

Pantheon Report

Generated at 2018-08-28 09:48:47 (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.

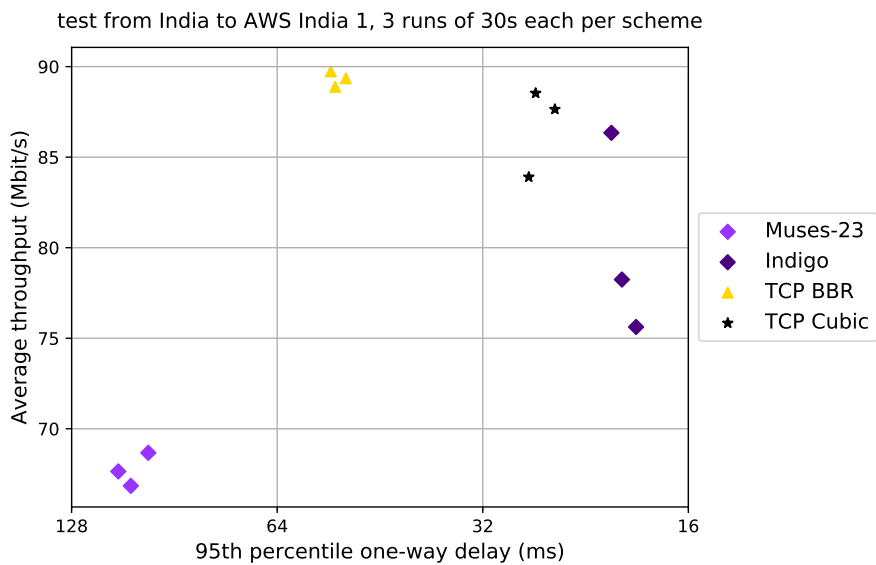
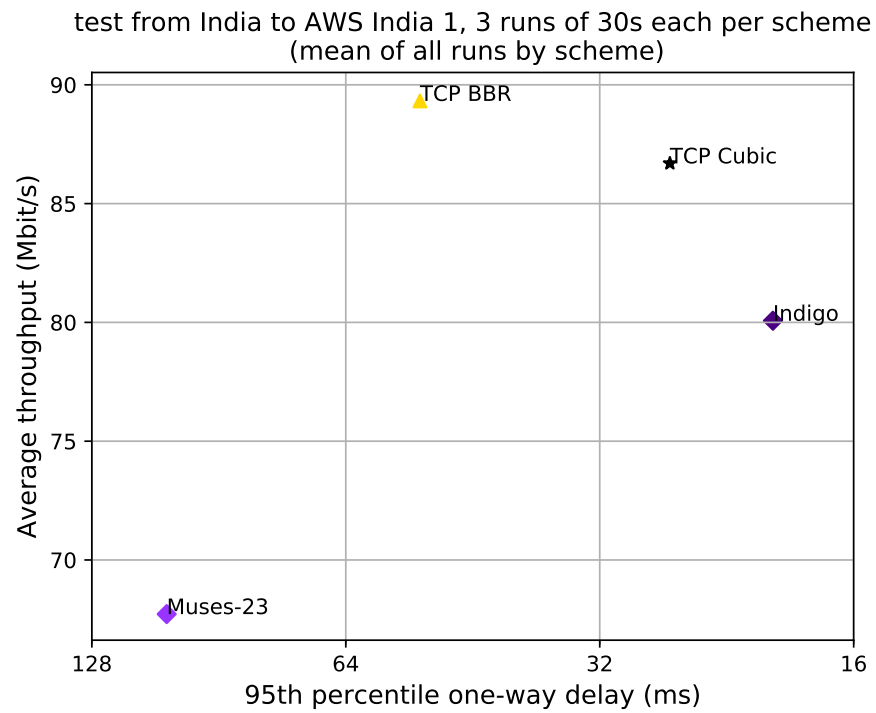
NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

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
```

Git summary:

```
branch: muses-23 @ 88af05c5b0b7531637ca401951507a2fde628df6
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b261c9e99c63be452bc16f94ce0caa99a4c9d39a
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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	89.32	52.27	4.28
TCP Cubic	3	86.69	26.42	0.12
Indigo	3	80.07	19.95	0.16
Muses-23	3	67.72	104.34	0.28

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 09:37:03

End at: 2018-08-28 09:37:33

Local clock offset: 0.487 ms

Remote clock offset: -0.619 ms

Below is generated by plot.py at 2018-08-28 09:48:15

Datalink statistics

-- Total of 1 flow:

Average throughput: 88.88 Mbit/s

95th percentile per-packet one-way delay: 52.629 ms

Loss rate: 4.44%

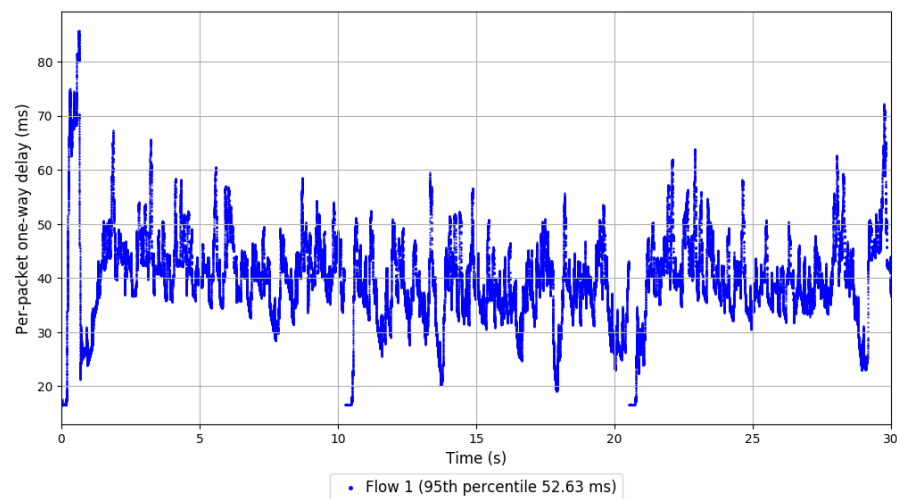
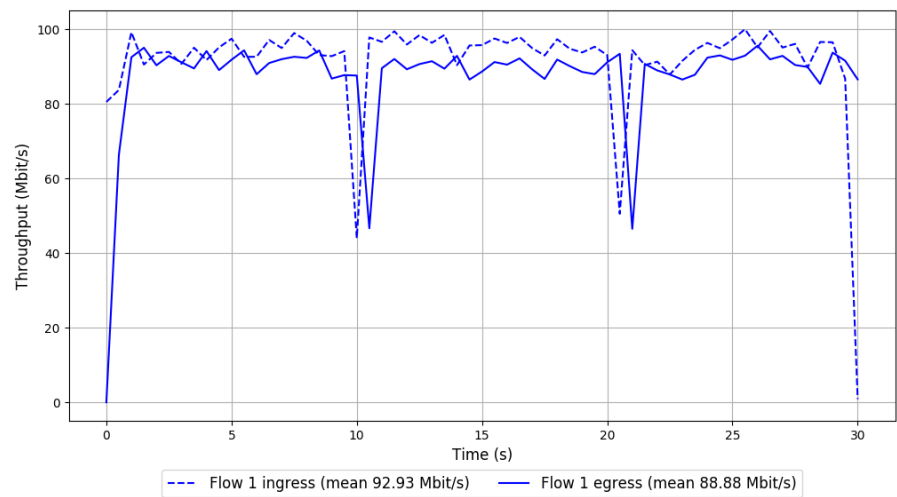
-- Flow 1:

Average throughput: 88.88 Mbit/s

95th percentile per-packet one-way delay: 52.629 ms

Loss rate: 4.44%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-28 09:41:42

End at: 2018-08-28 09:42:12

Local clock offset: 0.028 ms

Remote clock offset: -0.631 ms

Below is generated by plot.py at 2018-08-28 09:48:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 89.35 Mbit/s

95th percentile per-packet one-way delay: 50.776 ms

Loss rate: 4.64%

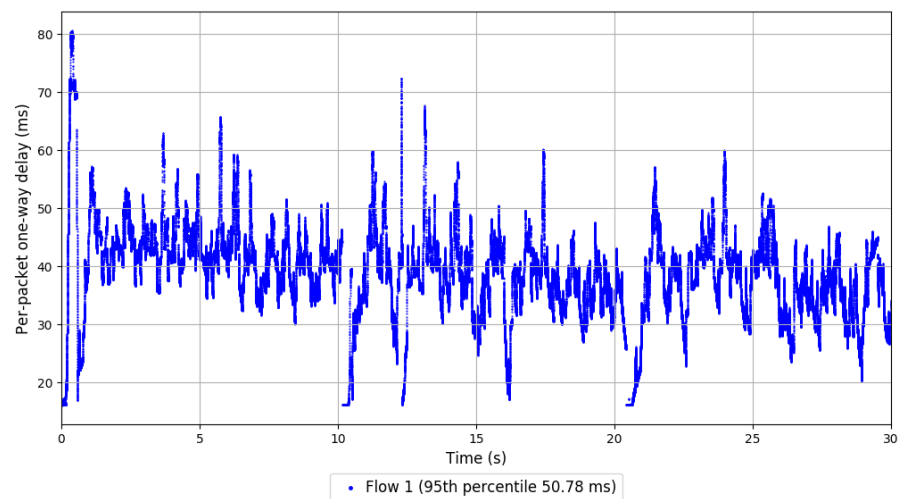
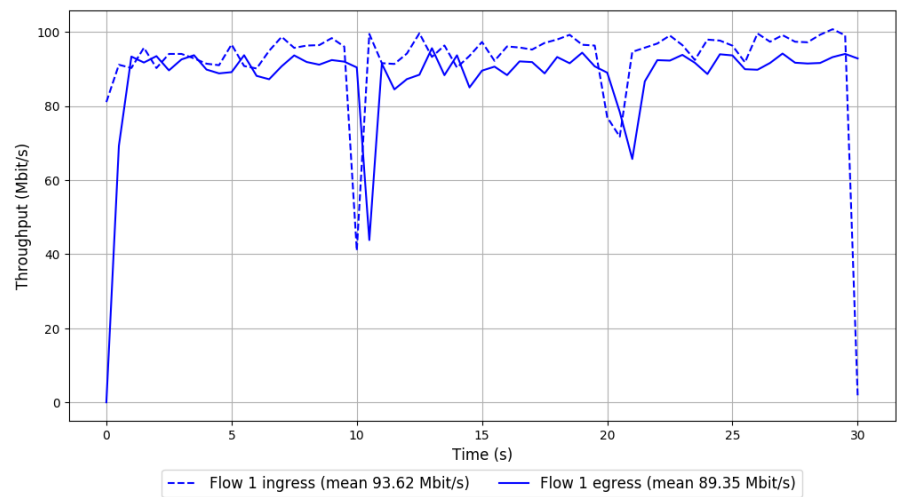
-- Flow 1:

Average throughput: 89.35 Mbit/s

95th percentile per-packet one-way delay: 50.776 ms

Loss rate: 4.64%

Run 2: Report of TCP BBR — Data Link

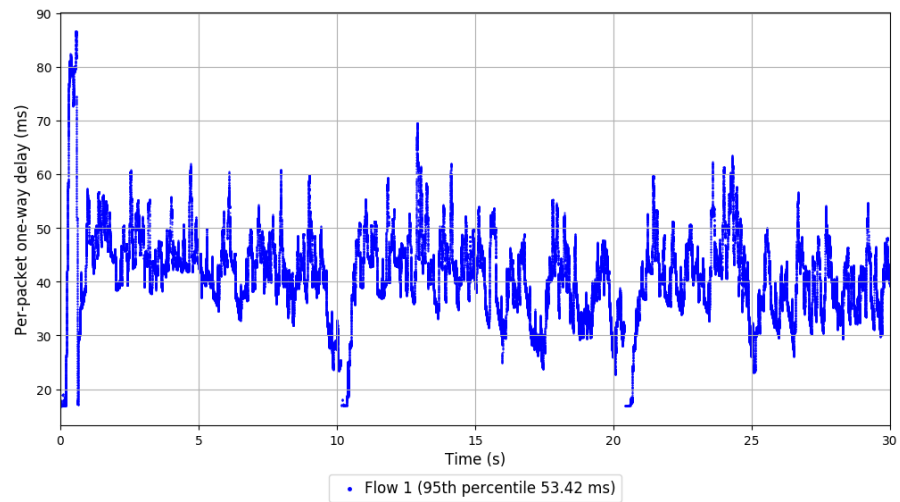
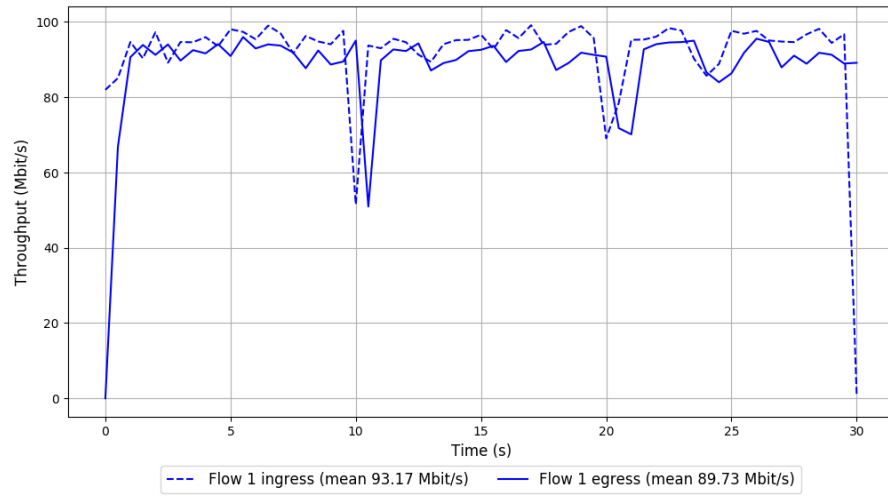


Run 3: Statistics of TCP BBR

Start at: 2018-08-28 09:46:16
End at: 2018-08-28 09:46:46
Local clock offset: -0.725 ms
Remote clock offset: -2.177 ms

Below is generated by plot.py at 2018-08-28 09:48:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 89.73 Mbit/s
95th percentile per-packet one-way delay: 53.417 ms
Loss rate: 3.77%
-- Flow 1:
Average throughput: 89.73 Mbit/s
95th percentile per-packet one-way delay: 53.417 ms
Loss rate: 3.77%

Run 3: Report of TCP BBR — Data Link

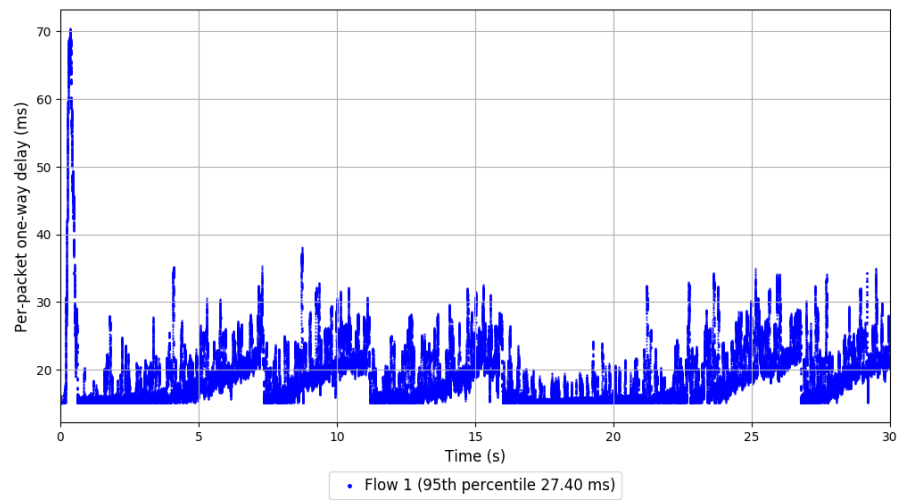
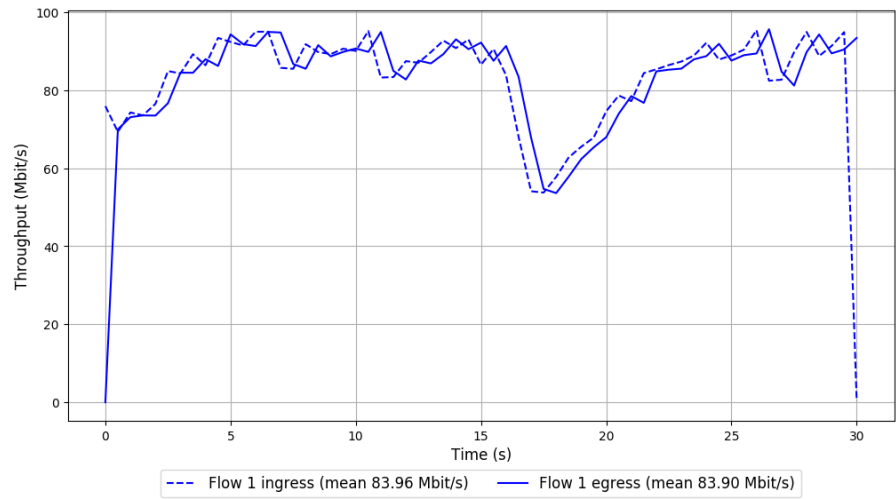


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 09:34:41
End at: 2018-08-28 09:35:11
Local clock offset: -1.72 ms
Remote clock offset: -1.584 ms

Below is generated by plot.py at 2018-08-28 09:48:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 83.90 Mbit/s
95th percentile per-packet one-way delay: 27.404 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 83.90 Mbit/s
95th percentile per-packet one-way delay: 27.404 ms
Loss rate: 0.16%

Run 1: Report of TCP Cubic — Data Link

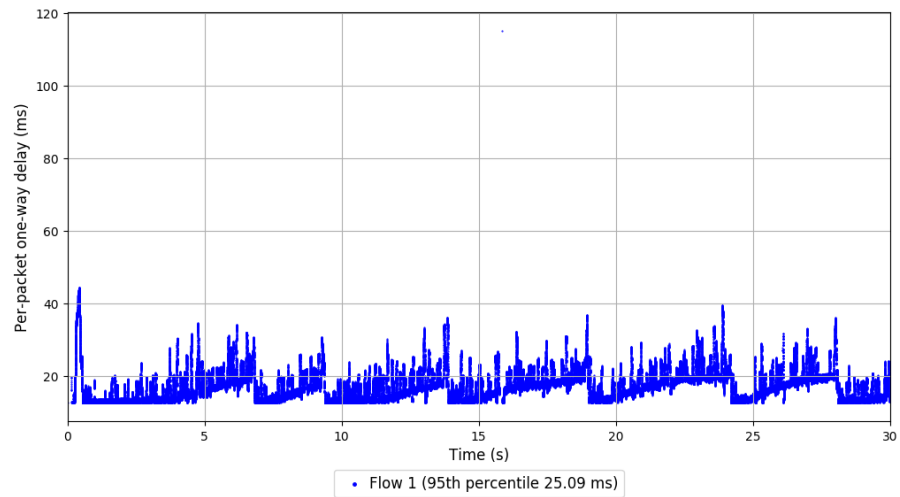
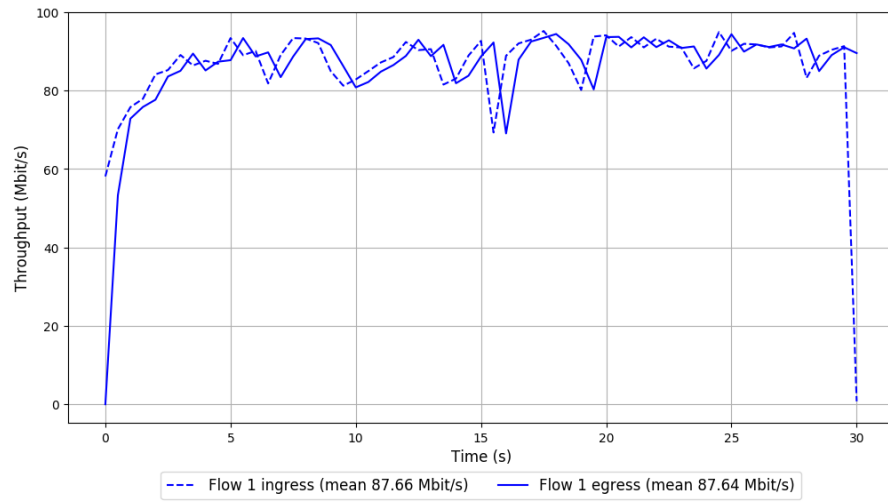


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 09:39:26
End at: 2018-08-28 09:39:56
Local clock offset: -4.444 ms
Remote clock offset: -1.538 ms

Below is generated by plot.py at 2018-08-28 09:48:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 87.64 Mbit/s
95th percentile per-packet one-way delay: 25.092 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 87.64 Mbit/s
95th percentile per-packet one-way delay: 25.092 ms
Loss rate: 0.10%

Run 2: Report of TCP Cubic — Data Link

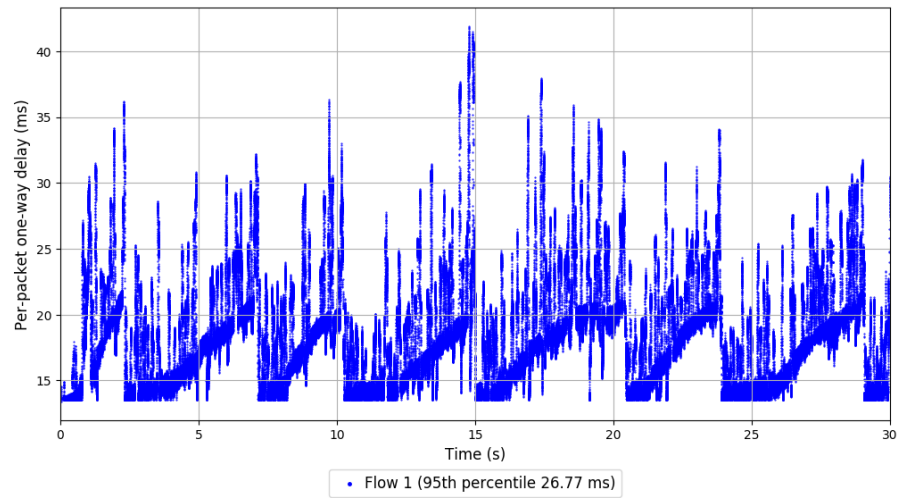
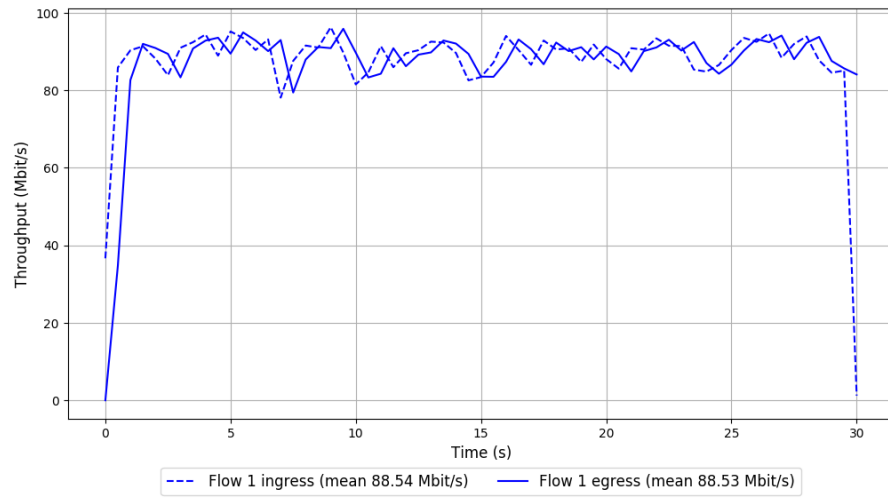


Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 09:44:00
End at: 2018-08-28 09:44:30
Local clock offset: -3.226 ms
Remote clock offset: -1.297 ms

Below is generated by plot.py at 2018-08-28 09:48:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 88.53 Mbit/s
95th percentile per-packet one-way delay: 26.775 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 88.53 Mbit/s
95th percentile per-packet one-way delay: 26.775 ms
Loss rate: 0.10%

Run 3: Report of TCP Cubic — Data Link

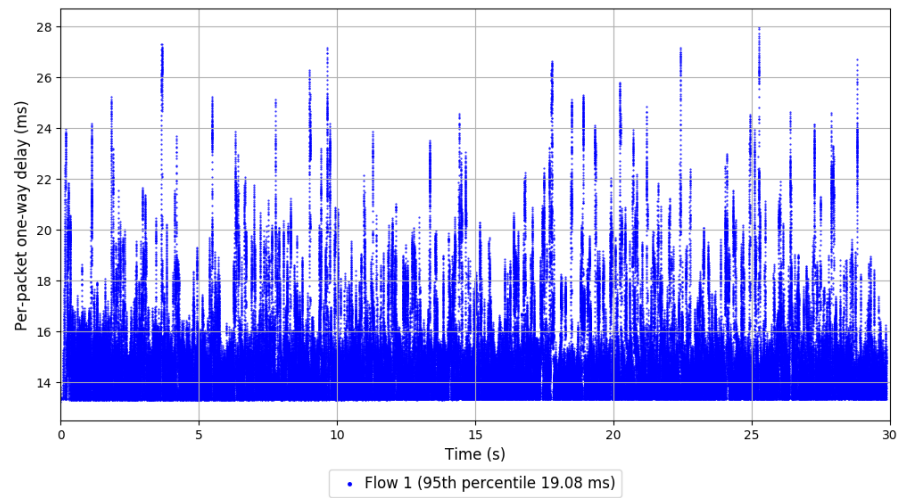
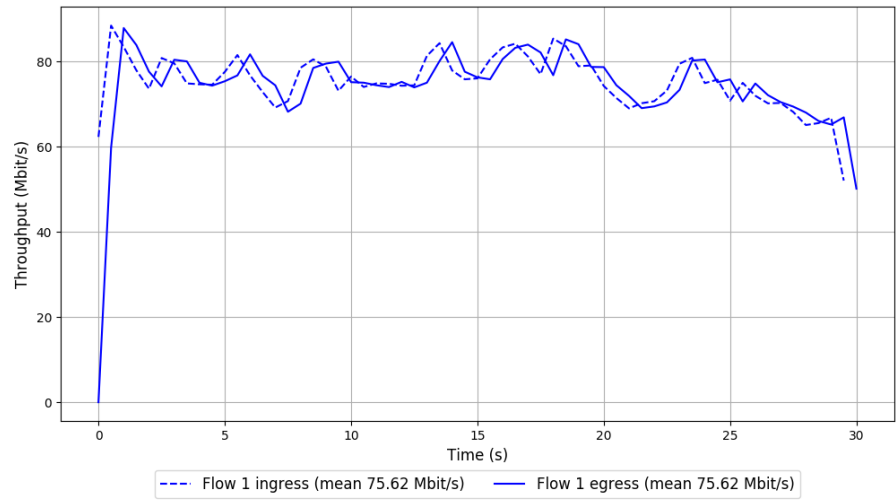


Run 1: Statistics of Indigo

Start at: 2018-08-28 09:33:33
End at: 2018-08-28 09:34:03
Local clock offset: -3.358 ms
Remote clock offset: -1.523 ms

Below is generated by plot.py at 2018-08-28 09:48:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 75.62 Mbit/s
95th percentile per-packet one-way delay: 19.082 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 75.62 Mbit/s
95th percentile per-packet one-way delay: 19.082 ms
Loss rate: 0.09%

Run 1: Report of Indigo — Data Link

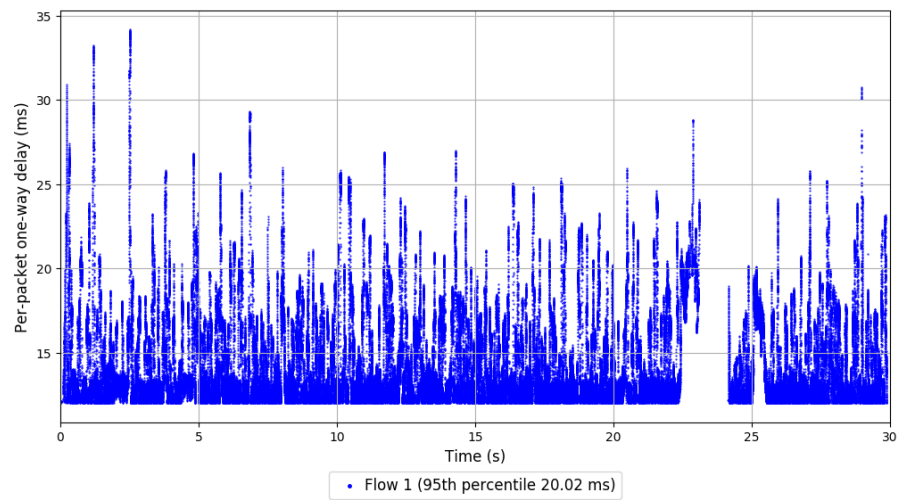
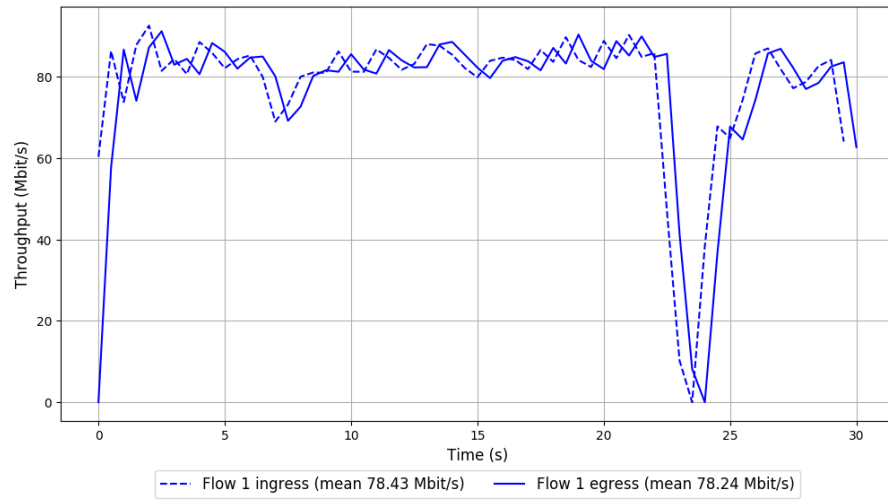


Run 2: Statistics of Indigo

Start at: 2018-08-28 09:38:16
End at: 2018-08-28 09:38:46
Local clock offset: -3.885 ms
Remote clock offset: -0.417 ms

Below is generated by plot.py at 2018-08-28 09:48:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 78.24 Mbit/s
95th percentile per-packet one-way delay: 20.017 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 78.24 Mbit/s
95th percentile per-packet one-way delay: 20.017 ms
Loss rate: 0.32%

Run 2: Report of Indigo — Data Link

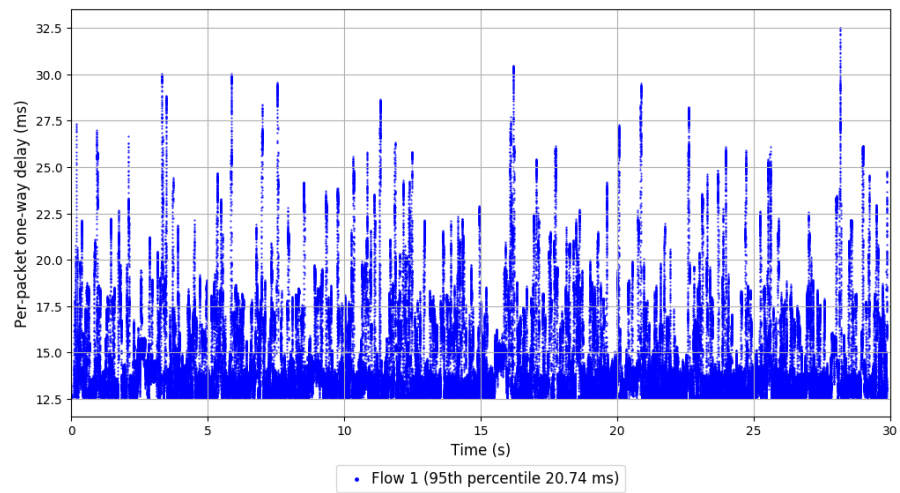
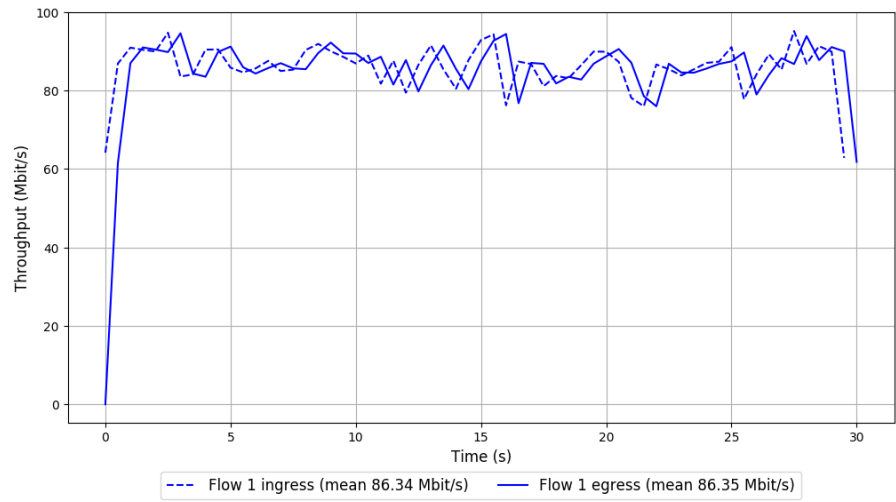


Run 3: Statistics of Indigo

Start at: 2018-08-28 09:42:51
End at: 2018-08-28 09:43:21
Local clock offset: -3.737 ms
Remote clock offset: -0.814 ms

Below is generated by plot.py at 2018-08-28 09:48:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 86.35 Mbit/s
95th percentile per-packet one-way delay: 20.740 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 86.35 Mbit/s
95th percentile per-packet one-way delay: 20.740 ms
Loss rate: 0.07%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-23

Start at: 2018-08-28 09:35:53

End at: 2018-08-28 09:36:23

Local clock offset: 0.107 ms

Remote clock offset: -0.991 ms

Below is generated by plot.py at 2018-08-28 09:48:45

Datalink statistics

-- Total of 1 flow:

Average throughput: 68.67 Mbit/s

95th percentile per-packet one-way delay: 98.842 ms

Loss rate: 0.39%

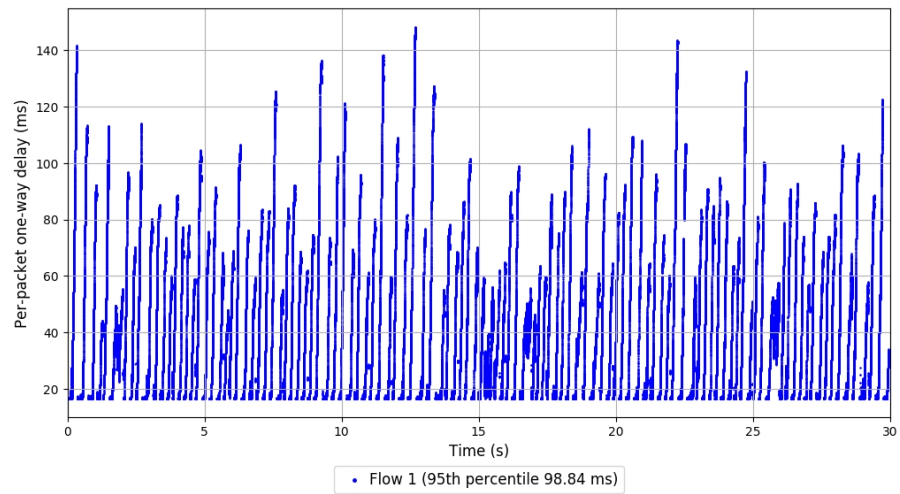
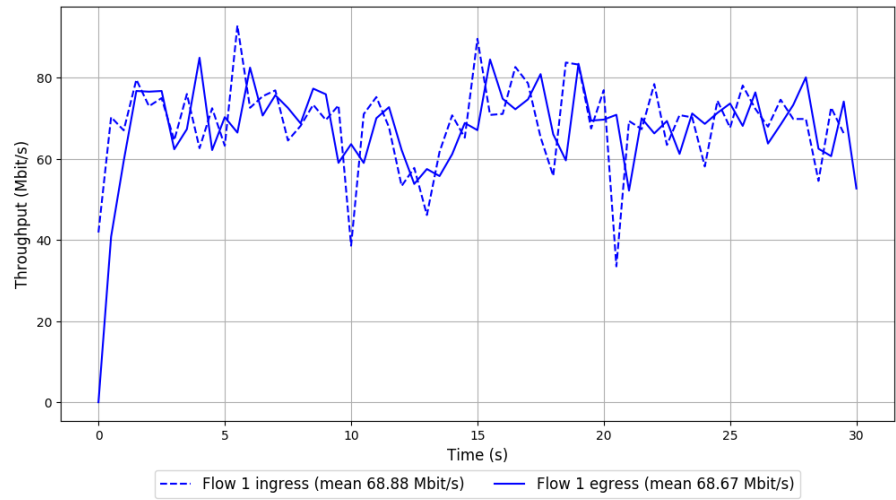
-- Flow 1:

Average throughput: 68.67 Mbit/s

95th percentile per-packet one-way delay: 98.842 ms

Loss rate: 0.39%

Run 1: Report of Muses-23 — Data Link



Run 2: Statistics of Muses-23

Start at: 2018-08-28 09:40:34

End at: 2018-08-28 09:41:04

Local clock offset: 1.644 ms

Remote clock offset: -1.603 ms

Below is generated by plot.py at 2018-08-28 09:48:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 66.85 Mbit/s

95th percentile per-packet one-way delay: 104.835 ms

Loss rate: 0.23%

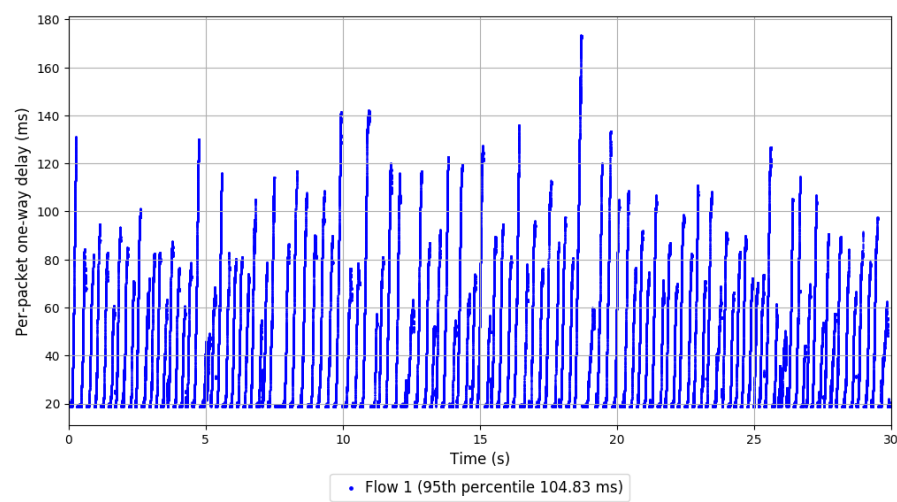
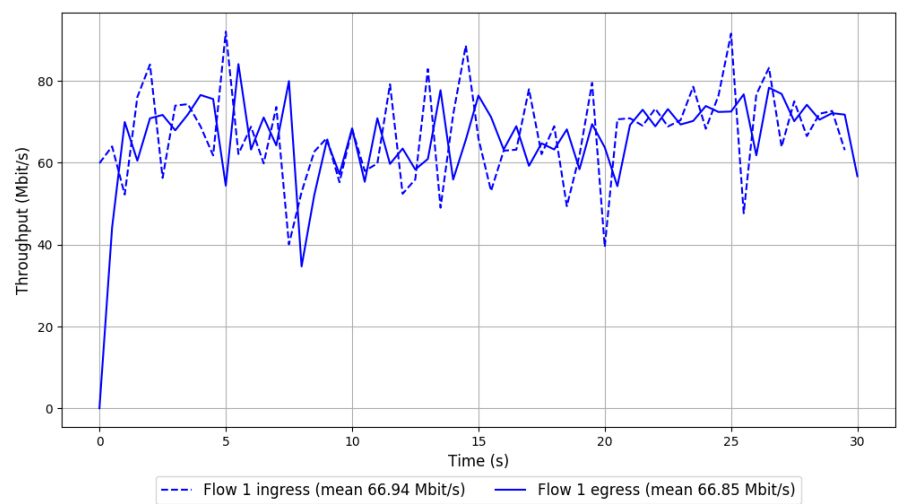
-- Flow 1:

Average throughput: 66.85 Mbit/s

95th percentile per-packet one-way delay: 104.835 ms

Loss rate: 0.23%

Run 2: Report of Muses-23 — Data Link



Run 3: Statistics of Muses-23

Start at: 2018-08-28 09:45:08
End at: 2018-08-28 09:45:38
Local clock offset: -1.283 ms
Remote clock offset: -0.984 ms

Below is generated by plot.py at 2018-08-28 09:48:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 67.65 Mbit/s
95th percentile per-packet one-way delay: 109.354 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 67.65 Mbit/s
95th percentile per-packet one-way delay: 109.354 ms
Loss rate: 0.22%

Run 3: Report of Muses-23 — Data Link

