

Pantheon Report

Generated at 2018-09-05 03:30:49 (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.

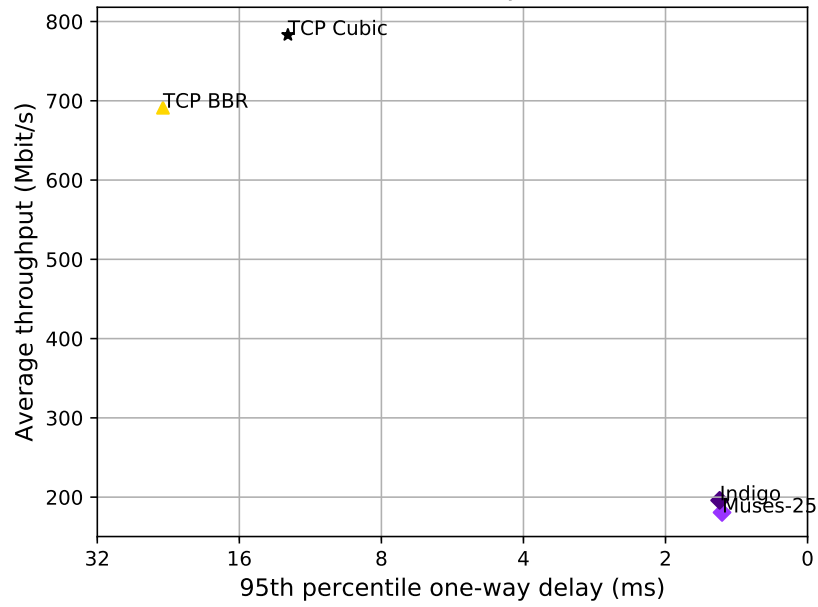
System info:

```
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
```

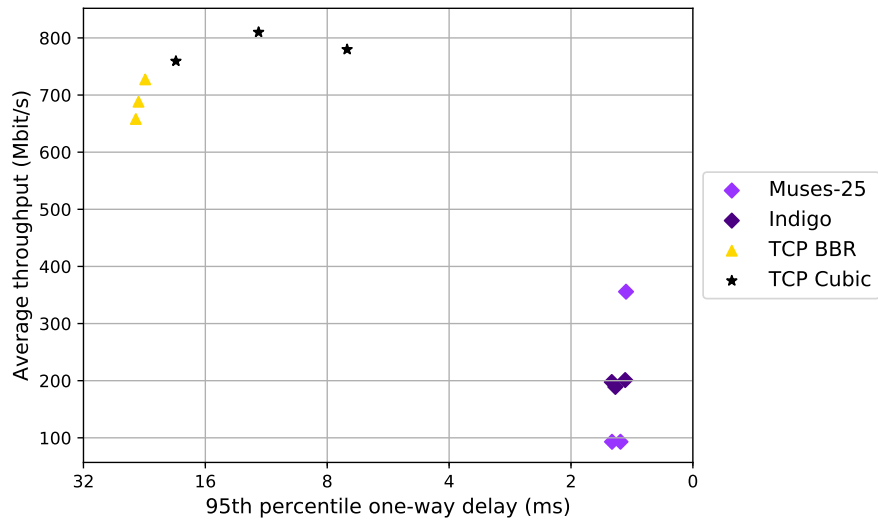
Git summary:

```
branch: muses @ 71e71e9a55b945431a7dea72180c1c9381097db9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd9c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 96fbc95fb38373d71fbc80c5a105e62e7636623b
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
```

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	691.27	23.23	0.05
TCP Cubic	3	783.06	12.63	0.07
Indigo	3	195.96	1.24	0.07
Muses-25	3	180.65	1.20	0.06

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 03:05:07

End at: 2018-09-05 03:05:37

Local clock offset: -0.555 ms

Remote clock offset: 3.027 ms

Below is generated by plot.py at 2018-09-05 03:30:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 727.39 Mbit/s

95th percentile per-packet one-way delay: 22.524 ms

Loss rate: 0.04%

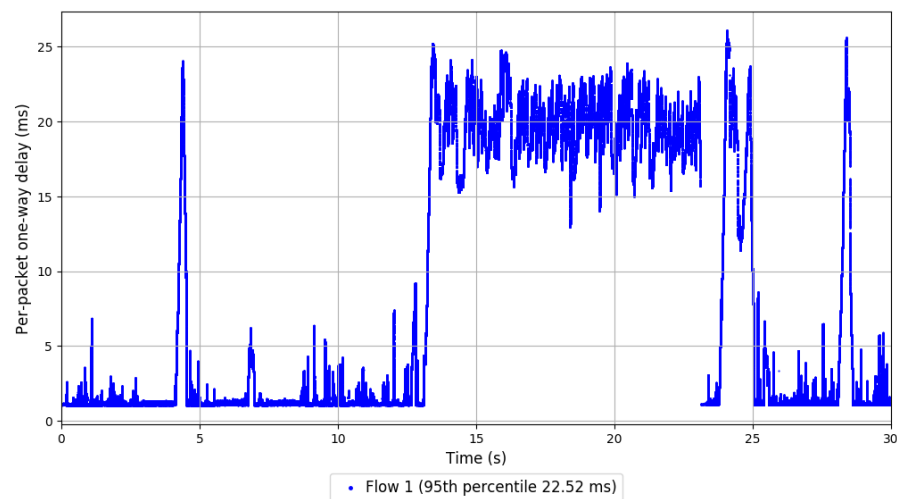
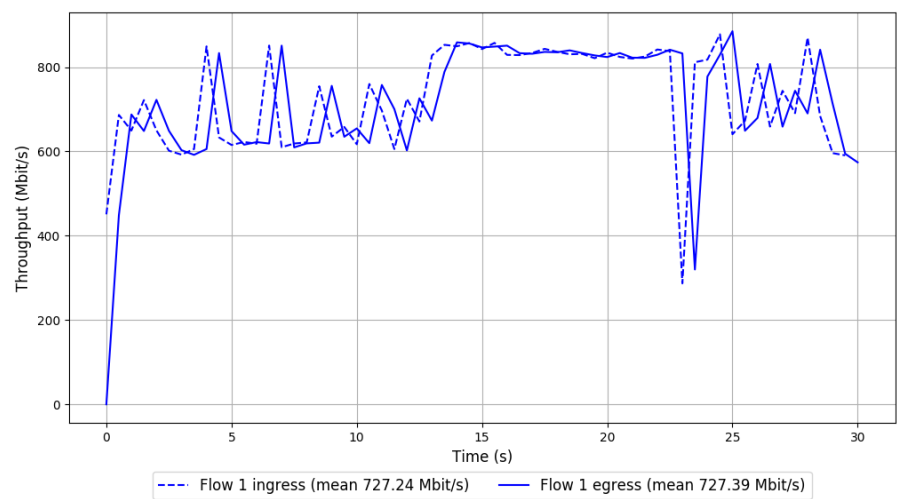
-- Flow 1:

Average throughput: 727.39 Mbit/s

95th percentile per-packet one-way delay: 22.524 ms

Loss rate: 0.04%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 03:11:22

End at: 2018-09-05 03:11:52

Local clock offset: -0.673 ms

Remote clock offset: 3.331 ms

Below is generated by plot.py at 2018-09-05 03:30:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 688.30 Mbit/s

95th percentile per-packet one-way delay: 23.397 ms

Loss rate: 0.07%

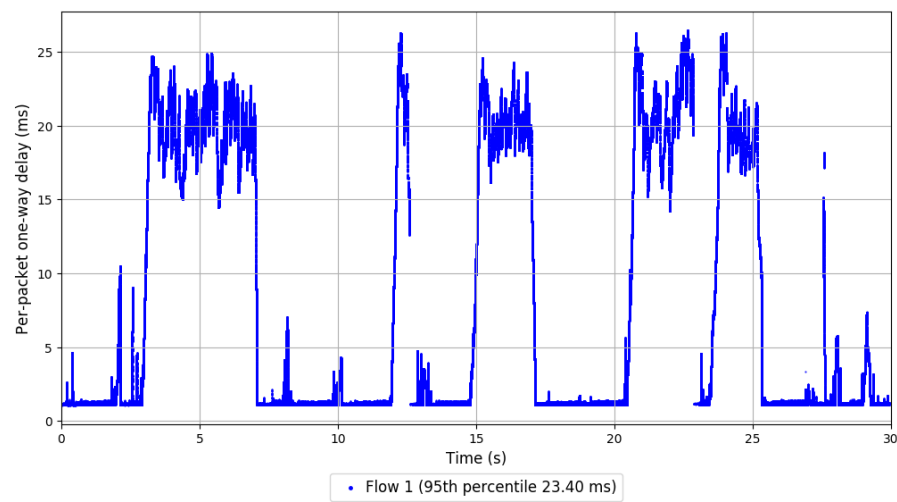
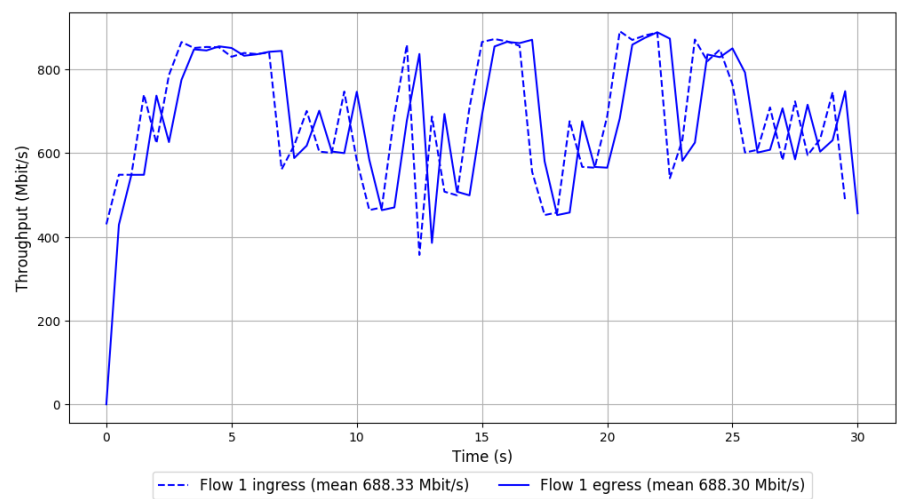
-- Flow 1:

Average throughput: 688.30 Mbit/s

95th percentile per-packet one-way delay: 23.397 ms

Loss rate: 0.07%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-05 03:17:36

End at: 2018-09-05 03:18:06

Local clock offset: -1.759 ms

Remote clock offset: 3.417 ms

Below is generated by plot.py at 2018-09-05 03:30:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 658.13 Mbit/s

95th percentile per-packet one-way delay: 23.758 ms

Loss rate: 0.05%

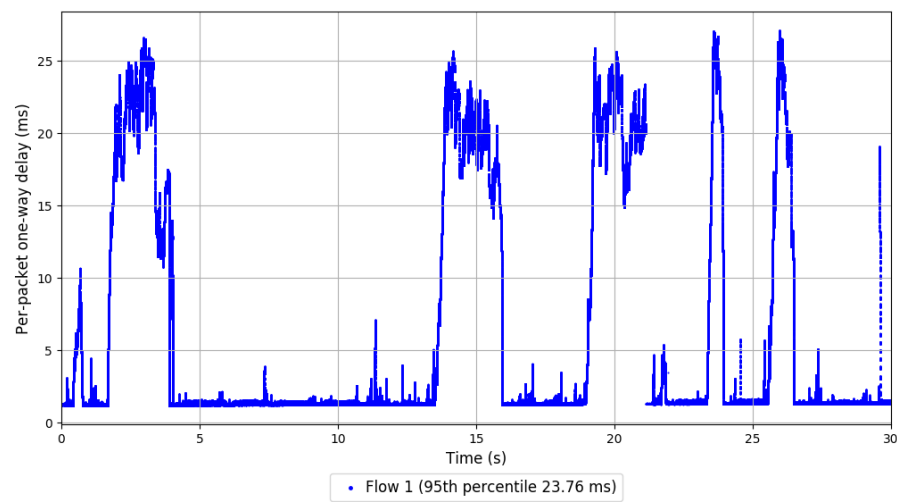
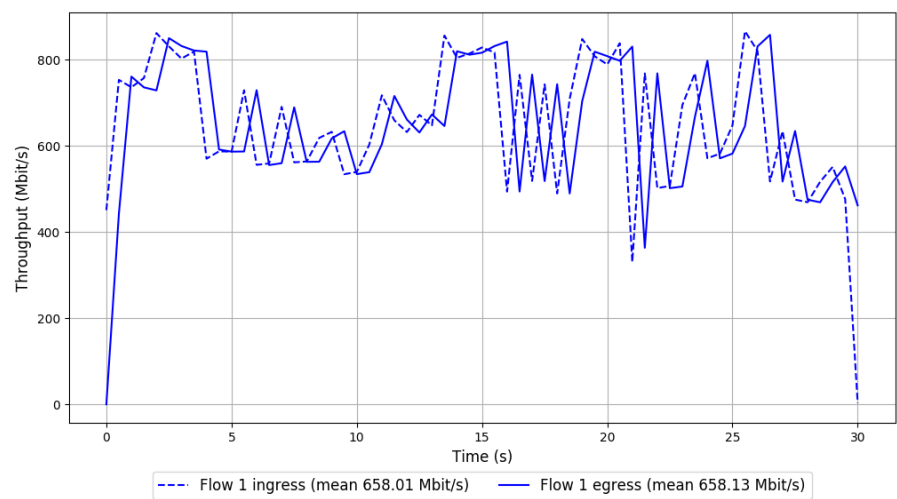
-- Flow 1:

Average throughput: 658.13 Mbit/s

95th percentile per-packet one-way delay: 23.758 ms

Loss rate: 0.05%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 03:06:50

End at: 2018-09-05 03:07:20

Local clock offset: -0.529 ms

Remote clock offset: 3.122 ms

Below is generated by plot.py at 2018-09-05 03:30:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 779.79 Mbit/s

95th percentile per-packet one-way delay: 7.144 ms

Loss rate: 0.08%

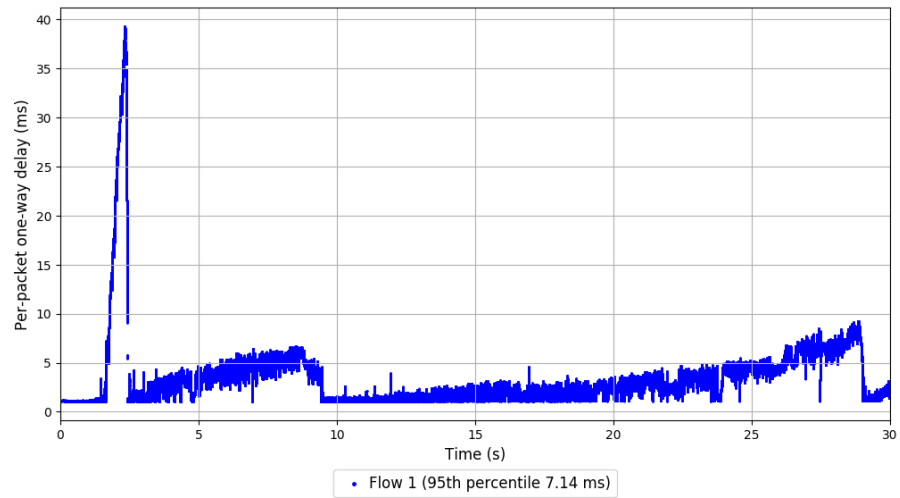
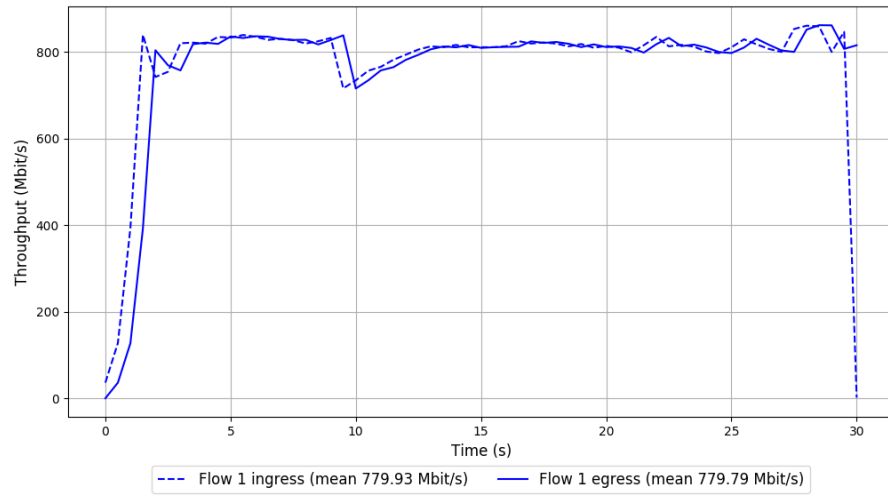
-- Flow 1:

Average throughput: 779.79 Mbit/s

95th percentile per-packet one-way delay: 7.144 ms

Loss rate: 0.08%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-05 03:13:03

End at: 2018-09-05 03:13:33

Local clock offset: -0.756 ms

Remote clock offset: 3.419 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 810.02 Mbit/s

95th percentile per-packet one-way delay: 11.820 ms

Loss rate: 0.06%

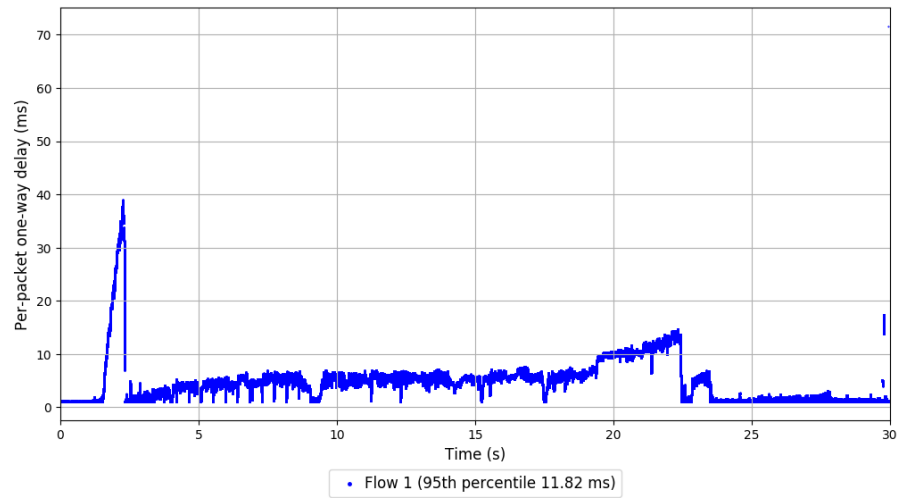
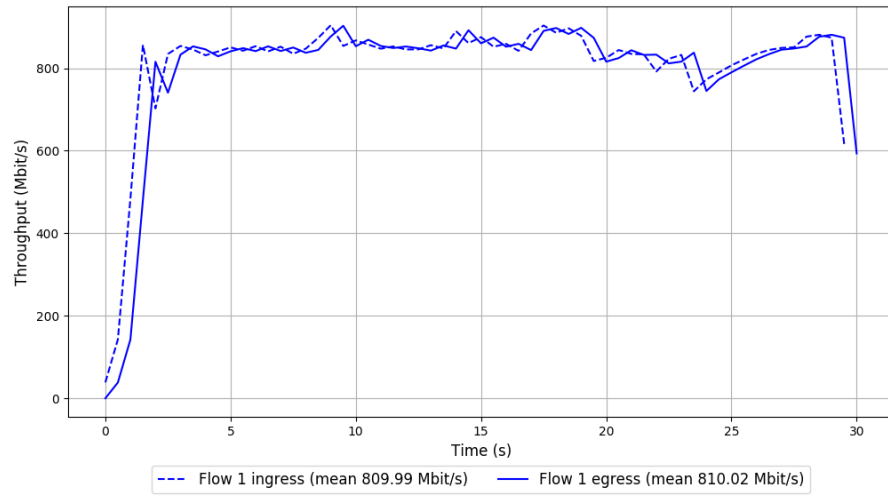
-- Flow 1:

Average throughput: 810.02 Mbit/s

95th percentile per-packet one-way delay: 11.820 ms

Loss rate: 0.06%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-05 03:19:16

End at: 2018-09-05 03:19:46

Local clock offset: -2.296 ms

Remote clock offset: 3.411 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 759.36 Mbit/s

95th percentile per-packet one-way delay: 18.915 ms

Loss rate: 0.08%

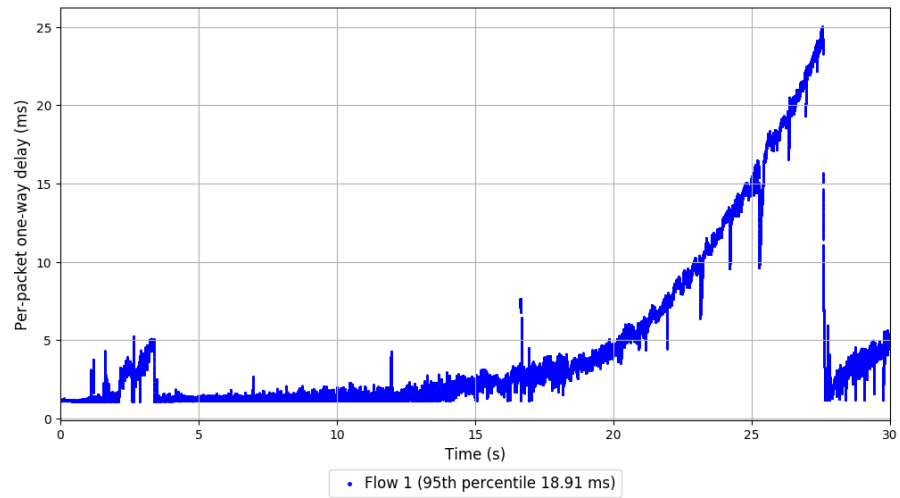
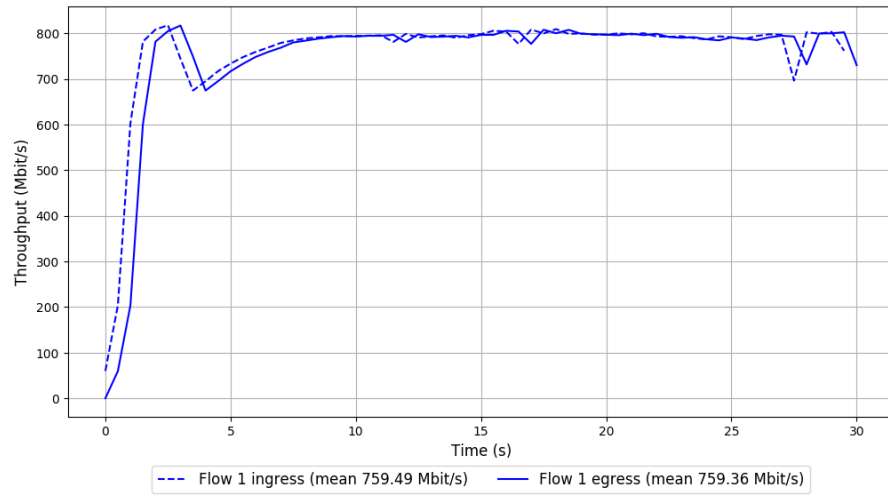
-- Flow 1:

Average throughput: 759.36 Mbit/s

95th percentile per-packet one-way delay: 18.915 ms

Loss rate: 0.08%

Run 3: Report of TCP Cubic — Data Link

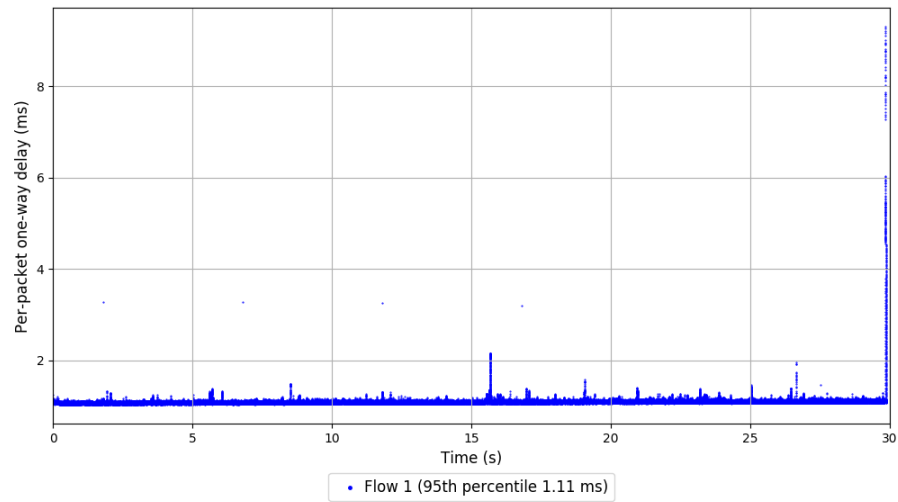
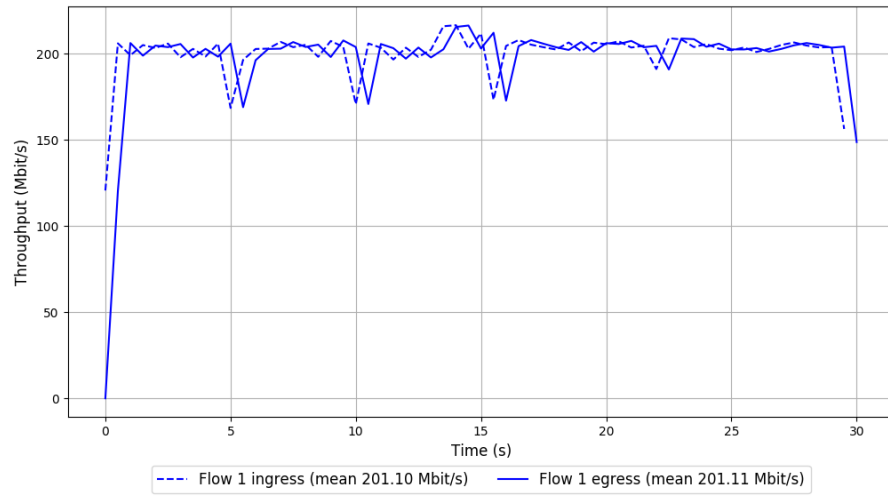


```
Run 1: Statistics of Indigo

Start at: 2018-09-05 03:08:34
End at: 2018-09-05 03:09:04
Local clock offset: -0.644 ms
Remote clock offset: 3.159 ms

# Below is generated by plot.py at 2018-09-05 03:30:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 201.11 Mbit/s
95th percentile per-packet one-way delay: 1.111 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 201.11 Mbit/s
95th percentile per-packet one-way delay: 1.111 ms
Loss rate: 0.07%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-05 03:14:47

End at: 2018-09-05 03:15:17

Local clock offset: -0.889 ms

Remote clock offset: 3.504 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 197.69 Mbit/s

95th percentile per-packet one-way delay: 1.331 ms

Loss rate: 0.06%

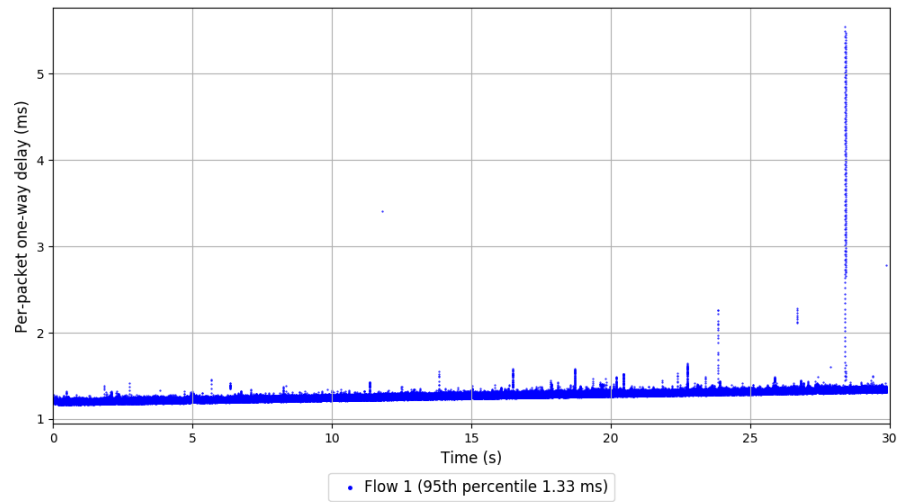
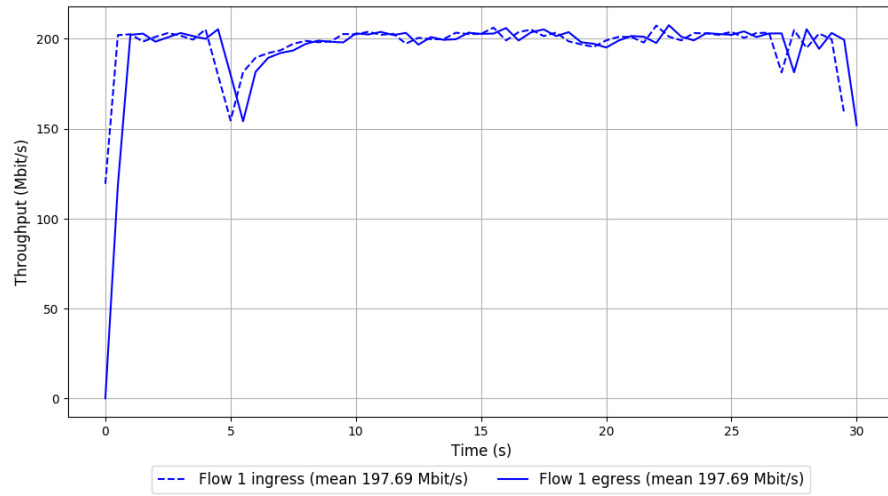
-- Flow 1:

Average throughput: 197.69 Mbit/s

95th percentile per-packet one-way delay: 1.331 ms

Loss rate: 0.06%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-05 03:20:59

End at: 2018-09-05 03:21:29

Local clock offset: -2.626 ms

Remote clock offset: 3.452 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 189.07 Mbit/s

95th percentile per-packet one-way delay: 1.272 ms

Loss rate: 0.07%

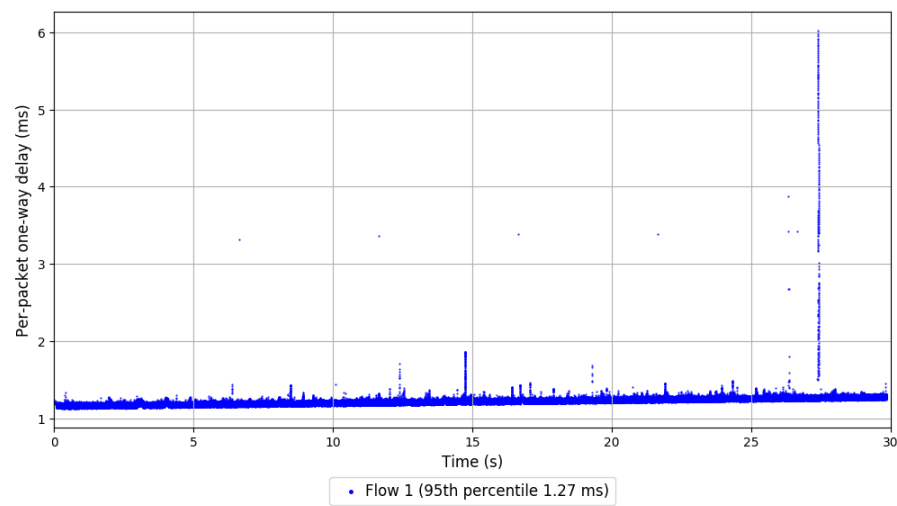
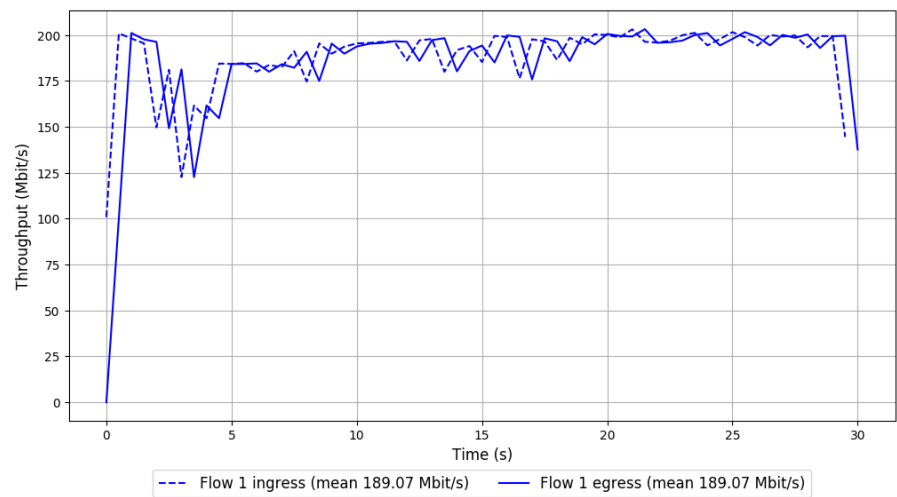
-- Flow 1:

Average throughput: 189.07 Mbit/s

95th percentile per-packet one-way delay: 1.272 ms

Loss rate: 0.07%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-05 03:03:36

End at: 2018-09-05 03:04:07

Local clock offset: -0.594 ms

Remote clock offset: 3.025 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 355.80 Mbit/s

95th percentile per-packet one-way delay: 1.097 ms

Loss rate: 0.06%

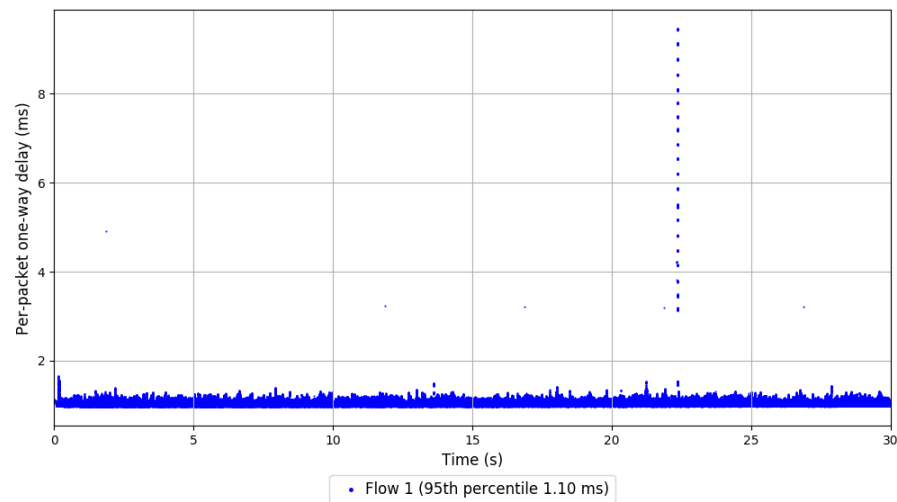
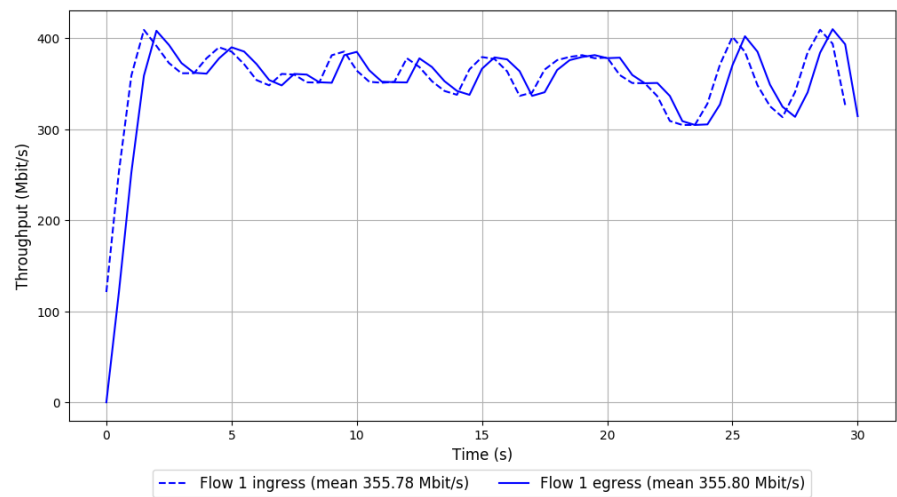
-- Flow 1:

Average throughput: 355.80 Mbit/s

95th percentile per-packet one-way delay: 1.097 ms

Loss rate: 0.06%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-05 03:10:00

End at: 2018-09-05 03:10:30

Local clock offset: -0.608 ms

Remote clock offset: 3.246 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 93.10 Mbit/s

95th percentile per-packet one-way delay: 1.188 ms

Loss rate: 0.07%

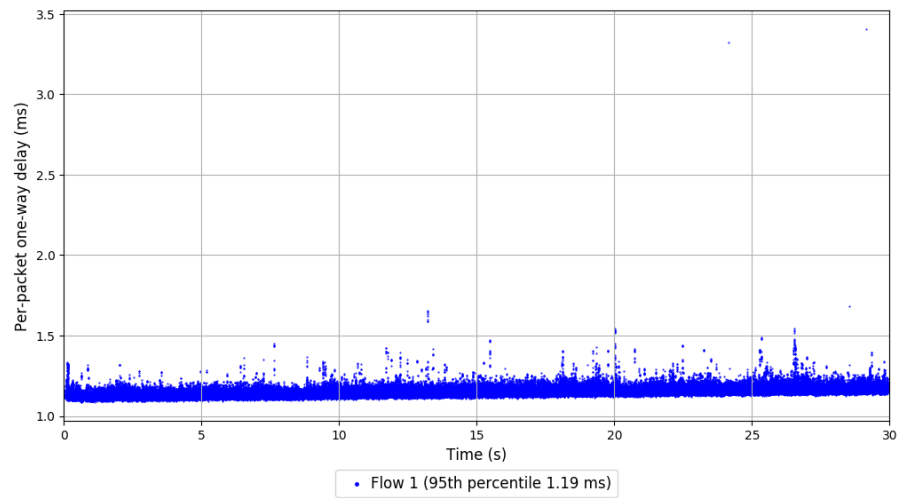
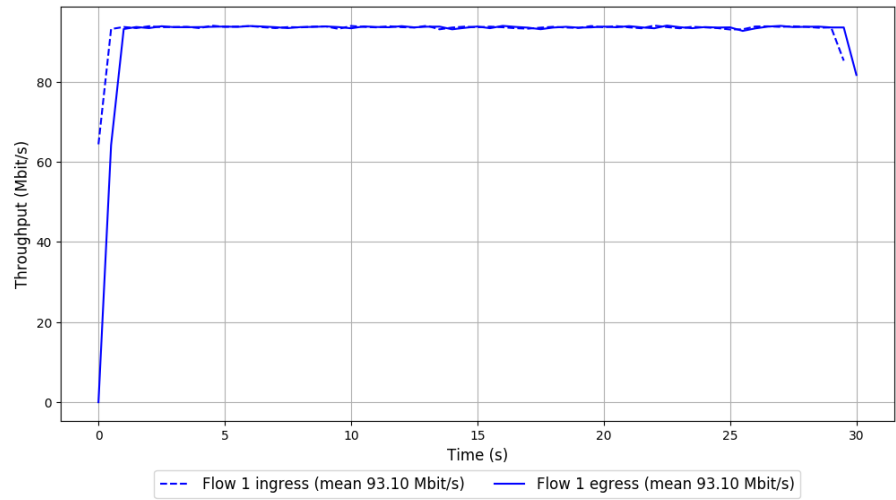
-- Flow 1:

Average throughput: 93.10 Mbit/s

95th percentile per-packet one-way delay: 1.188 ms

Loss rate: 0.07%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-09-05 03:16:14

End at: 2018-09-05 03:16:44

Local clock offset: -1.305 ms

Remote clock offset: 3.512 ms

Below is generated by plot.py at 2018-09-05 03:30:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 93.06 Mbit/s

95th percentile per-packet one-way delay: 1.327 ms

Loss rate: 0.06%

-- Flow 1:

Average throughput: 93.06 Mbit/s

95th percentile per-packet one-way delay: 1.327 ms

Loss rate: 0.06%

Run 3: Report of Muses-25 — Data Link

