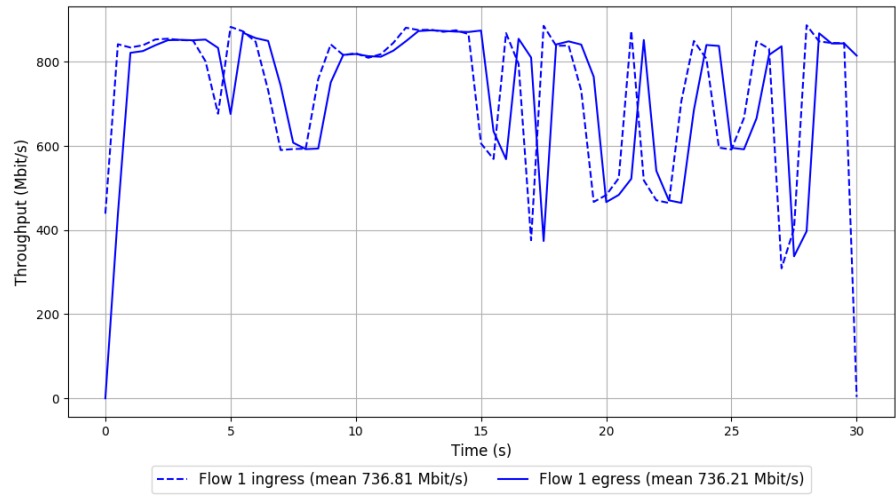
-- Flow 1:

Average throughput: 736.21 Mbit/s

95th percentile per-packet one-way delay: 22.636 ms

Loss rate: 0.15%

Run 3: Report of TCP BBR — Data Link

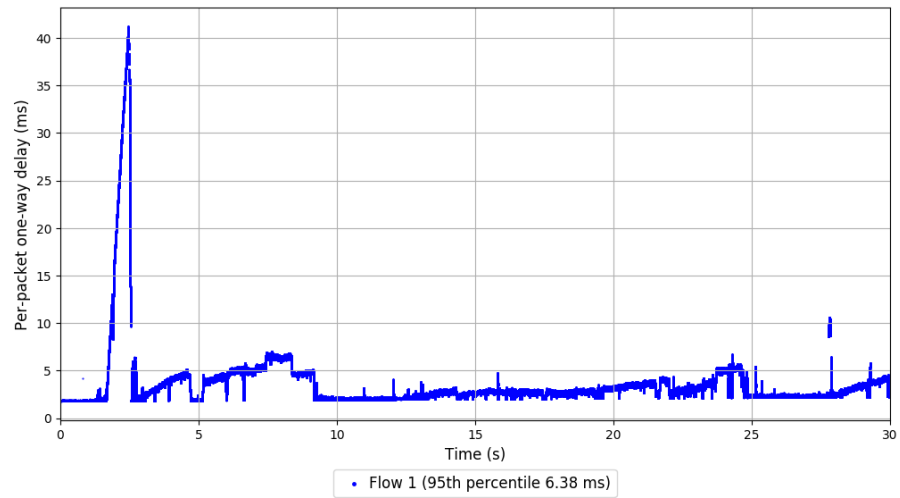
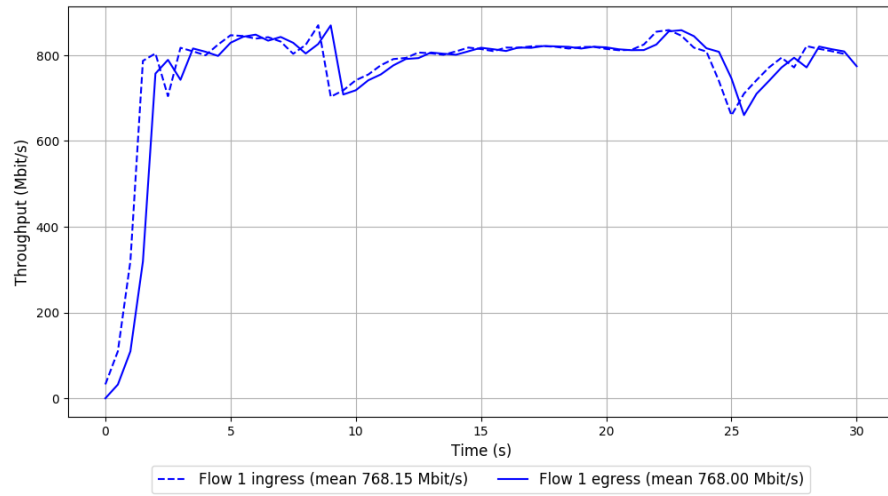


Run 1: Statistics of TCP Cubic

Start at: 2018-09-03 09:23:22
End at: 2018-09-03 09:23:52
Local clock offset: 13.21 ms
Remote clock offset: -0.238 ms

Below is generated by plot.py at 2018-09-03 09:45:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 768.00 Mbit/s
95th percentile per-packet one-way delay: 6.376 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 768.00 Mbit/s
95th percentile per-packet one-way delay: 6.376 ms
Loss rate: 0.09%

Run 1: Report of TCP Cubic — Data Link

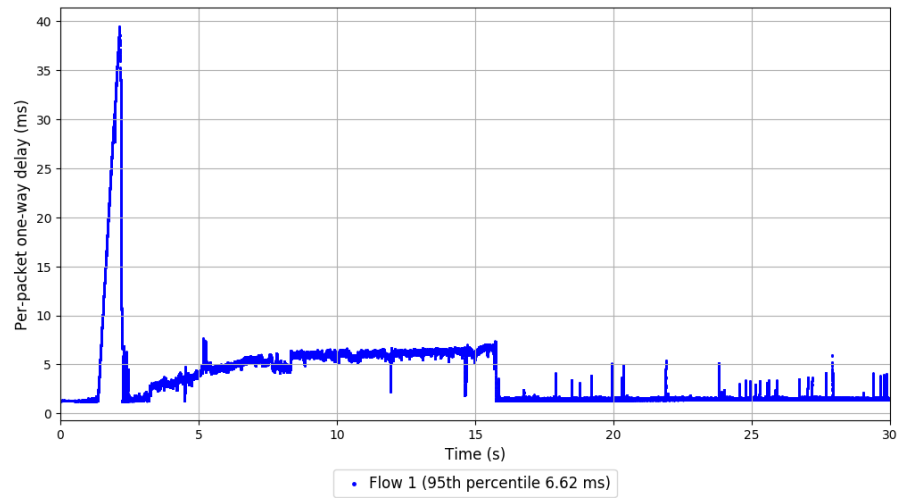
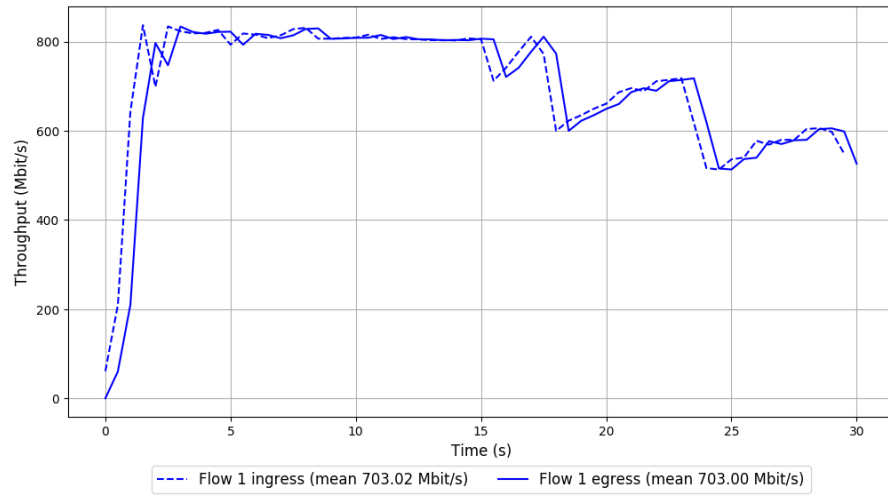


Run 2: Statistics of TCP Cubic

Start at: 2018-09-03 09:29:34
End at: 2018-09-03 09:30:04
Local clock offset: 8.345 ms
Remote clock offset: -0.833 ms

Below is generated by plot.py at 2018-09-03 09:45:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 703.00 Mbit/s
95th percentile per-packet one-way delay: 6.619 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 703.00 Mbit/s
95th percentile per-packet one-way delay: 6.619 ms
Loss rate: 0.07%

Run 2: Report of TCP Cubic — Data Link

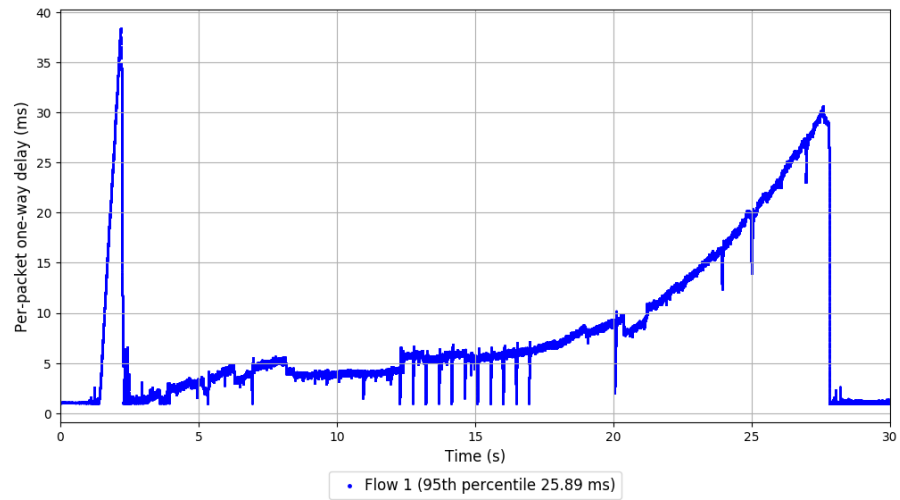
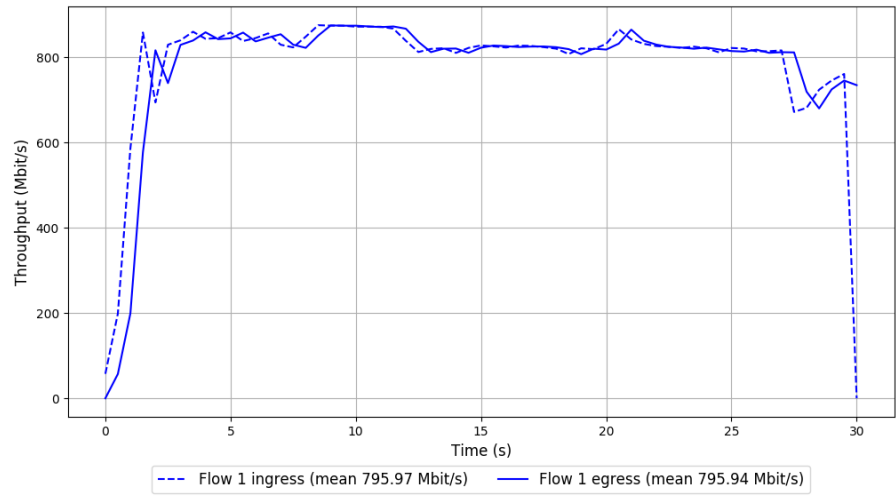


Run 3: Statistics of TCP Cubic

Start at: 2018-09-03 09:35:39
End at: 2018-09-03 09:36:09
Local clock offset: 6.865 ms
Remote clock offset: -1.269 ms

Below is generated by plot.py at 2018-09-03 09:45:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 795.94 Mbit/s
95th percentile per-packet one-way delay: 25.893 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 795.94 Mbit/s
95th percentile per-packet one-way delay: 25.893 ms
Loss rate: 0.07%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-09-03 09:21:56

End at: 2018-09-03 09:22:26

Local clock offset: 15.155 ms

Remote clock offset: -0.021 ms

Below is generated by plot.py at 2018-09-03 09:45:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 200.12 Mbit/s

95th percentile per-packet one-way delay: 2.537 ms

Loss rate: 0.06%

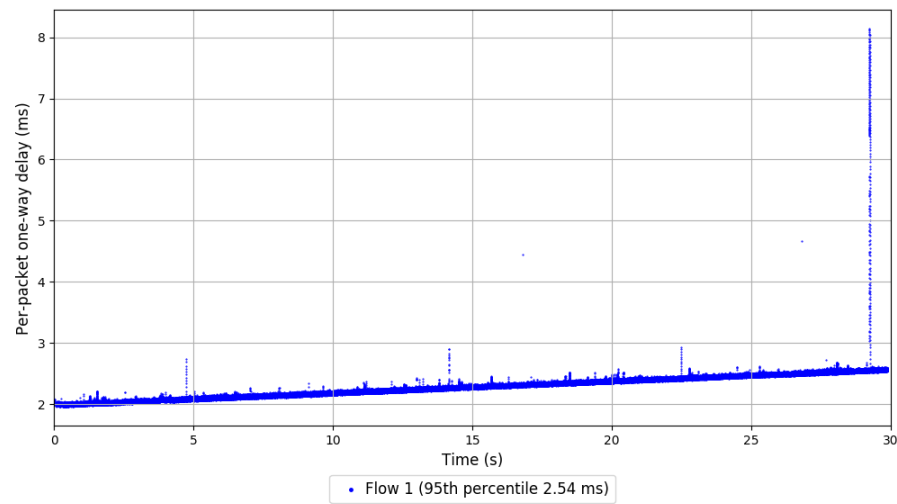
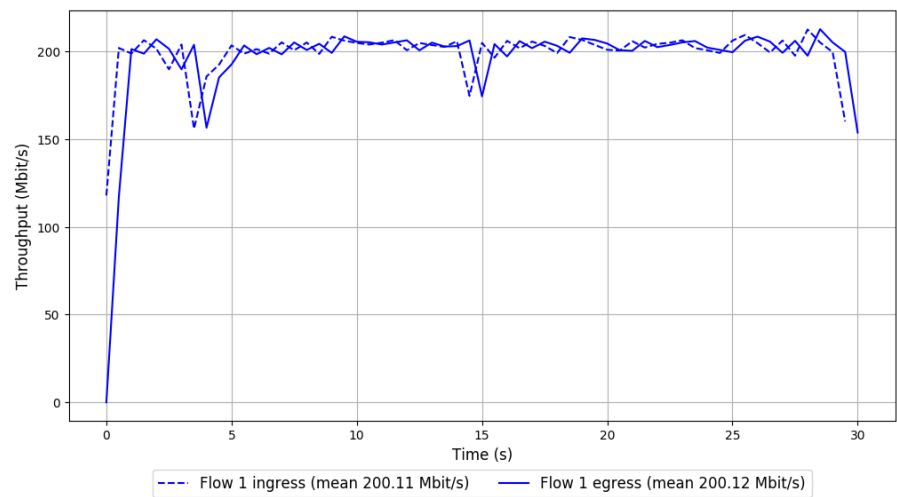
-- Flow 1:

Average throughput: 200.12 Mbit/s

95th percentile per-packet one-way delay: 2.537 ms

Loss rate: 0.06%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-03 09:28:08

End at: 2018-09-03 09:28:38

Local clock offset: 9.082 ms

Remote clock offset: -0.734 ms

Below is generated by plot.py at 2018-09-03 09:45:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 199.02 Mbit/s

95th percentile per-packet one-way delay: 1.598 ms

Loss rate: 0.06%

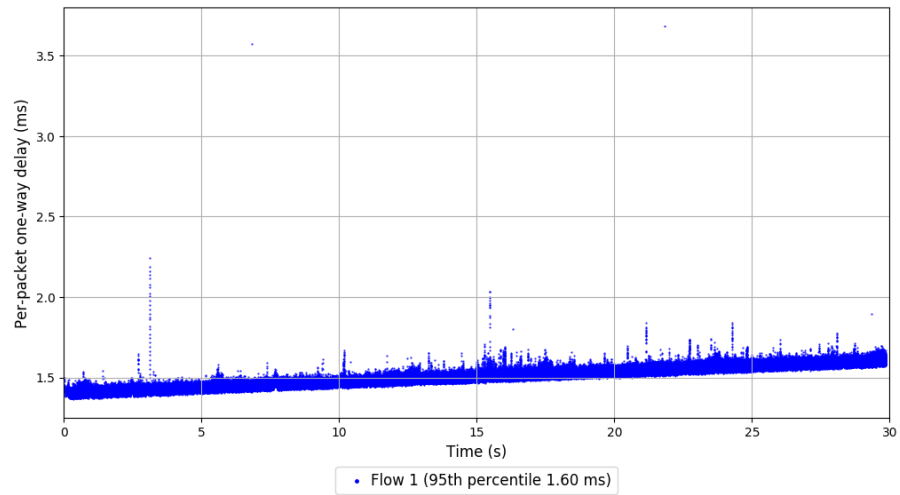
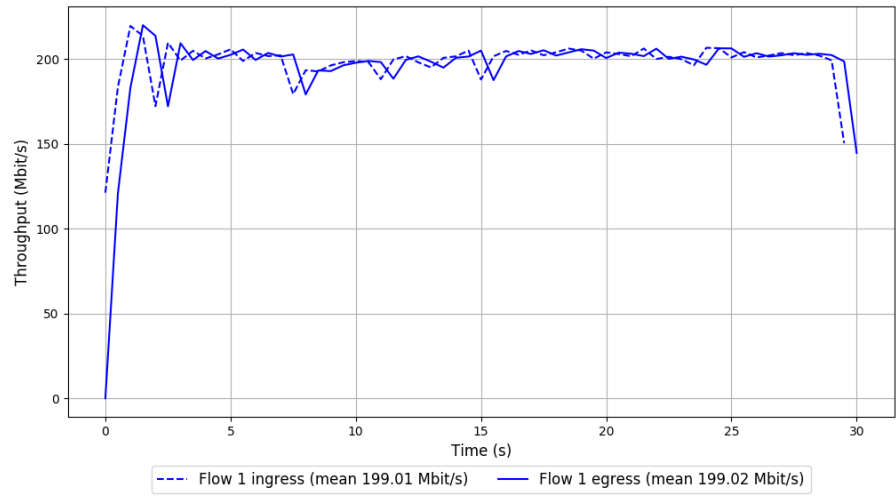
-- Flow 1:

Average throughput: 199.02 Mbit/s

95th percentile per-packet one-way delay: 1.598 ms

Loss rate: 0.06%

Run 2: Report of Indigo — Data Link

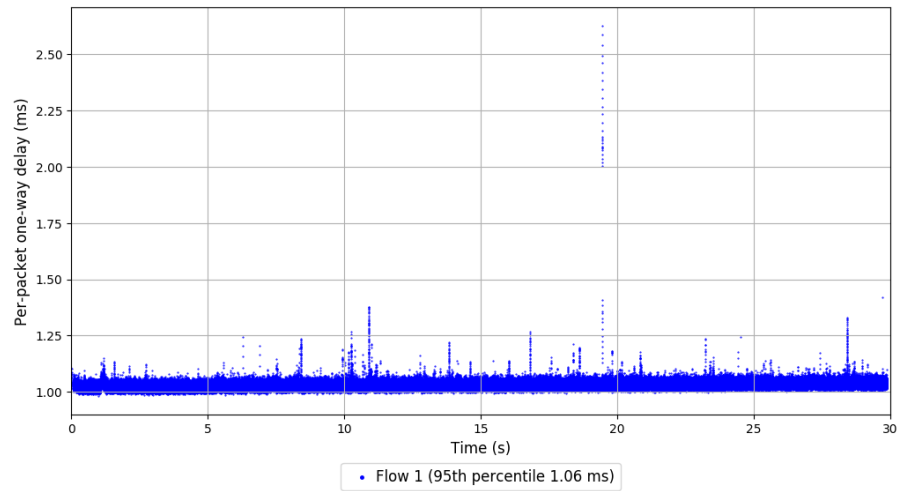
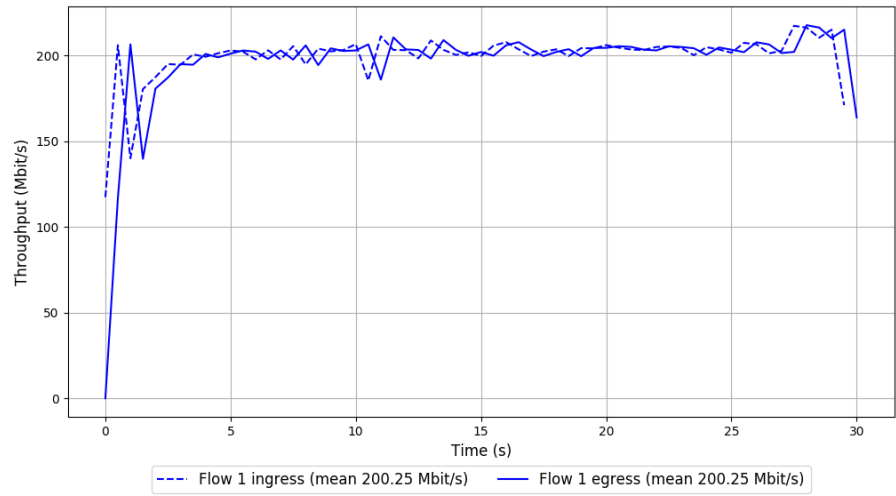


Run 3: Statistics of Indigo

Start at: 2018-09-03 09:34:13
End at: 2018-09-03 09:34:44
Local clock offset: 7.026 ms
Remote clock offset: -1.132 ms

Below is generated by plot.py at 2018-09-03 09:45:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 200.25 Mbit/s
95th percentile per-packet one-way delay: 1.056 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 200.25 Mbit/s
95th percentile per-packet one-way delay: 1.056 ms
Loss rate: 0.06%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-03 09:18:57

End at: 2018-09-03 09:19:27

Local clock offset: 14.067 ms

Remote clock offset: 0.515 ms

Below is generated by plot.py at 2018-09-03 09:45:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 16.78 Mbit/s

95th percentile per-packet one-way delay: 0.782 ms

Loss rate: 0.02%

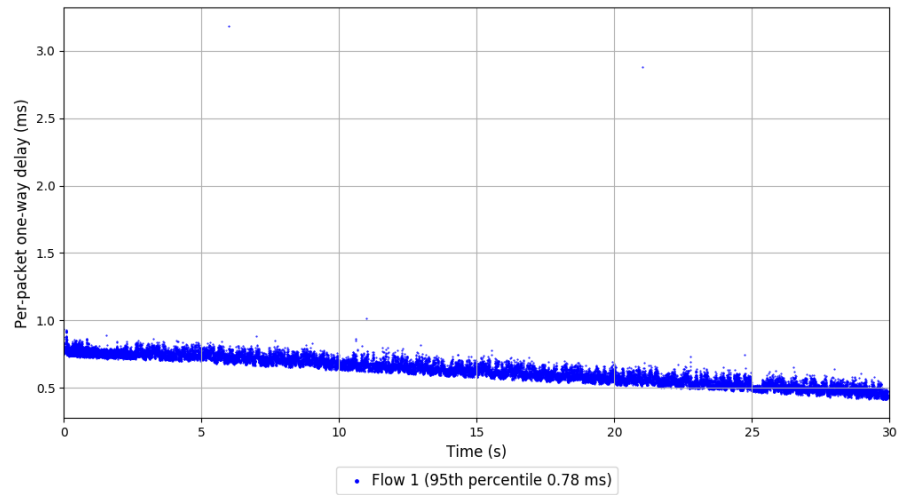
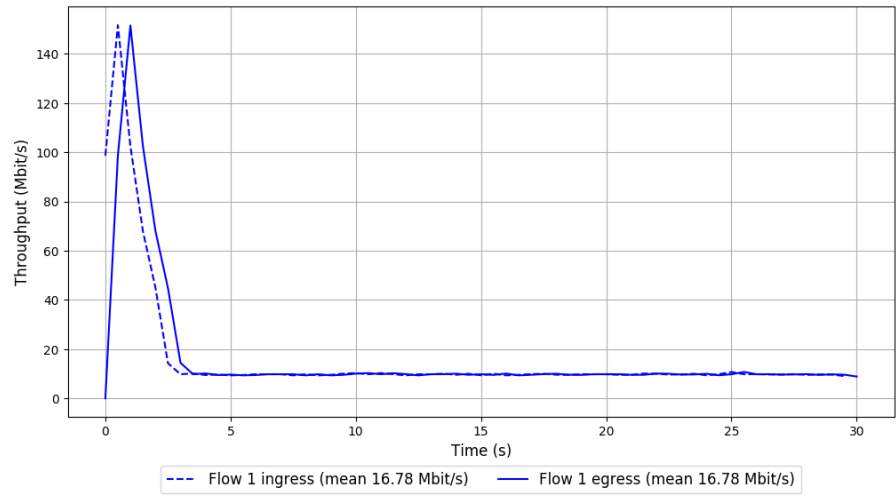
-- Flow 1:

Average throughput: 16.78 Mbit/s

95th percentile per-packet one-way delay: 0.782 ms

Loss rate: 0.02%

Run 1: Report of Muses-25 — Data Link

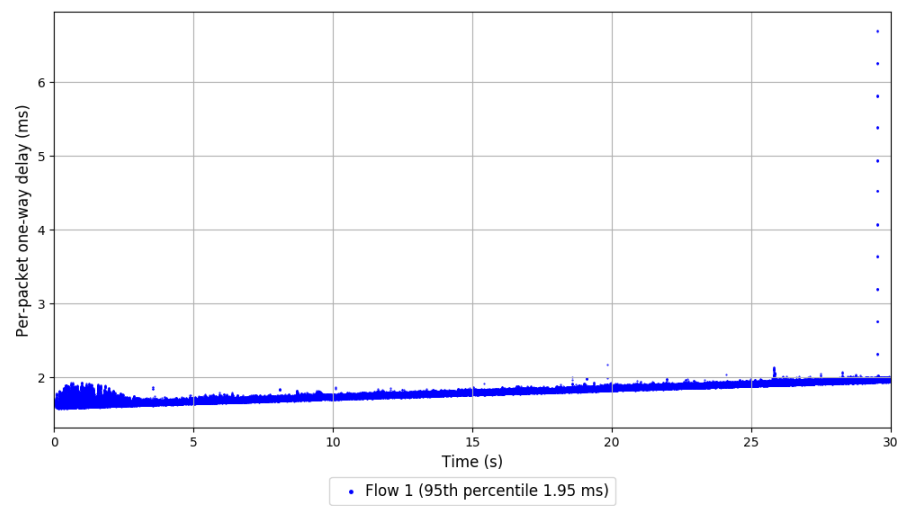
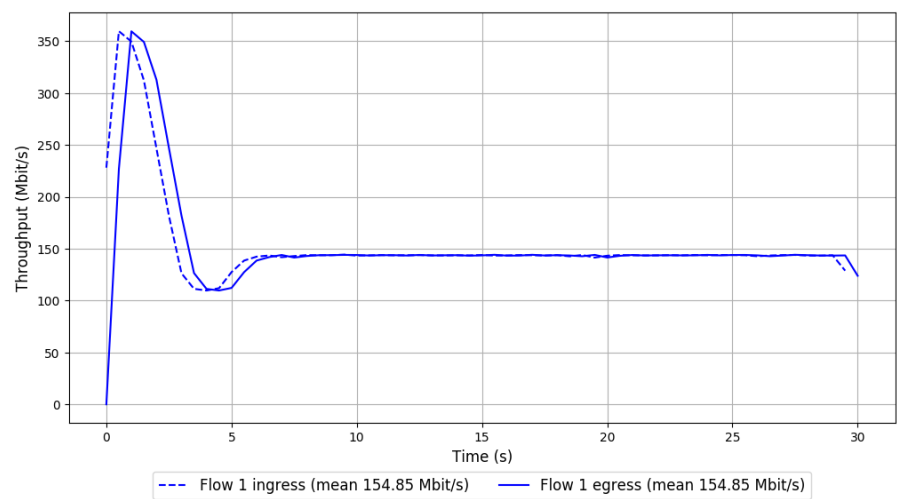


Run 2: Statistics of Muses-25

Start at: 2018-09-03 09:25:04
End at: 2018-09-03 09:25:34
Local clock offset: 11.389 ms
Remote clock offset: -0.397 ms

Below is generated by plot.py at 2018-09-03 09:45:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 154.85 Mbit/s
95th percentile per-packet one-way delay: 1.946 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 154.85 Mbit/s
95th percentile per-packet one-way delay: 1.946 ms
Loss rate: 0.06%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-09-03 09:31:13
End at: 2018-09-03 09:31:43
Local clock offset: 7.786 ms
Remote clock offset: -0.969 ms

Below is generated by plot.py at 2018-09-03 09:45:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 55.24 Mbit/s
95th percentile per-packet one-way delay: 1.351 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 55.24 Mbit/s
95th percentile per-packet one-way delay: 1.351 ms
Loss rate: 0.03%

Run 3: Report of Muses-25 — Data Link

