

Pantheon Report

Generated at 2018-09-03 09:33:44 (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.

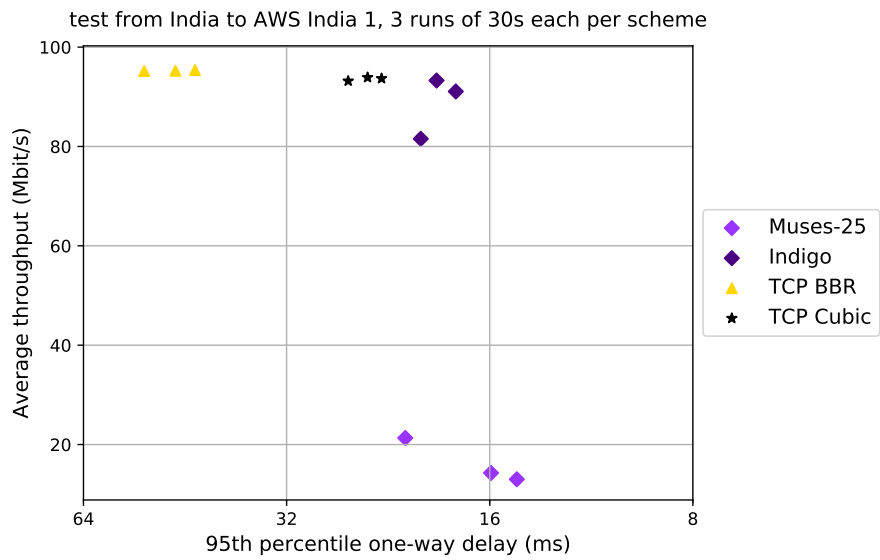
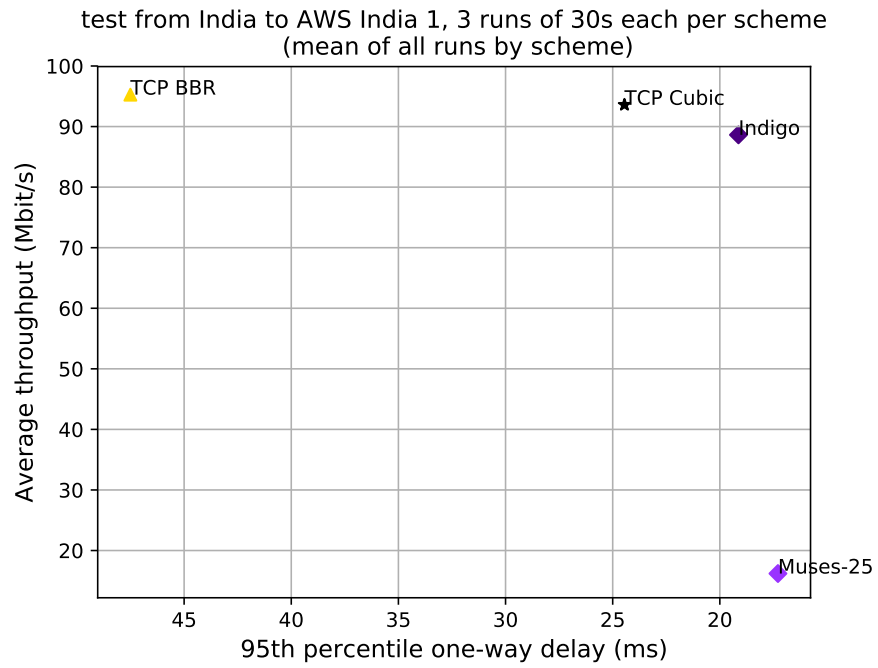
NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

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 @ f309f5459e2c5237279a184e52ece7a2b47ef1c9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b8d5019b83a3a678804d830fcfe1da7b3a63421b
third_party/pantheon-tunnel @ cbfce6db5ff5740dfe1771f813cd646339e1952
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
```



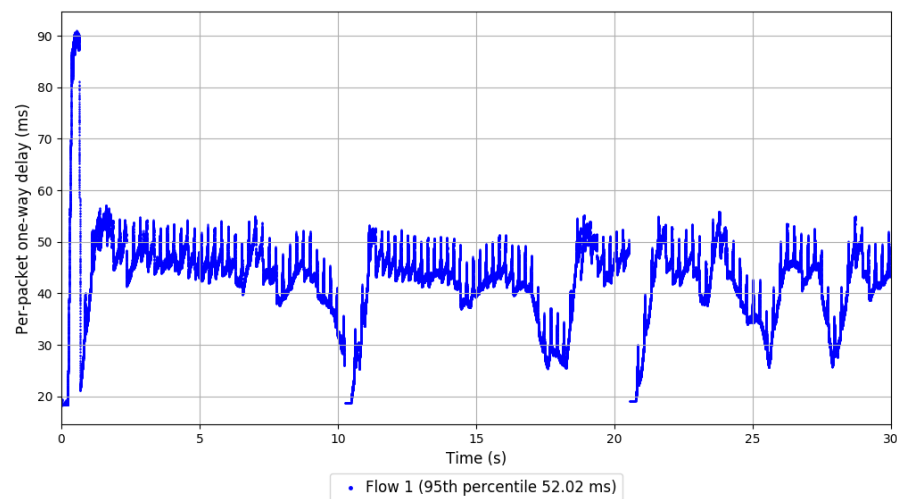
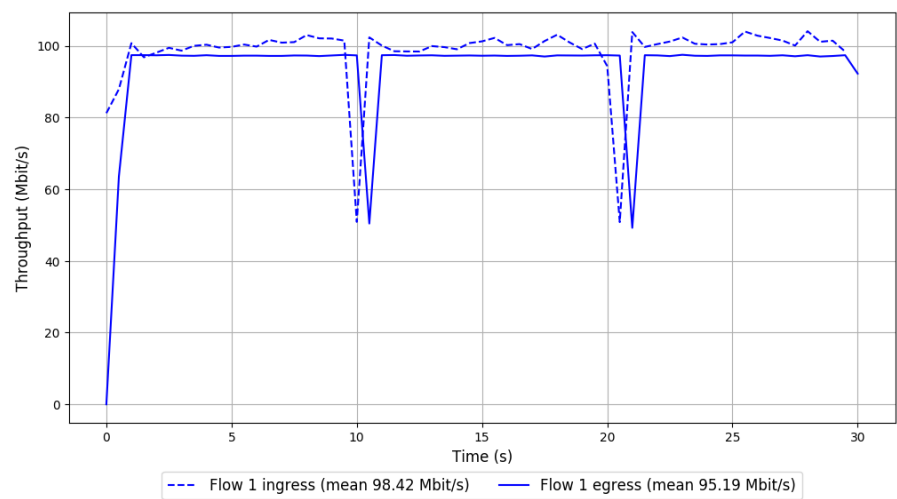
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	95.27	47.51	3.37
TCP Cubic	3	93.59	24.45	0.11
Indigo	3	88.63	19.13	0.09
Muses-25	3	16.20	17.29	0.09

Run 1: Statistics of TCP BBR

Start at: 2018-09-03 09:18:44
End at: 2018-09-03 09:19:14
Local clock offset: -51.263 ms
Remote clock offset: -5.022 ms

Below is generated by plot.py at 2018-09-03 09:33:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 95.19 Mbit/s
95th percentile per-packet one-way delay: 52.018 ms
Loss rate: 3.36%
-- Flow 1:
Average throughput: 95.19 Mbit/s
95th percentile per-packet one-way delay: 52.018 ms
Loss rate: 3.36%

Run 1: Report of TCP BBR — Data Link

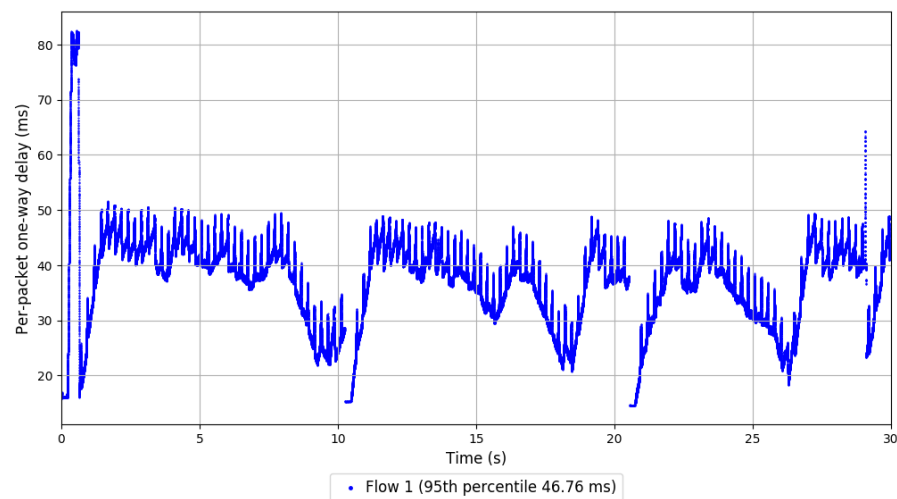
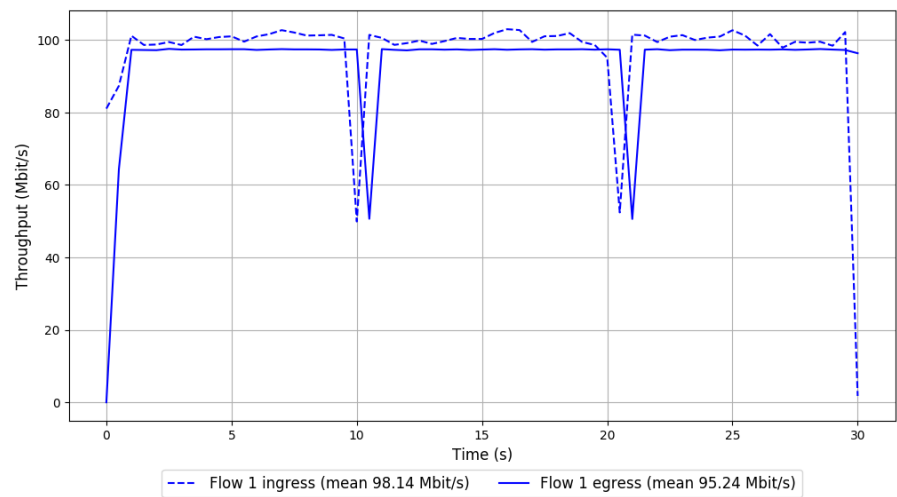


Run 2: Statistics of TCP BBR

Start at: 2018-09-03 09:23:25
End at: 2018-09-03 09:23:55
Local clock offset: -46.898 ms
Remote clock offset: -5.635 ms

Below is generated by plot.py at 2018-09-03 09:33:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 95.24 Mbit/s
95th percentile per-packet one-way delay: 46.764 ms
Loss rate: 3.05%
-- Flow 1:
Average throughput: 95.24 Mbit/s
95th percentile per-packet one-way delay: 46.764 ms
Loss rate: 3.05%

Run 2: Report of TCP BBR — Data Link

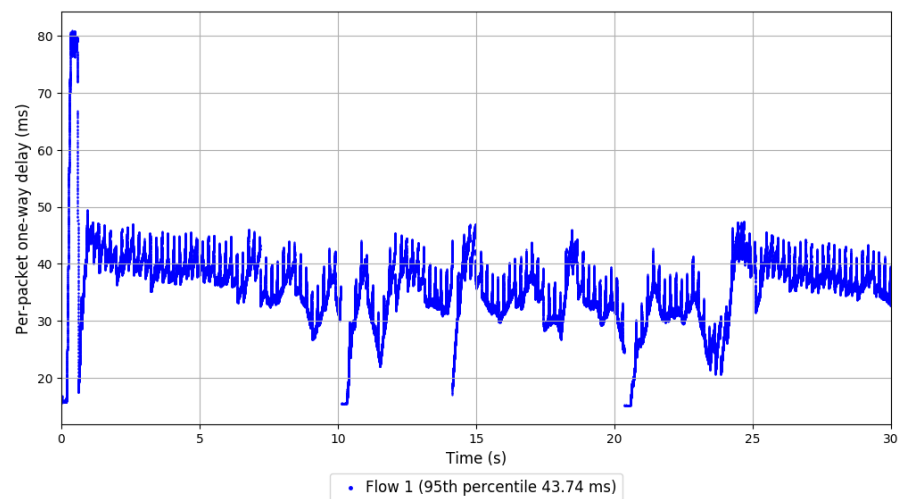
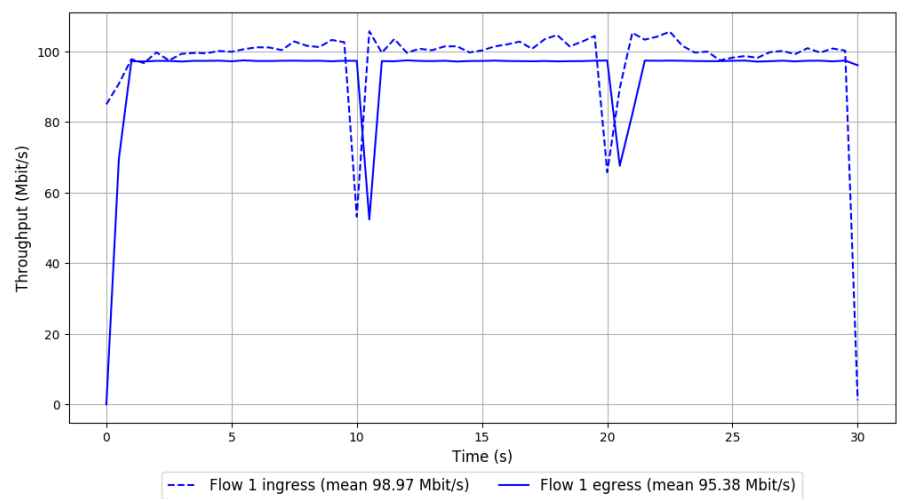


Run 3: Statistics of TCP BBR

Start at: 2018-09-03 09:28:04
End at: 2018-09-03 09:28:34
Local clock offset: -31.864 ms
Remote clock offset: -5.067 ms

Below is generated by plot.py at 2018-09-03 09:33:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 95.38 Mbit/s
95th percentile per-packet one-way delay: 43.744 ms
Loss rate: 3.71%
-- Flow 1:
Average throughput: 95.38 Mbit/s
95th percentile per-packet one-way delay: 43.744 ms
Loss rate: 3.71%

Run 3: Report of TCP BBR — Data Link

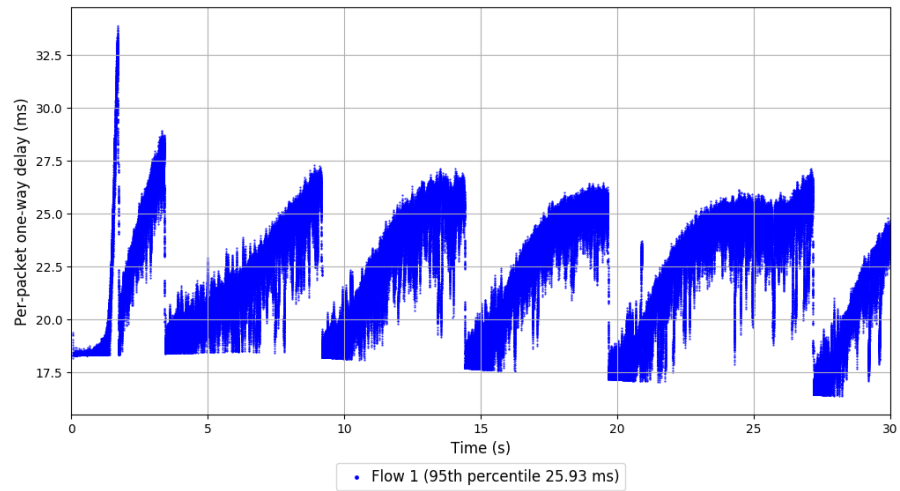
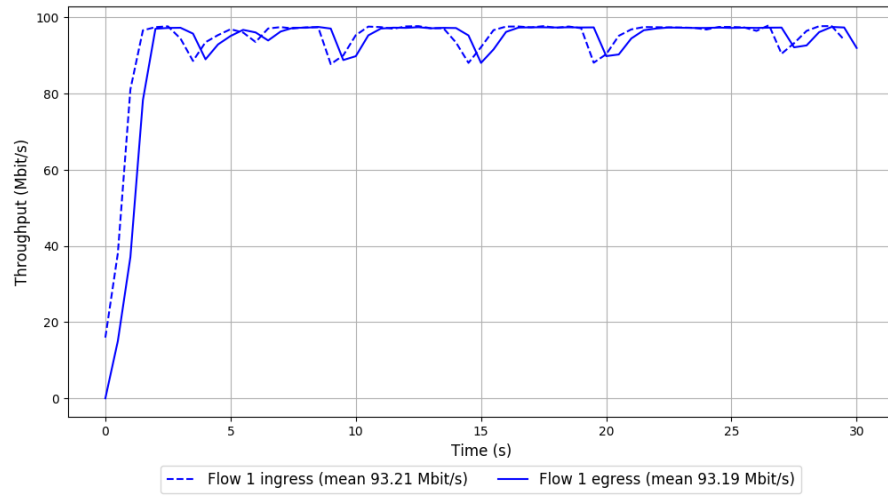


Run 1: Statistics of TCP Cubic

Start at: 2018-09-03 09:21:03
End at: 2018-09-03 09:21:33
Local clock offset: -55.527 ms
Remote clock offset: -5.09 ms

Below is generated by plot.py at 2018-09-03 09:33:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 93.19 Mbit/s
95th percentile per-packet one-way delay: 25.934 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 93.19 Mbit/s
95th percentile per-packet one-way delay: 25.934 ms
Loss rate: 0.12%

Run 1: Report of TCP Cubic — Data Link

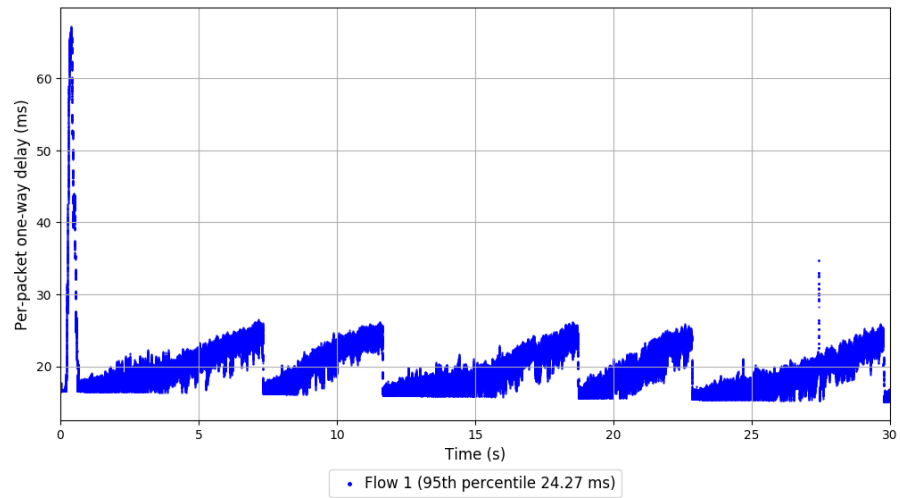
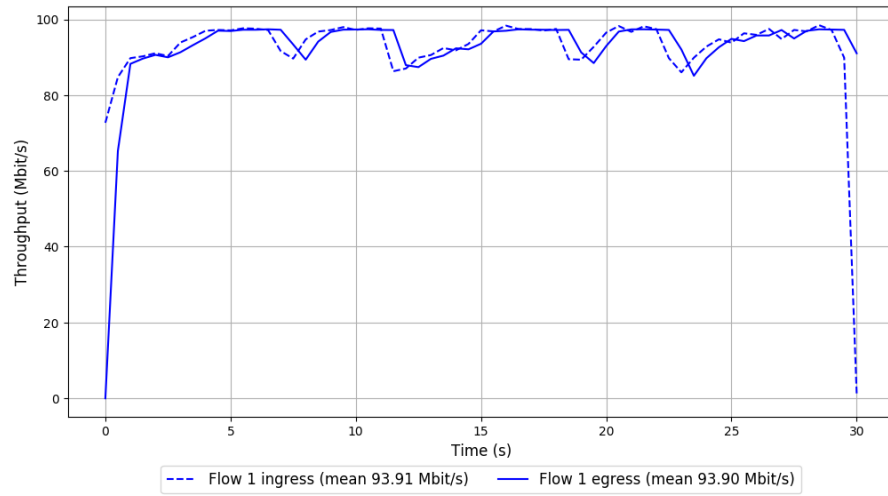


Run 2: Statistics of TCP Cubic

Start at: 2018-09-03 09:25:45
End at: 2018-09-03 09:26:15
Local clock offset: -37.202 ms
Remote clock offset: -5.16 ms

Below is generated by plot.py at 2018-09-03 09:33:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 93.90 Mbit/s
95th percentile per-packet one-way delay: 24.275 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 93.90 Mbit/s
95th percentile per-packet one-way delay: 24.275 ms
Loss rate: 0.10%

Run 2: Report of TCP Cubic — Data Link

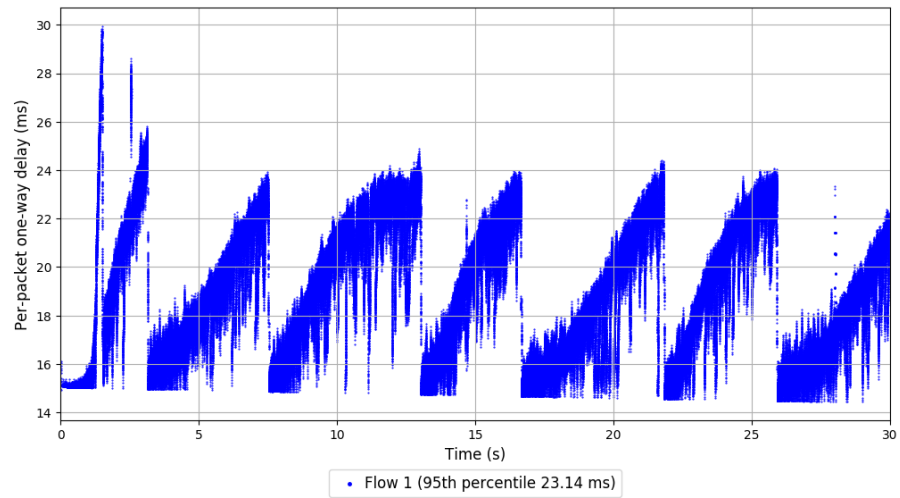
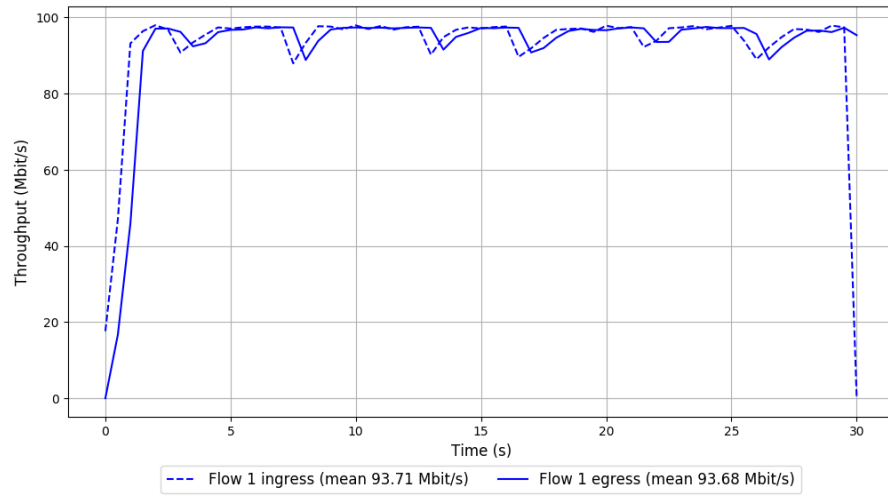


Run 3: Statistics of TCP Cubic

Start at: 2018-09-03 09:30:26
End at: 2018-09-03 09:30:56
Local clock offset: -27.029 ms
Remote clock offset: -3.508 ms

Below is generated by plot.py at 2018-09-03 09:33:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 93.68 Mbit/s
95th percentile per-packet one-way delay: 23.144 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 93.68 Mbit/s
95th percentile per-packet one-way delay: 23.144 ms
Loss rate: 0.12%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-09-03 09:22:12

End at: 2018-09-03 09:22:42

Local clock offset: -53.1 ms

Remote clock offset: -5.697 ms

Below is generated by plot.py at 2018-09-03 09:33:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 91.07 Mbit/s

95th percentile per-packet one-way delay: 17.965 ms

Loss rate: 0.09%

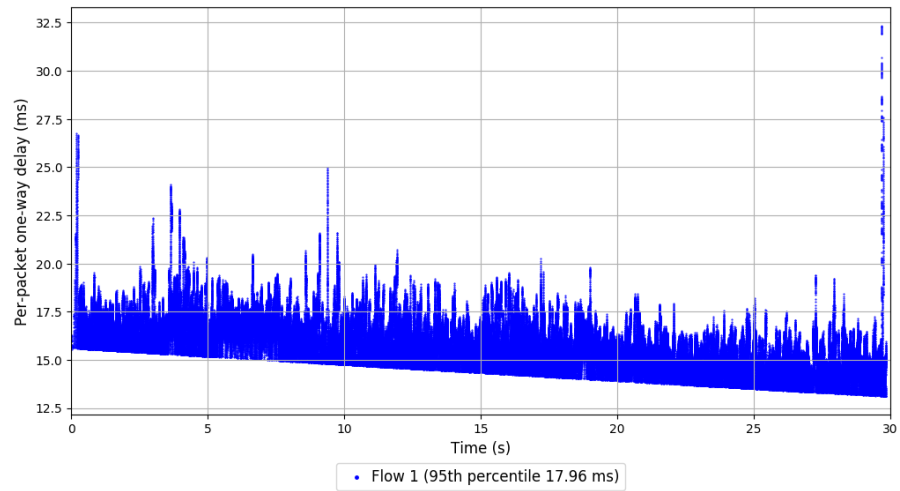
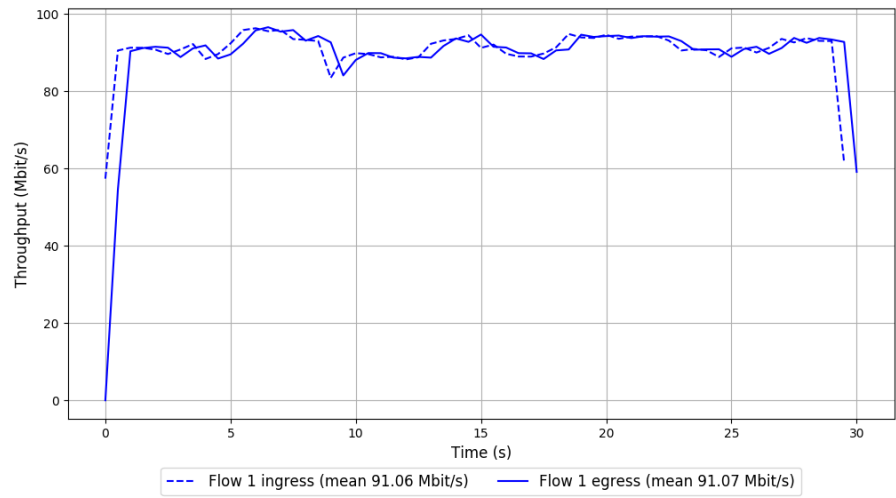
-- Flow 1:

Average throughput: 91.07 Mbit/s

95th percentile per-packet one-way delay: 17.965 ms

Loss rate: 0.09%

Run 1: Report of Indigo — Data Link

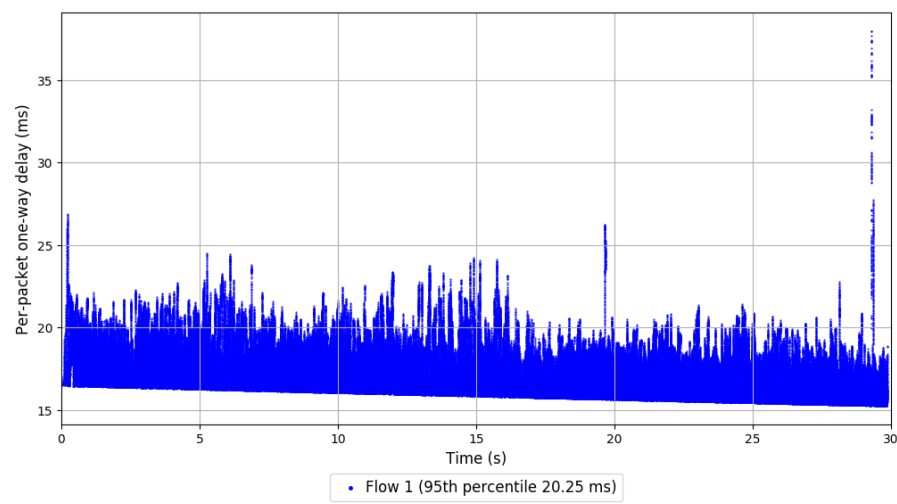
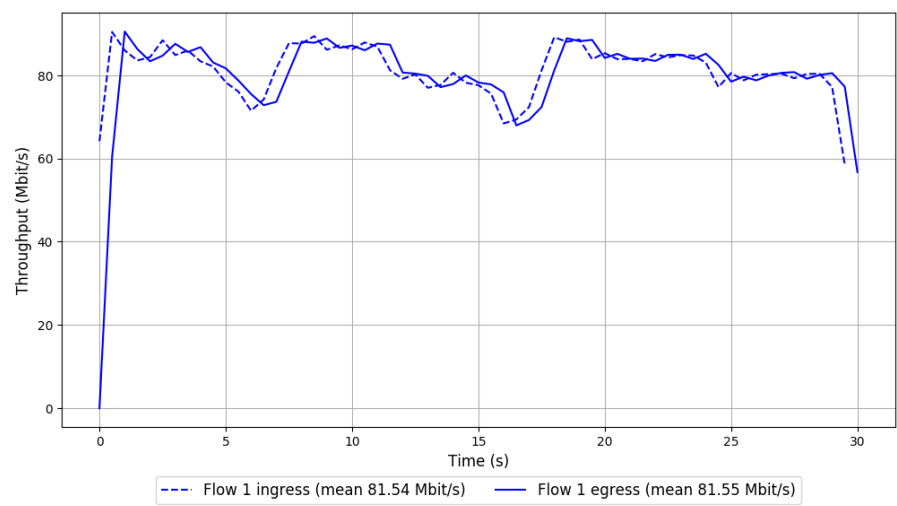


Run 2: Statistics of Indigo

Start at: 2018-09-03 09:26:54
End at: 2018-09-03 09:27:24
Local clock offset: -34.077 ms
Remote clock offset: -5.247 ms

Below is generated by plot.py at 2018-09-03 09:33:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 81.55 Mbit/s
95th percentile per-packet one-way delay: 20.245 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 81.55 Mbit/s
95th percentile per-packet one-way delay: 20.245 ms
Loss rate: 0.09%

Run 2: Report of Indigo — Data Link

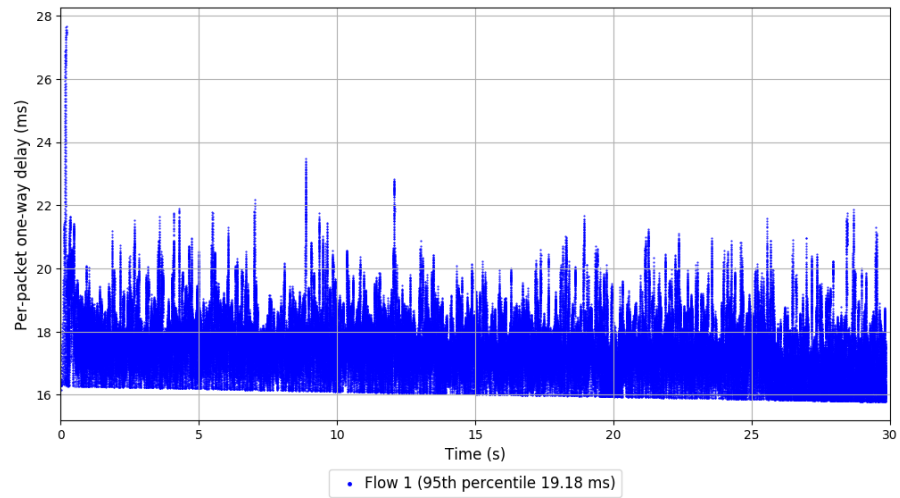
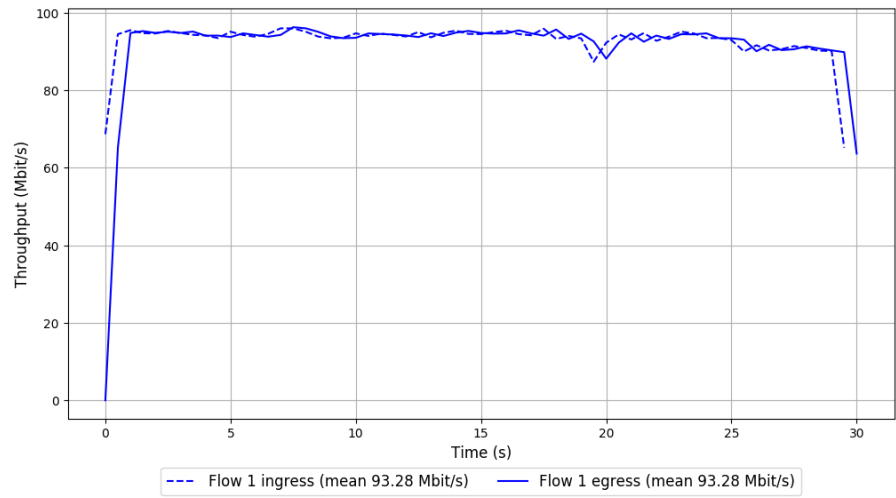


Run 3: Statistics of Indigo

Start at: 2018-09-03 09:31:35
End at: 2018-09-03 09:32:05
Local clock offset: -25.887 ms
Remote clock offset: -5.0 ms

Below is generated by plot.py at 2018-09-03 09:33:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 93.28 Mbit/s
95th percentile per-packet one-way delay: 19.183 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 93.28 Mbit/s
95th percentile per-packet one-way delay: 19.183 ms
Loss rate: 0.09%

Run 3: Report of Indigo — Data Link

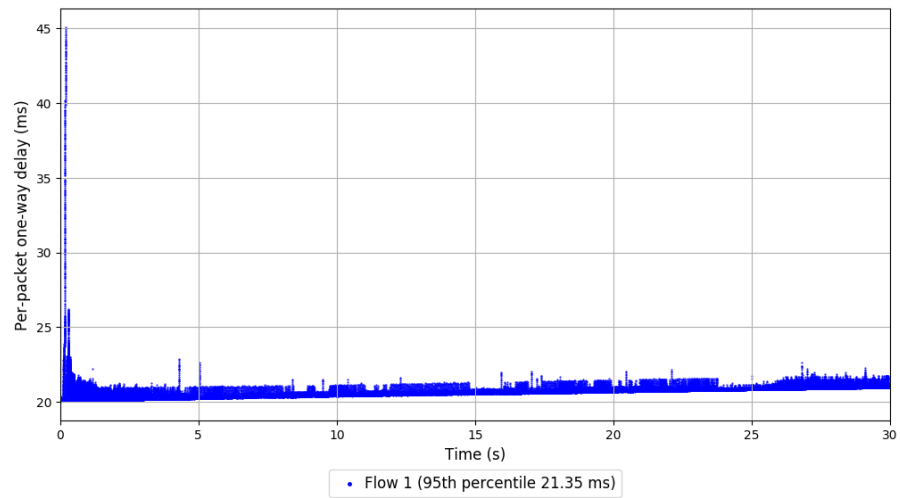
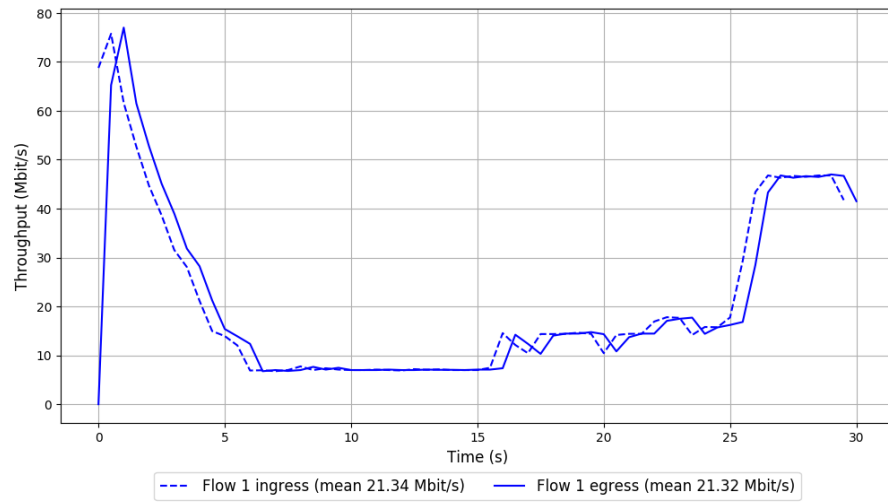


Run 1: Statistics of Muses-25

Start at: 2018-09-03 09:19:58
End at: 2018-09-03 09:20:28
Local clock offset: -51.035 ms
Remote clock offset: -4.352 ms

Below is generated by plot.py at 2018-09-03 09:33:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 21.32 Mbit/s
95th percentile per-packet one-way delay: 21.346 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 21.32 Mbit/s
95th percentile per-packet one-way delay: 21.346 ms
Loss rate: 0.18%

Run 1: Report of Muses-25 — Data Link

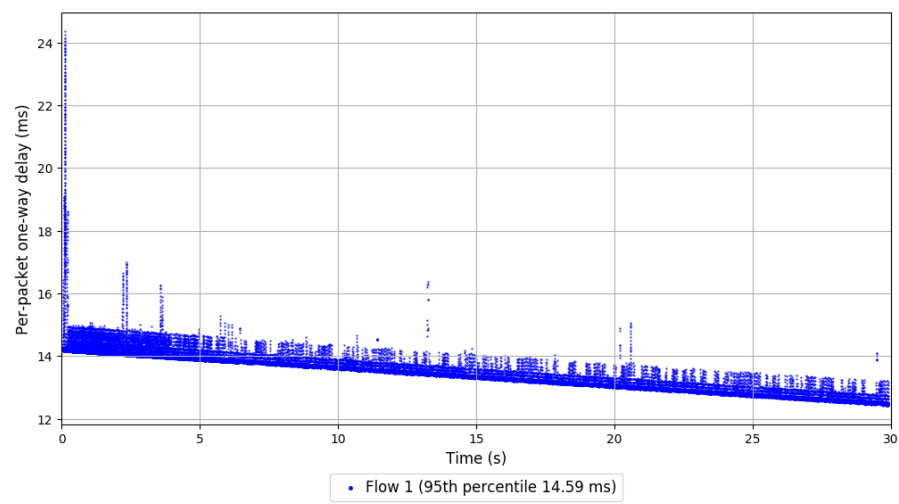
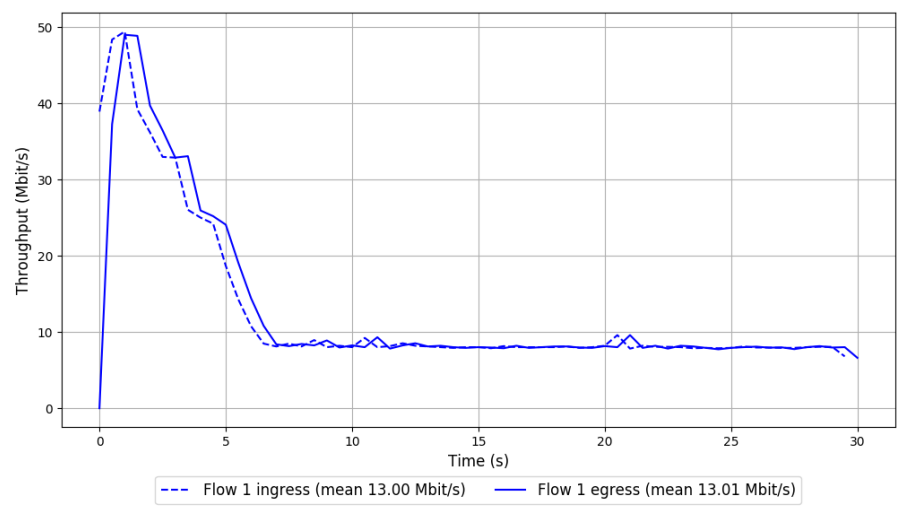


Run 2: Statistics of Muses-25

Start at: 2018-09-03 09:24:40
End at: 2018-09-03 09:25:10
Local clock offset: -42.78 ms
Remote clock offset: -4.696 ms

Below is generated by plot.py at 2018-09-03 09:33:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 13.01 Mbit/s
95th percentile per-packet one-way delay: 14.588 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 13.01 Mbit/s
95th percentile per-packet one-way delay: 14.588 ms
Loss rate: 0.06%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-09-03 09:29:21
End at: 2018-09-03 09:29:51
Local clock offset: -29.282 ms
Remote clock offset: -4.301 ms

Below is generated by plot.py at 2018-09-03 09:33:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 14.28 Mbit/s
95th percentile per-packet one-way delay: 15.931 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 14.28 Mbit/s
95th percentile per-packet one-way delay: 15.931 ms
Loss rate: 0.03%

Run 3: Report of Muses-25 — Data Link

