

Pantheon Report

Generated at 2018-08-31 09:45:15 (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.

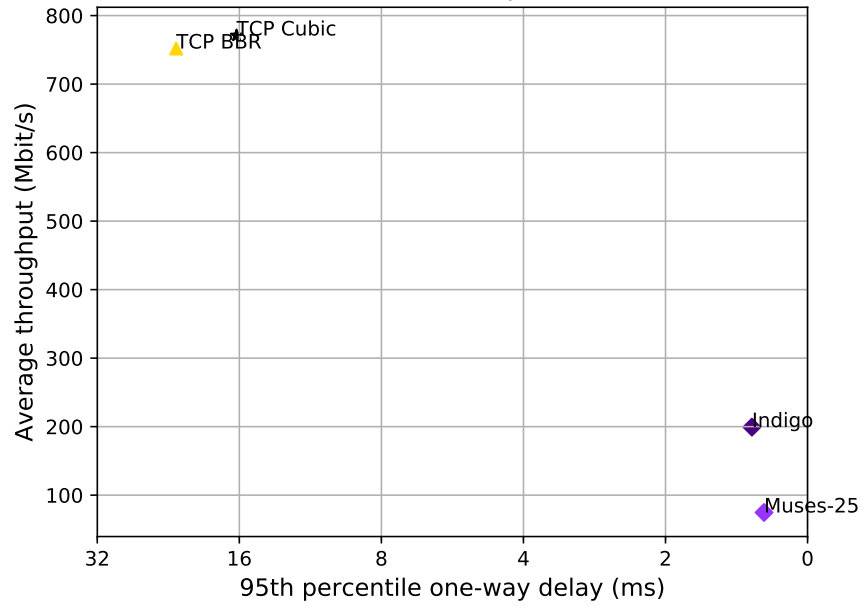
System info:

```
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
```

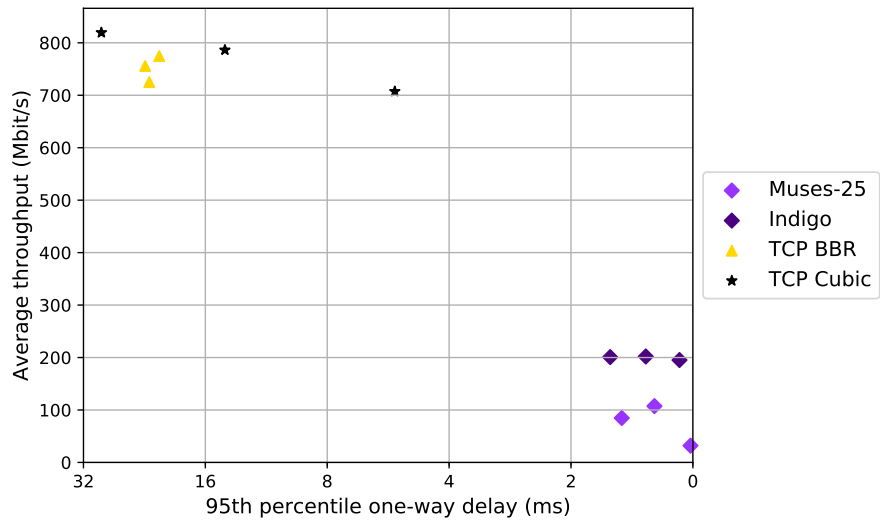
Git summary:

```
branch: muses @ e3c5aa19ca94c3066828fb83f16a8fb6b2731e7a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b59e0d118c50af3579569c462d33045741c85981
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	751.89	21.78	0.13
TCP Cubic	3	770.96	16.22	0.07
Indigo	3	199.33	0.78	0.07
Muses-25	3	74.71	0.61	0.05

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 09:19:45

End at: 2018-08-31 09:20:15

Local clock offset: -9.845 ms

Remote clock offset: -3.902 ms

Below is generated by plot.py at 2018-08-31 09:44:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 725.11 Mbit/s

95th percentile per-packet one-way delay: 22.009 ms

Loss rate: 0.13%

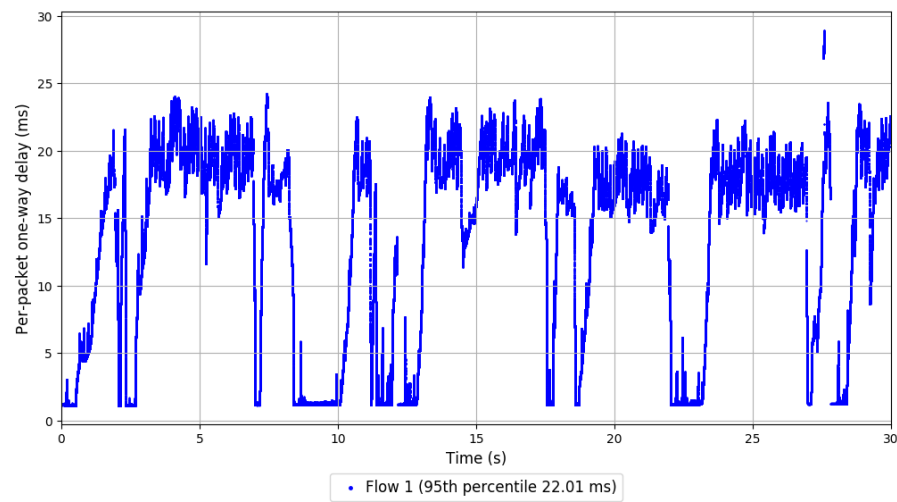
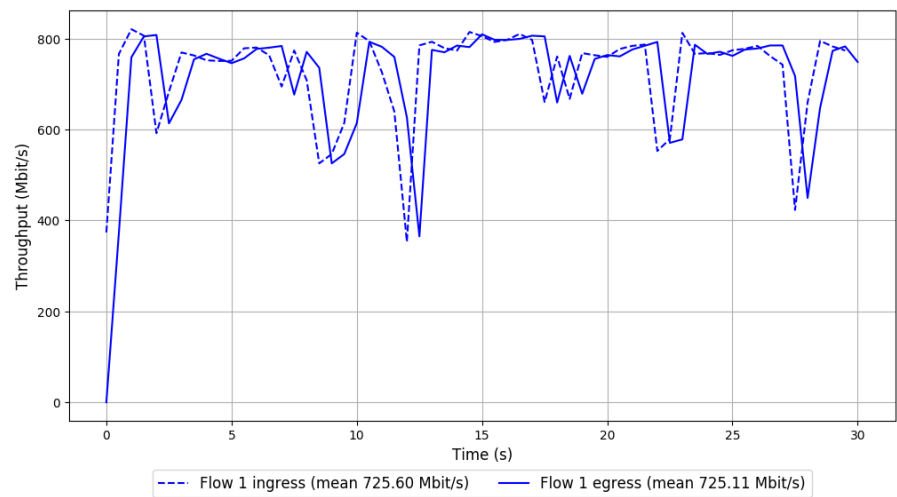
-- Flow 1:

Average throughput: 725.11 Mbit/s

95th percentile per-packet one-way delay: 22.009 ms

Loss rate: 0.13%

Run 1: Report of TCP BBR — Data Link

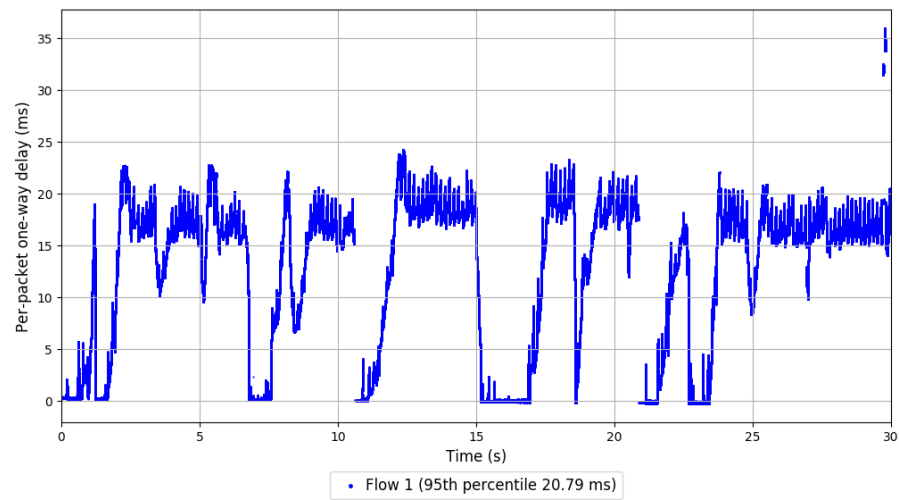
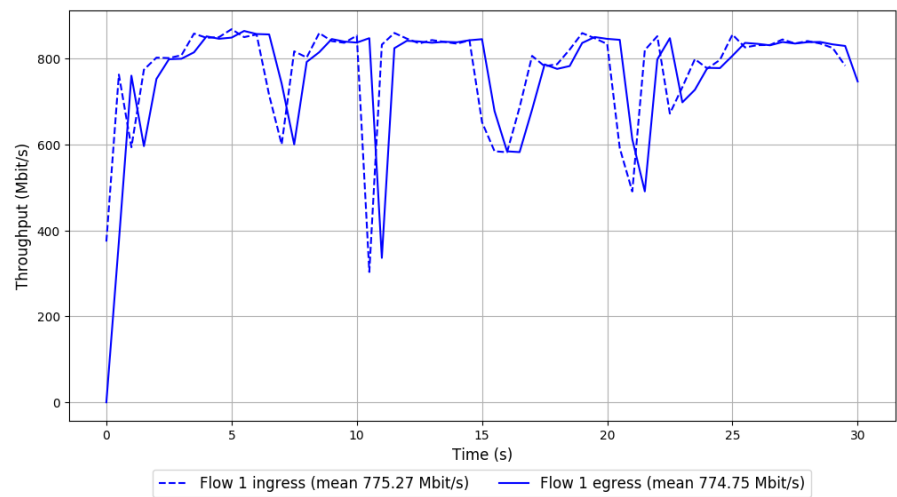


Run 2: Statistics of TCP BBR

Start at: 2018-08-31 09:25:54
End at: 2018-08-31 09:26:24
Local clock offset: -9.053 ms
Remote clock offset: -4.202 ms

Below is generated by plot.py at 2018-08-31 09:45:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 774.75 Mbit/s
95th percentile per-packet one-way delay: 20.793 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 774.75 Mbit/s
95th percentile per-packet one-way delay: 20.793 ms
Loss rate: 0.13%

Run 2: Report of TCP BBR — Data Link

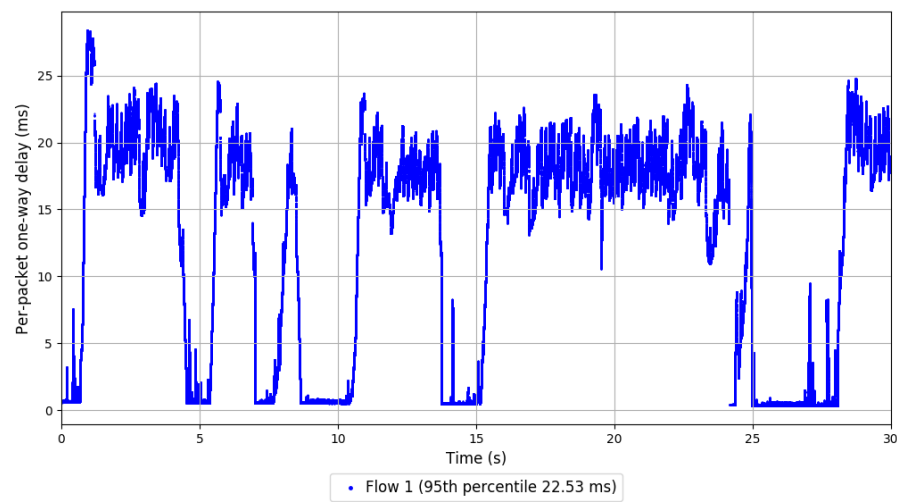
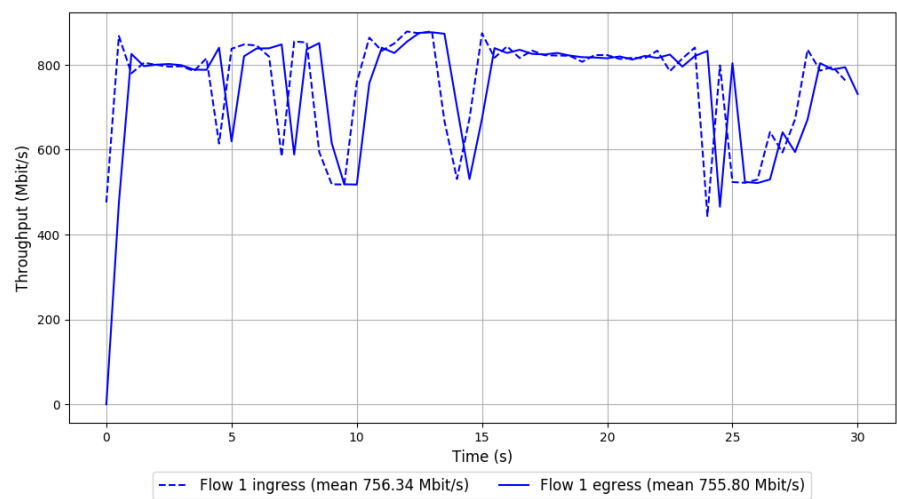


Run 3: Statistics of TCP BBR

Start at: 2018-08-31 09:32:06
End at: 2018-08-31 09:32:36
Local clock offset: -3.366 ms
Remote clock offset: -4.434 ms

Below is generated by plot.py at 2018-08-31 09:45:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 755.80 Mbit/s
95th percentile per-packet one-way delay: 22.531 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 755.80 Mbit/s
95th percentile per-packet one-way delay: 22.531 ms
Loss rate: 0.14%

Run 3: Report of TCP BBR — Data Link

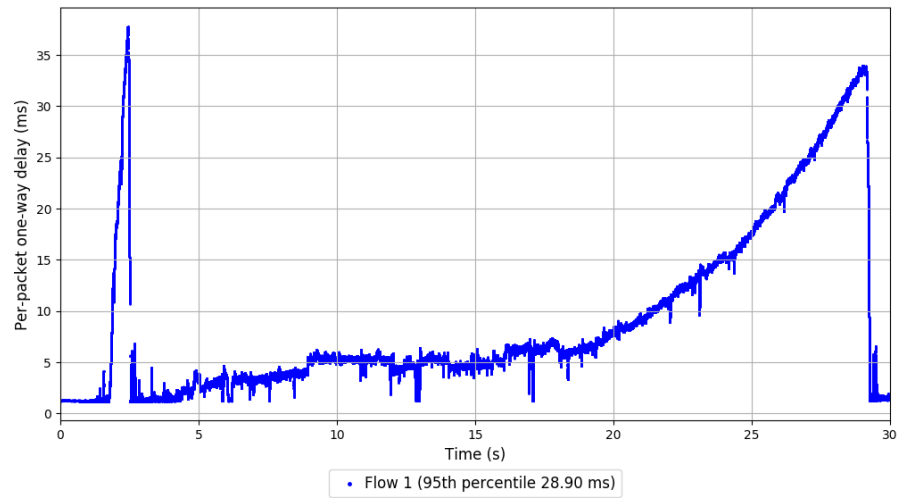
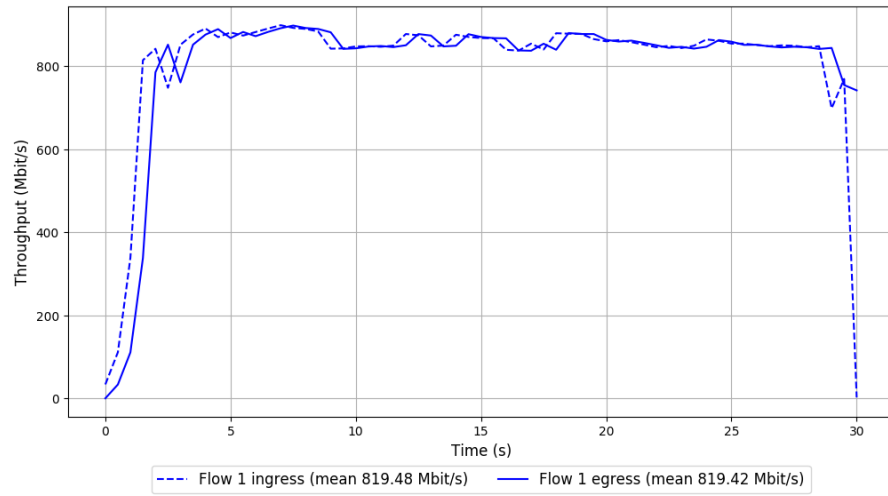


Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 09:22:52
End at: 2018-08-31 09:23:22
Local clock offset: -10.572 ms
Remote clock offset: -4.068 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 819.42 Mbit/s
95th percentile per-packet one-way delay: 28.898 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 819.42 Mbit/s
95th percentile per-packet one-way delay: 28.898 ms
Loss rate: 0.07%

Run 1: Report of TCP Cubic — Data Link

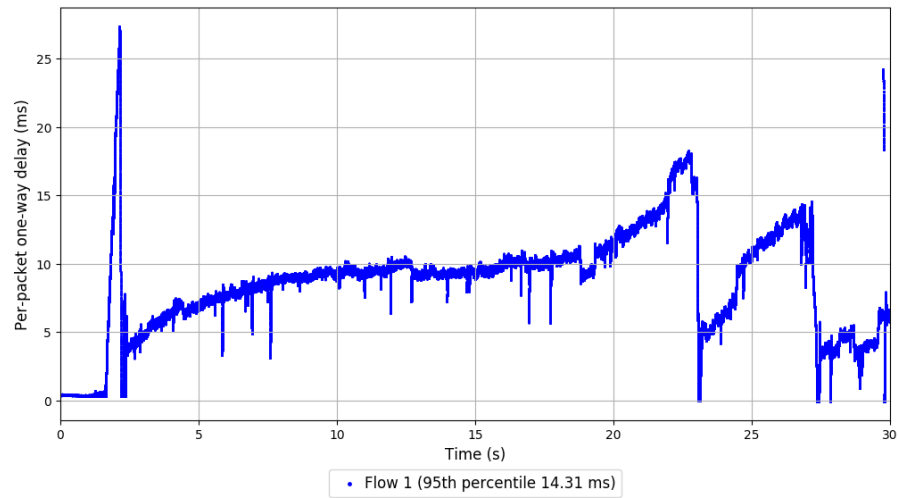
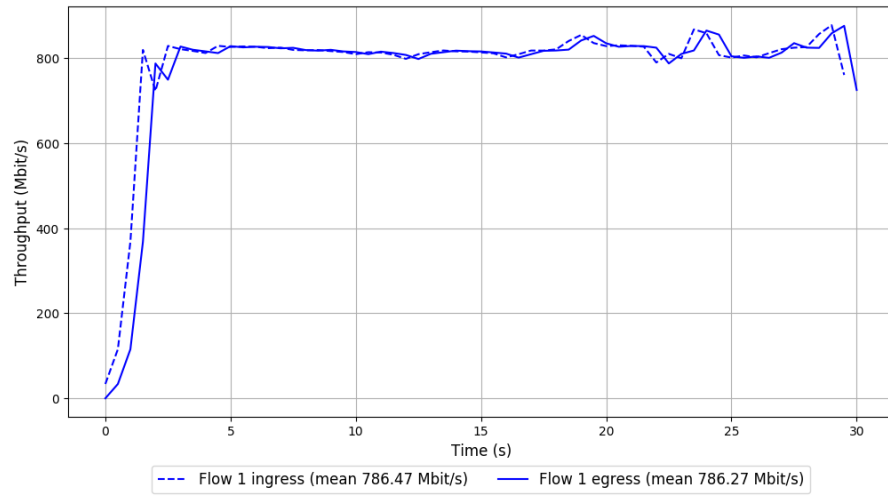


Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 09:29:02
End at: 2018-08-31 09:29:32
Local clock offset: -5.675 ms
Remote clock offset: -4.232 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 786.27 Mbit/s
95th percentile per-packet one-way delay: 14.315 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 786.27 Mbit/s
95th percentile per-packet one-way delay: 14.315 ms
Loss rate: 0.09%

Run 2: Report of TCP Cubic — Data Link

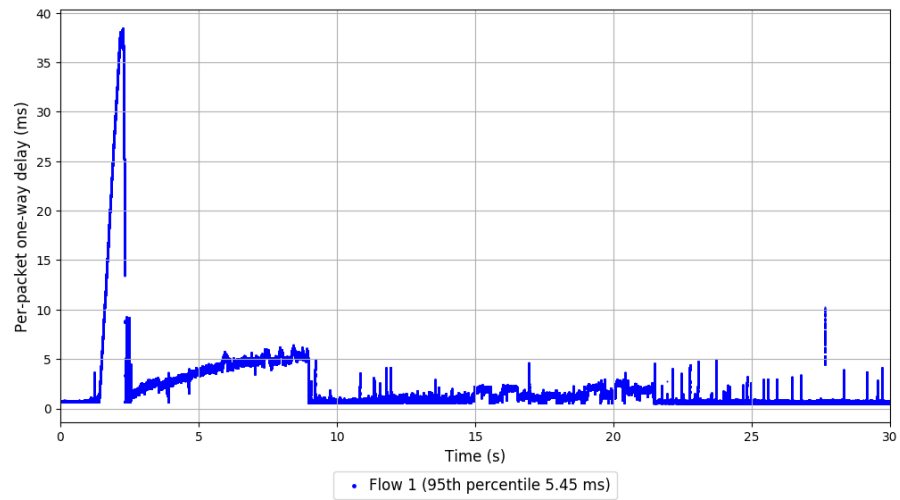
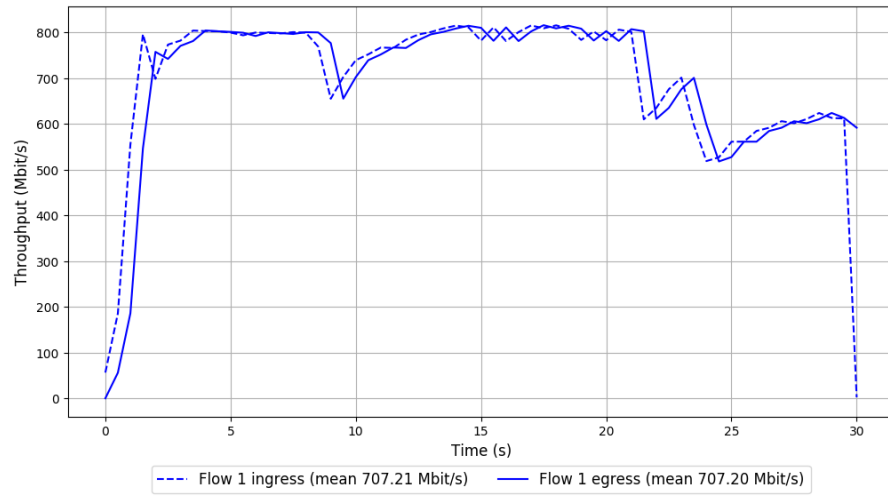


Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 09:35:13
End at: 2018-08-31 09:35:43
Local clock offset: -1.783 ms
Remote clock offset: -4.434 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 707.20 Mbit/s
95th percentile per-packet one-way delay: 5.448 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 707.20 Mbit/s
95th percentile per-packet one-way delay: 5.448 ms
Loss rate: 0.06%

Run 3: Report of TCP Cubic — Data Link

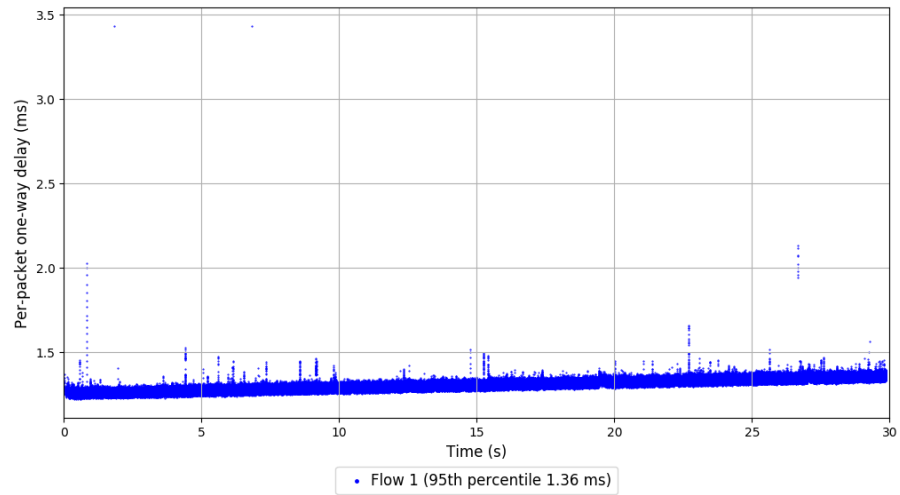
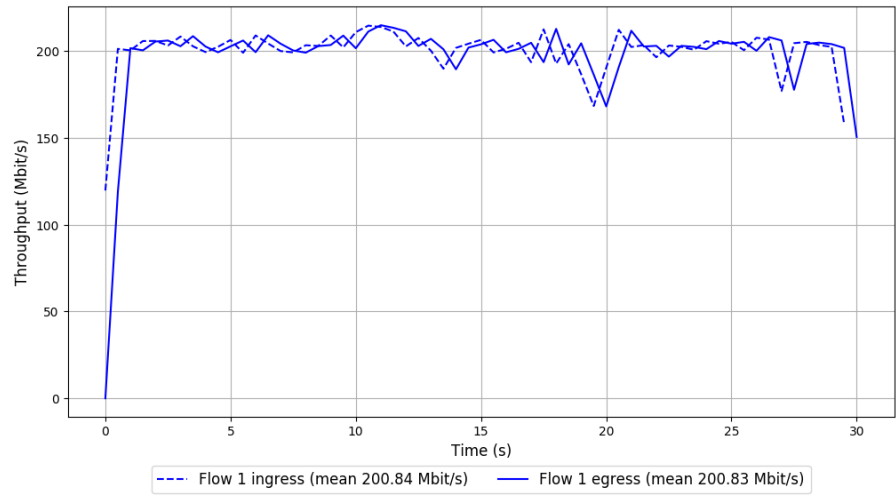


```
Run 1: Statistics of Indigo

Start at: 2018-08-31 09:21:26
End at: 2018-08-31 09:21:56
Local clock offset: -10.179 ms
Remote clock offset: -3.999 ms

# Below is generated by plot.py at 2018-08-31 09:45:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 200.83 Mbit/s
95th percentile per-packet one-way delay: 1.357 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 200.83 Mbit/s
95th percentile per-packet one-way delay: 1.357 ms
Loss rate: 0.07%
```

Run 1: Report of Indigo — Data Link

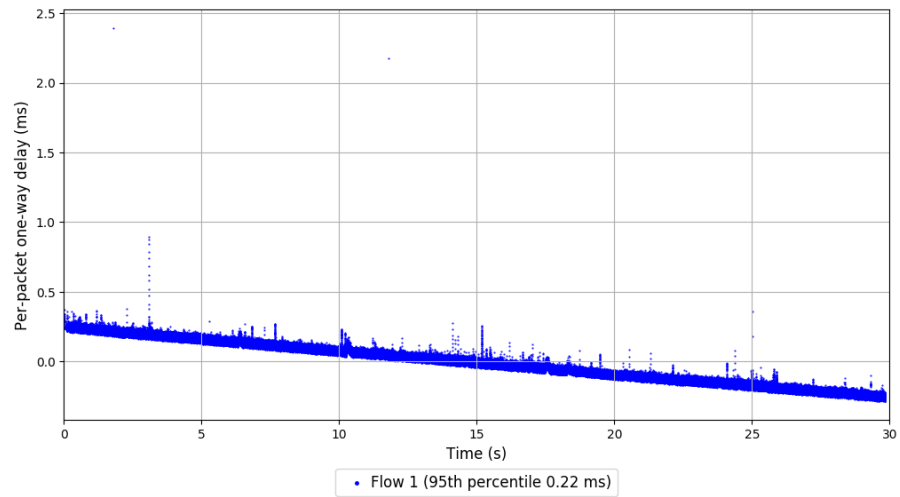
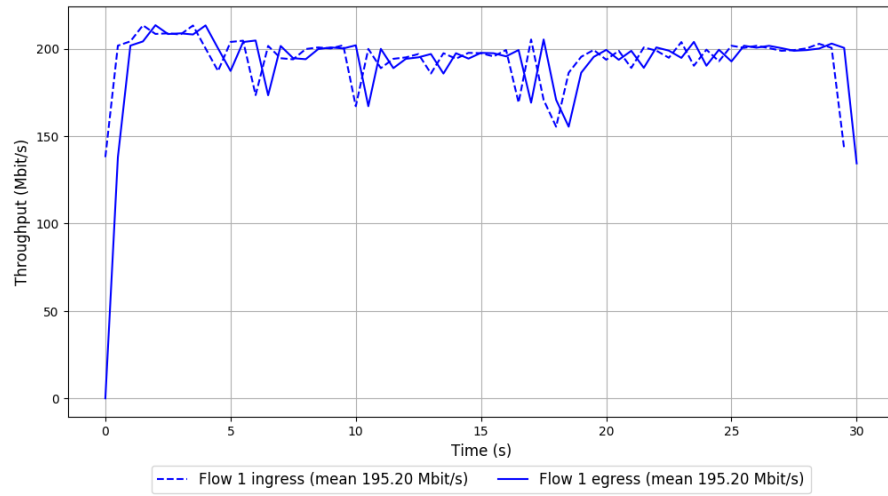


Run 2: Statistics of Indigo

Start at: 2018-08-31 09:27:36
End at: 2018-08-31 09:28:06
Local clock offset: -7.181 ms
Remote clock offset: -4.258 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 195.20 Mbit/s
95th percentile per-packet one-way delay: 0.220 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 195.20 Mbit/s
95th percentile per-packet one-way delay: 0.220 ms
Loss rate: 0.07%

Run 2: Report of Indigo — Data Link

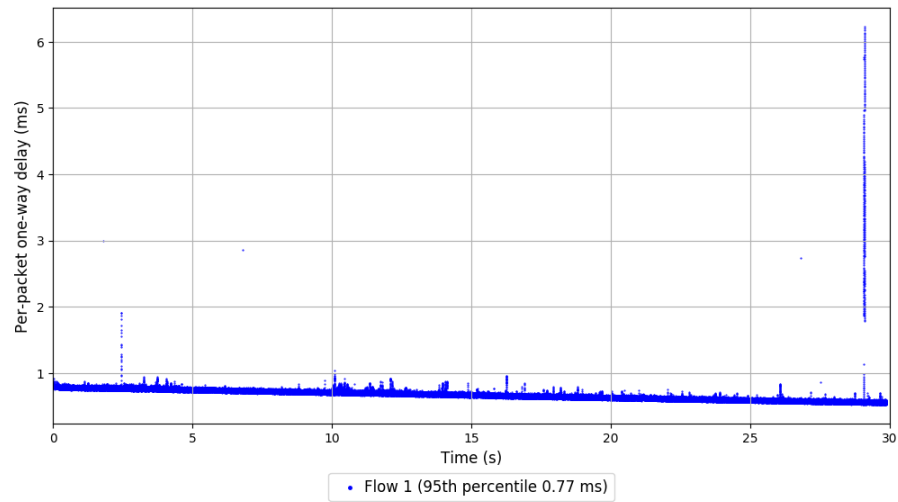
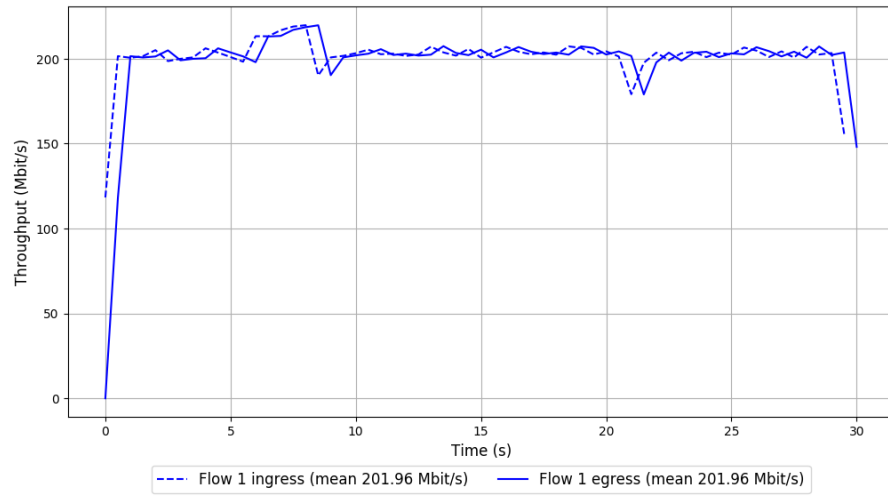


Run 3: Statistics of Indigo

Start at: 2018-08-31 09:33:48
End at: 2018-08-31 09:34:18
Local clock offset: -2.376 ms
Remote clock offset: -4.475 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 201.96 Mbit/s
95th percentile per-packet one-way delay: 0.773 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 201.96 Mbit/s
95th percentile per-packet one-way delay: 0.773 ms
Loss rate: 0.06%

Run 3: Report of Indigo — Data Link

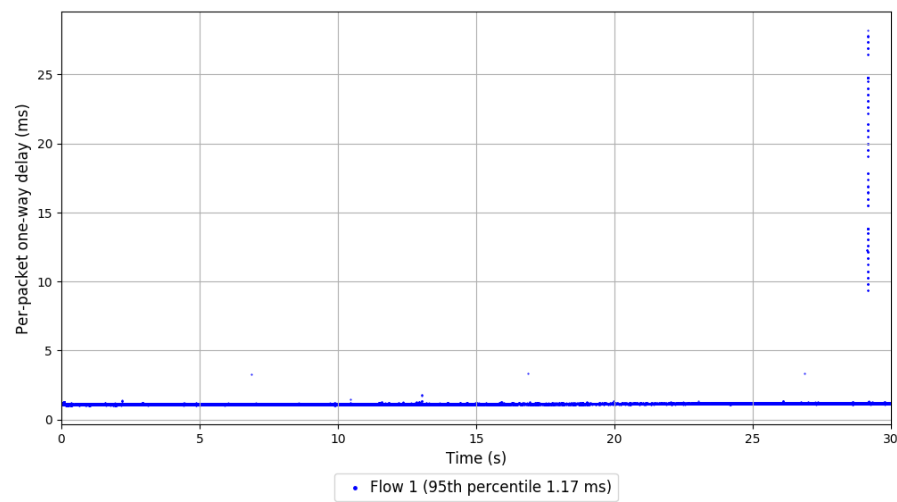
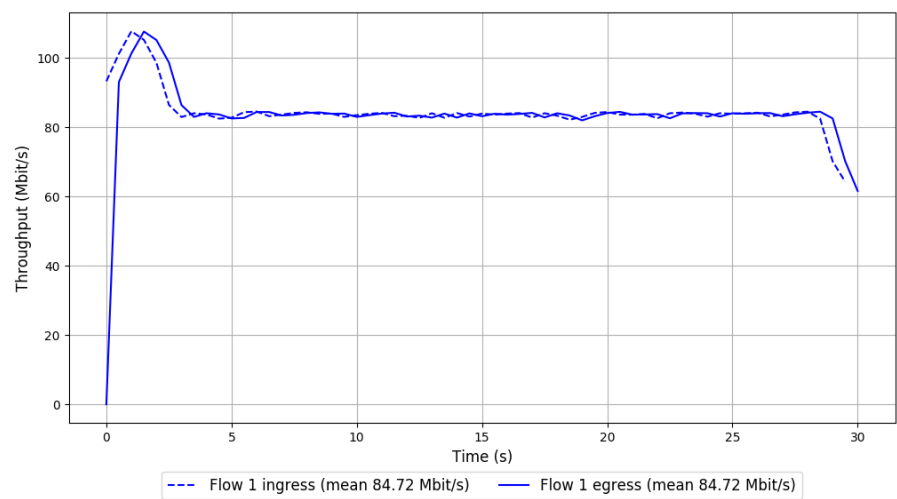


Run 1: Statistics of Muses-25

Start at: 2018-08-31 09:18:25
End at: 2018-08-31 09:18:55
Local clock offset: -9.548 ms
Remote clock offset: -3.799 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 84.72 Mbit/s
95th percentile per-packet one-way delay: 1.167 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 84.72 Mbit/s
95th percentile per-packet one-way delay: 1.167 ms
Loss rate: 0.06%

Run 1: Report of Muses-25 — Data Link

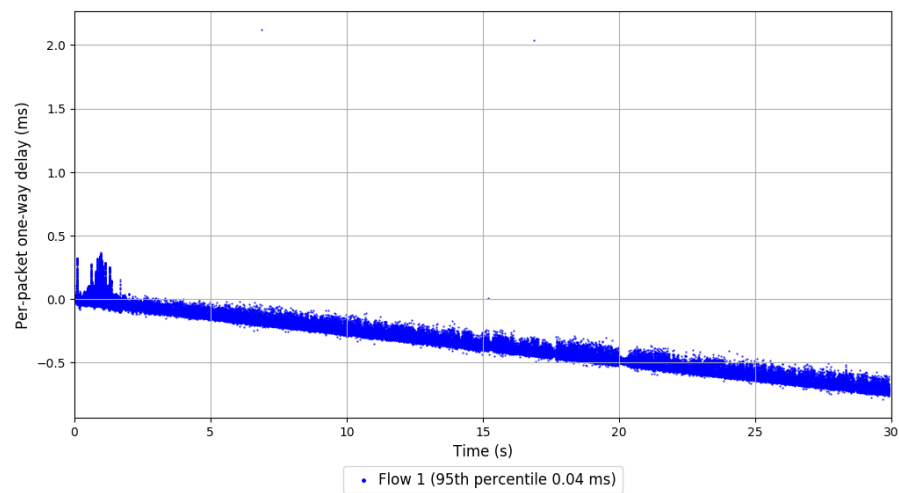
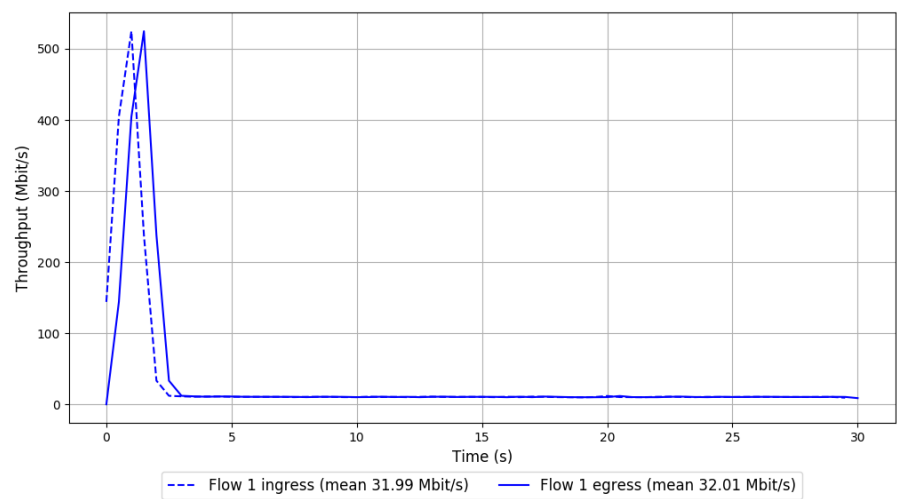


Run 2: Statistics of Muses-25

Start at: 2018-08-31 09:24:35
End at: 2018-08-31 09:25:05
Local clock offset: -11.066 ms
Remote clock offset: -4.115 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 32.01 Mbit/s
95th percentile per-packet one-way delay: 0.039 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 32.01 Mbit/s
95th percentile per-packet one-way delay: 0.039 ms
Loss rate: 0.03%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-08-31 09:30:44
End at: 2018-08-31 09:31:14
Local clock offset: -4.199 ms
Remote clock offset: -4.368 ms

Below is generated by plot.py at 2018-08-31 09:45:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 107.41 Mbit/s
95th percentile per-packet one-way delay: 0.631 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 107.41 Mbit/s
95th percentile per-packet one-way delay: 0.631 ms
Loss rate: 0.07%

Run 3: Report of Muses-25 — Data Link

