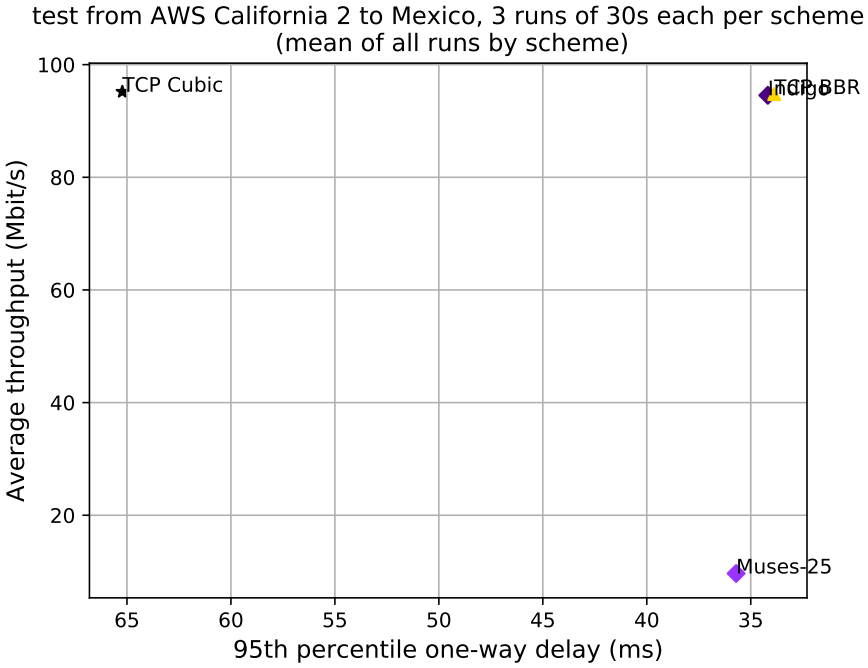
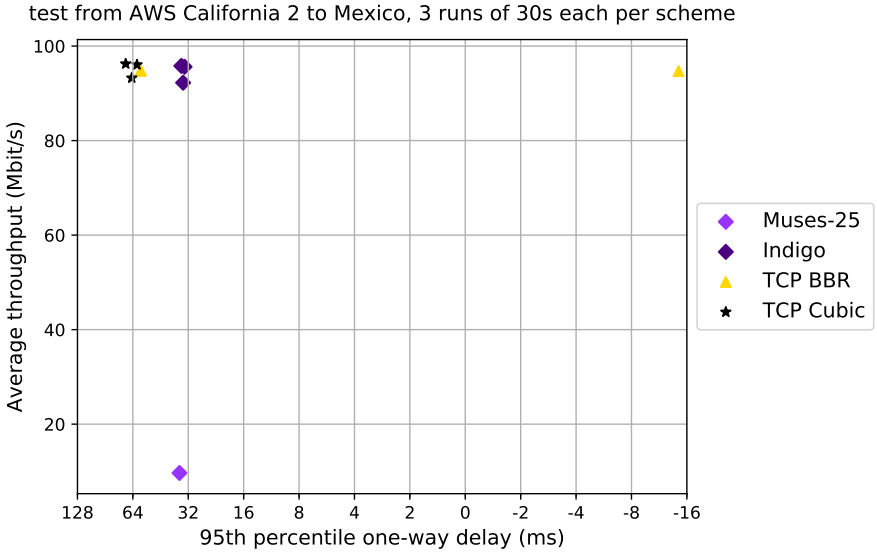
Pantheon Report

Generated at 2018-08-31 08:41:38 (UTC).
Data path: AWS California 2 on `ens5` (*local*) →Mexico 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 `time.stanford.edu` 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 @ e3c5aa19ca94c3066828fb83f16a8fb6b2731e7a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b59e0d118c50af3579569c462d33045741c85981
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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 California 2 to Mexico, 3 runs of 30s each per scheme
(mean of all runs by scheme)
TCP Cubic
Muses-25
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
100
80
60
40
20
65
60
55
50
45
40
35


test from AWS California 2 to Mexico, 3 runs of 30s each per scheme
Muses-25
Indigo
TCP BBR
TCP Cubic
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
100
80
60
40
20
128
64
32
16
8
4
2
0
-2
-4
-8
-16

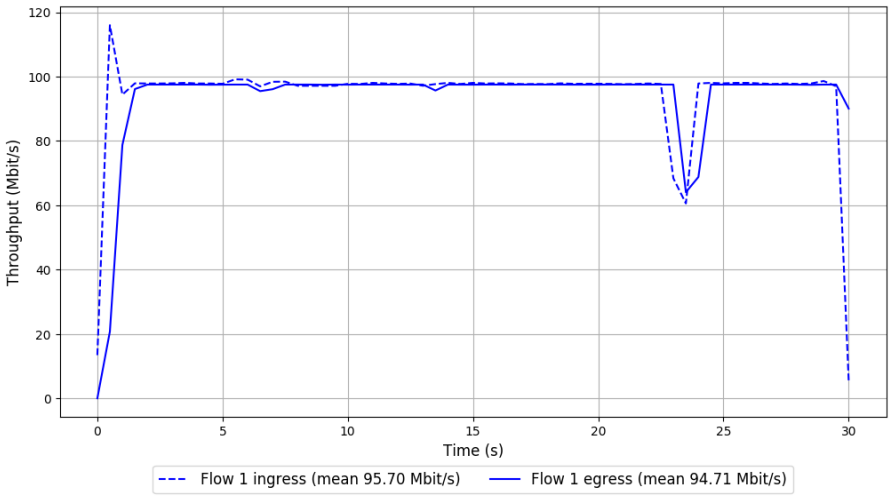
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	94.77	33.87	0.97
TCP Cubic	3	95.18	65.22	0.60
Indigo	3	94.56	34.18	0.01
Muses-25	1	9.66	35.70	49.15

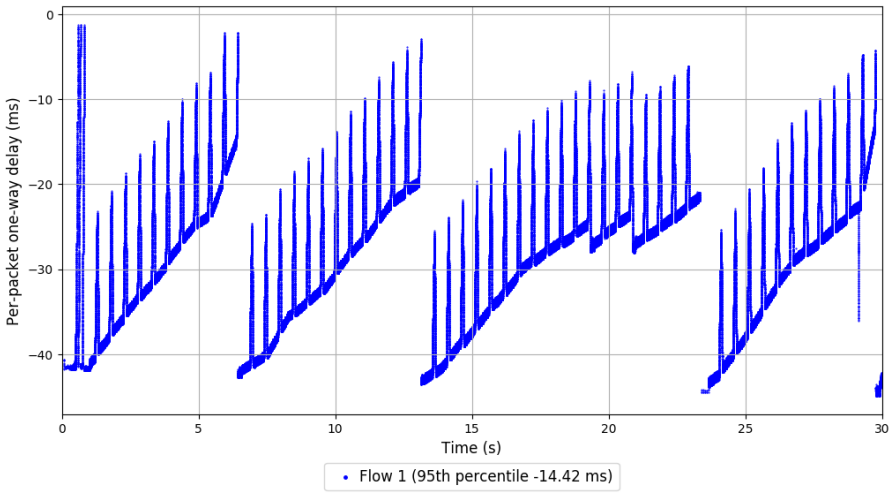
```
Run 1: Statistics of TCP BBR

Start at: 2018-08-31 08:25:14
End at: 2018-08-31 08:25:44
Local clock offset: 73.972 ms
Remote clock offset: -1.559 ms

# Below is generated by plot.py at 2018-08-31 08:41:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 94.71 Mbit/s
95th percentile per-packet one-way delay: -14.416 ms
Loss rate: 1.04%
-- Flow 1:
Average throughput: 94.71 Mbit/s
95th percentile per-packet one-way delay: -14.416 ms
Loss rate: 1.04%
```

Run 1: Report of TCP BBR — Data Link



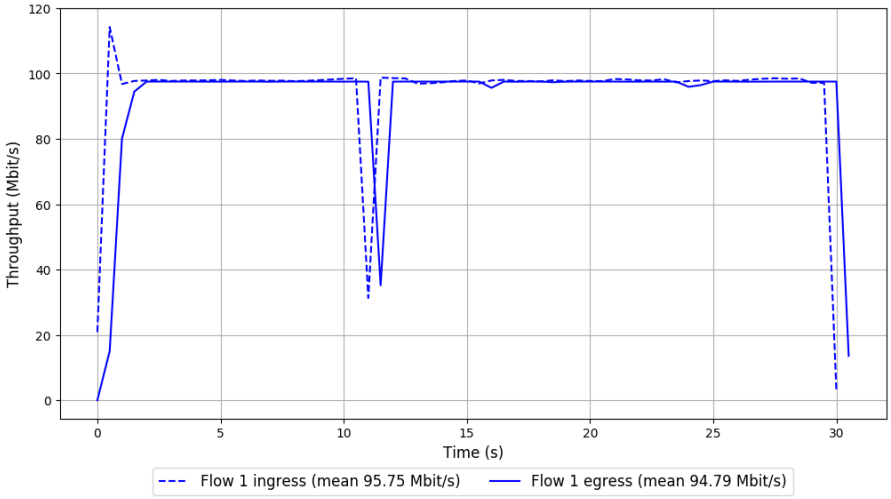


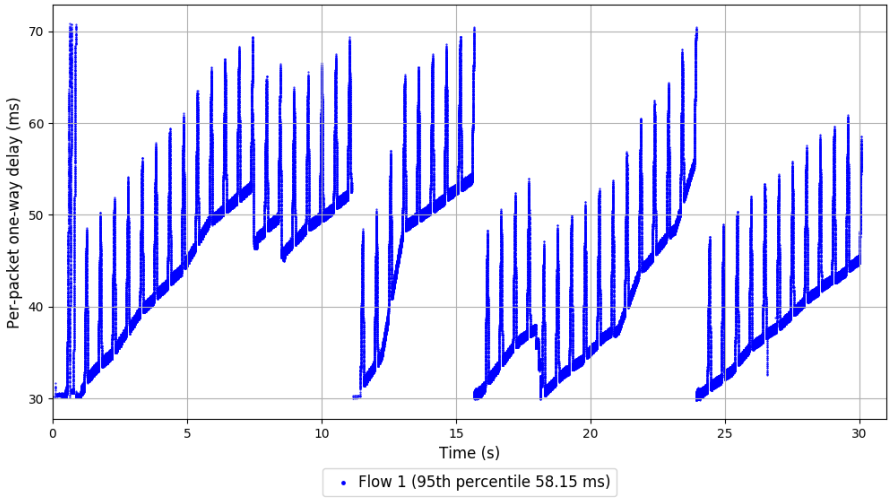
```
Run 2: Statistics of TCP BBR

Start at: 2018-08-31 08:30:27
End at: 2018-08-31 08:30:57
Local clock offset: 0.808 ms
Remote clock offset: -1.767 ms

# Below is generated by plot.py at 2018-08-31 08:41:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 94.79 Mbit/s
95th percentile per-packet one-way delay: 58.148 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 94.79 Mbit/s
95th percentile per-packet one-way delay: 58.148 ms
Loss rate: 0.91%
```

Run 2: Report of TCP BBR — Data Link



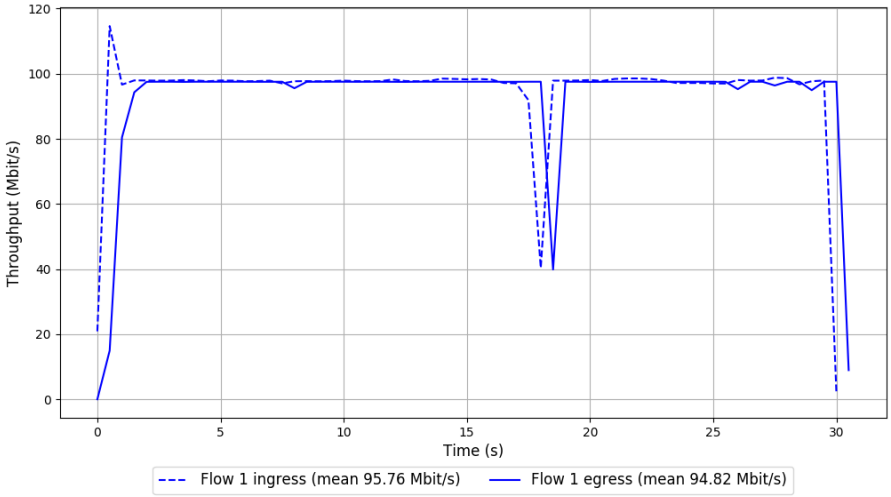


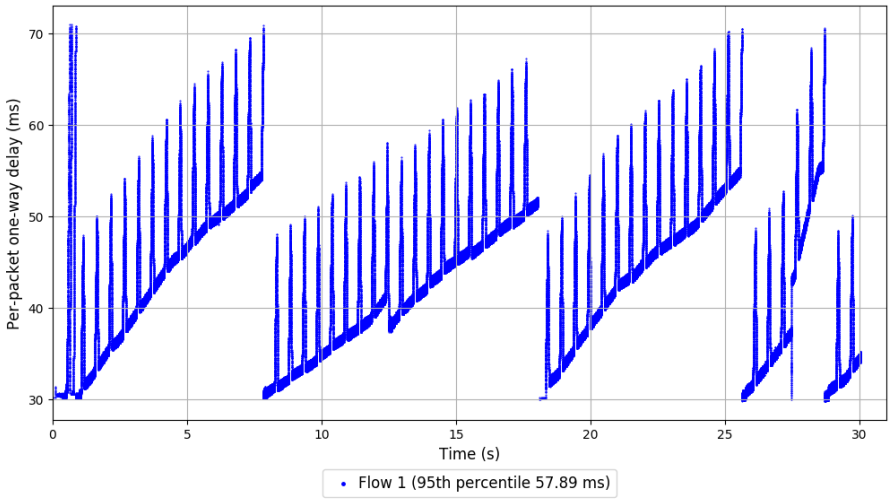
```
Run 3: Statistics of TCP BBR

Start at: 2018-08-31 08:35:41
End at: 2018-08-31 08:36:11
Local clock offset: -2.642 ms
Remote clock offset: -1.581 ms

# Below is generated by plot.py at 2018-08-31 08:41:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 94.82 Mbit/s
95th percentile per-packet one-way delay: 57.890 ms
Loss rate: 0.96%
-- Flow 1:
Average throughput: 94.82 Mbit/s
95th percentile per-packet one-way delay: 57.890 ms
Loss rate: 0.96%
```

Run 3: Report of TCP BBR — Data Link



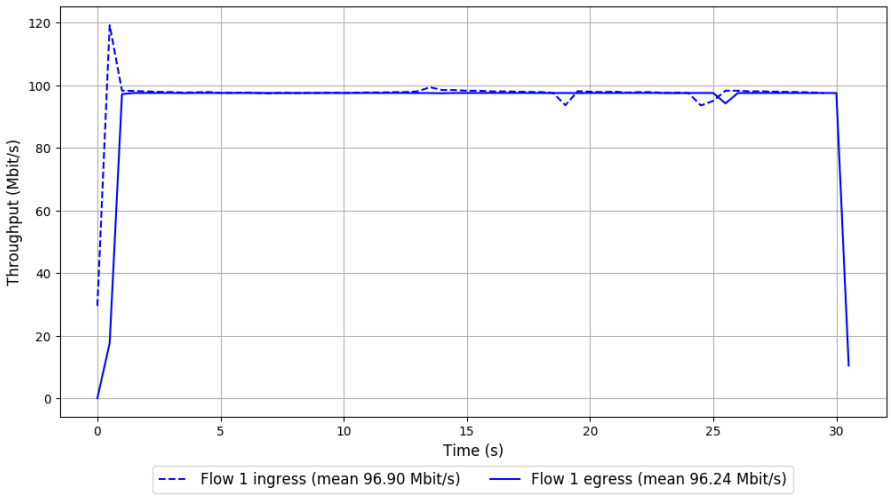


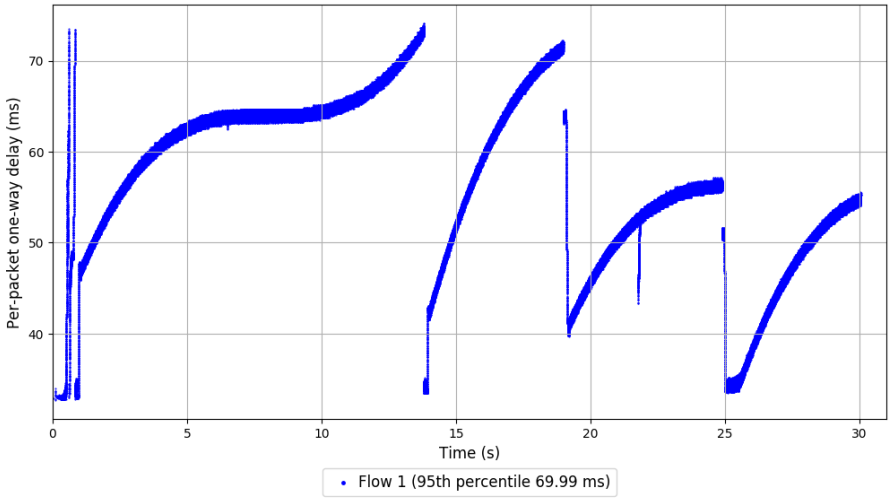
```
Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 08:26:34
End at: 2018-08-31 08:27:04
Local clock offset: -2.145 ms
Remote clock offset: -1.581 ms

# Below is generated by plot.py at 2018-08-31 08:41:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 96.24 Mbit/s
95th percentile per-packet one-way delay: 69.992 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 96.24 Mbit/s
95th percentile per-packet one-way delay: 69.992 ms
Loss rate: 0.60%
```

Run 1: Report of TCP Cubic — Data Link



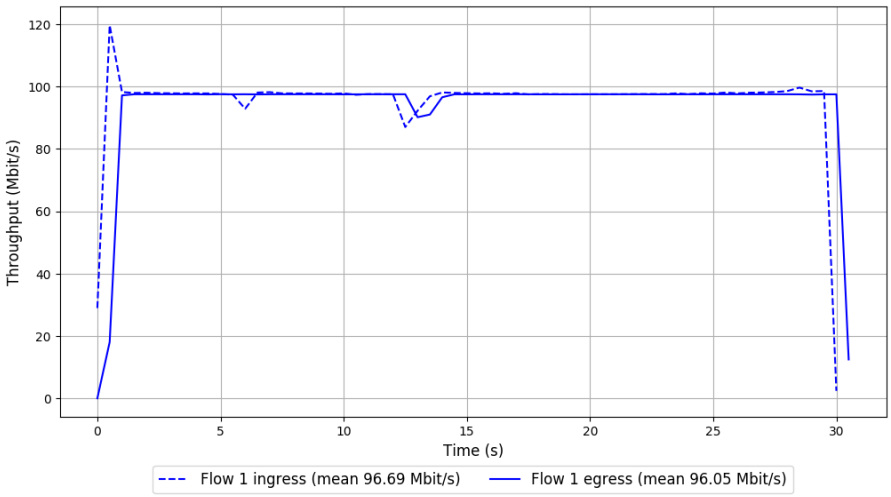


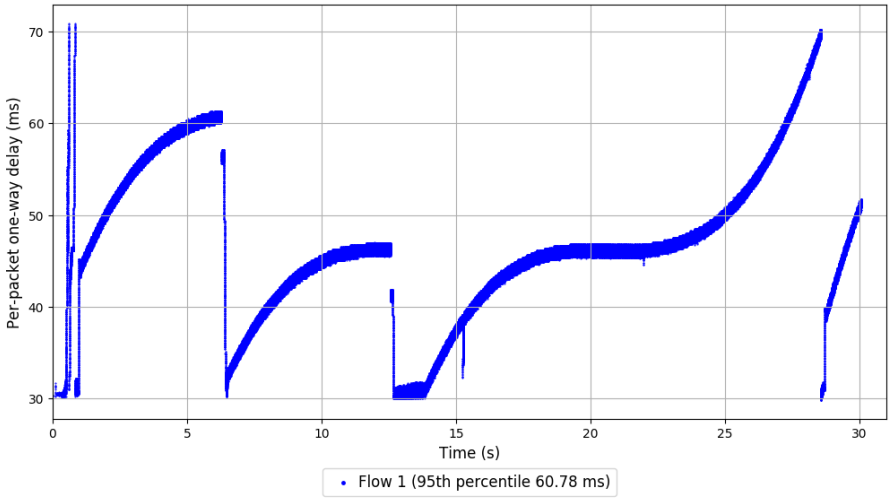
```
Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 08:31:46
End at: 2018-08-31 08:32:16
Local clock offset: -0.239 ms
Remote clock offset: -1.577 ms

# Below is generated by plot.py at 2018-08-31 08:41:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 96.05 Mbit/s
95th percentile per-packet one-way delay: 60.781 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 96.05 Mbit/s
95th percentile per-packet one-way delay: 60.781 ms
Loss rate: 0.59%
```

Run 2: Report of TCP Cubic — Data Link



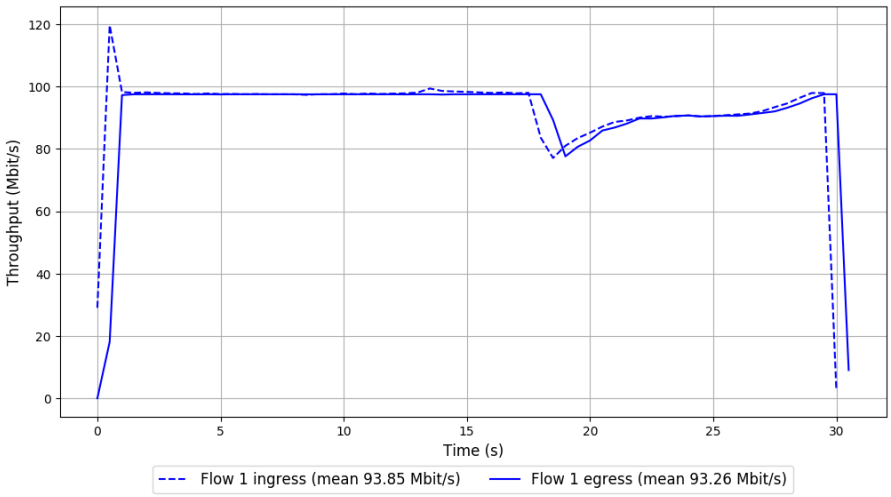


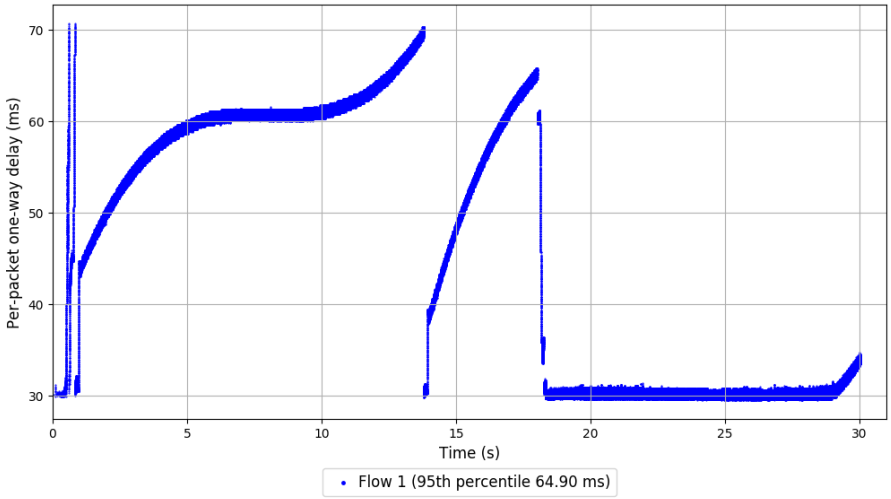
```
Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 08:36:59
End at: 2018-08-31 08:37:29
Local clock offset: -3.548 ms
Remote clock offset: -1.742 ms

# Below is generated by plot.py at 2018-08-31 08:41:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 93.26 Mbit/s
95th percentile per-packet one-way delay: 64.899 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 93.26 Mbit/s
95th percentile per-packet one-way delay: 64.899 ms
Loss rate: 0.61%
```

Run 3: Report of TCP Cubic — Data Link



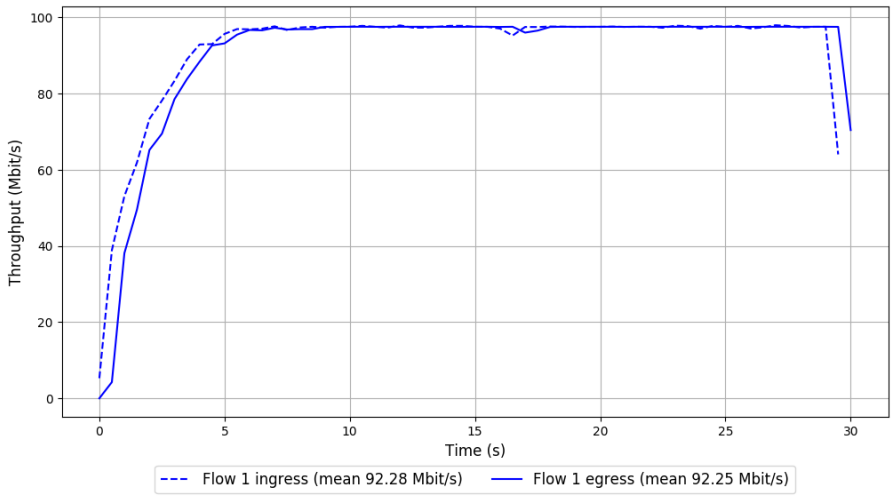


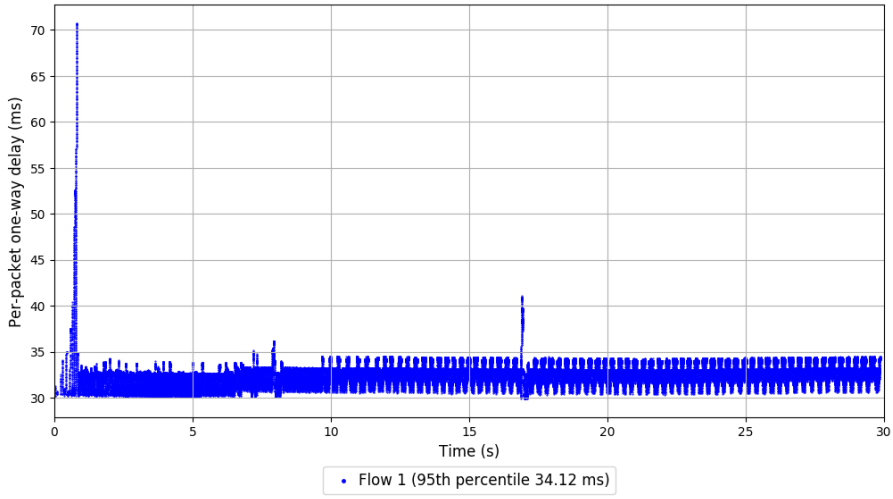
```
Run 1: Statistics of Indigo

Start at: 2018-08-31 08:27:52
End at: 2018-08-31 08:28:22
Local clock offset: 0.81 ms
Remote clock offset: -1.682 ms

# Below is generated by plot.py at 2018-08-31 08:41:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 92.25 Mbit/s
95th percentile per-packet one-way delay: 34.121 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 92.25 Mbit/s
95th percentile per-packet one-way delay: 34.121 ms
Loss rate: 0.02%
```

Run 1: Report of Indigo — Data Link



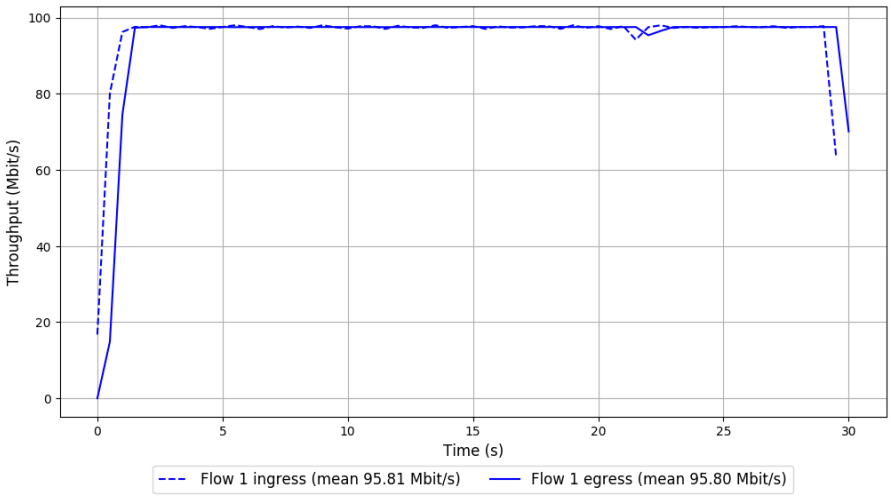


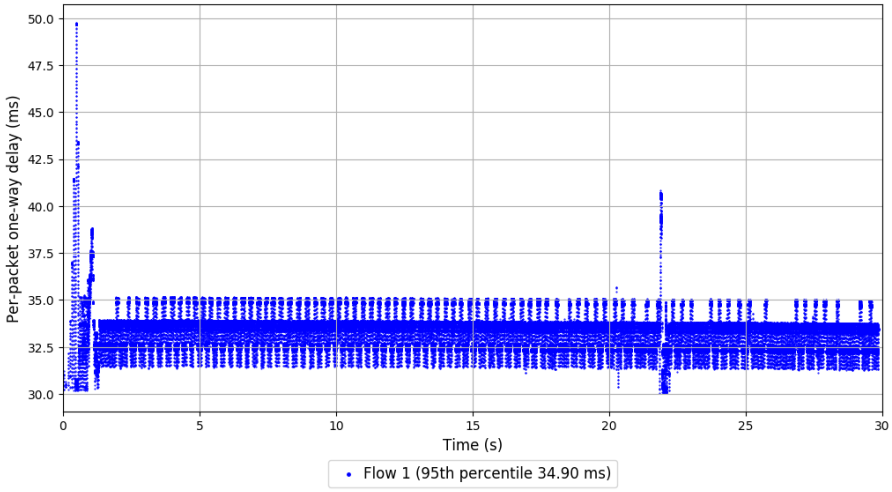
```
Run 2: Statistics of Indigo

Start at: 2018-08-31 08:33:05
End at: 2018-08-31 08:33:35
Local clock offset: -1.348 ms
Remote clock offset: -1.759 ms

# Below is generated by plot.py at 2018-08-31 08:41:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 95.80 Mbit/s
95th percentile per-packet one-way delay: 34.895 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 95.80 Mbit/s
95th percentile per-packet one-way delay: 34.895 ms
Loss rate: 0.00%
```

Run 2: Report of Indigo — Data Link



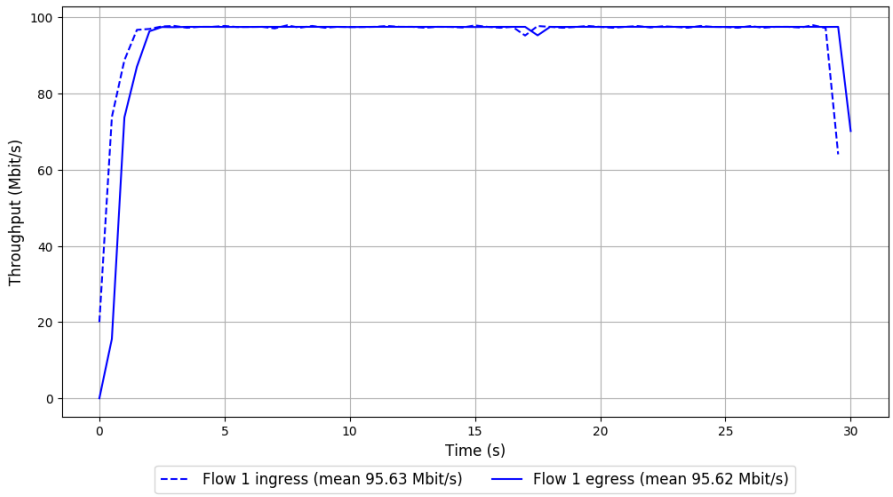


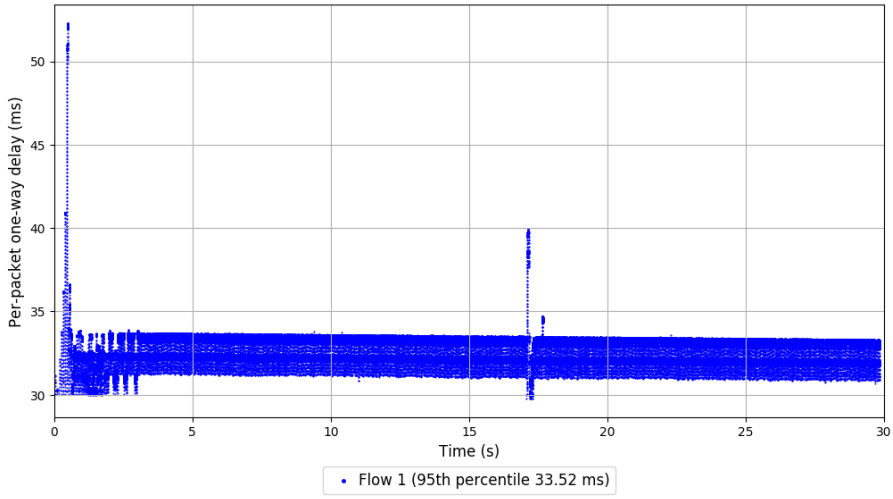
```
Run 3: Statistics of Indigo

Start at: 2018-08-31 08:38:18
End at: 2018-08-31 08:38:48
Local clock offset: -4.68 ms
Remote clock offset: -1.58 ms

# Below is generated by plot.py at 2018-08-31 08:41:37
# Datalink statistics
-- Total of 1 flow:
Average throughput: 95.62 Mbit/s
95th percentile per-packet one-way delay: 33.523 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 95.62 Mbit/s
95th percentile per-packet one-way delay: 33.523 ms
Loss rate: 0.00%
```

Run 3: Report of Indigo — Data Link

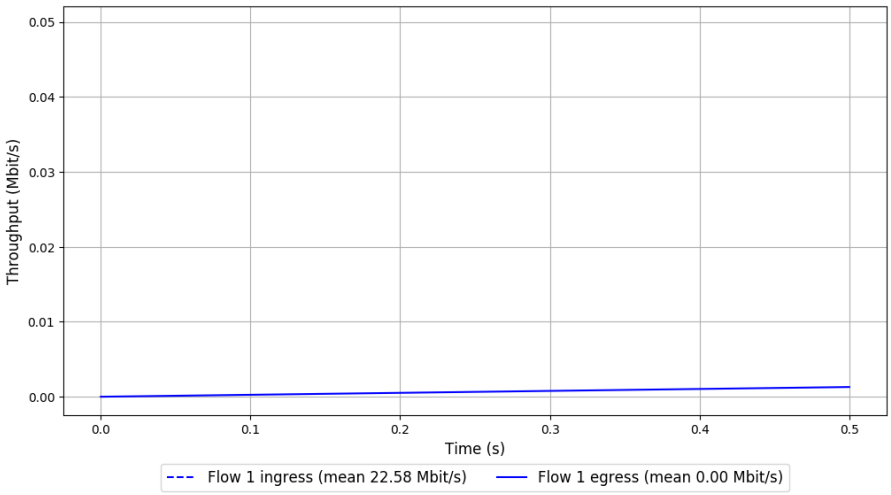


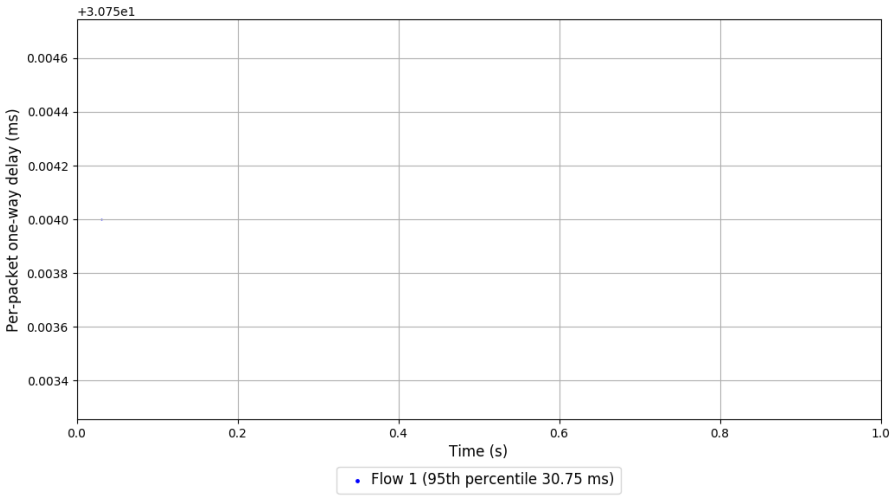


```
Run 1: Statistics of Muses-25

Start at: 2018-08-31 08:29:12
End at: 2018-08-31 08:29:42
Local clock offset: 0.609 ms
Remote clock offset: -1.706 ms
```

Run 1: Report of Muses-25 — Data Link



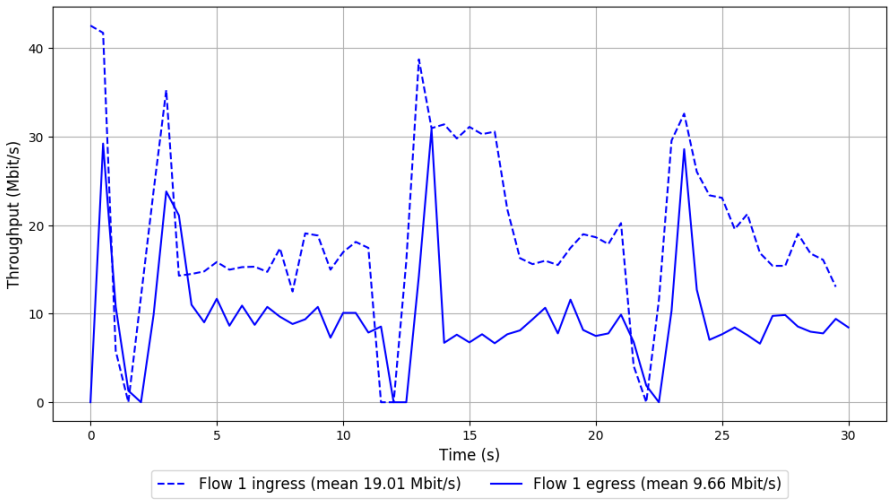


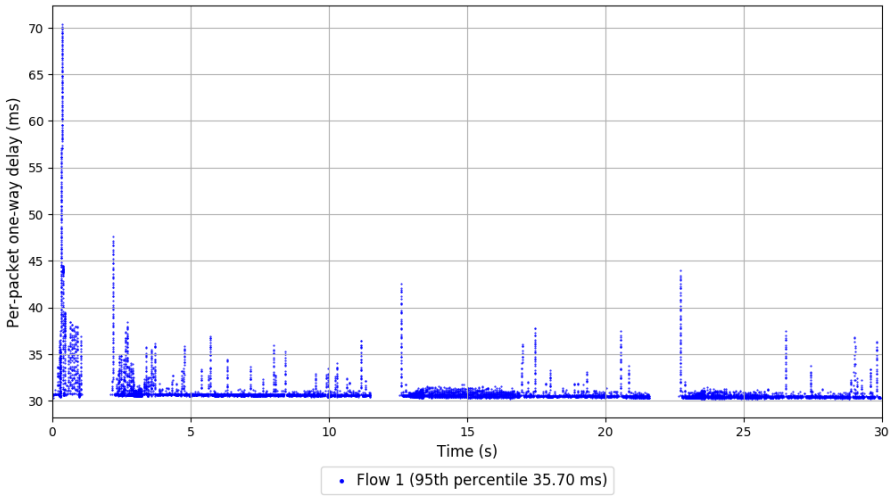
```
Run 2: Statistics of Muses-25

Start at: 2018-08-31 08:34:25
End at: 2018-08-31 08:34:55
Local clock offset: -1.825 ms
Remote clock offset: -1.564 ms

# Below is generated by plot.py at 2018-08-31 08:41:37
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.66 Mbit/s
95th percentile per-packet one-way delay: 35.702 ms
Loss rate: 49.15%
-- Flow 1:
Average throughput: 9.66 Mbit/s
95th percentile per-packet one-way delay: 35.702 ms
Loss rate: 49.15%
```

Run 2: Report of Muses-25 — Data Link





```
Run 3: Statistics of Muses-25

Start at: 2018-08-31 08:39:39
End at: 2018-08-31 08:40:09
Local clock offset: -5.979 ms
Remote clock offset: -1.739 ms
```

Run 3: Report of Muses-25 — Data Link