Pantheon Report

Generated at 2018-11-03 15:46:00 (UTC).

Data path: GCE Tokyo on `ens4` (*remote*) →GCE Sydney on `ens4` (*local*).

Repeated the test of 18 congestion control schemes 5 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `time.google.com` and have been applied to correct the timestamps in logs.
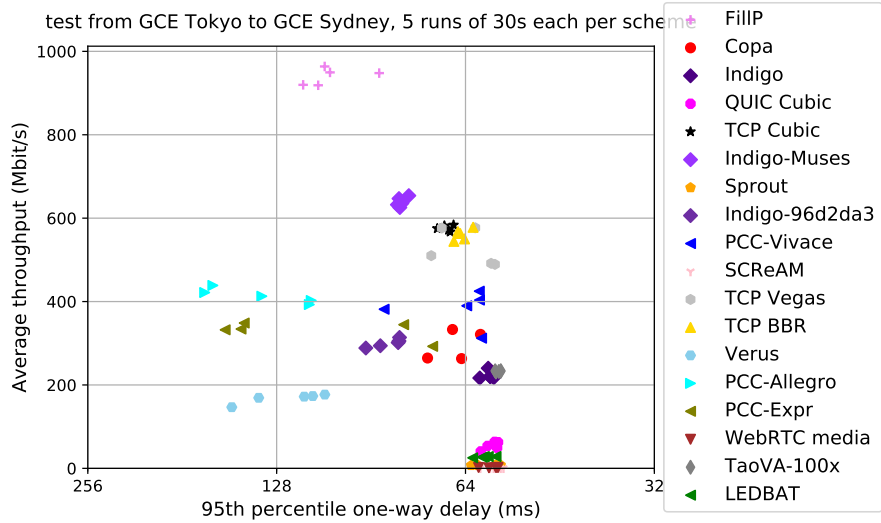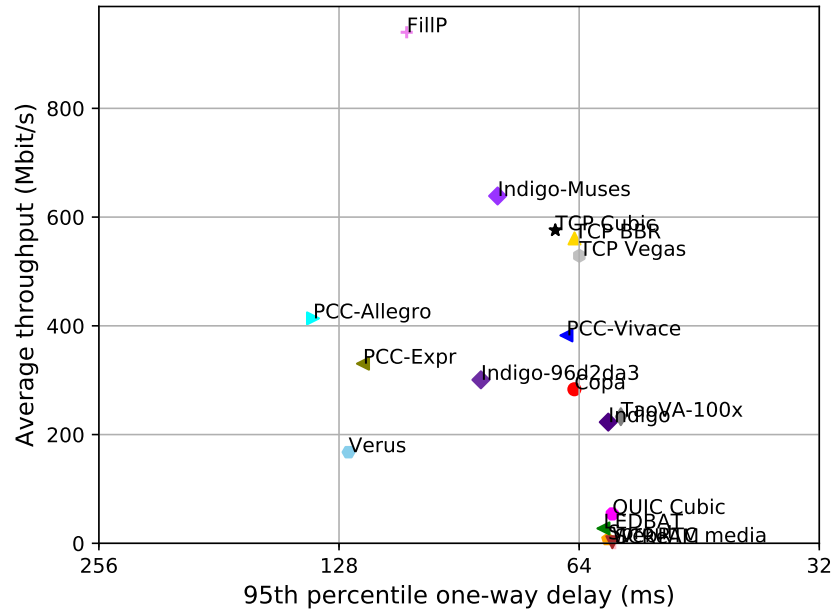
```
System info:
Linux 4.15.0-1021-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912

Git summary:
branch: muses @ 794ca3866981572cb73700a276691acf79c60f2b
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-96d2da3 @ 8413272d46f8aa0bcb967ed7048b6a8f994abb95
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
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
 M src/examples/cellsim.cc
 M src/examples/sproutbt2.cc
 M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
```

third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851

test from GCE Tokyo to GCE Sydney, 5 runs of 30s each per scheme
(mean of all runs by scheme)

FillP

Indigo-Muses

TCP Cubic
TCP BBR
TCP Vegas

PCC-Allegro

PCC-Vivace

PCC-Expr

Indigo-96d2da3
Copa

TaoVA-100x
Indigo

Verus

QUIC Cubic
LEDBAT
SCReAM media

Average throughput (Mbit/s)

95th percentile one-way delay (ms)

256   128   64   32

test from GCE Tokyo to GCE Sydney, 5 runs of 30s each per scheme

Average throughput (Mbit/s)

95th percentile one-way delay (ms)

256   128   64   32

- FillP
- Copa
- Indigo
- QUIC Cubic
- TCP Cubic
- Indigo-Muses
- Sprout
- Indigo-96d2da3
- PCC-Vivace
- SCReAM
- TCP Vegas
- TCP BBR
- Verus
- PCC-Allegro
- PCC-Expr
- WebRTC media
- TaoVA-100x
- LEDBAT

3

scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	5	560.78	64.86	0.42
Copa	5	283.34	64.89	0.35
TCP Cubic	5	575.81	68.56	0.41
FillP	5	939.94	105.29	0.87
Indigo	5	222.90	58.84	0.39
Indigo-96d2da3	5	300.68	84.99	0.28
LEDBAT	5	27.35	59.67	0.75
Indigo-Muses	5	638.84	80.99	0.43
PCC-Allegro	5	413.70	137.97	1.38
PCC-Expr	5	330.40	119.45	0.89
QUIC Cubic	5	54.02	58.16	0.53
SCReAM	5	0.22	57.75	0.36
Sprout	5	7.34	58.90	0.33
TaoVA-100x	5	232.86	56.75	0.39
TCP Vegas	5	528.81	63.97	0.36
Verus	5	167.62	124.53	0.79
PCC-Vivace	5	382.39	66.40	0.46
WebRTC media	5	1.93	58.16	0.54

```
Run 1: Statistics of TCP BBR

Start at: 2018-11-03 11:53:34
End at: 2018-11-03 11:54:04
Local clock offset: 0.132 ms
Remote clock offset: 0.209 ms


# Below is generated by plot.py at 2018-11-03 14:22:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 567.80 Mbit/s
95th percentile per-packet one-way delay: 65.796 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 567.80 Mbit/s
95th percentile per-packet one-way delay: 65.796 ms
Loss rate: 0.42%
```
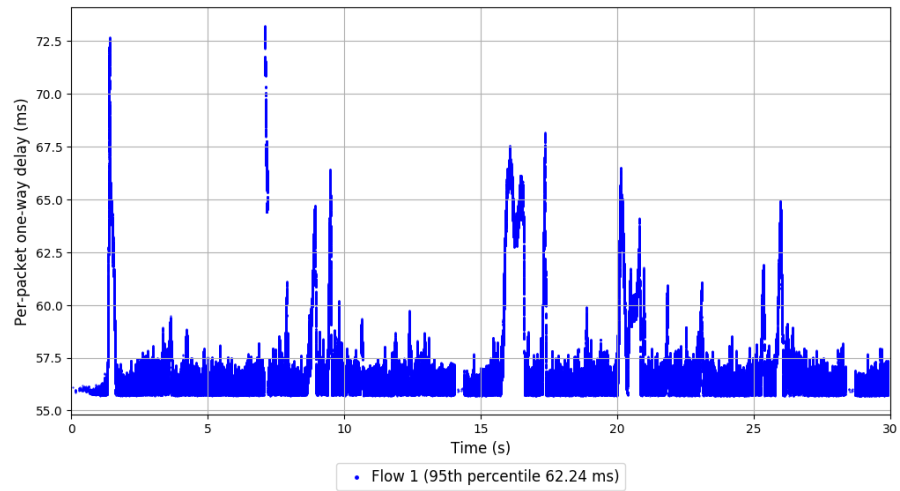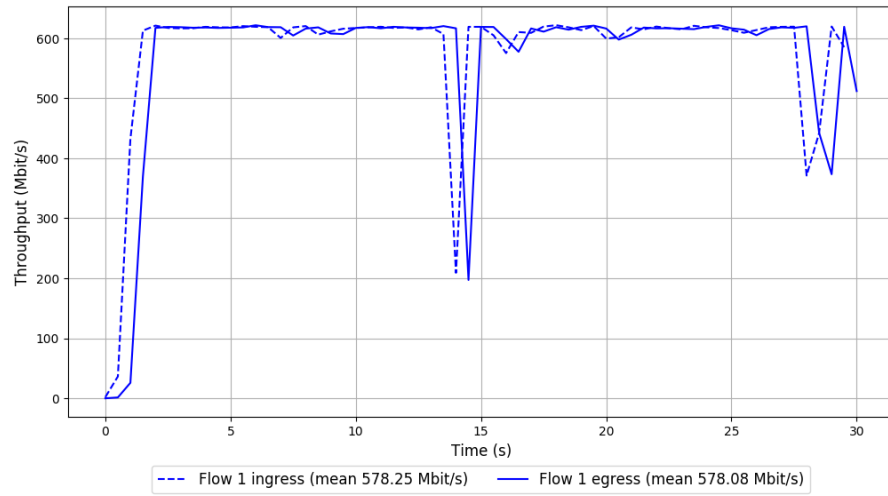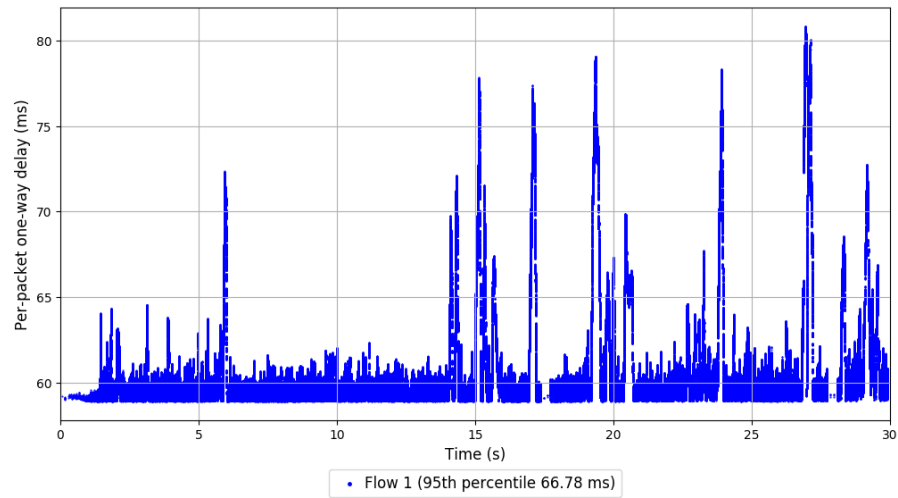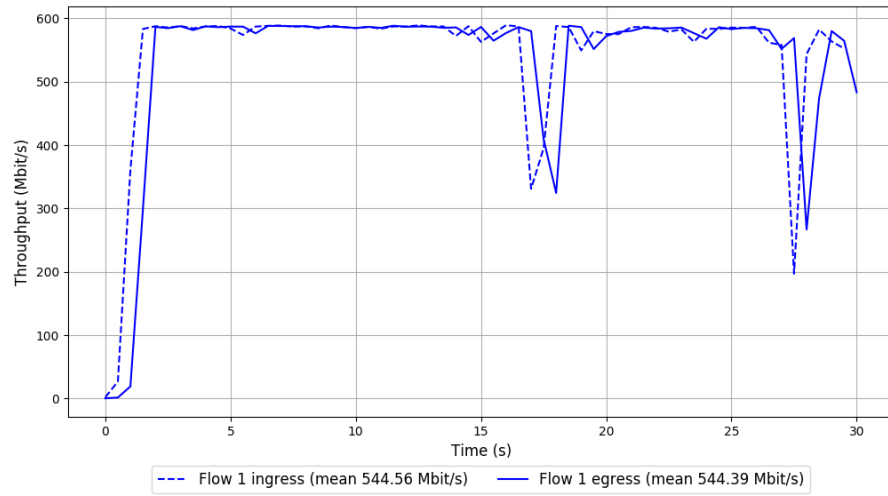
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-11-03 12:21:15
End at: 2018-11-03 12:21:45
Local clock offset: -0.141 ms
Remote clock offset: 1.372 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 578.08 Mbit/s
95th percentile per-packet one-way delay: 62.239 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 578.08 Mbit/s
95th percentile per-packet one-way delay: 62.239 ms
Loss rate: 0.41%
```
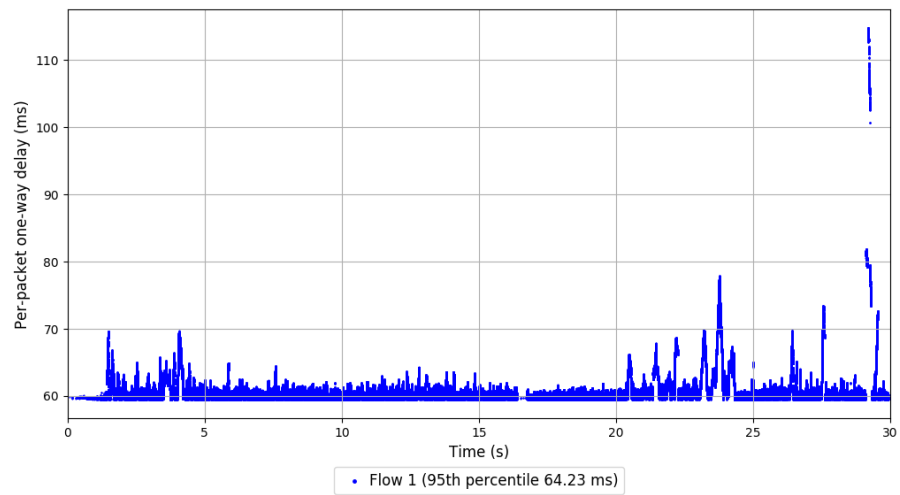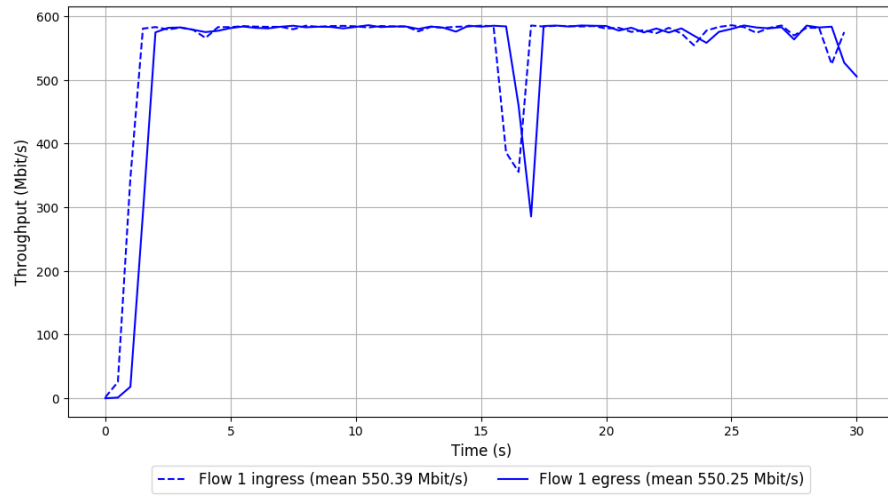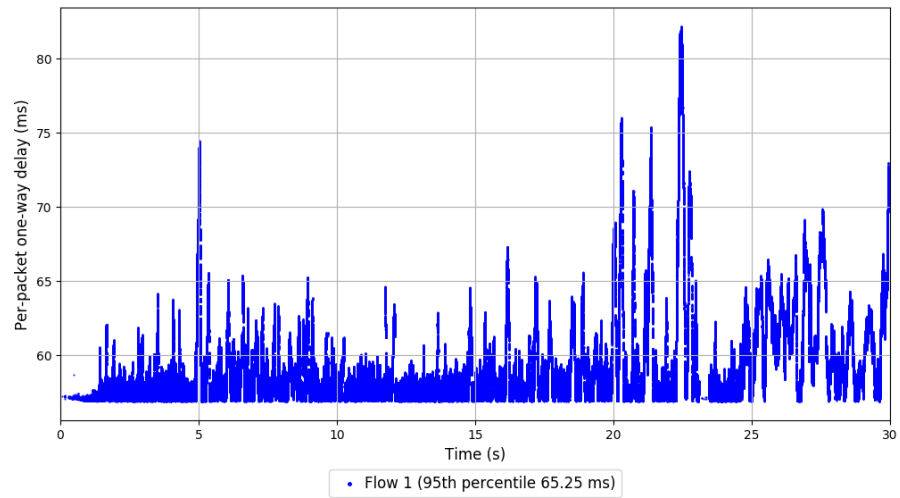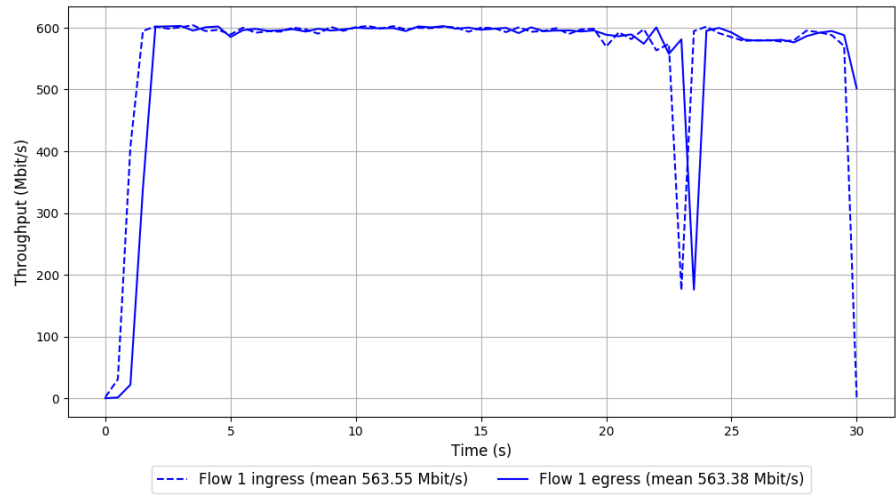
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-11-03 12:48:21
End at: 2018-11-03 12:48:51
Local clock offset: -0.147 ms
Remote clock offset: 1.083 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 544.39 Mbit/s
95th percentile per-packet one-way delay: 66.782 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 544.39 Mbit/s
95th percentile per-packet one-way delay: 66.782 ms
Loss rate: 0.43%
```

Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 544.56 Mbit/s)   Flow 1 egress (mean 544.39 Mbit/s)

Flow 1 (95th percentile 66.78 ms)

```
Run 4: Statistics of TCP BBR

Start at: 2018-11-03 13:15:46
End at: 2018-11-03 13:16:16
Local clock offset: 0.091 ms
Remote clock offset: 1.073 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 550.25 Mbit/s
95th percentile per-packet one-way delay: 64.228 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 550.25 Mbit/s
95th percentile per-packet one-way delay: 64.228 ms
Loss rate: 0.42%
```
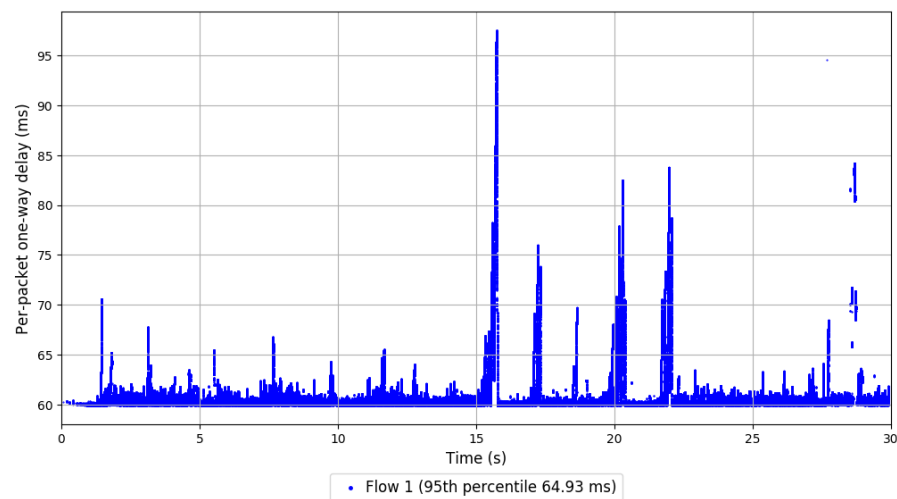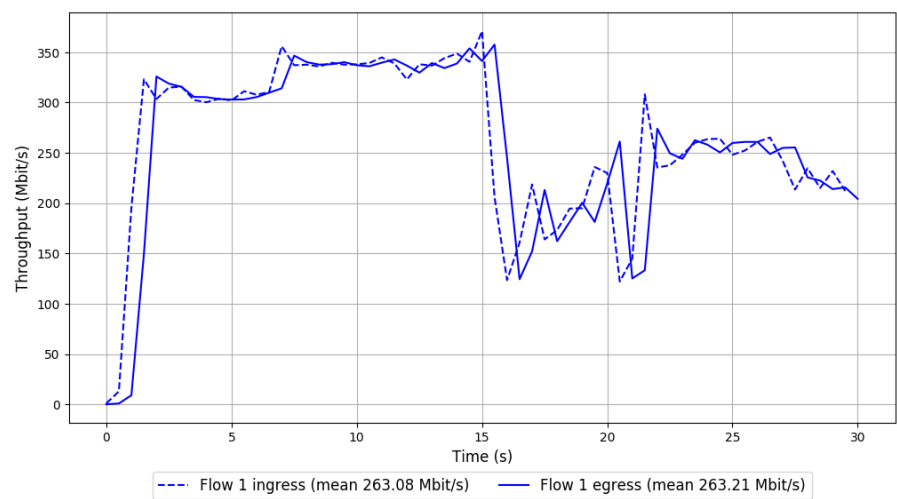
Run 4: Report of TCP BBR — Data Link

Flow 1 ingress (mean 550.39 Mbit/s)   Flow 1 egress (mean 550.25 Mbit/s)

Flow 1 (95th percentile 64.23 ms)

```
Run 5: Statistics of TCP BBR

Start at: 2018-11-03 13:43:00
End at: 2018-11-03 13:43:30
Local clock offset: -0.212 ms
Remote clock offset: -0.213 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 563.38 Mbit/s
95th percentile per-packet one-way delay: 65.253 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 563.38 Mbit/s
95th percentile per-packet one-way delay: 65.253 ms
Loss rate: 0.41%
```
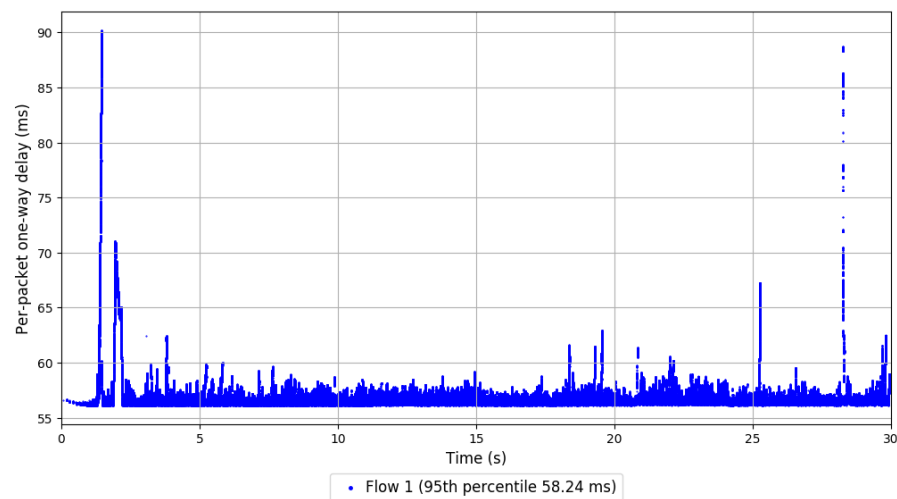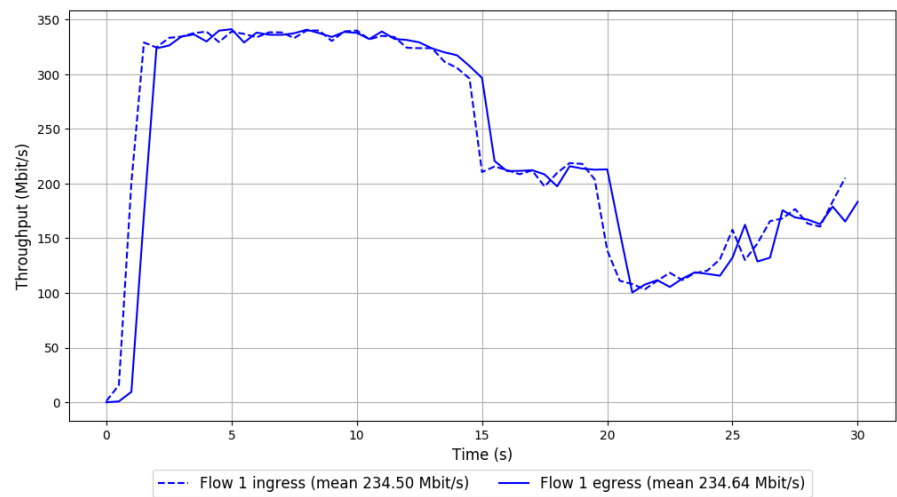
Run 5: Report of TCP BBR — Data Link

Flow 1 ingress (mean 563.55 Mbit/s)   Flow 1 egress (mean 563.38 Mbit/s)

Flow 1 (95th percentile 65.25 ms)

```
Run 1: Statistics of Copa

Start at: 2018-11-03 12:00:07
End at: 2018-11-03 12:00:37
Local clock offset: -0.12 ms
Remote clock offset: 0.396 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 263.21 Mbit/s
95th percentile per-packet one-way delay: 64.933 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 263.21 Mbit/s
95th percentile per-packet one-way delay: 64.933 ms
Loss rate: 0.34%
```
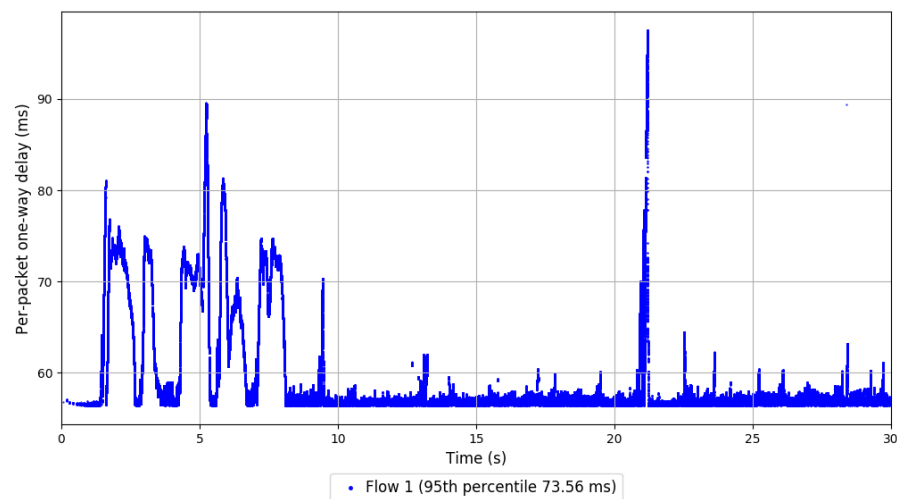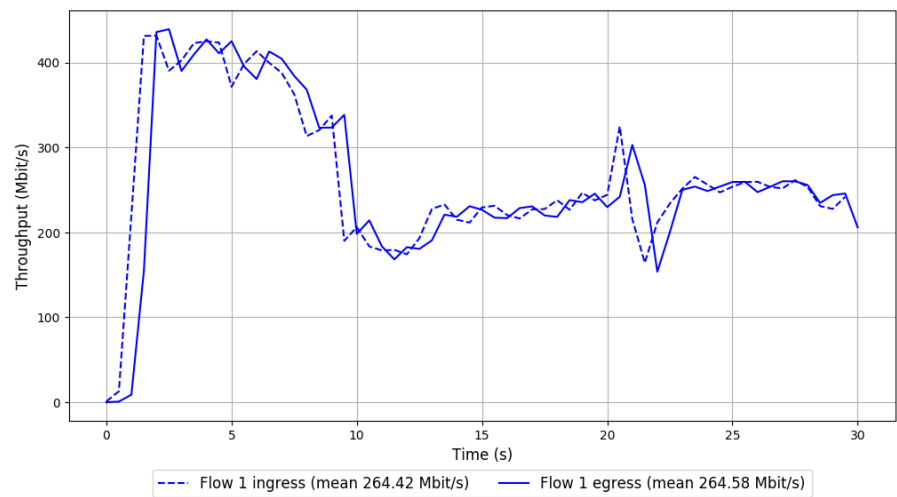
Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 263.08 Mbit/s)   Flow 1 egress (mean 263.21 Mbit/s)

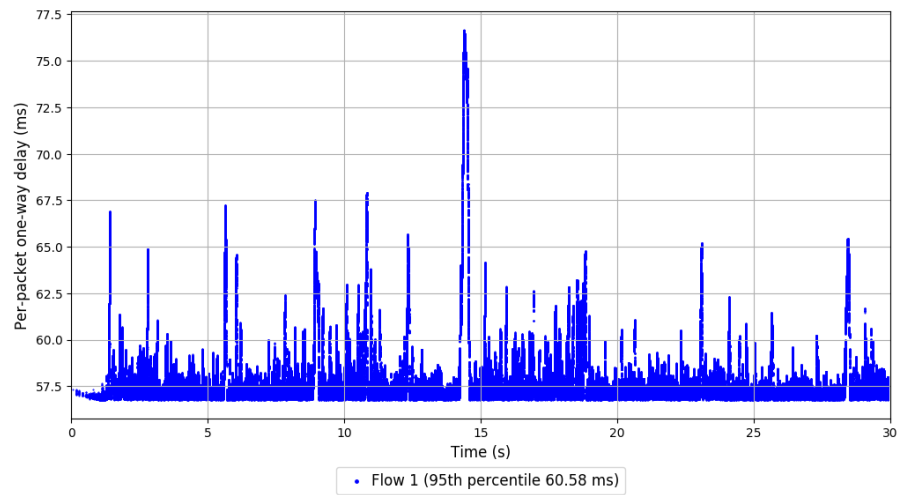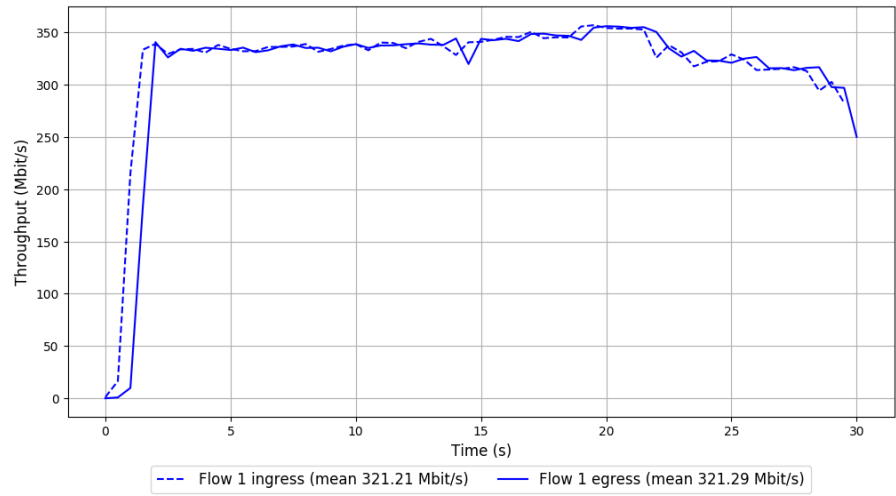Flow 1 (95th percentile 64.93 ms)

```
Run 2: Statistics of Copa

Start at: 2018-11-03 12:27:46
End at: 2018-11-03 12:28:16
Local clock offset: 0.048 ms
Remote clock offset: 0.831 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 234.64 Mbit/s
95th percentile per-packet one-way delay: 58.240 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 234.64 Mbit/s
95th percentile per-packet one-way delay: 58.240 ms
Loss rate: 0.33%
```
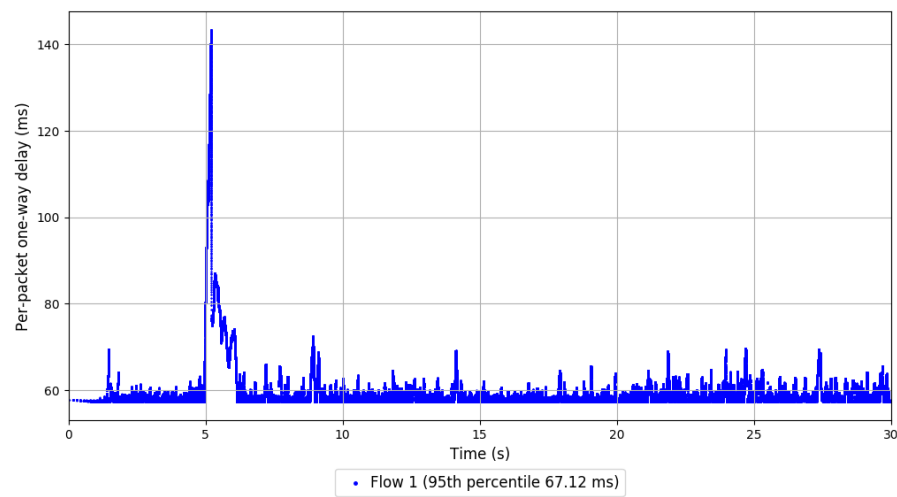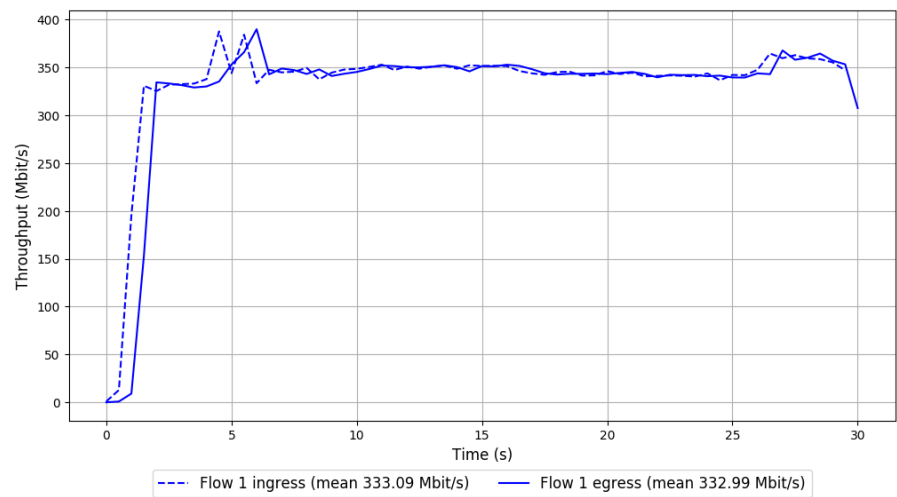
Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2018-11-03 12:54:56
End at: 2018-11-03 12:55:26
Local clock offset: 0.07 ms
Remote clock offset: 0.246 ms


# Below is generated by plot.py at 2018-11-03 14:22:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 264.58 Mbit/s
95th percentile per-packet one-way delay: 73.561 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 264.58 Mbit/s
95th percentile per-packet one-way delay: 73.561 ms
Loss rate: 0.32%
```

Run 3: Report of Copa — Data Link

```
Run 4: Statistics of Copa

Start at: 2018-11-03 13:22:14
End at: 2018-11-03 13:22:44
Local clock offset: -0.077 ms
Remote clock offset: -0.182 ms


# Below is generated by plot.py at 2018-11-03 14:32:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 321.29 Mbit/s
95th percentile per-packet one-way delay: 60.581 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 321.29 Mbit/s
95th percentile per-packet one-way delay: 60.581 ms
Loss rate: 0.35%
```
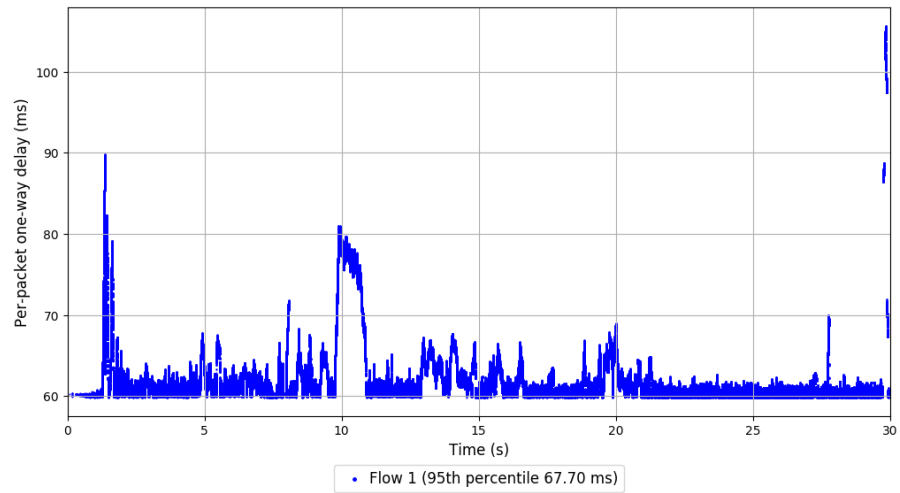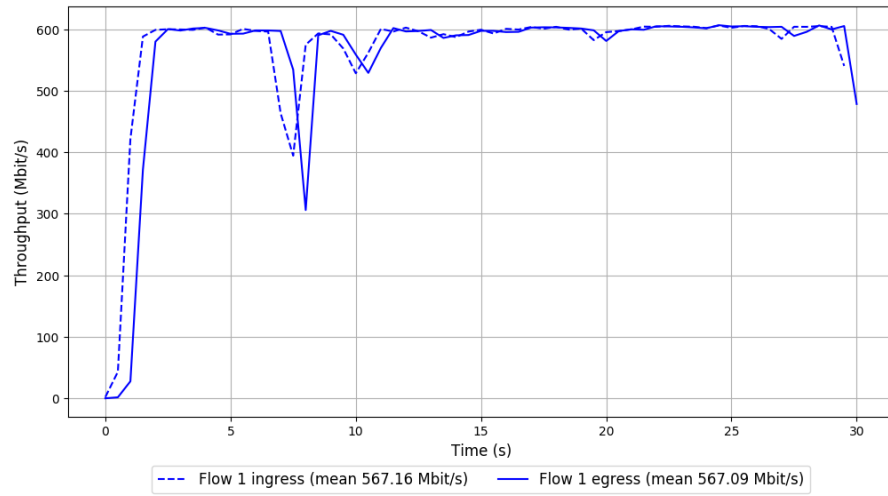
Run 4: Report of Copa — Data Link

```
Run 5: Statistics of Copa

Start at: 2018-11-03 13:49:20
End at: 2018-11-03 13:49:50
Local clock offset: -0.454 ms
Remote clock offset: -0.904 ms


# Below is generated by plot.py at 2018-11-03 14:32:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 332.99 Mbit/s
95th percentile per-packet one-way delay: 67.124 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 332.99 Mbit/s
95th percentile per-packet one-way delay: 67.124 ms
Loss rate: 0.41%
```
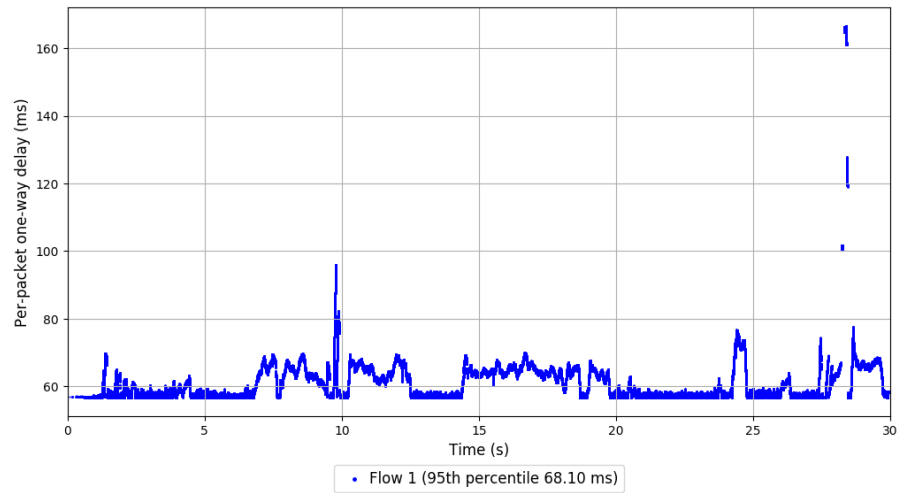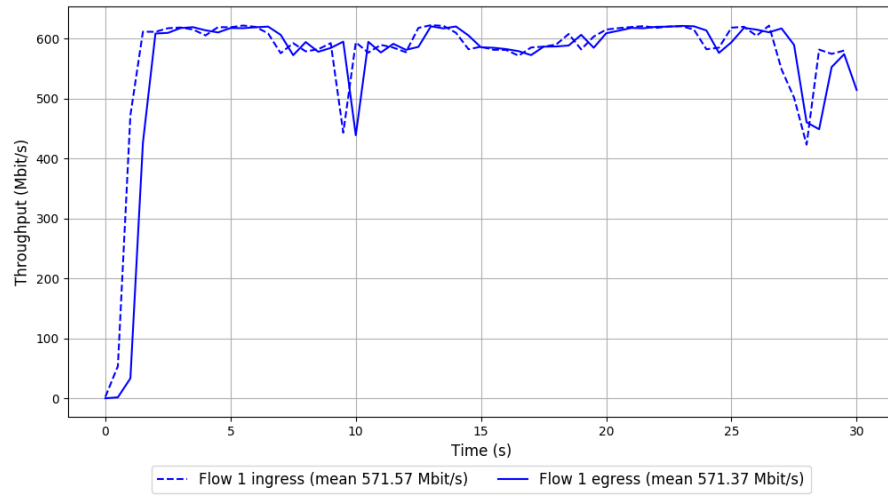
Run 5: Report of Copa — Data Link

Flow 1 ingress (mean 333.09 Mbit/s) — — — Flow 1 egress (mean 332.99 Mbit/s)
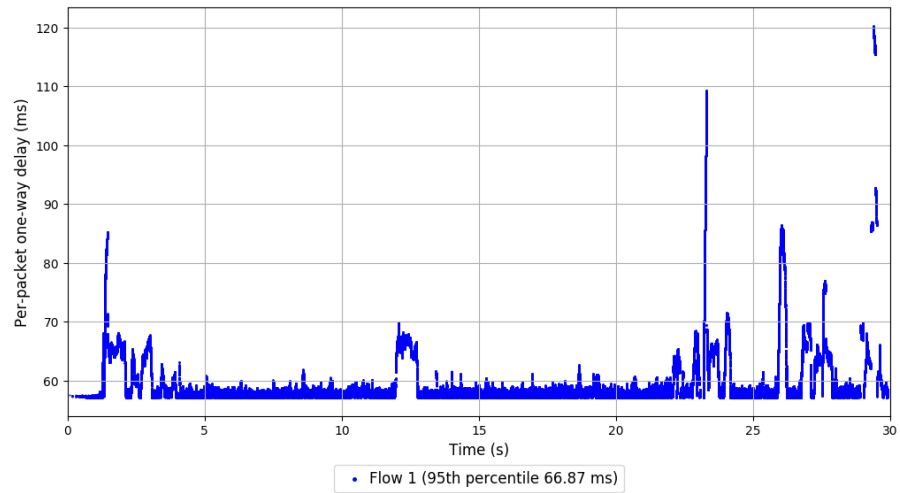

• Flow 1 (95th percentile 67.12 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2018-11-03 11:46:34
End at: 2018-11-03 11:47:04
Local clock offset: 0.037 ms
Remote clock offset: 0.362 ms


# Below is generated by plot.py at 2018-11-03 14:32:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 567.09 Mbit/s
95th percentile per-packet one-way delay: 67.702 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 567.09 Mbit/s
95th percentile per-packet one-way delay: 67.702 ms
Loss rate: 0.41%
```
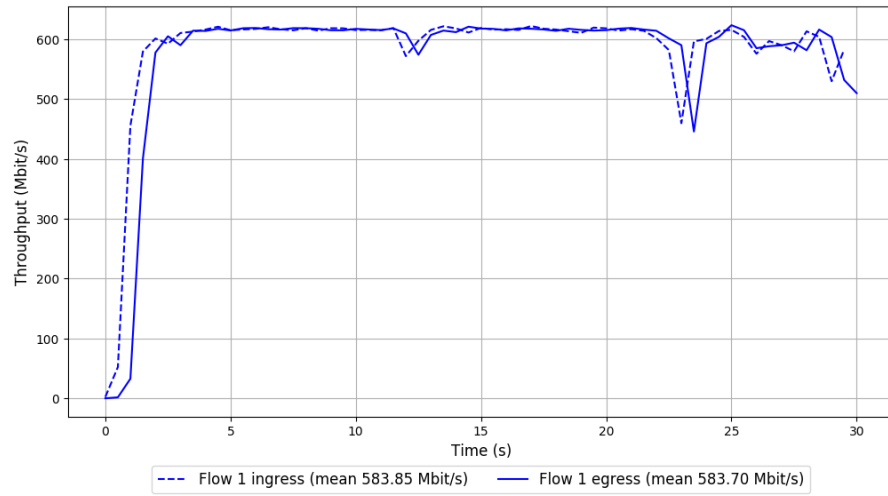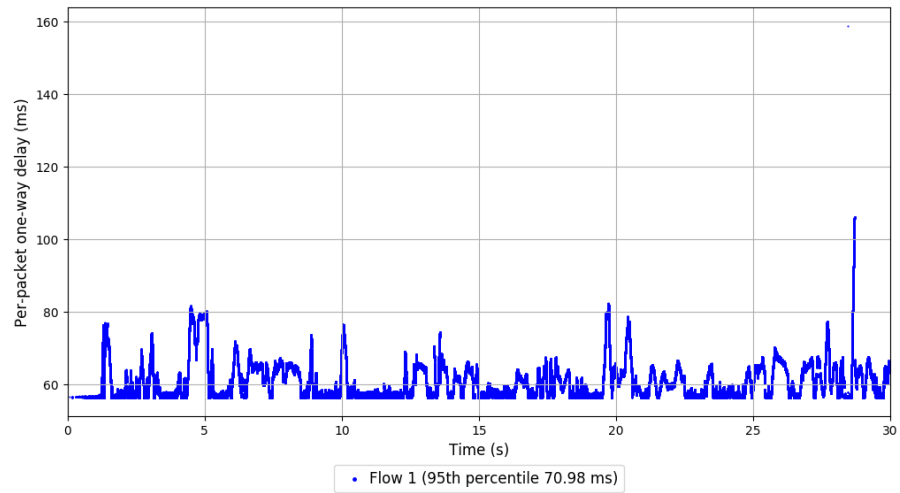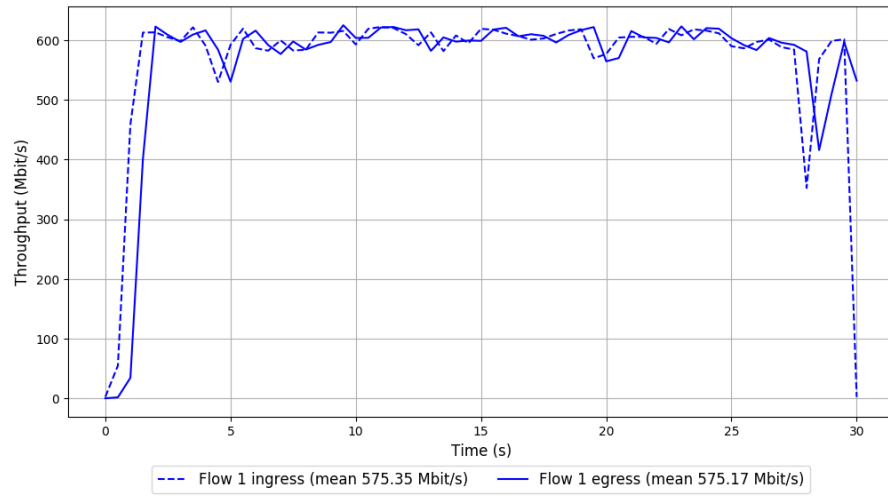
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 567.16 Mbit/s)   Flow 1 egress (mean 567.09 Mbit/s)

Flow 1 (95th percentile 67.70 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-11-03 12:14:04
End at: 2018-11-03 12:14:34
Local clock offset: -0.116 ms
Remote clock offset: 0.355 ms


# Below is generated by plot.py at 2018-11-03 14:32:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 571.37 Mbit/s
95th percentile per-packet one-way delay: 68.103 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 571.37 Mbit/s
95th percentile per-packet one-way delay: 68.103 ms
Loss rate: 0.42%
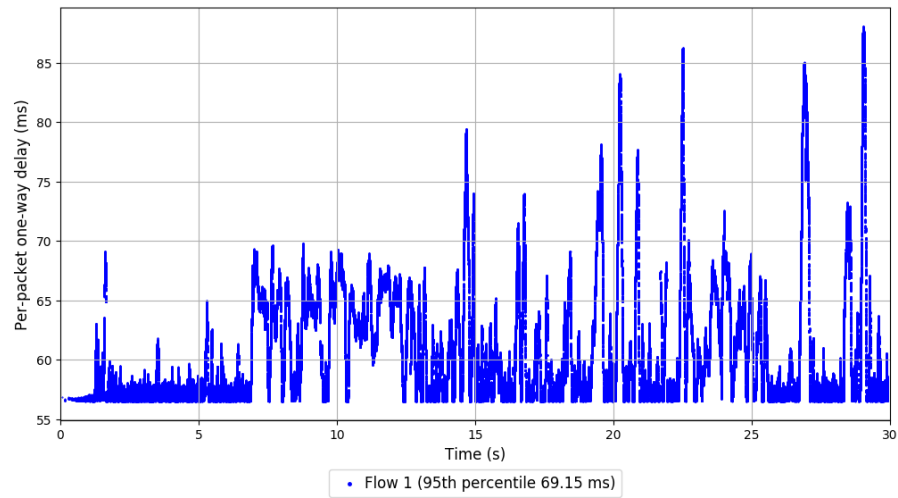```
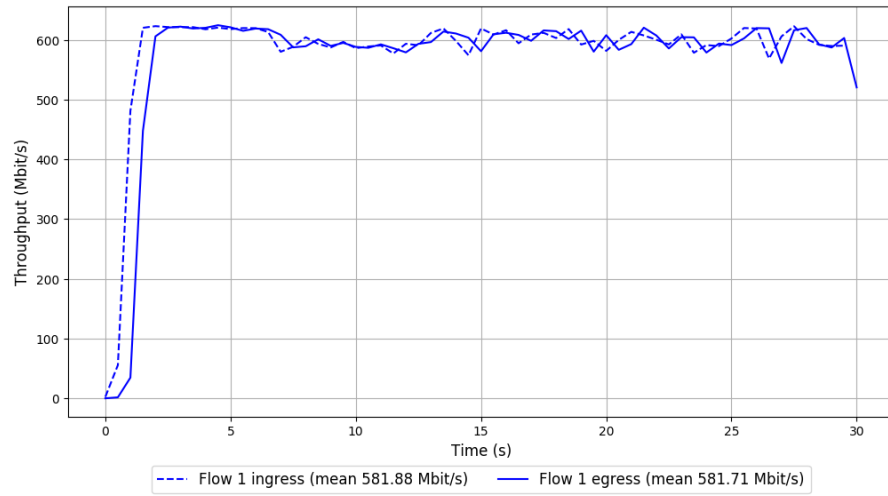
Run 2: Report of TCP Cubic — Data Link



Flow 1 ingress (mean 571.57 Mbit/s) --- Flow 1 egress (mean 571.37 Mbit/s)



• Flow 1 (95th percentile 68.10 ms)

```
Run 3: Statistics of TCP Cubic

Start at: 2018-11-03 12:41:32
End at: 2018-11-03 12:42:02
Local clock offset: -0.088 ms
Remote clock offset: -0.449 ms


# Below is generated by plot.py at 2018-11-03 14:33:11
# Datalink statistics
-- Total of 1 flow:
Average throughput: 583.70 Mbit/s
95th percentile per-packet one-way delay: 66.874 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 583.70 Mbit/s
95th percentile per-packet one-way delay: 66.874 ms
Loss rate: 0.41%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 583.85 Mbit/s)   Flow 1 egress (mean 583.70 Mbit/s)

Flow 1 (95th percentile 66.87 ms)

```
Run 4: Statistics of TCP Cubic

Start at: 2018-11-03 13:08:37
End at: 2018-11-03 13:09:07
Local clock offset: -0.343 ms
Remote clock offset: -0.169 ms


# Below is generated by plot.py at 2018-11-03 14:33:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 575.17 Mbit/s
95th percentile per-packet one-way delay: 70.980 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 575.17 Mbit/s
95th percentile per-packet one-way delay: 70.980 ms
Loss rate: 0.41%
```
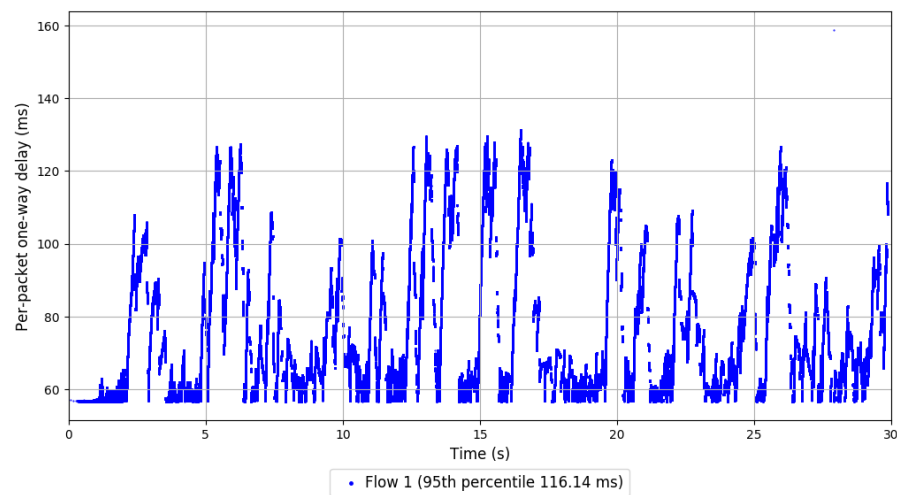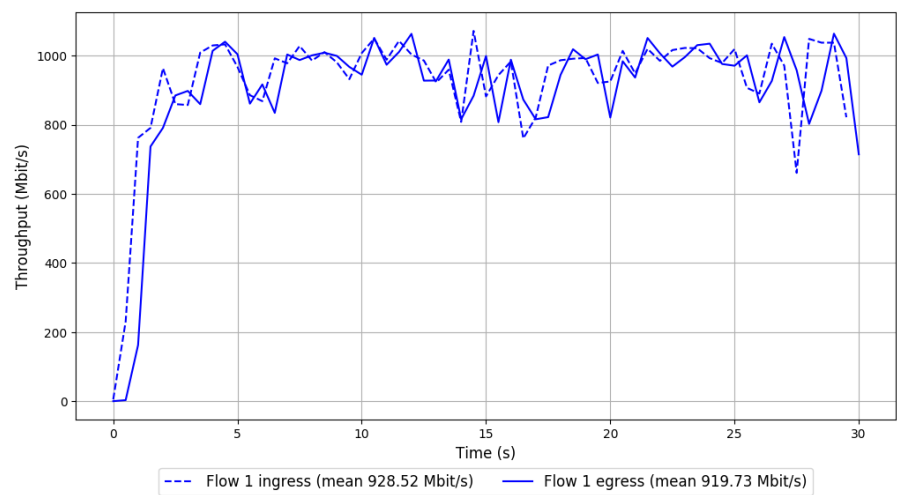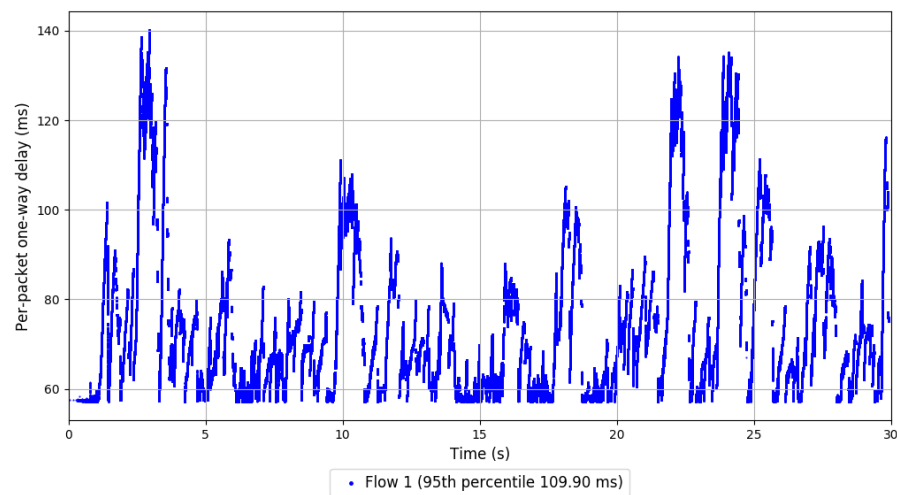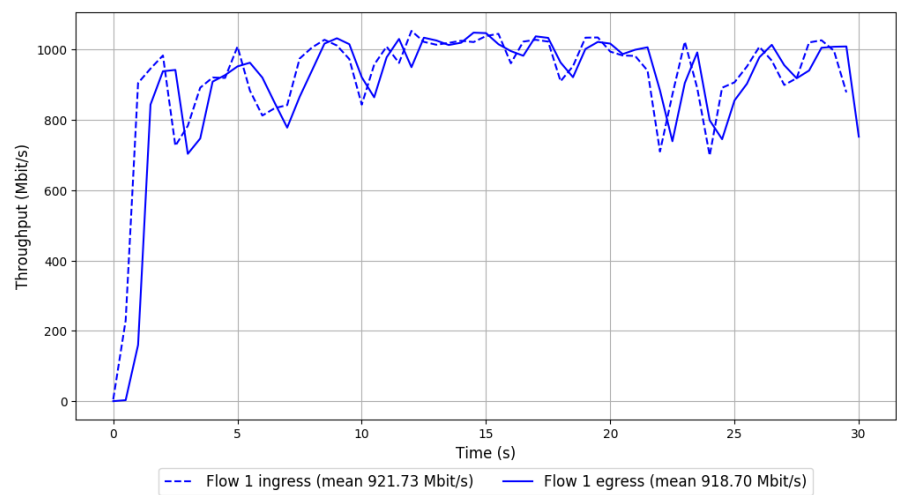
Run 4: Report of TCP Cubic — Data Link

```
Run 5: Statistics of TCP Cubic

Start at: 2018-11-03 13:35:48
End at: 2018-11-03 13:36:18
Local clock offset: -0.421 ms
Remote clock offset: -0.288 ms


# Below is generated by plot.py at 2018-11-03 14:33:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 581.71 Mbit/s
95th percentile per-packet one-way delay: 69.148 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 581.71 Mbit/s
95th percentile per-packet one-way delay: 69.148 ms
Loss rate: 0.41%
```

Run 5: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 581.88 Mbit/s) ------
Flow 1 egress (mean 581.71 Mbit/s) ——
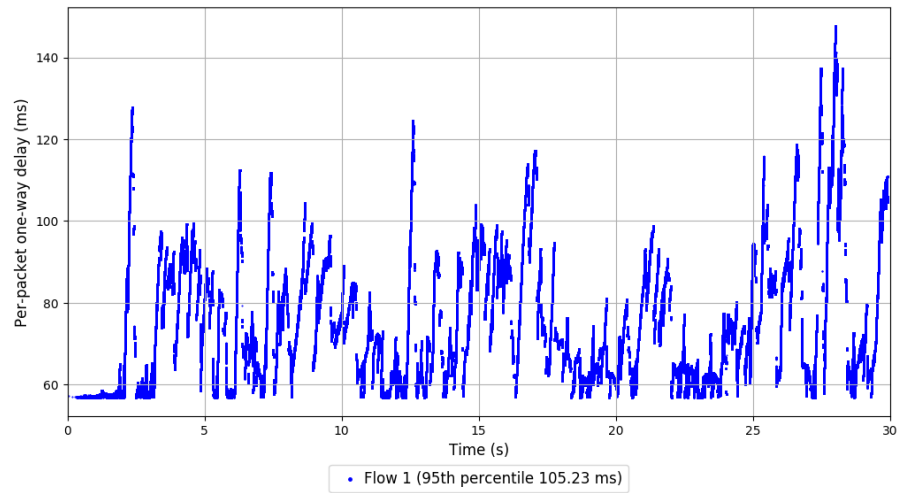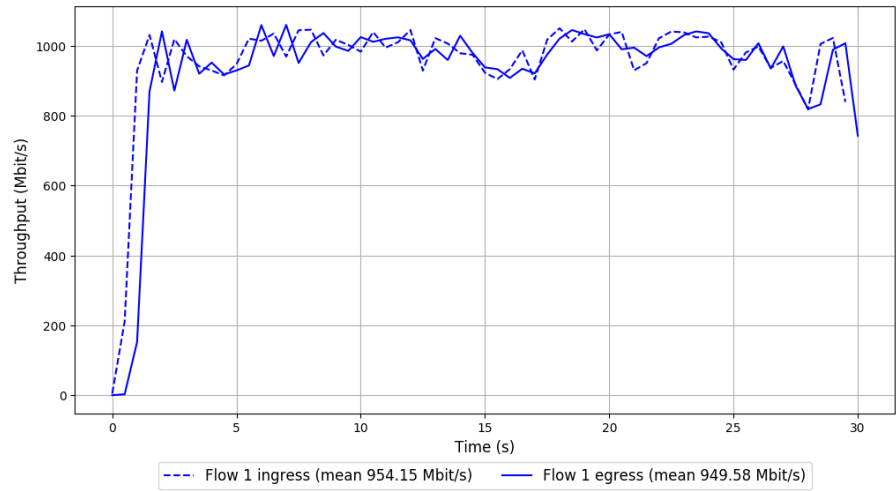

Flow 1 (95th percentile 69.15 ms)

```
Run 1: Statistics of FillP

Start at: 2018-11-03 11:55:20
End at: 2018-11-03 11:55:50
Local clock offset: -0.375 ms
Remote clock offset: 0.042 ms


# Below is generated by plot.py at 2018-11-03 14:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 919.73 Mbit/s
95th percentile per-packet one-way delay: 116.139 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 919.73 Mbit/s
95th percentile per-packet one-way delay: 116.139 ms
Loss rate: 1.33%
```
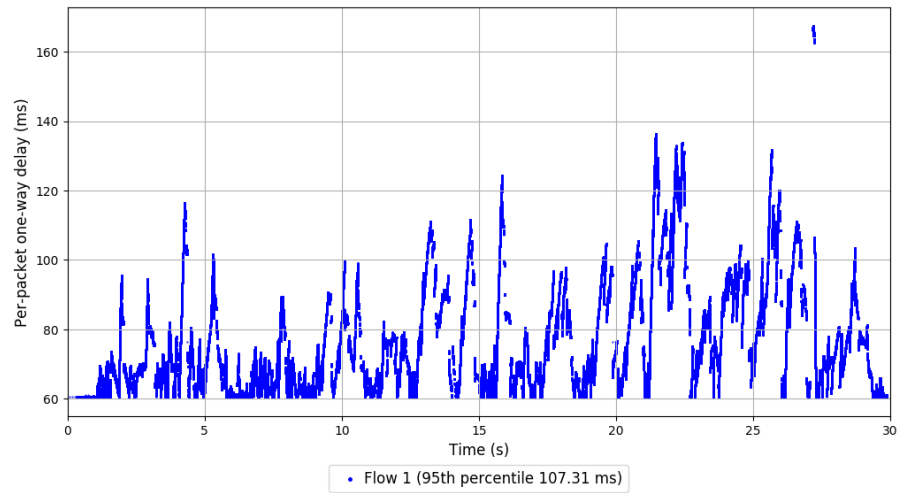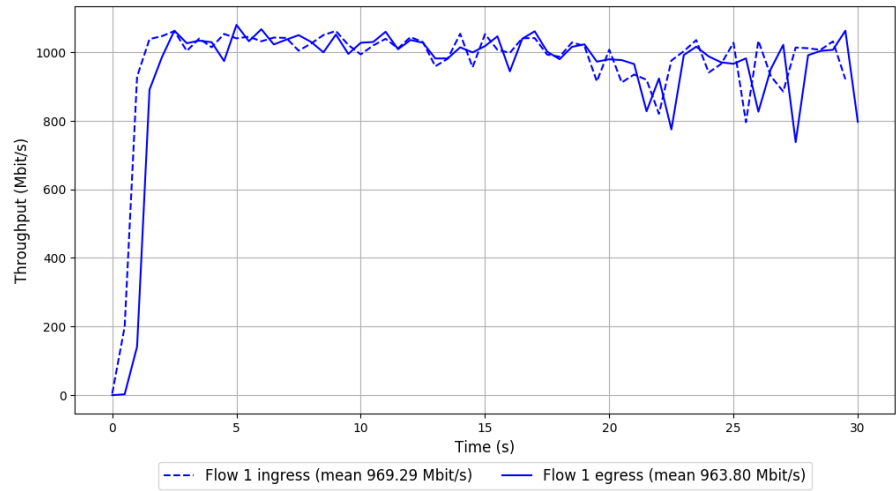
Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 928.52 Mbit/s) — — — Flow 1 egress (mean 919.73 Mbit/s)

• Flow 1 (95th percentile 116.14 ms)

```
Run 2: Statistics of FillP

Start at: 2018-11-03 12:22:58
End at: 2018-11-03 12:23:28
Local clock offset: -0.108 ms
Remote clock offset: -0.265 ms


# Below is generated by plot.py at 2018-11-03 14:54:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 918.70 Mbit/s
95th percentile per-packet one-way delay: 109.901 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 918.70 Mbit/s
95th percentile per-packet one-way delay: 109.901 ms
Loss rate: 0.71%
```

Run 2: Report of FillP — Data Link

Flow 1 ingress (mean 921.73 Mbit/s) --- Flow 1 egress (mean 918.70 Mbit/s)

• Flow 1 (95th percentile 109.90 ms)

```
Run 3: Statistics of FillP

Start at: 2018-11-03 12:50:04
End at: 2018-11-03 12:50:34
Local clock offset: -0.069 ms
Remote clock offset: -0.223 ms


# Below is generated by plot.py at 2018-11-03 14:55:47
# Datalink statistics
-- Total of 1 flow:
Average throughput: 949.58 Mbit/s
95th percentile per-packet one-way delay: 105.235 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 949.58 Mbit/s
95th percentile per-packet one-way delay: 105.235 ms
Loss rate: 0.86%
```
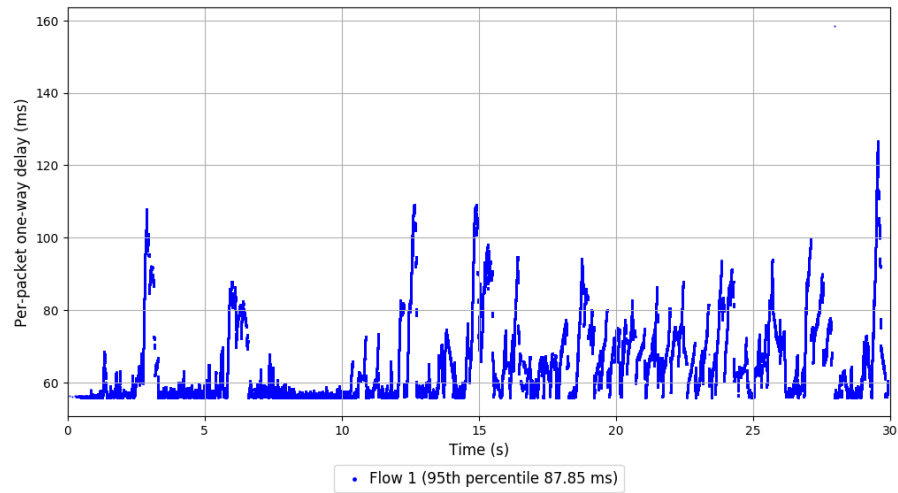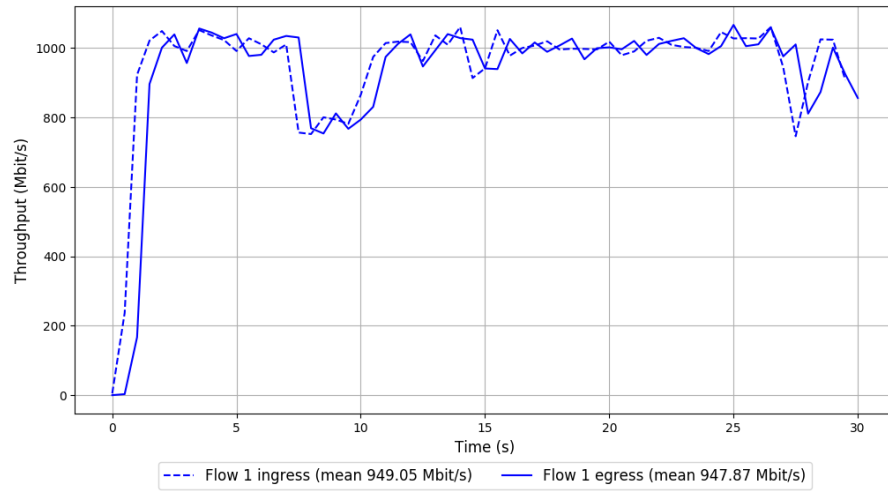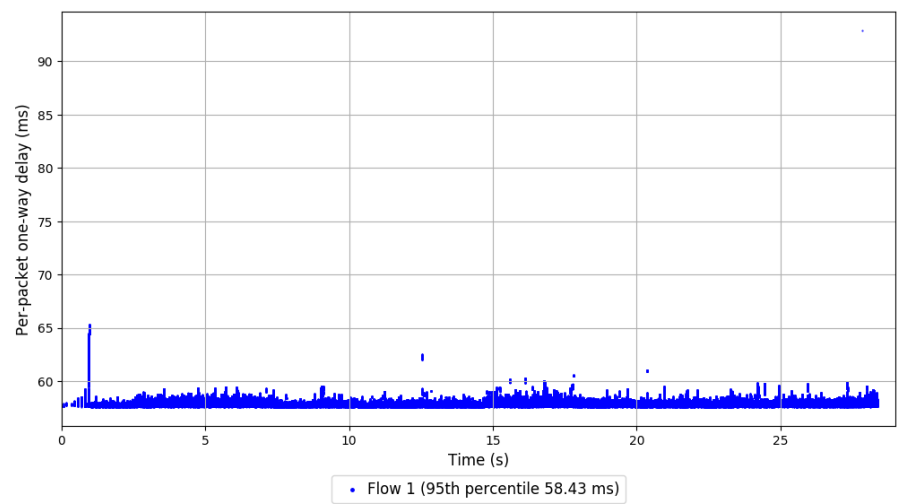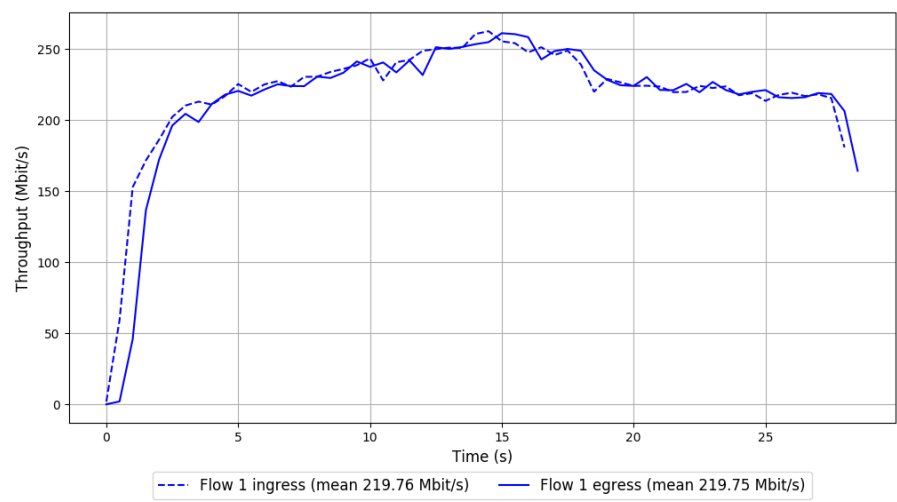
Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 954.15 Mbit/s) ----- Flow 1 egress (mean 949.58 Mbit/s) —

Flow 1 (95th percentile 105.23 ms)

40

```
Run 4: Statistics of FillP

Start at: 2018-11-03 13:17:27
End at: 2018-11-03 13:17:57
Local clock offset: -0.093 ms
Remote clock offset: -0.294 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 963.80 Mbit/s
95th percentile per-packet one-way delay: 107.309 ms
Loss rate: 0.96%
-- Flow 1:
Average throughput: 963.80 Mbit/s
95th percentile per-packet one-way delay: 107.309 ms
Loss rate: 0.96%
```

Run 4: Report of FillP — Data Link

```
Run 5: Statistics of FillP

Start at: 2018-11-03 13:44:44
End at: 2018-11-03 13:45:14
Local clock offset: -0.166 ms
Remote clock offset: 0.99 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 947.87 Mbit/s
95th percentile per-packet one-way delay: 87.849 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 947.87 Mbit/s
95th percentile per-packet one-way delay: 87.849 ms
Loss rate: 0.51%
```
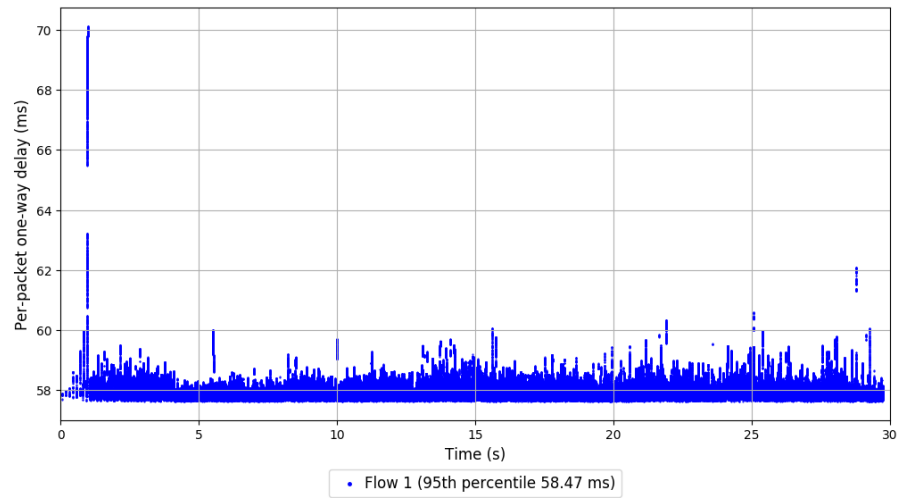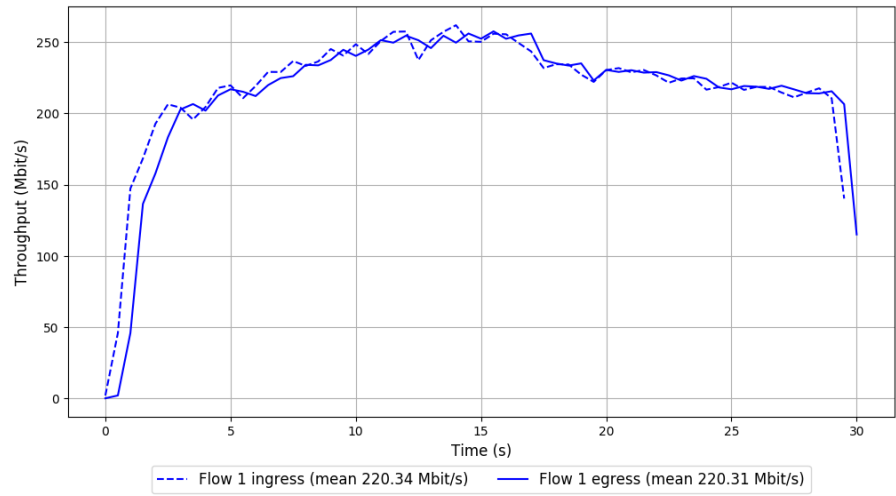
Run 5: Report of FillP — Data Link

Flow 1 ingress (mean 949.05 Mbit/s)   Flow 1 egress (mean 947.87 Mbit/s)

Flow 1 (95th percentile 87.85 ms)

44

```
Run 1: Statistics of Indigo

Start at: 2018-11-03 12:02:54
End at: 2018-11-03 12:03:24
Local clock offset: -0.361 ms
Remote clock offset: -0.672 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 219.75 Mbit/s
95th percentile per-packet one-way delay: 58.431 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 219.75 Mbit/s
95th percentile per-packet one-way delay: 58.431 ms
Loss rate: 0.40%
```
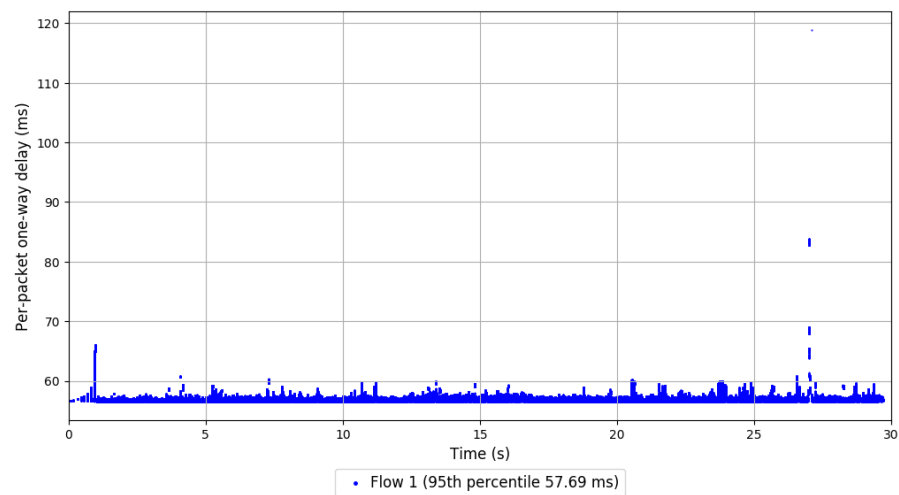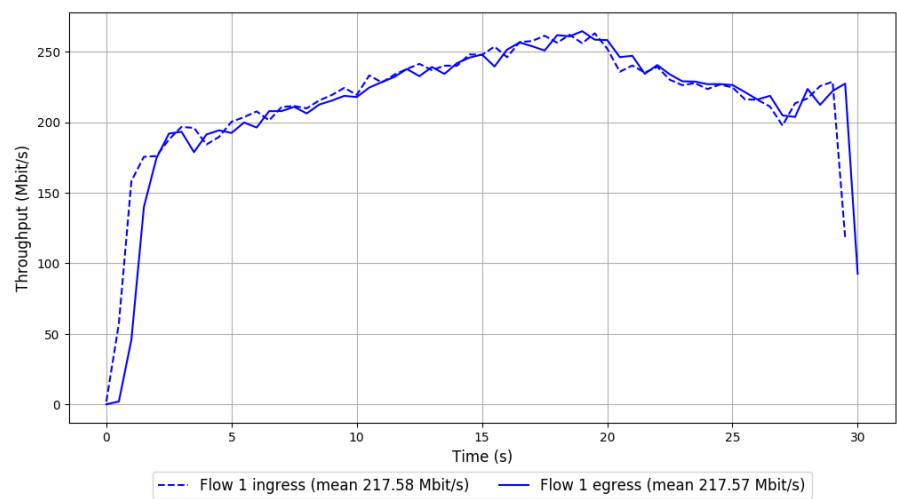
Run 1: Report of Indigo — Data Link

Flow 1 ingress (mean 219.76 Mbit/s)   Flow 1 egress (mean 219.75 Mbit/s)

Flow 1 (95th percentile 58.43 ms)

```
Run 2: Statistics of Indigo

Start at: 2018-11-03 12:30:33
End at: 2018-11-03 12:31:03
Local clock offset: 0.341 ms
Remote clock offset: -0.574 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 220.31 Mbit/s
95th percentile per-packet one-way delay: 58.467 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 220.31 Mbit/s
95th percentile per-packet one-way delay: 58.467 ms
Loss rate: 0.40%
```
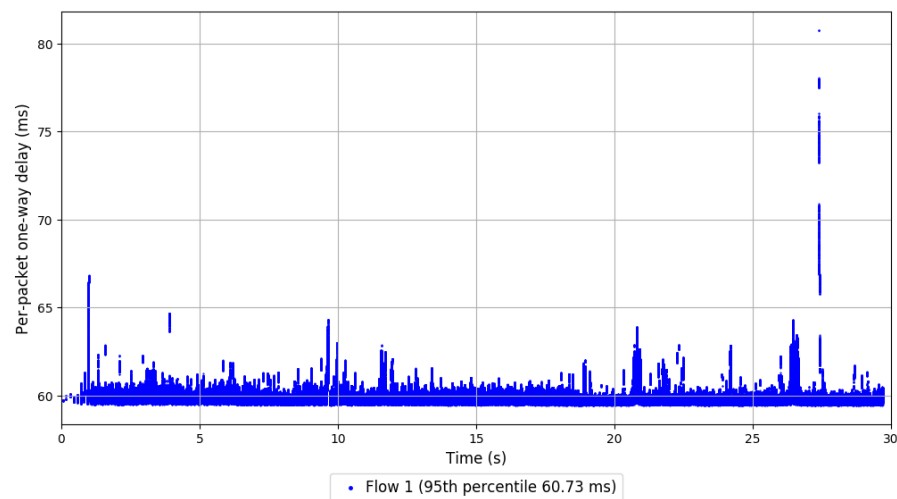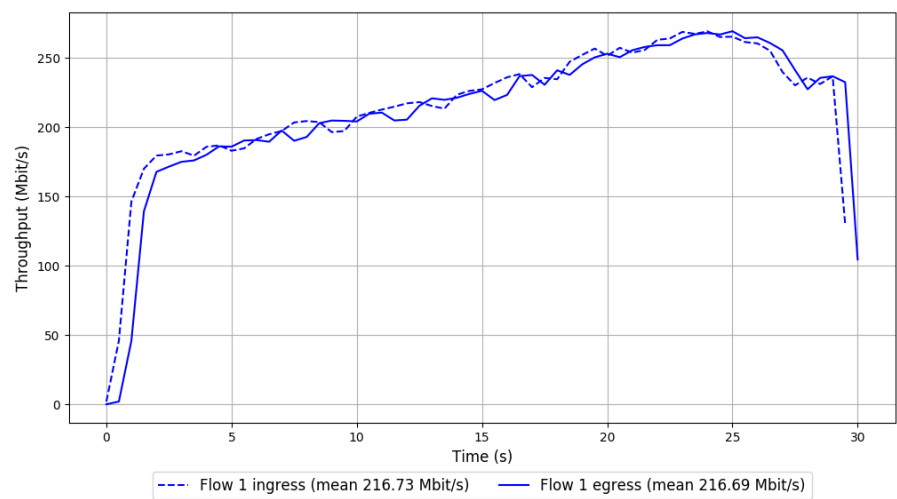
Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2018-11-03 12:57:48
End at: 2018-11-03 12:58:18
Local clock offset: -0.081 ms
Remote clock offset: 0.264 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 217.57 Mbit/s
95th percentile per-packet one-way delay: 57.691 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 217.57 Mbit/s
95th percentile per-packet one-way delay: 57.691 ms
Loss rate: 0.39%
```
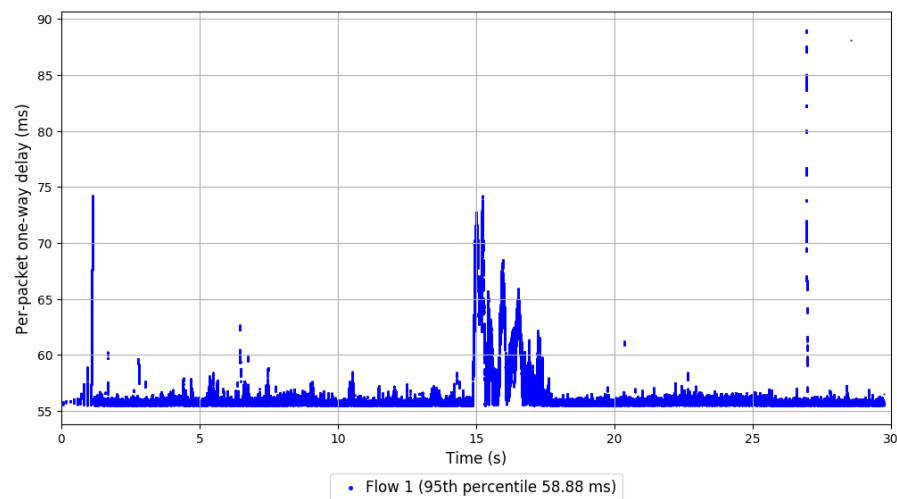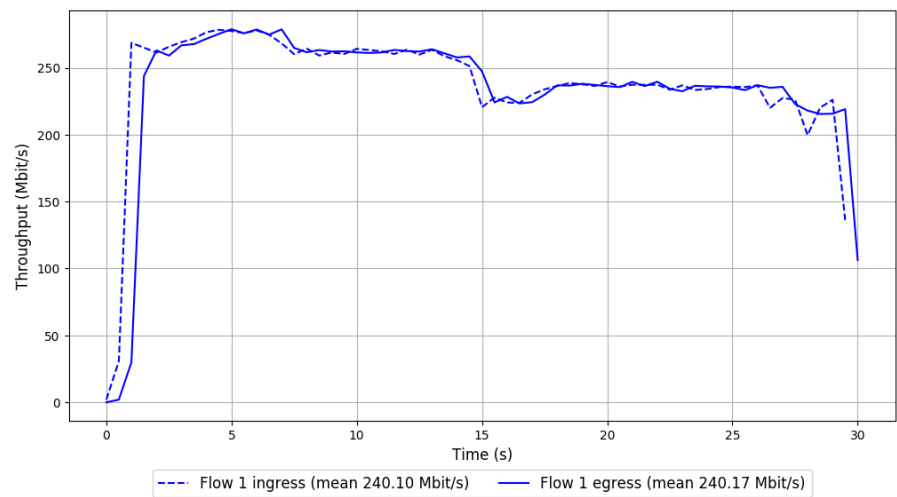
Run 3: Report of Indigo — Data Link

Flow 1 ingress (mean 217.58 Mbit/s)   Flow 1 egress (mean 217.57 Mbit/s)

Flow 1 (95th percentile 57.69 ms)

```
Run 4: Statistics of Indigo

Start at: 2018-11-03 13:25:08
End at: 2018-11-03 13:25:39
Local clock offset: -0.067 ms
Remote clock offset: 0.565 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 216.69 Mbit/s
95th percentile per-packet one-way delay: 60.735 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 216.69 Mbit/s
95th percentile per-packet one-way delay: 60.735 ms
Loss rate: 0.41%
```
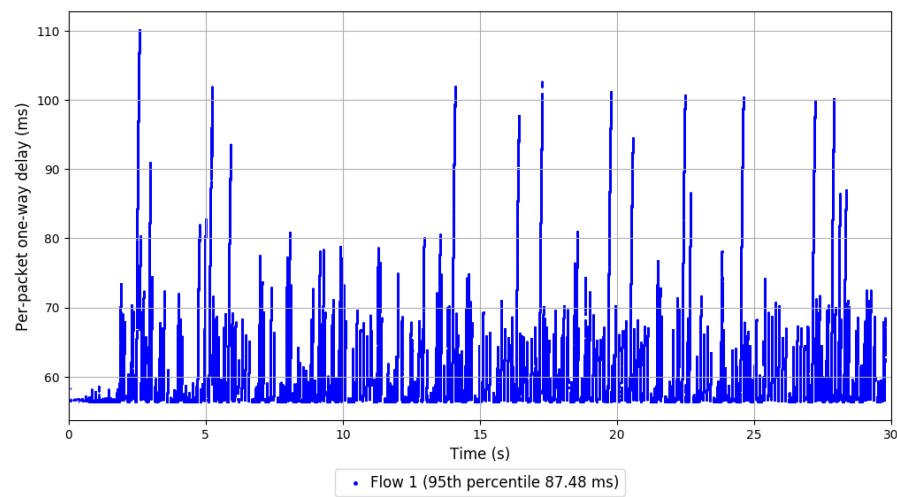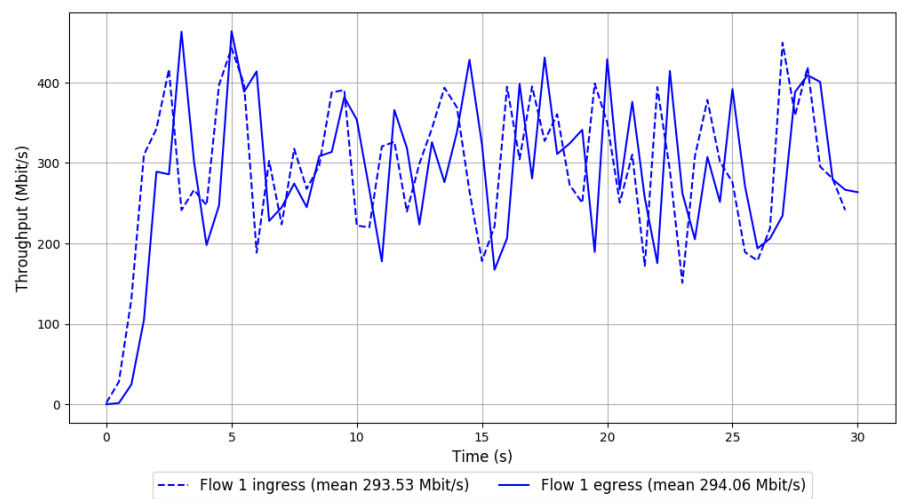
Run 4: Report of Indigo — Data Link

Flow 1 ingress (mean 216.73 Mbit/s)   Flow 1 egress (mean 216.69 Mbit/s)

Flow 1 (95th percentile 60.73 ms)

```
Run 5: Statistics of Indigo

Start at: 2018-11-03 13:52:19
End at: 2018-11-03 13:52:49
Local clock offset: -0.212 ms
Remote clock offset: 0.989 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 240.17 Mbit/s
95th percentile per-packet one-way delay: 58.882 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 240.17 Mbit/s
95th percentile per-packet one-way delay: 58.882 ms
Loss rate: 0.35%
```
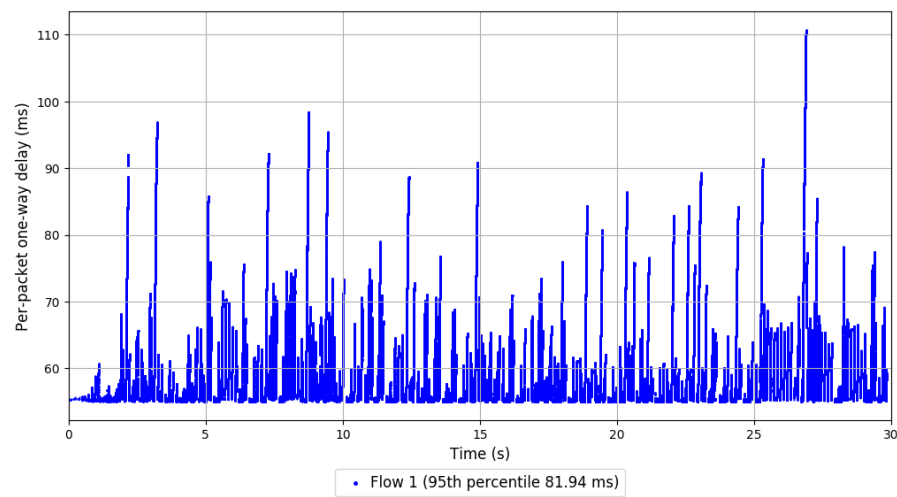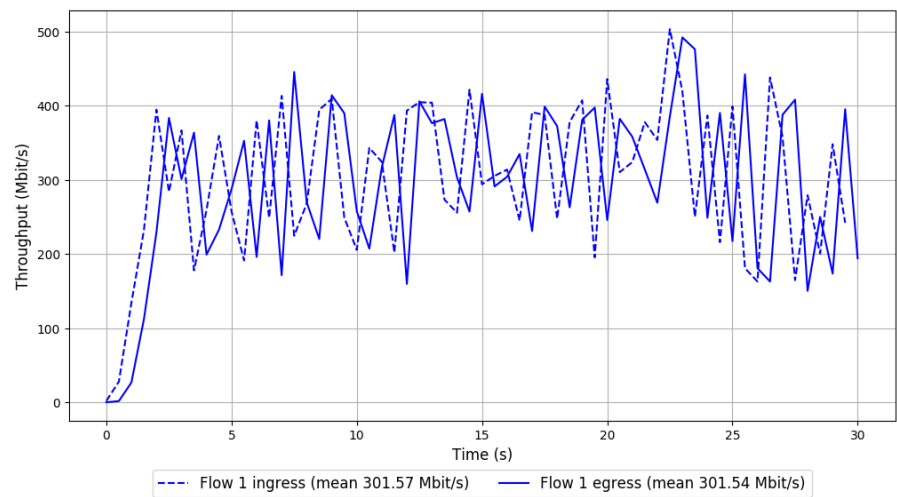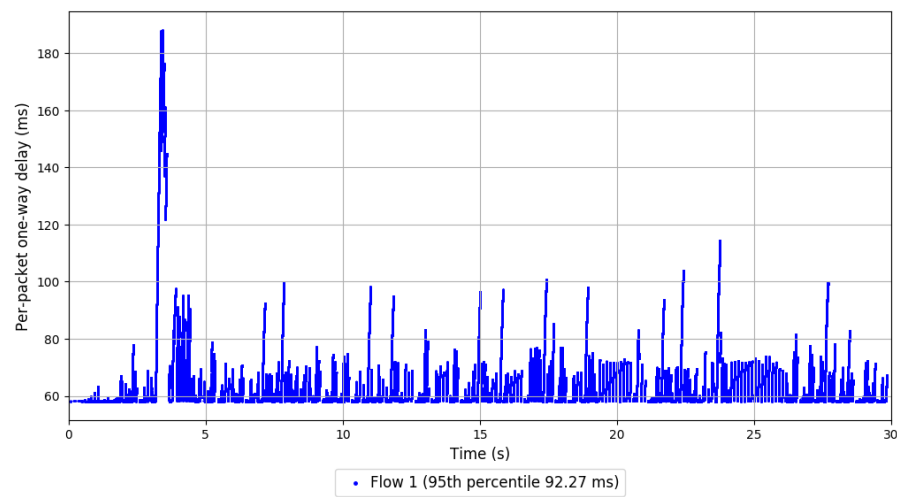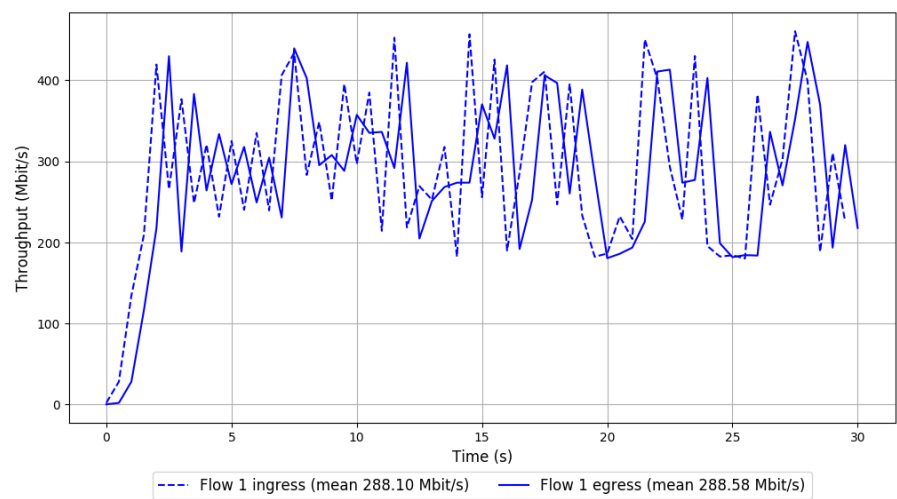
Run 5: Report of Indigo — Data Link

```
Run 1: Statistics of Indigo-96d2da3

Start at: 2018-11-03 11:45:11
End at: 2018-11-03 11:45:41
Local clock offset: 0.136 ms
Remote clock offset: 0.89 ms

# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 294.06 Mbit/s
95th percentile per-packet one-way delay: 87.483 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 294.06 Mbit/s
95th percentile per-packet one-way delay: 87.483 ms
Loss rate: 0.21%
```
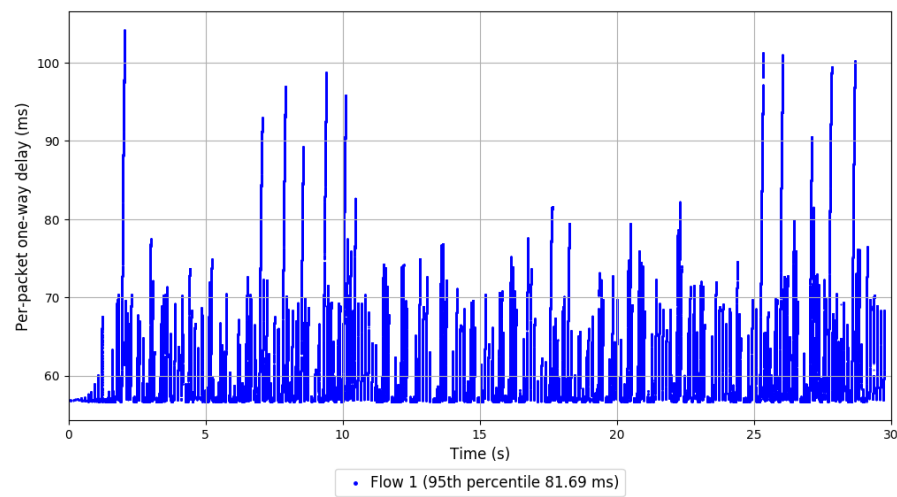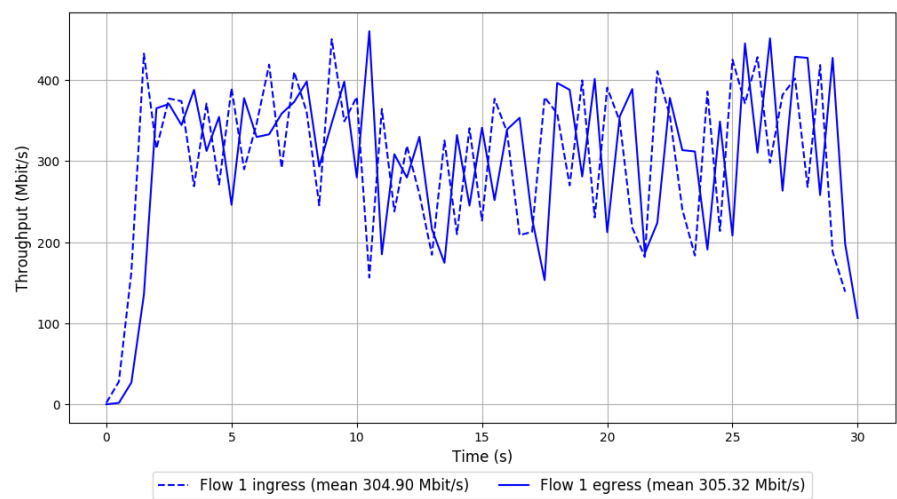
Run 1: Report of Indigo-96d2da3 — Data Link

```
Run 2: Statistics of Indigo-96d2da3

Start at: 2018-11-03 12:12:37
End at: 2018-11-03 12:13:07
Local clock offset: -0.564 ms
Remote clock offset: 1.497 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 301.54 Mbit/s
95th percentile per-packet one-way delay: 81.945 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 301.54 Mbit/s
95th percentile per-packet one-way delay: 81.945 ms
Loss rate: 0.40%
```

Run 2: Report of Indigo-96d2da3 — Data Link

```
Run 3: Statistics of Indigo-96d2da3

Start at: 2018-11-03 12:40:08
End at: 2018-11-03 12:40:38
Local clock offset: -0.084 ms
Remote clock offset: -0.843 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 288.58 Mbit/s
95th percentile per-packet one-way delay: 92.274 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 288.58 Mbit/s
95th percentile per-packet one-way delay: 92.274 ms
Loss rate: 0.29%
```
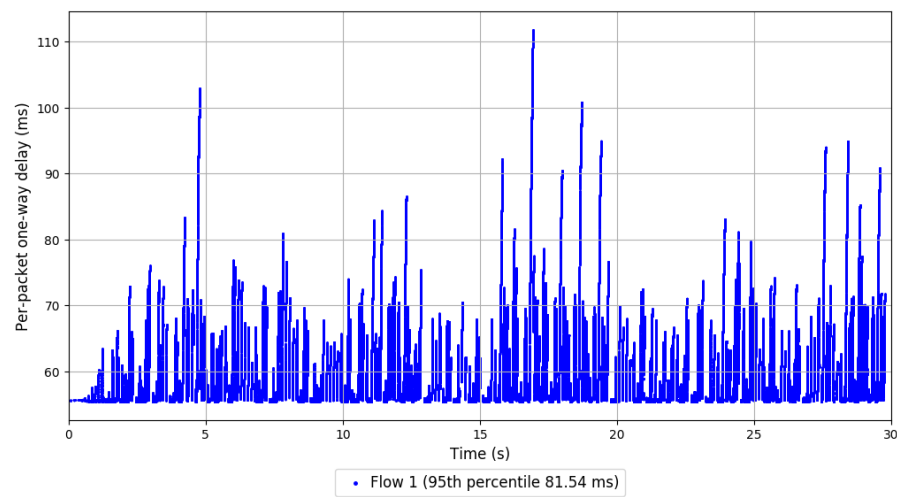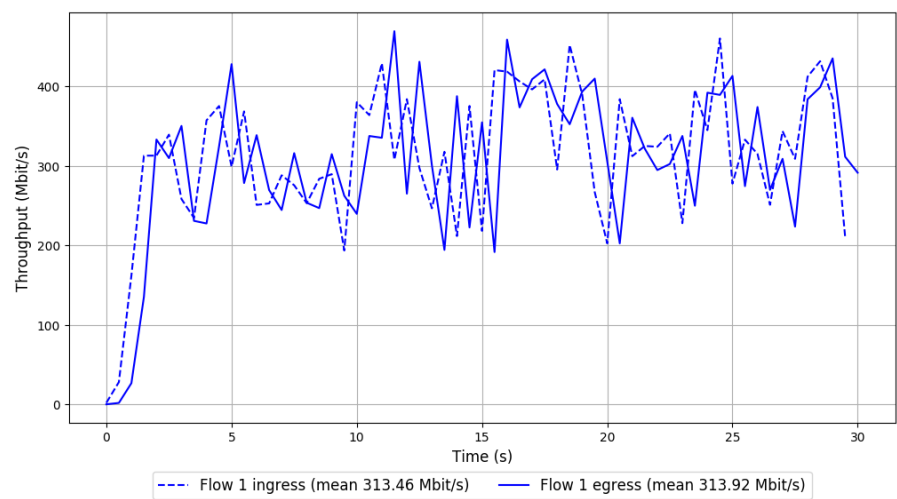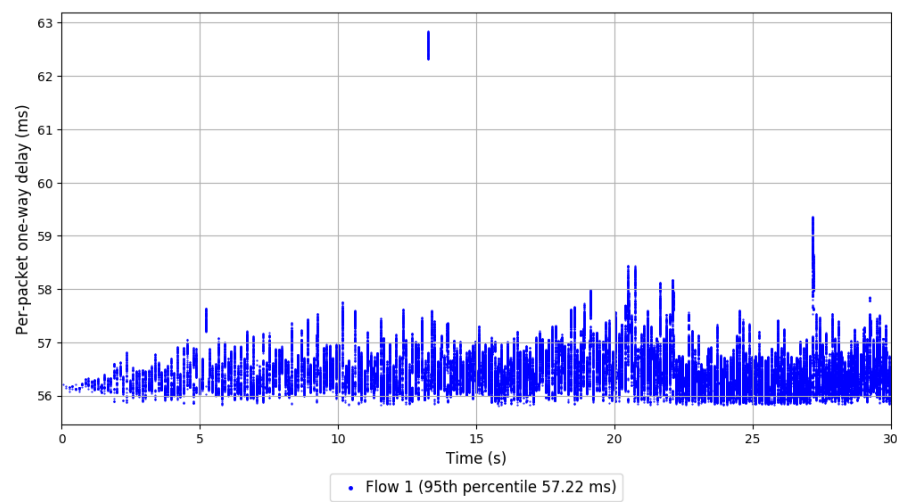
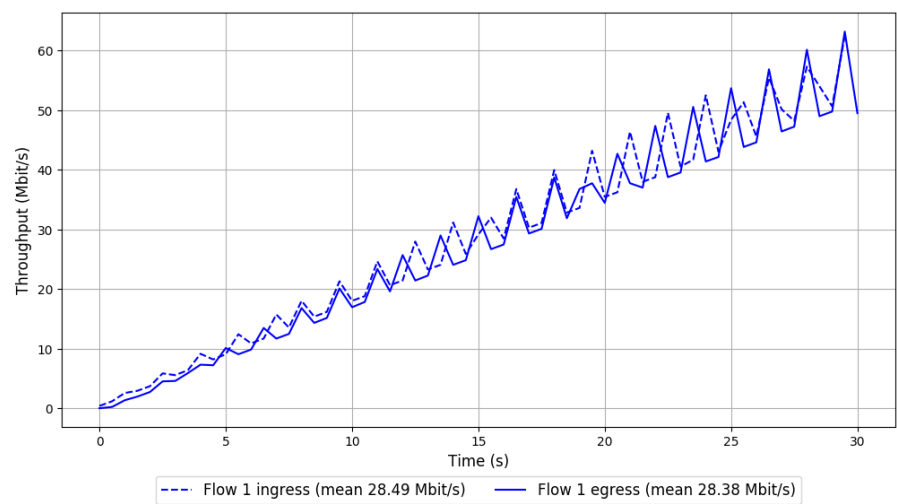Run 3: Report of Indigo-96d2da3 — Data Link

```
Run 4: Statistics of Indigo-96d2da3

Start at: 2018-11-03 13:07:10
End at: 2018-11-03 13:07:40
Local clock offset: -0.071 ms
Remote clock offset: -0.172 ms


# Below is generated by plot.py at 2018-11-03 14:56:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 305.32 Mbit/s
95th percentile per-packet one-way delay: 81.694 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 305.32 Mbit/s
95th percentile per-packet one-way delay: 81.694 ms
Loss rate: 0.25%
```

Run 4: Report of Indigo-96d2da3 — Data Link

```
Run 5: Statistics of Indigo-96d2da3

Start at: 2018-11-03 13:34:22
End at: 2018-11-03 13:34:52
Local clock offset: -0.135 ms
Remote clock offset: 1.249 ms


# Below is generated by plot.py at 2018-11-03 14:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 313.92 Mbit/s
95th percentile per-packet one-way delay: 81.536 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 313.92 Mbit/s
95th percentile per-packet one-way delay: 81.536 ms
Loss rate: 0.27%
```
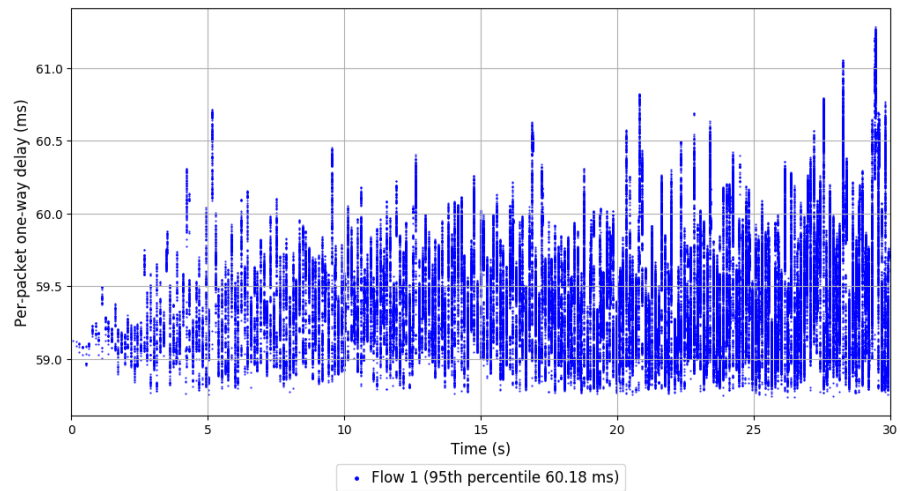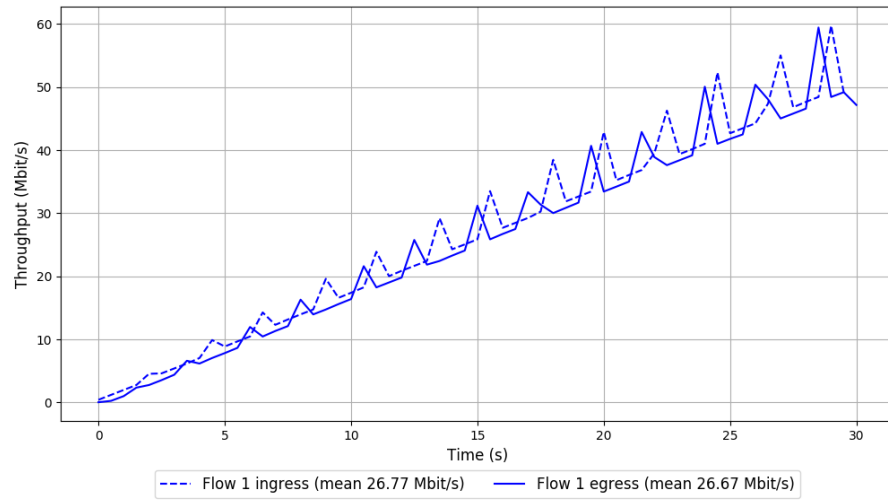
Run 5: Report of Indigo-96d2da3 — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-11-03 12:01:42
End at: 2018-11-03 12:02:12
Local clock offset: -0.527 ms
Remote clock offset: 0.761 ms

# Below is generated by plot.py at 2018-11-03 14:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 28.38 Mbit/s
95th percentile per-packet one-way delay: 57.221 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 28.38 Mbit/s
95th percentile per-packet one-way delay: 57.221 ms
Loss rate: 0.76%
```
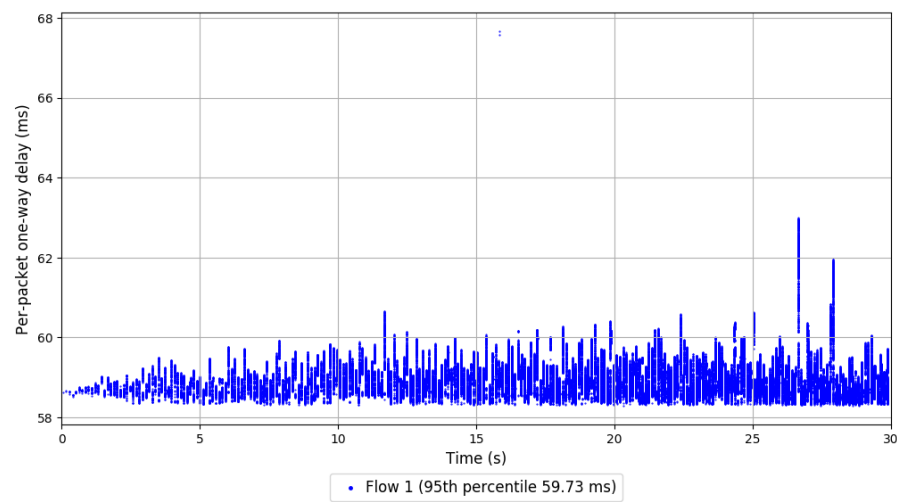
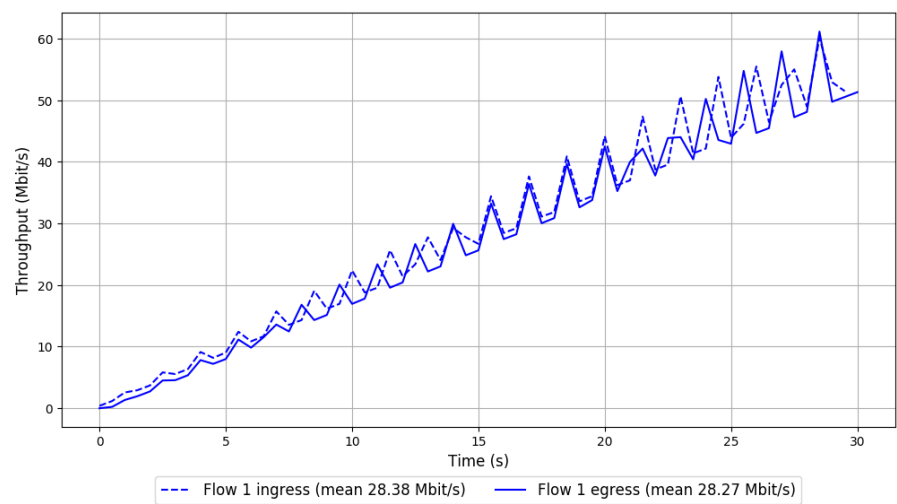# Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2018-11-03 12:29:22
End at: 2018-11-03 12:29:52
Local clock offset: -0.277 ms
Remote clock offset: 1.275 ms

# Below is generated by plot.py at 2018-11-03 14:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 26.67 Mbit/s
95th percentile per-packet one-way delay: 60.179 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 26.67 Mbit/s
95th percentile per-packet one-way delay: 60.179 ms
Loss rate: 0.78%
```

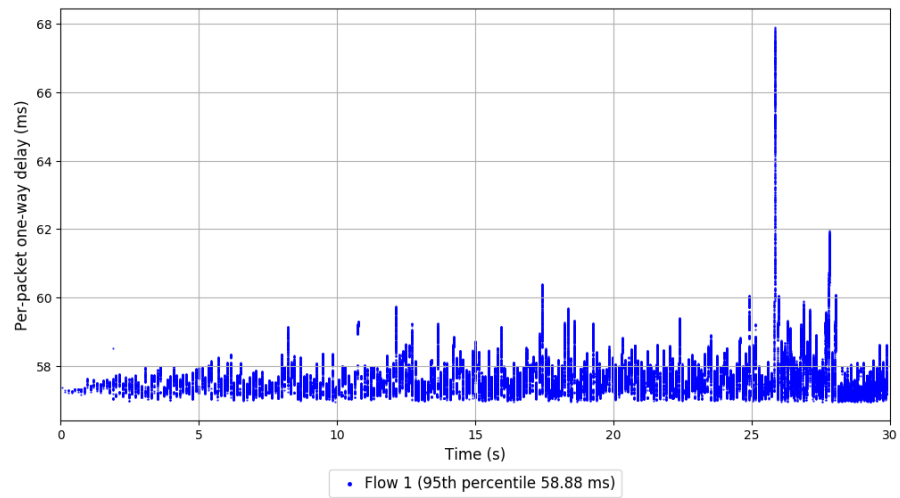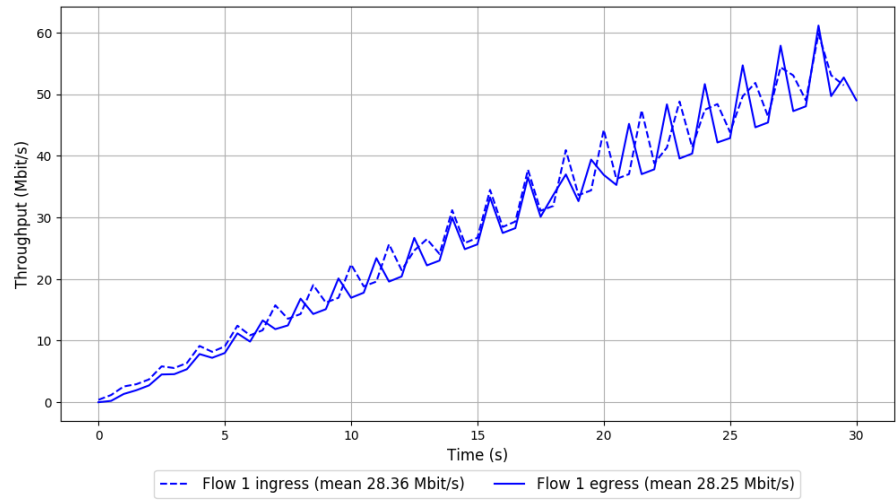Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2018-11-03 12:56:36
End at: 2018-11-03 12:57:06
Local clock offset: -0.065 ms
Remote clock offset: -1.528 ms


# Below is generated by plot.py at 2018-11-03 14:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 28.27 Mbit/s
95th percentile per-packet one-way delay: 59.734 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 28.27 Mbit/s
95th percentile per-packet one-way delay: 59.734 ms
Loss rate: 0.76%
```

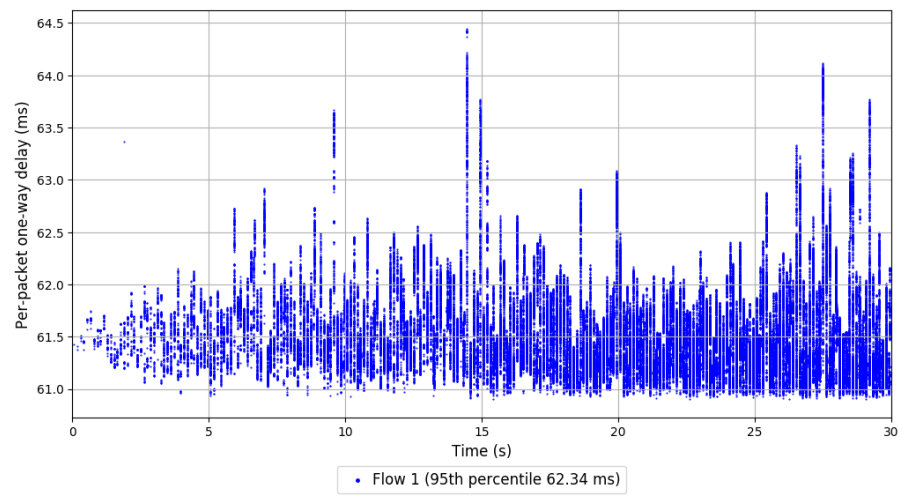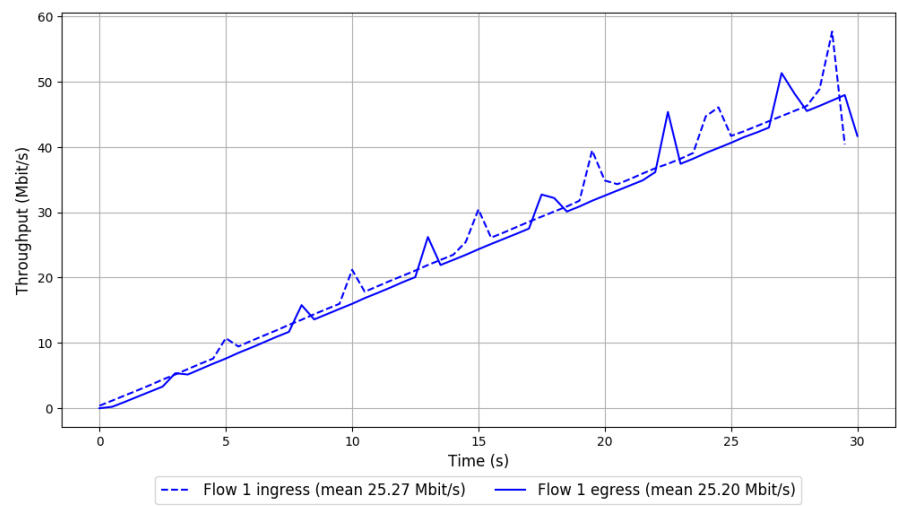## Run 3: Report of LEDBAT — Data Link

Run 4: Statistics of LEDBAT

Start at: 2018-11-03 13:23:57
End at: 2018-11-03 13:24:27
Local clock offset: -0.045 ms
Remote clock offset: -0.271 ms

Below is generated by plot.py at 2018-11-03 14:57:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 28.25 Mbit/s
95th percentile per-packet one-way delay: 58.879 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 28.25 Mbit/s
95th percentile per-packet one-way delay: 58.879 ms
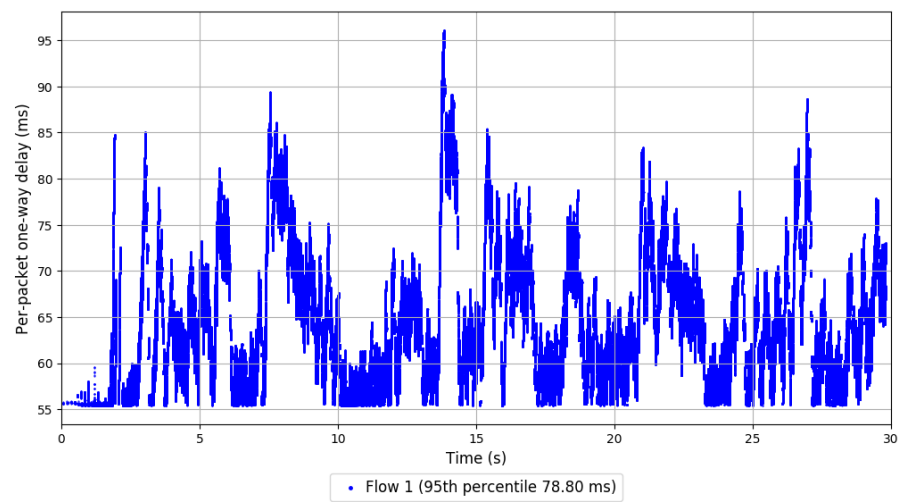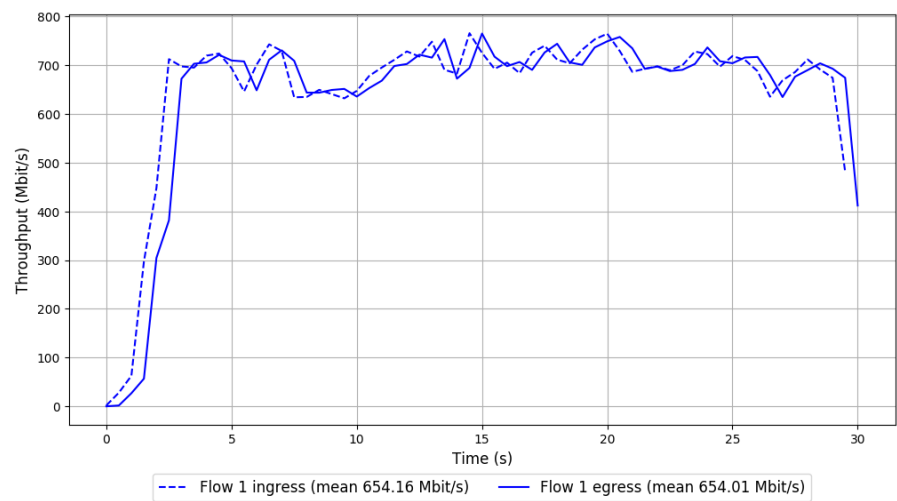Loss rate: 0.76%

Run 4: Report of LEDBAT — Data Link

Flow 1 ingress (mean 28.36 Mbit/s) --- Flow 1 egress (mean 28.25 Mbit/s)

Flow 1 (95th percentile 58.88 ms)

```
Run 5: Statistics of LEDBAT

Start at: 2018-11-03 13:51:08
End at: 2018-11-03 13:51:38
Local clock offset: -0.193 ms
Remote clock offset: -0.556 ms

# Below is generated by plot.py at 2018-11-03 14:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 25.20 Mbit/s
95th percentile per-packet one-way delay: 62.338 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 25.20 Mbit/s
95th percentile per-packet one-way delay: 62.338 ms
Loss rate: 0.67%
```
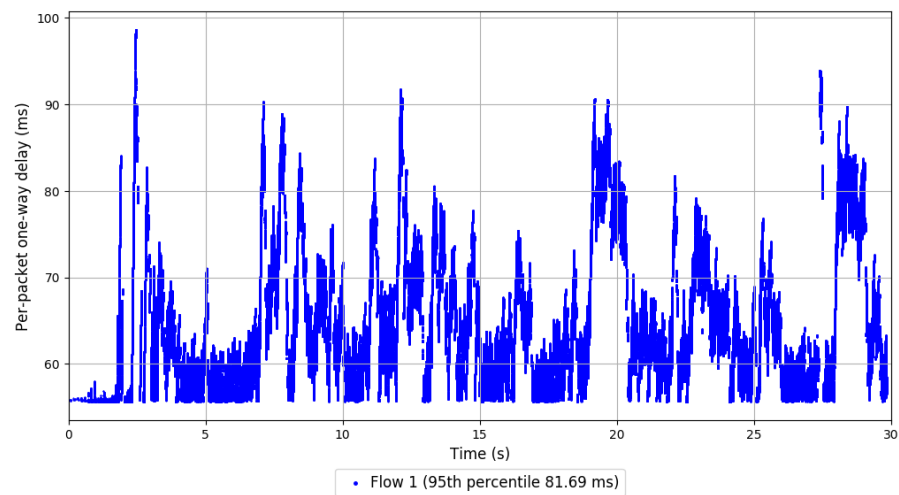
Run 5: Report of LEDBAT — Data Link

Flow 1 ingress (mean 25.27 Mbit/s) ----   Flow 1 egress (mean 25.20 Mbit/s) ———

Flow 1 (95th percentile 62.34 ms)

```
Run 1: Statistics of Indigo-Muses

Start at: 2018-11-03 12:06:08
End at: 2018-11-03 12:06:38
Local clock offset: -0.555 ms
Remote clock offset: 1.428 ms

# Below is generated by plot.py at 2018-11-03 15:07:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 654.01 Mbit/s
95th percentile per-packet one-way delay: 78.801 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 654.01 Mbit/s
95th percentile per-packet one-way delay: 78.801 ms
Loss rate: 0.41%
```
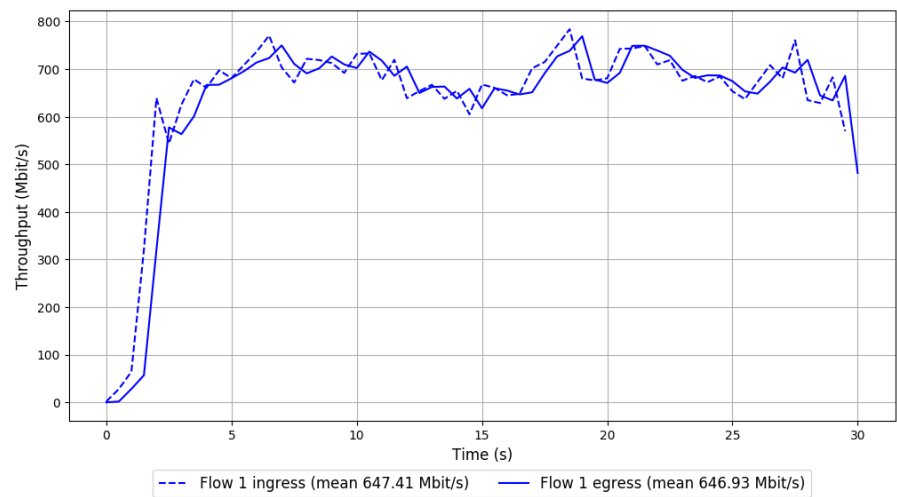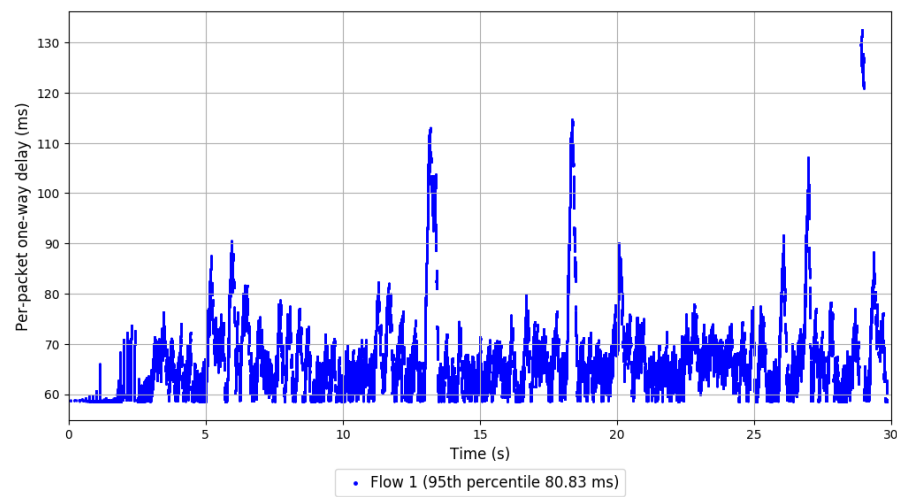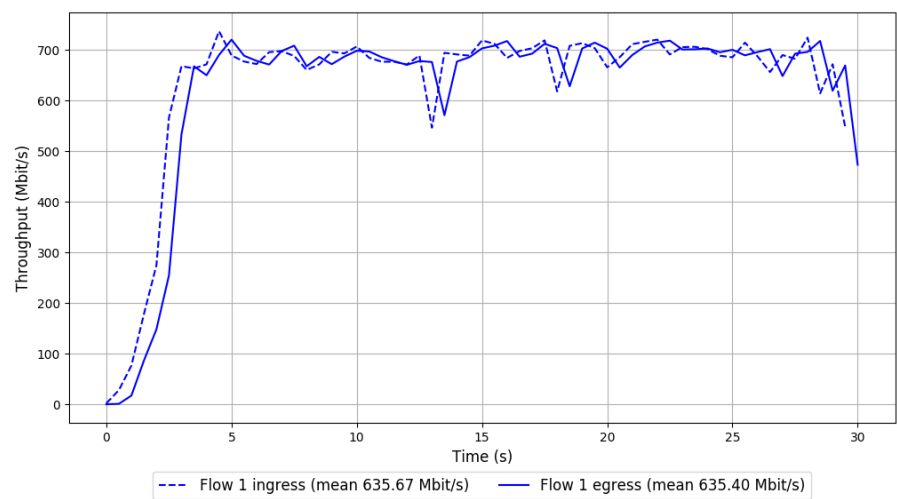
Run 1: Report of Indigo-Muses — Data Link

```
Run 2: Statistics of Indigo-Muses

Start at: 2018-11-03 12:33:49
End at: 2018-11-03 12:34:19
Local clock offset: 0.066 ms
Remote clock offset: 1.38 ms


# Below is generated by plot.py at 2018-11-03 15:08:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 646.93 Mbit/s
95th percentile per-packet one-way delay: 81.694 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 646.93 Mbit/s
95th percentile per-packet one-way delay: 81.694 ms
Loss rate: 0.46%
```
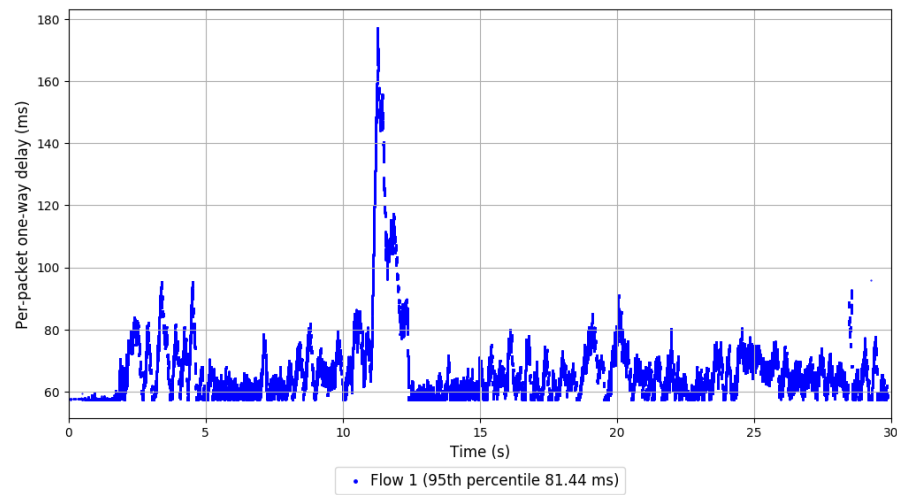
Run 2: Report of Indigo-Muses — Data Link

Flow 1 ingress (mean 647.41 Mbit/s)   Flow 1 egress (mean 646.93 Mbit/s)
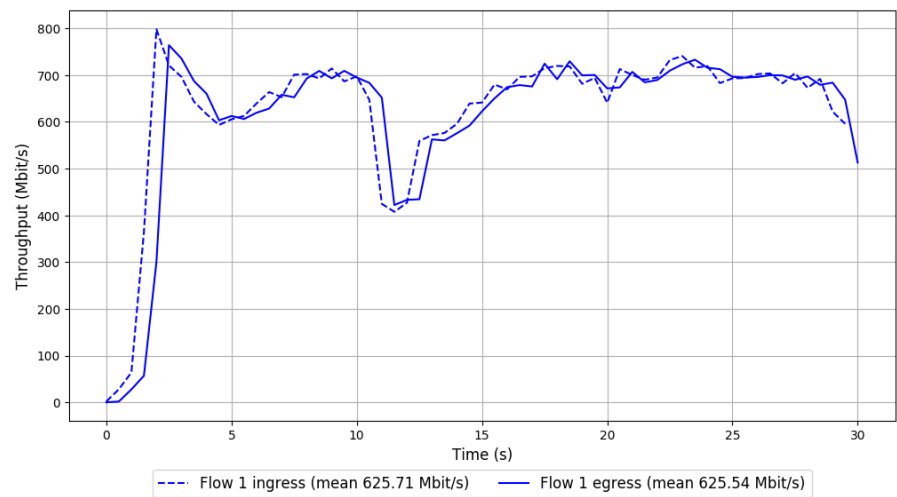

Flow 1 (95th percentile 81.69 ms)

```
Run 3: Statistics of Indigo-Muses

Start at: 2018-11-03 13:00:58
End at: 2018-11-03 13:01:28
Local clock offset: -0.103 ms
Remote clock offset: -1.454 ms


# Below is generated by plot.py at 2018-11-03 15:08:39
# Datalink statistics
-- Total of 1 flow:
Average throughput: 635.40 Mbit/s
95th percentile per-packet one-way delay: 80.827 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 635.40 Mbit/s
95th percentile per-packet one-way delay: 80.827 ms
Loss rate: 0.43%
```
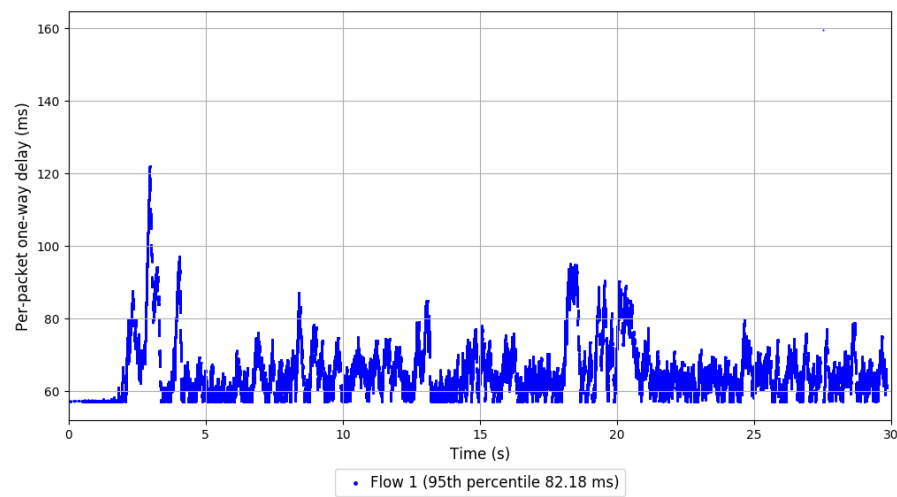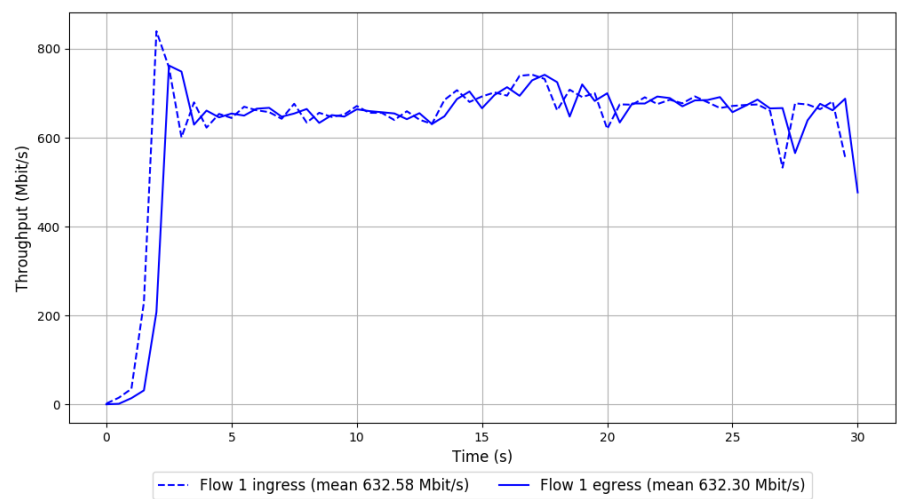
Run 3: Report of Indigo-Muses — Data Link

```
Run 4: Statistics of Indigo-Muses

Start at: 2018-11-03 13:28:14
End at: 2018-11-03 13:28:44
Local clock offset: -0.236 ms
Remote clock offset: -0.827 ms


# Below is generated by plot.py at 2018-11-03 15:08:42
# Datalink statistics
-- Total of 1 flow:
Average throughput: 625.54 Mbit/s
95th percentile per-packet one-way delay: 81.437 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 625.54 Mbit/s
95th percentile per-packet one-way delay: 81.437 ms
Loss rate: 0.41%
```
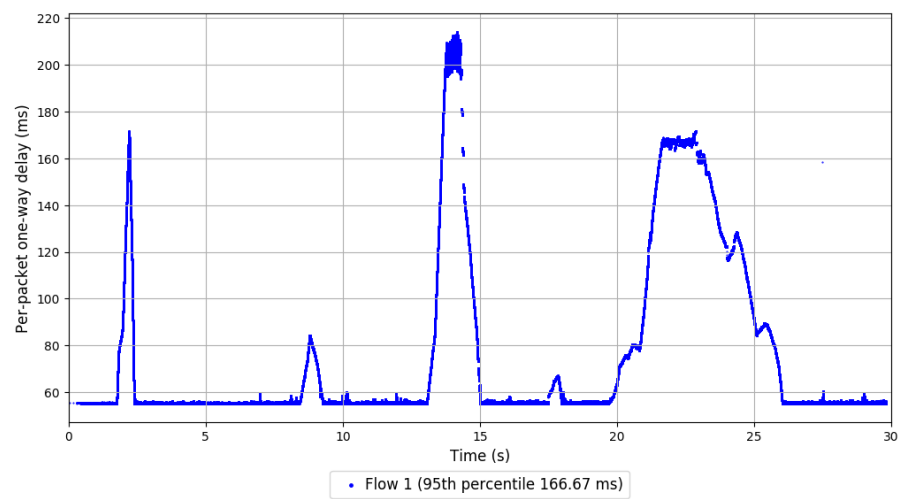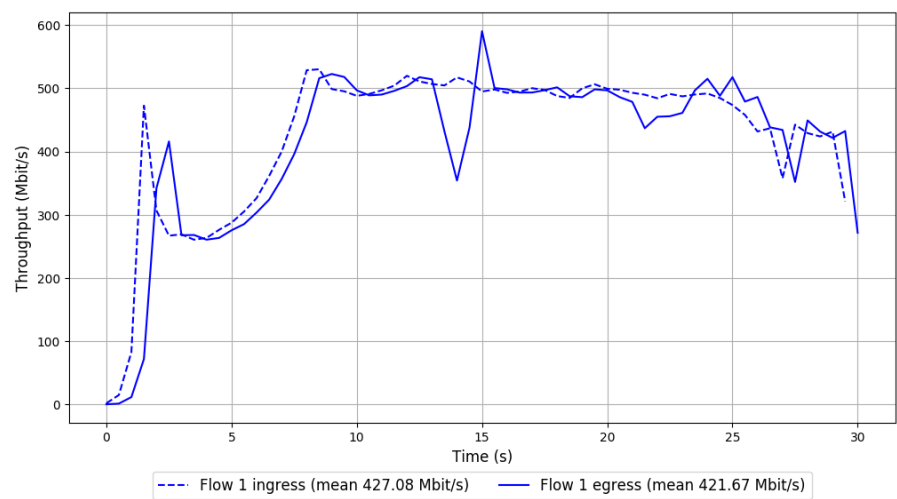
Run 4: Report of Indigo-Muses — Data Link

Flow 1 ingress (mean 625.71 Mbit/s)   Flow 1 egress (mean 625.54 Mbit/s)

Flow 1 (95th percentile 81.44 ms)

```
Run 5: Statistics of Indigo-Muses

Start at: 2018-11-03 13:55:33
End at: 2018-11-03 13:56:03
Local clock offset: -0.182 ms
Remote clock offset: -0.094 ms

# Below is generated by plot.py at 2018-11-03 15:09:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 632.30 Mbit/s
95th percentile per-packet one-way delay: 82.182 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 632.30 Mbit/s
95th percentile per-packet one-way delay: 82.182 ms
Loss rate: 0.43%
```
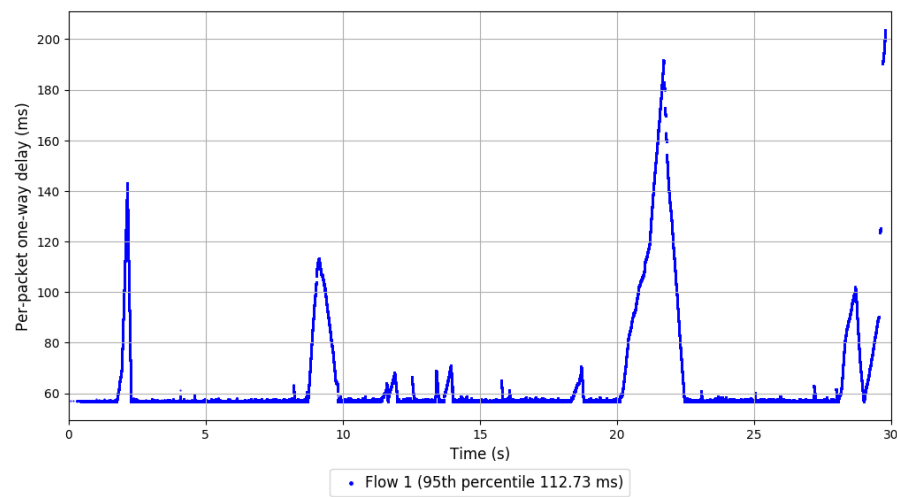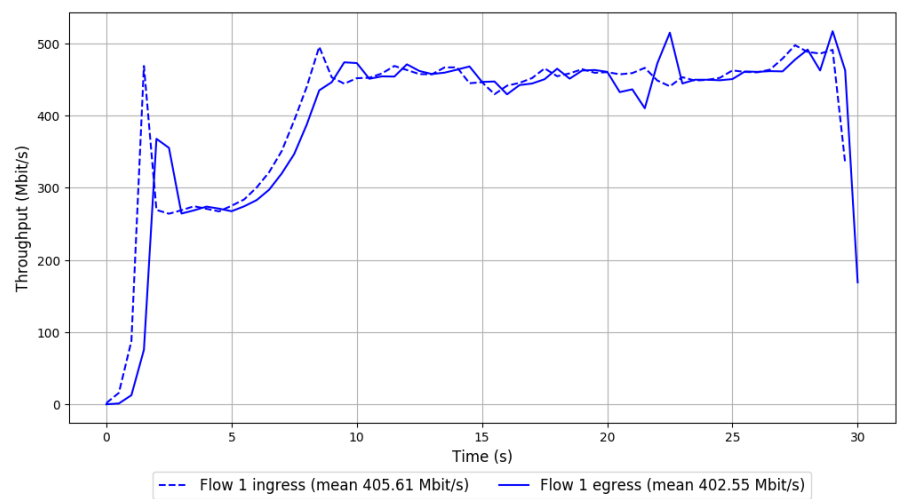
Run 5: Report of Indigo-Muses — Data Link

```
Run 1: Statistics of PCC-Allegro

Start at: 2018-11-03 12:04:23
End at: 2018-11-03 12:04:53
Local clock offset: -0.549 ms
Remote clock offset: 1.481 ms

# Below is generated by plot.py at 2018-11-03 15:12:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 421.67 Mbit/s
95th percentile per-packet one-way delay: 166.673 ms
Loss rate: 1.65%
-- Flow 1:
Average throughput: 421.67 Mbit/s
95th percentile per-packet one-way delay: 166.673 ms
Loss rate: 1.65%
```

Run 1: Report of PCC-Allegro — Data Link

```
Run 2: Statistics of PCC-Allegro

Start at: 2018-11-03 12:32:07
End at: 2018-11-03 12:32:37
Local clock offset: -0.528 ms
Remote clock offset: -0.015 ms


# Below is generated by plot.py at 2018-11-03 15:12:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 402.55 Mbit/s
95th percentile per-packet one-way delay: 112.735 ms
Loss rate: 1.14%
-- Flow 1:
Average throughput: 402.55 Mbit/s
95th percentile per-packet one-way delay: 112.735 ms
Loss rate: 1.14%
```
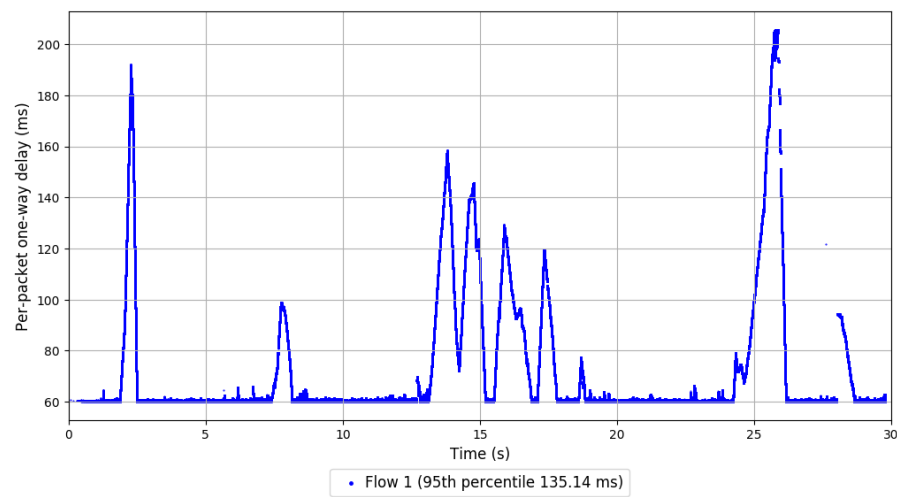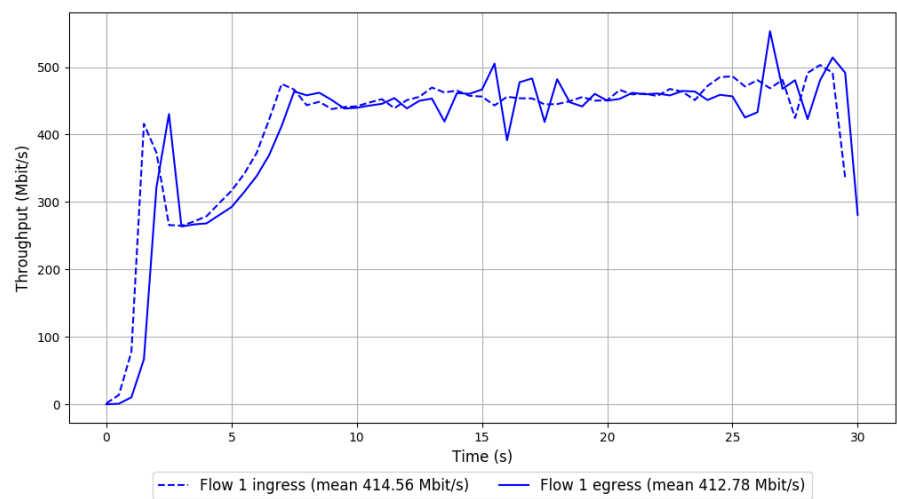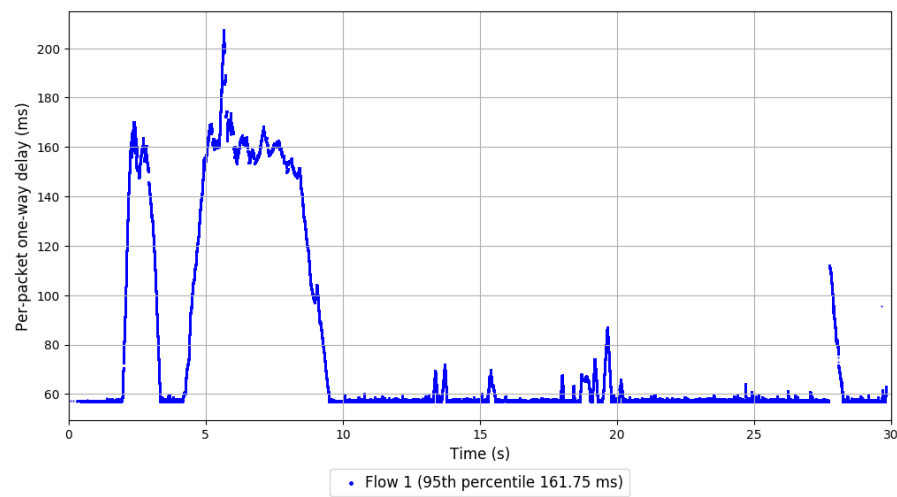
Run 2: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 405.61 Mbit/s) ---- Flow 1 egress (mean 402.55 Mbit/s) ———

• Flow 1 (95th percentile 112.73 ms)

```
Run 3: Statistics of PCC-Allegro

Start at: 2018-11-03 12:59:20
End at: 2018-11-03 12:59:50
Local clock offset: -0.33 ms
Remote clock offset: -0.181 ms


# Below is generated by plot.py at 2018-11-03 15:12:58
# Datalink statistics
-- Total of 1 flow:
Average throughput: 412.78 Mbit/s
95th percentile per-packet one-way delay: 135.139 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 412.78 Mbit/s
95th percentile per-packet one-way delay: 135.139 ms
Loss rate: 0.82%
```

Run 3: Report of PCC-Allegro — Data Link

```
Run 4: Statistics of PCC-Allegro

Start at: 2018-11-03 13:26:36
End at: 2018-11-03 13:27:06
Local clock offset: -0.04 ms
Remote clock offset: -0.13 ms


# Below is generated by plot.py at 2018-11-03 15:25:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 438.66 Mbit/s
95th percentile per-packet one-way delay: 161.747 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 438.66 Mbit/s
95th percentile per-packet one-way delay: 161.747 ms
Loss rate: 1.63%
```
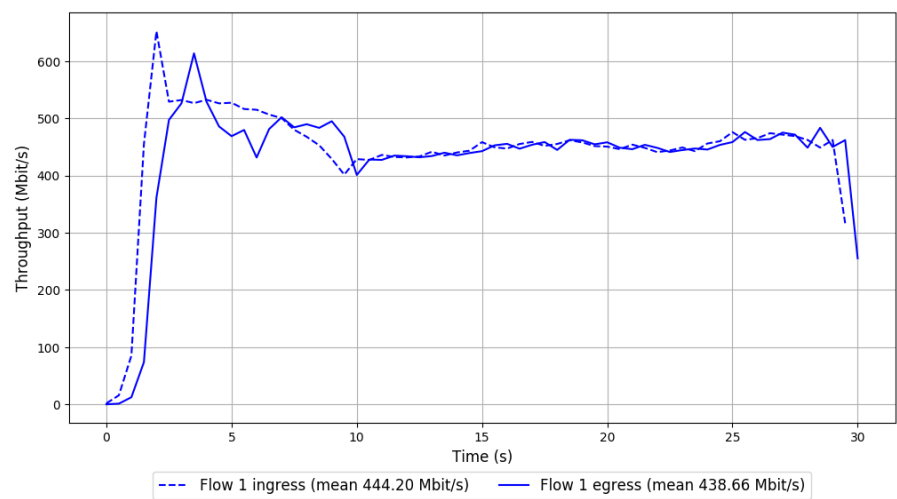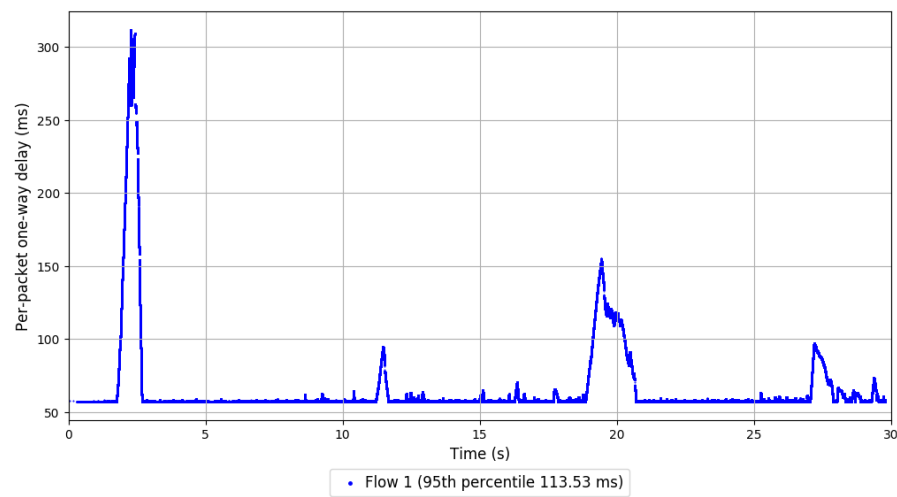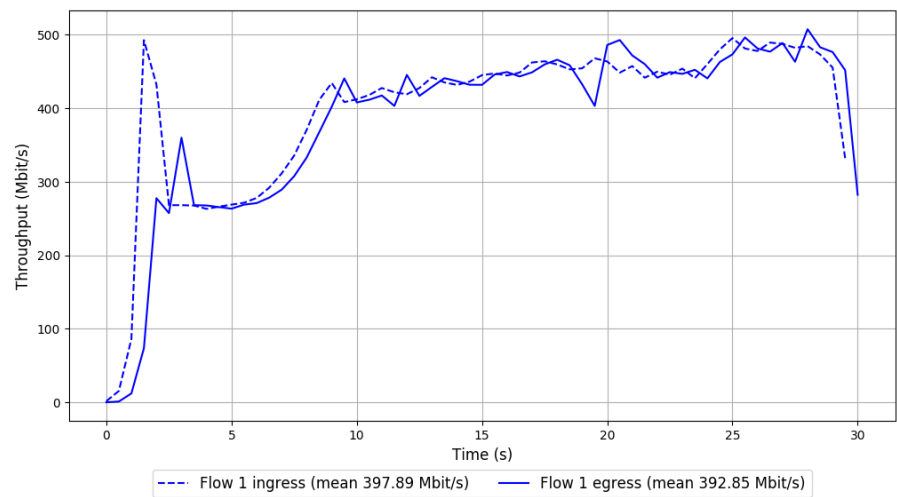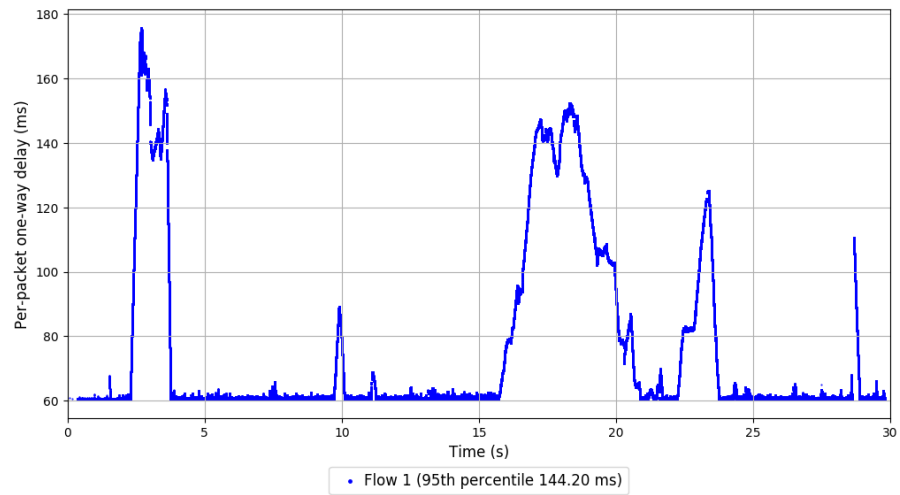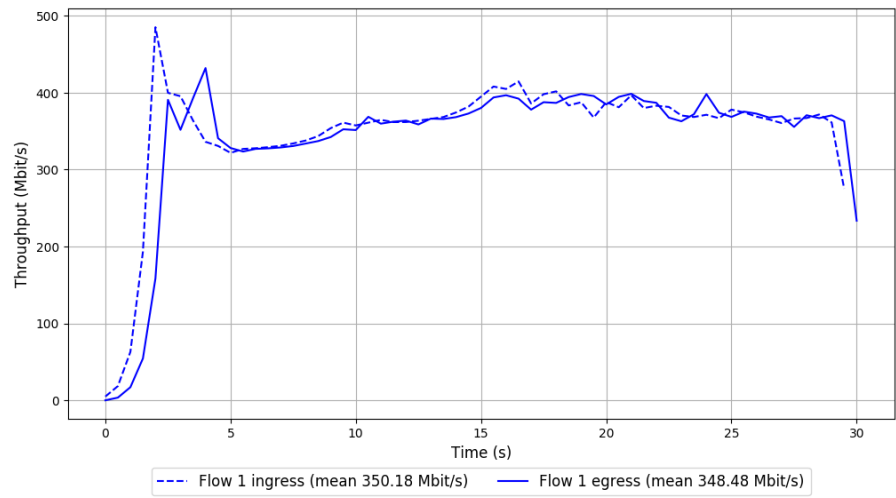
Run 4: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 444.20 Mbit/s)　　Flow 1 egress (mean 438.66 Mbit/s)

Flow 1 (95th percentile 161.75 ms)

```
Run 5: Statistics of PCC-Allegro

Start at: 2018-11-03 13:53:54
End at: 2018-11-03 13:54:24
Local clock offset: 0.248 ms
Remote clock offset: -0.058 ms


# Below is generated by plot.py at 2018-11-03 15:25:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 392.85 Mbit/s
95th percentile per-packet one-way delay: 113.533 ms
Loss rate: 1.65%
-- Flow 1:
Average throughput: 392.85 Mbit/s
95th percentile per-packet one-way delay: 113.533 ms
Loss rate: 1.65%
```

Run 5: Report of PCC-Allegro — Data Link
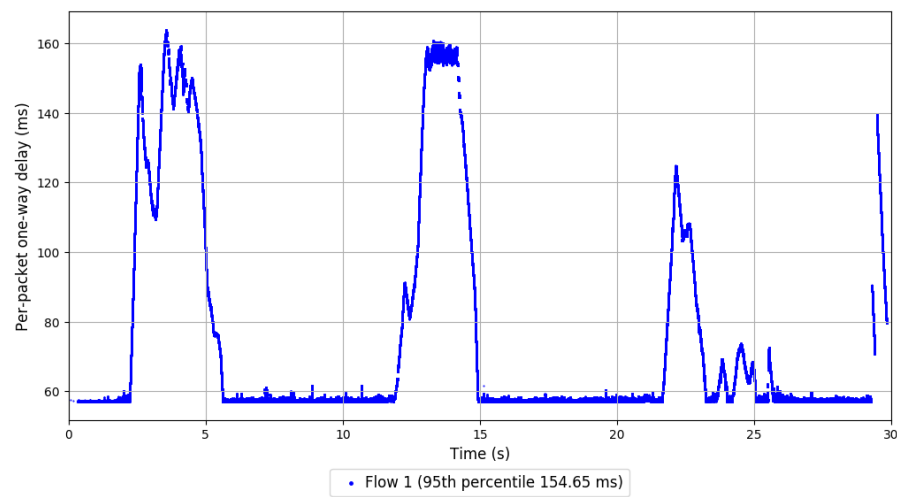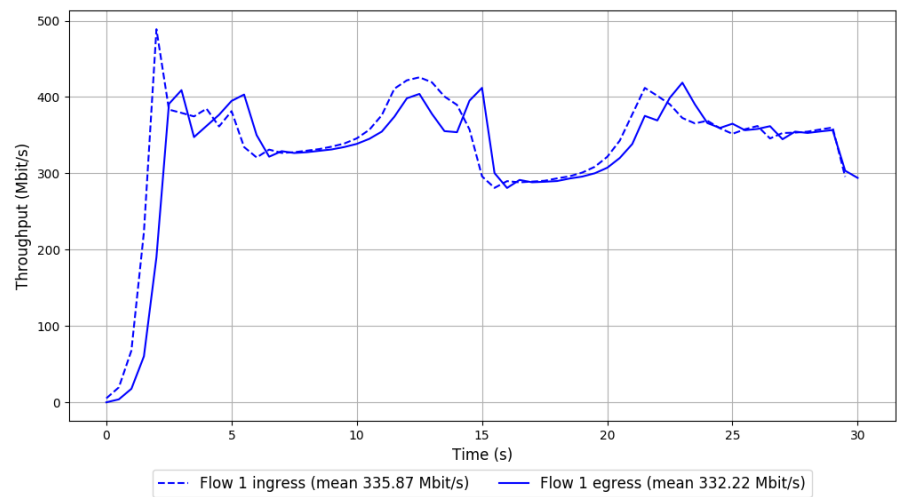

94

```
Run 1: Statistics of PCC-Expr

Start at: 2018-11-03 12:08:02
End at: 2018-11-03 12:08:32
Local clock offset: 0.055 ms
Remote clock offset: 0.148 ms


# Below is generated by plot.py at 2018-11-03 15:25:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 348.48 Mbit/s
95th percentile per-packet one-way delay: 144.203 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 348.48 Mbit/s
95th percentile per-packet one-way delay: 144.203 ms
Loss rate: 0.88%
```
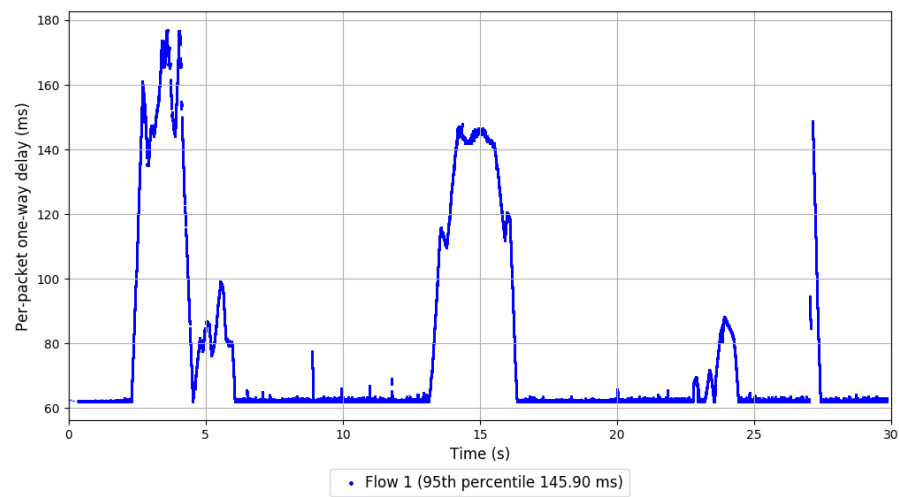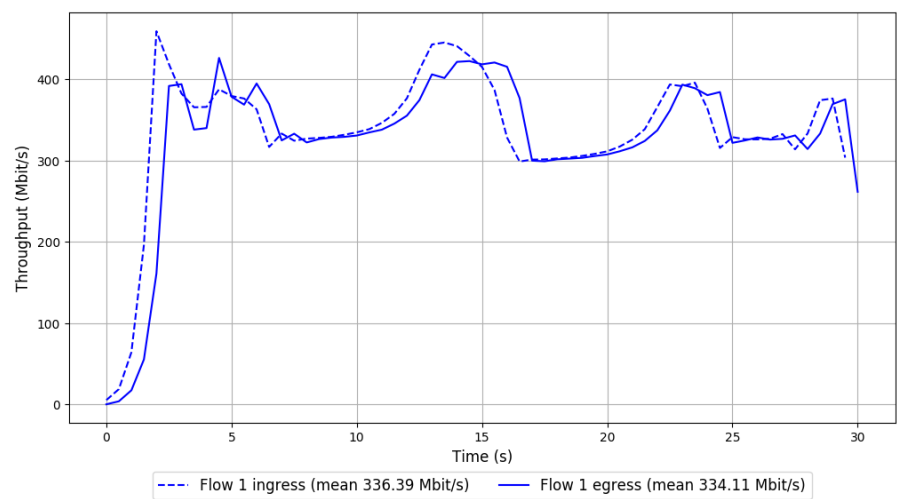
Run 1: Report of PCC-Expr — Data Link

```
Run 2: Statistics of PCC-Expr

Start at: 2018-11-03 12:35:35
End at: 2018-11-03 12:36:05
Local clock offset: 0.058 ms
Remote clock offset: -0.087 ms


# Below is generated by plot.py at 2018-11-03 15:25:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 332.22 Mbit/s
95th percentile per-packet one-way delay: 154.650 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 332.22 Mbit/s
95th percentile per-packet one-way delay: 154.650 ms
Loss rate: 1.47%
```
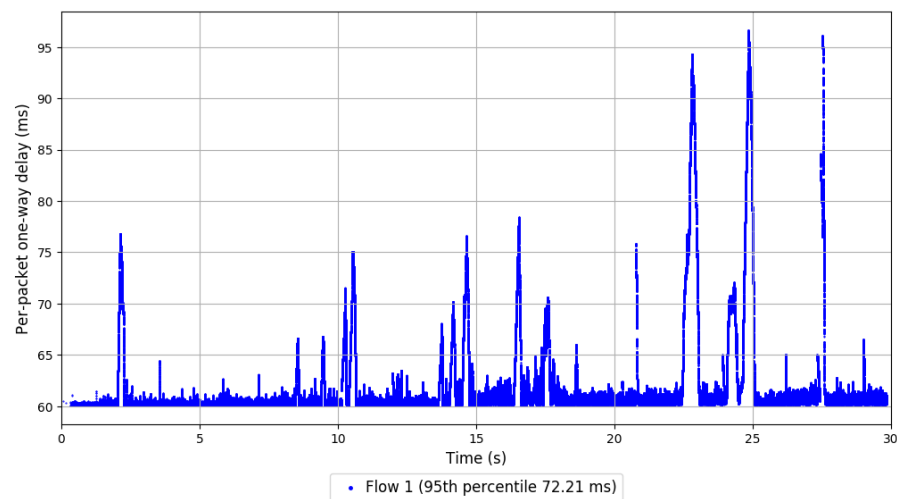
Run 2: Report of PCC-Expr — Data Link

```
Run 3: Statistics of PCC-Expr

Start at: 2018-11-03 13:02:45
End at: 2018-11-03 13:03:15
Local clock offset: 0.319 ms
Remote clock offset: -1.226 ms


# Below is generated by plot.py at 2018-11-03 15:25:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 334.11 Mbit/s
95th percentile per-packet one-way delay: 145.898 ms
Loss rate: 1.07%
-- Flow 1:
Average throughput: 334.11 Mbit/s
95th percentile per-packet one-way delay: 145.898 ms
Loss rate: 1.07%
```
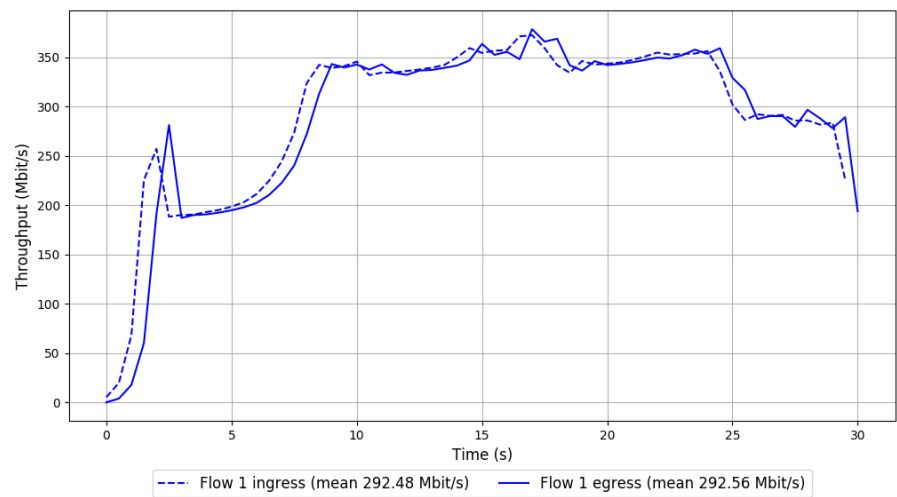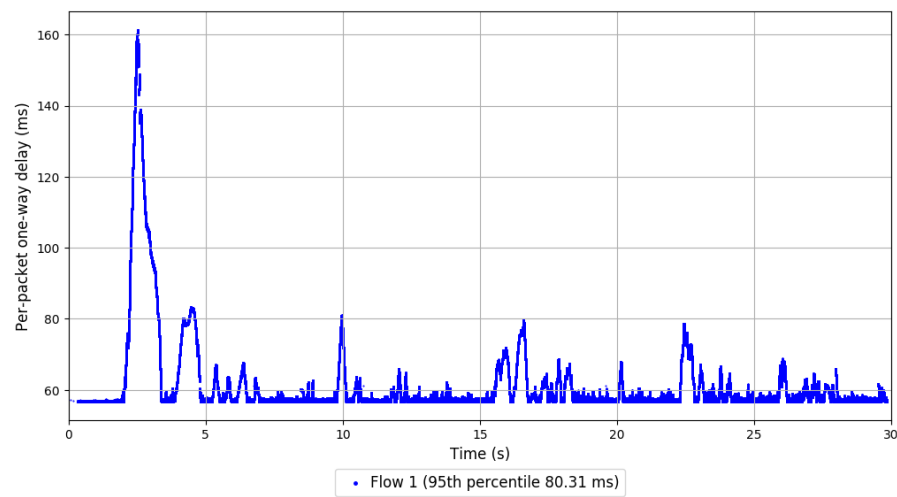
Run 3: Report of PCC-Expr — Data Link

```
Run 4: Statistics of PCC-Expr

Start at: 2018-11-03 13:29:55
End at: 2018-11-03 13:30:25
Local clock offset: -0.27 ms
Remote clock offset: -0.277 ms


# Below is generated by plot.py at 2018-11-03 15:25:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 292.56 Mbit/s
95th percentile per-packet one-way delay: 72.207 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 292.56 Mbit/s
95th percentile per-packet one-way delay: 72.207 ms
Loss rate: 0.37%
```

Run 4: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 292.48 Mbit/s)   Flow 1 egress (mean 292.56 Mbit/s)

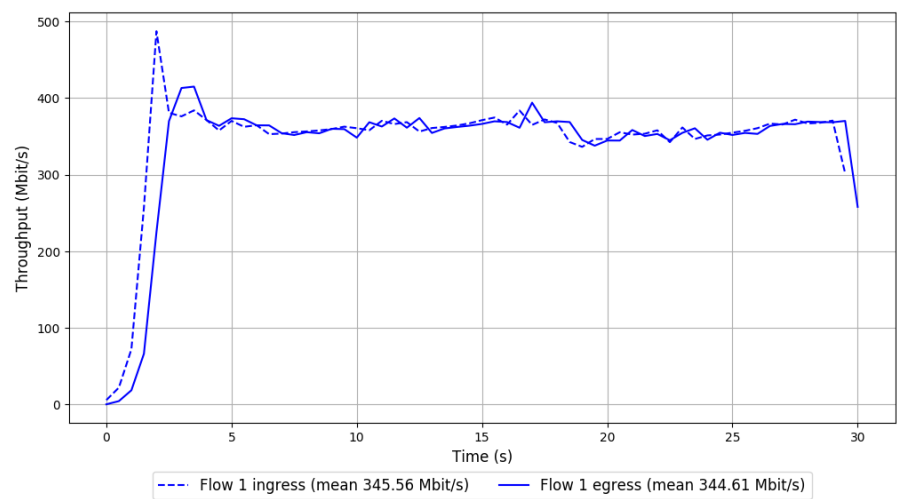
Flow 1 (95th percentile 72.21 ms)

```
Run 5: Statistics of PCC-Expr

Start at: 2018-11-03 13:57:27
End at: 2018-11-03 13:57:57
Local clock offset: -0.458 ms
Remote clock offset: -0.207 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 344.61 Mbit/s
95th percentile per-packet one-way delay: 80.309 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 344.61 Mbit/s
95th percentile per-packet one-way delay: 80.309 ms
Loss rate: 0.66%
```

Run 5: Report of PCC-Expr — Data Link

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-11-03 11:58:54
End at: 2018-11-03 11:59:24
Local clock offset: -0.147 ms
Remote clock offset: 0.699 ms

# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 62.70 Mbit/s
95th percentile per-packet one-way delay: 56.795 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 62.70 Mbit/s
95th percentile per-packet one-way delay: 56.795 ms
Loss rate: 0.65%
```
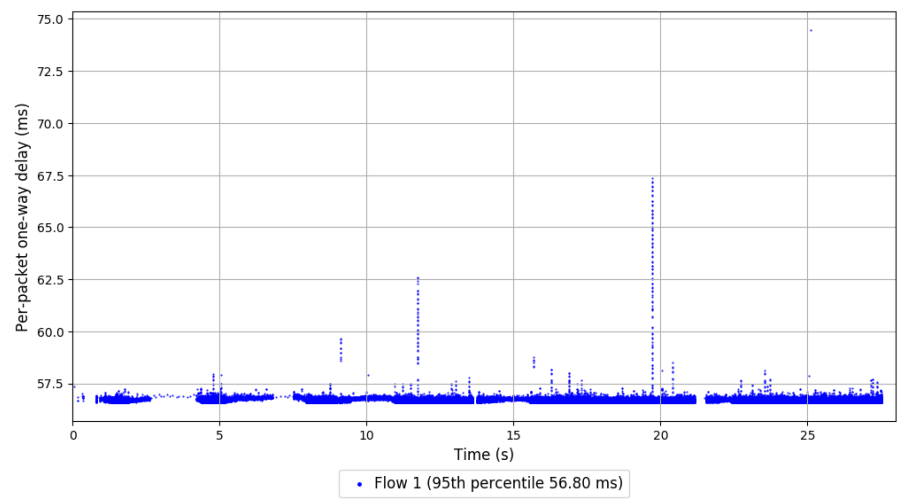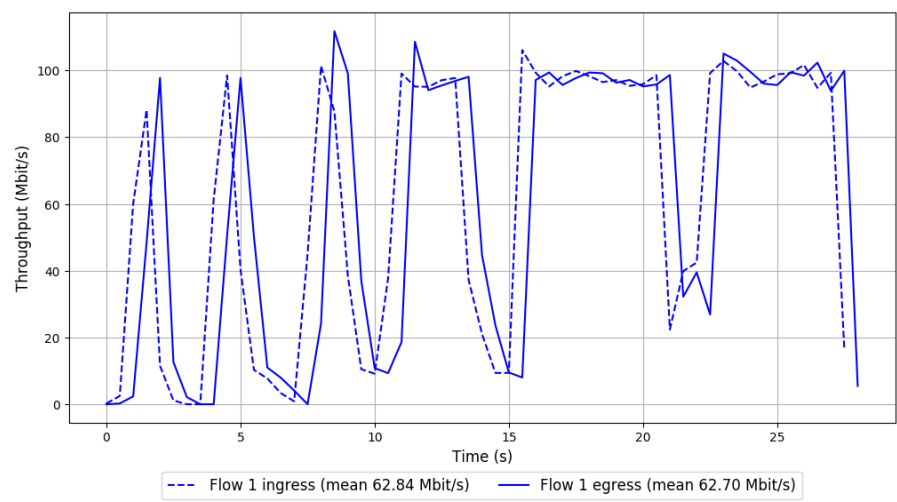
Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-11-03 12:26:35
End at: 2018-11-03 12:27:05
Local clock offset: 0.311 ms
Remote clock offset: 0.645 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 40.69 Mbit/s
95th percentile per-packet one-way delay: 60.521 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 40.69 Mbit/s
95th percentile per-packet one-way delay: 60.521 ms
Loss rate: 0.28%
```
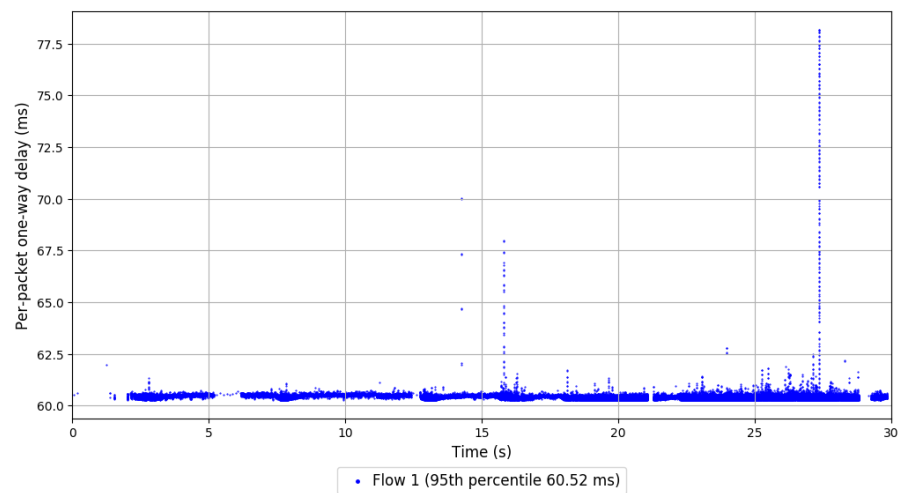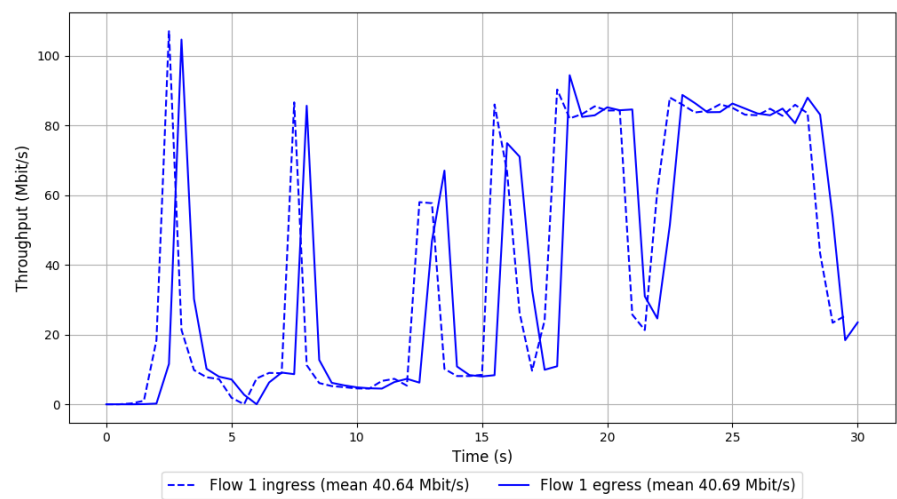
Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-11-03 12:53:44
End at: 2018-11-03 12:54:15
Local clock offset: 0.138 ms
Remote clock offset: -1.561 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 53.81 Mbit/s
95th percentile per-packet one-way delay: 59.022 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 53.81 Mbit/s
95th percentile per-packet one-way delay: 59.022 ms
Loss rate: 0.60%
```
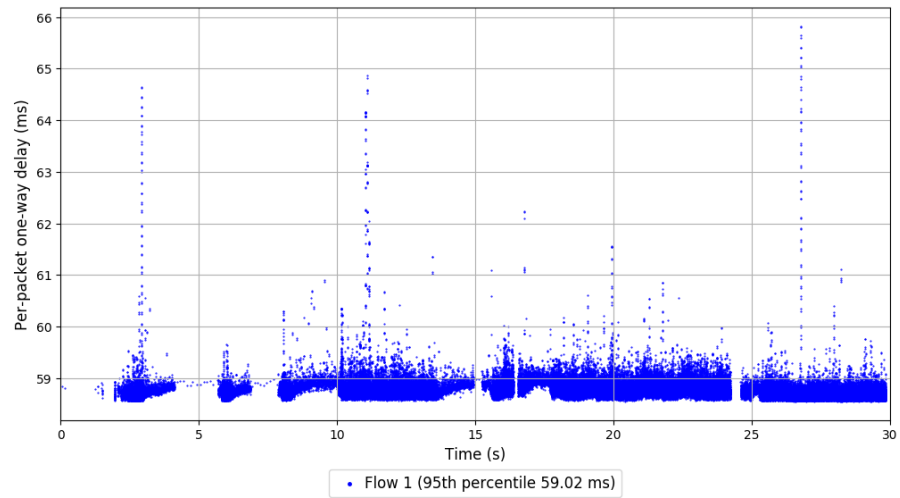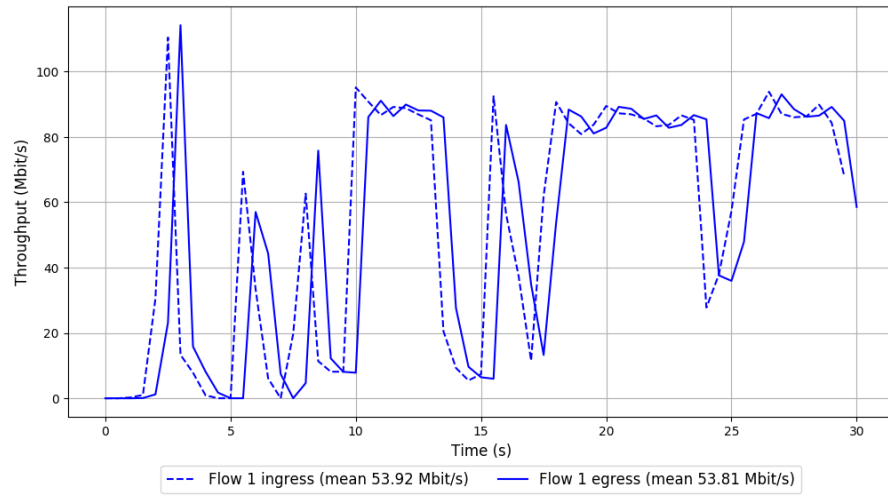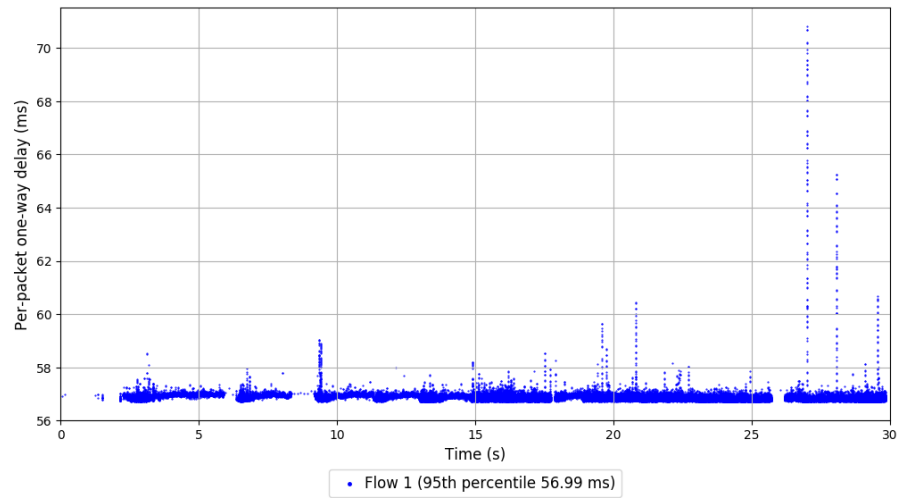
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 53.92 Mbit/s) ----   Flow 1 egress (mean 53.81 Mbit/s) ——

• Flow 1 (95th percentile 59.02 ms)

```
Run 4: Statistics of QUIC Cubic

Start at: 2018-11-03 13:21:02
End at: 2018-11-03 13:21:32
Local clock offset: -0.062 ms
Remote clock offset: -0.051 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 49.35 Mbit/s
95th percentile per-packet one-way delay: 56.986 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 49.35 Mbit/s
95th percentile per-packet one-way delay: 56.986 ms
Loss rate: 0.53%
```
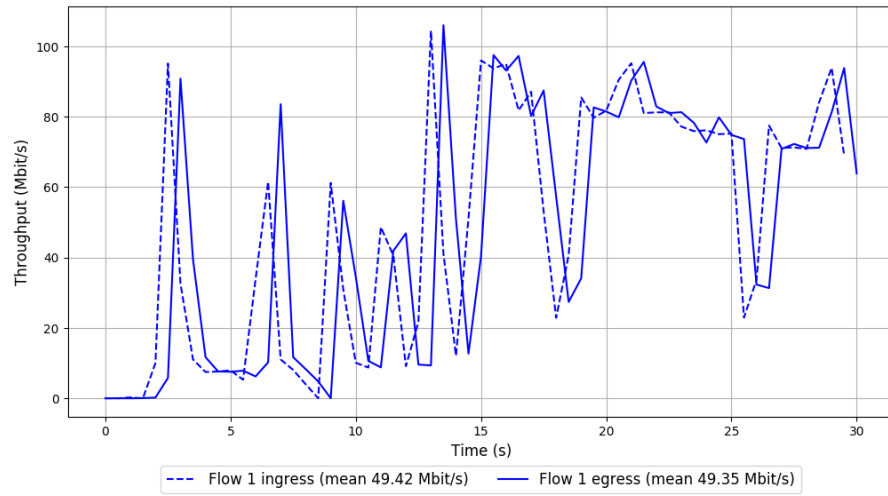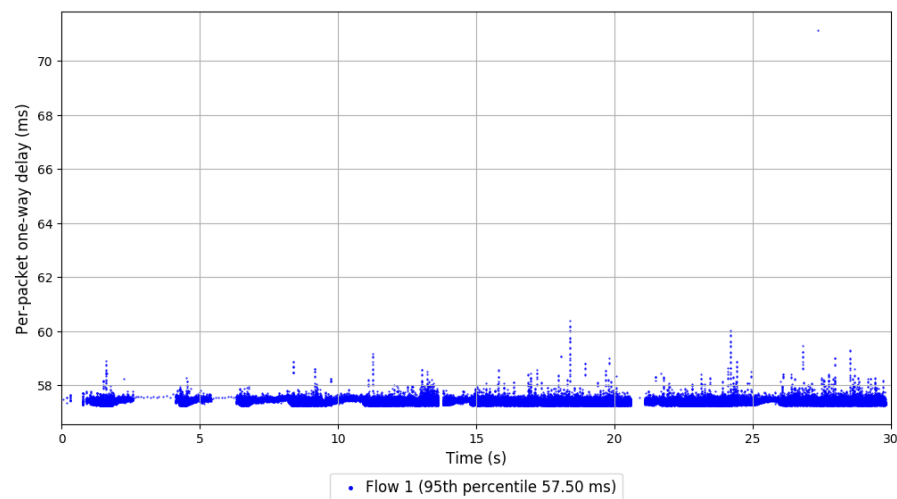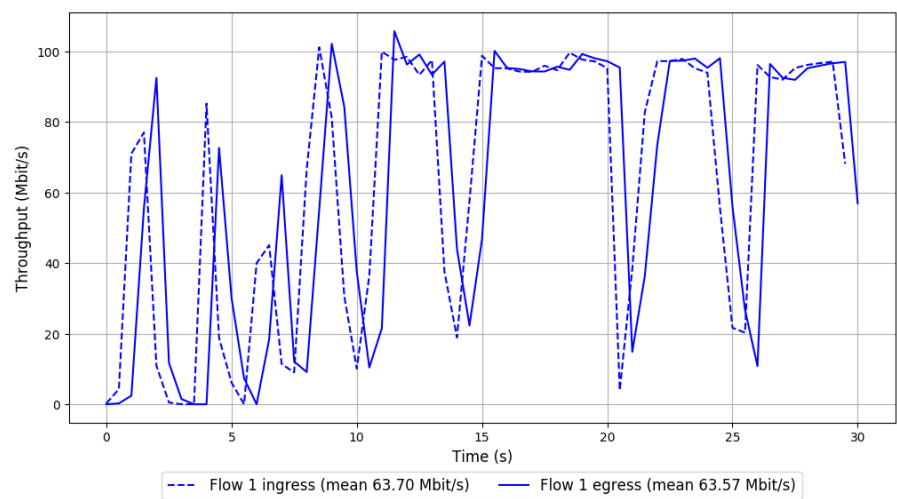
Run 4: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 49.42 Mbit/s) --- Flow 1 egress (mean 49.35 Mbit/s)

Flow 1 (95th percentile 56.99 ms)

```
Run 5: Statistics of QUIC Cubic

Start at: 2018-11-03 13:48:08
End at: 2018-11-03 13:48:38
Local clock offset: 0.236 ms
Remote clock offset: -0.205 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 63.57 Mbit/s
95th percentile per-packet one-way delay: 57.501 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 63.57 Mbit/s
95th percentile per-packet one-way delay: 57.501 ms
Loss rate: 0.59%
```

Run 5: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 63.70 Mbit/s)   Flow 1 egress (mean 63.57 Mbit/s)
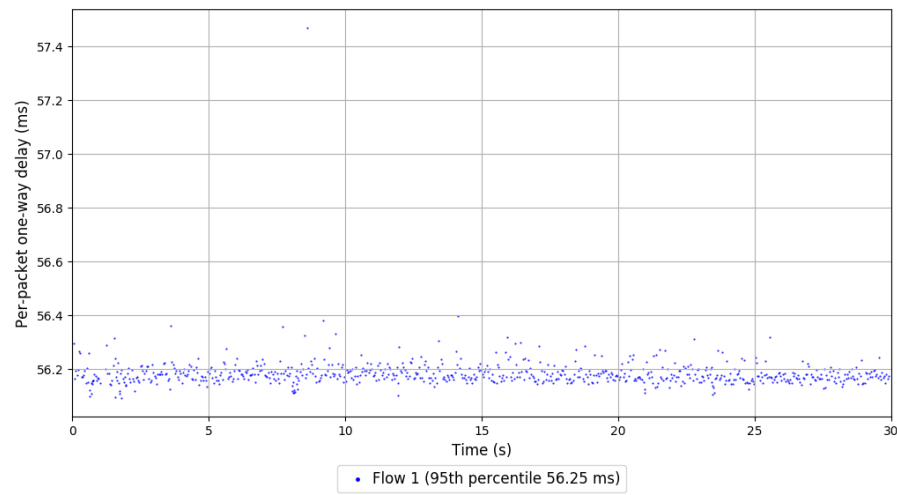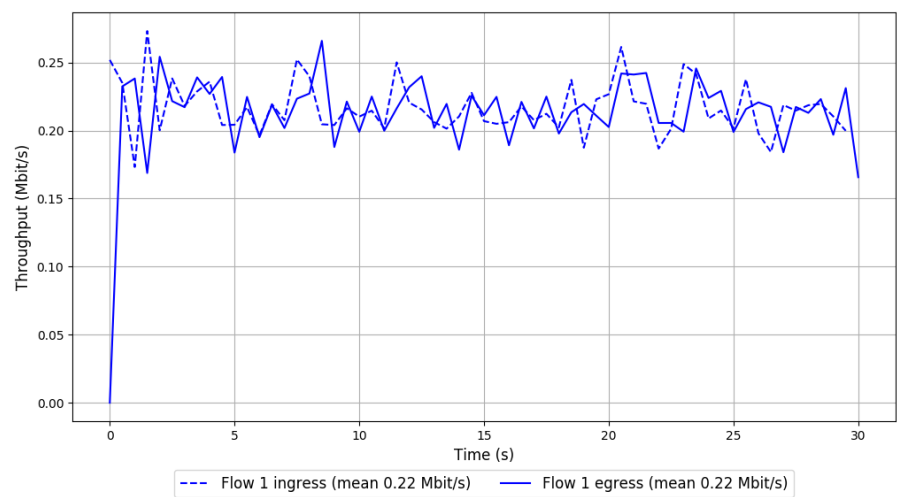

Flow 1 (95th percentile 57.50 ms)

```
Run 1: Statistics of SCReAM

Start at: 2018-11-03 11:52:26
End at: 2018-11-03 11:52:56
Local clock offset: 0.018 ms
Remote clock offset: 1.252 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 56.250 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 56.250 ms
Loss rate: 0.39%
```
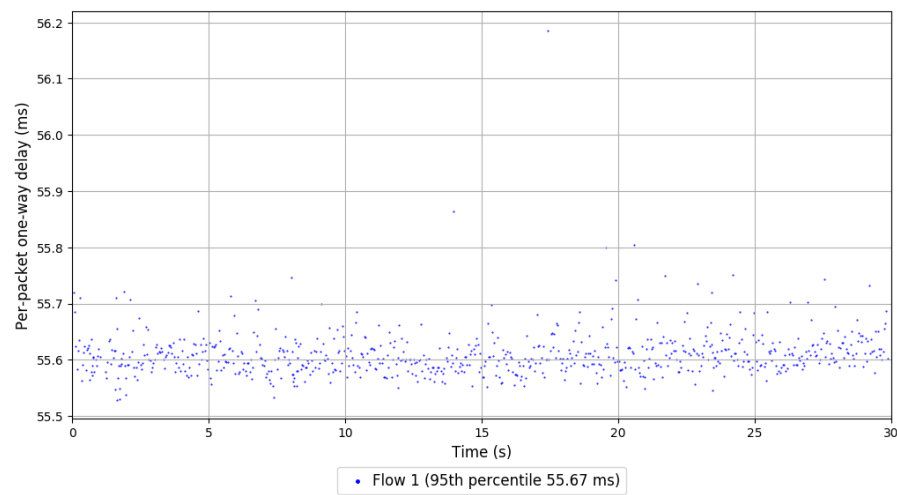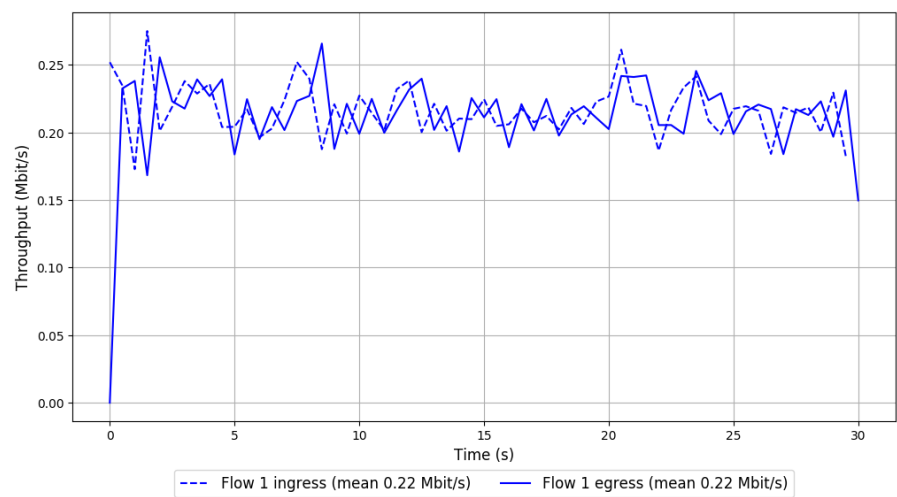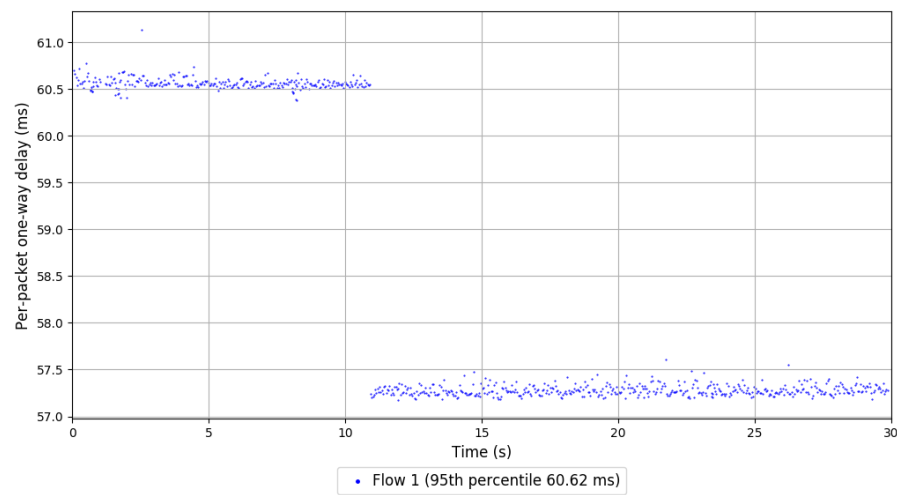
Run 1: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.22 Mbit/s)   Flow 1 egress (mean 0.22 Mbit/s)

• Flow 1 (95th percentile 56.25 ms)

```
Run 2: Statistics of SCReAM

Start at: 2018-11-03 12:20:07
End at: 2018-11-03 12:20:37
Local clock offset: -0.361 ms
Remote clock offset: 1.441 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 55.675 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 55.675 ms
Loss rate: 0.38%
```

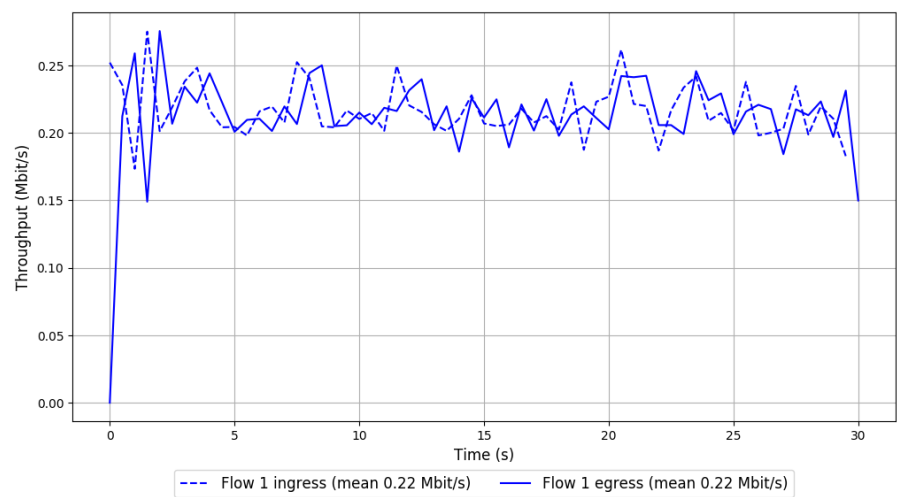## Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-11-03 12:47:13
End at: 2018-11-03 12:47:43
Local clock offset: -0.103 ms
Remote clock offset: -0.213 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 60.617 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 60.617 ms
Loss rate: 0.38%
```

Run 3: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.22 Mbit/s)   Flow 1 egress (mean 0.22 Mbit/s)

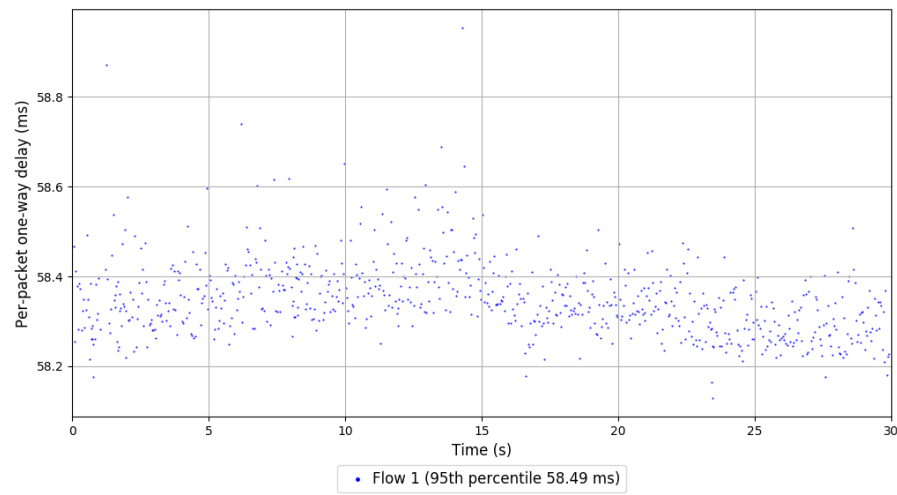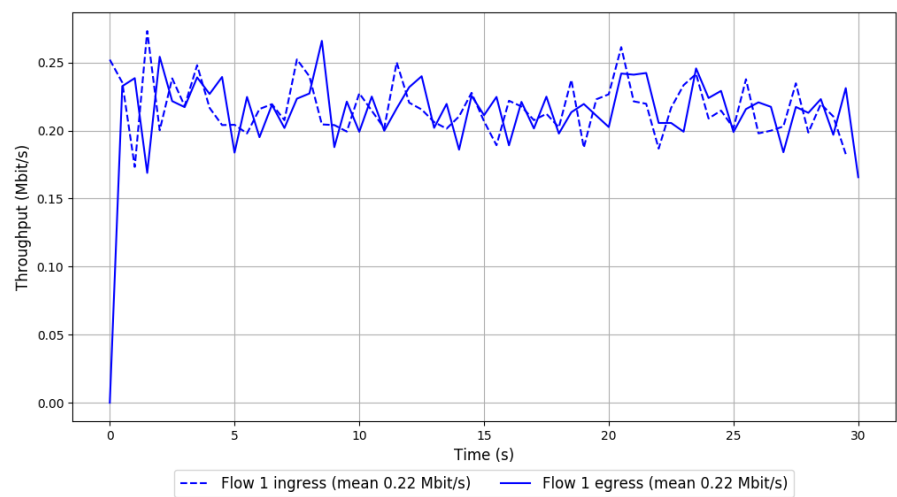Flow 1 (95th percentile 60.62 ms)

```
Run 4: Statistics of SCReAM

Start at: 2018-11-03 13:14:38
End at: 2018-11-03 13:15:08
Local clock offset: -0.266 ms
Remote clock offset: -1.473 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 58.490 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 58.490 ms
Loss rate: 0.26%
```
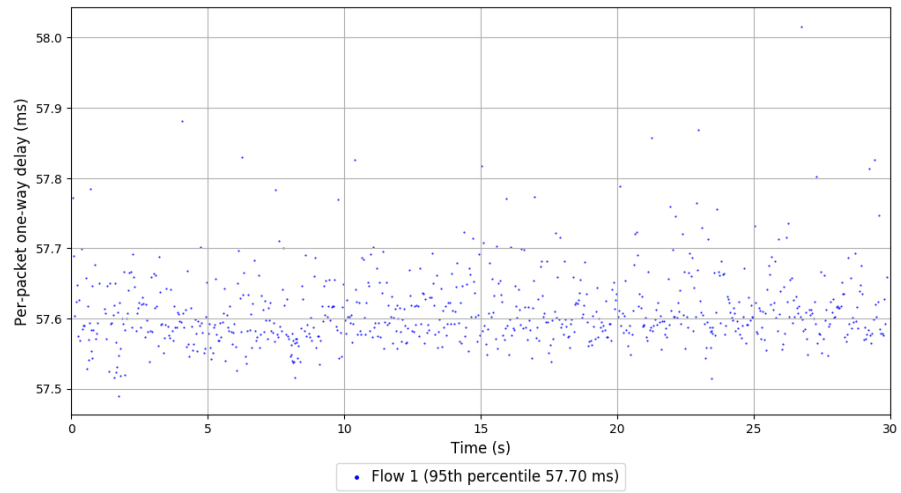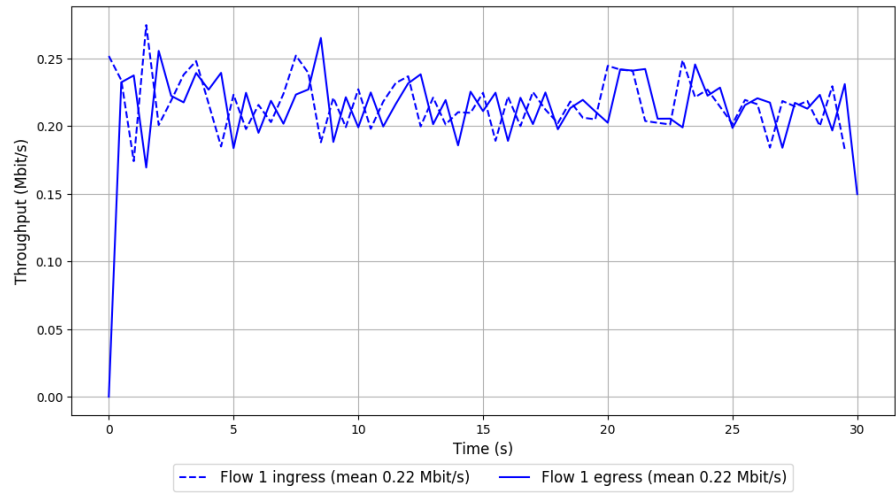
Run 4: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.22 Mbit/s) --- Flow 1 egress (mean 0.22 Mbit/s)

Flow 1 (95th percentile 58.49 ms)

```
Run 5: Statistics of SCReAM

Start at: 2018-11-03 13:41:52
End at: 2018-11-03 13:42:22
Local clock offset: 0.085 ms
Remote clock offset: -0.24 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 57.702 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 57.702 ms
Loss rate: 0.38%
```
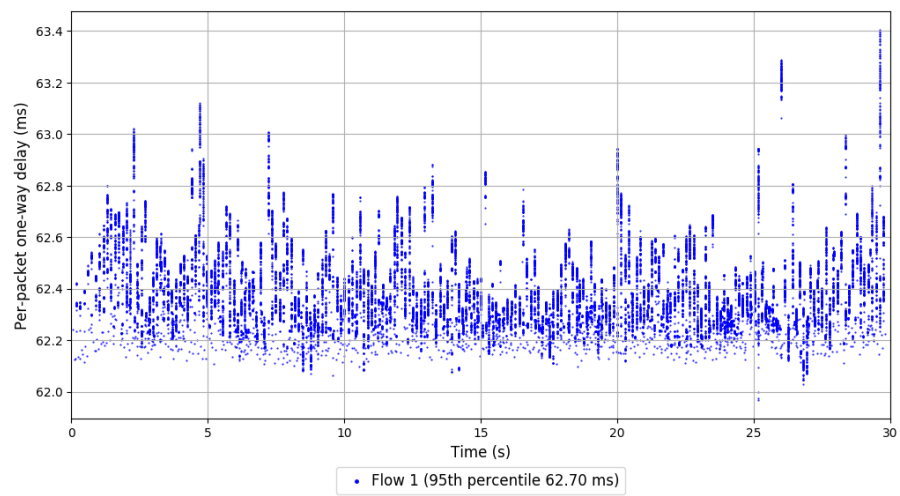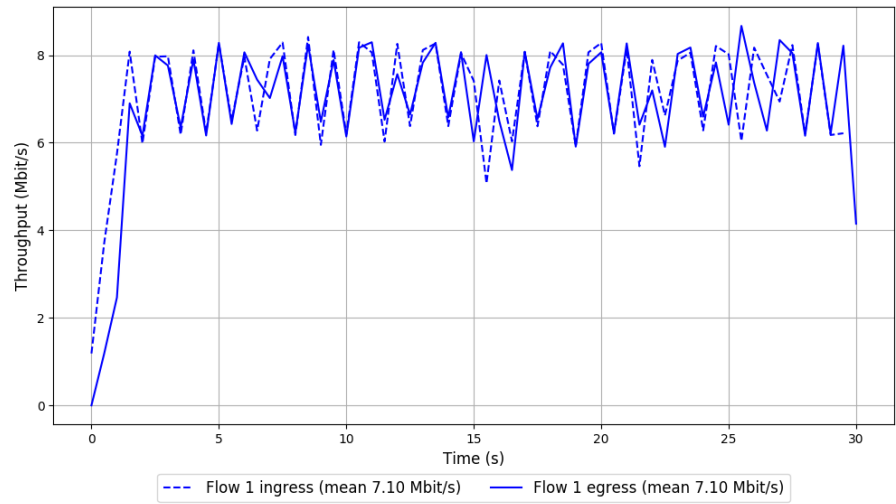
Run 5: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.22 Mbit/s)   Flow 1 egress (mean 0.22 Mbit/s)

Flow 1 (95th percentile 57.70 ms)

```
Run 1: Statistics of Sprout

Start at: 2018-11-03 12:11:28
End at: 2018-11-03 12:11:58
Local clock offset: -0.118 ms
Remote clock offset: -1.26 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.10 Mbit/s
95th percentile per-packet one-way delay: 62.703 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 7.10 Mbit/s
95th percentile per-packet one-way delay: 62.703 ms
Loss rate: 0.49%
```

Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-11-03 12:38:59
End at: 2018-11-03 12:39:29
Local clock offset: -0.101 ms
Remote clock offset: 1.195 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.81 Mbit/s
95th percentile per-packet one-way delay: 56.252 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 7.81 Mbit/s
95th percentile per-packet one-way delay: 56.252 ms
Loss rate: 0.20%
```
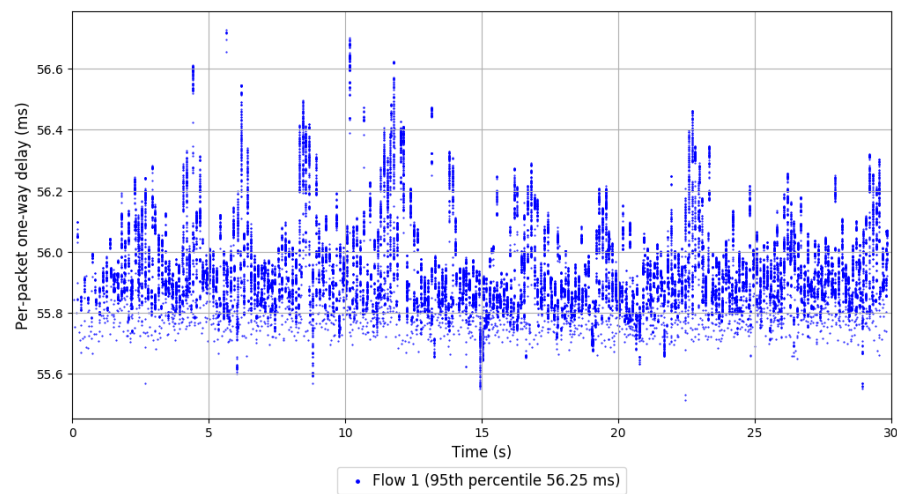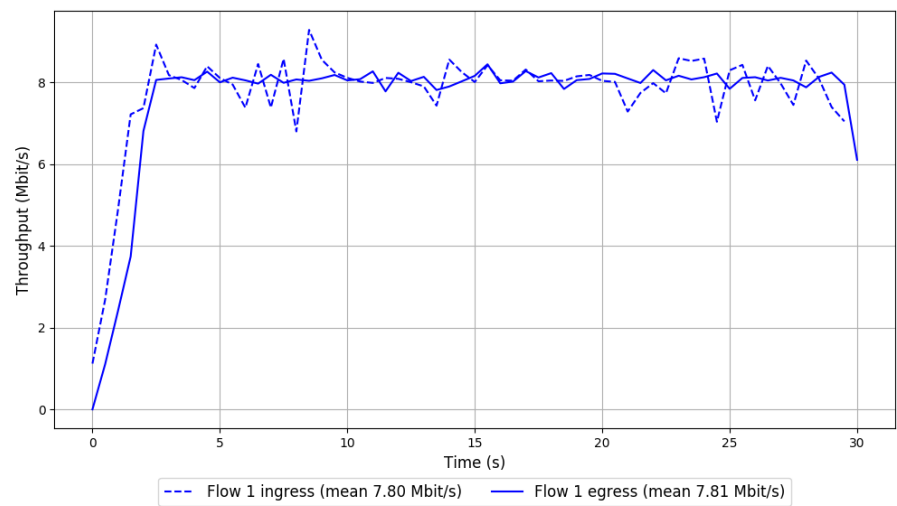
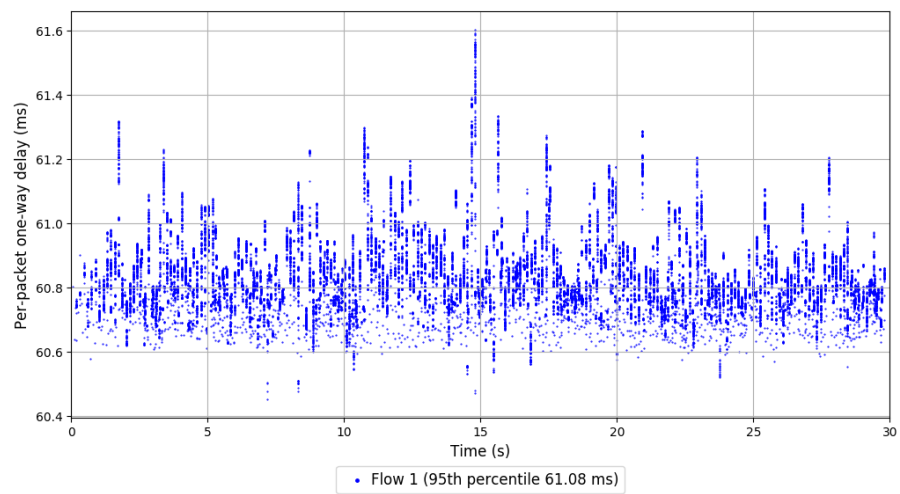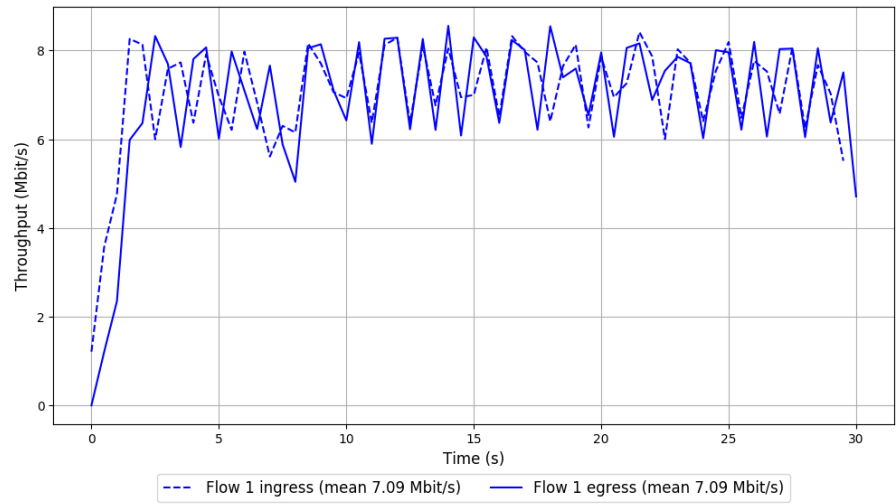## Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-11-03 13:06:01
End at: 2018-11-03 13:06:31
Local clock offset: 0.2 ms
Remote clock offset: -0.063 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.09 Mbit/s
95th percentile per-packet one-way delay: 61.081 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 7.09 Mbit/s
95th percentile per-packet one-way delay: 61.081 ms
Loss rate: 0.43%
```

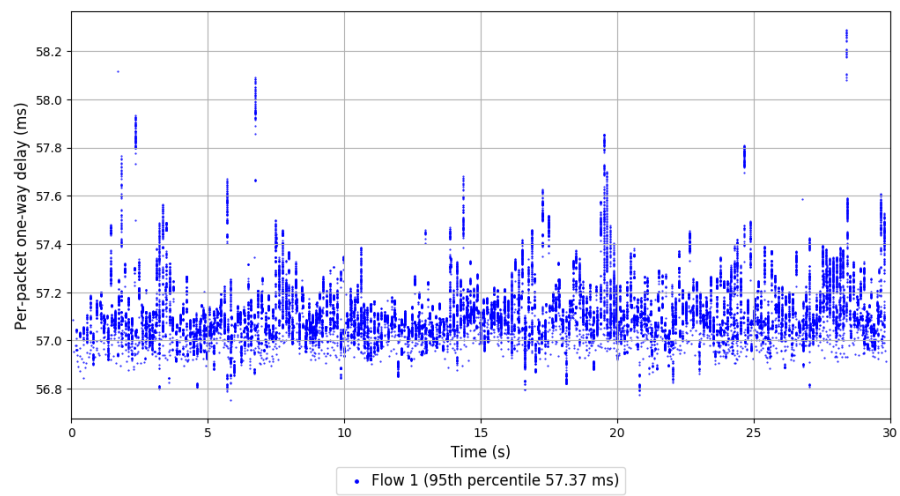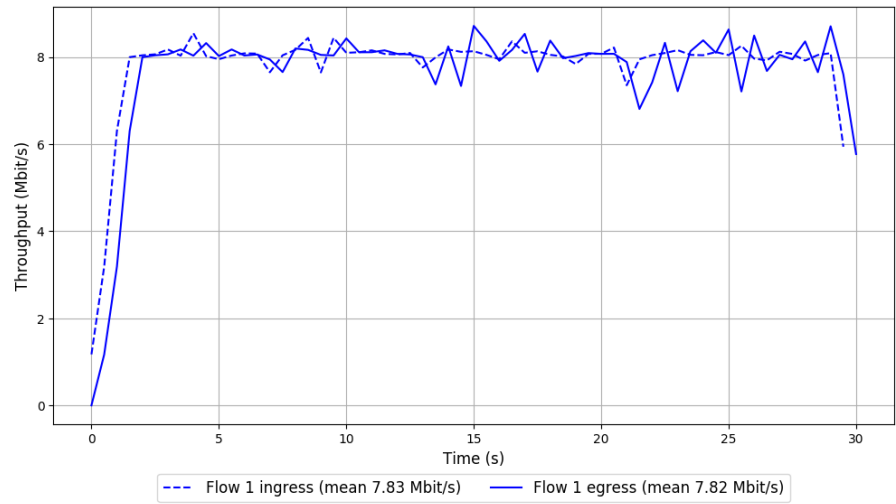# Run 3: Report of Sprout — Data Link

```
Run 4: Statistics of Sprout

Start at: 2018-11-03 13:33:13
End at: 2018-11-03 13:33:43
Local clock offset: -0.548 ms
Remote clock offset: -0.157 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.82 Mbit/s
95th percentile per-packet one-way delay: 57.371 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 7.82 Mbit/s
95th percentile per-packet one-way delay: 57.371 ms
Loss rate: 0.43%
```
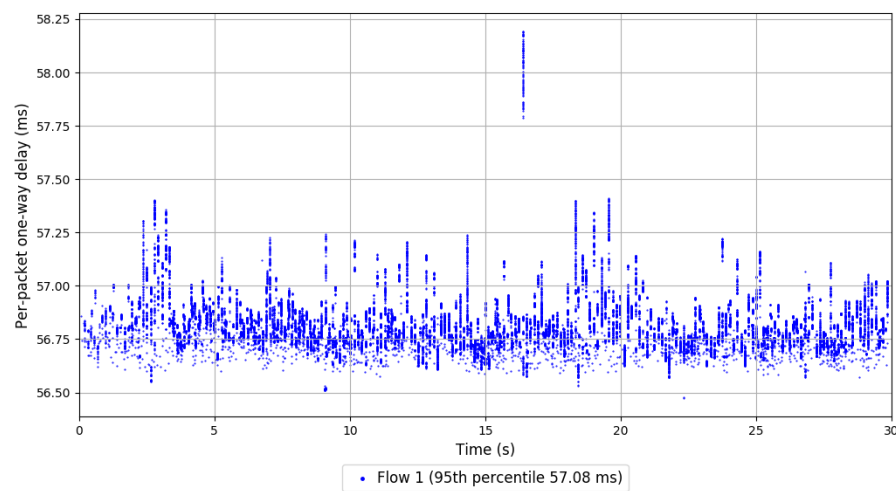
Run 4: Report of Sprout — Data Link

```
Run 5: Statistics of Sprout

Start at: 2018-11-03 14:00:43
End at: 2018-11-03 14:01:13
Local clock offset: -0.176 ms
Remote clock offset: 0.269 ms


# Below is generated by plot.py at 2018-11-03 15:26:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.88 Mbit/s
95th percentile per-packet one-way delay: 57.077 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 6.88 Mbit/s
95th percentile per-packet one-way delay: 57.077 ms
Loss rate: 0.12%
```
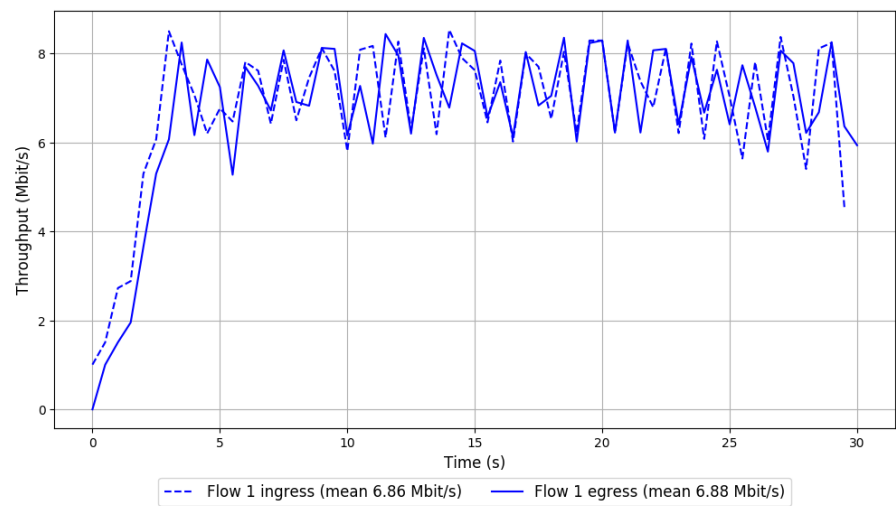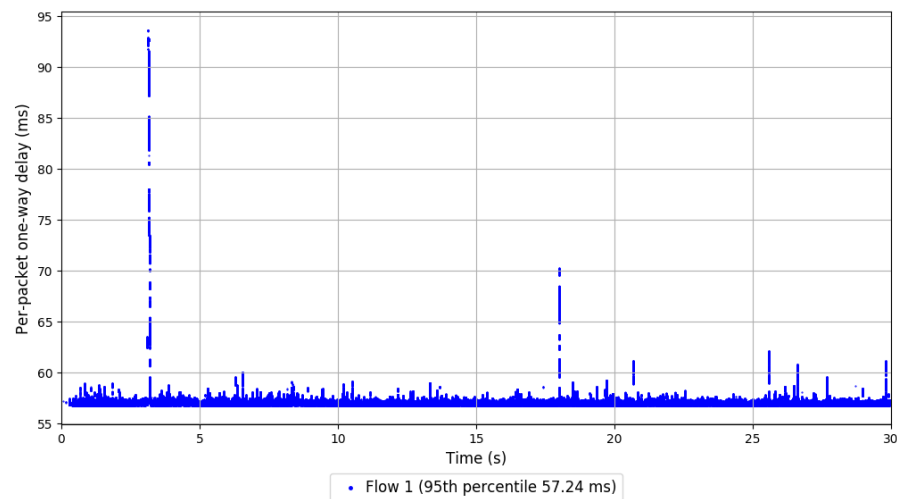
Run 5: Report of Sprout — Data Link

Flow 1 ingress (mean 6.86 Mbit/s)   Flow 1 egress (mean 6.88 Mbit/s)

Flow 1 (95th percentile 57.08 ms)

```
Run 1: Statistics of TaoVA-100x

Start at: 2018-11-03 12:09:53
End at: 2018-11-03 12:10:23
Local clock offset: -0.528 ms
Remote clock offset: 0.182 ms

# Below is generated by plot.py at 2018-11-03 15:30:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 231.14 Mbit/s
95th percentile per-packet one-way delay: 57.237 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 231.14 Mbit/s
95th percentile per-packet one-way delay: 57.237 ms
Loss rate: 0.39%
```
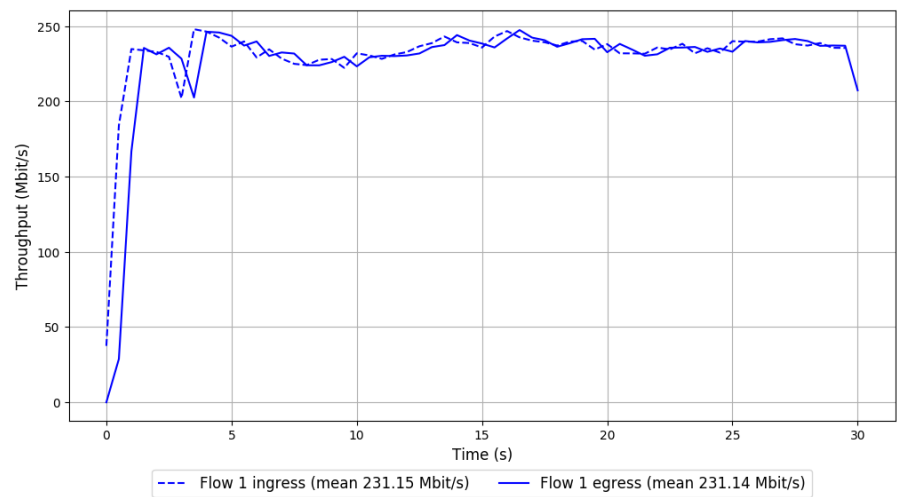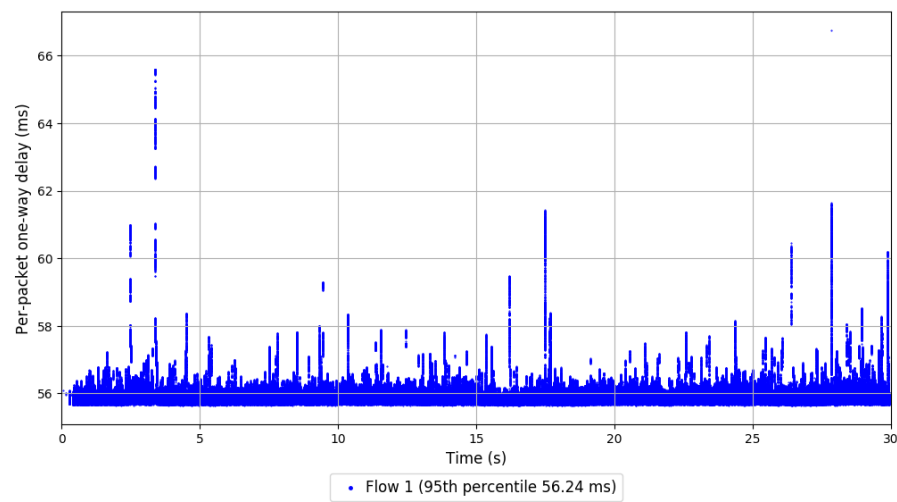
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 231.15 Mbit/s)   Flow 1 egress (mean 231.14 Mbit/s)

Flow 1 (95th percentile 57.24 ms)

```
Run 2: Statistics of TaoVA-100x

Start at: 2018-11-03 12:37:23
End at: 2018-11-03 12:37:53
Local clock offset: -0.121 ms
Remote clock offset: 1.06 ms


# Below is generated by plot.py at 2018-11-03 15:30:54
# Datalink statistics
-- Total of 1 flow:
Average throughput: 232.61 Mbit/s
95th percentile per-packet one-way delay: 56.240 ms
Loss rate: 0.36%
-- Flow 1:
Average throughput: 232.61 Mbit/s
95th percentile per-packet one-way delay: 56.240 ms
Loss rate: 0.36%
```
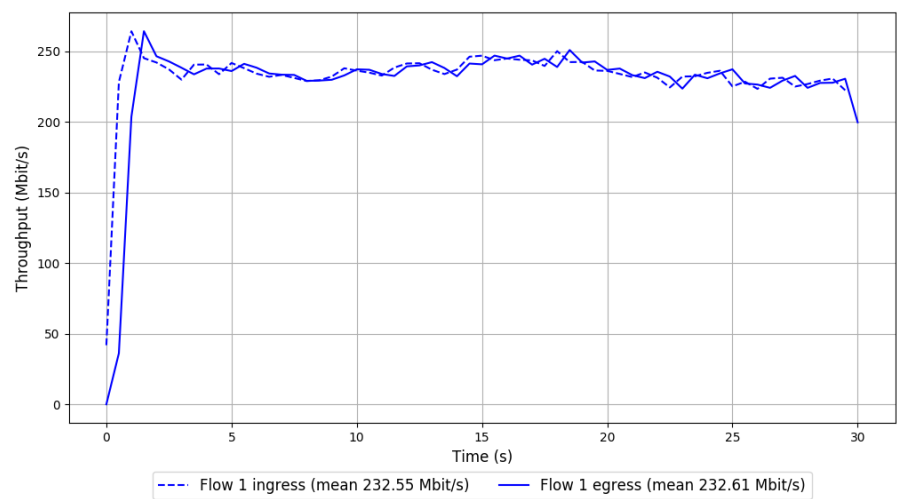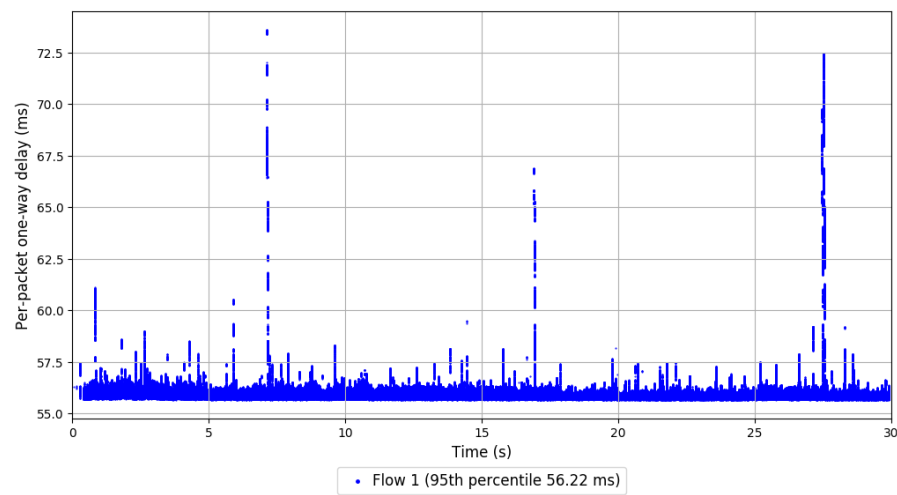
Run 2: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 232.55 Mbit/s)   Flow 1 egress (mean 232.61 Mbit/s)

Flow 1 (95th percentile 56.24 ms)

```
Run 3: Statistics of TaoVA-100x

Start at: 2018-11-03 13:04:28
End at: 2018-11-03 13:04:58
Local clock offset: 0.103 ms
Remote clock offset: 1.008 ms


# Below is generated by plot.py at 2018-11-03 15:31:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 234.18 Mbit/s
95th percentile per-packet one-way delay: 56.220 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 234.18 Mbit/s
95th percentile per-packet one-way delay: 56.220 ms
Loss rate: 0.39%
```
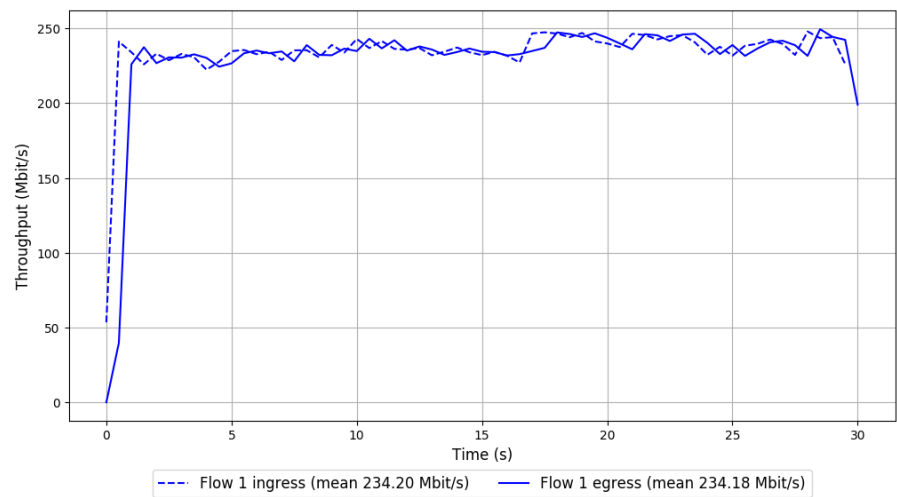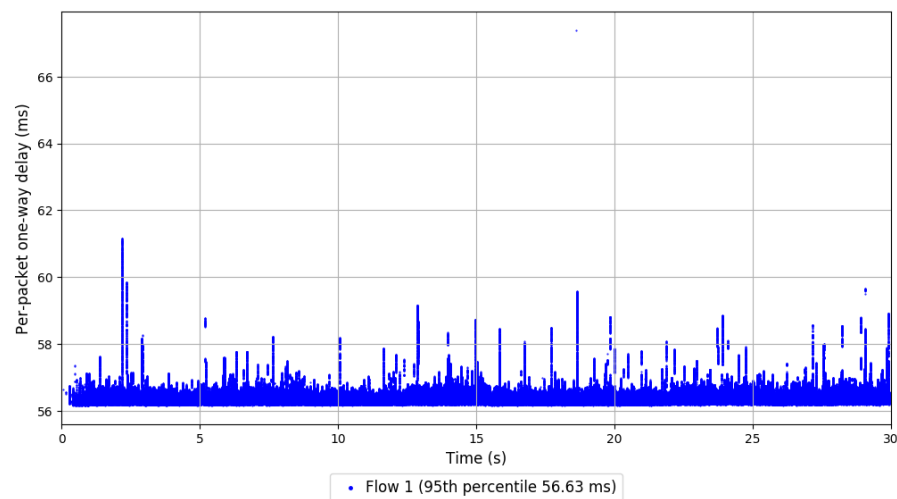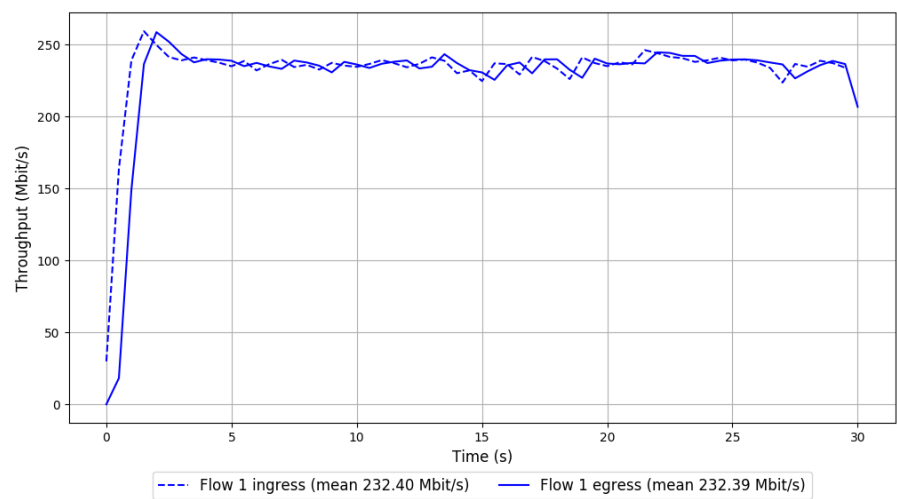
Run 3: Report of TaoVA-100x — Data Link

```
Run 4: Statistics of TaoVA-100x

Start at: 2018-11-03 13:31:40
End at: 2018-11-03 13:32:10
Local clock offset: -0.509 ms
Remote clock offset: -0.119 ms


# Below is generated by plot.py at 2018-11-03 15:31:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 232.39 Mbit/s
95th percentile per-packet one-way delay: 56.634 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 232.39 Mbit/s
95th percentile per-packet one-way delay: 56.634 ms
Loss rate: 0.39%
```
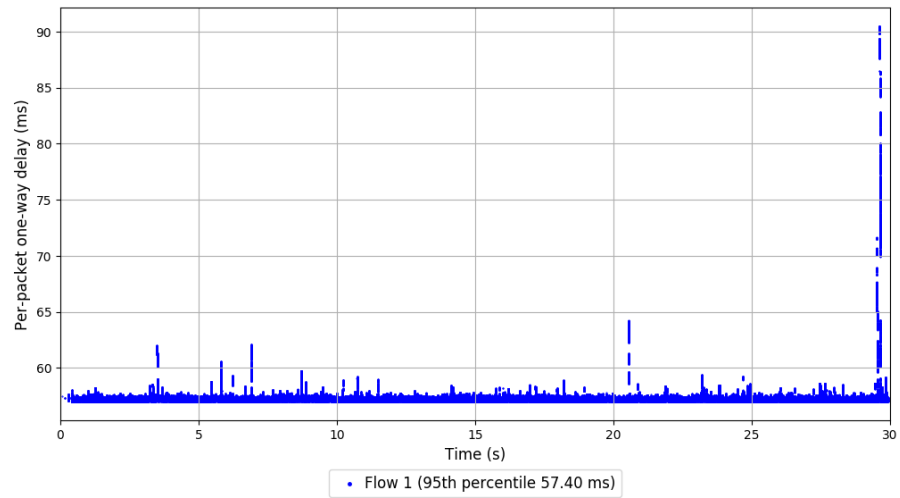
Run 4: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 232.40 Mbit/s) --- Flow 1 egress (mean 232.39 Mbit/s)

Flow 1 (95th percentile 56.63 ms)

```
Run 5: Statistics of TaoVA-100x

Start at: 2018-11-03 13:59:12
End at: 2018-11-03 13:59:42
Local clock offset: 0.017 ms
Remote clock offset: -0.065 ms

# Below is generated by plot.py at 2018-11-03 15:33:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 233.96 Mbit/s
95th percentile per-packet one-way delay: 57.401 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 233.96 Mbit/s
95th percentile per-packet one-way delay: 57.401 ms
Loss rate: 0.40%
```
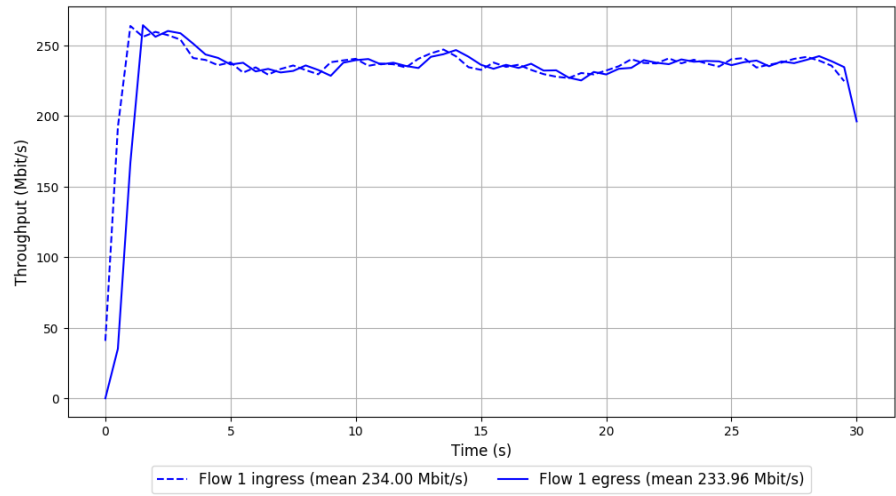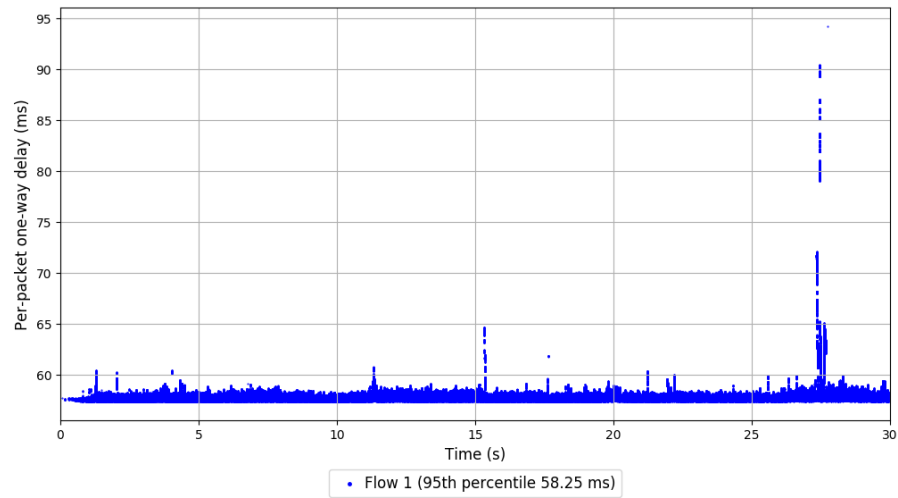
Run 5: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 234.00 Mbit/s)   Flow 1 egress (mean 233.96 Mbit/s)

Flow 1 (95th percentile 57.40 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2018-11-03 11:50:49
End at: 2018-11-03 11:51:19
Local clock offset: 0.307 ms
Remote clock offset: -0.16 ms


# Below is generated by plot.py at 2018-11-03 15:35:06
# Datalink statistics
-- Total of 1 flow:
Average throughput: 491.63 Mbit/s
95th percentile per-packet one-way delay: 58.254 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 491.63 Mbit/s
95th percentile per-packet one-way delay: 58.254 ms
Loss rate: 0.40%
```
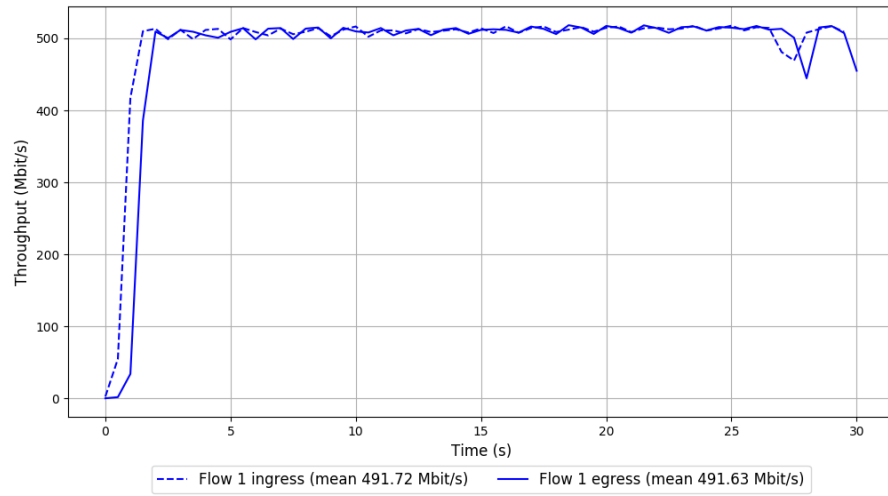
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-11-03 12:18:23
End at: 2018-11-03 12:18:53
Local clock offset: -0.124 ms
Remote clock offset: 0.226 ms


# Below is generated by plot.py at 2018-11-03 15:37:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 576.89 Mbit/s
95th percentile per-packet one-way delay: 61.751 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 576.89 Mbit/s
95th percentile per-packet one-way delay: 61.751 ms
Loss rate: 0.33%
```
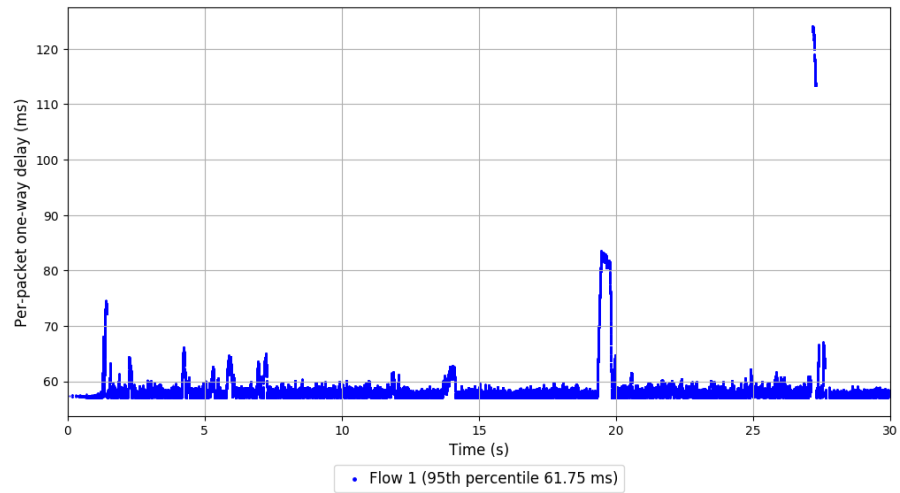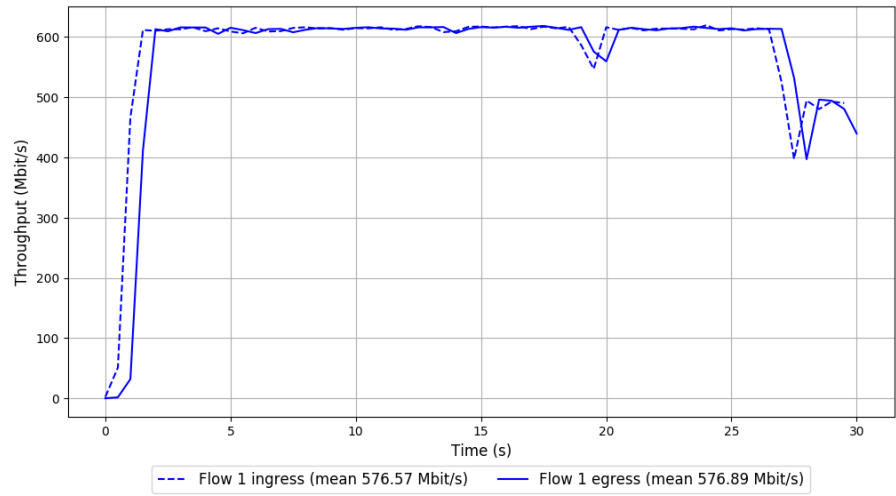
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-11-03 12:45:41
End at: 2018-11-03 12:46:11
Local clock offset: -0.486 ms
Remote clock offset: 0.313 ms


# Below is generated by plot.py at 2018-11-03 15:37:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 489.14 Mbit/s
95th percentile per-packet one-way delay: 57.446 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 489.14 Mbit/s
95th percentile per-packet one-way delay: 57.446 ms
Loss rate: 0.40%
```
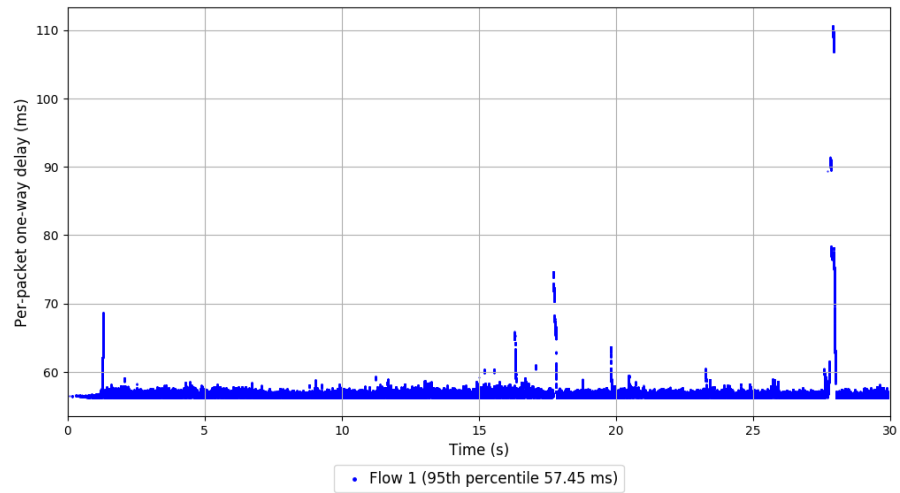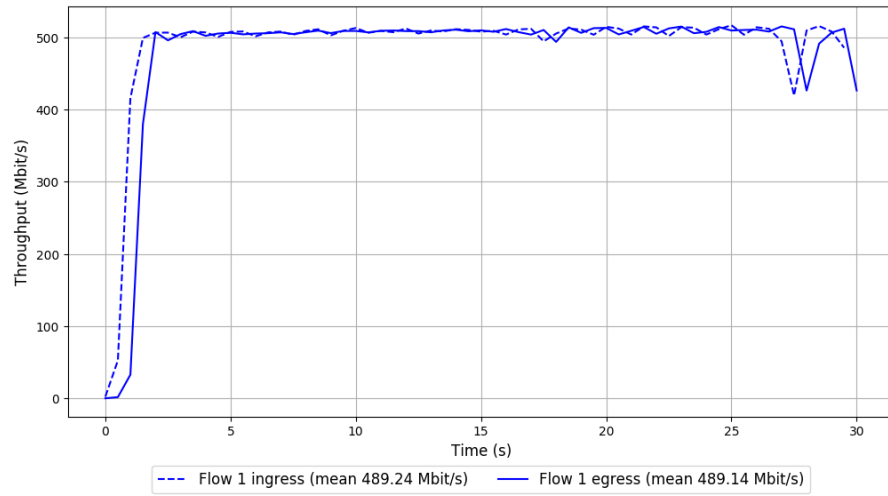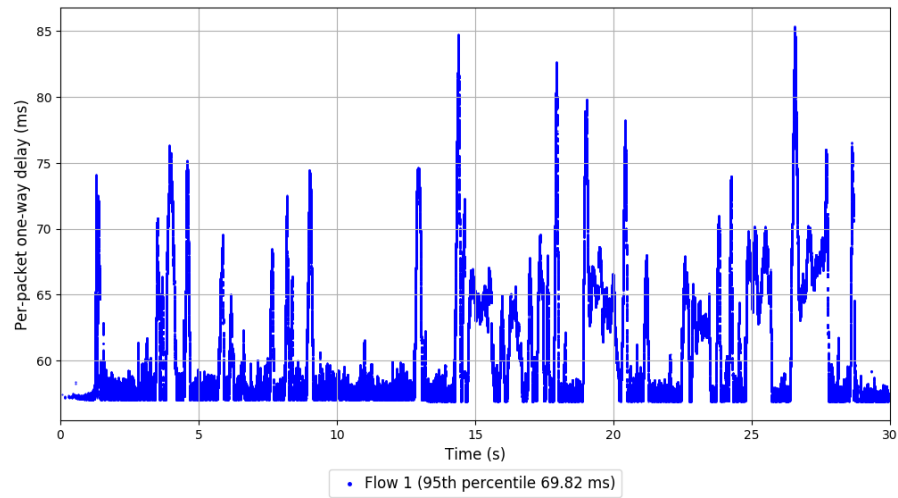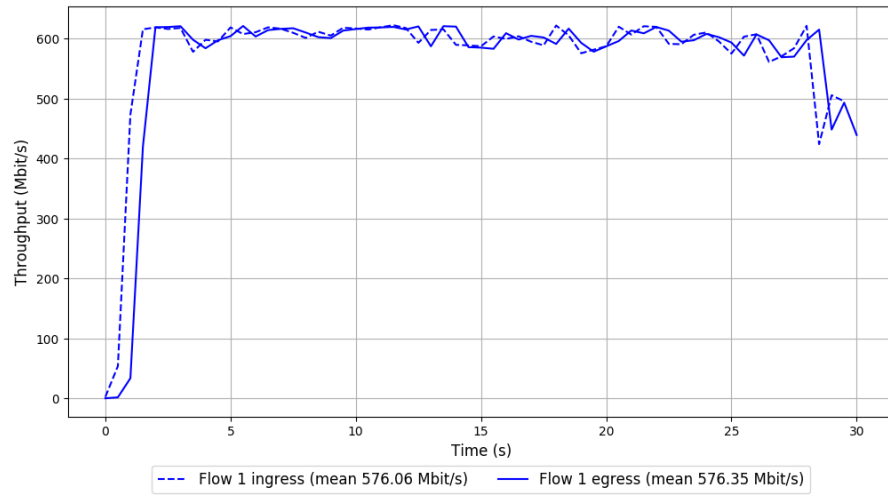
Run 3: Report of TCP Vegas — Data Link

```
Run 4: Statistics of TCP Vegas

Start at: 2018-11-03 13:12:55
End at: 2018-11-03 13:13:25
Local clock offset: -0.045 ms
Remote clock offset: -0.176 ms


# Below is generated by plot.py at 2018-11-03 15:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 576.35 Mbit/s
95th percentile per-packet one-way delay: 69.818 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 576.35 Mbit/s
95th percentile per-packet one-way delay: 69.818 ms
Loss rate: 0.33%
```

Run 4: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 576.06 Mbit/s)   Flow 1 egress (mean 576.35 Mbit/s)

Flow 1 (95th percentile 69.82 ms)

```
Run 5: Statistics of TCP Vegas

Start at: 2018-11-03 13:40:08
End at: 2018-11-03 13:40:38
Local clock offset: -0.163 ms
Remote clock offset: 1.056 ms


# Below is generated by plot.py at 2018-11-03 15:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 510.04 Mbit/s
95th percentile per-packet one-way delay: 72.569 ms
Loss rate: 0.36%
-- Flow 1:
Average throughput: 510.04 Mbit/s
95th percentile per-packet one-way delay: 72.569 ms
Loss rate: 0.36%
```
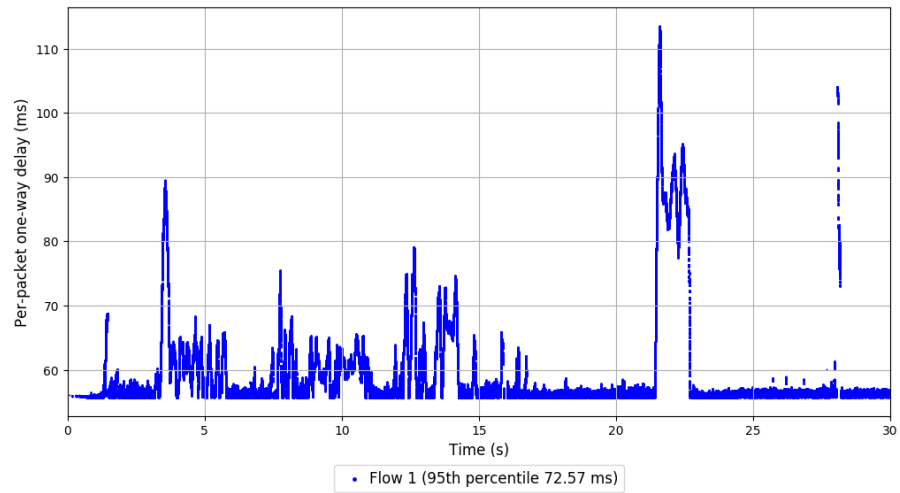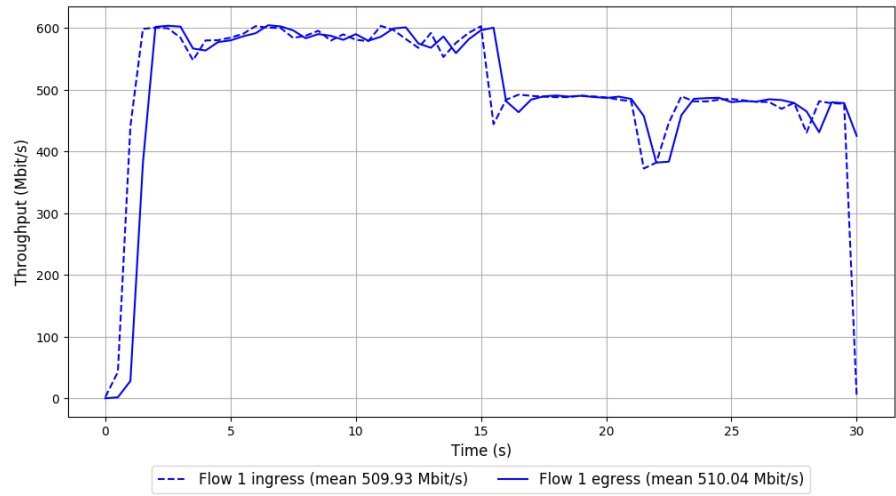
Run 5: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2018-11-03 11:49:23
End at: 2018-11-03 11:49:53
Local clock offset: -0.099 ms
Remote clock offset: -0.61 ms


# Below is generated by plot.py at 2018-11-03 15:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 169.17 Mbit/s
95th percentile per-packet one-way delay: 136.704 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 169.17 Mbit/s
95th percentile per-packet one-way delay: 136.704 ms
Loss rate: 0.98%
```
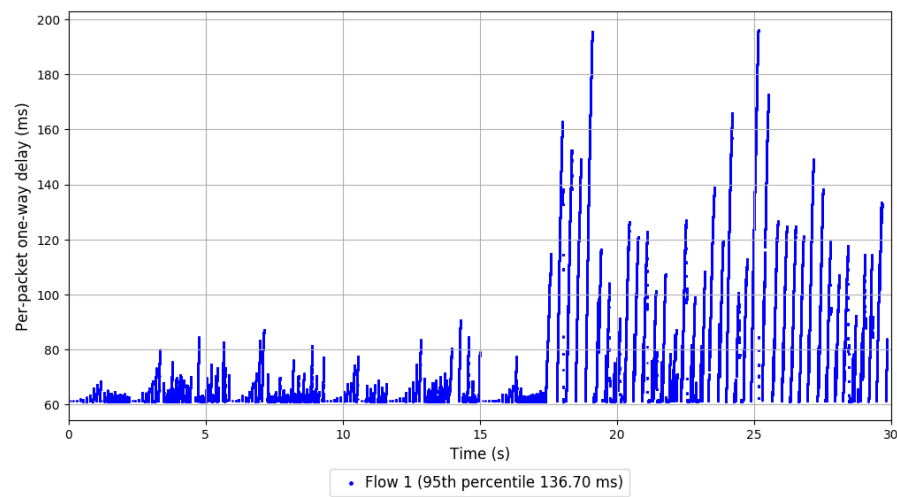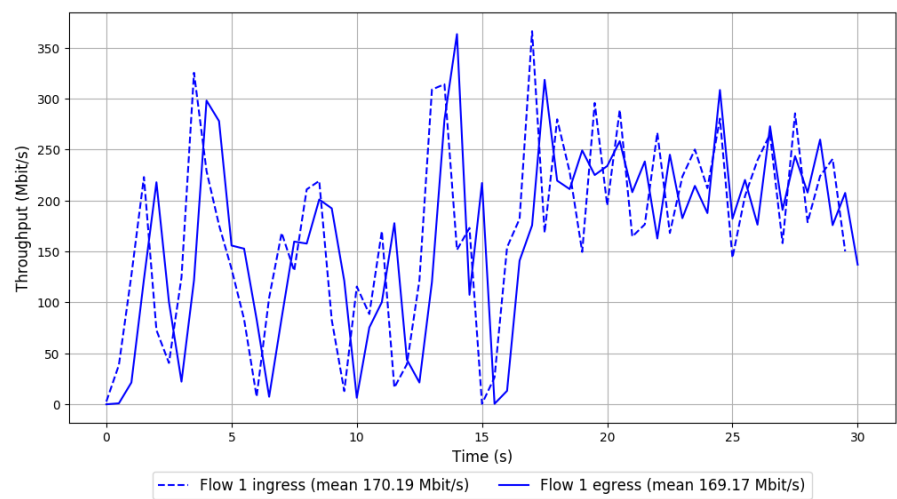
Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 170.19 Mbit/s)   Flow 1 egress (mean 169.17 Mbit/s)

Flow 1 (95th percentile 136.70 ms)

```
Run 2: Statistics of Verus

Start at: 2018-11-03 12:16:55
End at: 2018-11-03 12:17:25
Local clock offset: 0.115 ms
Remote clock offset: 0.527 ms


# Below is generated by plot.py at 2018-11-03 15:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 171.99 Mbit/s
95th percentile per-packet one-way delay: 115.681 ms
Loss rate: 1.13%
-- Flow 1:
Average throughput: 171.99 Mbit/s
95th percentile per-packet one-way delay: 115.681 ms
Loss rate: 1.13%
```
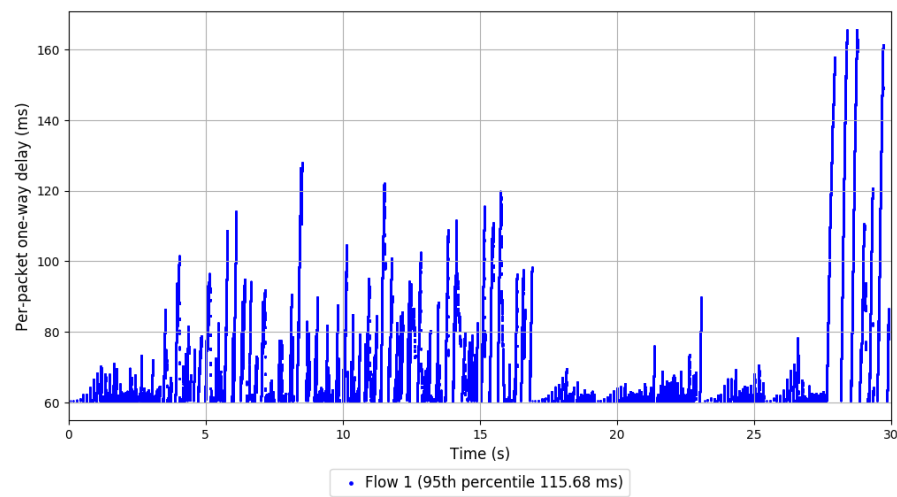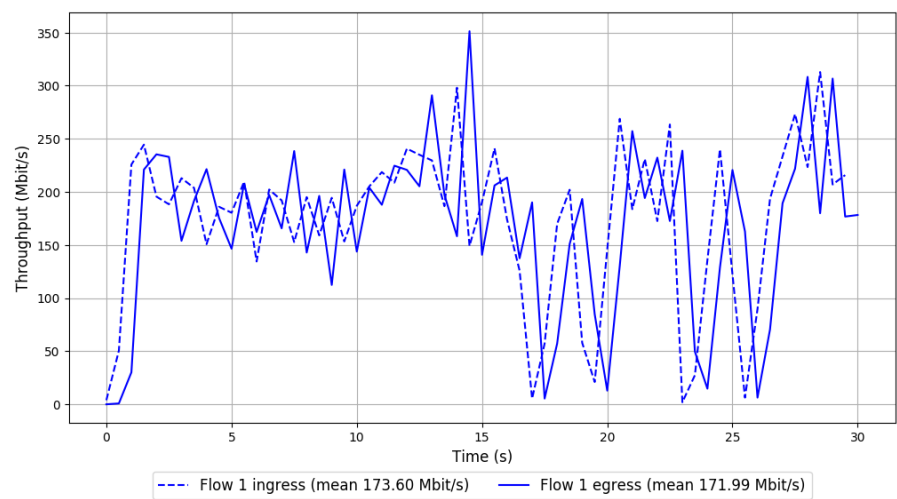
Run 2: Report of Verus — Data Link

Flow 1 ingress (mean 173.60 Mbit/s)   Flow 1 egress (mean 171.99 Mbit/s)

Flow 1 (95th percentile 115.68 ms)

```
Run 3: Statistics of Verus

Start at: 2018-11-03 12:44:17
End at: 2018-11-03 12:44:47
Local clock offset: -0.281 ms
Remote clock offset: 0.324 ms


# Below is generated by plot.py at 2018-11-03 15:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 173.35 Mbit/s
95th percentile per-packet one-way delay: 112.099 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 173.35 Mbit/s
95th percentile per-packet one-way delay: 112.099 ms
Loss rate: 0.22%
```
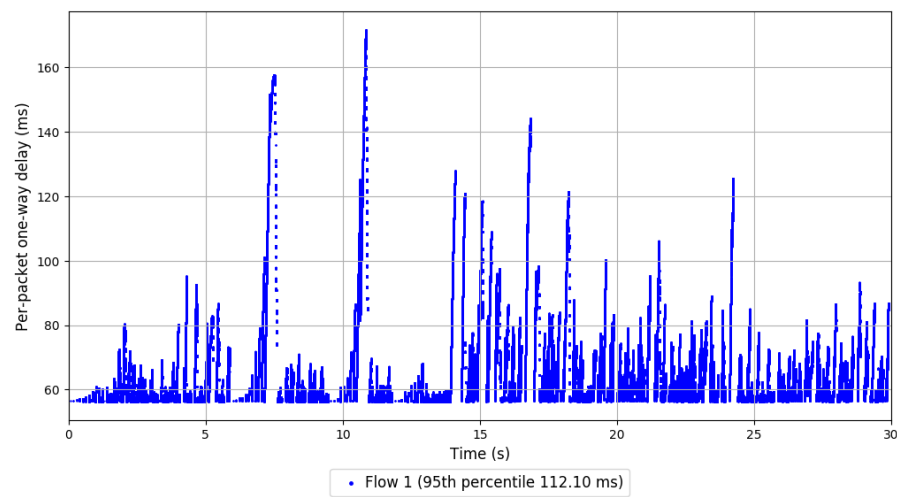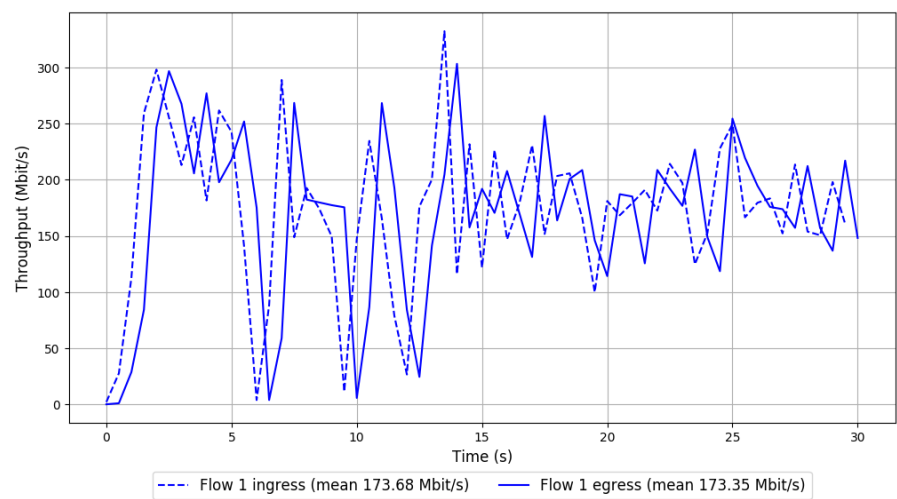
Run 3: Report of Verus — Data Link

```
Run 4: Statistics of Verus

Start at: 2018-11-03 13:11:30
End at: 2018-11-03 13:12:00
Local clock offset: -0.302 ms
Remote clock offset: 0.375 ms


# Below is generated by plot.py at 2018-11-03 15:42:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 146.67 Mbit/s
95th percentile per-packet one-way delay: 150.905 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 146.67 Mbit/s
95th percentile per-packet one-way delay: 150.905 ms
Loss rate: 0.78%
```
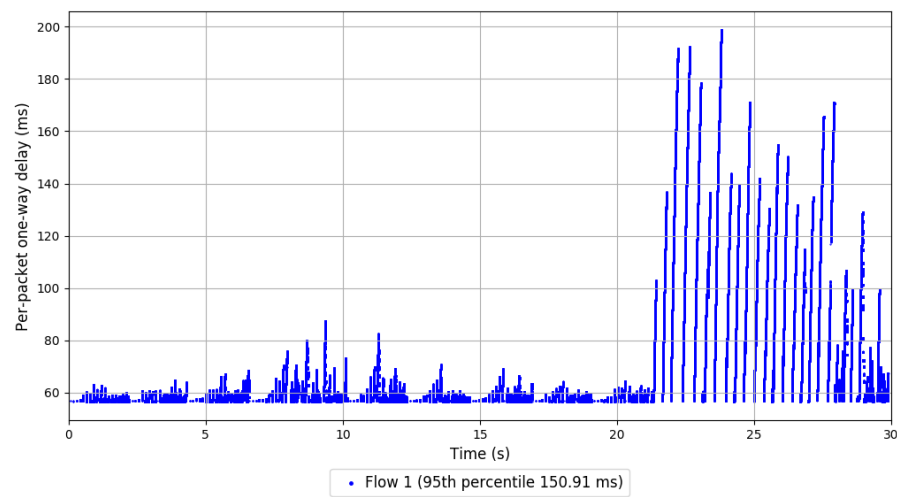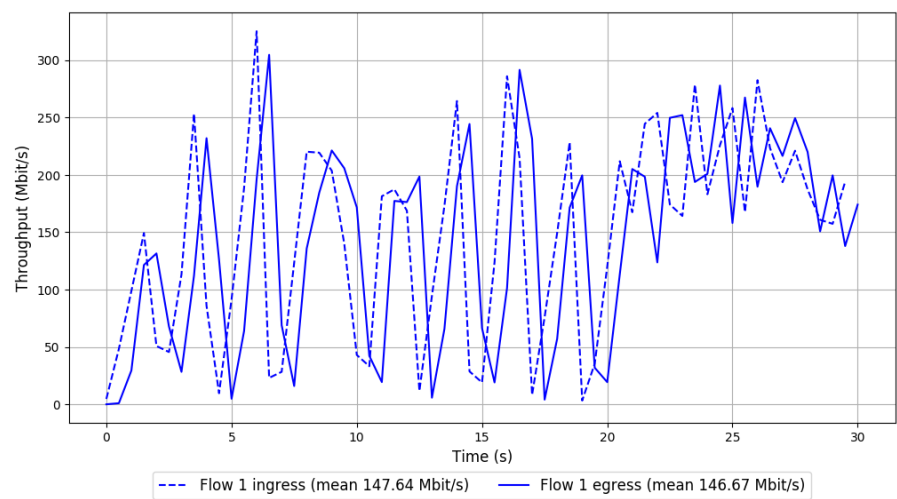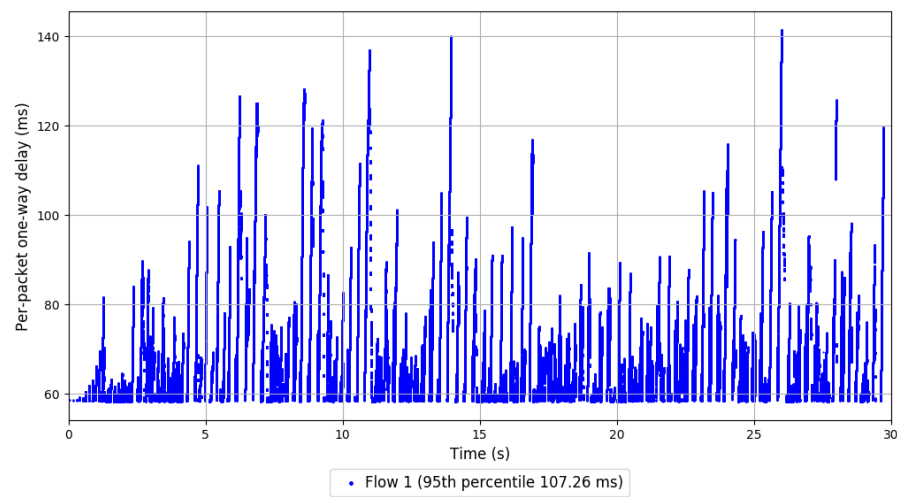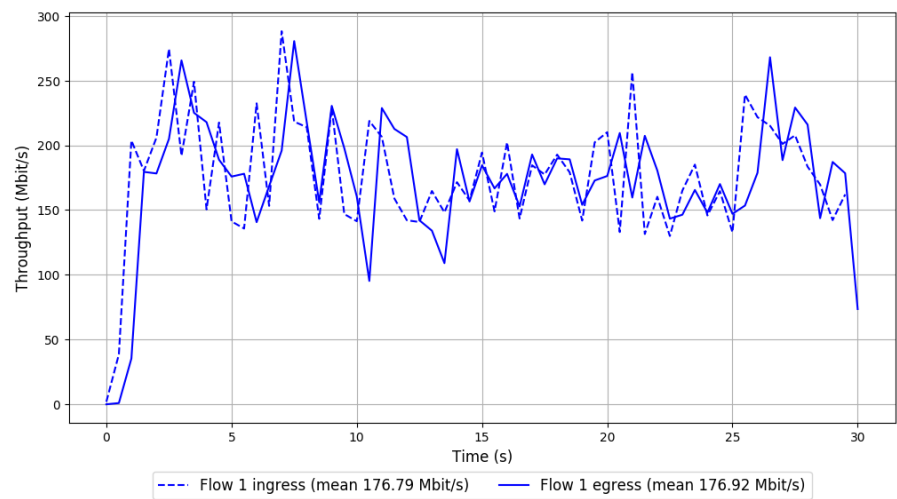
Run 4: Report of Verus — Data Link

```
Run 5: Statistics of Verus

Start at: 2018-11-03 13:38:40
End at: 2018-11-03 13:39:10
Local clock offset: -0.149 ms
Remote clock offset: -1.454 ms


# Below is generated by plot.py at 2018-11-03 15:43:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 176.92 Mbit/s
95th percentile per-packet one-way delay: 107.256 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 176.92 Mbit/s
95th percentile per-packet one-way delay: 107.256 ms
Loss rate: 0.84%
```

Run 5: Report of Verus — Data Link

```
Run 1: Statistics of PCC-Vivace

Start at: 2018-11-03 11:57:14
End at: 2018-11-03 11:57:44
Local clock offset: 0.255 ms
Remote clock offset: 0.027 ms


# Below is generated by plot.py at 2018-11-03 15:45:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 381.56 Mbit/s
95th percentile per-packet one-way delay: 86.289 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 381.56 Mbit/s
95th percentile per-packet one-way delay: 86.289 ms
Loss rate: 0.50%
```
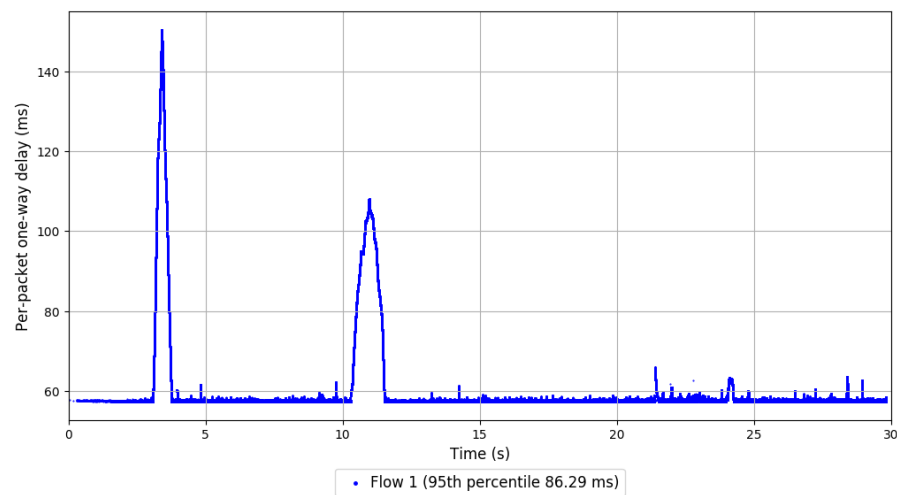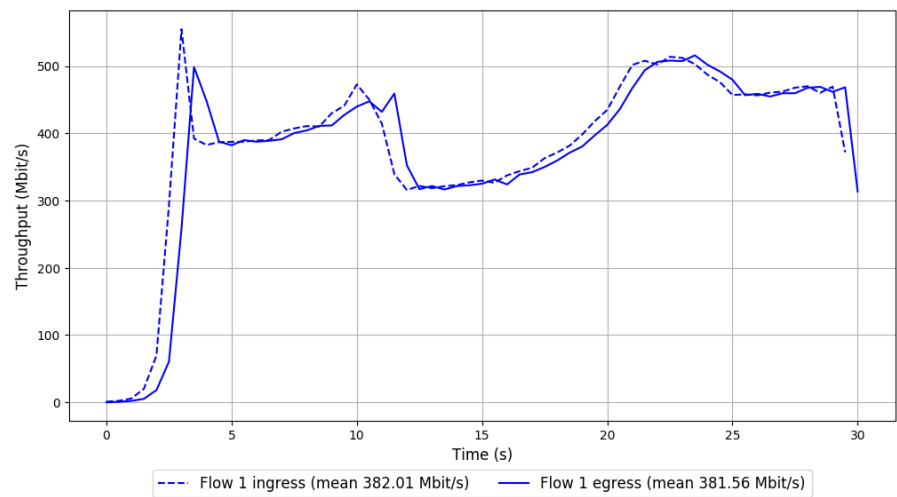
Run 1: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 382.01 Mbit/s) — — — Flow 1 egress (mean 381.56 Mbit/s)

Flow 1 (95th percentile 86.29 ms)

```
Run 2: Statistics of PCC-Vivace

Start at: 2018-11-03 12:24:51
End at: 2018-11-03 12:25:21
Local clock offset: -0.328 ms
Remote clock offset: 0.746 ms


# Below is generated by plot.py at 2018-11-03 15:45:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 424.92 Mbit/s
95th percentile per-packet one-way delay: 60.847 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 424.92 Mbit/s
95th percentile per-packet one-way delay: 60.847 ms
Loss rate: 0.44%
```
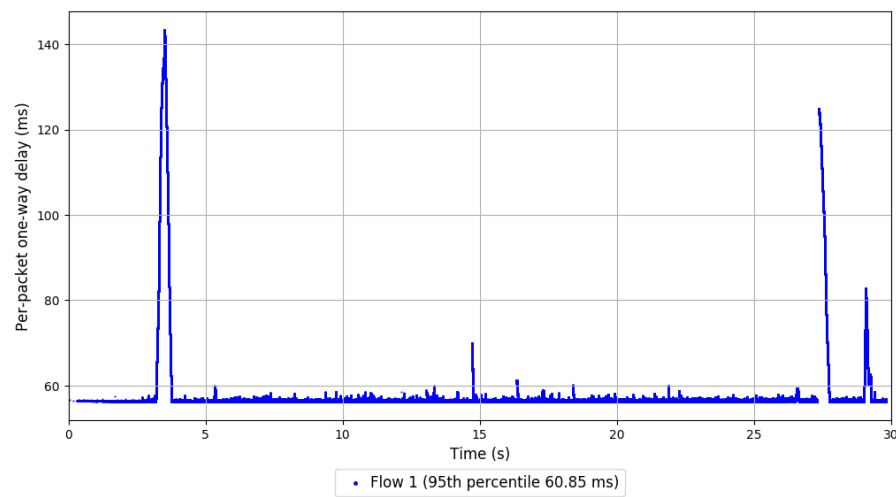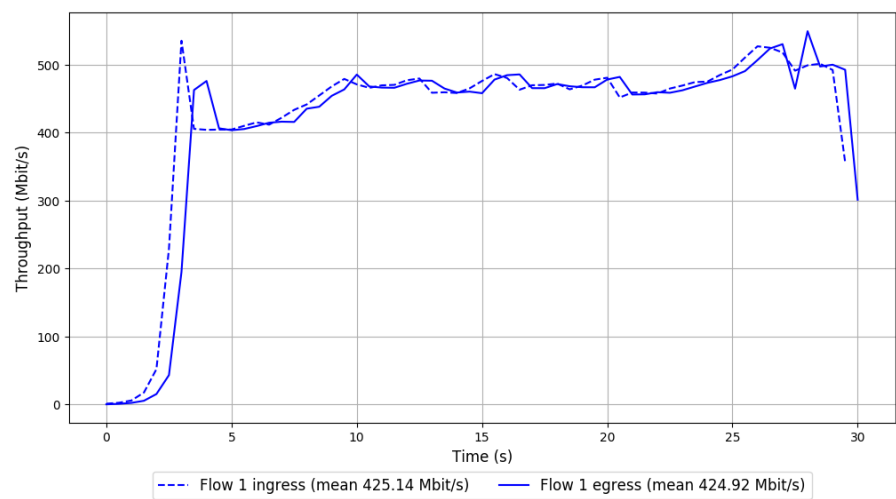
Run 2: Report of PCC-Vivace — Data Link

```
Run 3: Statistics of PCC-Vivace

Start at: 2018-11-03 12:52:02
End at: 2018-11-03 12:52:32
Local clock offset: 0.069 ms
Remote clock offset: -0.311 ms


# Below is generated by plot.py at 2018-11-03 15:45:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 403.53 Mbit/s
95th percentile per-packet one-way delay: 60.807 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 403.53 Mbit/s
95th percentile per-packet one-way delay: 60.807 ms
Loss rate: 0.45%
```
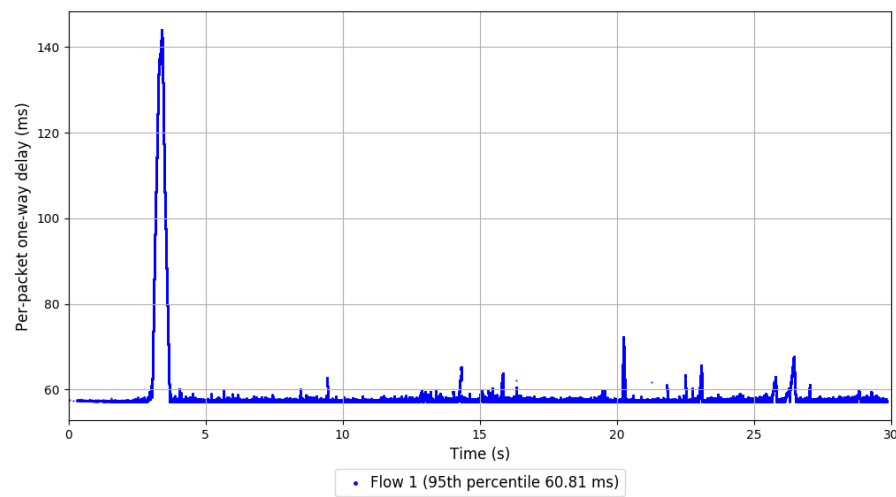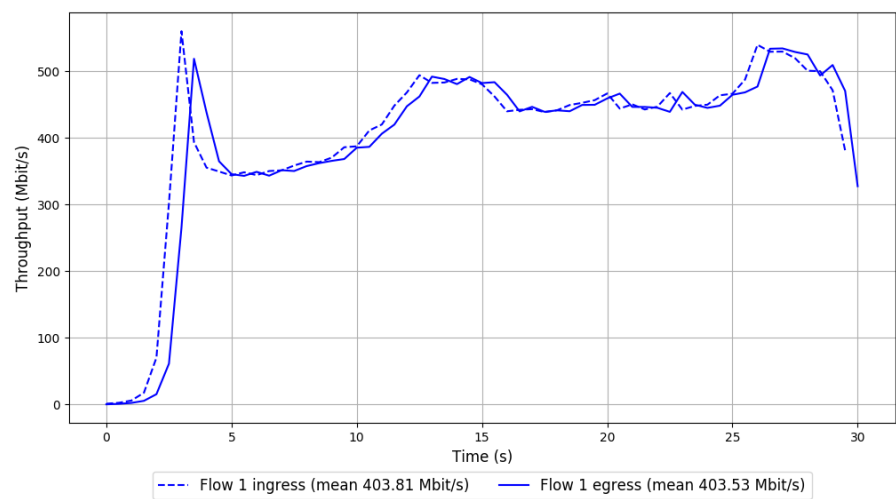
Run 3: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 403.81 Mbit/s) — Flow 1 egress (mean 403.53 Mbit/s)
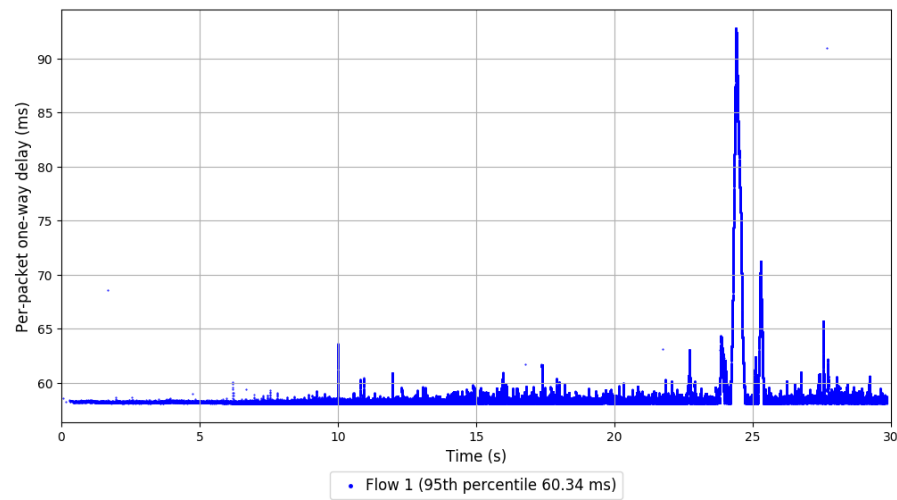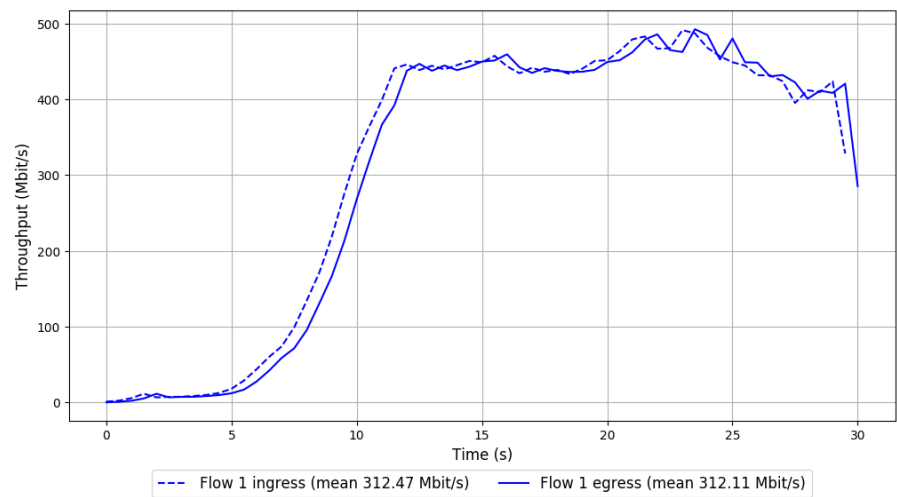

Flow 1 (95th percentile 60.81 ms)

```
Run 4: Statistics of PCC-Vivace

Start at: 2018-11-03 13:19:22
End at: 2018-11-03 13:19:52
Local clock offset: -0.507 ms
Remote clock offset: -1.498 ms


# Below is generated by plot.py at 2018-11-03 15:45:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 312.11 Mbit/s
95th percentile per-packet one-way delay: 60.338 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 312.11 Mbit/s
95th percentile per-packet one-way delay: 60.338 ms
Loss rate: 0.50%
```

Run 4: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 312.47 Mbit/s) --- Flow 1 egress (mean 312.11 Mbit/s)

Flow 1 (95th percentile 60.34 ms)

```
Run 5: Statistics of PCC-Vivace

Start at: 2018-11-03 13:46:32
End at: 2018-11-03 13:47:02
Local clock offset: -0.183 ms
Remote clock offset: 1.218 ms


# Below is generated by plot.py at 2018-11-03 15:45:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 389.84 Mbit/s
95th percentile per-packet one-way delay: 63.712 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 389.84 Mbit/s
95th percentile per-packet one-way delay: 63.712 ms
Loss rate: 0.41%
```
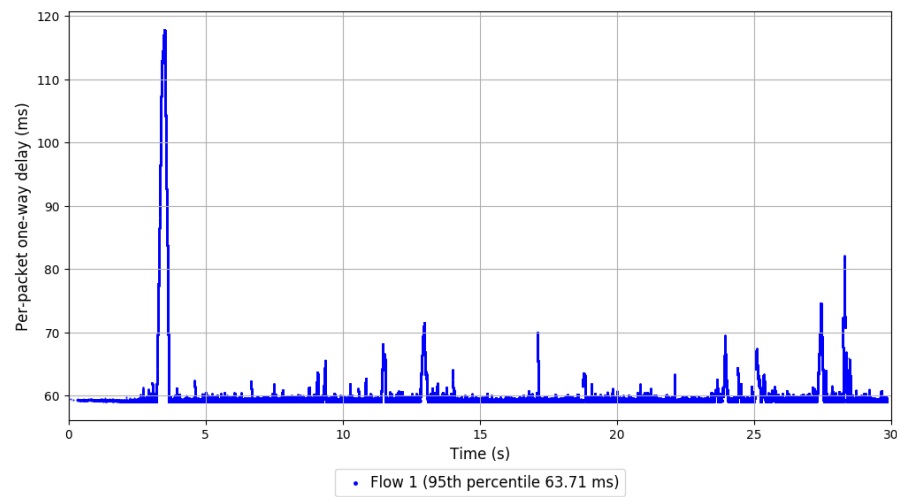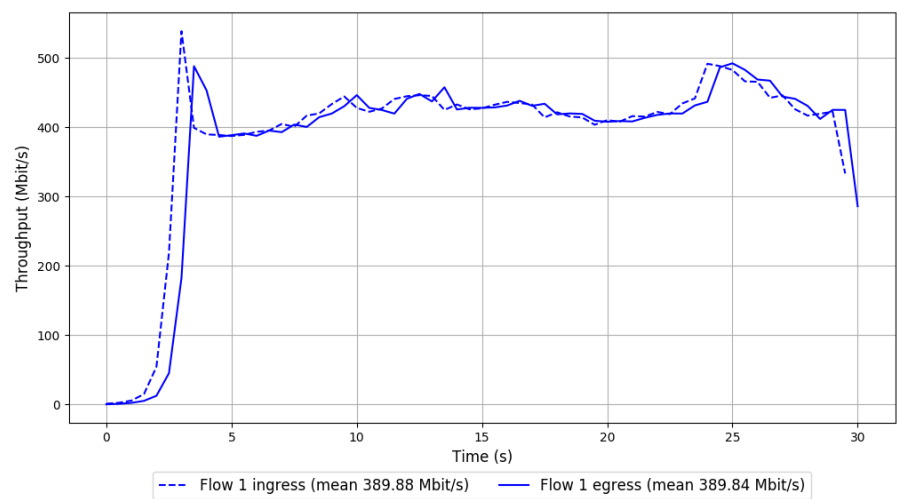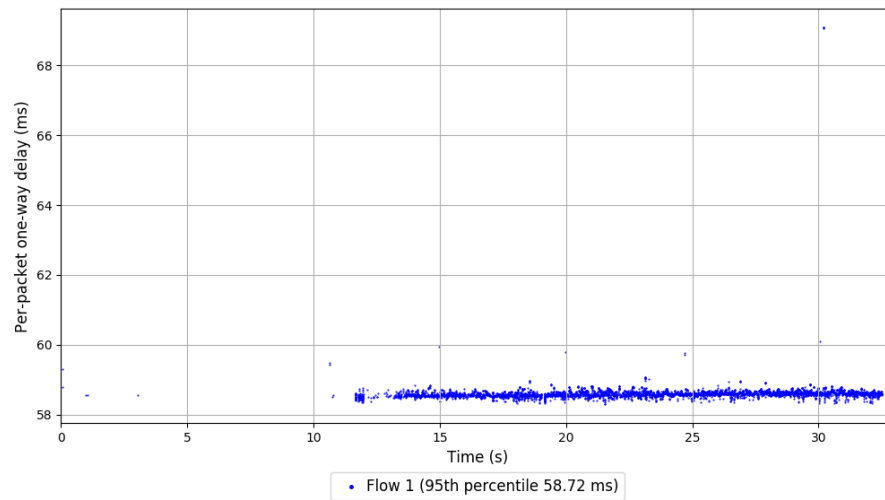
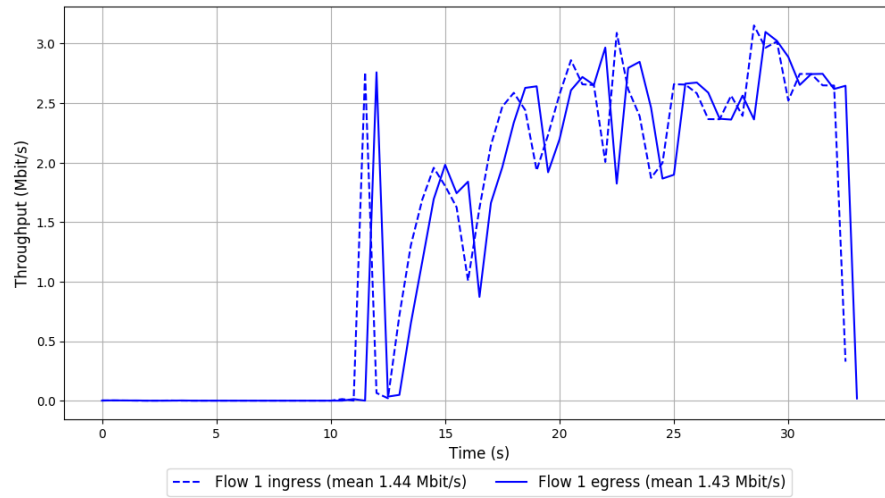# Run 5: Report of PCC-Vivace — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-11-03 11:48:15
End at: 2018-11-03 11:48:45
Local clock offset: 0.112 ms
Remote clock offset: -1.212 ms


# Below is generated by plot.py at 2018-11-03 15:45:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 58.723 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 58.723 ms
Loss rate: 0.71%
```

Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-11-03 12:15:46
End at: 2018-11-03 12:16:16
Local clock offset: -0.553 ms
Remote clock offset: 0.303 ms


# Below is generated by plot.py at 2018-11-03 15:45:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 56.785 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 56.785 ms
Loss rate: 0.45%
```
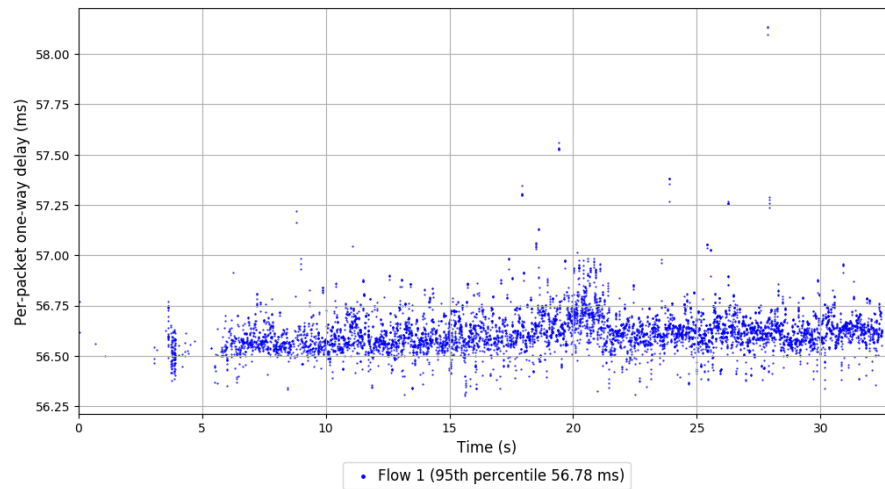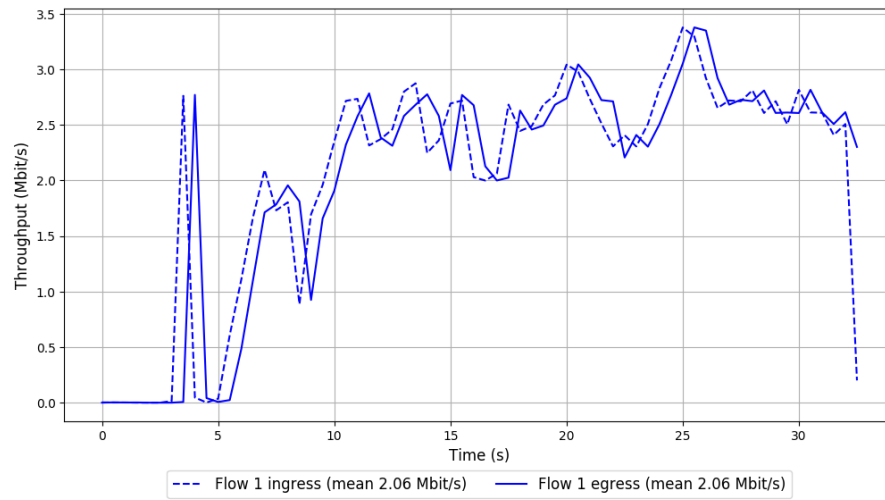
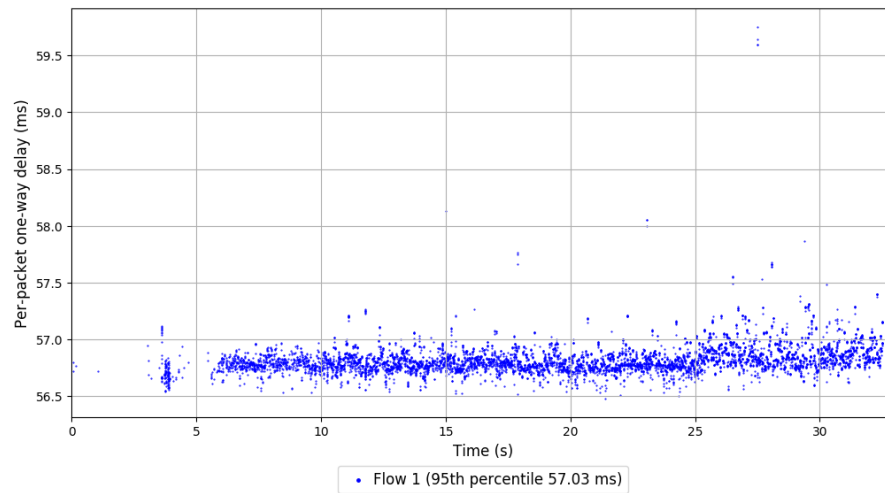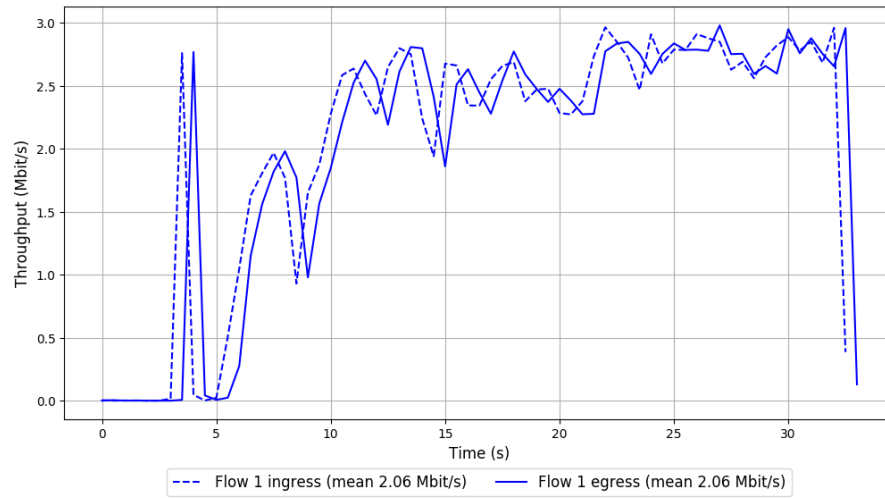Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-11-03 12:43:08
End at: 2018-11-03 12:43:38
Local clock offset: -0.348 ms
Remote clock offset: -0.197 ms


# Below is generated by plot.py at 2018-11-03 15:45:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 57.028 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 57.028 ms
Loss rate: 0.48%
```

Run 3: Report of WebRTC media — Data Link

```
Run 4: Statistics of WebRTC media

Start at: 2018-11-03 13:10:21
End at: 2018-11-03 13:10:51
Local clock offset: 0.248 ms
Remote clock offset: 0.125 ms

# Below is generated by plot.py at 2018-11-03 15:45:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 57.250 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 57.250 ms
Loss rate: 0.52%
```
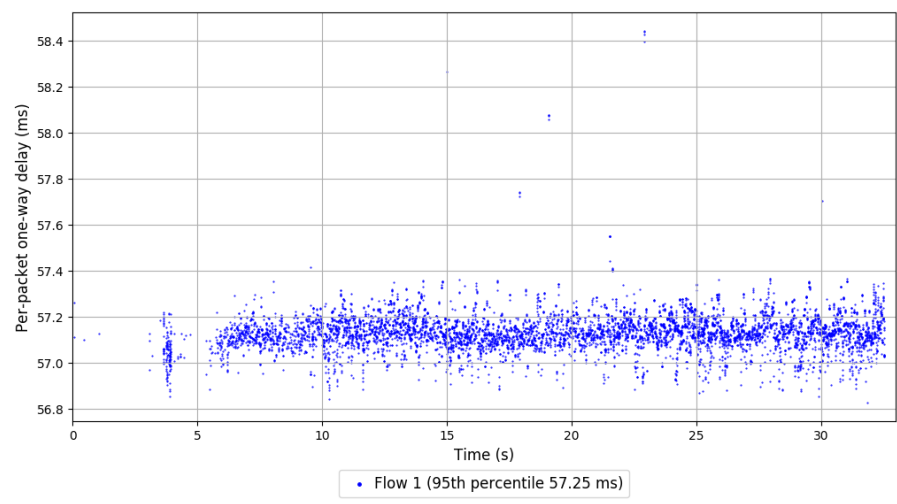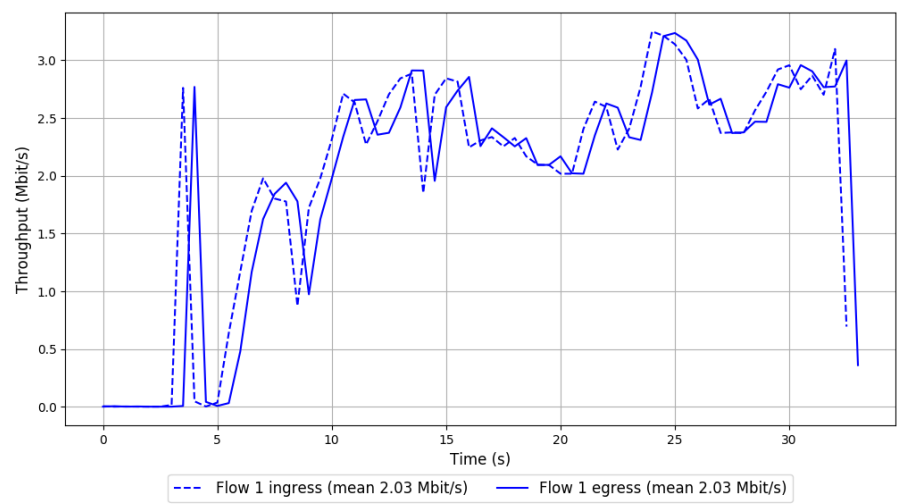
Run 4: Report of WebRTC media — Data Link

```
Run 5: Statistics of WebRTC media

Start at: 2018-11-03 13:37:31
End at: 2018-11-03 13:38:01
Local clock offset: 0.258 ms
Remote clock offset: -0.131 ms


# Below is generated by plot.py at 2018-11-03 15:45:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 61.002 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 61.002 ms
Loss rate: 0.52%
```

Run 5: Report of WebRTC media — Data Link