

Pantheon Report

Generated at 2018-08-31 07:28:12 (UTC).

Data path: GCE Sydney on `ens4` (*local*) → GCE Iowa on `ens4` (*remote*).

Repeated the test of 4 congestion control schemes twice.

Each test lasted for 30 seconds running 1 flow.

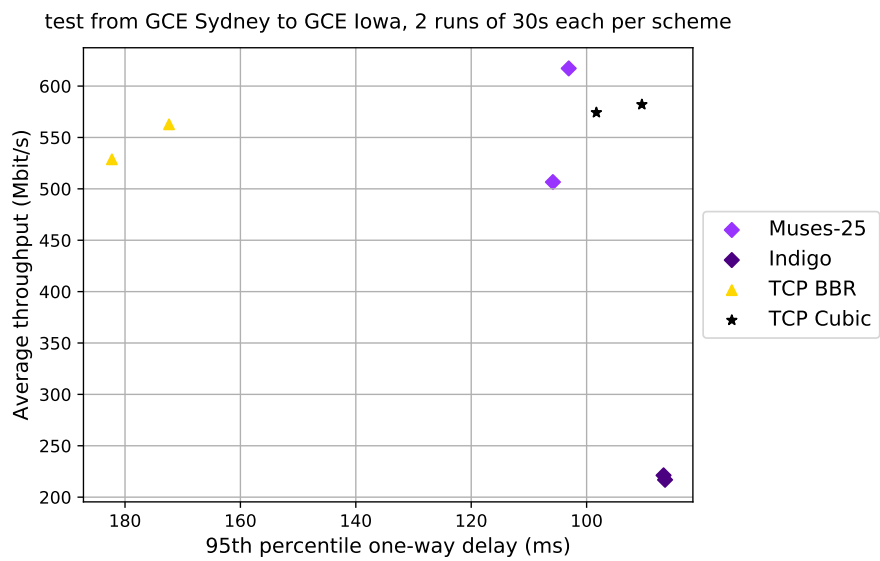
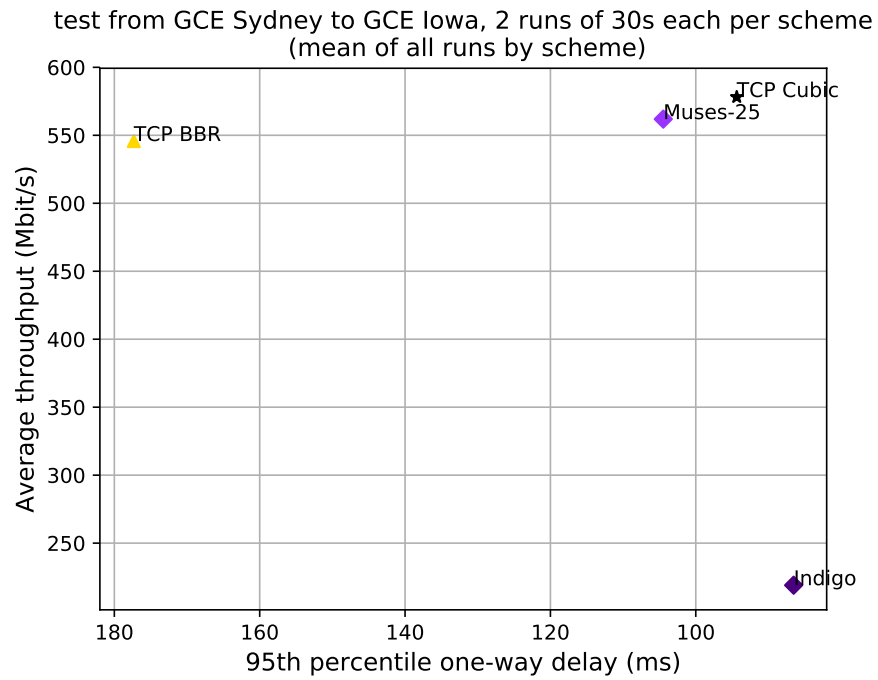
NTP offsets were measured against `time.google.com` and have been applied to correct the timestamps in logs.

System info:

```
Linux 4.15.0-1018-gcp
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 @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
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
```



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	2	545.77	177.32	0.68
TCP Cubic	2	578.14	94.36	0.01
Indigo	2	219.05	86.54	0.00
Muses-25	2	561.90	104.47	0.01

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 07:11:03

End at: 2018-08-31 07:11:33

Local clock offset: 1.238 ms

Remote clock offset: 1.445 ms

Below is generated by plot.py at 2018-08-31 07:27:15

Datalink statistics

-- Total of 1 flow:

Average throughput: 528.75 Mbit/s

95th percentile per-packet one-way delay: 182.272 ms

Loss rate: 0.75%

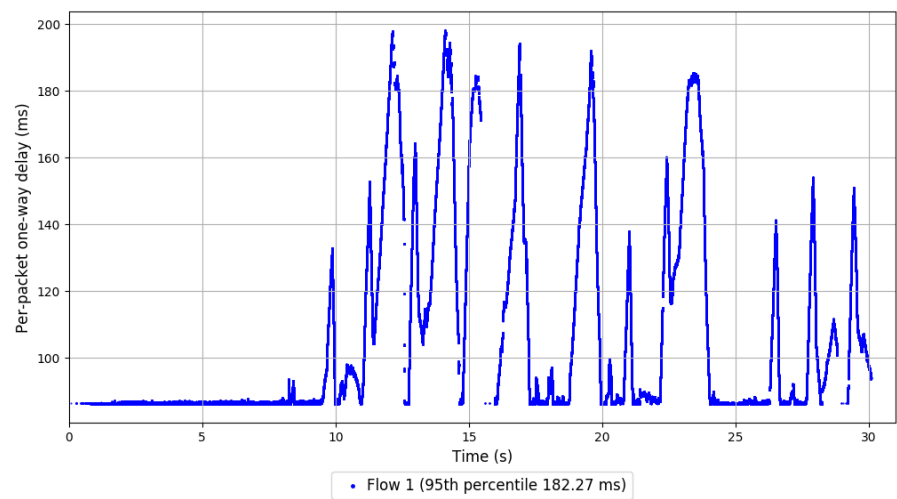
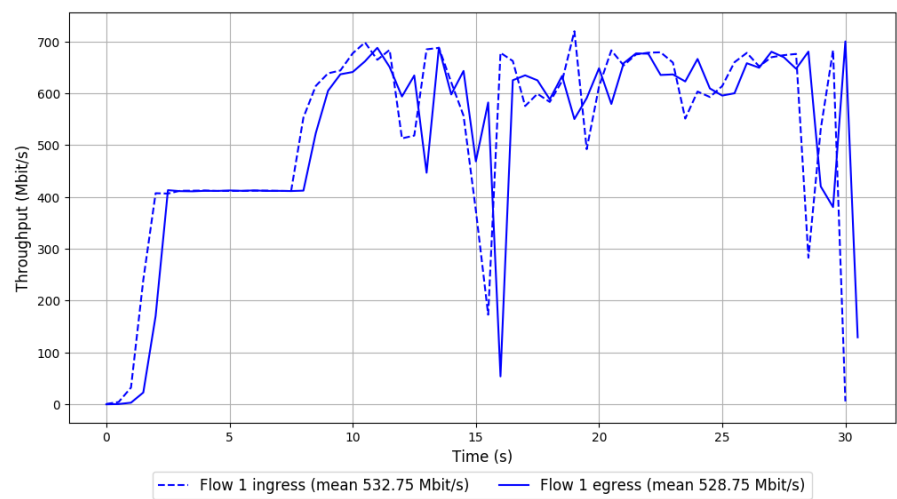
-- Flow 1:

Average throughput: 528.75 Mbit/s

95th percentile per-packet one-way delay: 182.272 ms

Loss rate: 0.75%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-31 07:17:15

End at: 2018-08-31 07:17:45

Local clock offset: 0.564 ms

Remote clock offset: 0.953 ms

Below is generated by plot.py at 2018-08-31 07:27:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 562.80 Mbit/s

95th percentile per-packet one-way delay: 172.374 ms

Loss rate: 0.61%

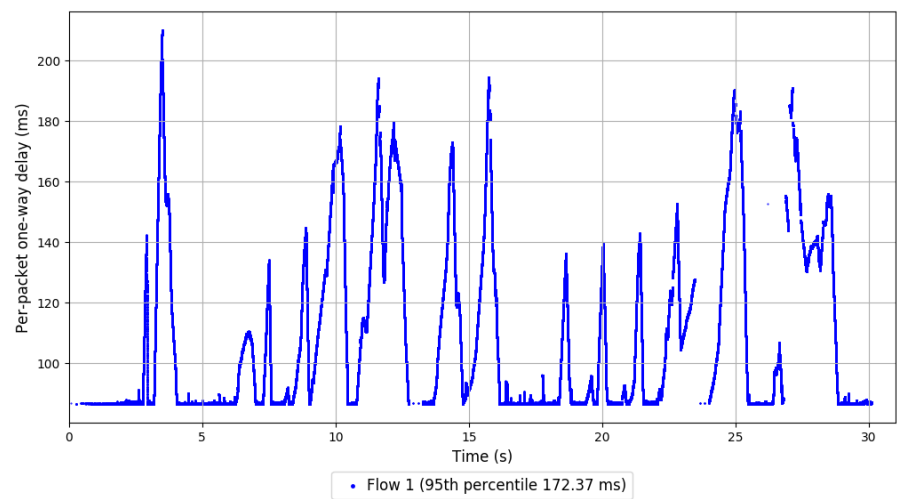
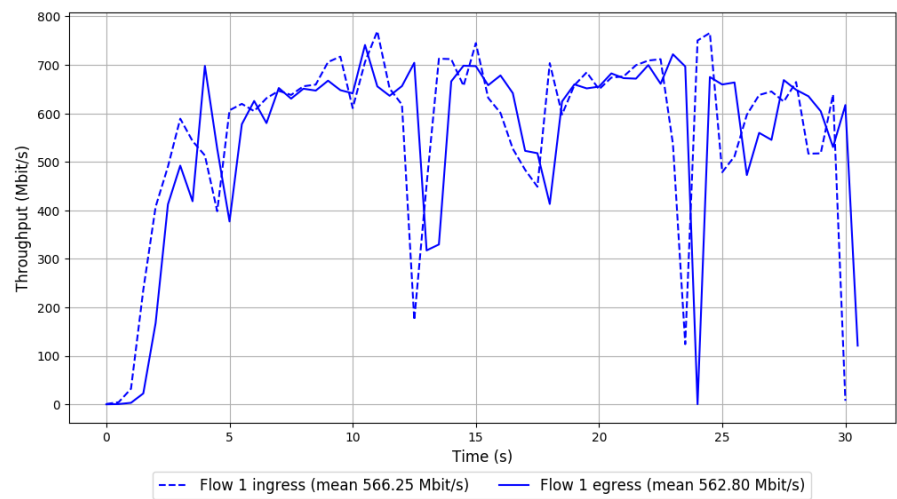
-- Flow 1:

Average throughput: 562.80 Mbit/s

95th percentile per-packet one-way delay: 172.374 ms

Loss rate: 0.61%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 07:09:28

End at: 2018-08-31 07:09:58

Local clock offset: 1.429 ms

Remote clock offset: 1.671 ms

Below is generated by plot.py at 2018-08-31 07:27:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 574.25 Mbit/s

95th percentile per-packet one-way delay: 98.303 ms

Loss rate: 0.02%

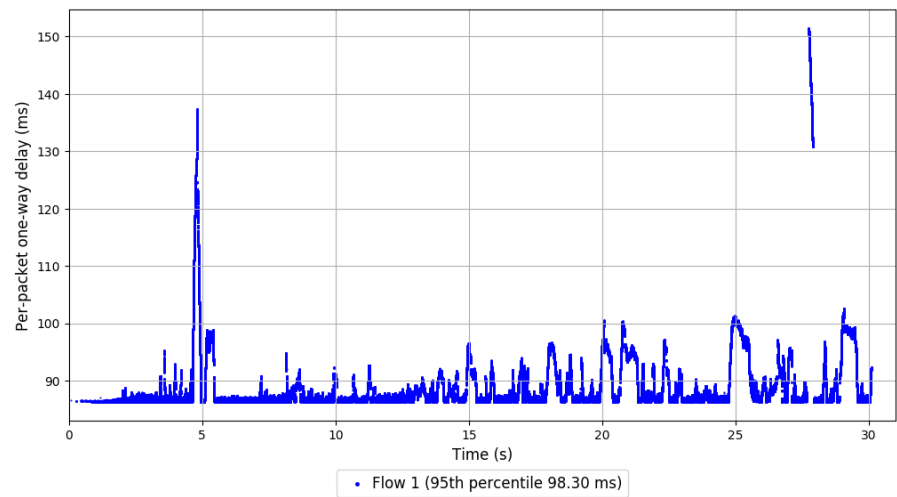
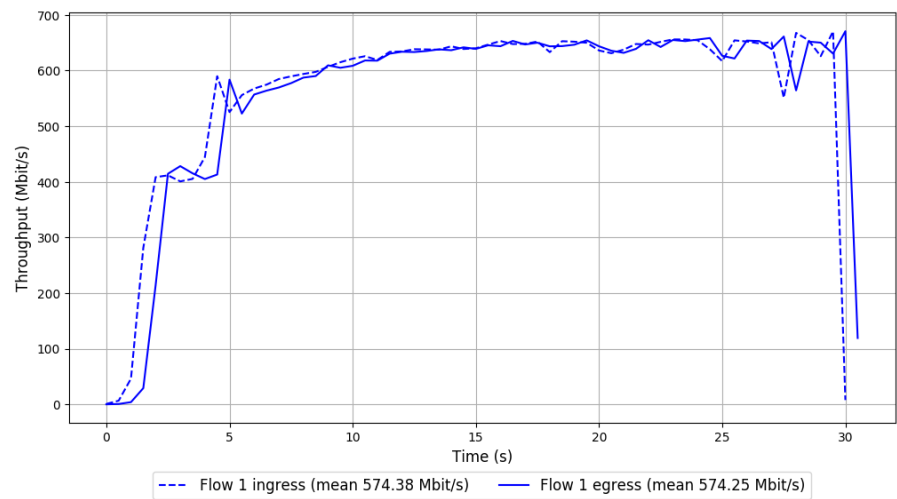
-- Flow 1:

Average throughput: 574.25 Mbit/s

95th percentile per-packet one-way delay: 98.303 ms

Loss rate: 0.02%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 07:15:39

End at: 2018-08-31 07:16:09

Local clock offset: 0.761 ms

Remote clock offset: 1.022 ms

Below is generated by plot.py at 2018-08-31 07:27:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 582.03 Mbit/s

95th percentile per-packet one-way delay: 90.425 ms

Loss rate: 0.00%

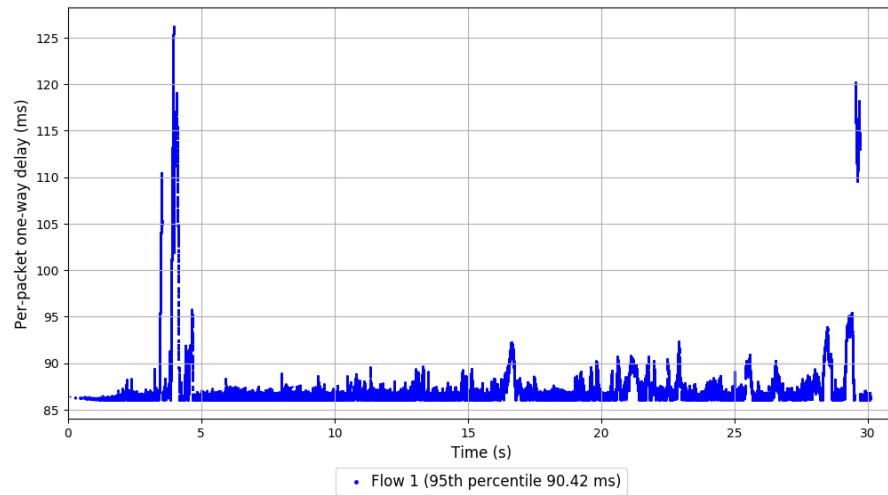
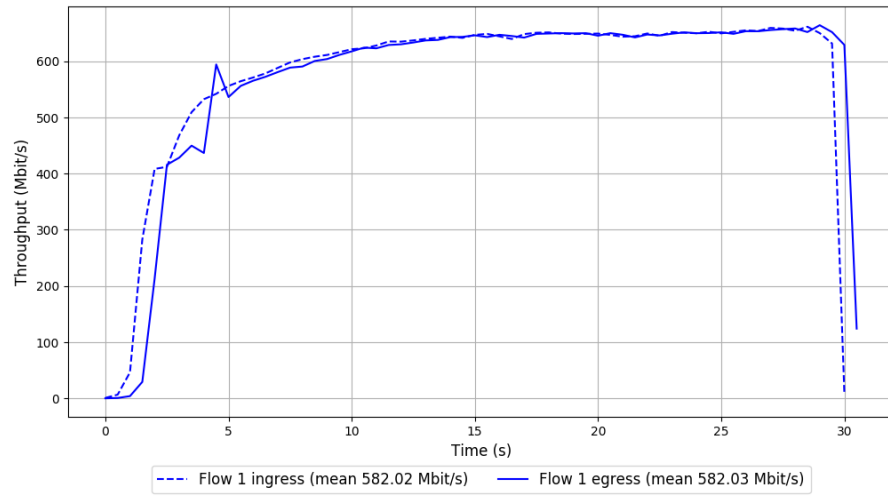
-- Flow 1:

Average throughput: 582.03 Mbit/s

95th percentile per-packet one-way delay: 90.425 ms

Loss rate: 0.00%

Run 2: Report of TCP Cubic — Data Link

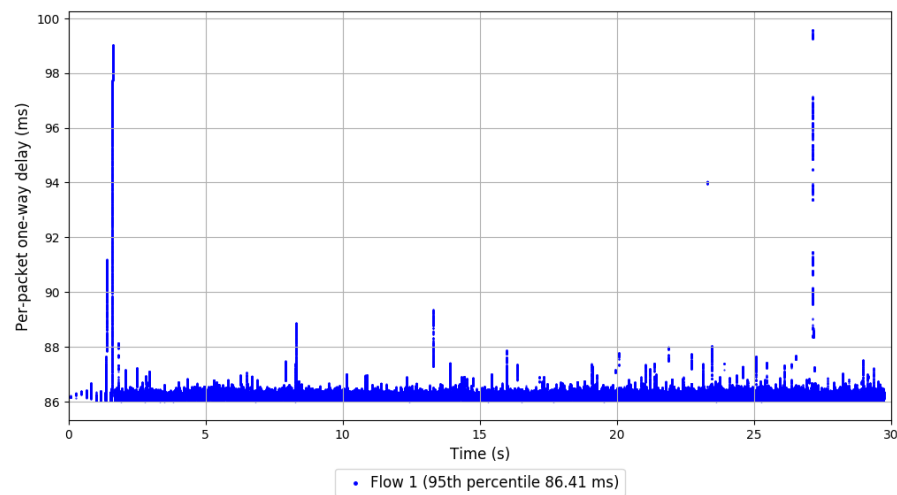
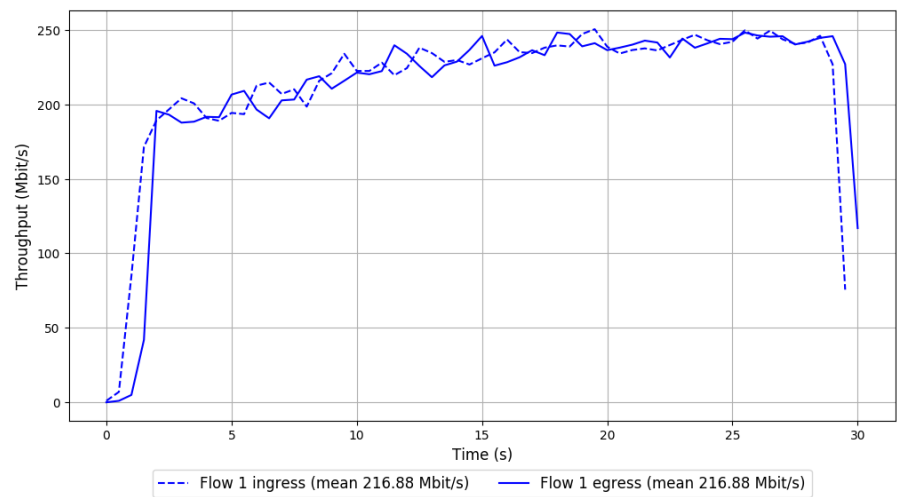


```
Run 1: Statistics of Indigo

Start at: 2018-08-31 07:08:01
End at: 2018-08-31 07:08:31
Local clock offset: 1.815 ms
Remote clock offset: 1.932 ms

# Below is generated by plot.py at 2018-08-31 07:27:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 216.88 Mbit/s
95th percentile per-packet one-way delay: 86.408 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 216.88 Mbit/s
95th percentile per-packet one-way delay: 86.408 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-31 07:14:12

End at: 2018-08-31 07:14:42

Local clock offset: 0.903 ms

Remote clock offset: 1.168 ms

Below is generated by plot.py at 2018-08-31 07:27:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 221.21 Mbit/s

95th percentile per-packet one-way delay: 86.663 ms

Loss rate: 0.00%

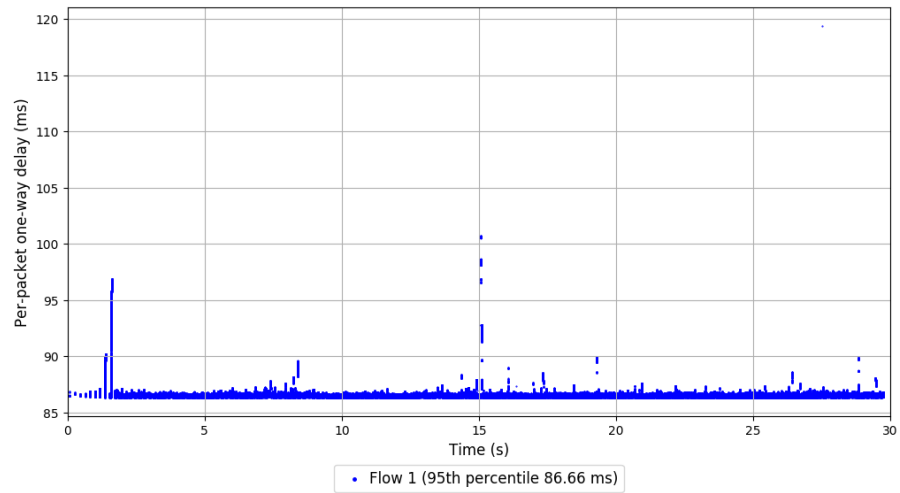
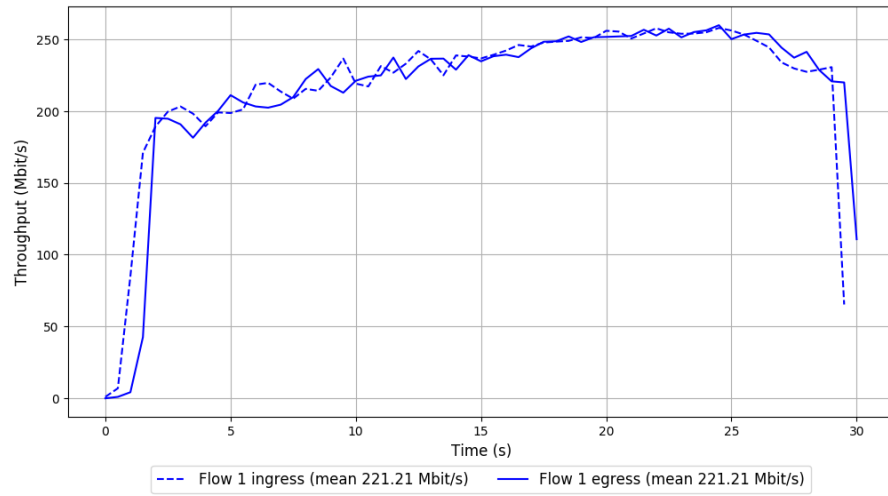
-- Flow 1:

Average throughput: 221.21 Mbit/s

95th percentile per-packet one-way delay: 86.663 ms

Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-08-31 07:06:21

End at: 2018-08-31 07:06:51

Local clock offset: 1.852 ms

Remote clock offset: 2.218 ms

Below is generated by plot.py at 2018-08-31 07:28:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 617.20 Mbit/s

95th percentile per-packet one-way delay: 103.100 ms

Loss rate: 0.00%

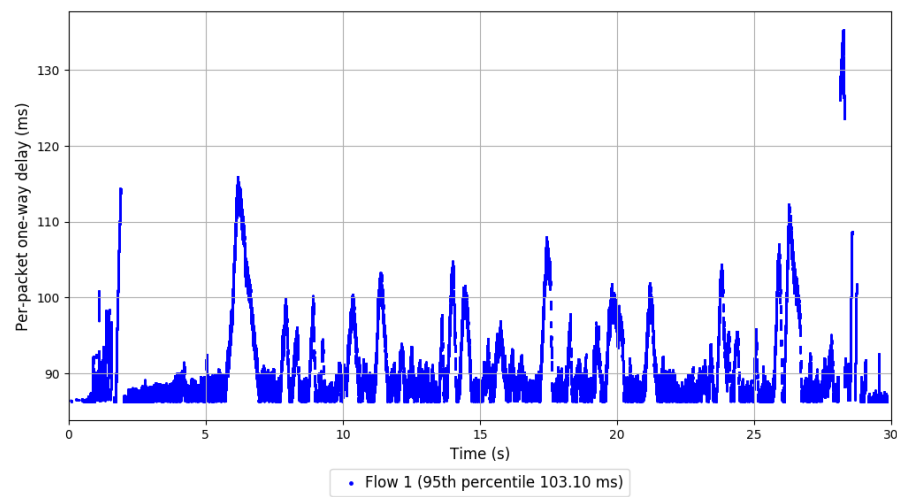
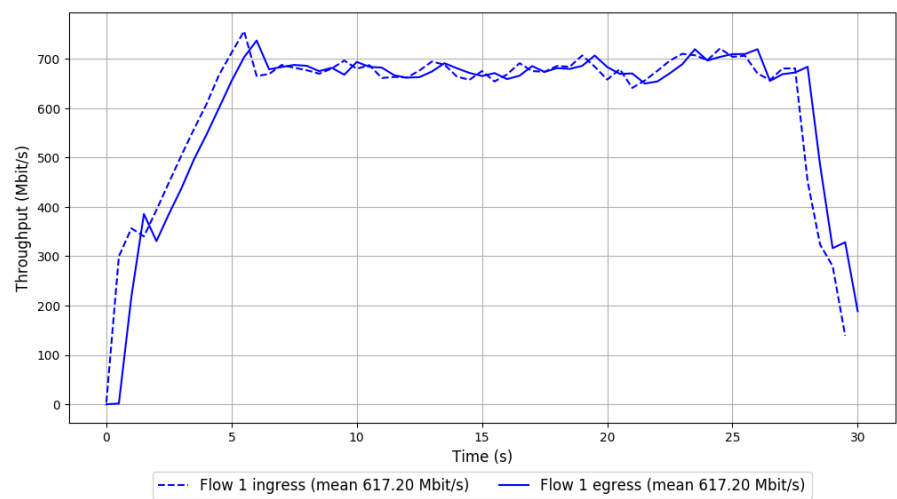
-- Flow 1:

Average throughput: 617.20 Mbit/s

95th percentile per-packet one-way delay: 103.100 ms

Loss rate: 0.00%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-08-31 07:12:38

End at: 2018-08-31 07:13:08

Local clock offset: 1.012 ms

Remote clock offset: 1.266 ms

Below is generated by plot.py at 2018-08-31 07:28:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 506.60 Mbit/s

95th percentile per-packet one-way delay: 105.842 ms

Loss rate: 0.03%

-- Flow 1:

Average throughput: 506.60 Mbit/s

95th percentile per-packet one-way delay: 105.842 ms

Loss rate: 0.03%

Run 2: Report of Muses-25 — Data Link

