

Pantheon Report

Generated at 2018-09-05 02:19:54 (UTC).

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

Repeated the test of 4 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

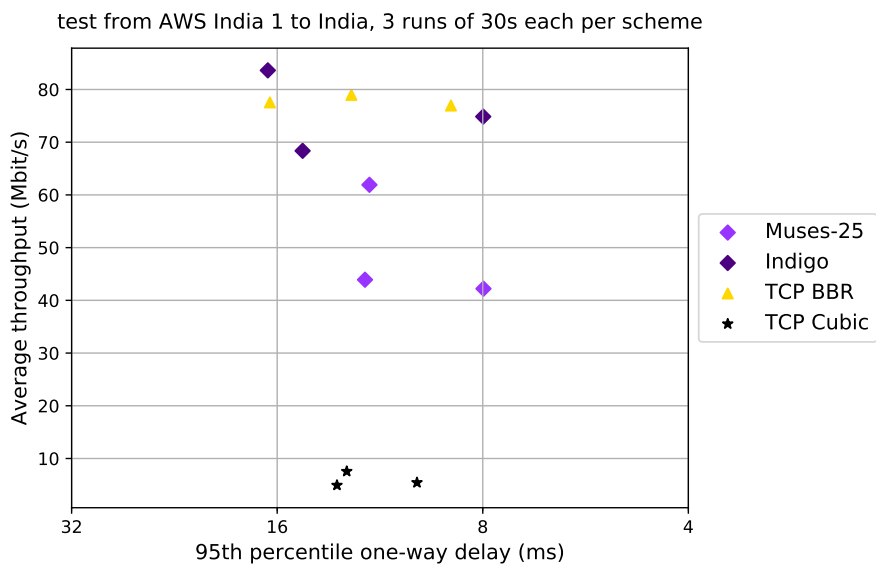
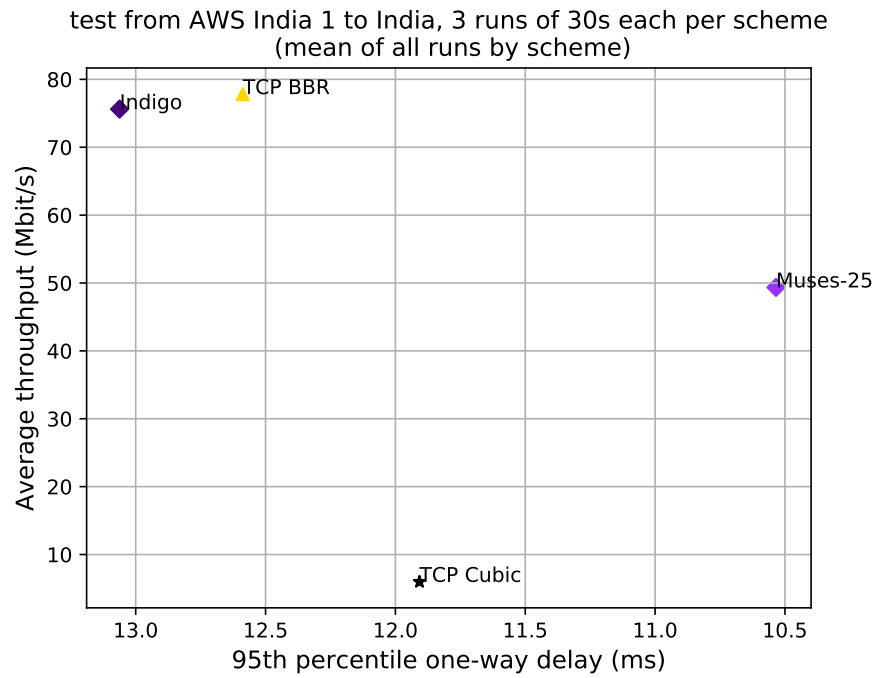
NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

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 @ 71e71e9a55b945431a7dea72180c1c9381097db9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 96fbc95fb38373d71fbc80c5a105e62e7636623b
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	77.83	12.59	9.32
TCP Cubic	3	5.97	11.91	1.60
Indigo	3	75.62	13.06	8.17
Muses-25	3	49.35	10.53	8.02

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 02:07:58

End at: 2018-09-05 02:08:28

Local clock offset: 0.805 ms

Remote clock offset: -4.869 ms

Below is generated by plot.py at 2018-09-05 02:19:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 77.55 Mbit/s

95th percentile per-packet one-way delay: 16.399 ms

Loss rate: 9.88%

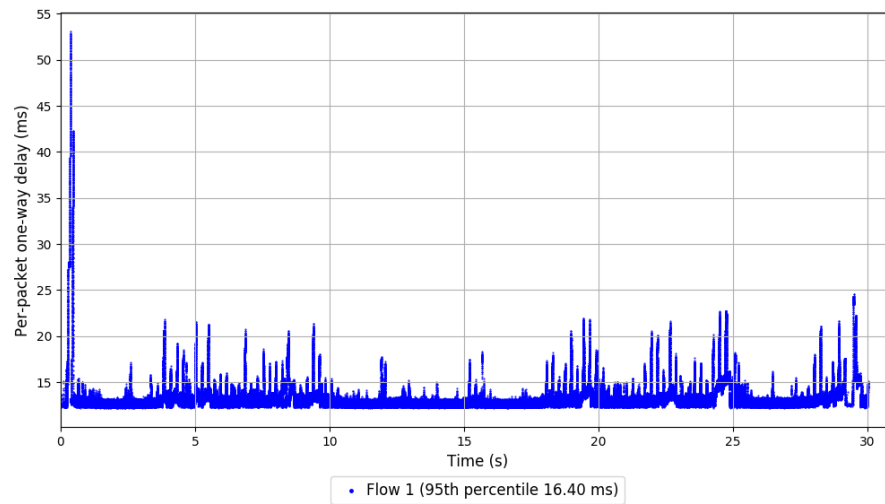
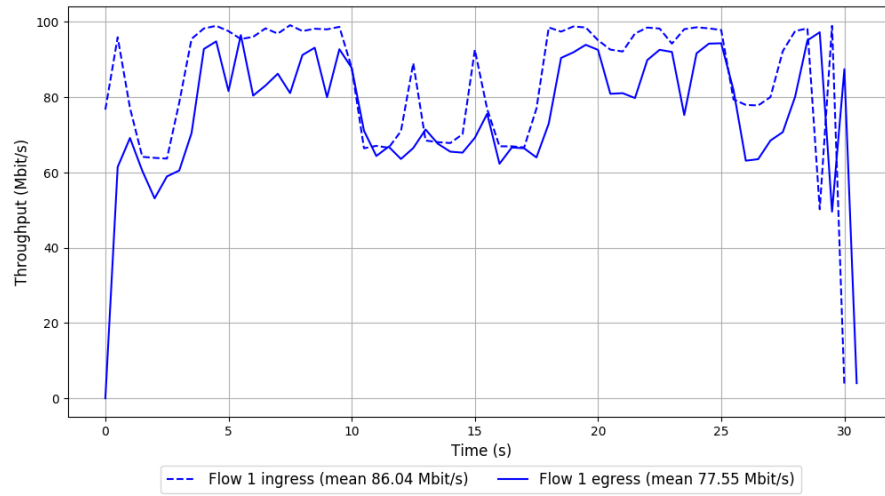
-- Flow 1:

Average throughput: 77.55 Mbit/s

95th percentile per-packet one-way delay: 16.399 ms

Loss rate: 9.88%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 02:12:28

End at: 2018-09-05 02:12:58

Local clock offset: 1.558 ms

Remote clock offset: -3.969 ms

Below is generated by plot.py at 2018-09-05 02:19:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 78.98 Mbit/s

95th percentile per-packet one-way delay: 12.458 ms

Loss rate: 8.44%

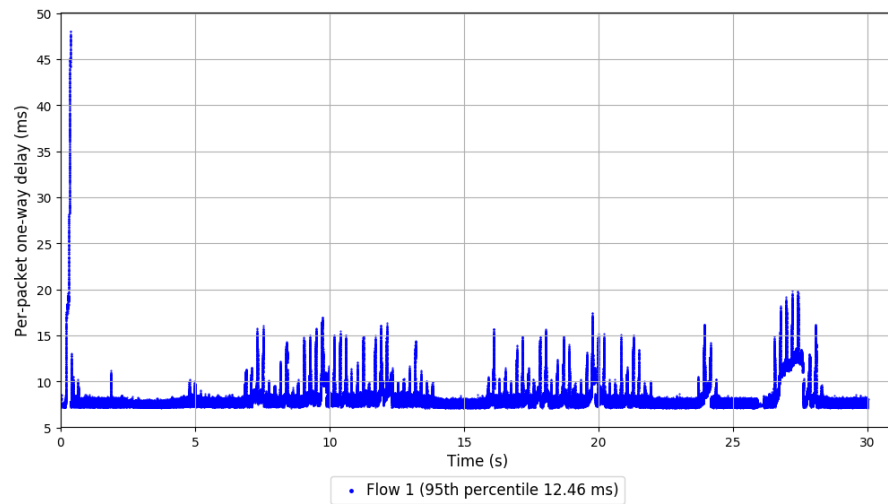
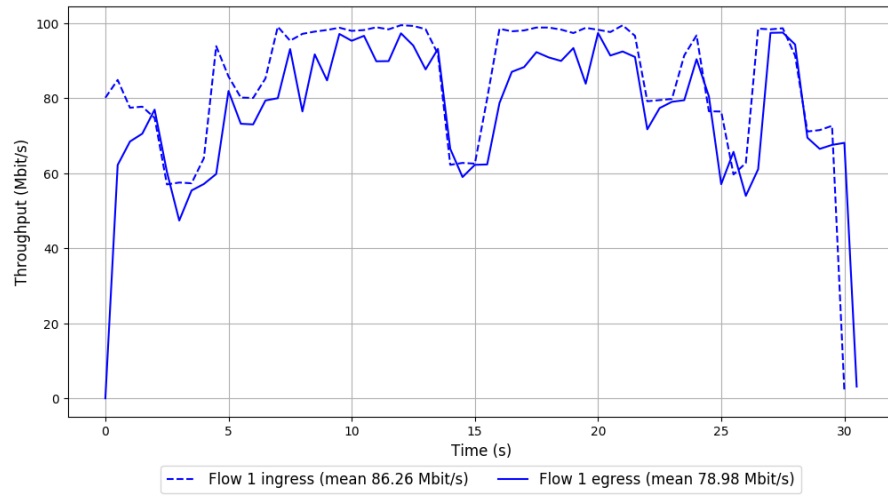
-- Flow 1:

Average throughput: 78.98 Mbit/s

95th percentile per-packet one-way delay: 12.458 ms

Loss rate: 8.44%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-05 02:16:58

End at: 2018-09-05 02:17:28

Local clock offset: 2.795 ms

Remote clock offset: -3.509 ms

Below is generated by plot.py at 2018-09-05 02:19:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 76.95 Mbit/s

95th percentile per-packet one-way delay: 8.906 ms

Loss rate: 9.63%

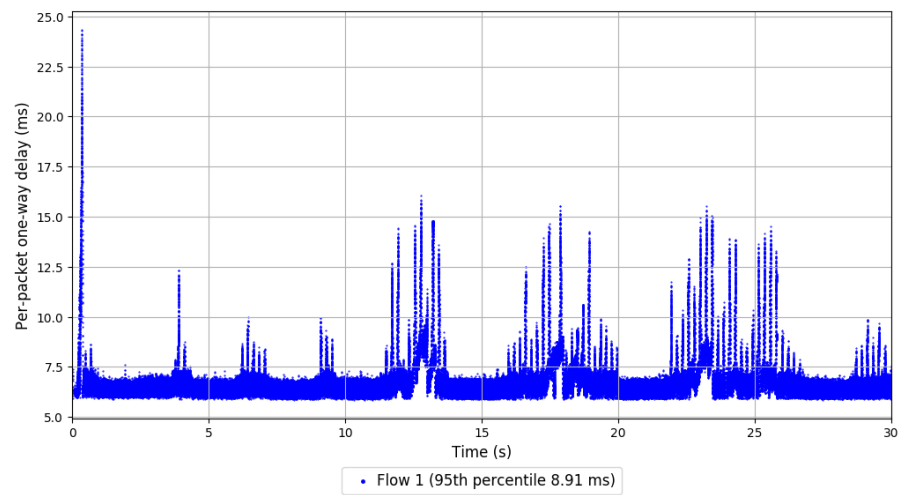
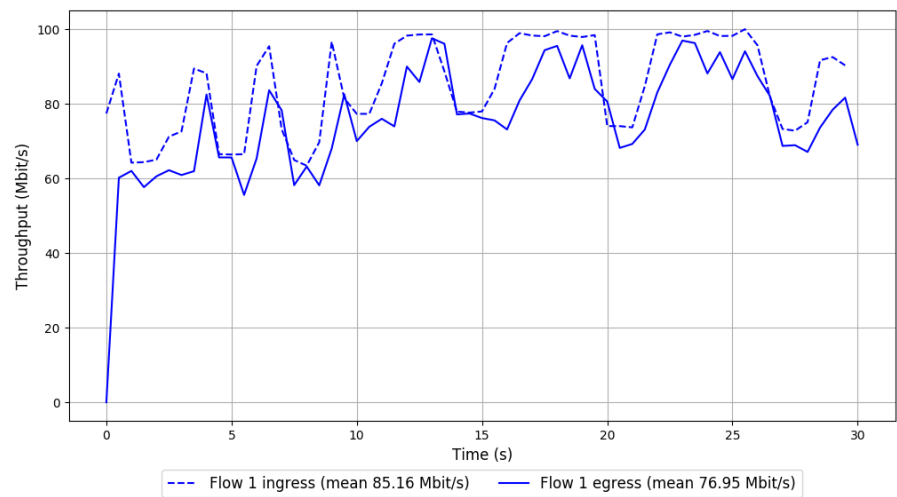
-- Flow 1:

Average throughput: 76.95 Mbit/s

95th percentile per-packet one-way delay: 8.906 ms

Loss rate: 9.63%

Run 3: Report of TCP BBR — Data Link

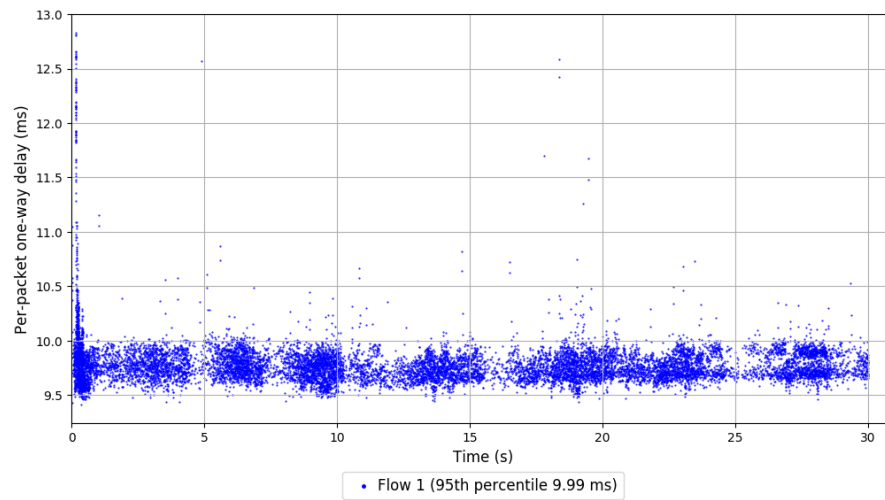
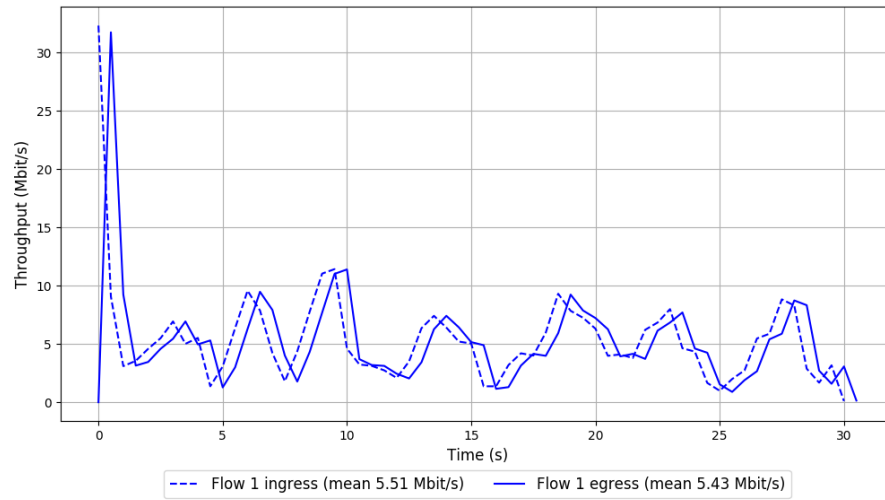


Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 02:05:46
End at: 2018-09-05 02:06:16
Local clock offset: 3.585 ms
Remote clock offset: -4.965 ms

Below is generated by plot.py at 2018-09-05 02:19:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.43 Mbit/s
95th percentile per-packet one-way delay: 9.987 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 5.43 Mbit/s
95th percentile per-packet one-way delay: 9.987 ms
Loss rate: 1.54%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-05 02:10:15

End at: 2018-09-05 02:10:45

Local clock offset: 2.515 ms

Remote clock offset: -3.44 ms

Below is generated by plot.py at 2018-09-05 02:19:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.56 Mbit/s

95th percentile per-packet one-way delay: 12.656 ms

Loss rate: 1.09%

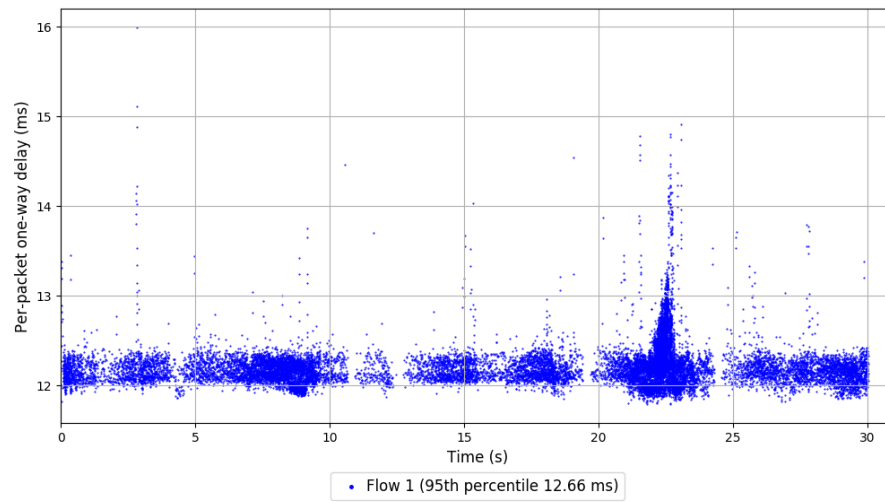
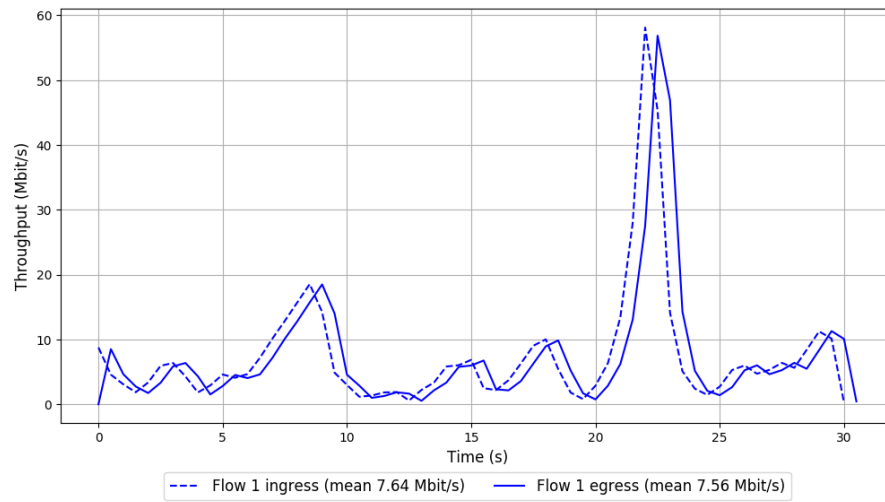
-- Flow 1:

Average throughput: 7.56 Mbit/s

95th percentile per-packet one-way delay: 12.656 ms

Loss rate: 1.09%

Run 2: Report of TCP Cubic — Data Link

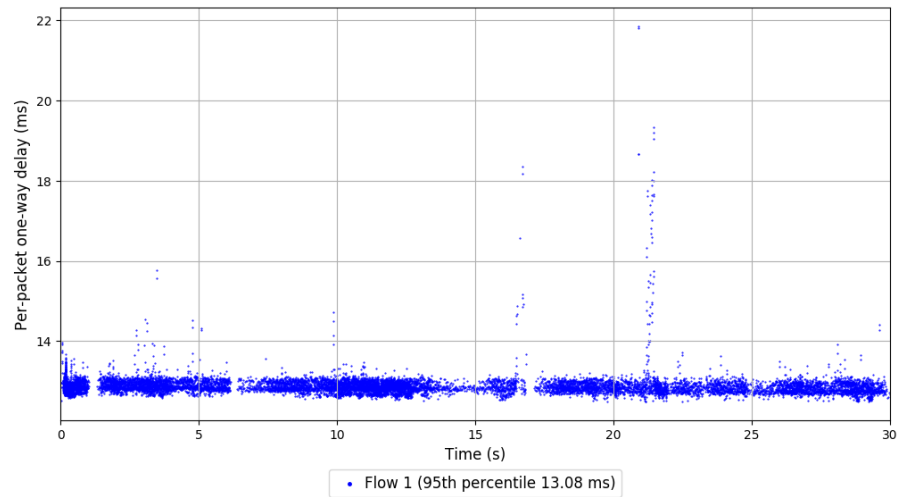
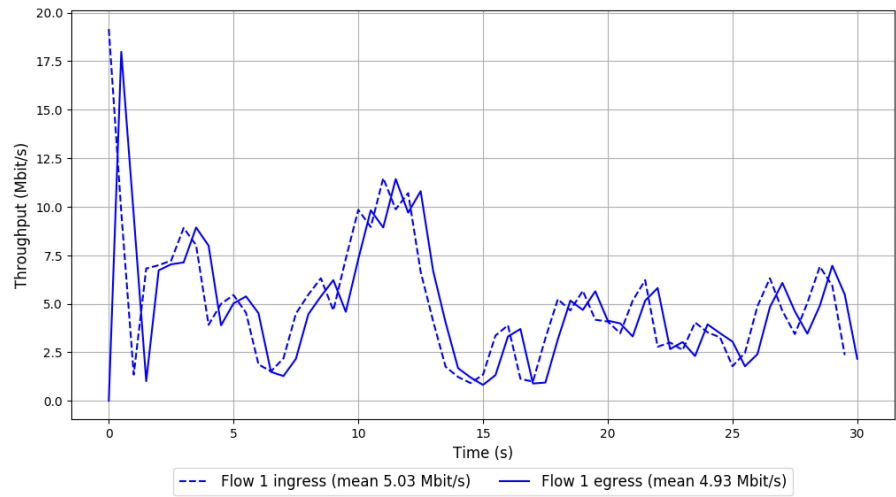


Run 3: Statistics of TCP Cubic

Start at: 2018-09-05 02:14:46
End at: 2018-09-05 02:15:16
Local clock offset: 0.256 ms
Remote clock offset: -4.749 ms

Below is generated by plot.py at 2018-09-05 02:19:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.93 Mbit/s
95th percentile per-packet one-way delay: 13.079 ms
Loss rate: 2.16%
-- Flow 1:
Average throughput: 4.93 Mbit/s
95th percentile per-packet one-way delay: 13.079 ms
Loss rate: 2.16%

Run 3: Report of TCP Cubic — Data Link

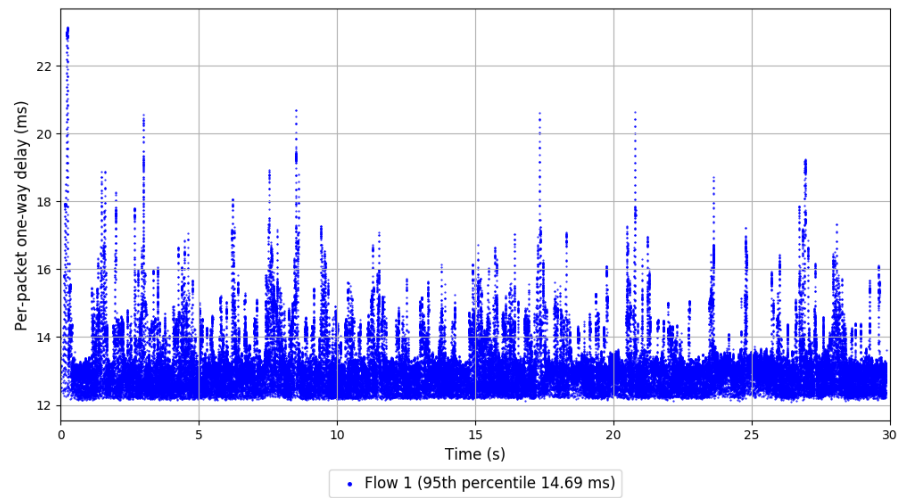
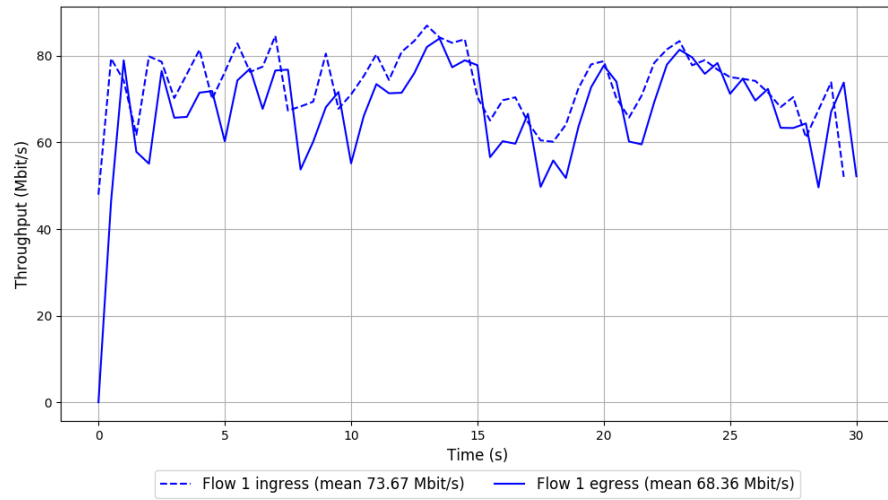


```
Run 1: Statistics of Indigo

Start at: 2018-09-05 02:09:07
End at: 2018-09-05 02:09:37
Local clock offset: 1.393 ms
Remote clock offset: -4.29 ms

# Below is generated by plot.py at 2018-09-05 02:19:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 68.36 Mbit/s
95th percentile per-packet one-way delay: 14.685 ms
Loss rate: 7.22%
-- Flow 1:
Average throughput: 68.36 Mbit/s
95th percentile per-packet one-way delay: 14.685 ms
Loss rate: 7.22%
```


Run 1: Report of Indigo — Data Link

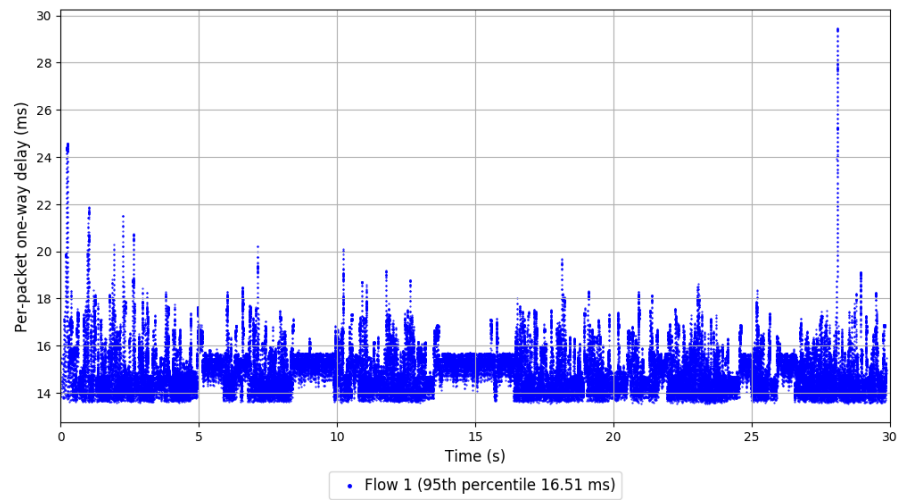
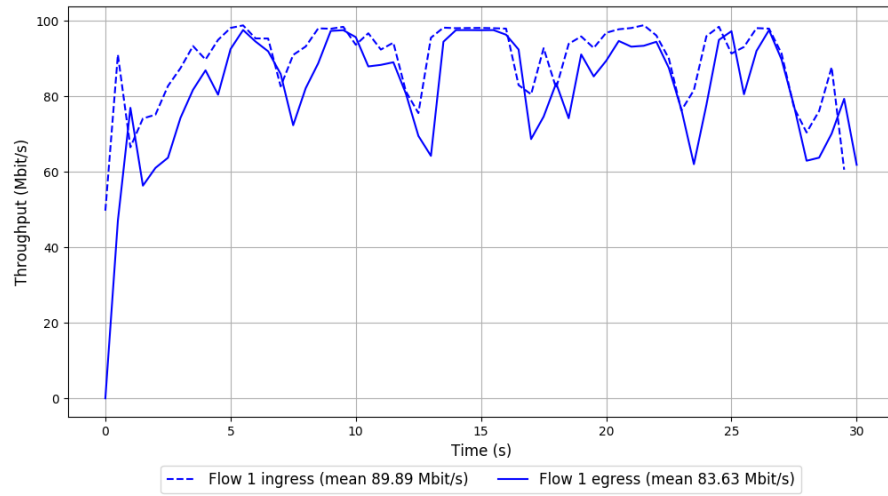


Run 2: Statistics of Indigo

Start at: 2018-09-05 02:13:37
End at: 2018-09-05 02:14:07
Local clock offset: 0.775 ms
Remote clock offset: -3.282 ms

Below is generated by plot.py at 2018-09-05 02:19:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 83.63 Mbit/s
95th percentile per-packet one-way delay: 16.513 ms
Loss rate: 6.97%
-- Flow 1:
Average throughput: 83.63 Mbit/s
95th percentile per-packet one-way delay: 16.513 ms
Loss rate: 6.97%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-05 02:18:07

End at: 2018-09-05 02:18:37

Local clock offset: 3.43 ms

Remote clock offset: -3.085 ms

Below is generated by plot.py at 2018-09-05 02:19:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 74.86 Mbit/s

95th percentile per-packet one-way delay: 7.988 ms

Loss rate: 10.31%

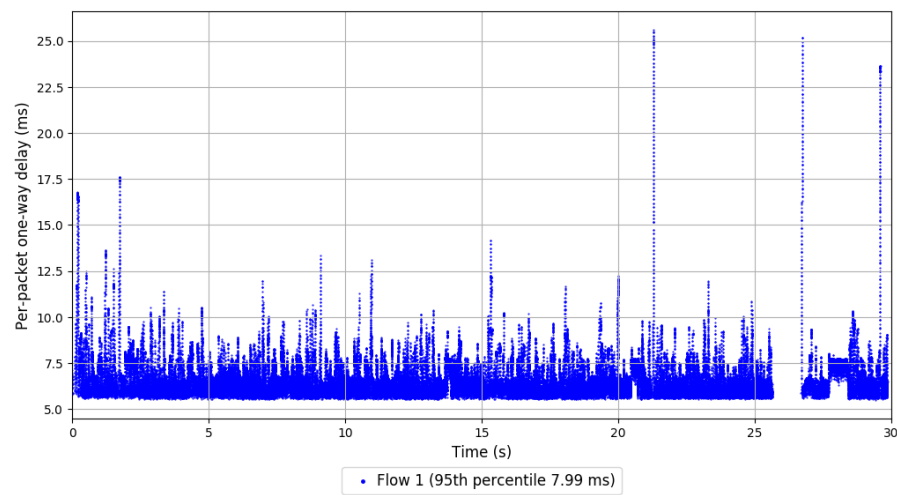
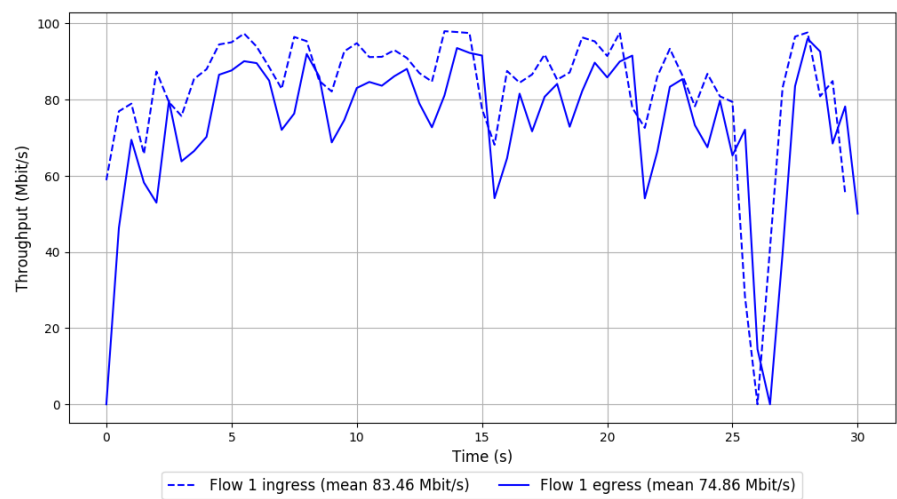
-- Flow 1:

Average throughput: 74.86 Mbit/s

95th percentile per-packet one-way delay: 7.988 ms

Loss rate: 10.31%

Run 3: Report of Indigo — Data Link

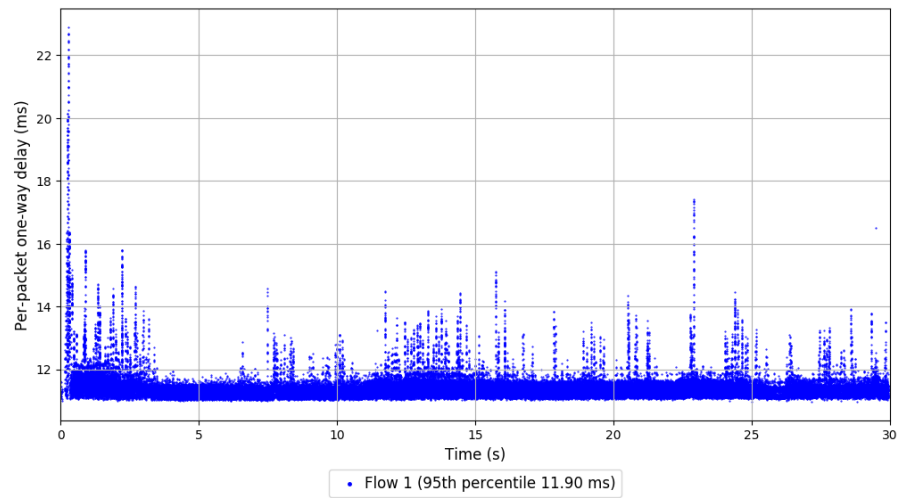
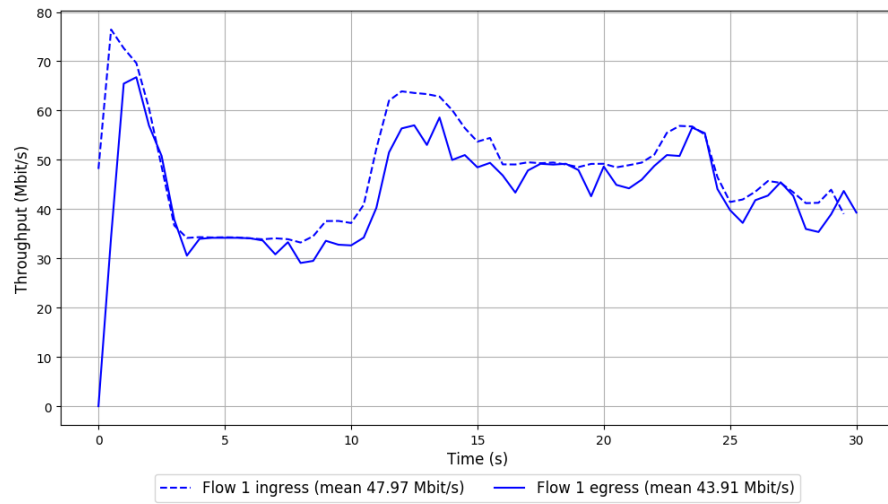


Run 1: Statistics of Muses-25

Start at: 2018-09-05 02:06:51
End at: 2018-09-05 02:07:21
Local clock offset: 2.693 ms
Remote clock offset: -4.174 ms

Below is generated by plot.py at 2018-09-05 02:19:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 43.91 Mbit/s
95th percentile per-packet one-way delay: 11.900 ms
Loss rate: 8.48%
-- Flow 1:
Average throughput: 43.91 Mbit/s
95th percentile per-packet one-way delay: 11.900 ms
Loss rate: 8.48%

Run 1: Report of Muses-25 — Data Link

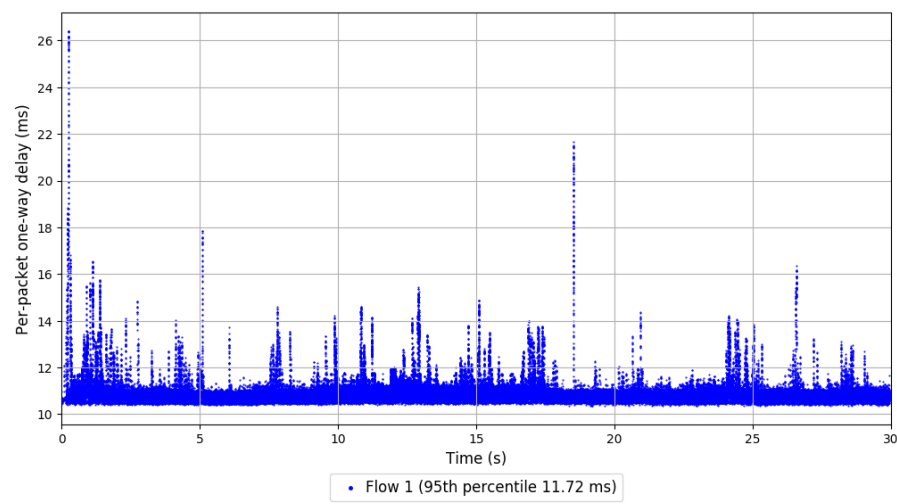
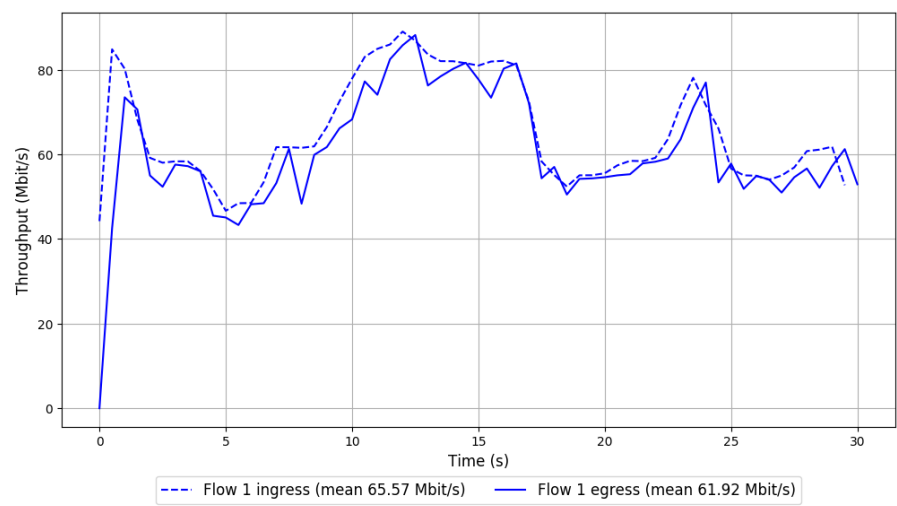


Run 2: Statistics of Muses-25

Start at: 2018-09-05 02:11:21
End at: 2018-09-05 02:11:51
Local clock offset: 2.814 ms
Remote clock offset: -4.525 ms

Below is generated by plot.py at 2018-09-05 02:19:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 61.92 Mbit/s
95th percentile per-packet one-way delay: 11.723 ms
Loss rate: 5.59%
-- Flow 1:
Average throughput: 61.92 Mbit/s
95th percentile per-packet one-way delay: 11.723 ms
Loss rate: 5.59%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-09-05 02:15:52

End at: 2018-09-05 02:16:22

Local clock offset: 1.374 ms

Remote clock offset: -3.747 ms

Below is generated by plot.py at 2018-09-05 02:19:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 42.21 Mbit/s

95th percentile per-packet one-way delay: 7.981 ms

Loss rate: 10.00%

-- Flow 1:

Average throughput: 42.21 Mbit/s

95th percentile per-packet one-way delay: 7.981 ms

Loss rate: 10.00%

Run 3: Report of Muses-25 — Data Link

