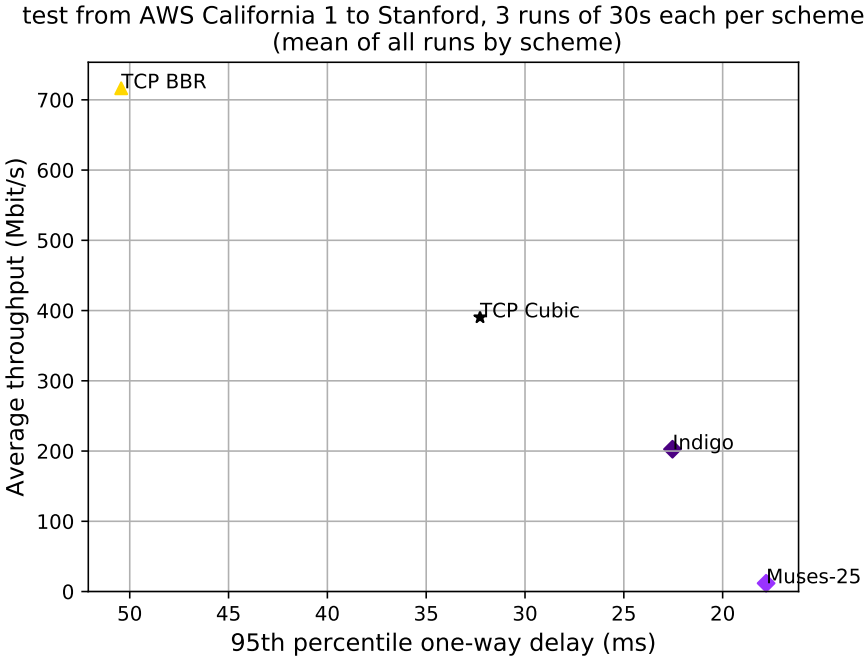
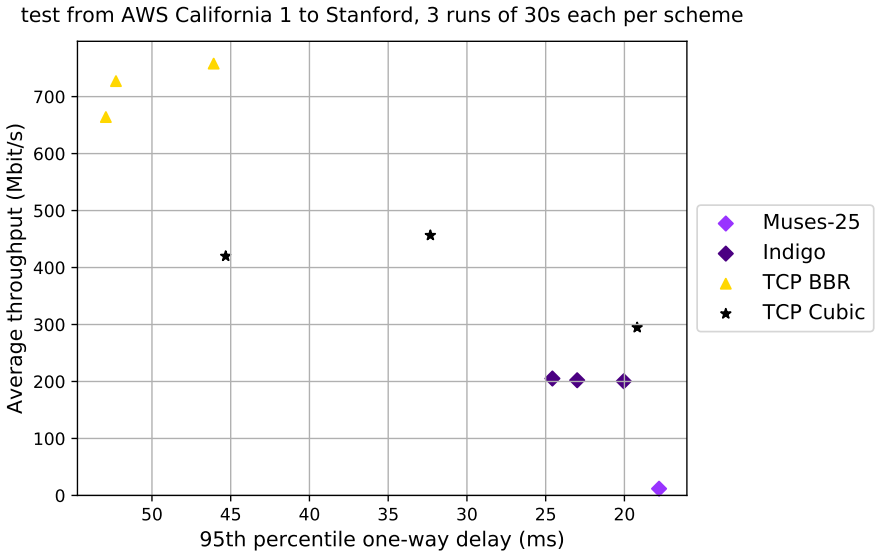
Pantheon Report

Generated at 2018-08-31 08:48:36 (UTC).
Data path: AWS California 1 on `ens5` (*local*) →Stanford on `eno1` (*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 1 to Stanford, 3 runs of 30s each per scheme
(mean of all runs by scheme)
TCP BBR
TCP Cubic
Indigo
Muses-25
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
0
100
200
300
400
500
600
700
50
45
40
35
30
25
20


test from AWS California 1 to Stanford, 3 runs of 30s each per scheme
Muses-25
Indigo
TCP BBR
TCP Cubic
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
0
100
200
300
400
500
600
700
50
45
40
35
30
25
20

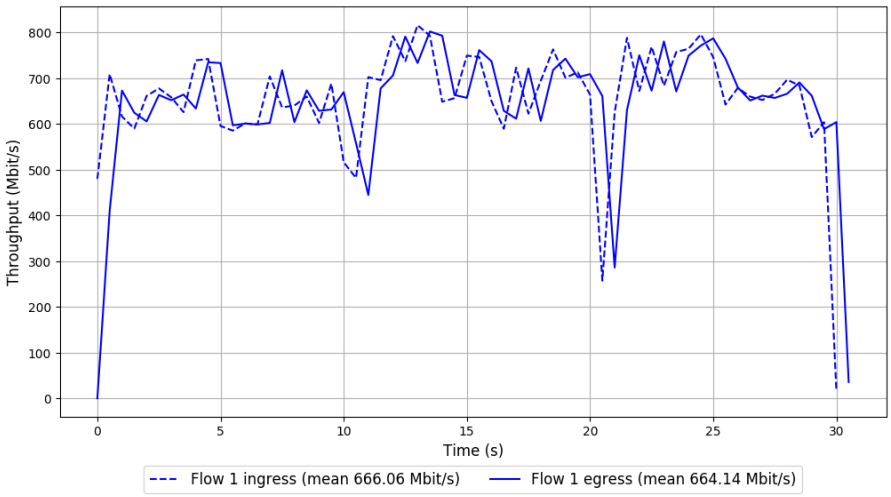
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	716.44	50.43	0.34
TCP Cubic	3	390.40	32.28	0.02
Indigo	3	202.61	22.54	0.00
Muses-25	1	11.82	17.80	4.52

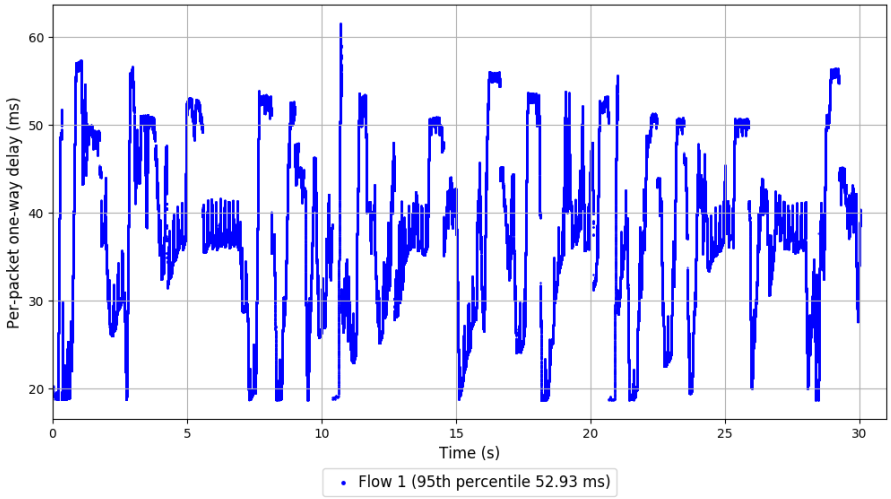
```
Run 1: Statistics of TCP BBR

Start at: 2018-08-31 08:29:27
End at: 2018-08-31 08:29:57
Local clock offset: 2.149 ms
Remote clock offset: -0.194 ms

# Below is generated by plot.py at 2018-08-31 08:48:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 664.14 Mbit/s
95th percentile per-packet one-way delay: 52.927 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 664.14 Mbit/s
95th percentile per-packet one-way delay: 52.927 ms
Loss rate: 0.29%
```

Run 1: Report of TCP BBR — Data Link



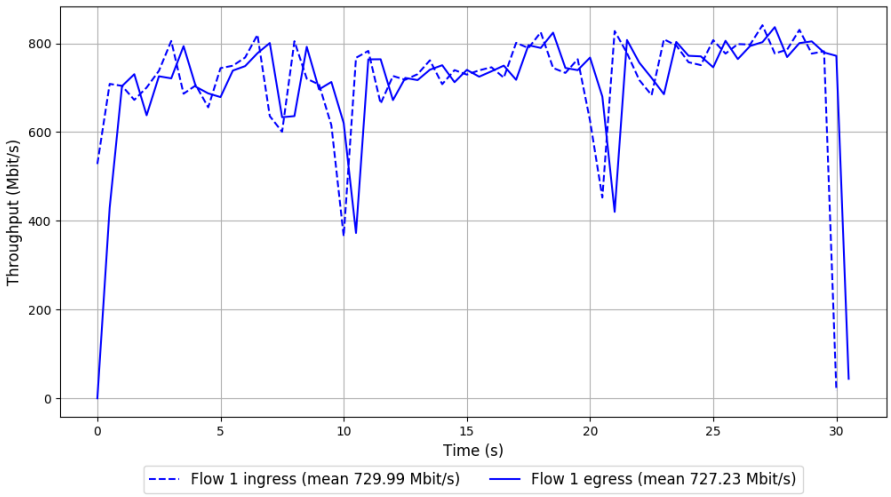


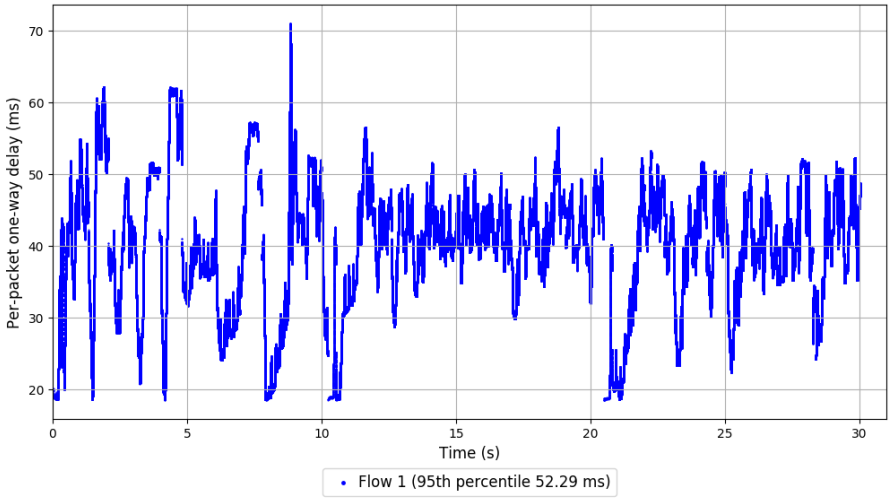
```
Run 2: Statistics of TCP BBR

Start at: 2018-08-31 08:35:23
End at: 2018-08-31 08:35:53
Local clock offset: -0.328 ms
Remote clock offset: -0.222 ms

# Below is generated by plot.py at 2018-08-31 08:48:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 727.23 Mbit/s
95th percentile per-packet one-way delay: 52.286 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 727.23 Mbit/s
95th percentile per-packet one-way delay: 52.286 ms
Loss rate: 0.38%
```

Run 2: Report of TCP BBR — Data Link



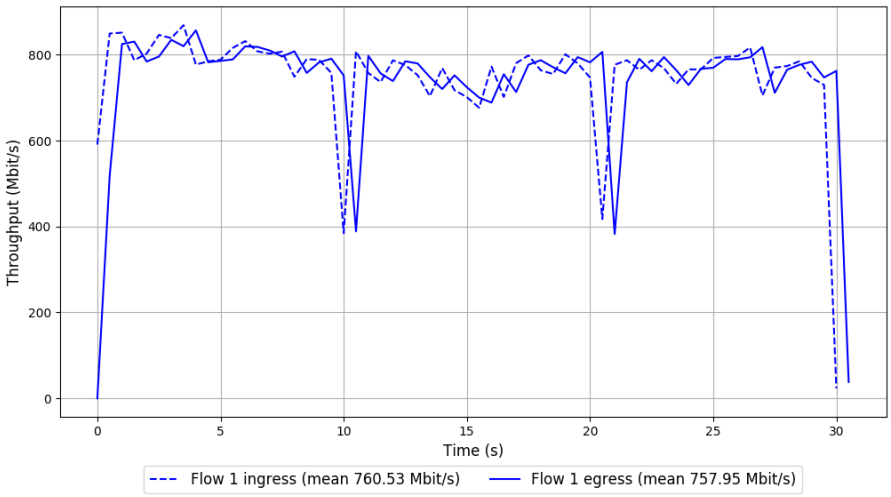


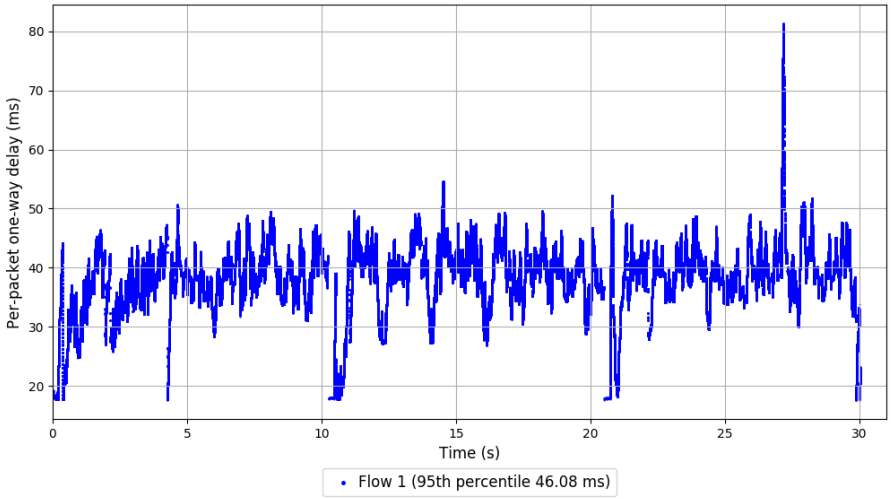
```
Run 3: Statistics of TCP BBR

Start at: 2018-08-31 08:41:22
End at: 2018-08-31 08:41:52
Local clock offset: -2.552 ms
Remote clock offset: -0.102 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 757.95 Mbit/s
95th percentile per-packet one-way delay: 46.082 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 757.95 Mbit/s
95th percentile per-packet one-way delay: 46.082 ms
Loss rate: 0.34%
```

Run 3: Report of TCP BBR — Data Link



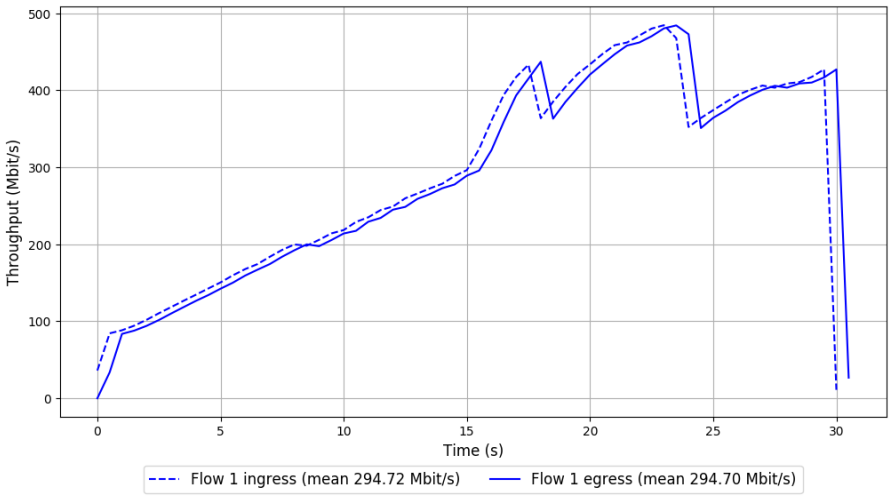


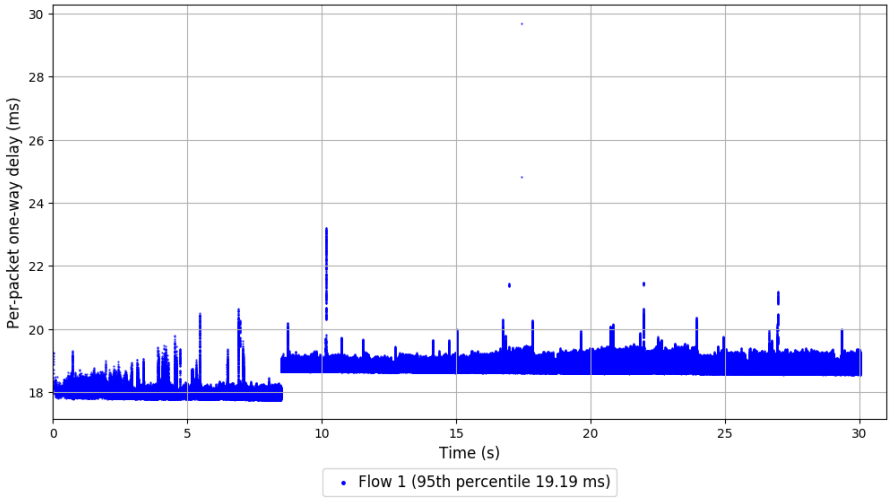
```
Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 08:28:00
End at: 2018-08-31 08:28:30
Local clock offset: 2.533 ms
Remote clock offset: -0.258 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 294.70 Mbit/s
95th percentile per-packet one-way delay: 19.190 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 294.70 Mbit/s
95th percentile per-packet one-way delay: 19.190 ms
Loss rate: 0.01%
```

Run 1: Report of TCP Cubic — Data Link



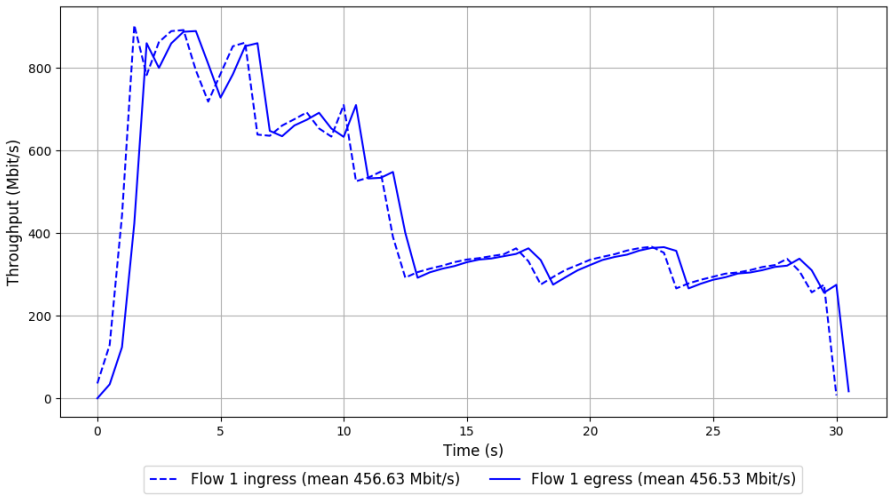


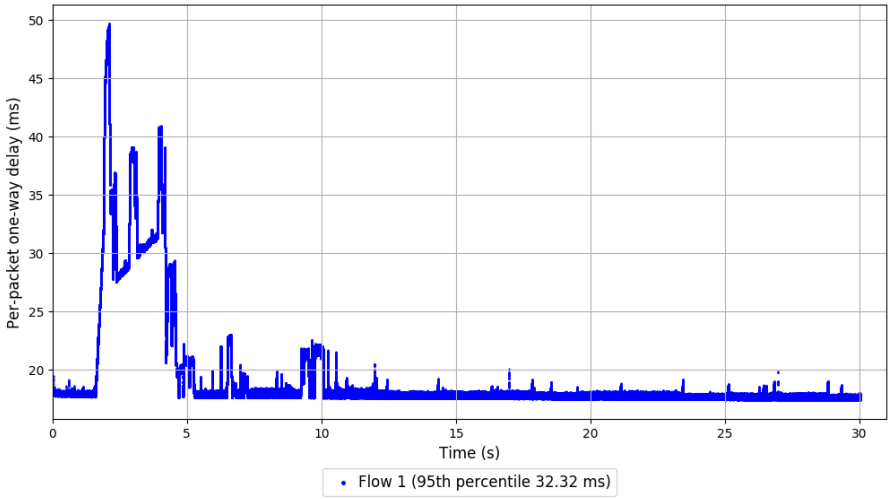
```
Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 08:33:51
End at: 2018-08-31 08:34:21
Local clock offset: 0.515 ms
Remote clock offset: -0.194 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 456.53 Mbit/s
95th percentile per-packet one-way delay: 32.321 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 456.53 Mbit/s
95th percentile per-packet one-way delay: 32.321 ms
Loss rate: 0.02%
```

Run 2: Report of TCP Cubic — Data Link



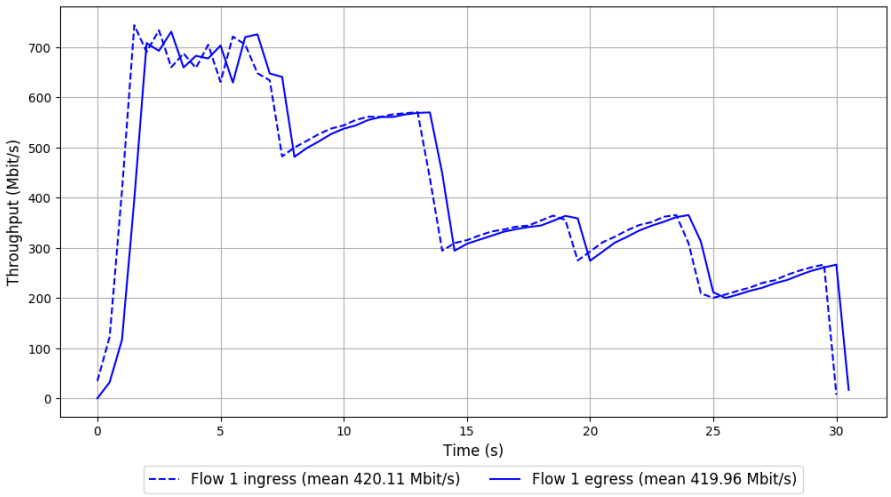


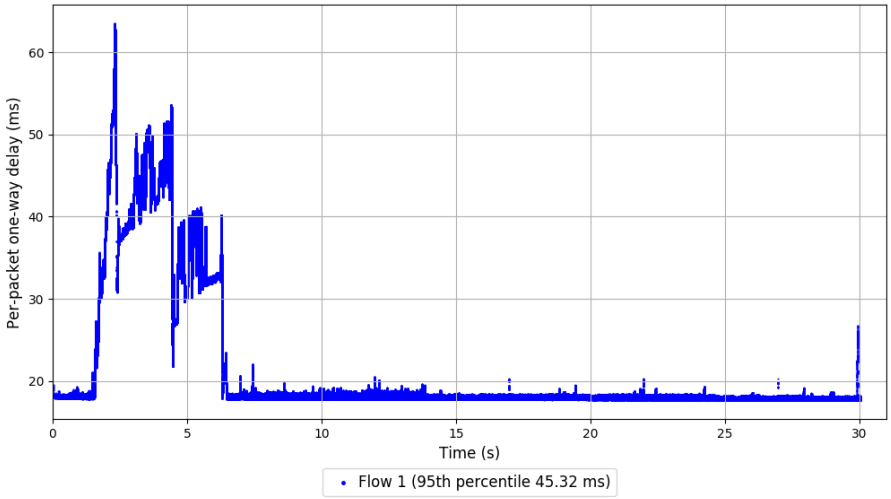
```
Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 08:39:52
End at: 2018-08-31 08:40:22
Local clock offset: -2.156 ms
Remote clock offset: -0.124 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 419.96 Mbit/s
95th percentile per-packet one-way delay: 45.319 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 419.96 Mbit/s
95th percentile per-packet one-way delay: 45.319 ms
Loss rate: 0.04%
```

Run 3: Report of TCP Cubic — Data Link



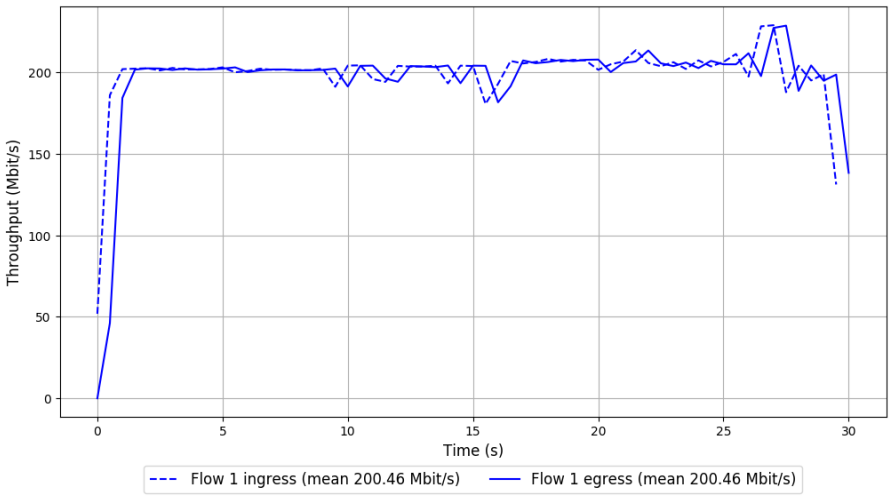


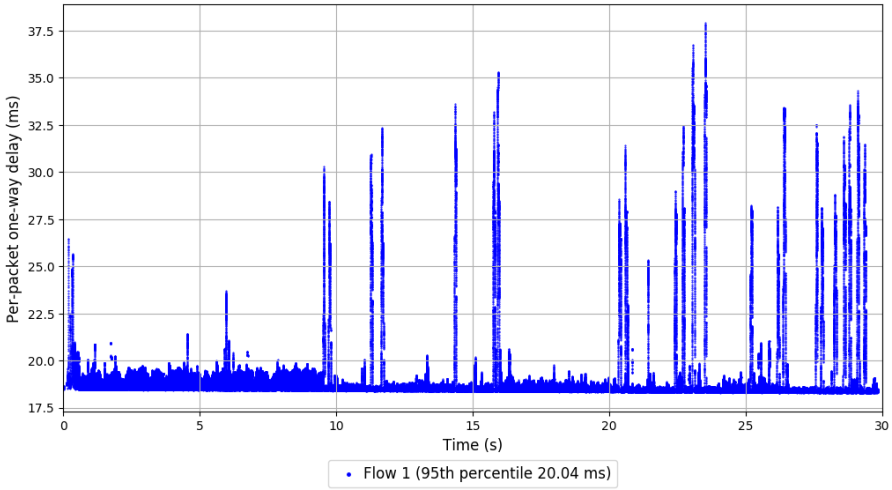
```
Run 1: Statistics of Indigo

Start at: 2018-08-31 08:26:34
End at: 2018-08-31 08:27:04
Local clock offset: 3.079 ms
Remote clock offset: -0.199 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 200.46 Mbit/s
95th percentile per-packet one-way delay: 20.041 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 200.46 Mbit/s
95th percentile per-packet one-way delay: 20.041 ms
Loss rate: 0.01%
```

Run 1: Report of Indigo — Data Link



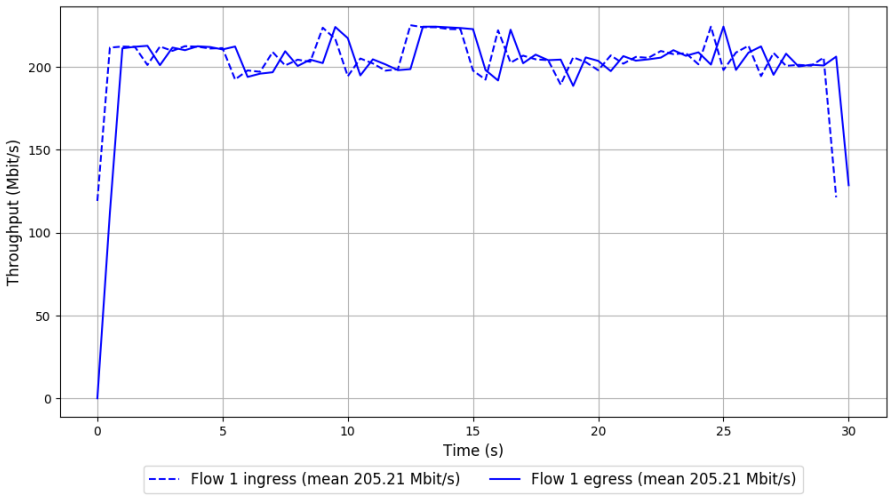


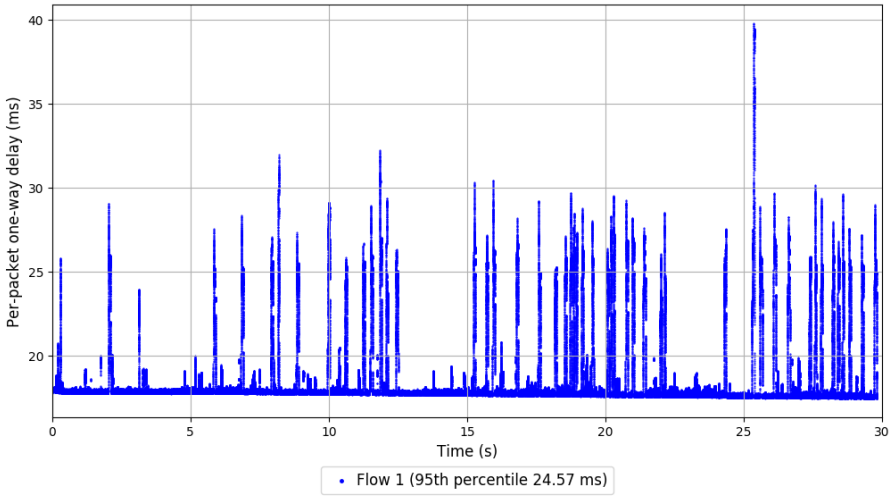
```
Run 2: Statistics of Indigo

Start at: 2018-08-31 08:32:24
End at: 2018-08-31 08:32:54
Local clock offset: 1.388 ms
Remote clock offset: -0.211 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 205.21 Mbit/s
95th percentile per-packet one-way delay: 24.573 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 205.21 Mbit/s
95th percentile per-packet one-way delay: 24.573 ms
Loss rate: 0.00%
```

Run 2: Report of Indigo — Data Link



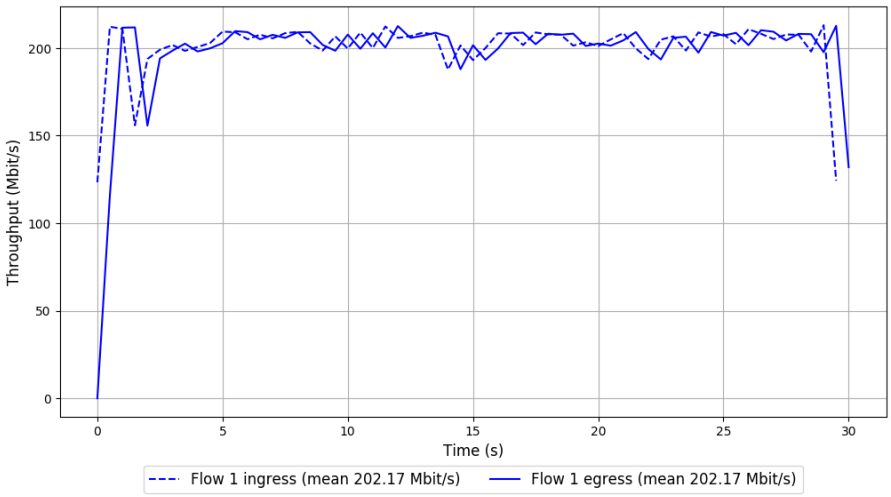


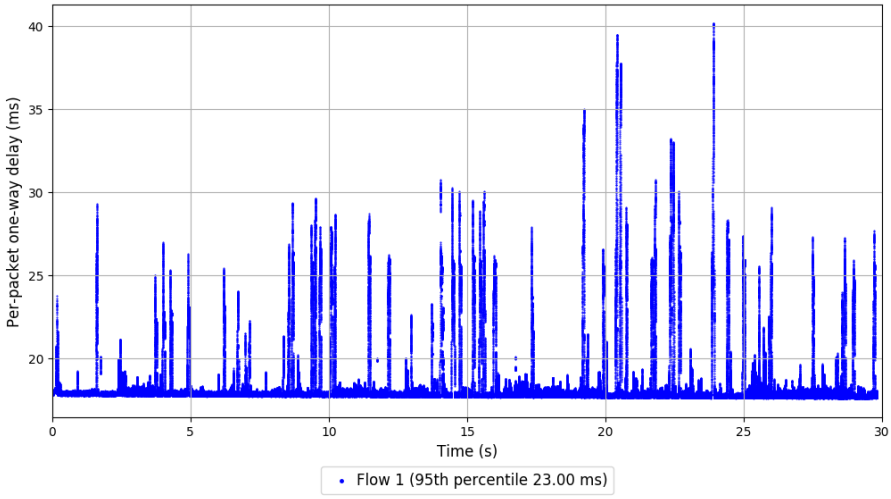
```
Run 3: Statistics of Indigo

Start at: 2018-08-31 08:38:26
End at: 2018-08-31 08:38:56
Local clock offset: -1.553 ms
Remote clock offset: -0.088 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 202.17 Mbit/s
95th percentile per-packet one-way delay: 23.000 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 202.17 Mbit/s
95th percentile per-packet one-way delay: 23.000 ms
Loss rate: 0.00%
```

Run 3: Report of Indigo — Data Link

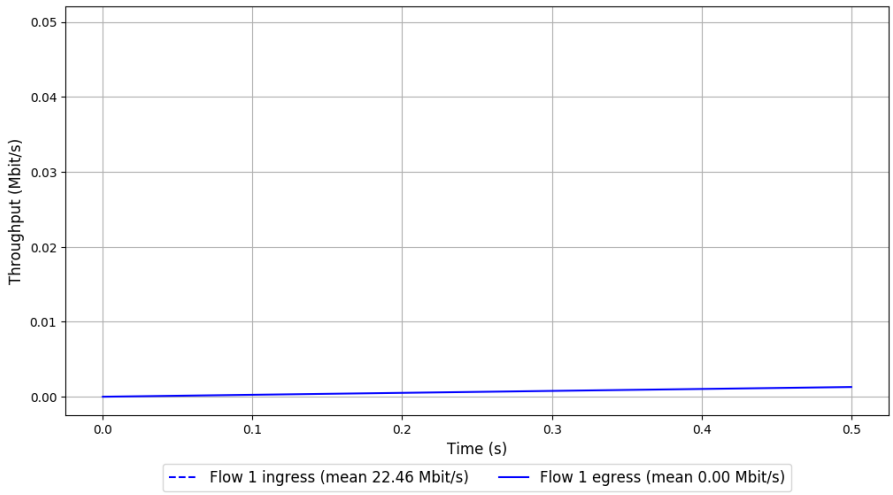


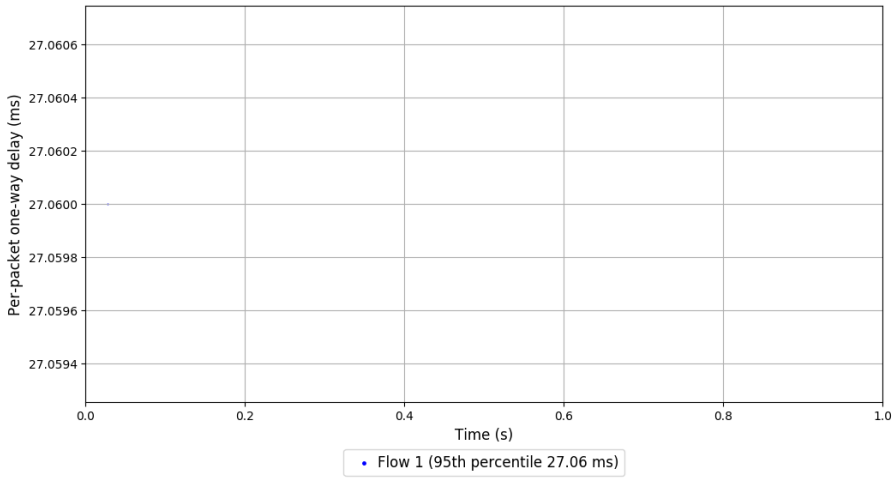


```
Run 1: Statistics of Muses-25

Start at: 2018-08-31 08:25:17
End at: 2018-08-31 08:25:47
Local clock offset: -4.981 ms
Remote clock offset: -0.341 ms
```

Run 1: Report of Muses-25 — Data Link



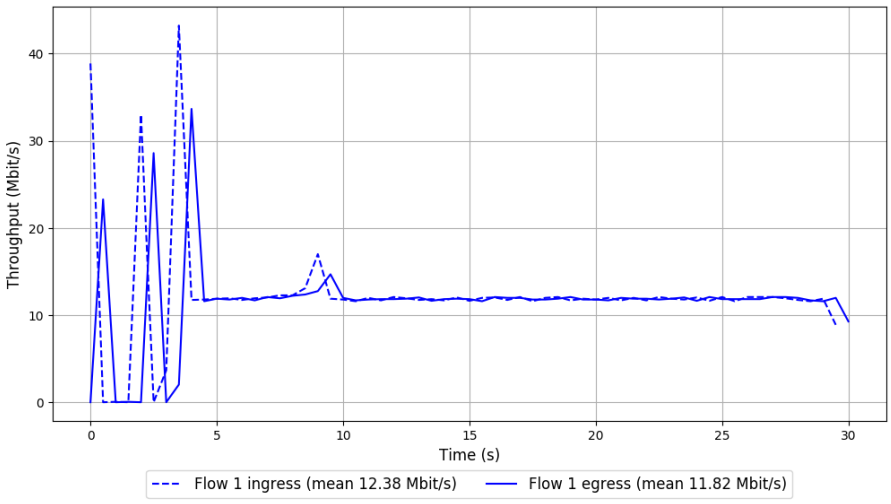


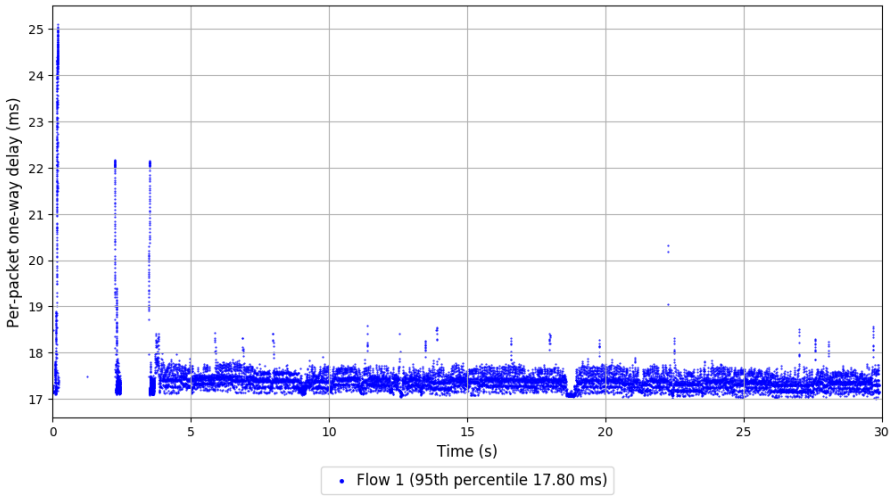
```
Run 2: Statistics of Muses-25

Start at: 2018-08-31 08:31:07
End at: 2018-08-31 08:31:37
Local clock offset: 1.721 ms
Remote clock offset: -0.177 ms

# Below is generated by plot.py at 2018-08-31 08:48:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.82 Mbit/s
95th percentile per-packet one-way delay: 17.801 ms
Loss rate: 4.52%
-- Flow 1:
Average throughput: 11.82 Mbit/s
95th percentile per-packet one-way delay: 17.801 ms
Loss rate: 4.52%
```

Run 2: Report of Muses-25 — Data Link





```
Run 3: Statistics of Muses-25

Start at: 2018-08-31 08:37:04
End at: 2018-08-31 08:37:34
Local clock offset: -0.956 ms
Remote clock offset: -0.087 ms
```

Run 3: Report of Muses-25 — Data Link