

## Pantheon Report

Generated at 2018-09-05 03:18:20 (UTC).

Data path: Brazil on **p4p1** (*remote*) → AWS Brazil 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 **gps.ntp.br** and have been applied to correct the timestamps in logs.

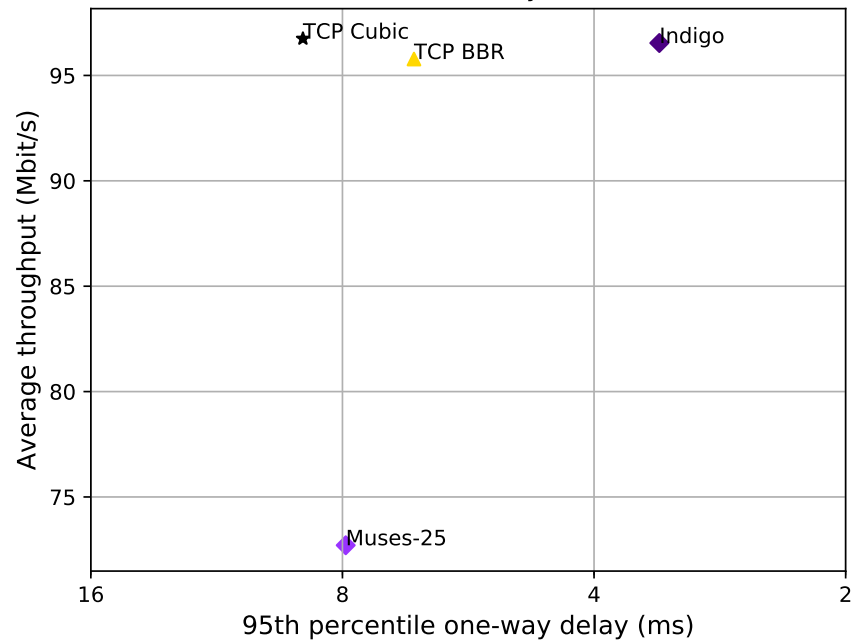
### System info:

```
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
```

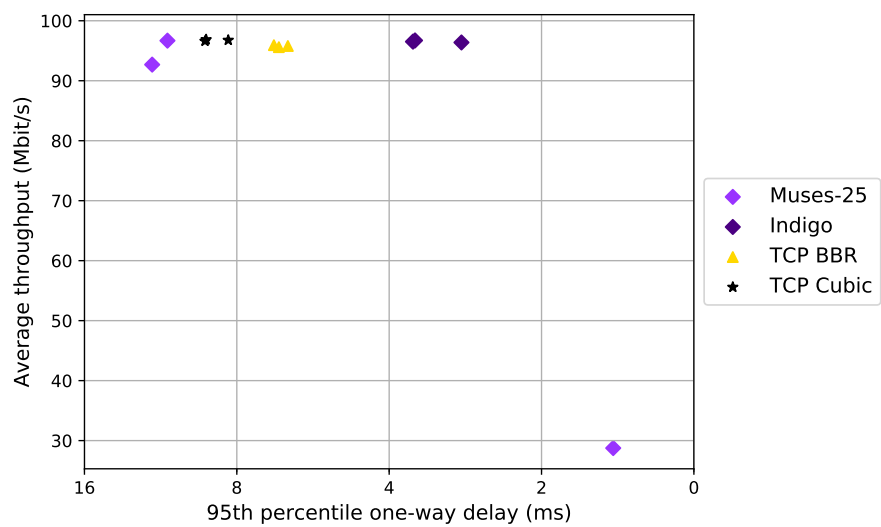
### Git summary:

```
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 @ cbfce6db5ff5740d4fe1771f813cd646339e1952
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 Brazil to AWS Brazil 1, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from Brazil to AWS Brazil 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      | 95.78                            | 6.57                                | 0.02                         |
| TCP Cubic | 3      | 96.74                            | 8.92                                | 0.06                         |
| Indigo    | 3      | 96.54                            | 3.34                                | 0.01                         |
| Muses-25  | 3      | 72.71                            | 7.93                                | 0.02                         |

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 03:06:49

End at: 2018-09-05 03:07:19

Local clock offset: 8.398 ms

Remote clock offset: 0.24 ms

# Below is generated by plot.py at 2018-09-05 03:17:50

# Datalink statistics

-- Total of 1 flow:

Average throughput: 95.94 Mbit/s

95th percentile per-packet one-way delay: 6.758 ms

Loss rate: 0.02%

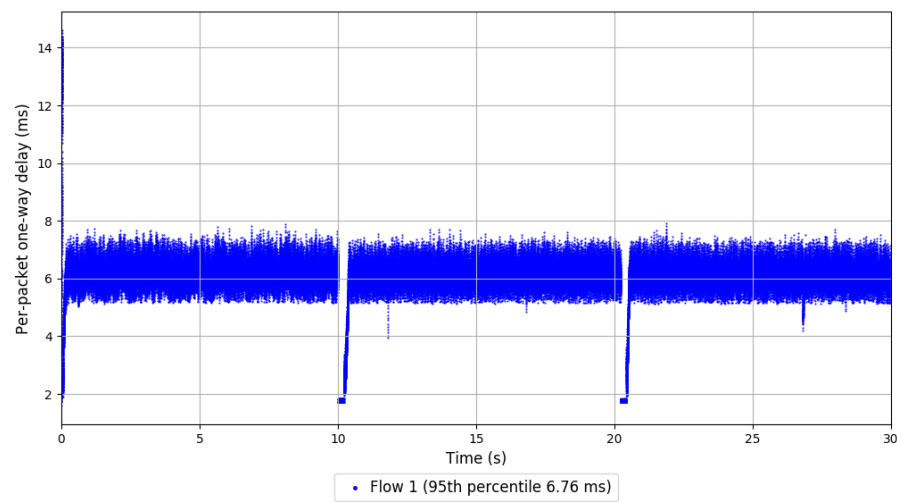
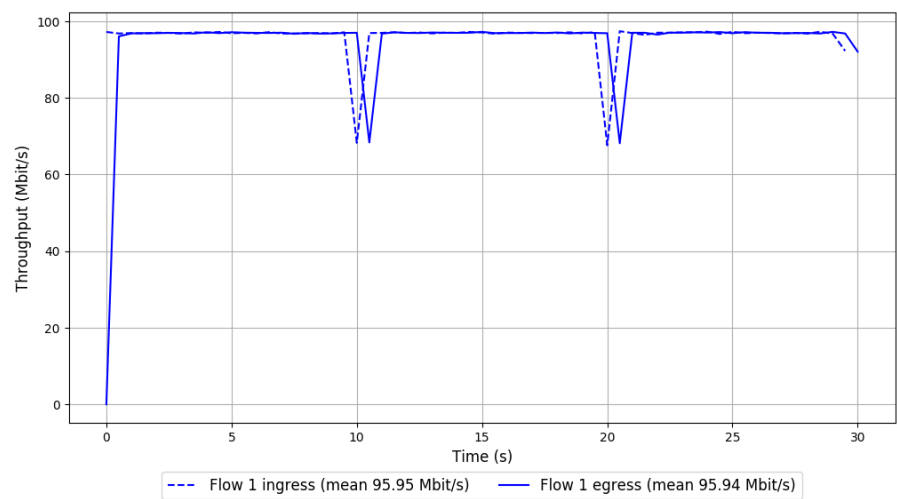
-- Flow 1:

Average throughput: 95.94 Mbit/s

95th percentile per-packet one-way delay: 6.758 ms

Loss rate: 0.02%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 03:11:19

End at: 2018-09-05 03:11:49

Local clock offset: 8.775 ms

Remote clock offset: 0.361 ms

# Below is generated by plot.py at 2018-09-05 03:17:50

# Datalink statistics

-- Total of 1 flow:

Average throughput: 95.80 Mbit/s

95th percentile per-packet one-way delay: 6.342 ms

Loss rate: 0.02%

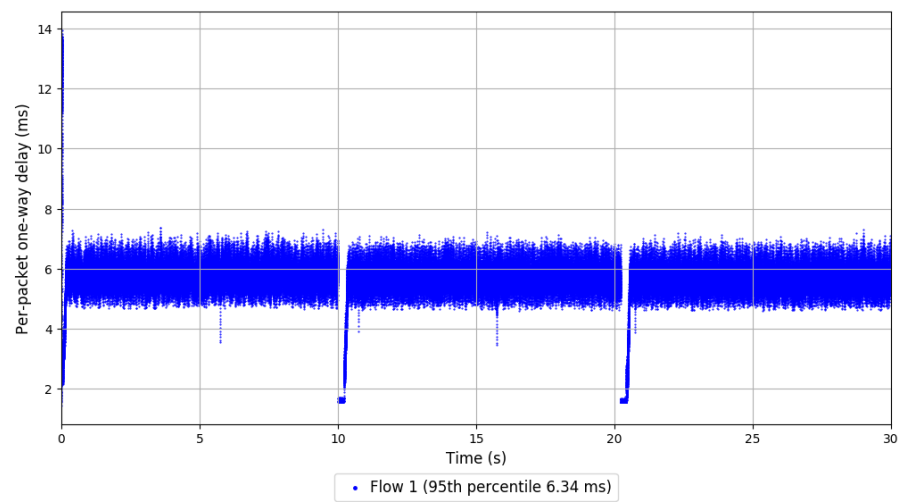
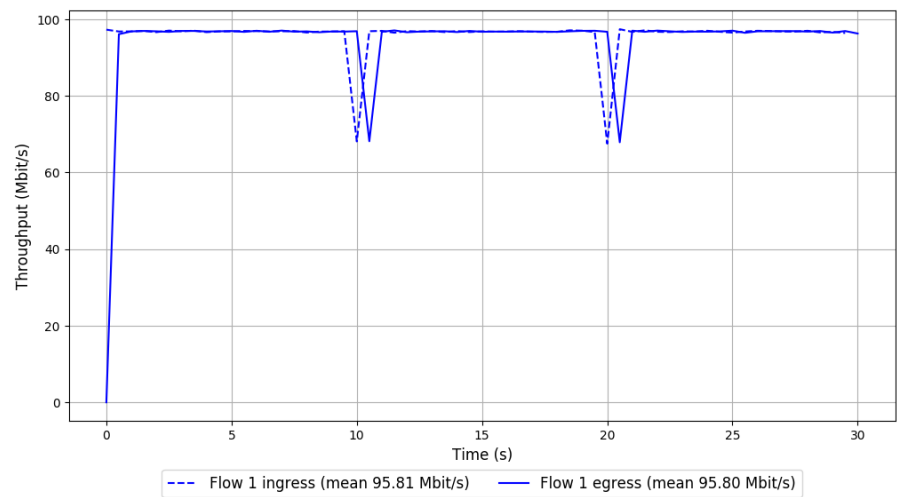
-- Flow 1:

Average throughput: 95.80 Mbit/s

95th percentile per-packet one-way delay: 6.342 ms

Loss rate: 0.02%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-05 03:15:52

End at: 2018-09-05 03:16:22

Local clock offset: 9.025 ms

Remote clock offset: 0.372 ms

# Below is generated by plot.py at 2018-09-05 03:17:50

# Datalink statistics

-- Total of 1 flow:

Average throughput: 95.60 Mbit/s

95th percentile per-packet one-way delay: 6.607 ms

Loss rate: 0.02%

-- Flow 1:

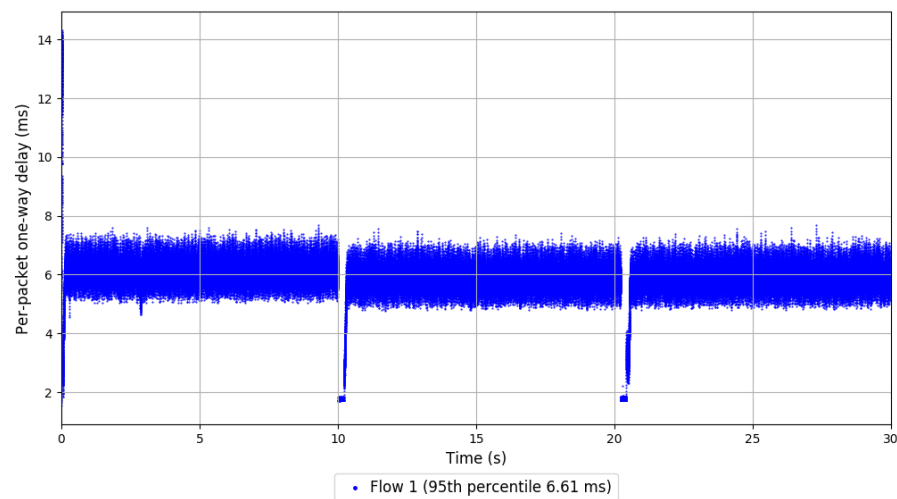
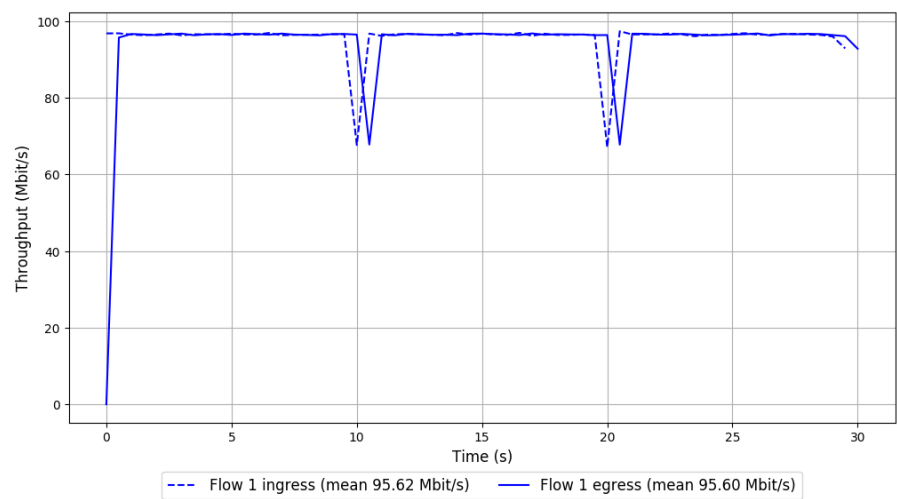
Average throughput: 95.60 Mbit/s

95th percentile per-packet one-way delay: 6.607 ms

Loss rate: 0.02%



Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 03:05:41

End at: 2018-09-05 03:06:11

Local clock offset: 8.311 ms

Remote clock offset: 0.254 ms

# Below is generated by plot.py at 2018-09-05 03:17:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.86 Mbit/s

95th percentile per-packet one-way delay: 9.198 ms

Loss rate: 0.06%

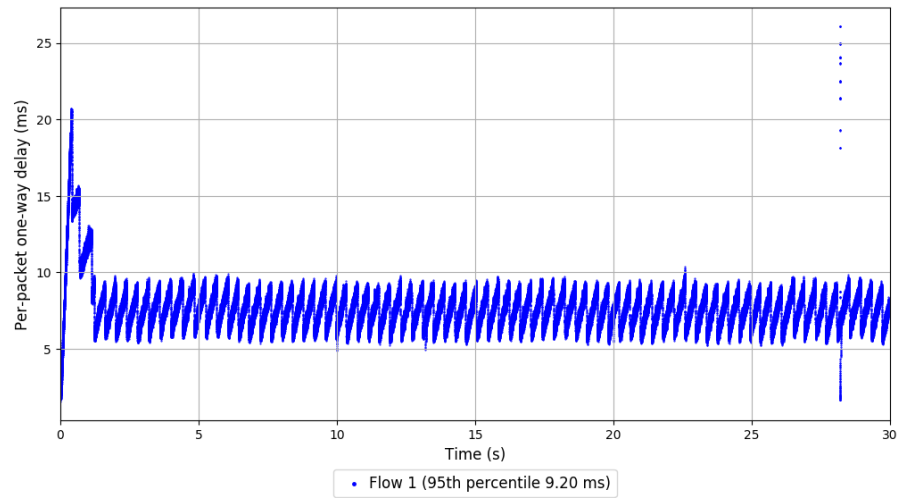
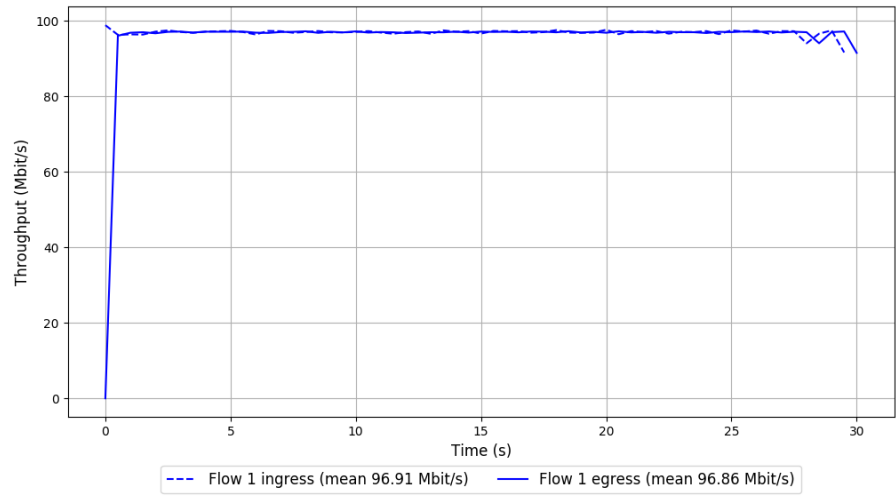
-- Flow 1:

Average throughput: 96.86 Mbit/s

95th percentile per-packet one-way delay: 9.198 ms

Loss rate: 0.06%

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



Run 2: Statistics of TCP Cubic

Start at: 2018-09-05 03:10:11

End at: 2018-09-05 03:10:41

Local clock offset: 7.903 ms

Remote clock offset: 0.355 ms

# Below is generated by plot.py at 2018-09-05 03:17:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.77 Mbit/s

95th percentile per-packet one-way delay: 8.317 ms

Loss rate: 0.06%

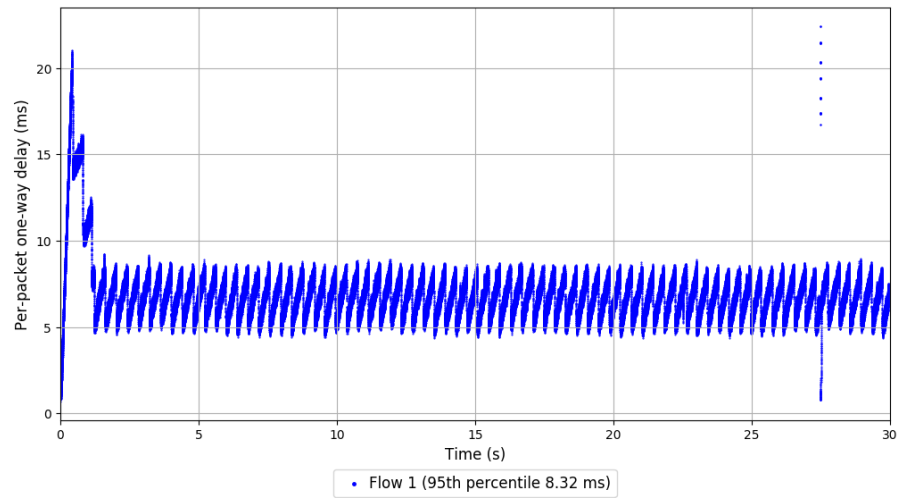
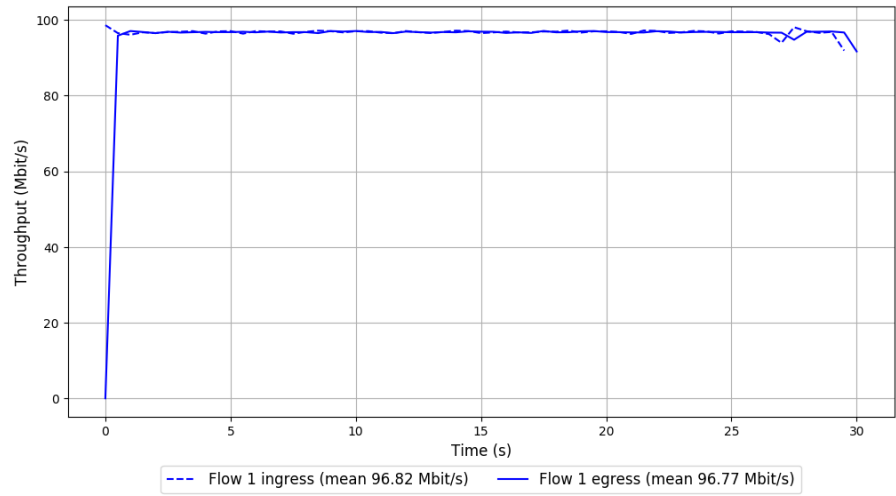
-- Flow 1:

Average throughput: 96.77 Mbit/s

95th percentile per-packet one-way delay: 8.317 ms

Loss rate: 0.06%

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



Run 3: Statistics of TCP Cubic

Start at: 2018-09-05 03:14:44

End at: 2018-09-05 03:15:14

Local clock offset: 9.155 ms

Remote clock offset: 0.386 ms

# Below is generated by plot.py at 2018-09-05 03:17:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.60 Mbit/s

95th percentile per-packet one-way delay: 9.246 ms

Loss rate: 0.06%

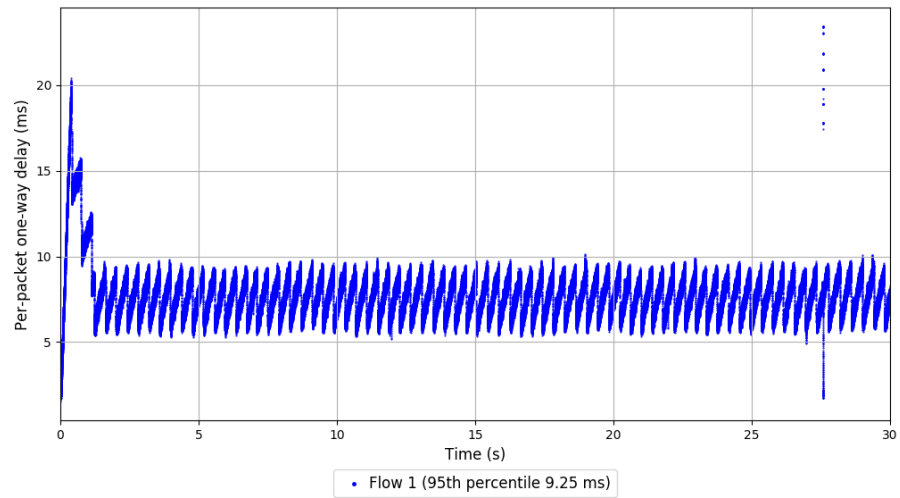
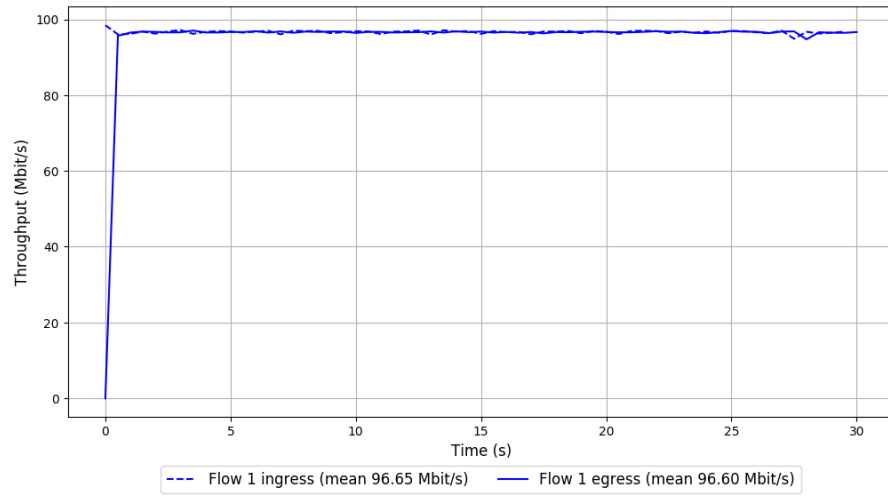
-- Flow 1:

Average throughput: 96.60 Mbit/s

95th percentile per-packet one-way delay: 9.246 ms

Loss rate: 0.06%

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



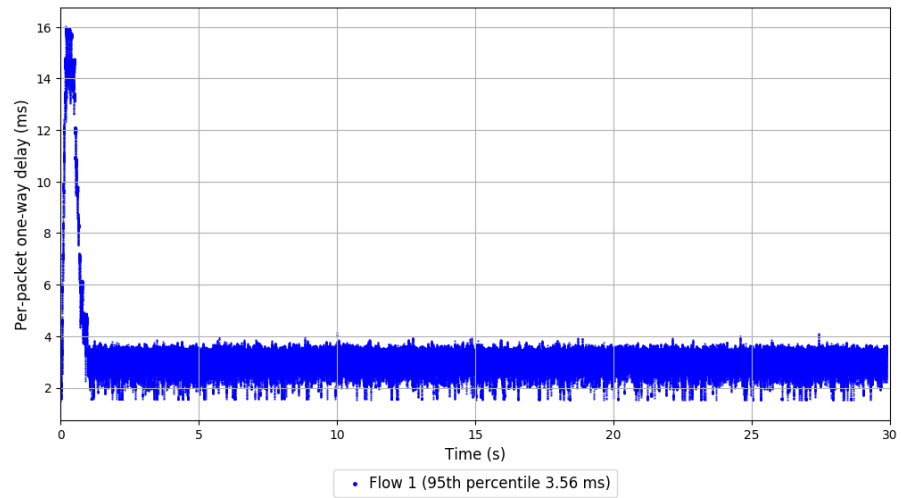
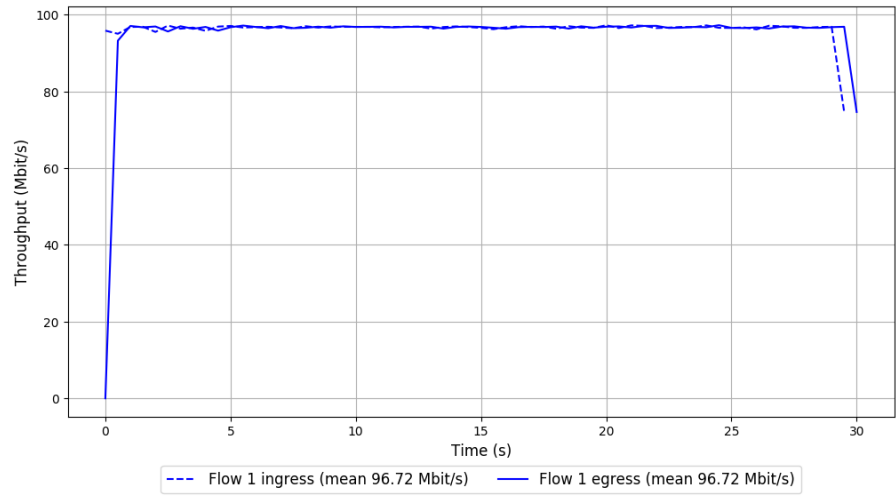
```
Run 1: Statistics of Indigo

Start at: 2018-09-05 03:04:31
End at: 2018-09-05 03:05:01
Local clock offset: 8.19 ms
Remote clock offset: 0.321 ms

# Below is generated by plot.py at 2018-09-05 03:17:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 96.72 Mbit/s
95th percentile per-packet one-way delay: 3.556 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 96.72 Mbit/s
95th percentile per-packet one-way delay: 3.556 ms
Loss rate: 0.01%
```



## Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-05 03:09:02

End at: 2018-09-05 03:09:32

Local clock offset: 8.506 ms

Remote clock offset: 0.325 ms

# Below is generated by plot.py at 2018-09-05 03:17:53

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.52 Mbit/s

95th percentile per-packet one-way delay: 3.590 ms

Loss rate: 0.01%

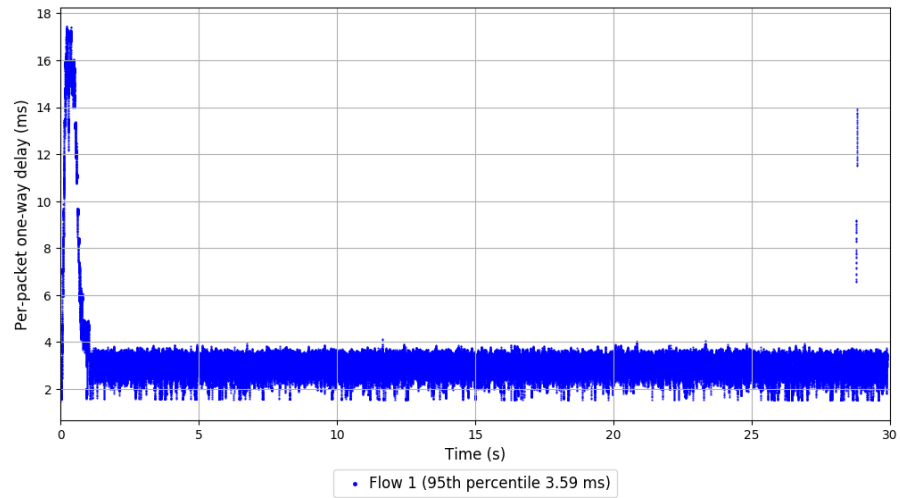
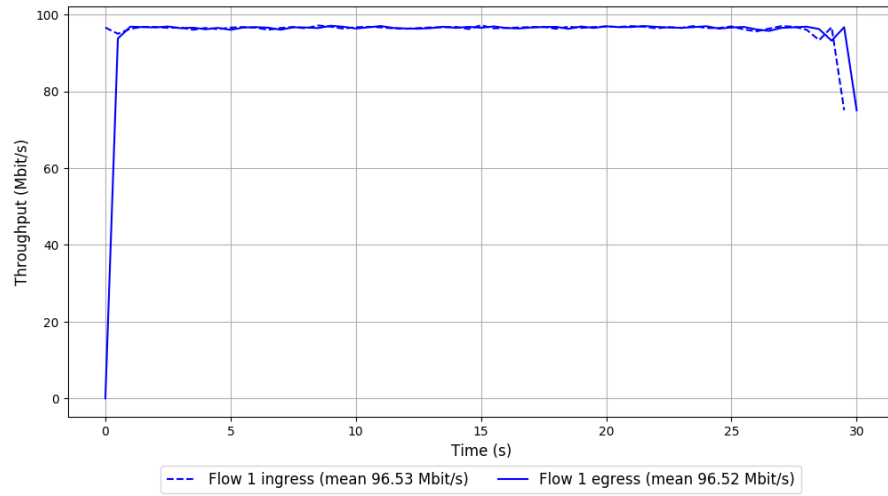
-- Flow 1:

Average throughput: 96.52 Mbit/s

95th percentile per-packet one-way delay: 3.590 ms

Loss rate: 0.01%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-05 03:13:35

End at: 2018-09-05 03:14:05

Local clock offset: 8.268 ms

Remote clock offset: 0.345 ms

# Below is generated by plot.py at 2018-09-05 03:18:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.38 Mbit/s

95th percentile per-packet one-way delay: 2.879 ms

Loss rate: 0.01%

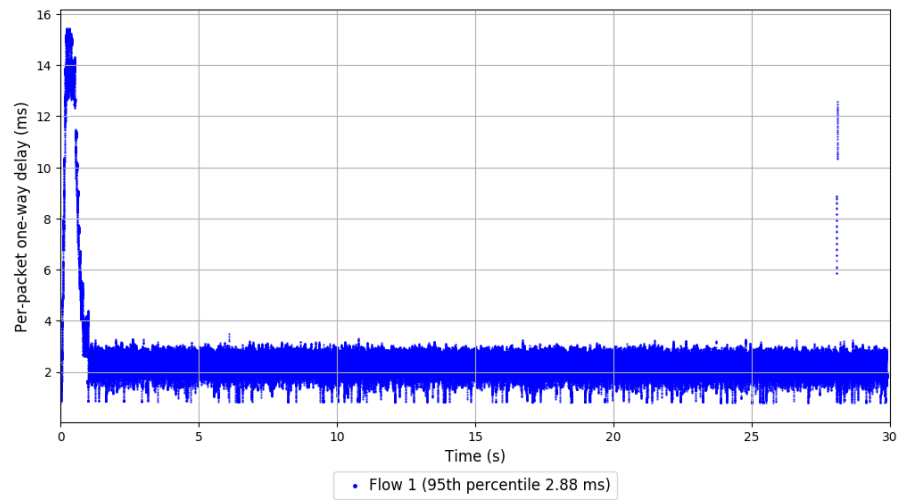
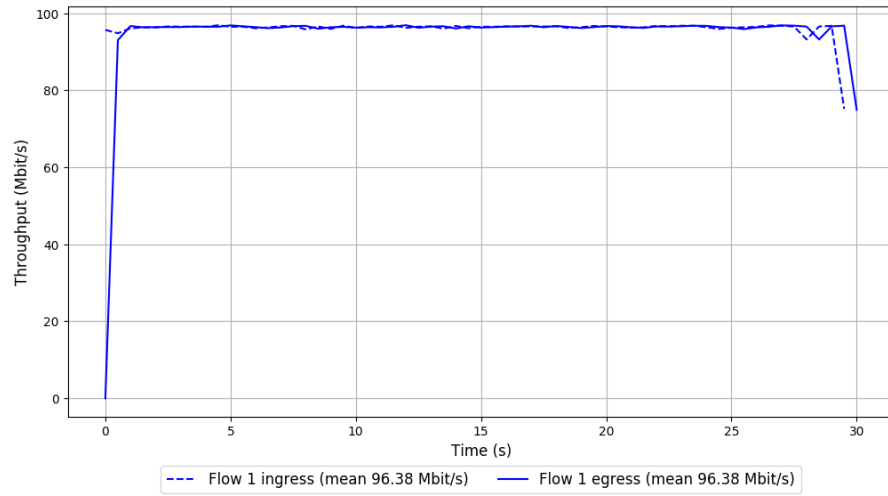
-- Flow 1:

Average throughput: 96.38 Mbit/s

95th percentile per-packet one-way delay: 2.879 ms

Loss rate: 0.01%

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



Run 1: Statistics of Muses-25

Start at: 2018-09-05 03:03:23

End at: 2018-09-05 03:03:53

Local clock offset: 8.234 ms

Remote clock offset: 0.307 ms

# Below is generated by plot.py at 2018-09-05 03:18:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 92.69 Mbit/s

95th percentile per-packet one-way delay: 11.758 ms

Loss rate: 0.00%

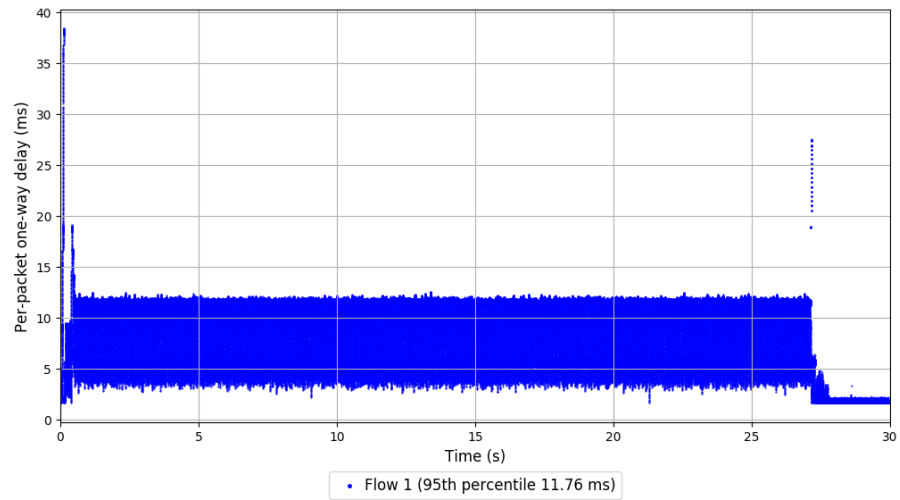
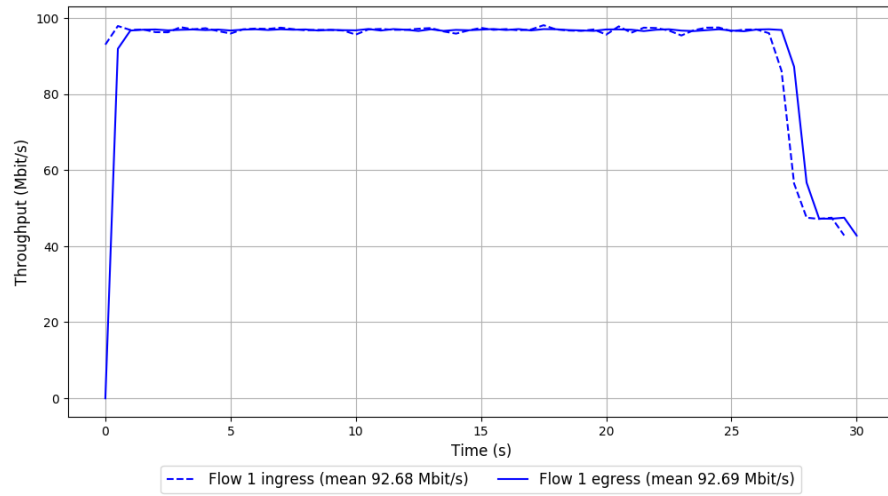
-- Flow 1:

Average throughput: 92.69 Mbit/s

95th percentile per-packet one-way delay: 11.758 ms

Loss rate: 0.00%

# Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-05 03:07:57

End at: 2018-09-05 03:08:27

Local clock offset: 7.713 ms

Remote clock offset: 0.337 ms

# Below is generated by plot.py at 2018-09-05 03:18:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 28.75 Mbit/s

95th percentile per-packet one-way delay: 1.059 ms

Loss rate: 0.01%

-- Flow 1:

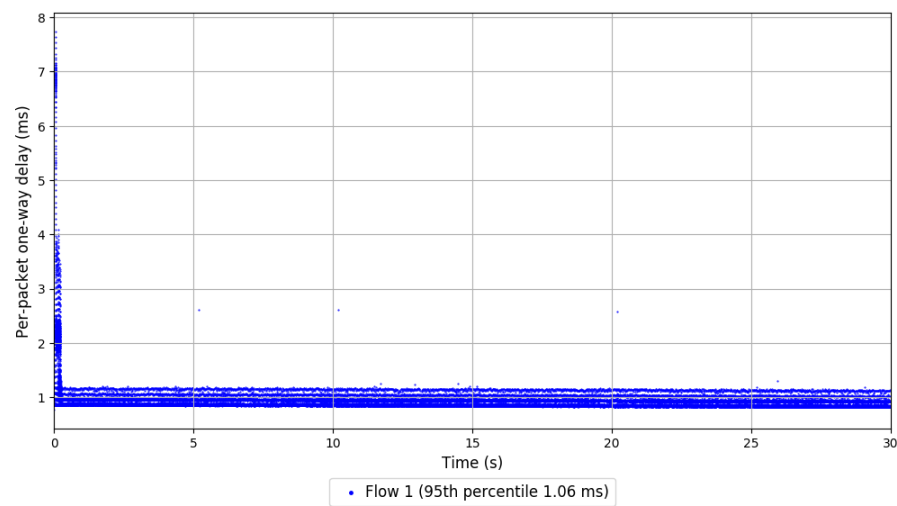
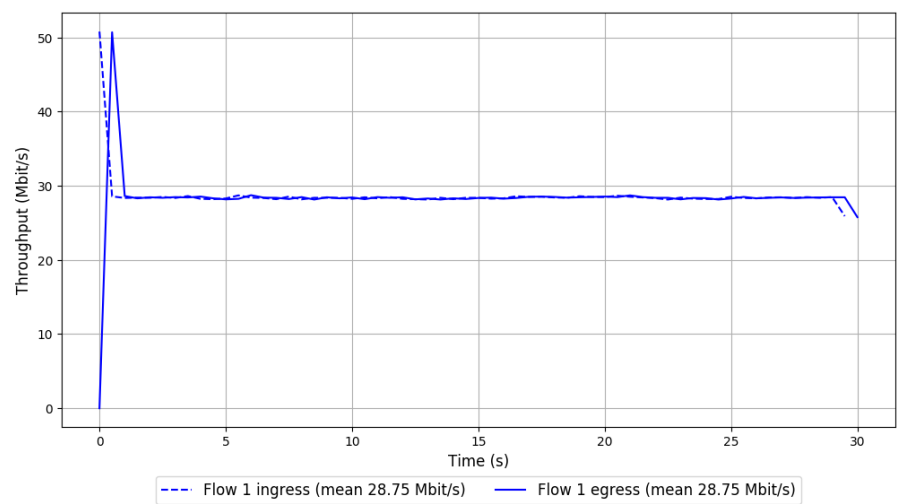
Average throughput: 28.75 Mbit/s

95th percentile per-packet one-way delay: 1.059 ms

Loss rate: 0.01%



Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-09-05 03:12:27

End at: 2018-09-05 03:12:57

Local clock offset: 8.15 ms

Remote clock offset: 0.35 ms

# Below is generated by plot.py at 2018-09-05 03:18:19

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.68 Mbit/s

95th percentile per-packet one-way delay: 10.968 ms

Loss rate: 0.04%

-- Flow 1:

Average throughput: 96.68 Mbit/s

95th percentile per-packet one-way delay: 10.968 ms

Loss rate: 0.04%

### Run 3: Report of Muses-25 — Data Link

