

## Pantheon Report

Generated at 2018-08-31 04:31:36 (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.

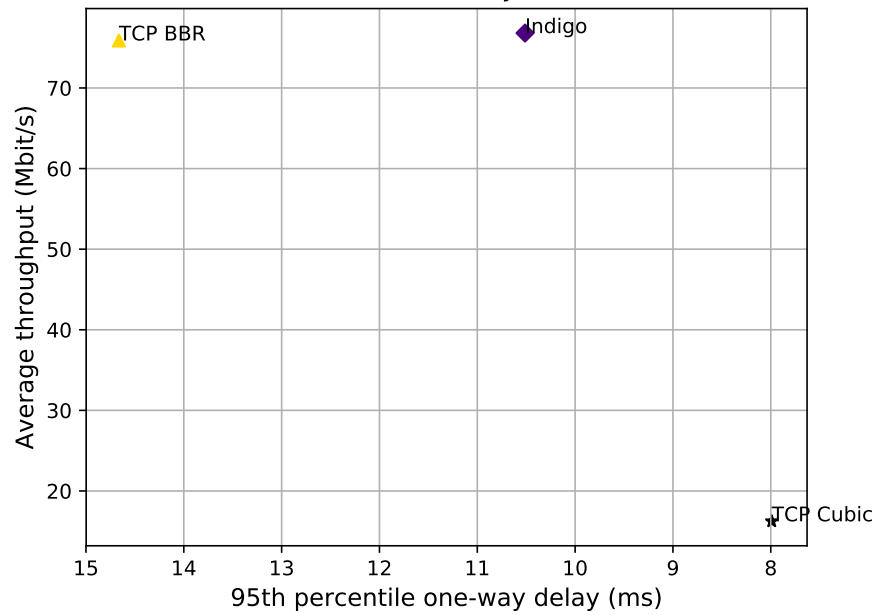
### System info:

```
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
```

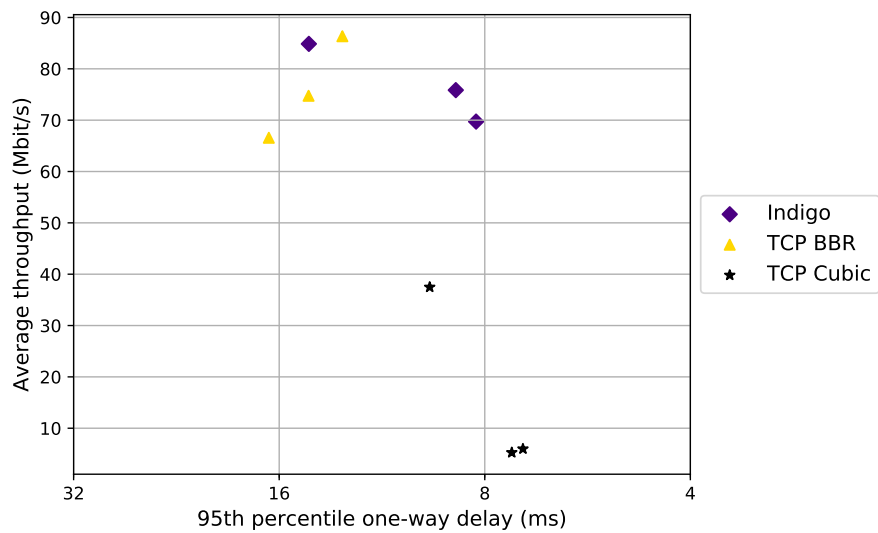
### Git summary:

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

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



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



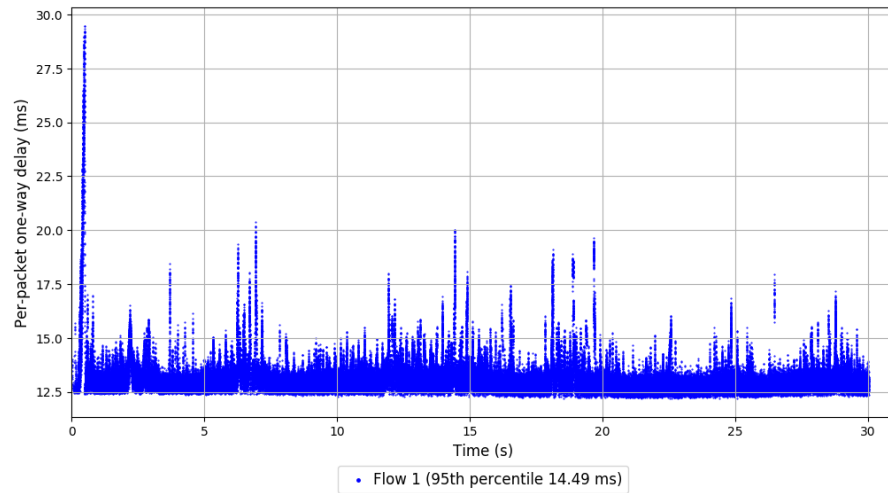
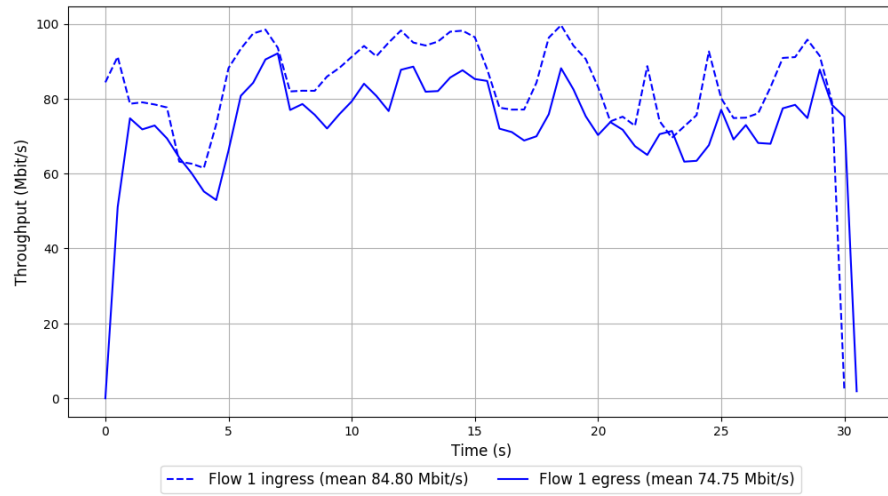
| scheme    | # runs | mean avg tput (Mbit/s)<br>flow 1 | mean 95th-%ile delay (ms)<br>flow 1 | mean loss rate (%)<br>flow 1 |
|-----------|--------|----------------------------------|-------------------------------------|------------------------------|
| TCP BBR   | 3      | 75.89                            | 14.66                               | 11.10                        |
| TCP Cubic | 3      | 16.24                            | 7.99                                | 1.24                         |
| Indigo    | 3      | 76.81                            | 10.51                               | 11.57                        |
| Muses-25  | 0      | N/A                              | N/A                                 | N/A                          |

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 04:20:01  
End at: 2018-08-31 04:20:31  
Local clock offset: -1.162 ms  
Remote clock offset: -4.013 ms

# Below is generated by plot.py at 2018-08-31 04:31:34  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 74.75 Mbit/s  
95th percentile per-packet one-way delay: 14.491 ms  
Loss rate: 11.85%  
-- Flow 1:  
Average throughput: 74.75 Mbit/s  
95th percentile per-packet one-way delay: 14.491 ms  
Loss rate: 11.85%

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



Run 2: Statistics of TCP BBR

Start at: 2018-08-31 04:24:26

End at: 2018-08-31 04:24:56

Local clock offset: -4.196 ms

Remote clock offset: -3.44 ms

# Below is generated by plot.py at 2018-08-31 04:31:34

# Datalink statistics

-- Total of 1 flow:

Average throughput: 66.58 Mbit/s

95th percentile per-packet one-way delay: 16.569 ms

Loss rate: 13.12%

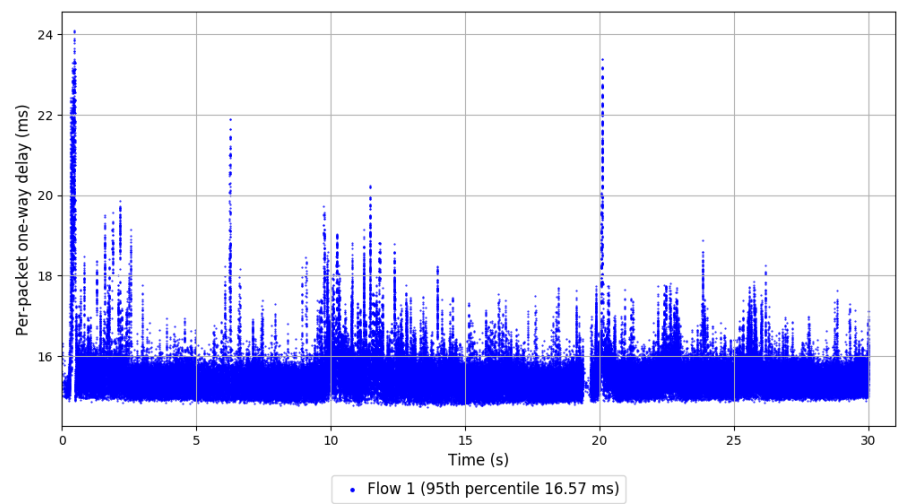
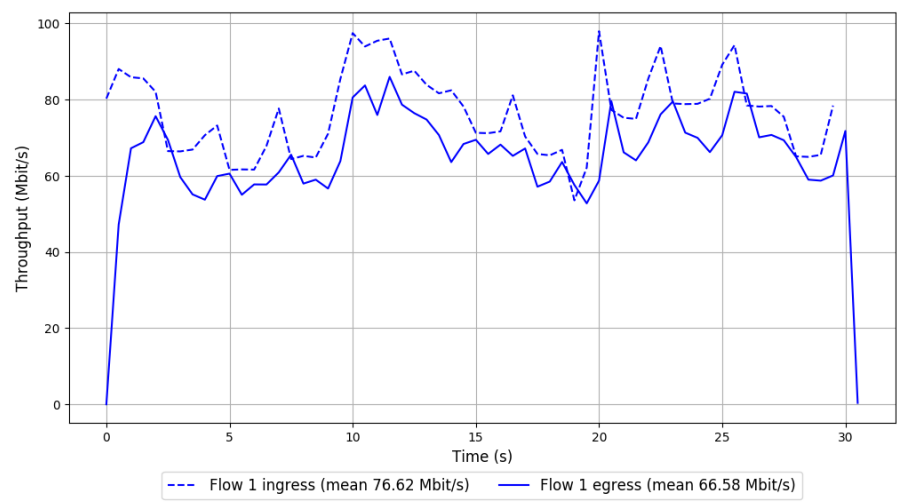
-- Flow 1:

Average throughput: 66.58 Mbit/s

95th percentile per-packet one-way delay: 16.569 ms

Loss rate: 13.12%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-31 04:28:51

End at: 2018-08-31 04:29:21

Local clock offset: -3.14 ms

Remote clock offset: -3.194 ms

# Below is generated by plot.py at 2018-08-31 04:31:35

# Datalink statistics

-- Total of 1 flow:

Average throughput: 86.35 Mbit/s

95th percentile per-packet one-way delay: 12.930 ms

Loss rate: 8.34%

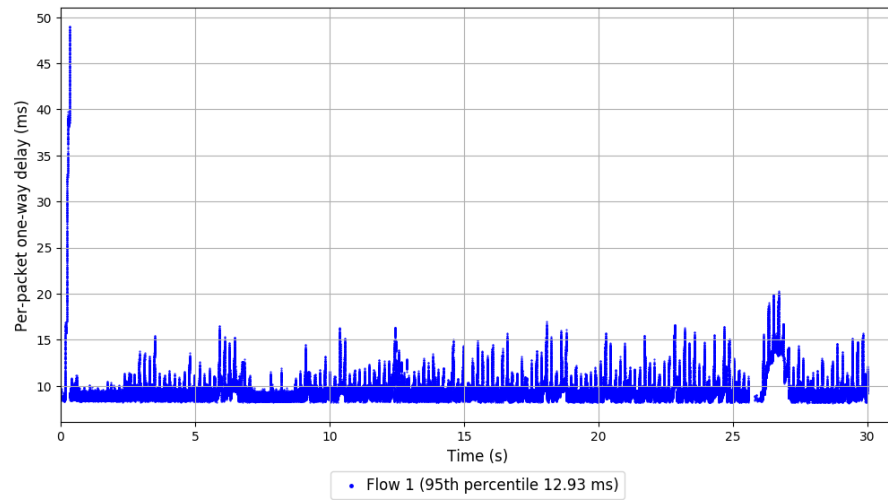
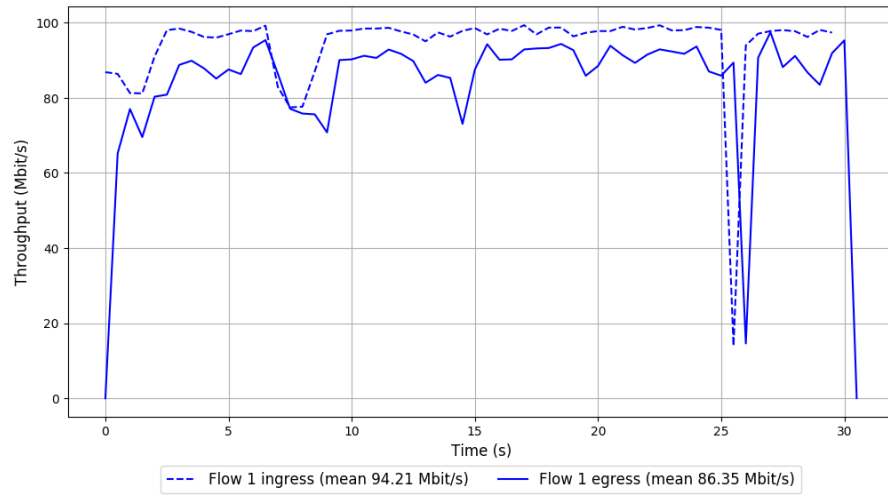
-- Flow 1:

Average throughput: 86.35 Mbit/s

95th percentile per-packet one-way delay: 12.930 ms

Loss rate: 8.34%

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

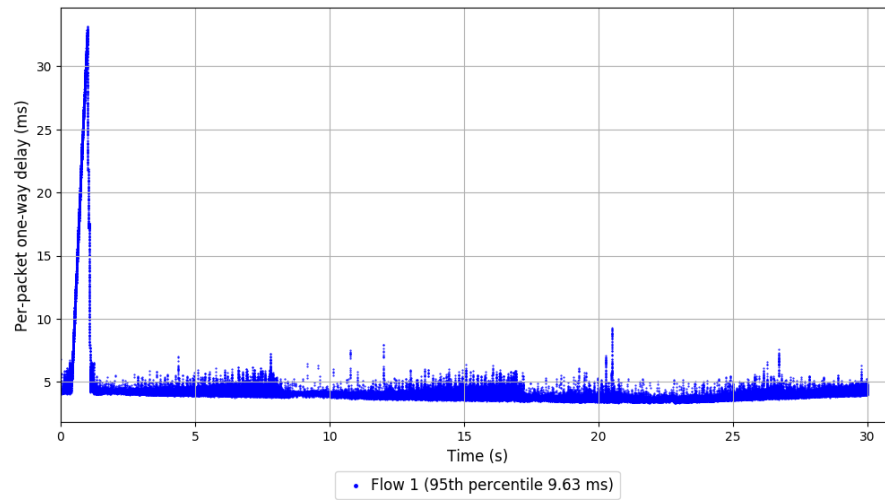
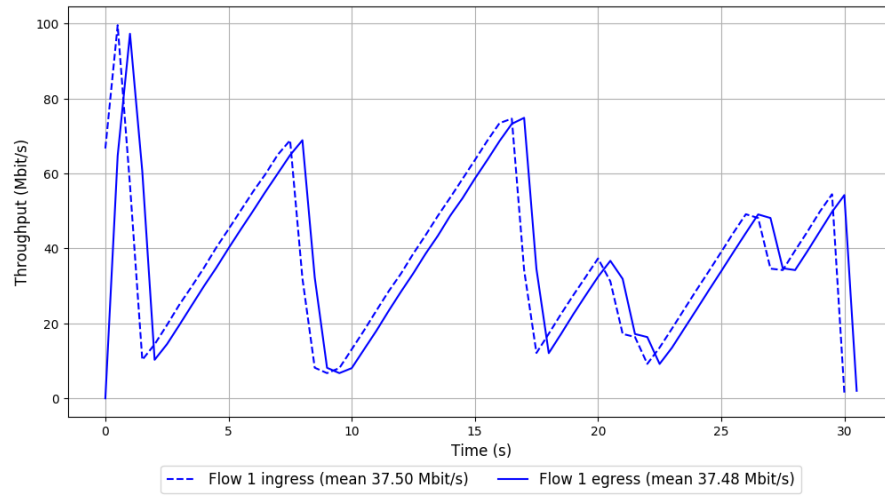


Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 04:17:51  
End at: 2018-08-31 04:18:22  
Local clock offset: 0.624 ms  
Remote clock offset: -3.649 ms

# Below is generated by plot.py at 2018-08-31 04:31:35  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 37.48 Mbit/s  
95th percentile per-packet one-way delay: 9.633 ms  
Loss rate: 0.05%  
-- Flow 1:  
Average throughput: 37.48 Mbit/s  
95th percentile per-packet one-way delay: 9.633 ms  
Loss rate: 0.05%

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

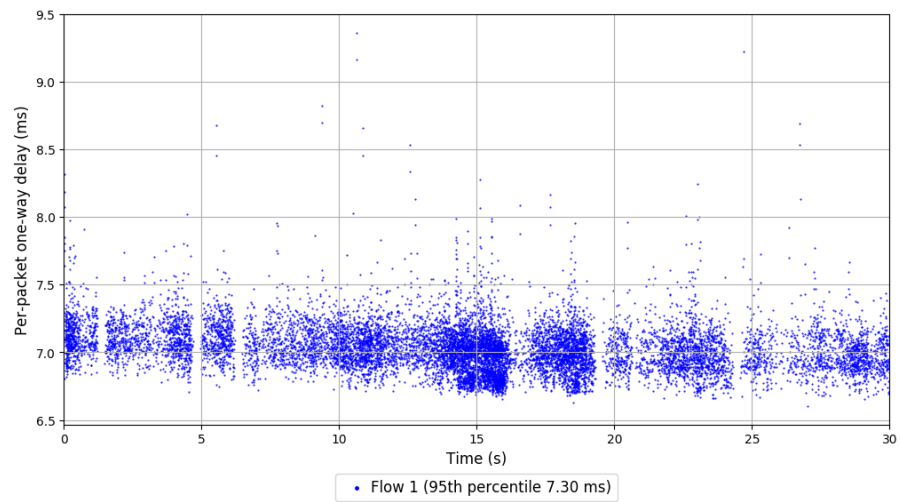
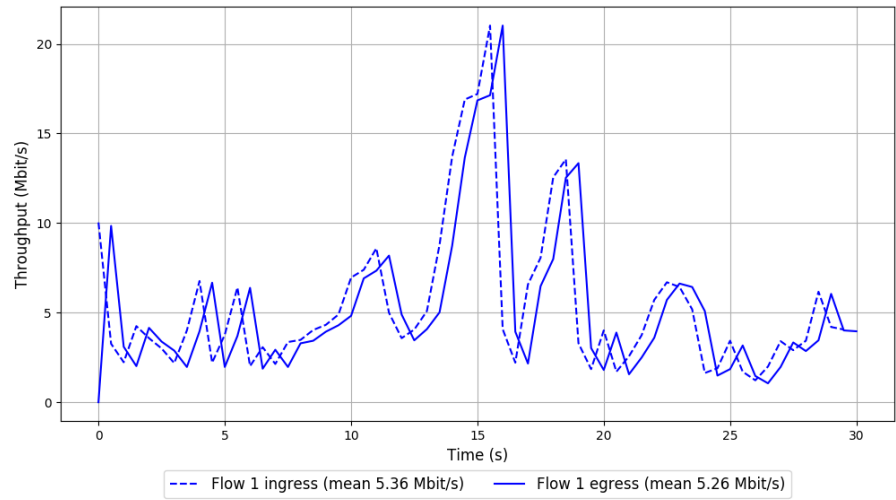


Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 04:22:18  
End at: 2018-08-31 04:22:48  
Local clock offset: -0.907 ms  
Remote clock offset: -3.736 ms

# Below is generated by plot.py at 2018-08-31 04:31:35  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 5.26 Mbit/s  
95th percentile per-packet one-way delay: 7.304 ms  
Loss rate: 1.99%  
-- Flow 1:  
Average throughput: 5.26 Mbit/s  
95th percentile per-packet one-way delay: 7.304 ms  
Loss rate: 1.99%

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



Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 04:26:42

End at: 2018-08-31 04:27:12

Local clock offset: -0.696 ms

Remote clock offset: -3.13 ms

# Below is generated by plot.py at 2018-08-31 04:31:35

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.98 Mbit/s

95th percentile per-packet one-way delay: 7.034 ms

Loss rate: 1.68%

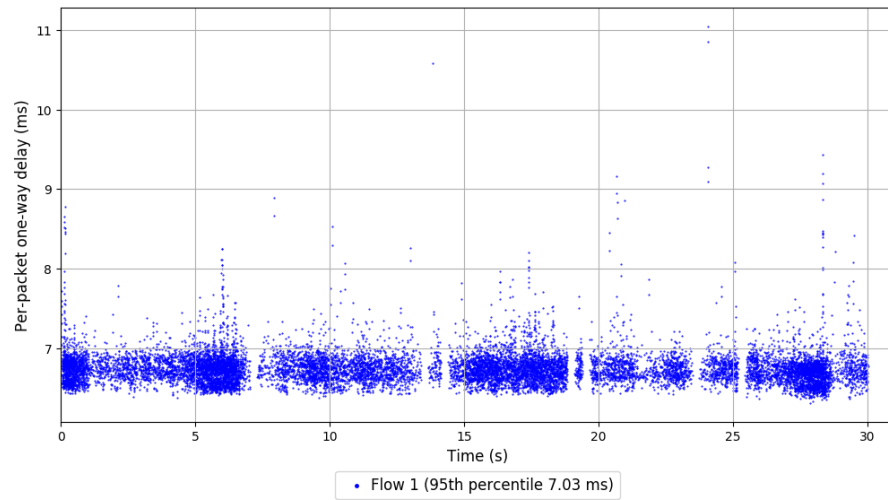
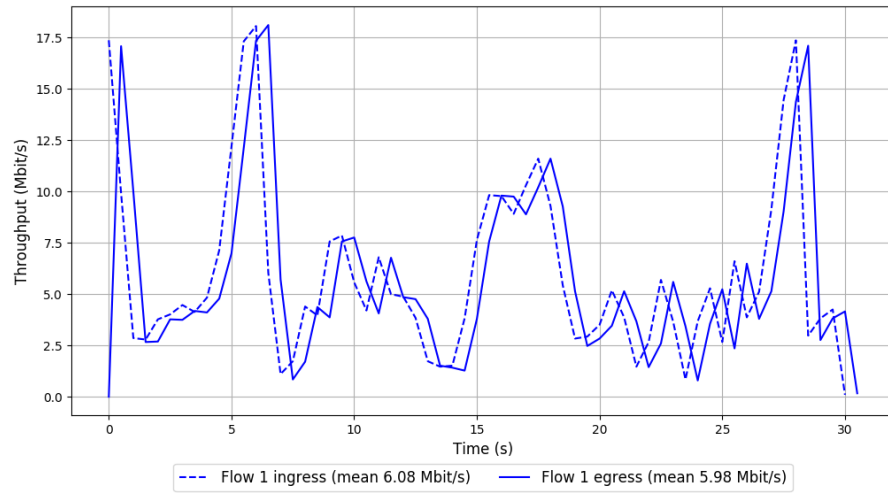
-- Flow 1:

Average throughput: 5.98 Mbit/s

95th percentile per-packet one-way delay: 7.034 ms

Loss rate: 1.68%

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

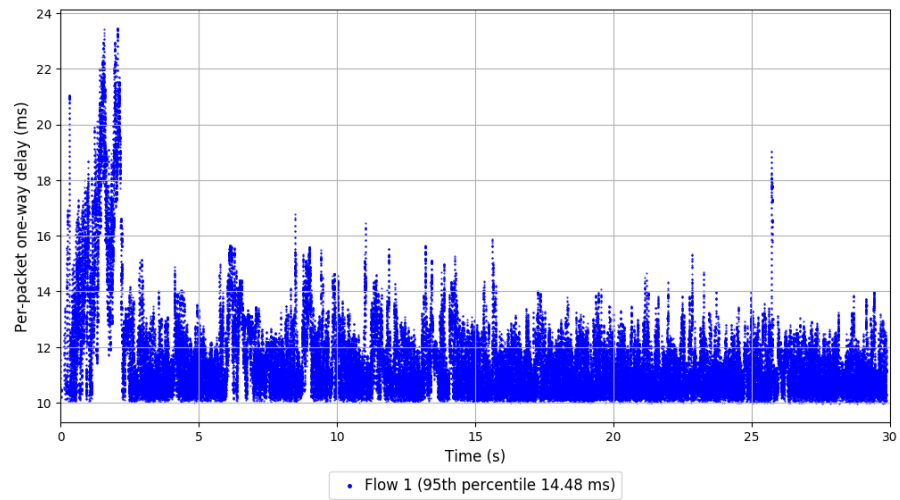
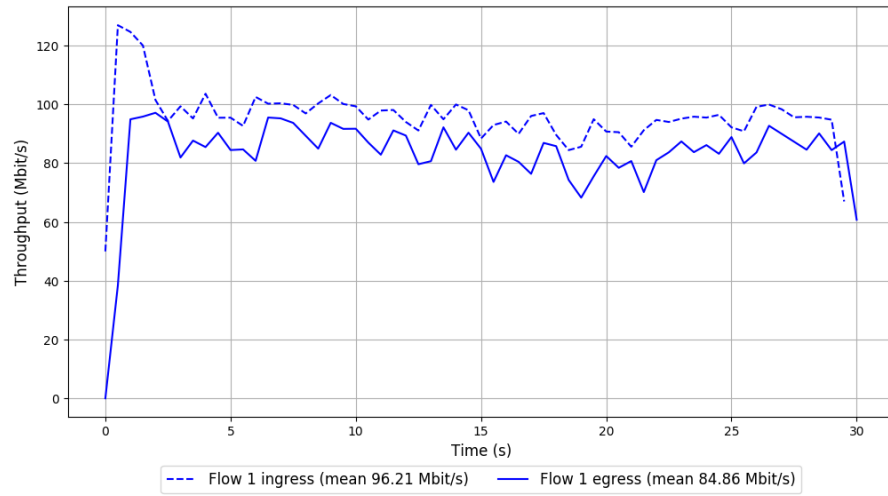


```
Run 1: Statistics of Indigo

Start at: 2018-08-31 04:21:09
End at: 2018-08-31 04:21:39
Local clock offset: -3.142 ms
Remote clock offset: -2.912 ms

# Below is generated by plot.py at 2018-08-31 04:31:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 84.86 Mbit/s
95th percentile per-packet one-way delay: 14.477 ms
Loss rate: 11.80%
-- Flow 1:
Average throughput: 84.86 Mbit/s
95th percentile per-packet one-way delay: 14.477 ms
Loss rate: 11.80%
```

# Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-31 04:25:34

End at: 2018-08-31 04:26:04

Local clock offset: -1.436 ms

Remote clock offset: -3.828 ms

# Below is generated by plot.py at 2018-08-31 04:31:35

# Datalink statistics

-- Total of 1 flow:

Average throughput: 75.85 Mbit/s

95th percentile per-packet one-way delay: 8.821 ms

Loss rate: 11.30%

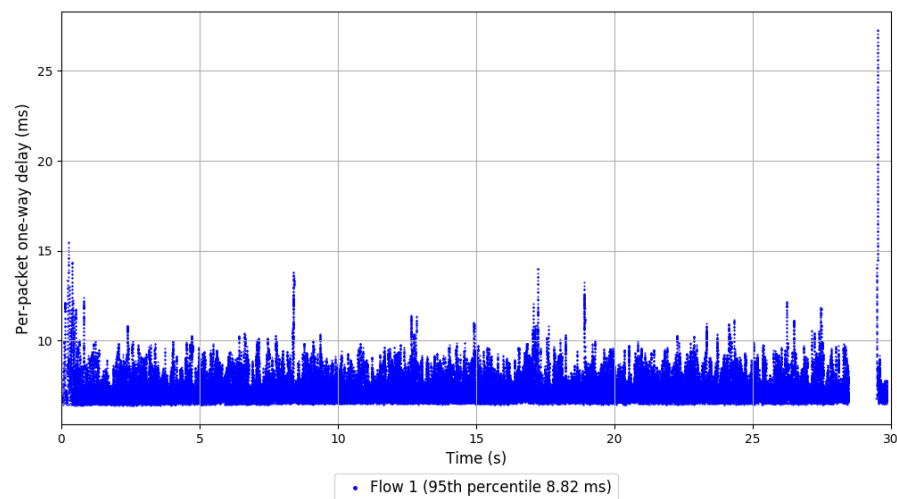
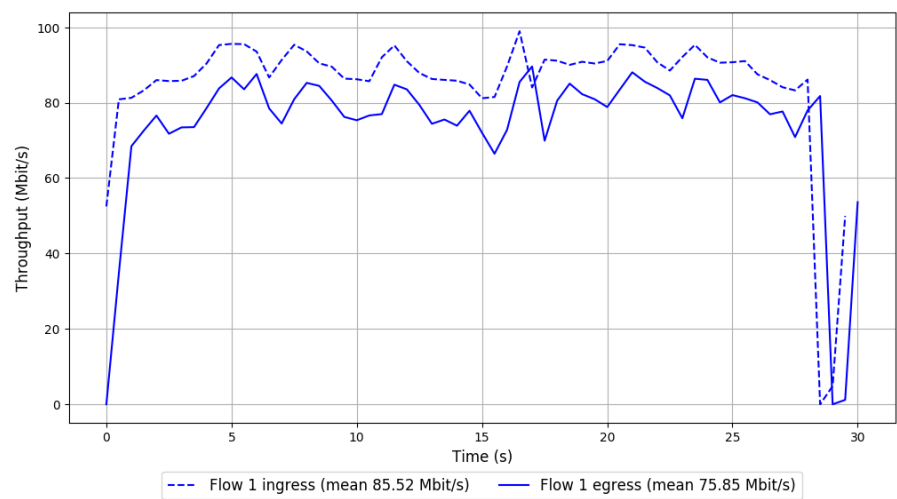
-- Flow 1:

Average throughput: 75.85 Mbit/s

95th percentile per-packet one-way delay: 8.821 ms

Loss rate: 11.30%

Run 2: Report of Indigo — Data Link

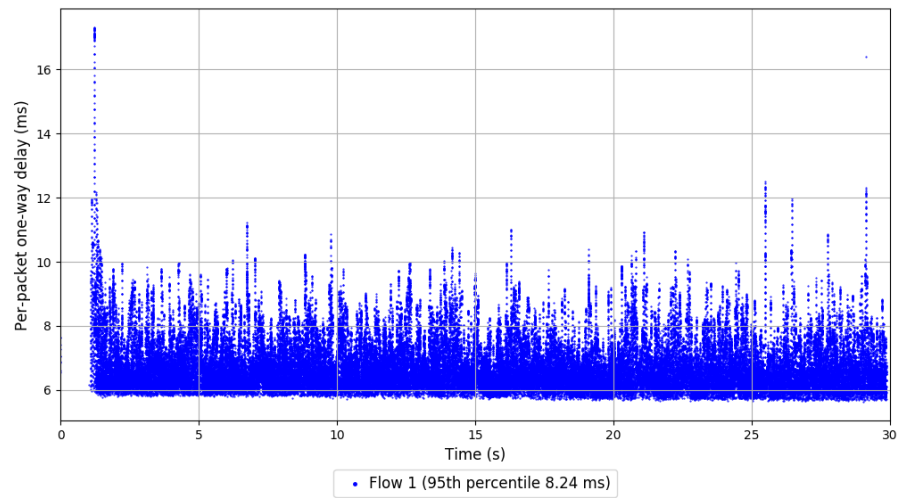
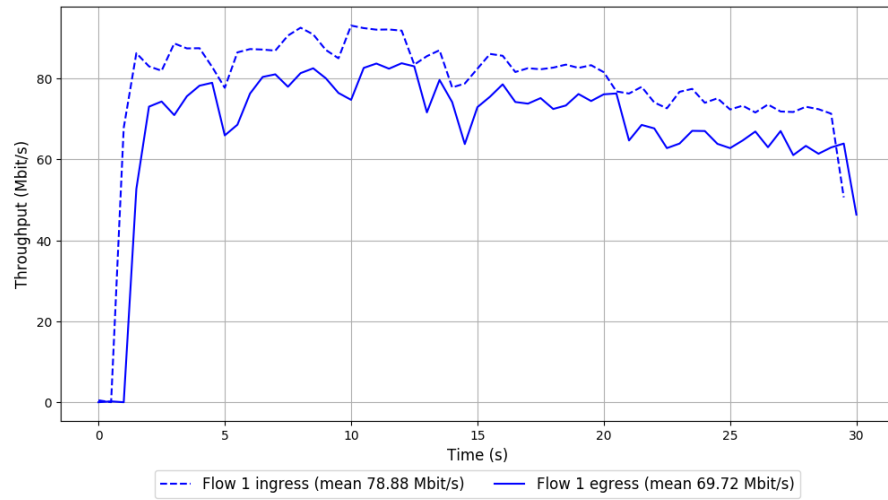


Run 3: Statistics of Indigo

Start at: 2018-08-31 04:30:00  
End at: 2018-08-31 04:30:30  
Local clock offset: -2.727 ms  
Remote clock offset: -4.889 ms

# Below is generated by plot.py at 2018-08-31 04:31:35  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 69.72 Mbit/s  
95th percentile per-packet one-way delay: 8.238 ms  
Loss rate: 11.61%  
-- Flow 1:  
Average throughput: 69.72 Mbit/s  
95th percentile per-packet one-way delay: 8.238 ms  
Loss rate: 11.61%

### Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

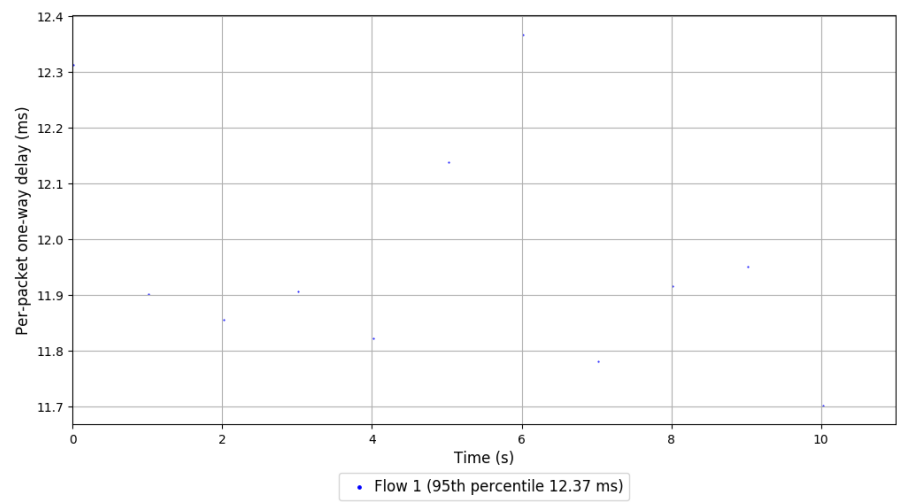
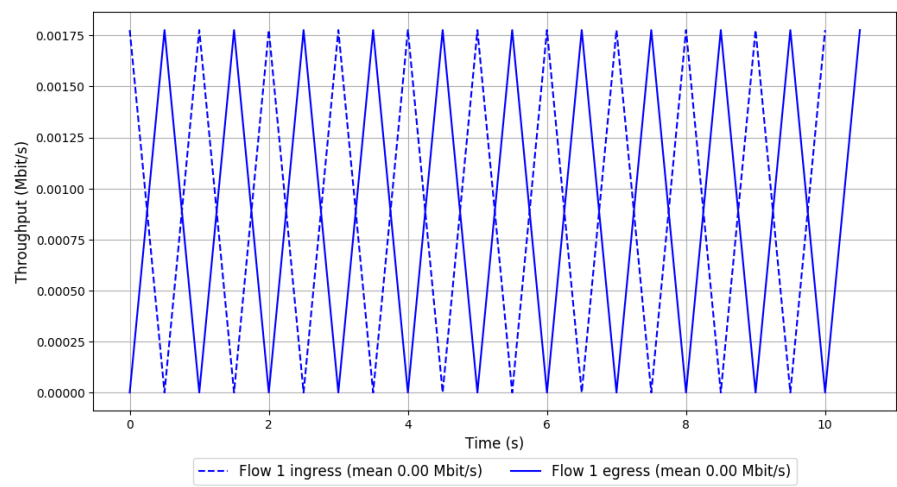
Start at: 2018-08-31 04:18:57

End at: 2018-08-31 04:19:27

Local clock offset: -0.434 ms

Remote clock offset: -3.871 ms

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

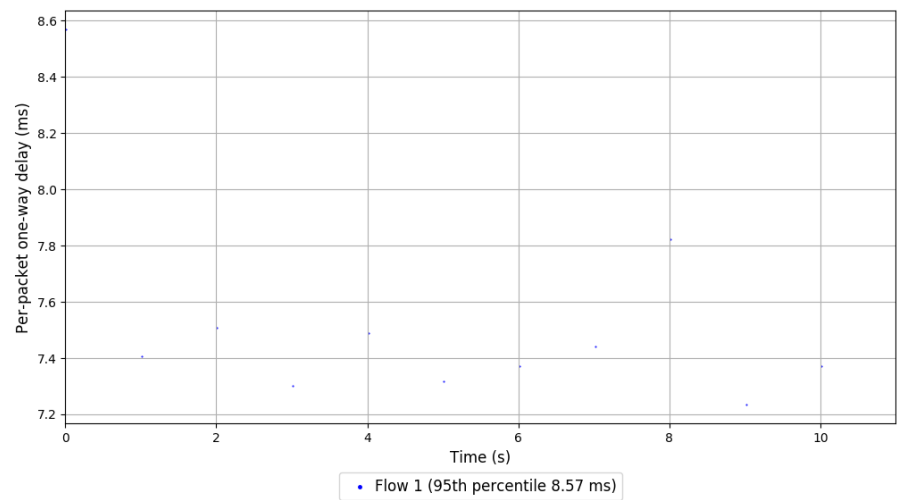
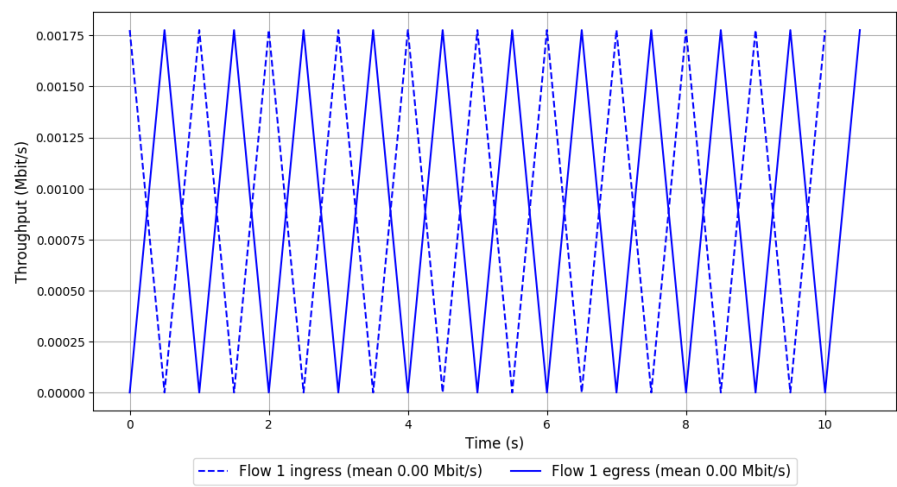
Start at: 2018-08-31 04:23:22

End at: 2018-08-31 04:23:52

Local clock offset: -1.966 ms

Remote clock offset: -3.76 ms

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-08-31 04:27:47

End at: 2018-08-31 04:28:17

Local clock offset: -1.667 ms

Remote clock offset: -4.317 ms

Run 3: Report of Muses-25 — Data Link

