

Pantheon Report

Generated at 2018-08-31 09:33:03 (UTC).

Data path: India on `em1` (*remote*) → AWS India 1 on `ens5` (*local*).

Repeated the test of 4 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

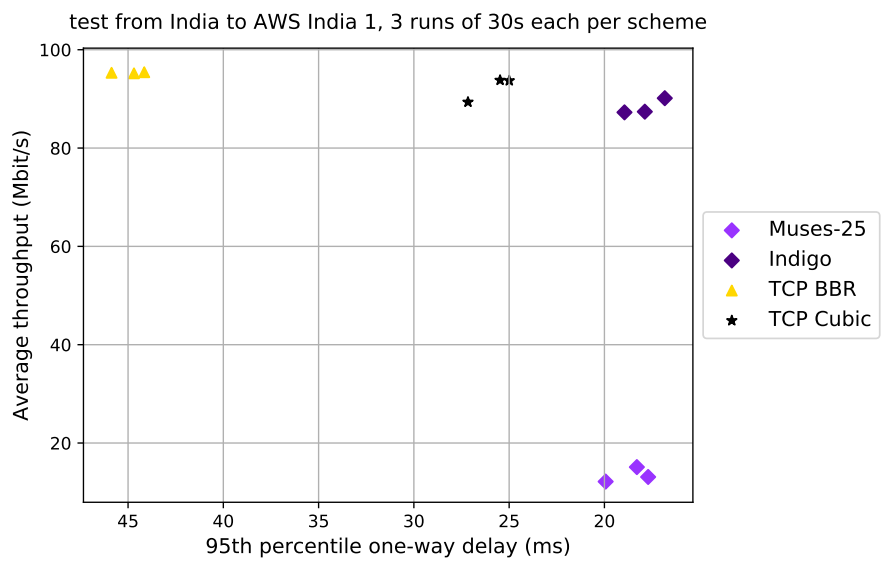
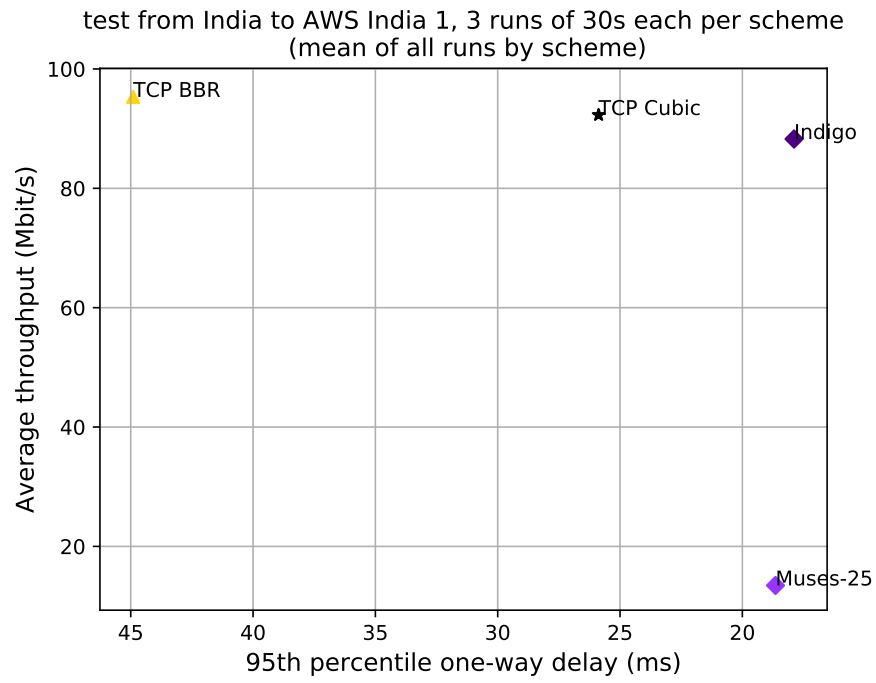
NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

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 @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
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
```



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	95.32	44.90	3.19
TCP Cubic	3	92.29	25.88	0.09
Indigo	3	88.27	17.89	0.09
Muses-25	3	13.45	18.65	0.06

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 09:21:36

End at: 2018-08-31 09:22:06

Local clock offset: 5.905 ms

Remote clock offset: -2.79 ms

Below is generated by plot.py at 2018-08-31 09:32:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 95.31 Mbit/s

95th percentile per-packet one-way delay: 45.866 ms

Loss rate: 3.41%

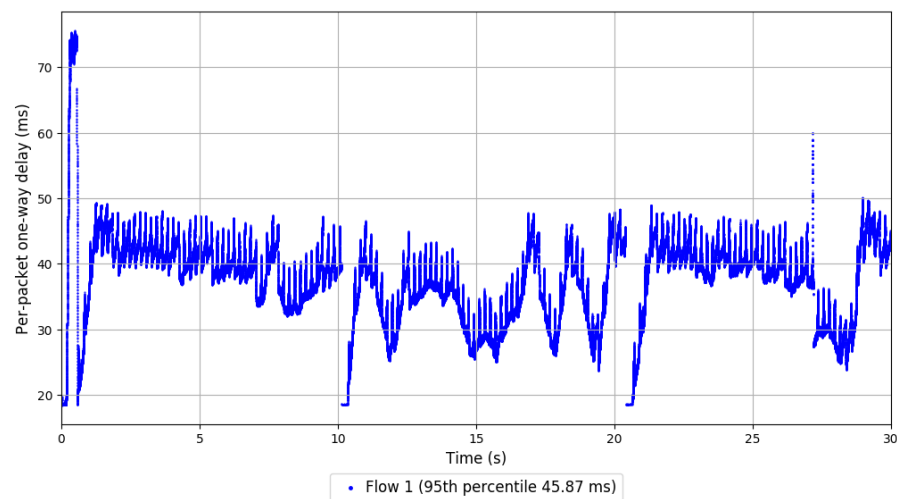
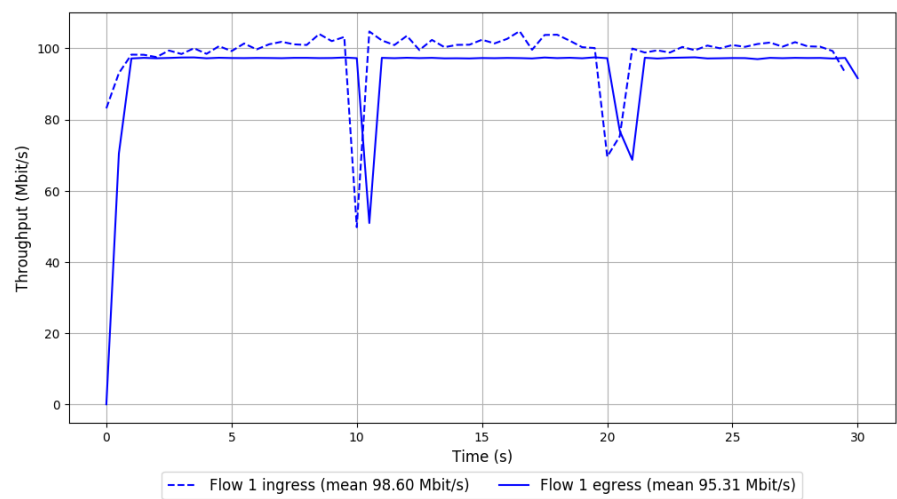
-- Flow 1:

Average throughput: 95.31 Mbit/s

95th percentile per-packet one-way delay: 45.866 ms

Loss rate: 3.41%

Run 1: Report of TCP BBR — Data Link

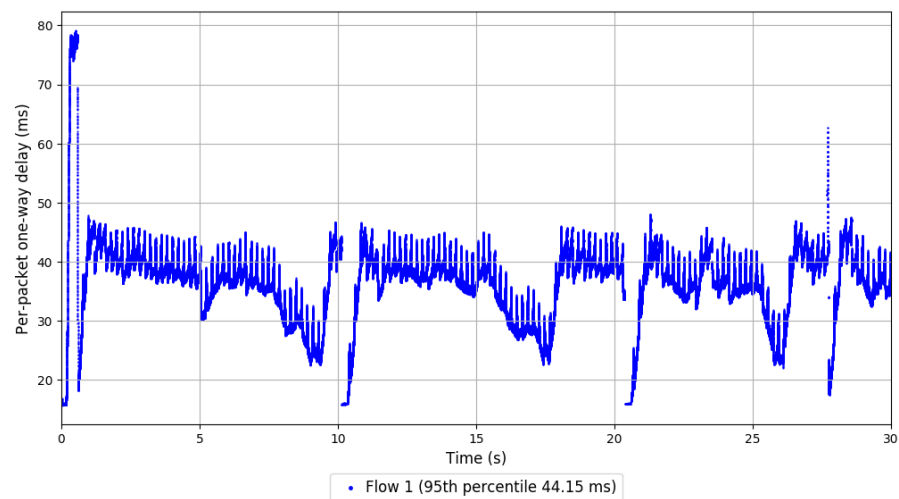
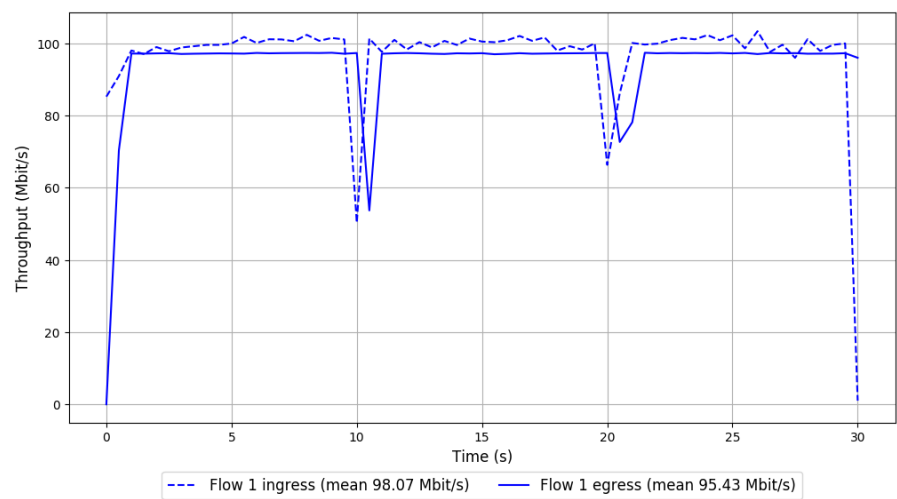


Run 2: Statistics of TCP BBR

Start at: 2018-08-31 09:26:12
End at: 2018-08-31 09:26:42
Local clock offset: 3.144 ms
Remote clock offset: -2.386 ms

Below is generated by plot.py at 2018-08-31 09:32:54
Datalink statistics
-- Total of 1 flow:
Average throughput: 95.43 Mbit/s
95th percentile per-packet one-way delay: 44.150 ms
Loss rate: 2.78%
-- Flow 1:
Average throughput: 95.43 Mbit/s
95th percentile per-packet one-way delay: 44.150 ms
Loss rate: 2.78%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-31 09:30:51

End at: 2018-08-31 09:31:21

Local clock offset: 2.67 ms

Remote clock offset: -3.08 ms

Below is generated by plot.py at 2018-08-31 09:32:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 95.21 Mbit/s

95th percentile per-packet one-way delay: 44.689 ms

Loss rate: 3.39%

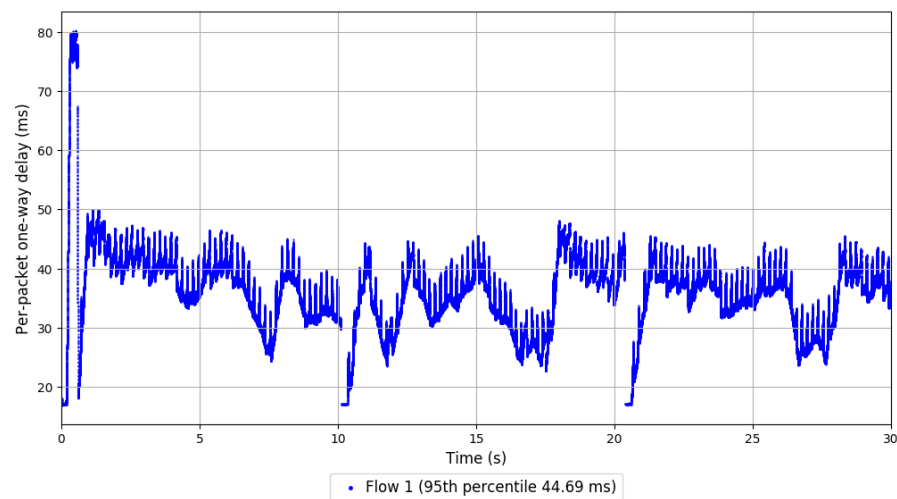
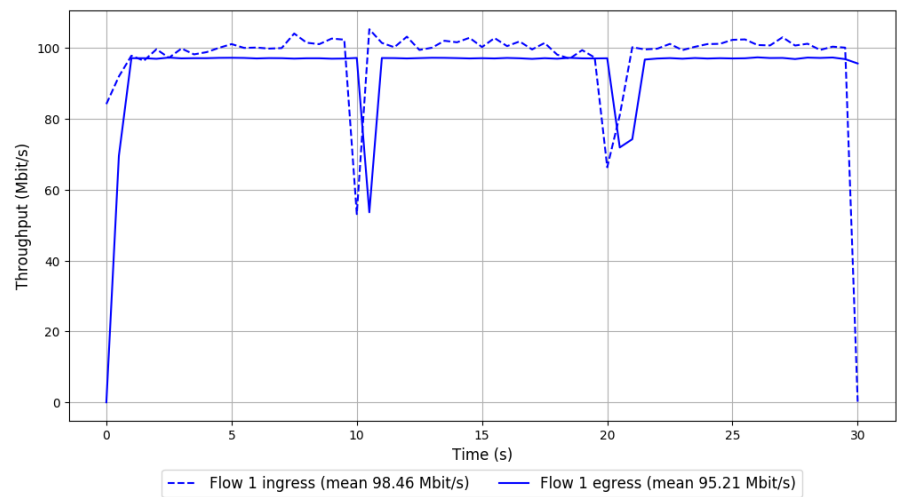
-- Flow 1:

Average throughput: 95.21 Mbit/s

95th percentile per-packet one-way delay: 44.689 ms

Loss rate: 3.39%

Run 3: Report of TCP BBR — Data Link

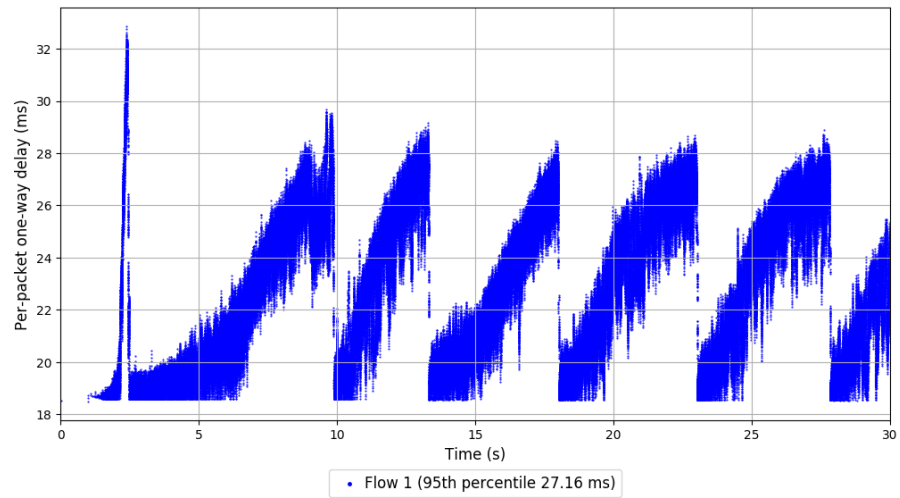
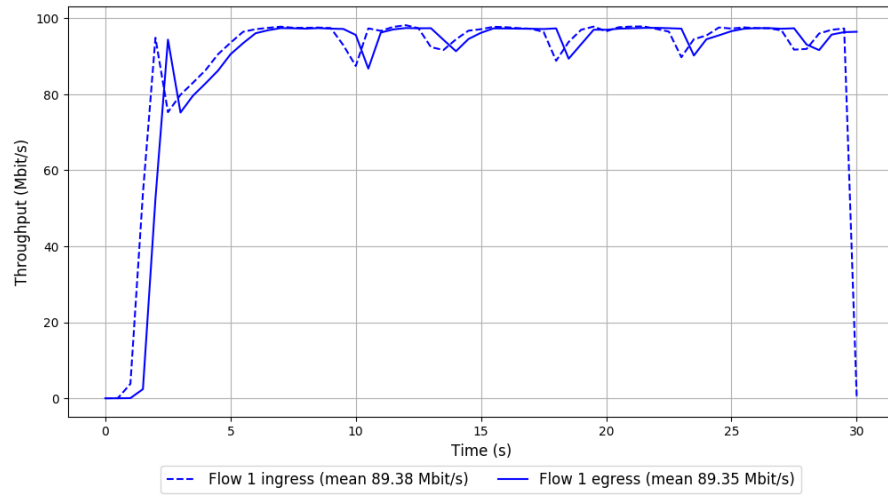


Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 09:18:12
End at: 2018-08-31 09:18:42
Local clock offset: 4.499 ms
Remote clock offset: -3.811 ms

Below is generated by plot.py at 2018-08-31 09:32:54
Datalink statistics
-- Total of 1 flow:
Average throughput: 89.35 Mbit/s
95th percentile per-packet one-way delay: 27.161 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 89.35 Mbit/s
95th percentile per-packet one-way delay: 27.161 ms
Loss rate: 0.12%

Run 1: Report of TCP Cubic — Data Link

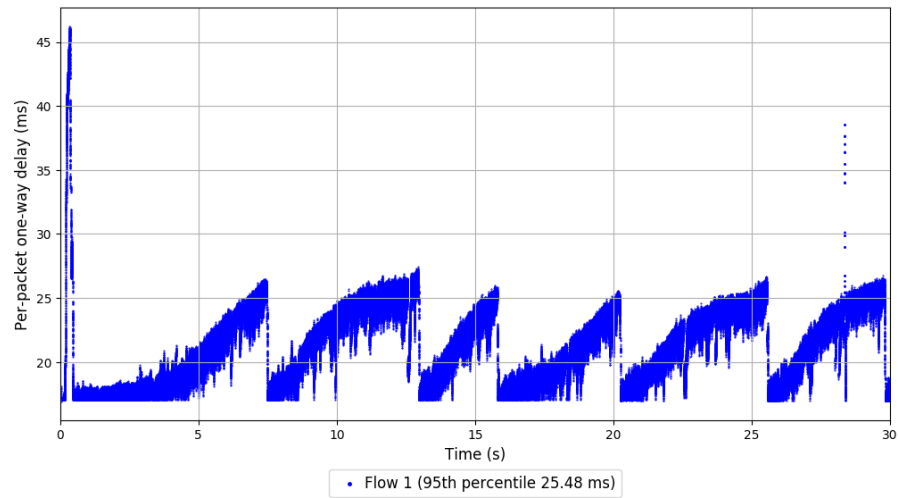
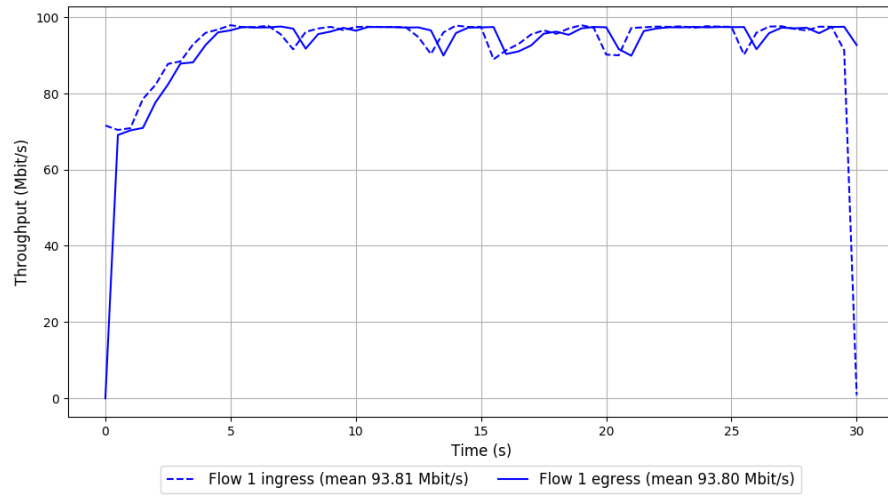


Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 09:22:47
End at: 2018-08-31 09:23:17
Local clock offset: 4.08 ms
Remote clock offset: -3.294 ms

Below is generated by plot.py at 2018-08-31 09:32:54
Datalink statistics
-- Total of 1 flow:
Average throughput: 93.80 Mbit/s
95th percentile per-packet one-way delay: 25.476 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 93.80 Mbit/s
95th percentile per-packet one-way delay: 25.476 ms
Loss rate: 0.08%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 09:27:23

End at: 2018-08-31 09:27:53

Local clock offset: 2.366 ms

Remote clock offset: -3.42 ms

Below is generated by plot.py at 2018-08-31 09:32:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 93.71 Mbit/s

95th percentile per-packet one-way delay: 24.994 ms

Loss rate: 0.08%

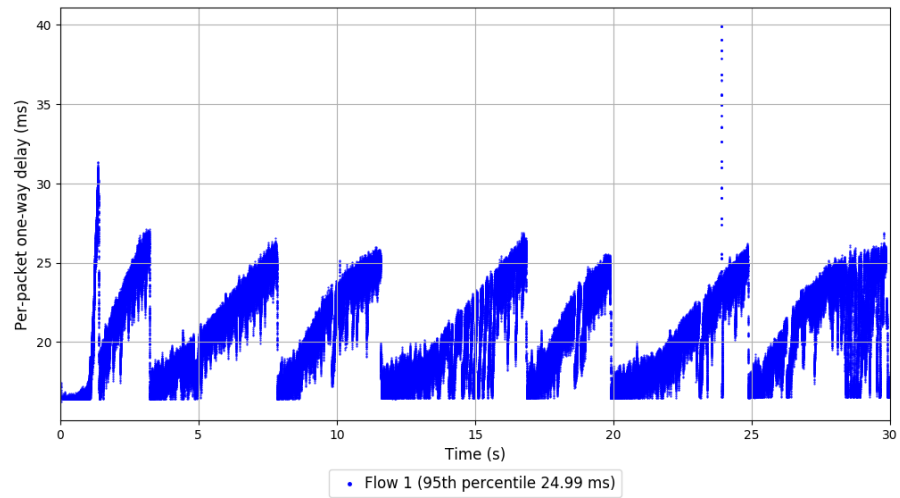
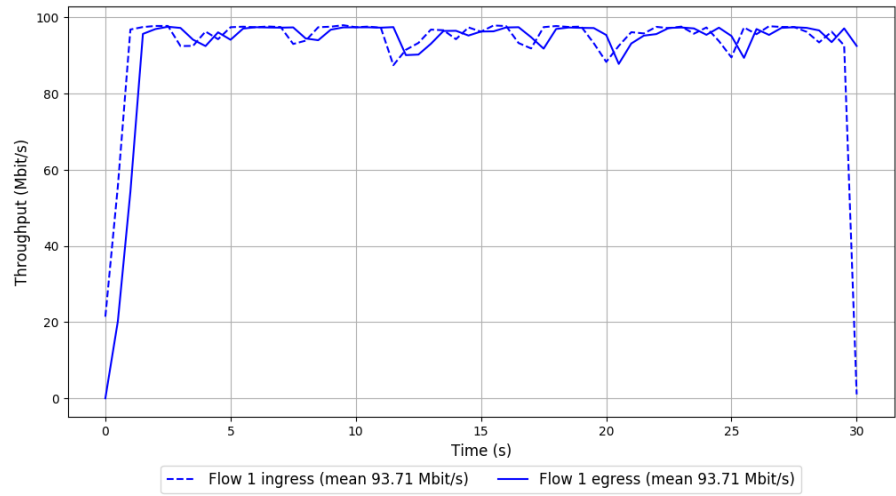
-- Flow 1:

Average throughput: 93.71 Mbit/s

95th percentile per-packet one-way delay: 24.994 ms

Loss rate: 0.08%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-08-31 09:20:26

End at: 2018-08-31 09:20:56

Local clock offset: 2.83 ms

Remote clock offset: -3.523 ms

Below is generated by plot.py at 2018-08-31 09:32:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 87.26 Mbit/s

95th percentile per-packet one-way delay: 18.947 ms

Loss rate: 0.09%

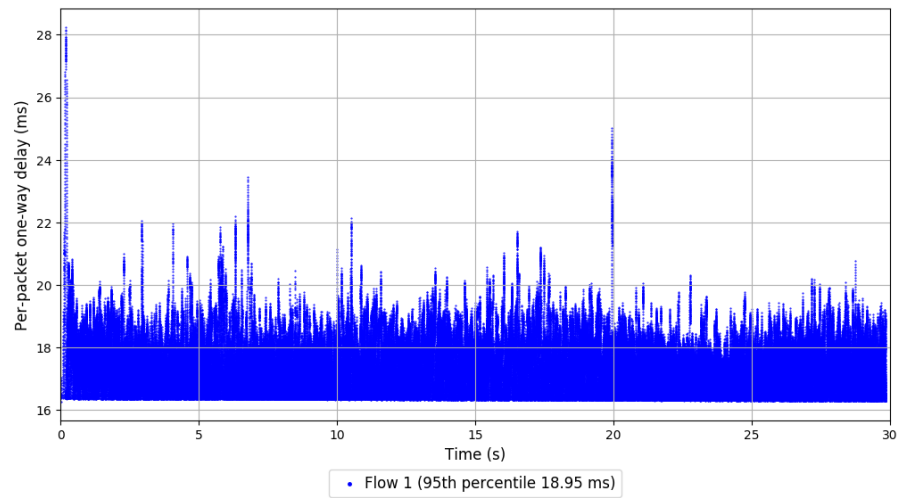
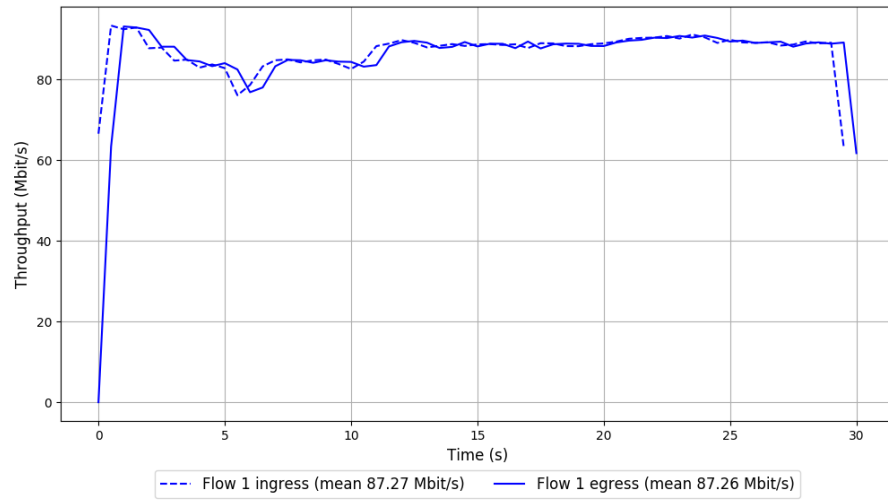
-- Flow 1:

Average throughput: 87.26 Mbit/s

95th percentile per-packet one-way delay: 18.947 ms

Loss rate: 0.09%

Run 1: Report of Indigo — Data Link

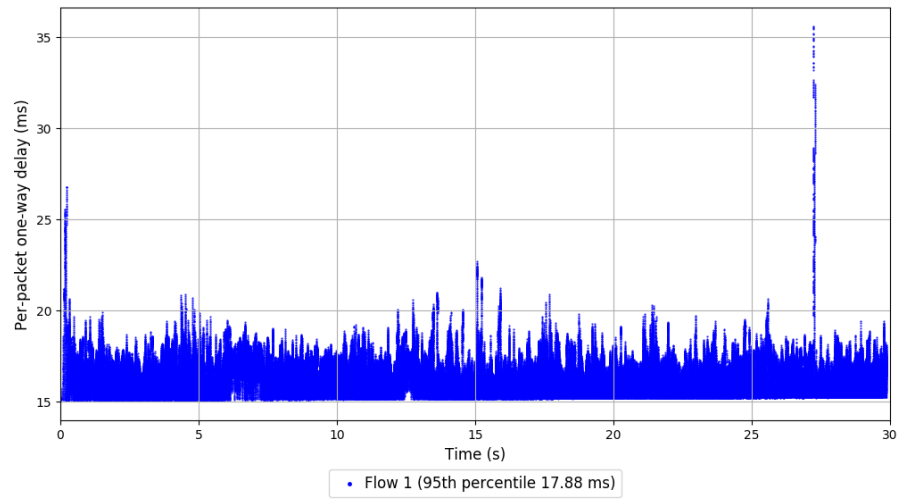
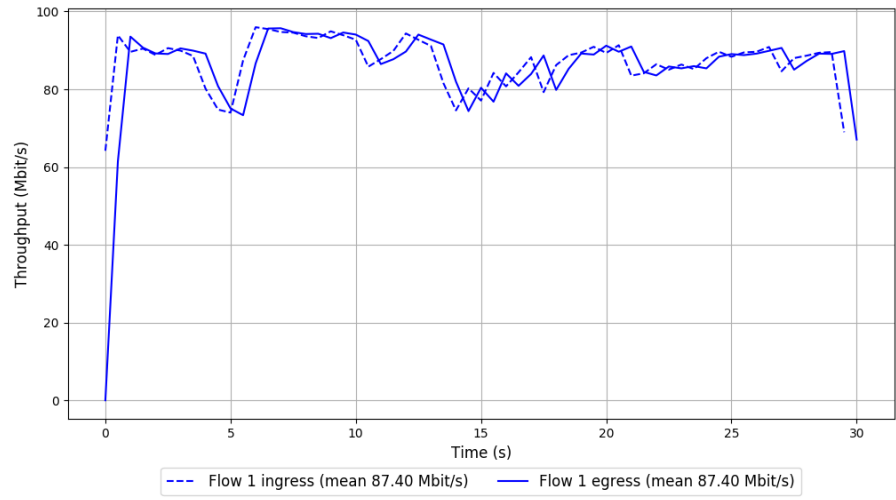


Run 2: Statistics of Indigo

Start at: 2018-08-31 09:25:01
End at: 2018-08-31 09:25:31
Local clock offset: 3.134 ms
Remote clock offset: -2.018 ms

Below is generated by plot.py at 2018-08-31 09:32:54
Datalink statistics
-- Total of 1 flow:
Average throughput: 87.40 Mbit/s
95th percentile per-packet one-way delay: 17.880 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 87.40 Mbit/s
95th percentile per-packet one-way delay: 17.880 ms
Loss rate: 0.09%

Run 2: Report of Indigo — Data Link

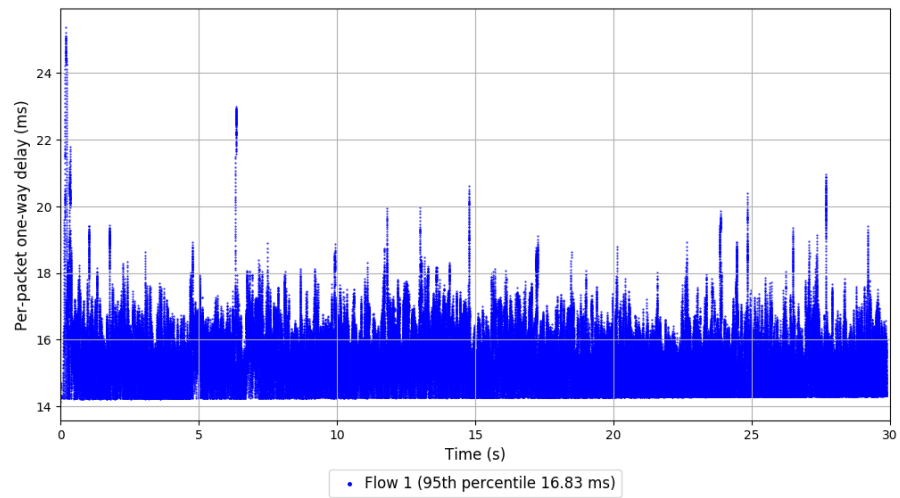
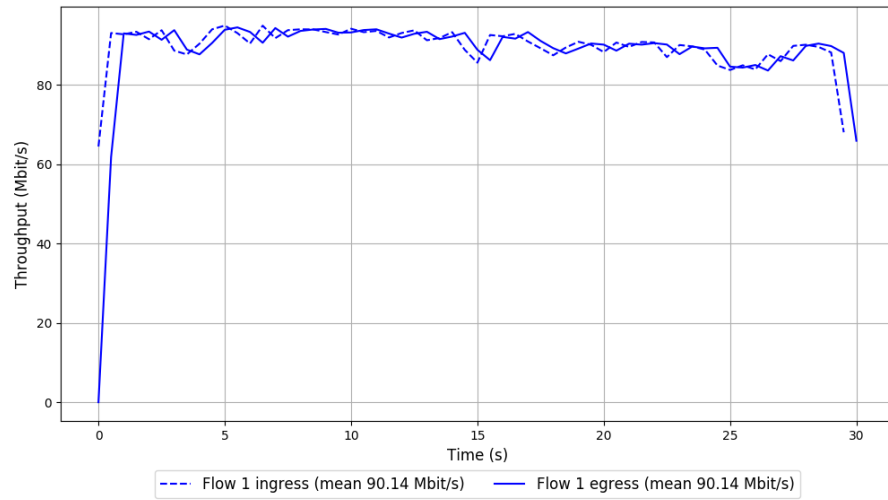


Run 3: Statistics of Indigo

Start at: 2018-08-31 09:29:37
End at: 2018-08-31 09:30:07
Local clock offset: 0.417 ms
Remote clock offset: -2.745 ms

Below is generated by plot.py at 2018-08-31 09:33:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 90.14 Mbit/s
95th percentile per-packet one-way delay: 16.832 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 90.14 Mbit/s
95th percentile per-packet one-way delay: 16.832 ms
Loss rate: 0.09%

Run 3: Report of Indigo — Data Link

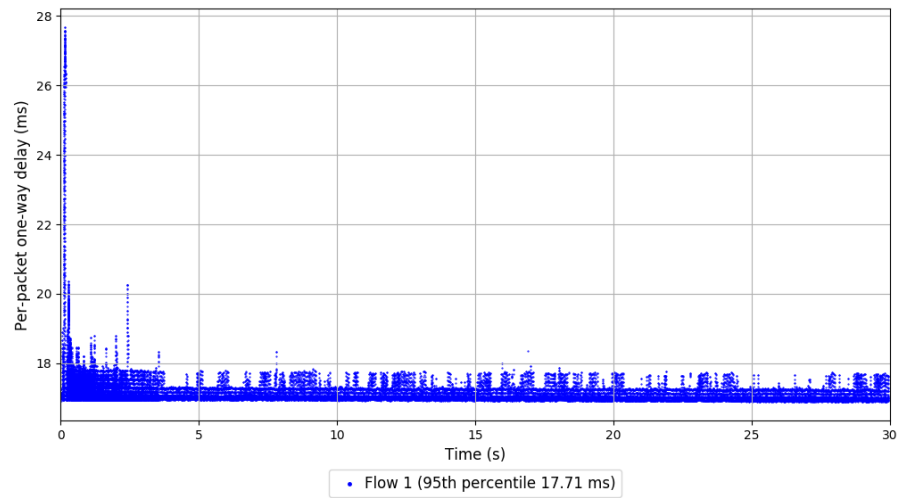
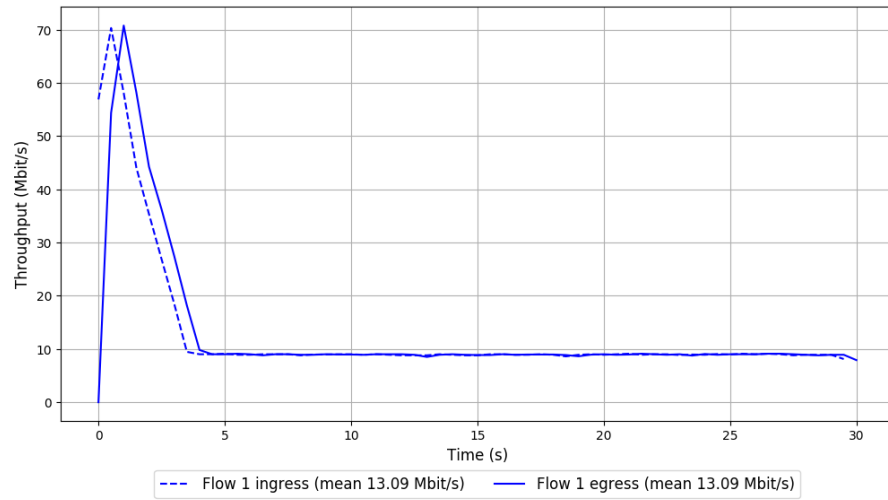


Run 1: Statistics of Muses-25

Start at: 2018-08-31 09:19:21
End at: 2018-08-31 09:19:51
Local clock offset: 3.538 ms
Remote clock offset: -3.264 ms

Below is generated by plot.py at 2018-08-31 09:33:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 13.09 Mbit/s
95th percentile per-packet one-way delay: 17.706 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 13.09 Mbit/s
95th percentile per-packet one-way delay: 17.706 ms
Loss rate: 0.06%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-08-31 09:23:56

End at: 2018-08-31 09:24:26

Local clock offset: 4.0 ms

Remote clock offset: -3.919 ms

Below is generated by plot.py at 2018-08-31 09:33:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 15.10 Mbit/s

95th percentile per-packet one-way delay: 18.297 ms

Loss rate: 0.06%

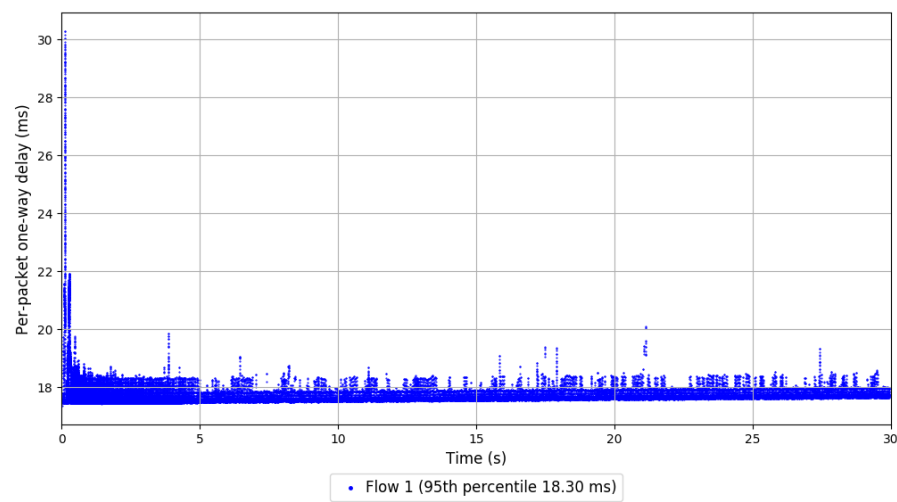
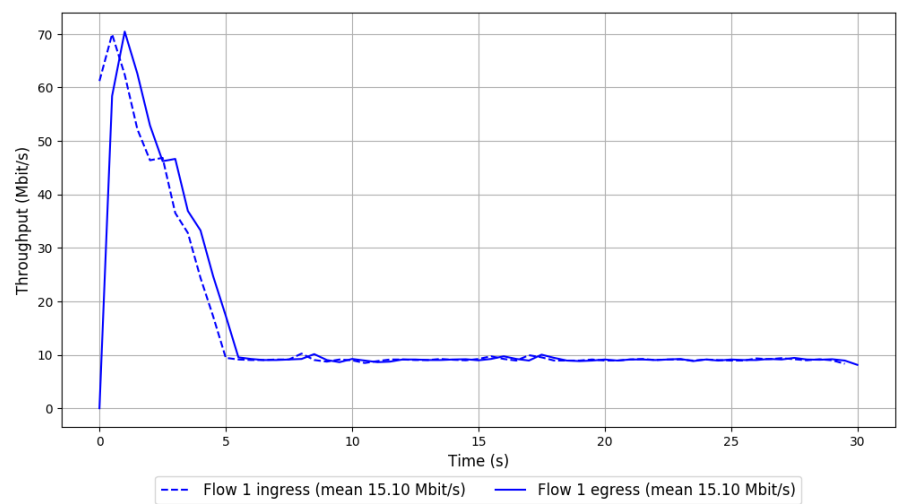
-- Flow 1:

Average throughput: 15.10 Mbit/s

95th percentile per-packet one-way delay: 18.297 ms

Loss rate: 0.06%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-08-31 09:28:32
End at: 2018-08-31 09:29:02
Local clock offset: 4.191 ms
Remote clock offset: -3.177 ms

Below is generated by plot.py at 2018-08-31 09:33:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 12.16 Mbit/s
95th percentile per-packet one-way delay: 19.935 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 12.16 Mbit/s
95th percentile per-packet one-way delay: 19.935 ms
Loss rate: 0.06%

Run 3: Report of Muses-25 — Data Link

