

Pantheon Report

Generated at 2018-09-05 21:23:54 (UTC).

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

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.

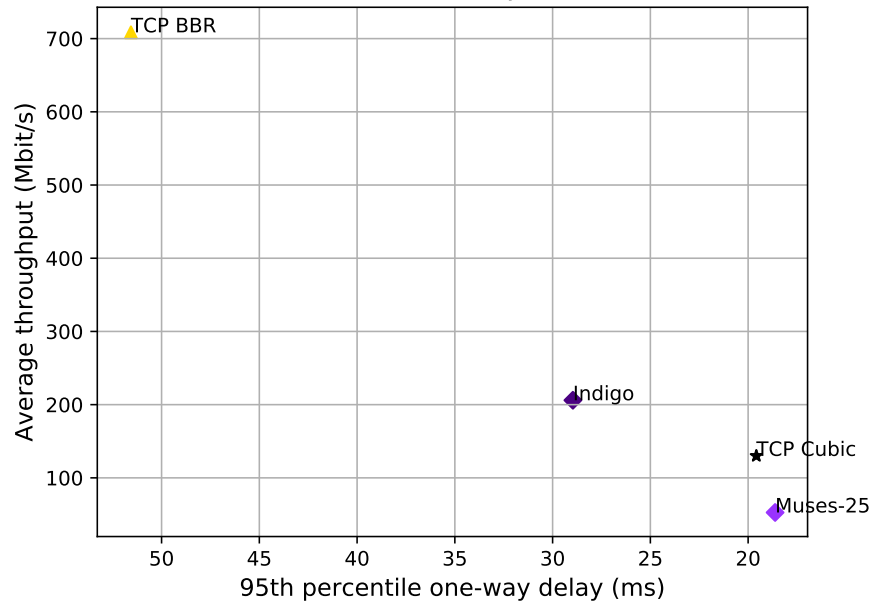
System info:

```
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
```

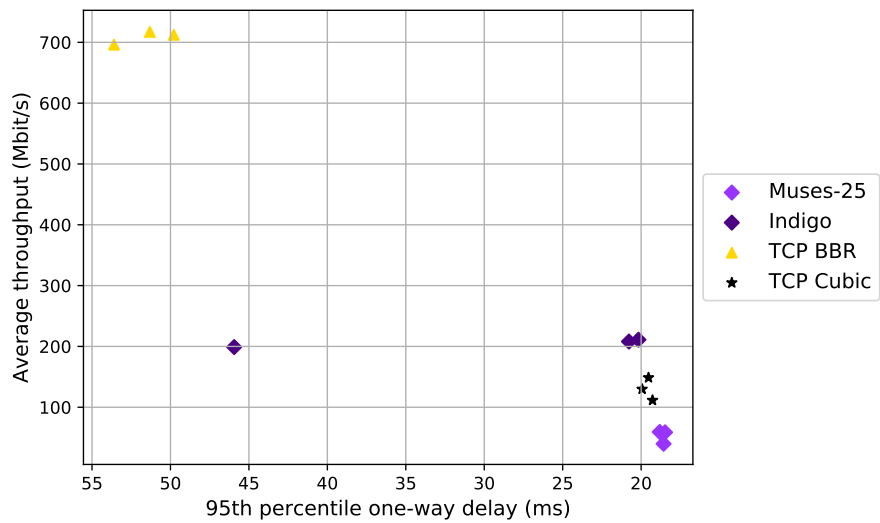
Git summary:

```
branch: muses @ 18b9165265c8ba2915c862e8713fd9ad82c1ac21
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ a28d20fb82a95a965a3da65fd1eb71b8994e9b84
third_party/pantheon-tunnel @ cbfce6db5ff5740d4fe1771f813cd646339e1952
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 AWS California 1 to Stanford, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS California 1 to Stanford, 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	708.58	51.57	0.43
TCP Cubic	3	129.98	19.58	0.02
Indigo	3	206.01	28.96	0.01
Muses-25	3	52.70	18.62	0.04

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 21:06:00

End at: 2018-09-05 21:06:30

Local clock offset: -0.701 ms

Remote clock offset: 2.609 ms

Below is generated by plot.py at 2018-09-05 21:23:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 696.16 Mbit/s

95th percentile per-packet one-way delay: 53.598 ms

Loss rate: 0.42%

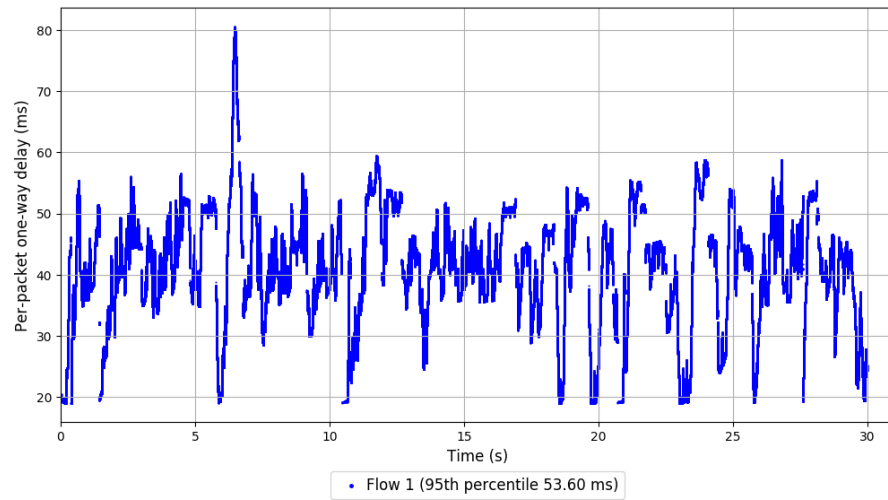
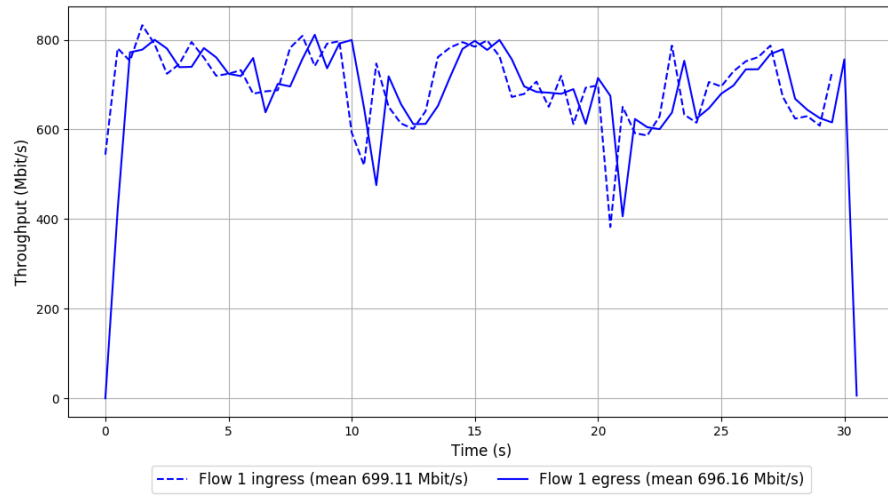
-- Flow 1:

Average throughput: 696.16 Mbit/s

95th percentile per-packet one-way delay: 53.598 ms

Loss rate: 0.42%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 21:11:50

End at: 2018-09-05 21:12:20

Local clock offset: -0.791 ms

Remote clock offset: 2.6 ms

Below is generated by plot.py at 2018-09-05 21:23:51

Datalink statistics

-- Total of 1 flow:

Average throughput: 717.18 Mbit/s

95th percentile per-packet one-way delay: 51.313 ms

Loss rate: 0.38%

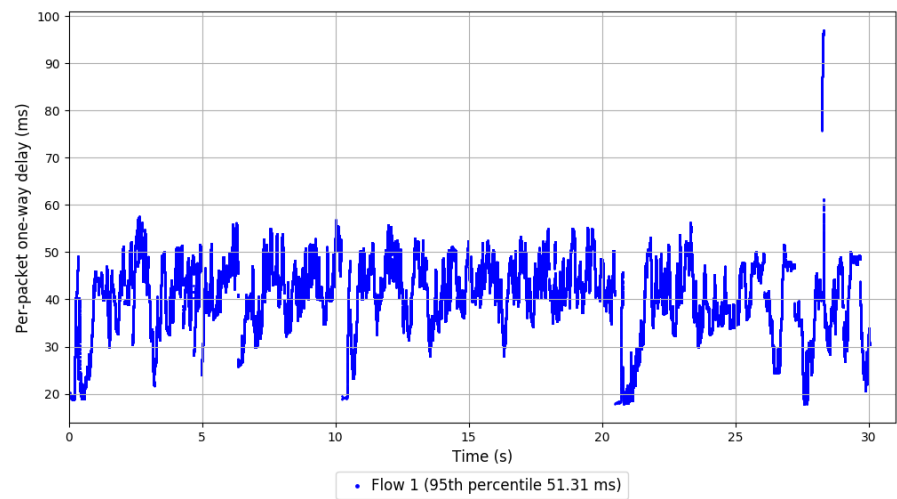
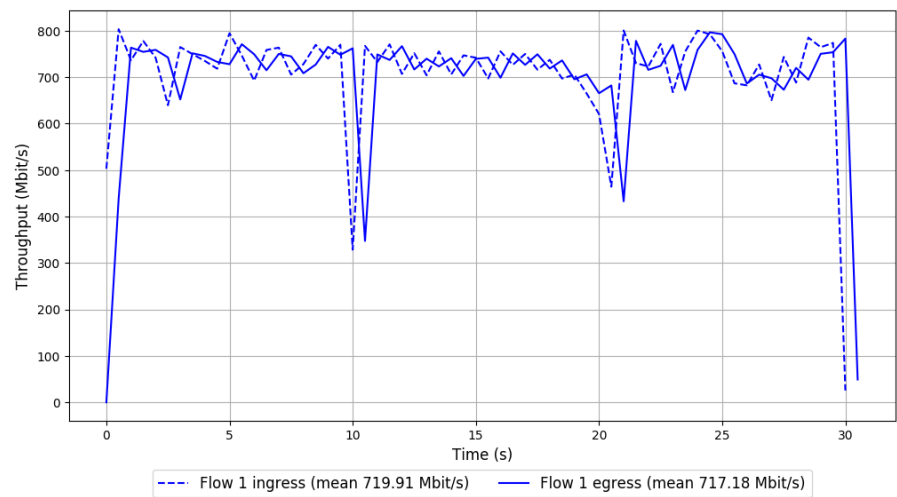
-- Flow 1:

Average throughput: 717.18 Mbit/s

95th percentile per-packet one-way delay: 51.313 ms

Loss rate: 0.38%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-05 21:17:41

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

Local clock offset: -1.975 ms

Remote clock offset: 2.659 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 712.39 Mbit/s

95th percentile per-packet one-way delay: 49.792 ms

Loss rate: 0.49%

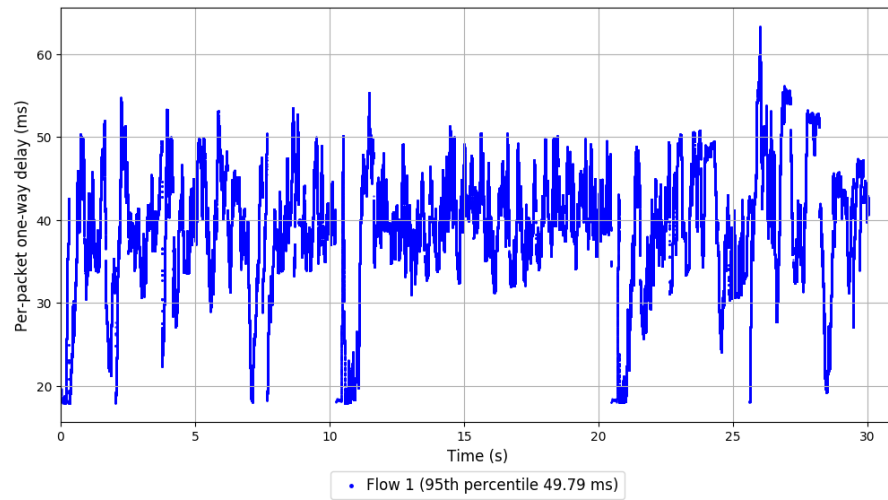
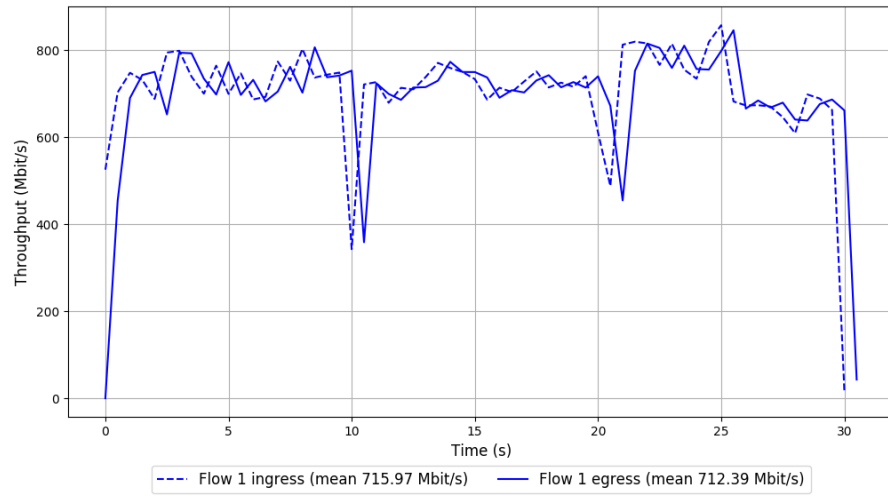
-- Flow 1:

Average throughput: 712.39 Mbit/s

95th percentile per-packet one-way delay: 49.792 ms

Loss rate: 0.49%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 21:03:17

End at: 2018-09-05 21:03:48

Local clock offset: -0.852 ms

Remote clock offset: 2.648 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 148.61 Mbit/s

95th percentile per-packet one-way delay: 19.529 ms

Loss rate: 0.03%

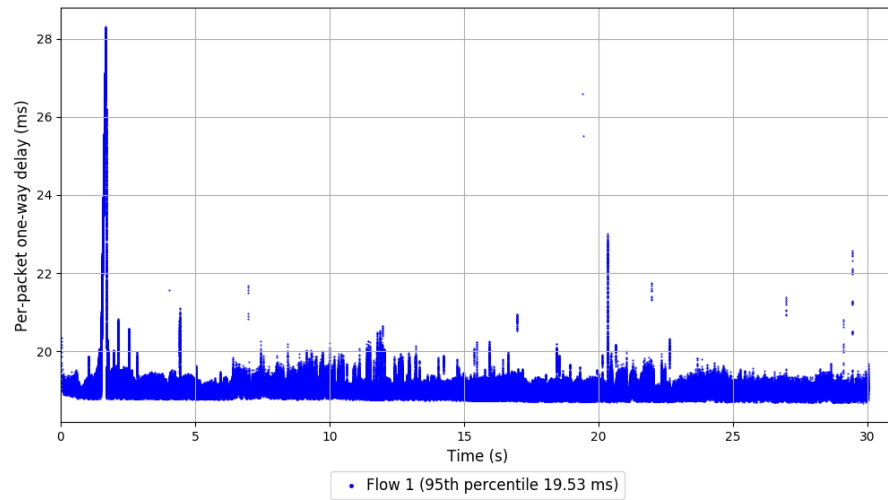
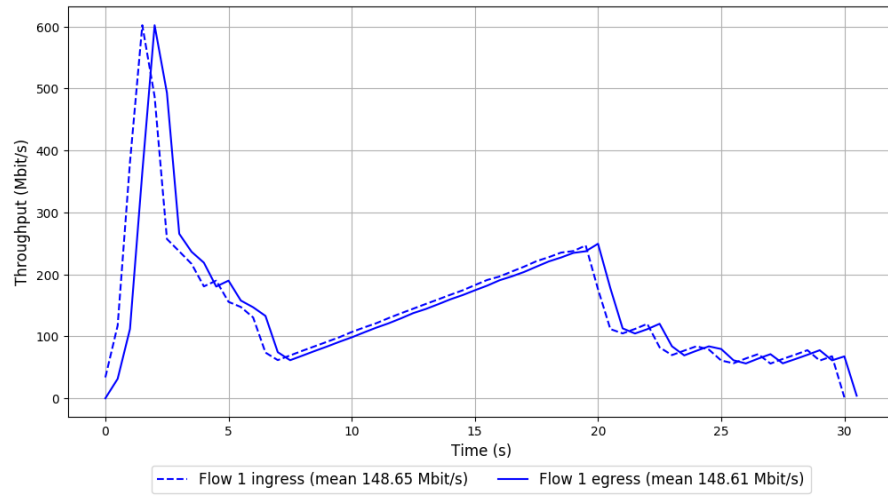
-- Flow 1:

Average throughput: 148.61 Mbit/s

95th percentile per-packet one-way delay: 19.529 ms

Loss rate: 0.03%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

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

End at: 2018-09-05 21:09:39

Local clock offset: -1.133 ms

Remote clock offset: 2.637 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 129.82 Mbit/s

95th percentile per-packet one-way delay: 19.936 ms

Loss rate: 0.03%

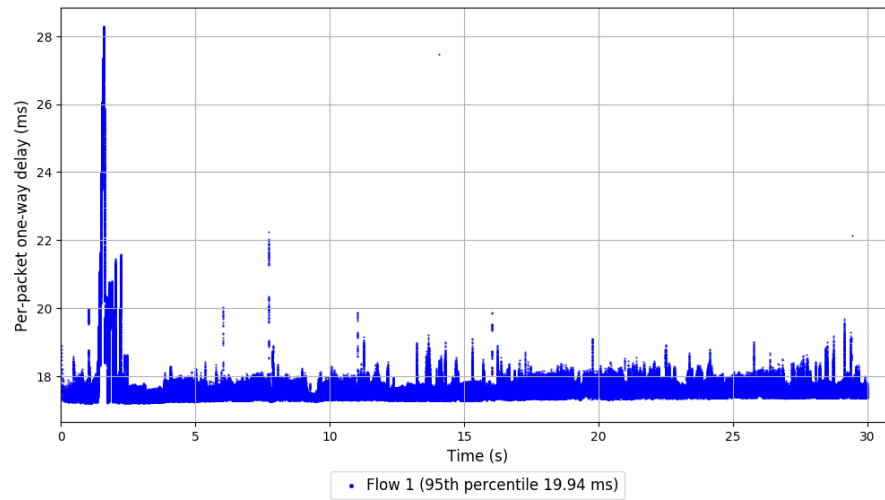
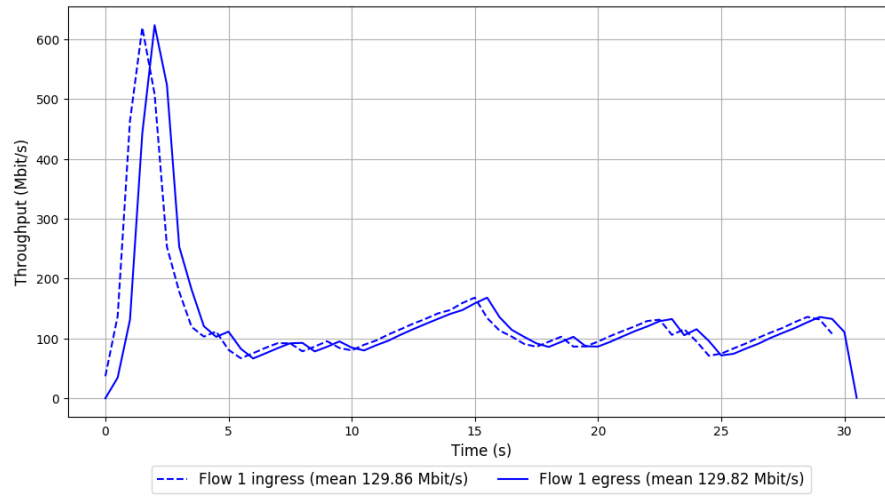
-- Flow 1:

Average throughput: 129.82 Mbit/s

95th percentile per-packet one-way delay: 19.936 ms

Loss rate: 0.03%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-05 21:15:00

End at: 2018-09-05 21:15:30

Local clock offset: -1.31 ms

Remote clock offset: 2.659 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 111.52 Mbit/s

95th percentile per-packet one-way delay: 19.274 ms

Loss rate: 0.01%

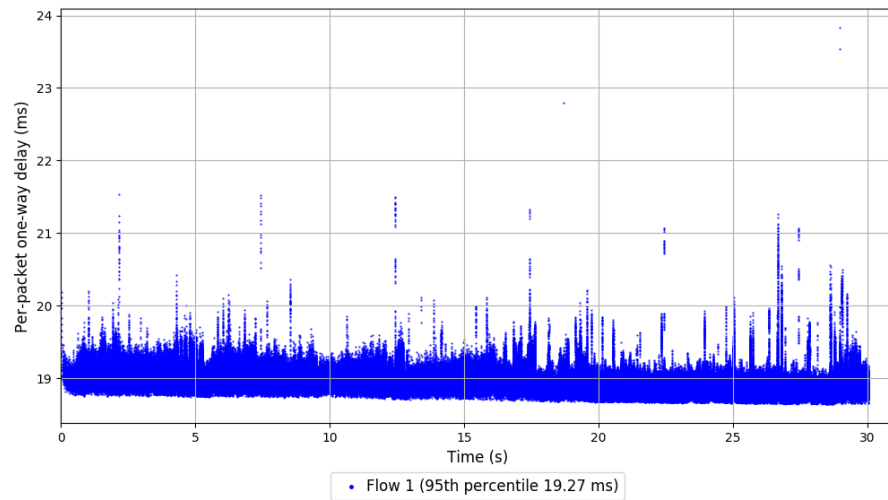
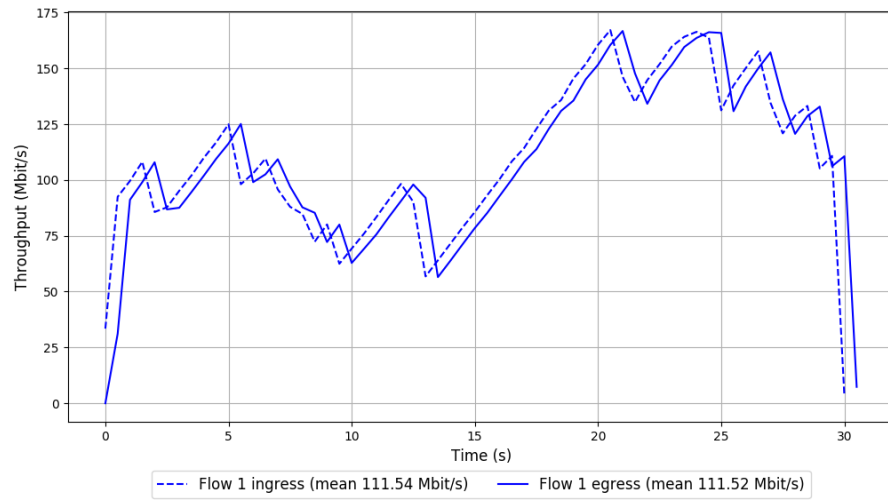
-- Flow 1:

Average throughput: 111.52 Mbit/s

95th percentile per-packet one-way delay: 19.274 ms

Loss rate: 0.01%

Run 3: Report of TCP Cubic — Data Link

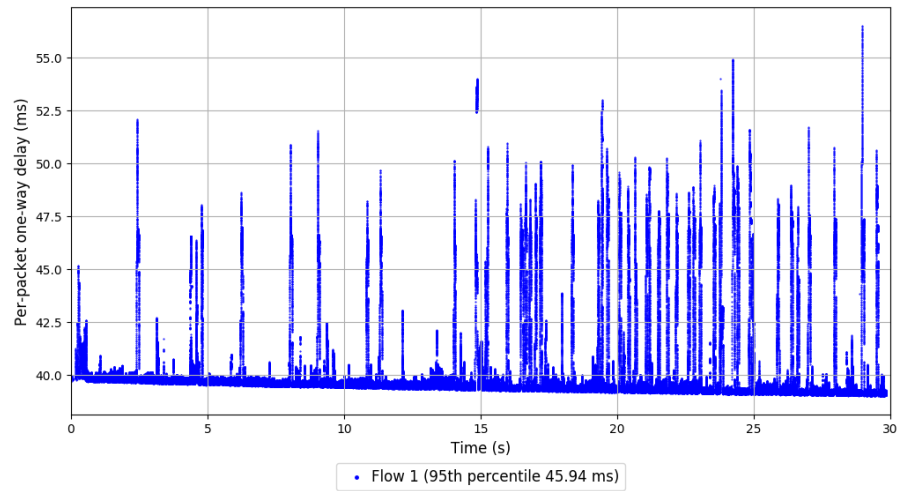
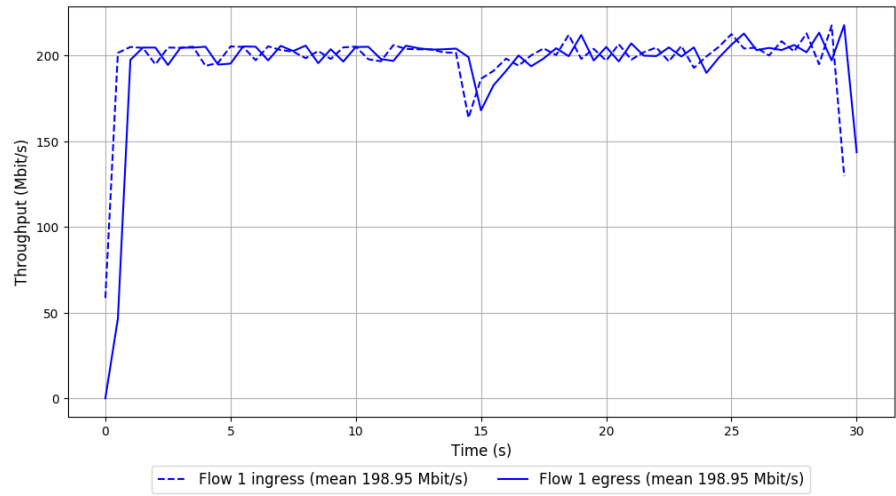


```
Run 1: Statistics of Indigo

Start at: 2018-09-05 21:01:51
End at: 2018-09-05 21:02:21
Local clock offset: -21.8 ms
Remote clock offset: 2.744 ms

# Below is generated by plot.py at 2018-09-05 21:23:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 198.95 Mbit/s
95th percentile per-packet one-way delay: 45.939 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 198.95 Mbit/s
95th percentile per-packet one-way delay: 45.939 ms
Loss rate: 0.01%
```


Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-05 21:07:42

End at: 2018-09-05 21:08:12

Local clock offset: -0.649 ms

Remote clock offset: 2.576 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 208.05 Mbit/s

95th percentile per-packet one-way delay: 20.777 ms

Loss rate: 0.01%

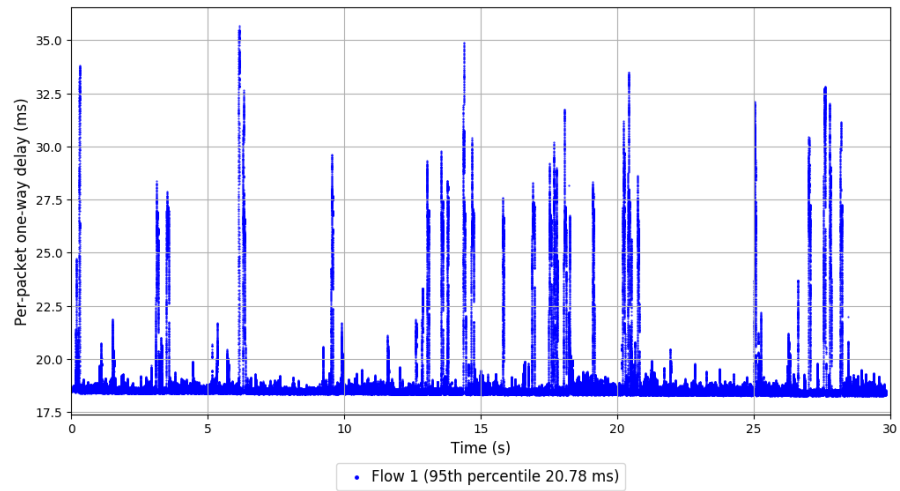
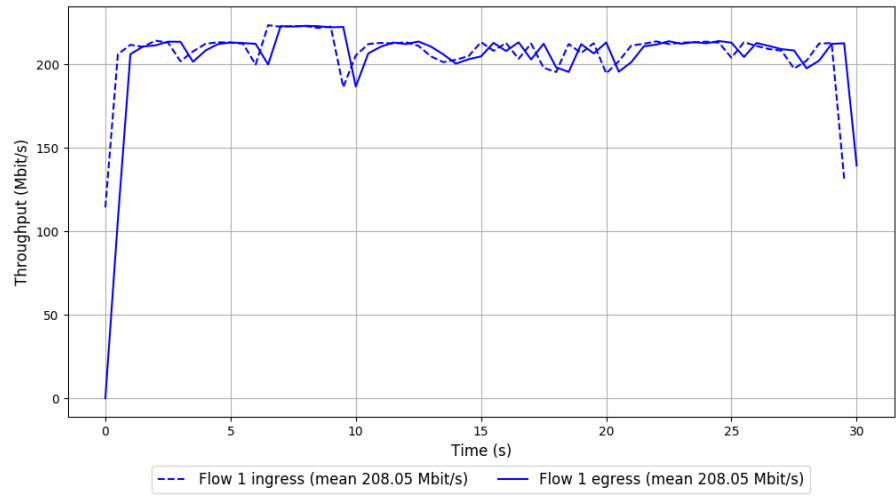
-- Flow 1:

Average throughput: 208.05 Mbit/s

95th percentile per-packet one-way delay: 20.777 ms

Loss rate: 0.01%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-05 21:13:33

End at: 2018-09-05 21:14:03

Local clock offset: -0.953 ms

Remote clock offset: 2.719 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 211.02 Mbit/s

95th percentile per-packet one-way delay: 20.172 ms

Loss rate: 0.01%

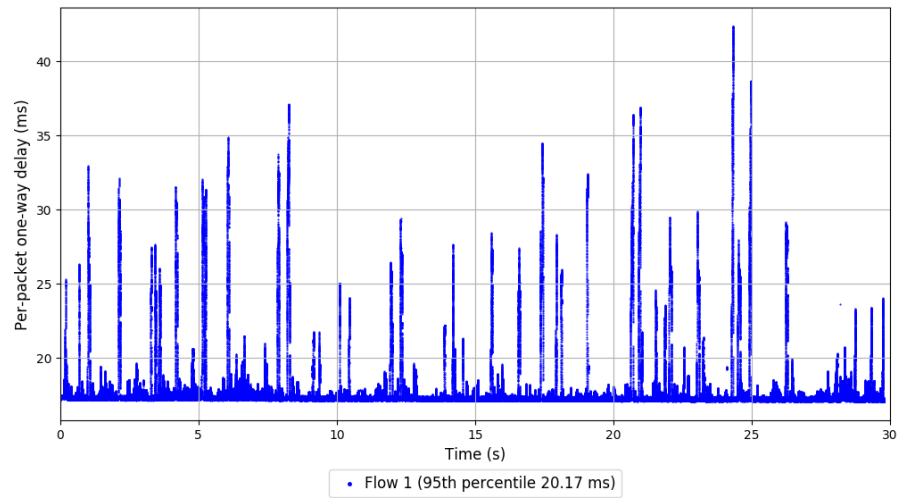
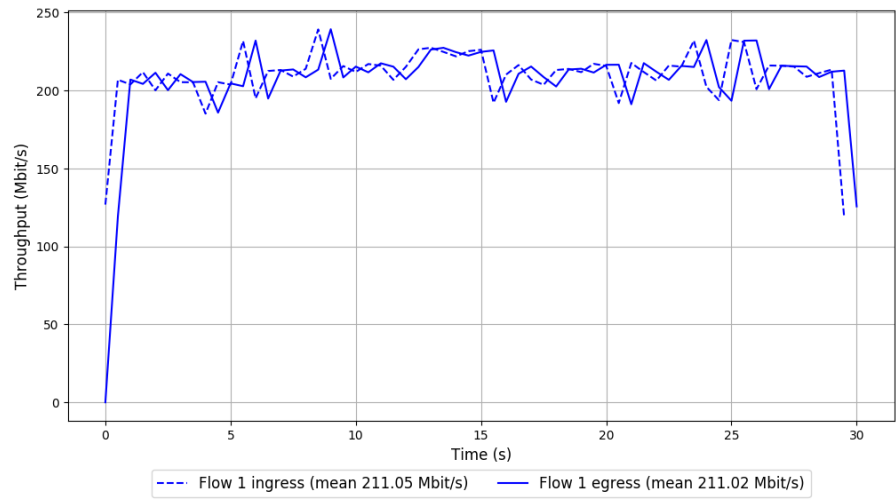
-- Flow 1:

Average throughput: 211.02 Mbit/s

95th percentile per-packet one-way delay: 20.172 ms

Loss rate: 0.01%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-05 21:04:40

End at: 2018-09-05 21:05:10

Local clock offset: -1.02 ms

Remote clock offset: 2.723 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 58.79 Mbit/s

95th percentile per-packet one-way delay: 18.475 ms

Loss rate: 0.04%

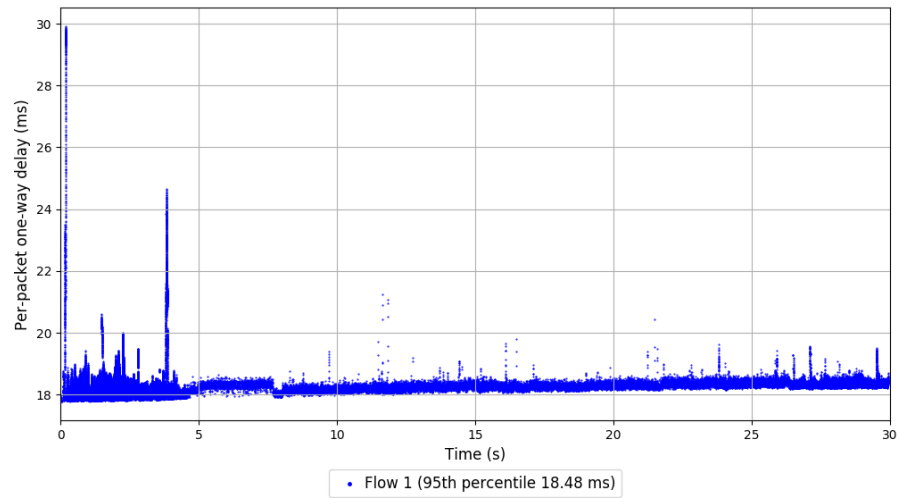
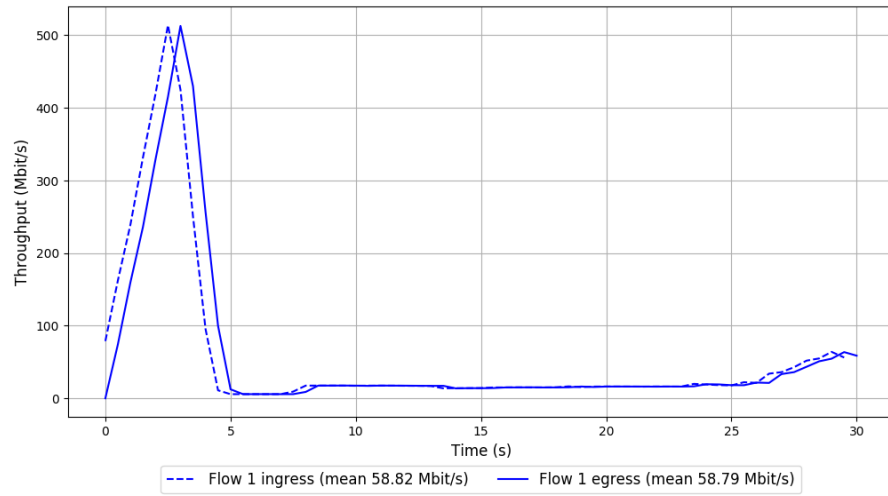
-- Flow 1:

Average throughput: 58.79 Mbit/s

95th percentile per-packet one-way delay: 18.475 ms

Loss rate: 0.04%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-05 21:10:31

End at: 2018-09-05 21:11:01

Local clock offset: -1.017 ms

Remote clock offset: 2.602 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 39.93 Mbit/s

95th percentile per-packet one-way delay: 18.568 ms

Loss rate: 0.04%

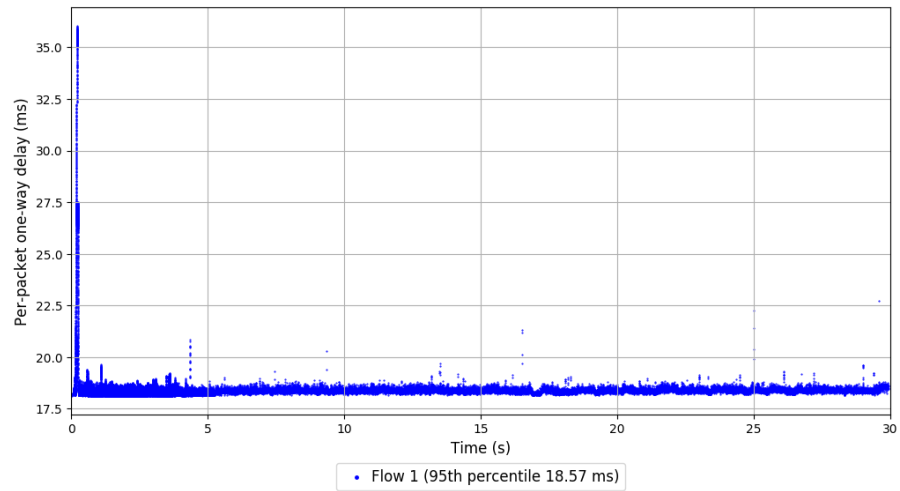
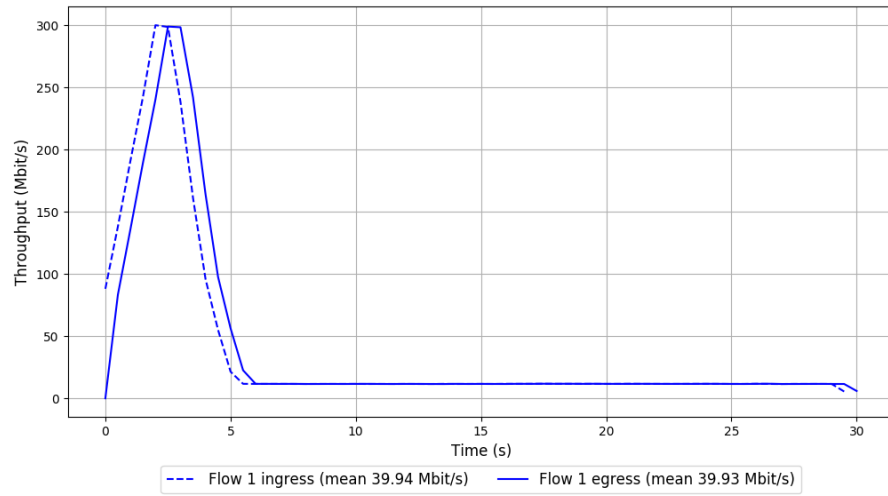
-- Flow 1:

Average throughput: 39.93 Mbit/s

95th percentile per-packet one-way delay: 18.568 ms

Loss rate: 0.04%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

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

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

Local clock offset: -1.54 ms

Remote clock offset: 2.742 ms

Below is generated by plot.py at 2018-09-05 21:23:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 59.38 Mbit/s

95th percentile per-packet one-way delay: 18.816 ms

Loss rate: 0.05%

-- Flow 1:

Average throughput: 59.38 Mbit/s

95th percentile per-packet one-way delay: 18.816 ms

Loss rate: 0.05%

Run 3: Report of Muses-25 — Data Link

