

## Pantheon Report

Generated at 2018-08-31 05:24:48 (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.

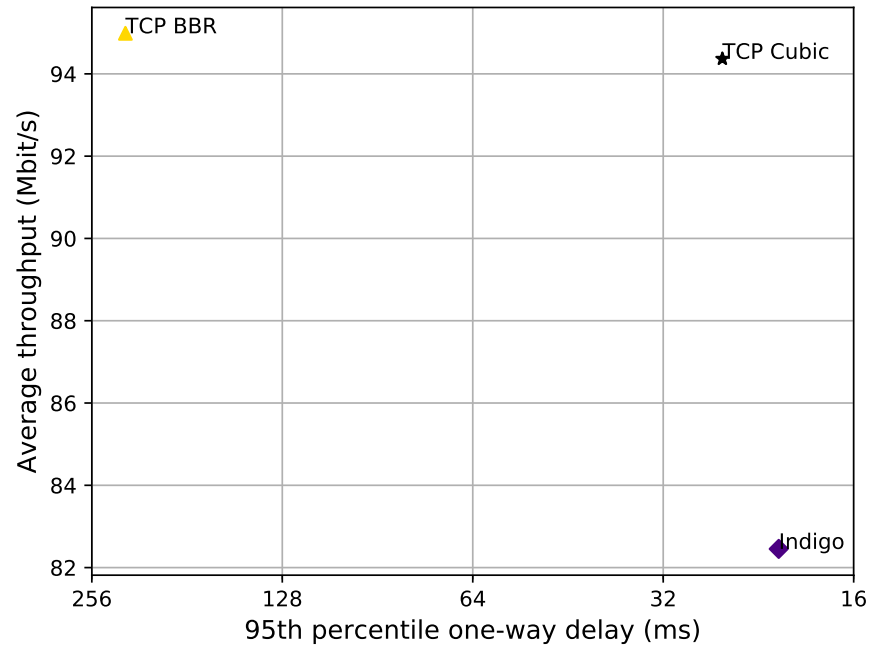
### System info:

```
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
```

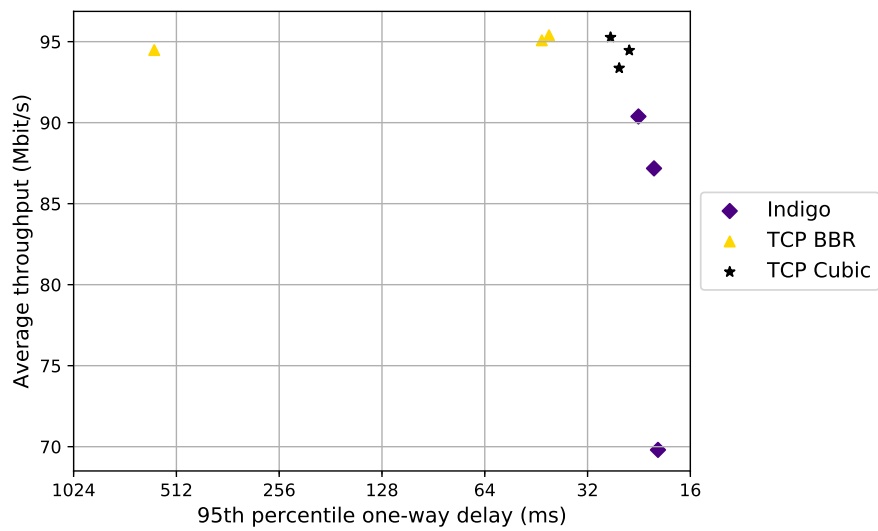
### Git summary:

```
branch: muses @ 2de97ca91a065473c29a25fffe63fb137c97a67c
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
```

test from India to AWS India 1, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from India to AWS India 1, 3 runs of 30s each per scheme



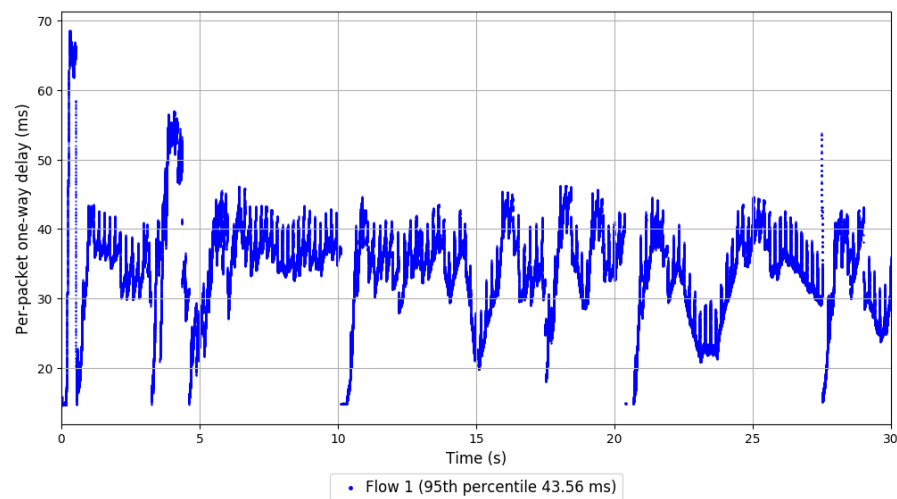
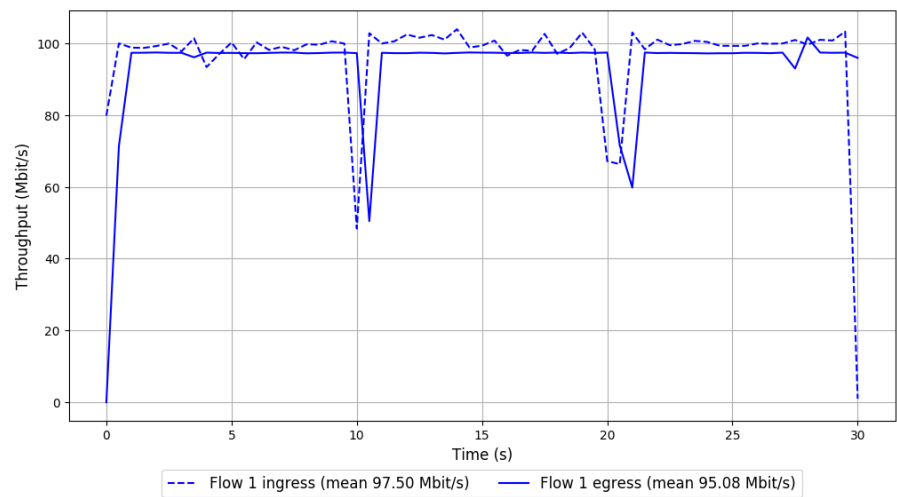
| scheme    | # runs | mean avg tput (Mbit/s)<br>flow 1 | mean 95th-%ile delay (ms)<br>flow 1 | mean loss rate (%)<br>flow 1 |
|-----------|--------|----------------------------------|-------------------------------------|------------------------------|
| TCP BBR   | 3      | 94.98                            | 226.55                              | 2.92                         |
| TCP Cubic | 3      | 94.37                            | 25.80                               | 0.10                         |
| Indigo    | 3      | 82.45                            | 21.02                               | 0.09                         |
| Muses-25  | 0      | N/A                              | N/A                                 | N/A                          |

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 05:13:13  
End at: 2018-08-31 05:13:43  
Local clock offset: -10.35 ms  
Remote clock offset: -4.498 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.08 Mbit/s  
95th percentile per-packet one-way delay: 43.563 ms  
Loss rate: 2.58%  
-- Flow 1:  
Average throughput: 95.08 Mbit/s  
95th percentile per-packet one-way delay: 43.563 ms  
Loss rate: 2.58%

Run 1: Report of TCP BBR — Data Link

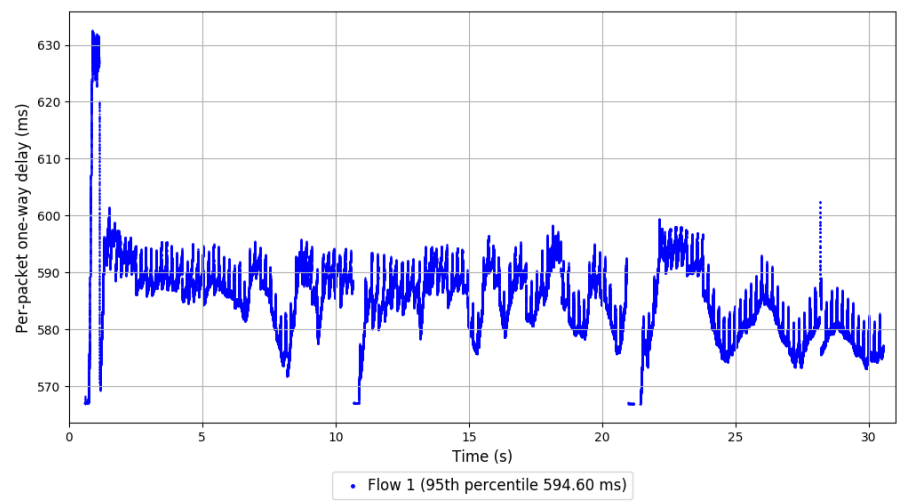
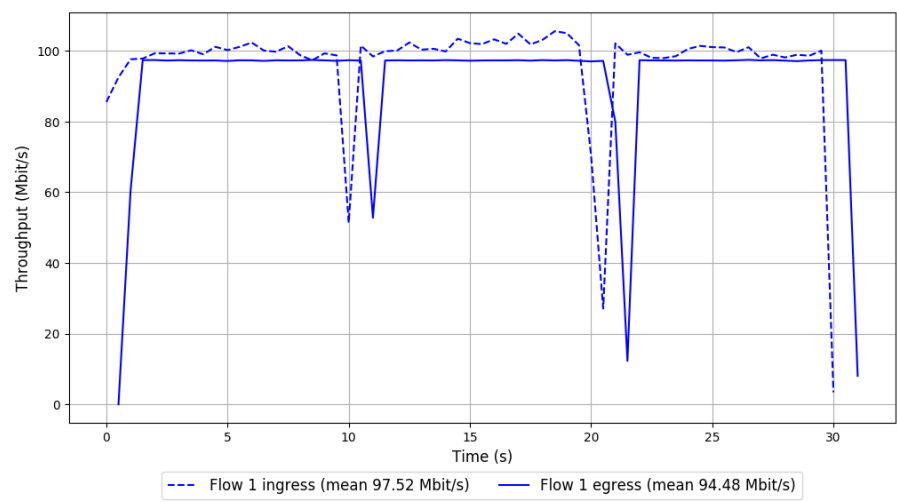


Run 2: Statistics of TCP BBR

Start at: 2018-08-31 05:18:04  
End at: 2018-08-31 05:18:34  
Local clock offset: -6.009 ms  
Remote clock offset: -553.23 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 94.48 Mbit/s  
95th percentile per-packet one-way delay: 594.601 ms  
Loss rate: 3.26%  
-- Flow 1:  
Average throughput: 94.48 Mbit/s  
95th percentile per-packet one-way delay: 594.601 ms  
Loss rate: 3.26%

Run 2: Report of TCP BBR — Data Link

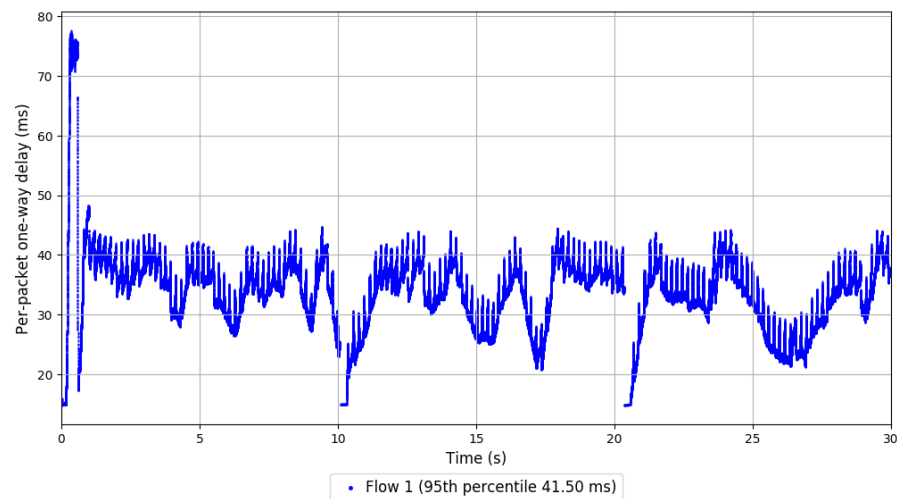
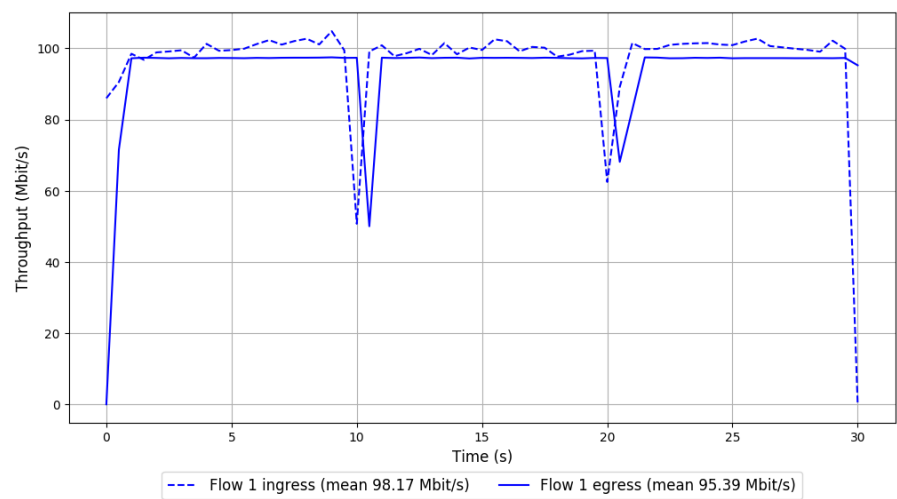


Run 3: Statistics of TCP BBR

Start at: 2018-08-31 05:22:42  
End at: 2018-08-31 05:23:12  
Local clock offset: -7.495 ms  
Remote clock offset: -4.861 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.39 Mbit/s  
95th percentile per-packet one-way delay: 41.496 ms  
Loss rate: 2.91%  
-- Flow 1:  
Average throughput: 95.39 Mbit/s  
95th percentile per-packet one-way delay: 41.496 ms  
Loss rate: 2.91%

Run 3: Report of TCP BBR — Data Link

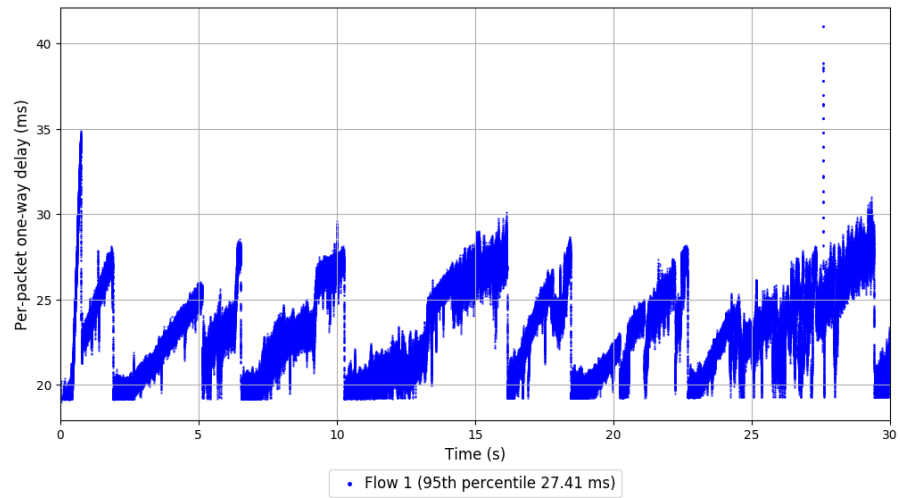
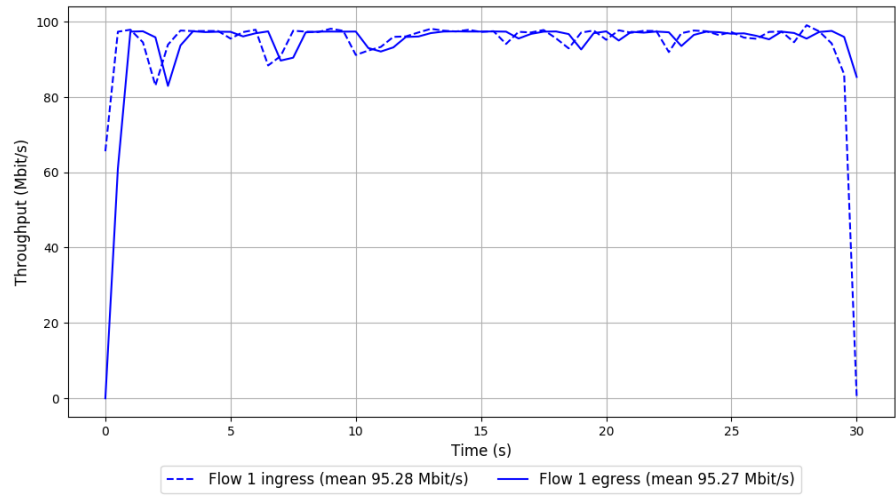


Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 05:12:04  
End at: 2018-08-31 05:12:34  
Local clock offset: -5.434 ms  
Remote clock offset: -4.334 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.27 Mbit/s  
95th percentile per-packet one-way delay: 27.407 ms  
Loss rate: 0.09%  
-- Flow 1:  
Average throughput: 95.27 Mbit/s  
95th percentile per-packet one-way delay: 27.407 ms  
Loss rate: 0.09%

### Run 1: Report of TCP Cubic — Data Link

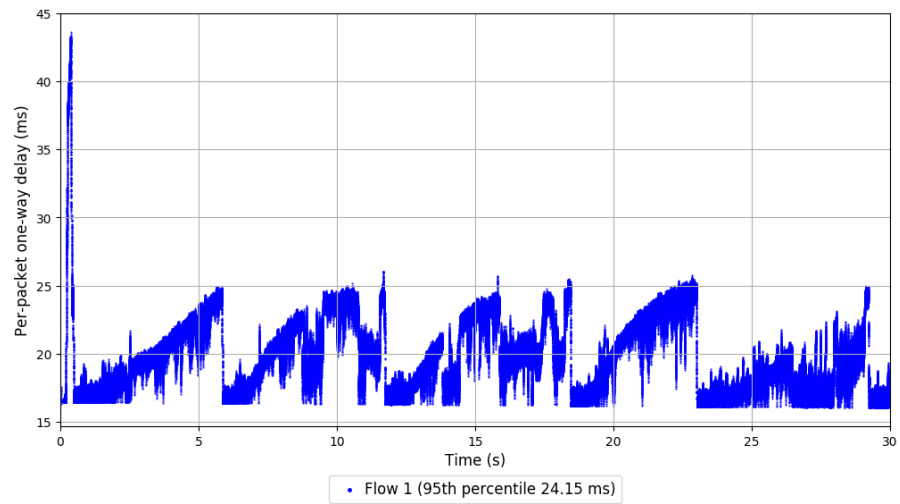
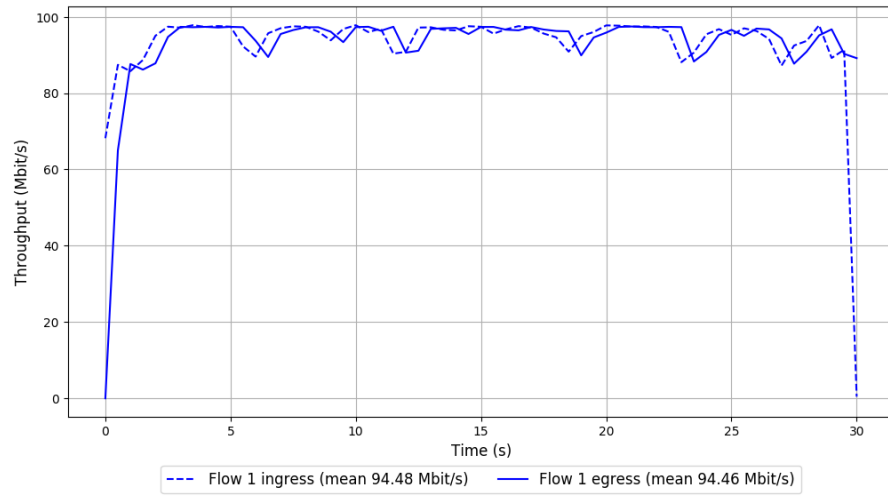


Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 05:16:43  
End at: 2018-08-31 05:17:13  
Local clock offset: -8.993 ms  
Remote clock offset: -4.588 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 94.46 Mbit/s  
95th percentile per-packet one-way delay: 24.152 ms  
Loss rate: 0.10%  
-- Flow 1:  
Average throughput: 94.46 Mbit/s  
95th percentile per-packet one-way delay: 24.152 ms  
Loss rate: 0.10%

## Run 2: Report of TCP Cubic — Data Link

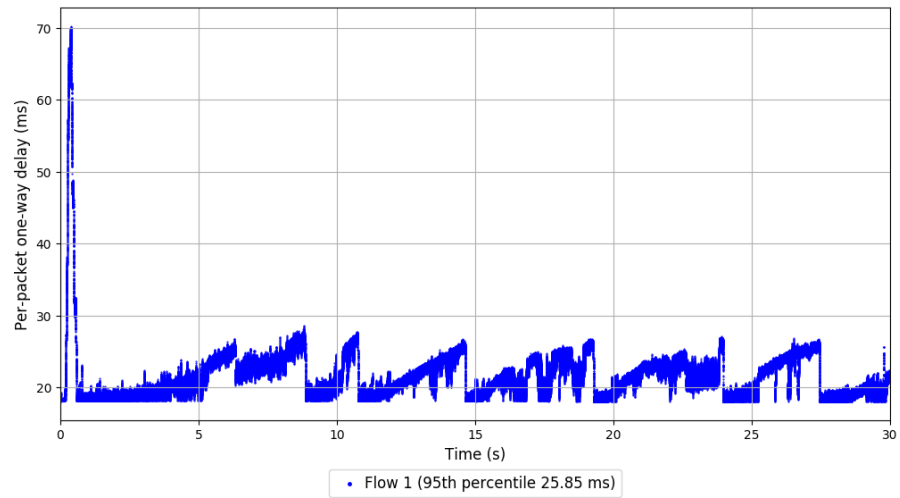
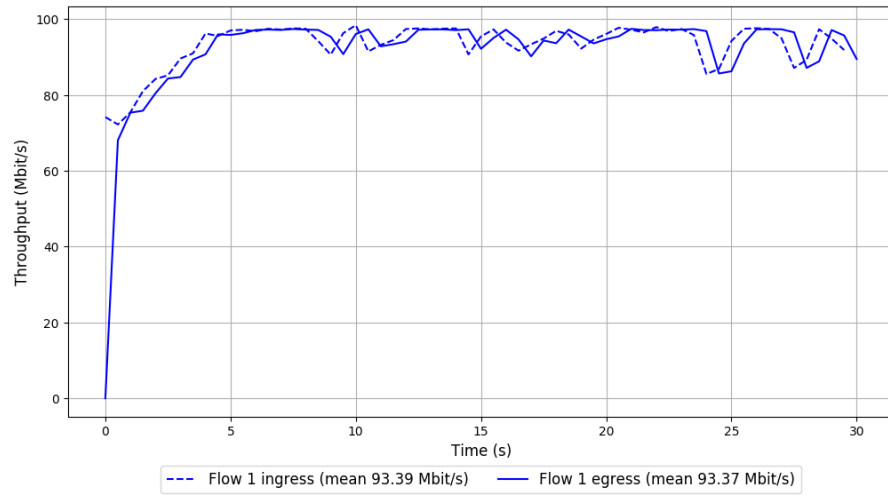


Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 05:21:32  
End at: 2018-08-31 05:22:02  
Local clock offset: -5.186 ms  
Remote clock offset: -5.458 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 93.37 Mbit/s  
95th percentile per-packet one-way delay: 25.848 ms  
Loss rate: 0.10%  
-- Flow 1:  
Average throughput: 93.37 Mbit/s  
95th percentile per-packet one-way delay: 25.848 ms  
Loss rate: 0.10%

### Run 3: Report of TCP Cubic — Data Link

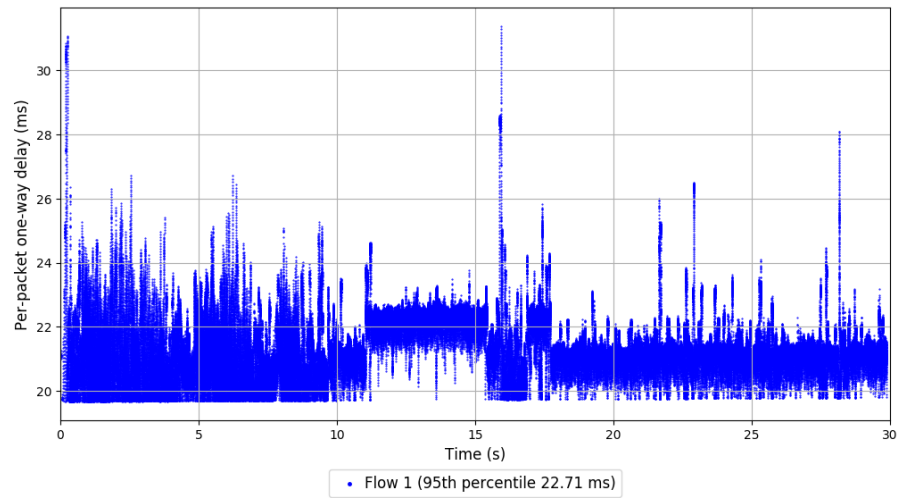
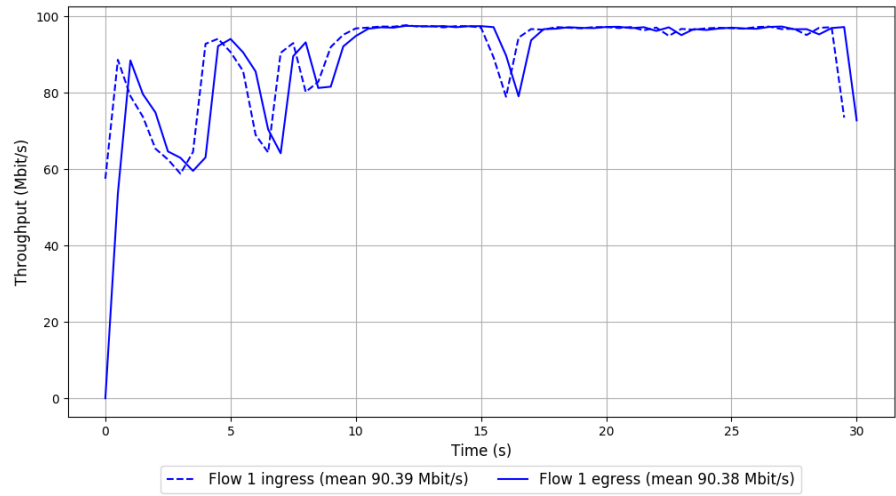


Run 1: Statistics of Indigo

Start at: 2018-08-31 05:09:47  
End at: 2018-08-31 05:10:17  
Local clock offset: -4.878 ms  
Remote clock offset: -4.919 ms

# Below is generated by plot.py at 2018-08-31 05:24:44  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 90.38 Mbit/s  
95th percentile per-packet one-way delay: 22.706 ms  
Loss rate: 0.09%  
-- Flow 1:  
Average throughput: 90.38 Mbit/s  
95th percentile per-packet one-way delay: 22.706 ms  
Loss rate: 0.09%

### Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-31 05:14:24

End at: 2018-08-31 05:14:54

Local clock offset: -8.67 ms

Remote clock offset: -5.067 ms

# Below is generated by plot.py at 2018-08-31 05:24:44

# Datalink statistics

-- Total of 1 flow:

Average throughput: 87.18 Mbit/s

95th percentile per-packet one-way delay: 20.442 ms

Loss rate: 0.09%

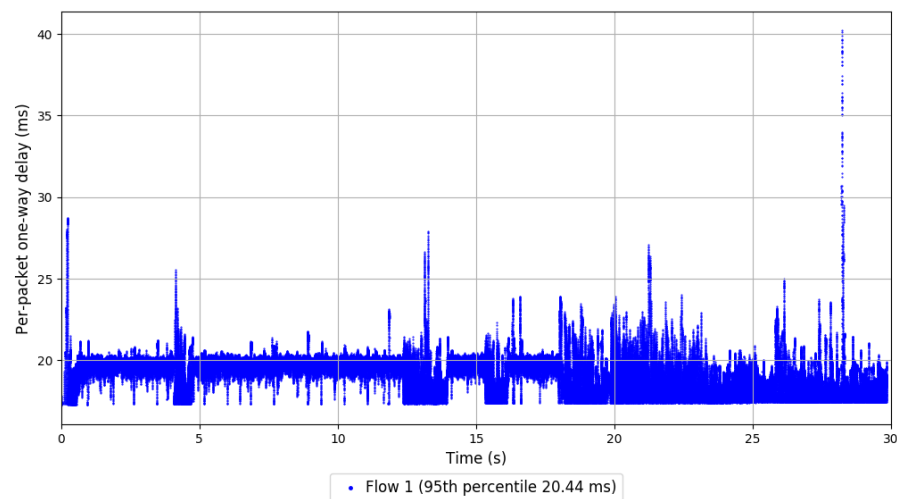
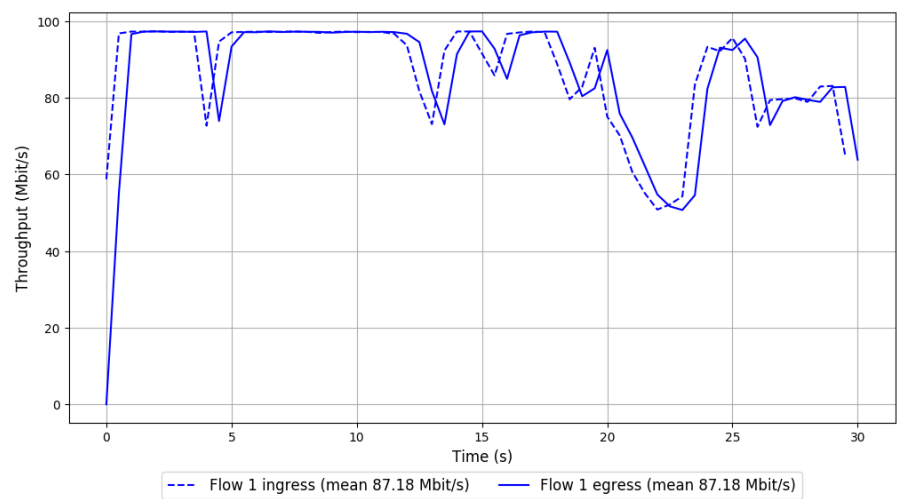
-- Flow 1:

Average throughput: 87.18 Mbit/s

95th percentile per-packet one-way delay: 20.442 ms

Loss rate: 0.09%

Run 2: Report of Indigo — Data Link

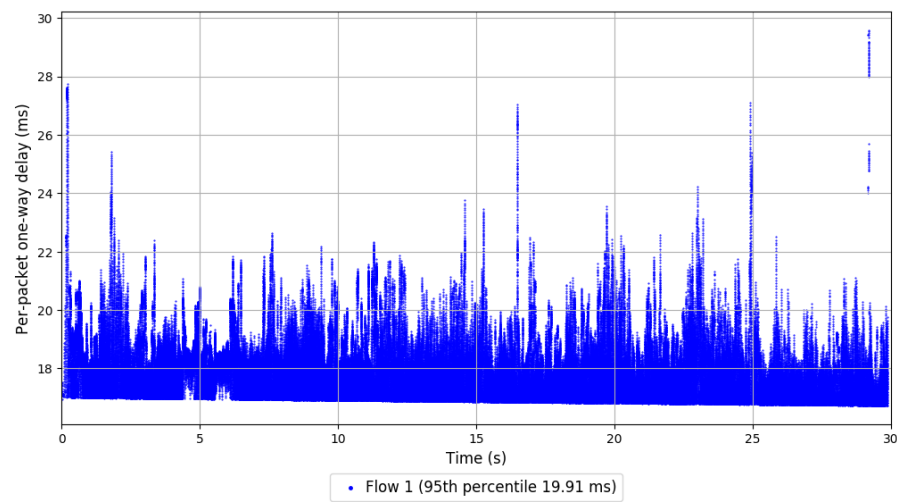
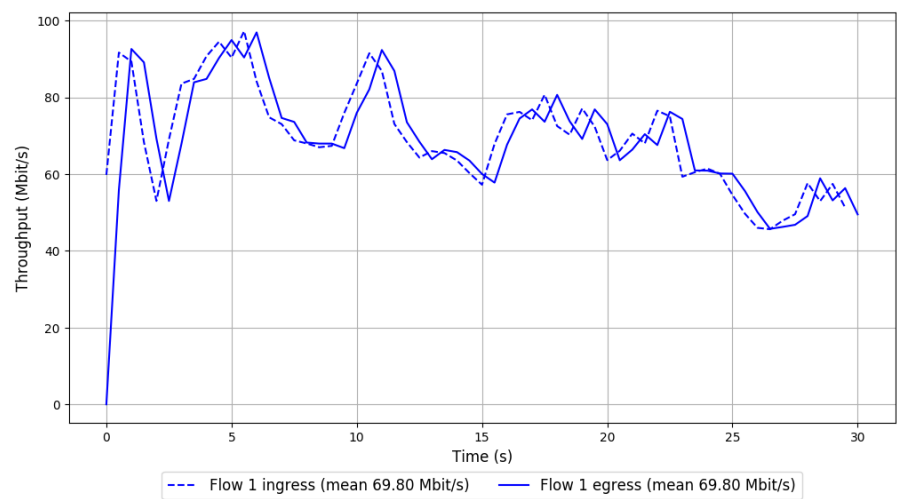


Run 3: Statistics of Indigo

Start at: 2018-08-31 05:19:14  
End at: 2018-08-31 05:19:44  
Local clock offset: -7.196 ms  
Remote clock offset: -5.138 ms

# Below is generated by plot.py at 2018-08-31 05:24:46  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 69.80 Mbit/s  
95th percentile per-packet one-way delay: 19.905 ms  
Loss rate: 0.10%  
-- Flow 1:  
Average throughput: 69.80 Mbit/s  
95th percentile per-packet one-way delay: 19.905 ms  
Loss rate: 0.10%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

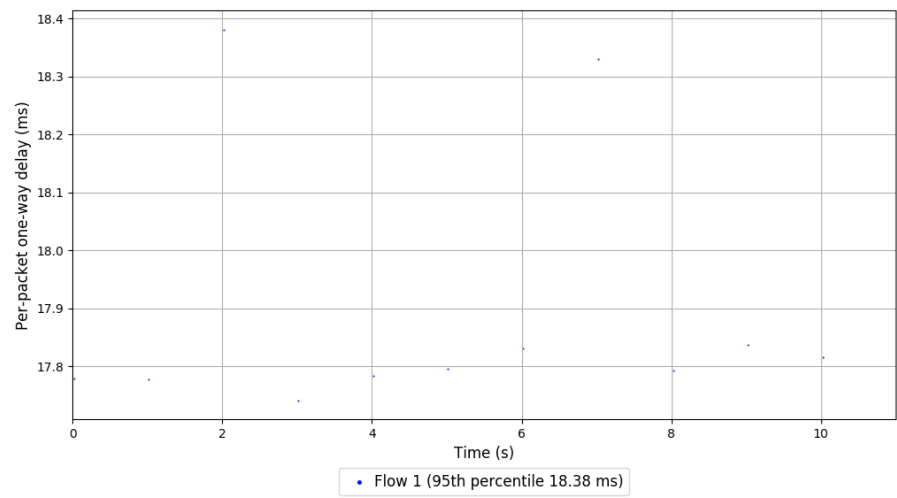
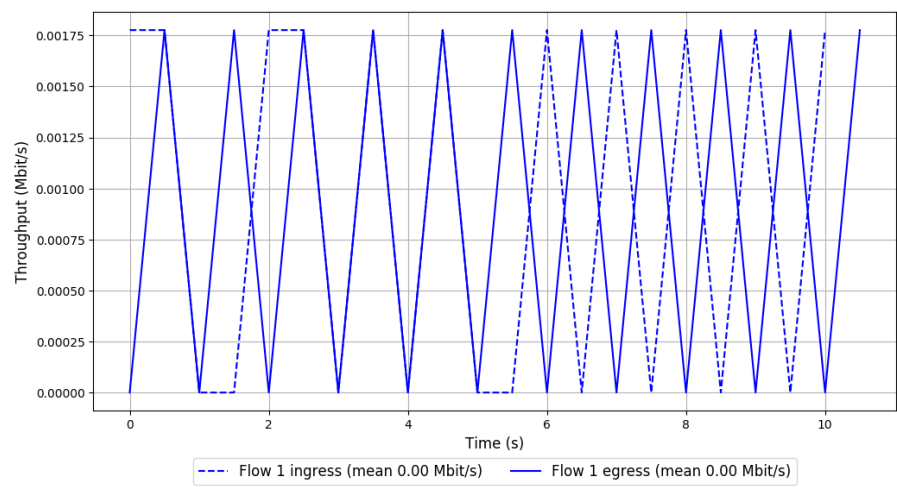
Start at: 2018-08-31 05:11:00

End at: 2018-08-31 05:11:30

Local clock offset: -7.14 ms

Remote clock offset: -5.08 ms

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

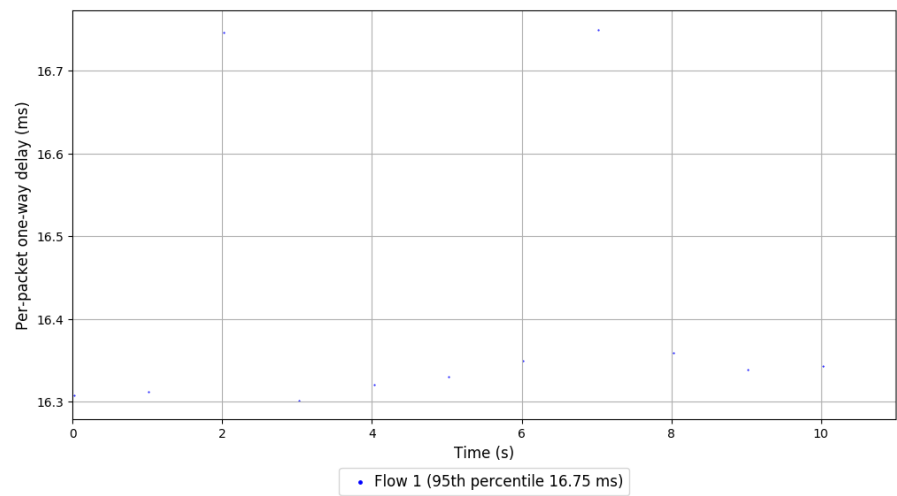
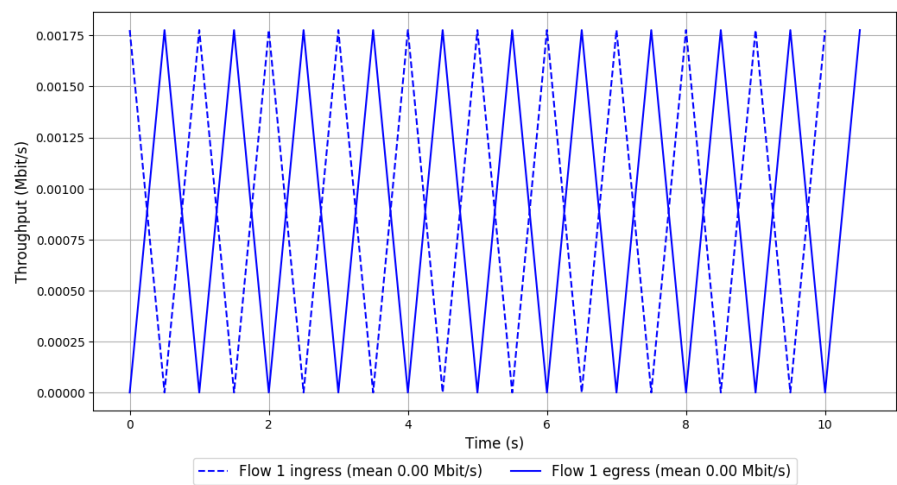
Start at: 2018-08-31 05:15:34

End at: 2018-08-31 05:16:04

Local clock offset: -8.894 ms

Remote clock offset: -4.073 ms

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-08-31 05:20:27

End at: 2018-08-31 05:20:57

Local clock offset: -6.243 ms

Remote clock offset: -5.507 ms

Run 3: Report of Muses-25 — Data Link

