Pantheon Report

Generated at 2018-10-26 03:02:35 (UTC).

Tested in mahimahi: `mm-delay 50 mm-link 60mbps.trace 60mbps.trace --uplink-queue=droptail --uplink-queue-args=packets=1 --downlink-queue=droptail --downlink-queue-args=packets=1`

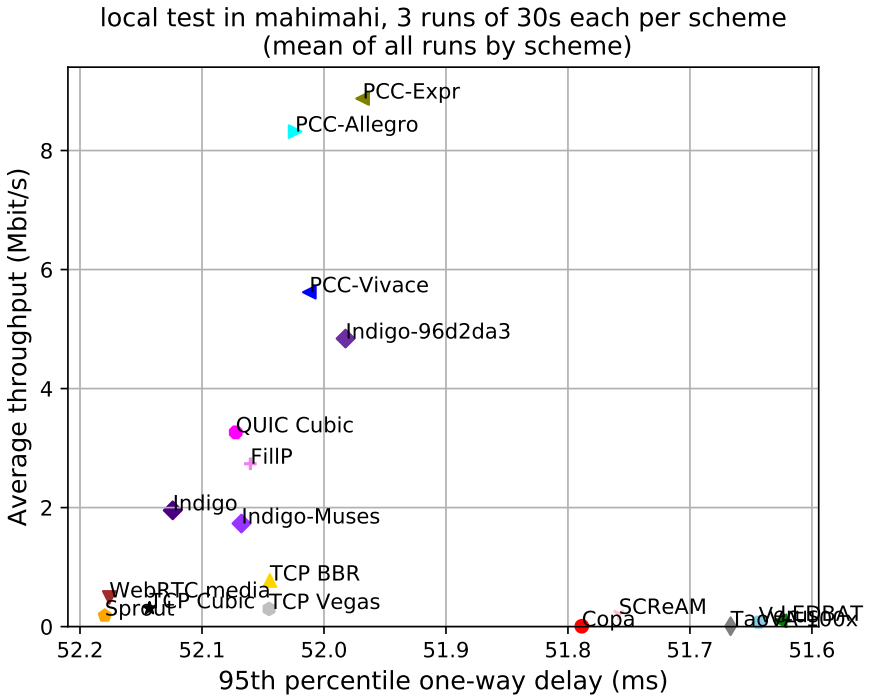
Repeated the test of 18 congestion control schemes 3 times.

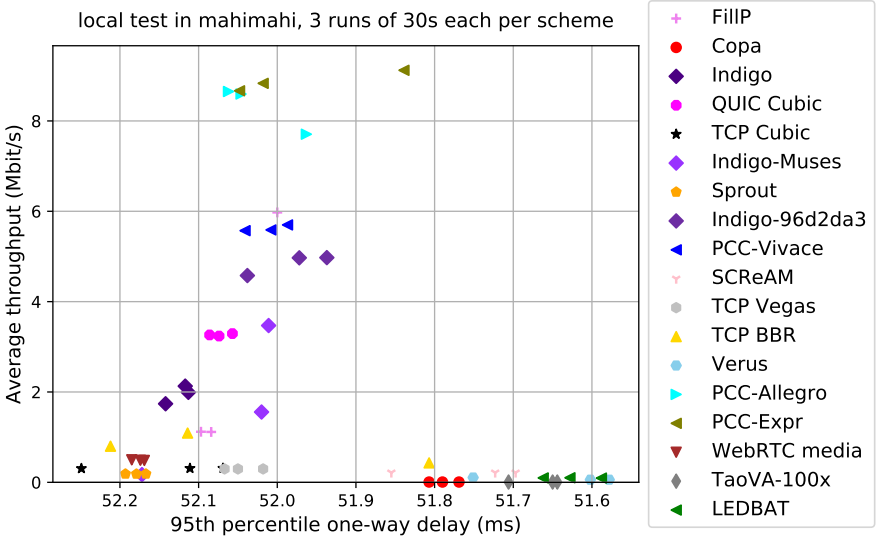
Each test lasted for 30 seconds running 1 flow.

```
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 @ 2e19c0464530faa92c63f8217c9971438a26a3be
third_party/fillp @ 5332fc9127c63565e13f4933b336c02d1aabdac6
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


local test in mahimahi, 3 runs of 30s each per scheme
(mean of all runs by scheme)
PCC-Expr
PCC-Allegro
PCC-Vivace
Indigo-96d2da3
QUIC Cubic
FillP
Indigo
Indigo-Muses
TCP BBR
WebRTC media
Sprout
TCP Cubic
TCP Vegas
SCReAM
Copa
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
0
2
4
6
8
52.2
52.1
52.0
51.9
51.8
51.7
51.6


local test in mahimahi, 3 runs of 30s each per scheme
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
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

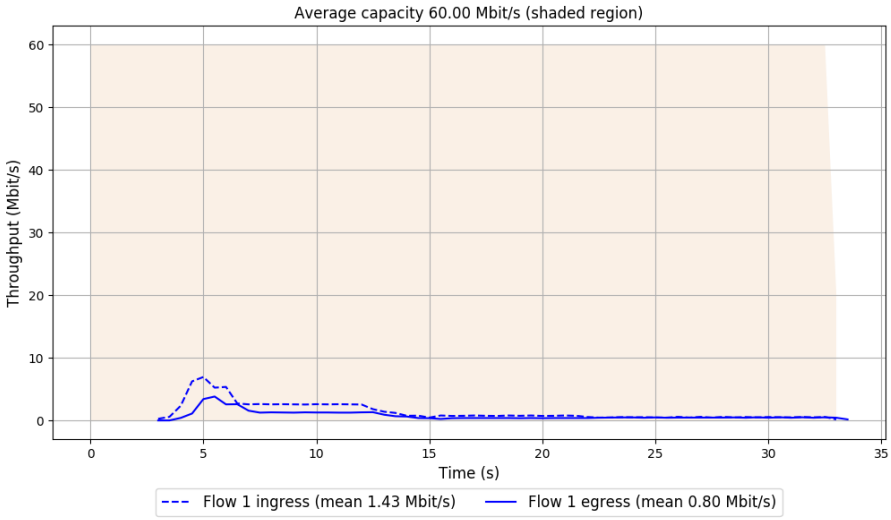
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.77	52.04	34.28
Copa	3	0.01	51.79	90.36
TCP Cubic	3	0.31	52.14	8.43
FillP	3	2.74	52.06	53.48
Indigo	3	1.95	52.12	97.58
Indigo-96d2da3	3	4.84	51.98	78.13
LEDBAT	3	0.10	51.63	43.32
Indigo-Muses	3	1.73	52.07	63.32
PCC-Allegro	3	8.32	52.02	2.90
PCC-Expr	3	8.87	51.97	35.01
QUIC Cubic	3	3.26	52.07	1.39
SCReAM	3	0.21	51.76	0.22
Sprout	3	0.19	52.18	8.95
TaoVA-100x	3	0.01	51.67	51.91
TCP Vegas	3	0.30	52.04	11.10
Verus	3	0.08	51.64	57.21
PCC-Vivace	3	5.62	52.01	0.43
WebRTC media	3	0.49	52.18	38.66

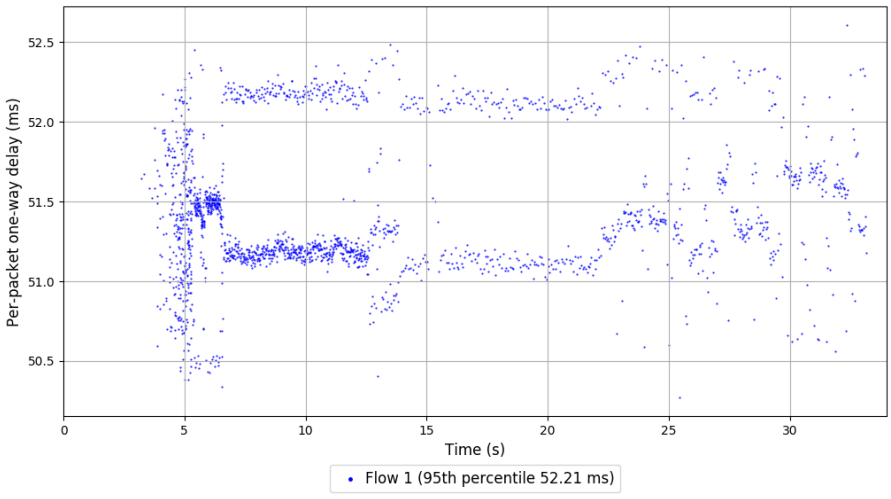
```
Run 1: Statistics of TCP BBR

Start at: 2018-10-26 02:33:01
End at: 2018-10-26 02:33:31

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.80 Mbit/s (1.3% utilization)
95th percentile per-packet one-way delay: 52.212 ms
Loss rate: 44.10%
-- Flow 1:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 52.212 ms
Loss rate: 44.10%
```

Run 1: Report of TCP BBR — Data Link



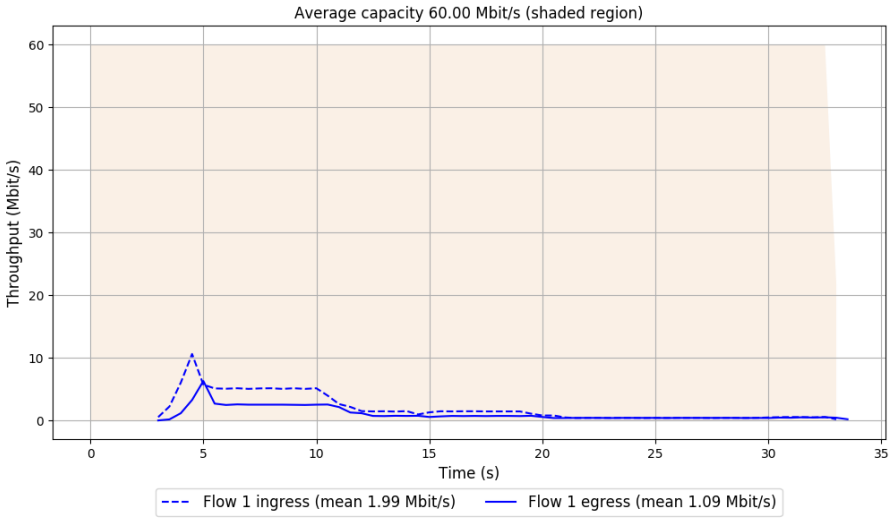


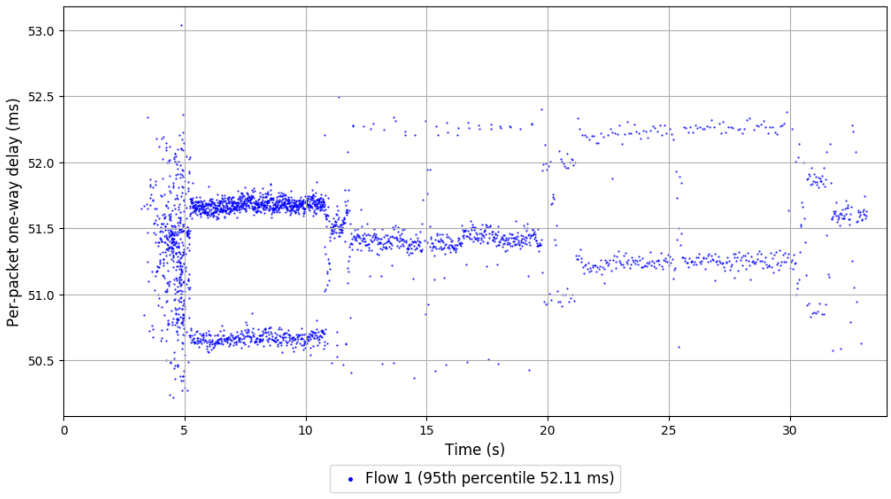
```
Run 2: Statistics of TCP BBR

Start at: 2018-10-26 02:43:47
End at: 2018-10-26 02:44:17

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 1.09 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 52.114 ms
Loss rate: 45.21%
-- Flow 1:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 52.114 ms
Loss rate: 45.21%
```

Run 2: Report of TCP BBR — Data Link



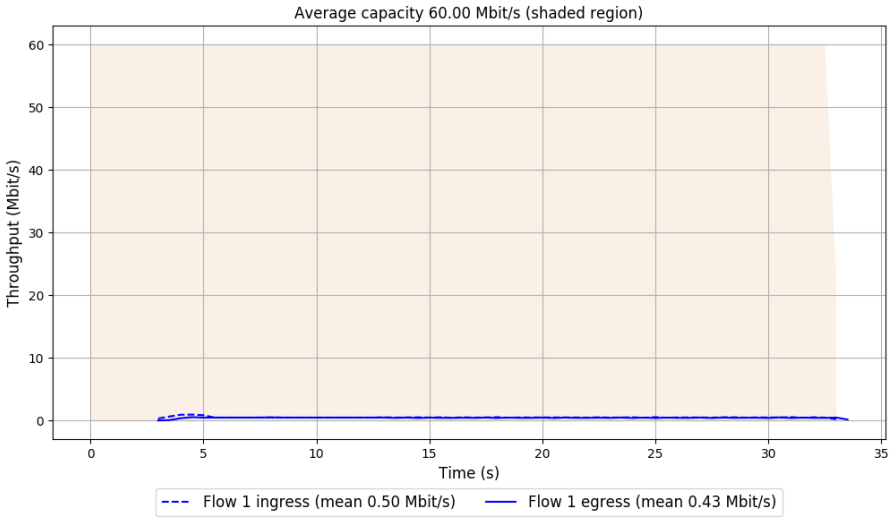


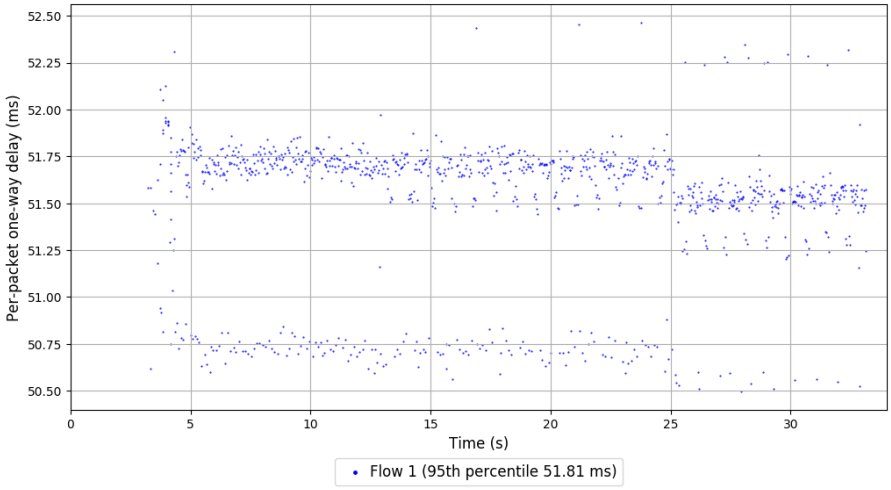
```
Run 3: Statistics of TCP BBR

Start at: 2018-10-26 02:54:35
End at: 2018-10-26 02:55:06

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.43 Mbit/s (0.7% utilization)
95th percentile per-packet one-way delay: 51.807 ms
Loss rate: 13.53%
-- Flow 1:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 51.807 ms
Loss rate: 13.53%
```

Run 3: Report of TCP BBR — Data Link



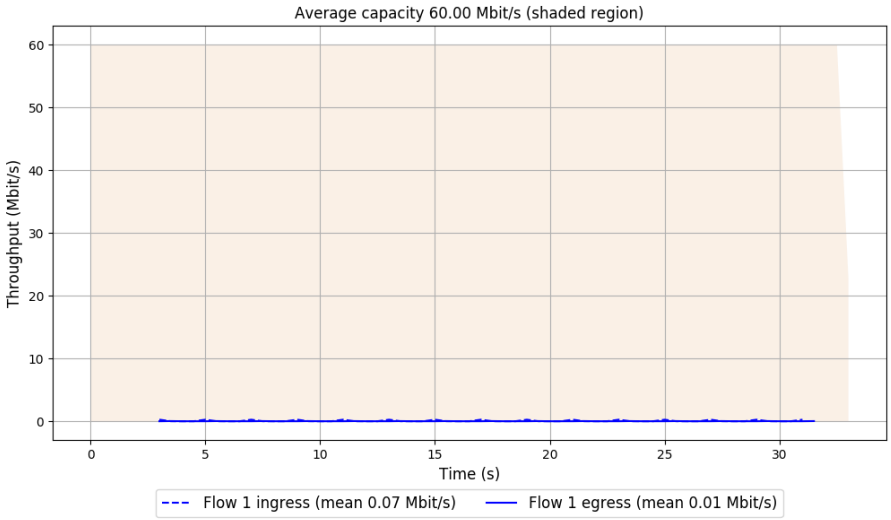


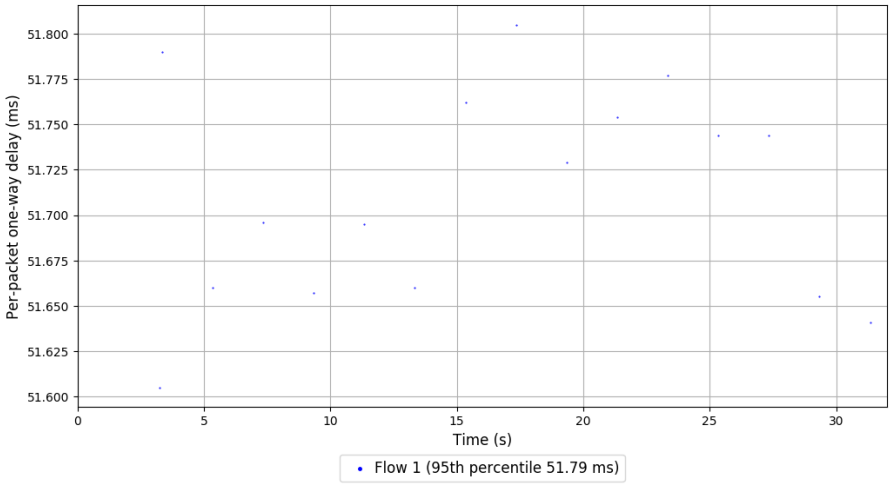
```
Run 1: Statistics of Copa

Start at: 2018-10-26 02:35:25
End at: 2018-10-26 02:35:55

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.0% utilization)
95th percentile per-packet one-way delay: 51.790 ms
Loss rate: 90.36%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 51.790 ms
Loss rate: 90.36%
```

Run 1: Report of Copa — Data Link



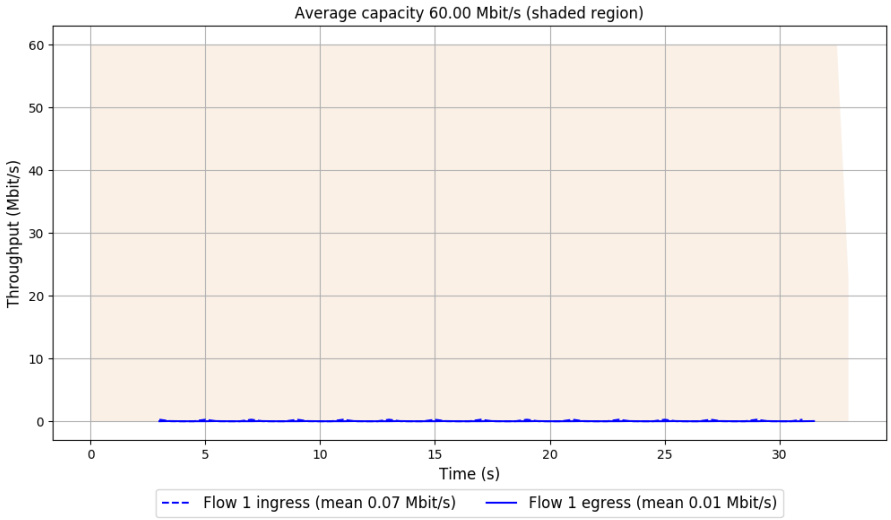


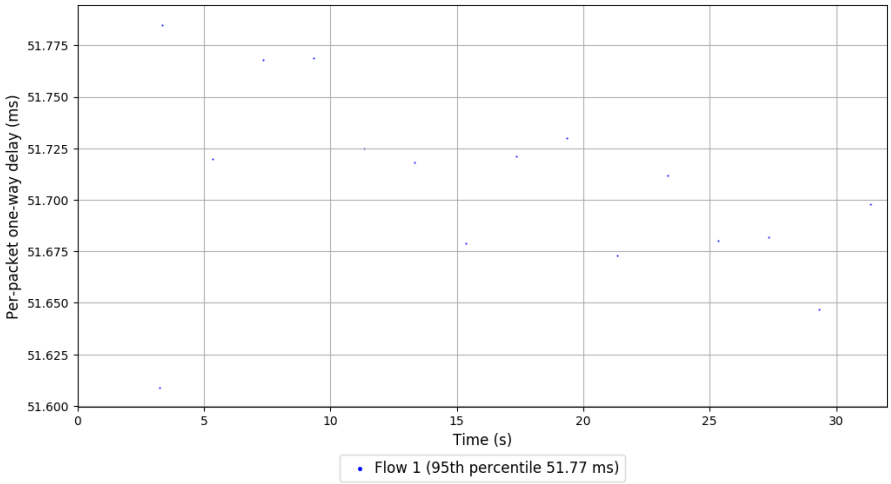
```
Run 2: Statistics of Copa

Start at: 2018-10-26 02:46:10
End at: 2018-10-26 02:46:40

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.0% utilization)
95th percentile per-packet one-way delay: 51.769 ms
Loss rate: 90.36%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 51.769 ms
Loss rate: 90.36%
```

Run 2: Report of Copa — Data Link



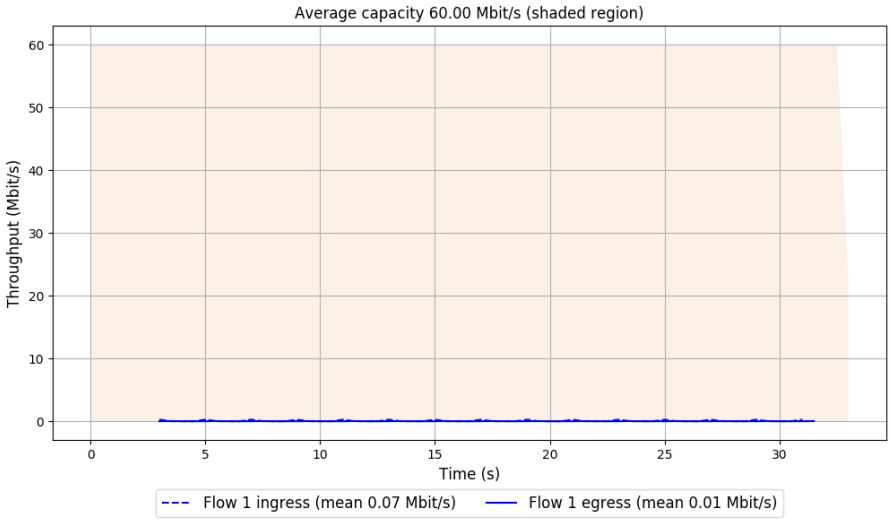


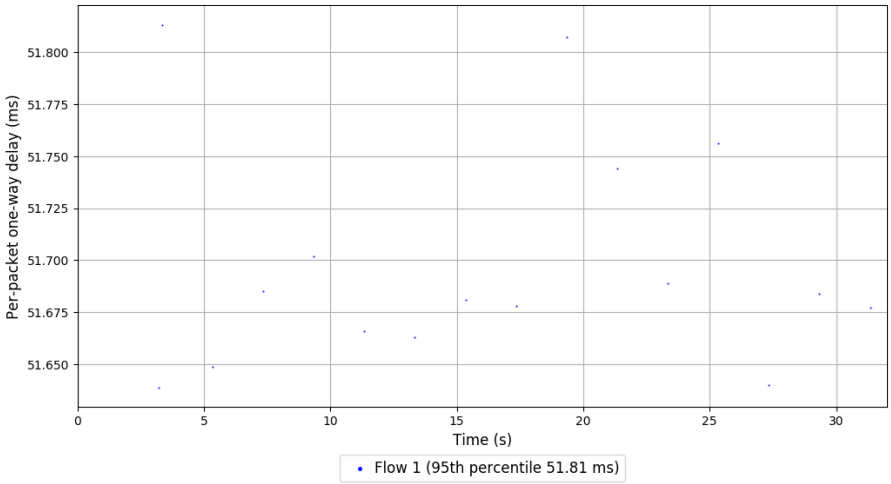
```
Run 3: Statistics of Copa

Start at: 2018-10-26 02:56:59
End at: 2018-10-26 02:57:29

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.0% utilization)
95th percentile per-packet one-way delay: 51.807 ms
Loss rate: 90.36%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 51.807 ms
Loss rate: 90.36%
```

Run 3: Report of Copa — Data Link



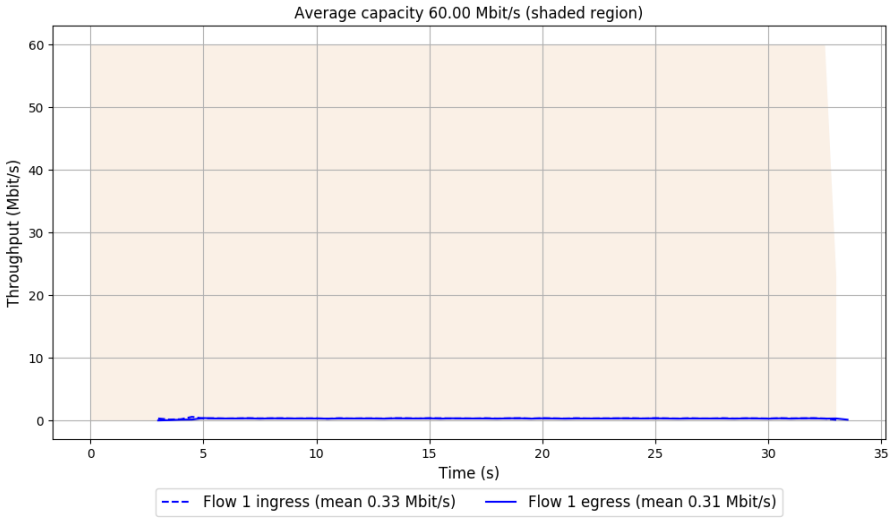


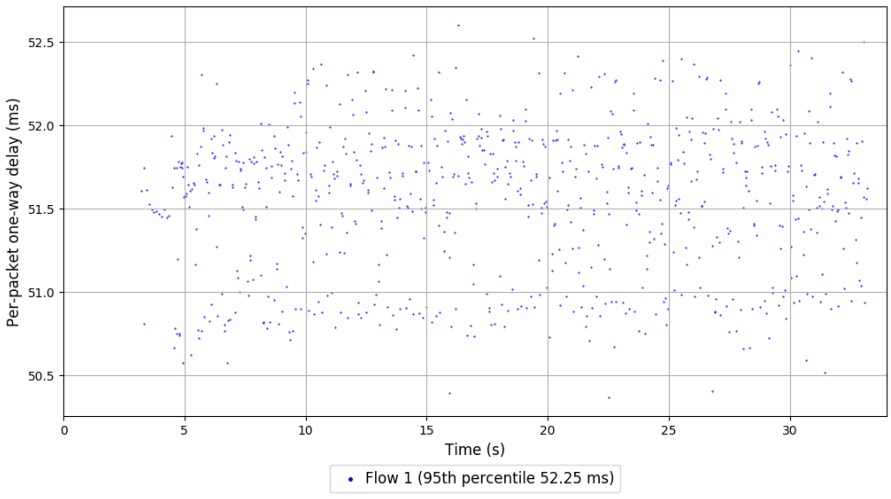
```
Run 1: Statistics of TCP Cubic

Start at: 2018-10-26 02:32:25
End at: 2018-10-26 02:32:55

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.31 Mbit/s (0.5% utilization)
95th percentile per-packet one-way delay: 52.249 ms
Loss rate: 8.61%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 52.249 ms
Loss rate: 8.61%
```

Run 1: Report of TCP Cubic — Data Link



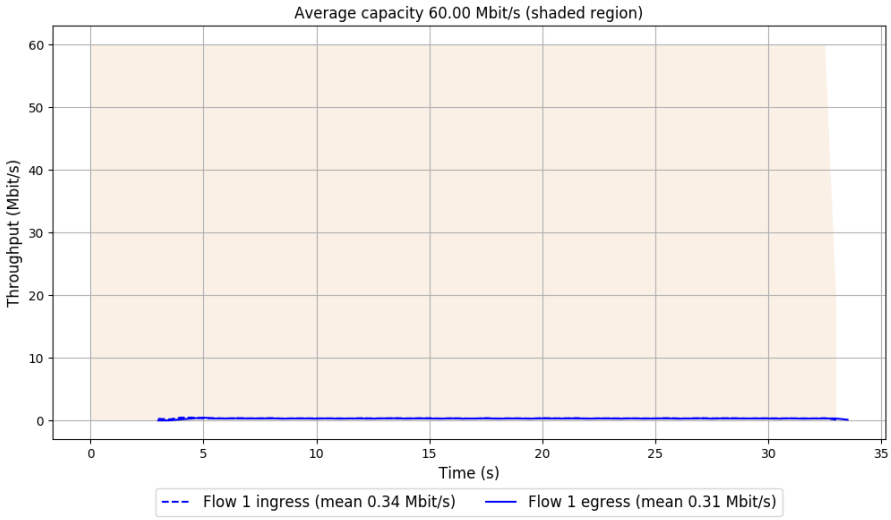


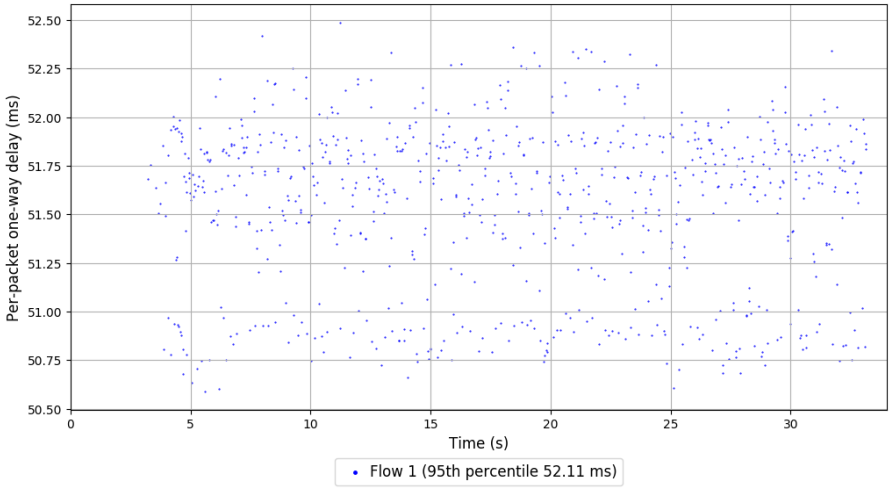
```
Run 2: Statistics of TCP Cubic

Start at: 2018-10-26 02:43:11
End at: 2018-10-26 02:43:41

# Below is generated by plot.py at 2018-10-26 03:00:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.31 Mbit/s (0.5% utilization)
95th percentile per-packet one-way delay: 52.111 ms
Loss rate: 8.32%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 52.111 ms
Loss rate: 8.32%
```

Run 2: Report of TCP Cubic — Data Link



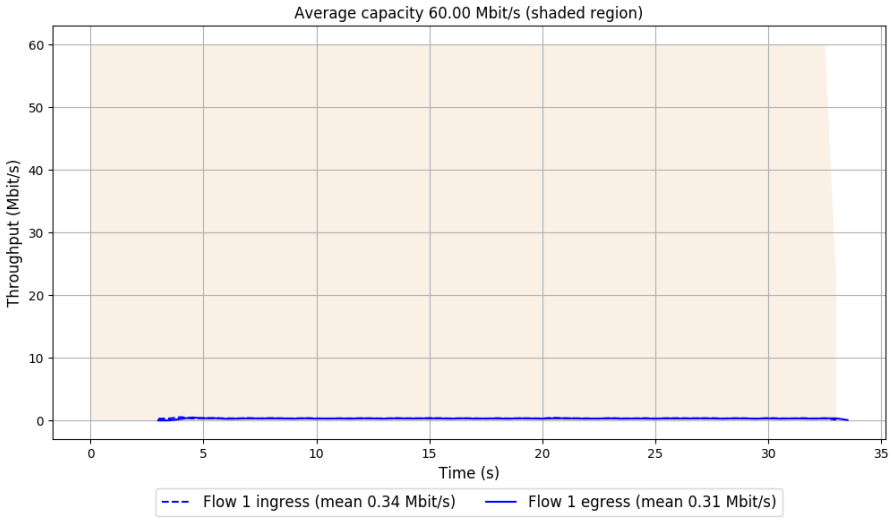


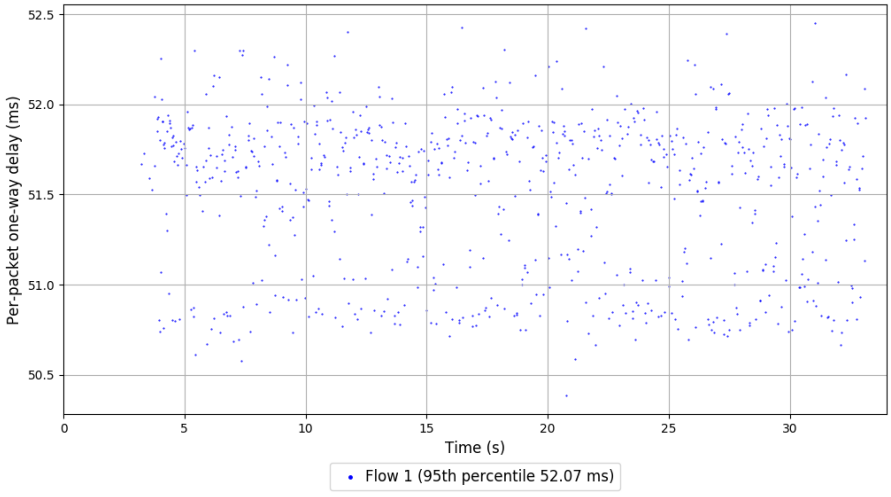
```
Run 3: Statistics of TCP Cubic

Start at: 2018-10-26 02:54:00
End at: 2018-10-26 02:54:30

# Below is generated by plot.py at 2018-10-26 03:00:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.31 Mbit/s (0.5% utilization)
95th percentile per-packet one-way delay: 52.069 ms
Loss rate: 8.37%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 52.069 ms
Loss rate: 8.37%
```

Run 3: Report of TCP Cubic — Data Link



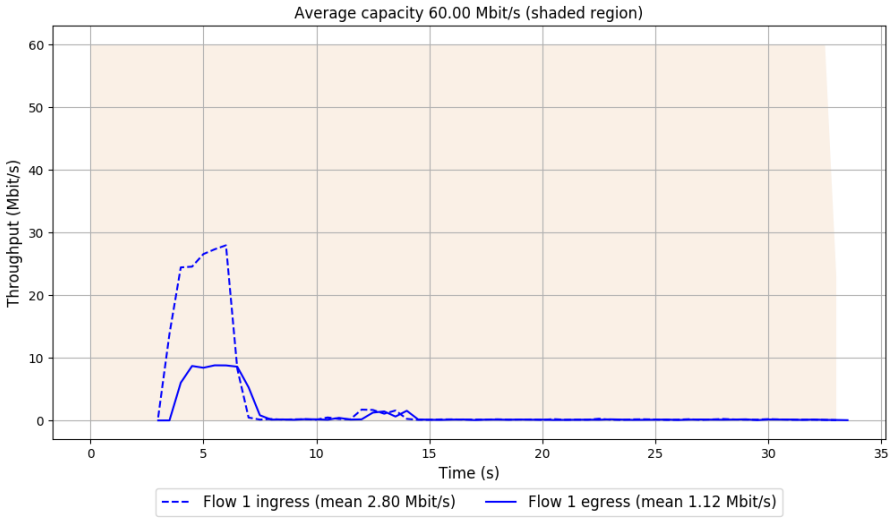


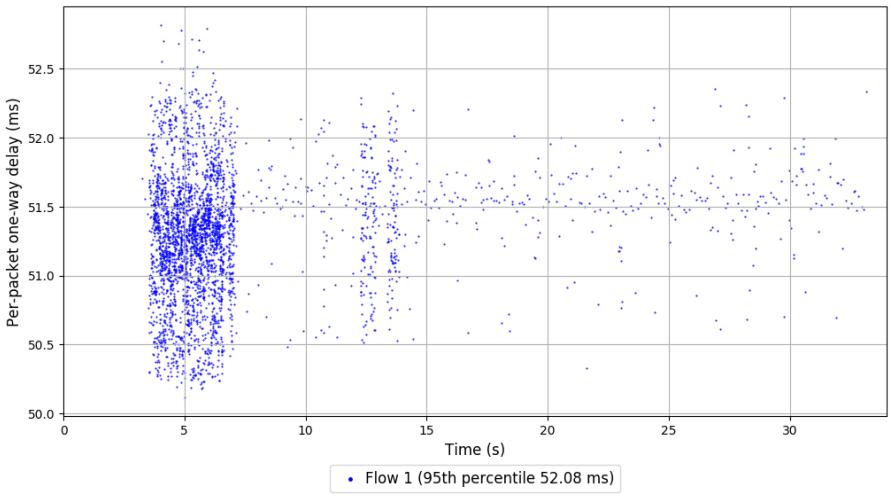
```
Run 1: Statistics of FillP

Start at: 2018-10-26 02:31:13
End at: 2018-10-26 02:31:44

# Below is generated by plot.py at 2018-10-26 03:00:41
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 1.12 Mbit/s (1.9% utilization)
95th percentile per-packet one-way delay: 52.084 ms
Loss rate: 60.17%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 52.084 ms
Loss rate: 60.17%
```

Run 1: Report of FillP — Data Link



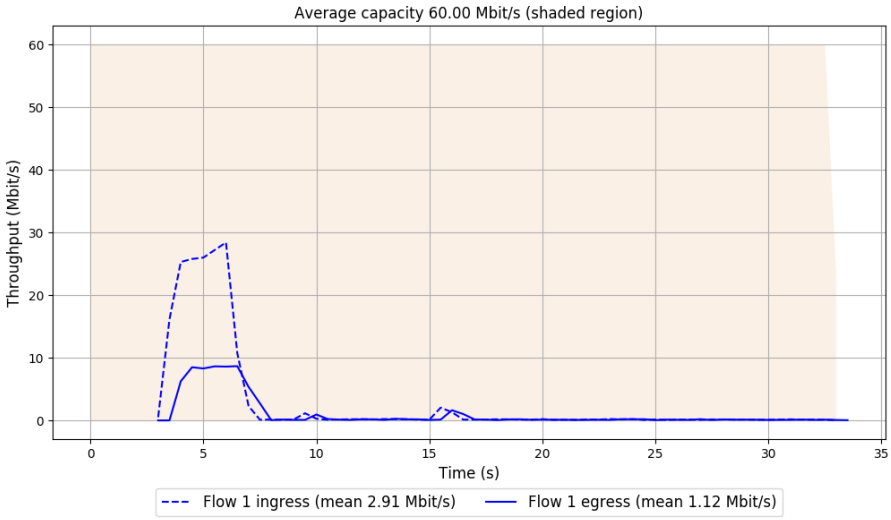


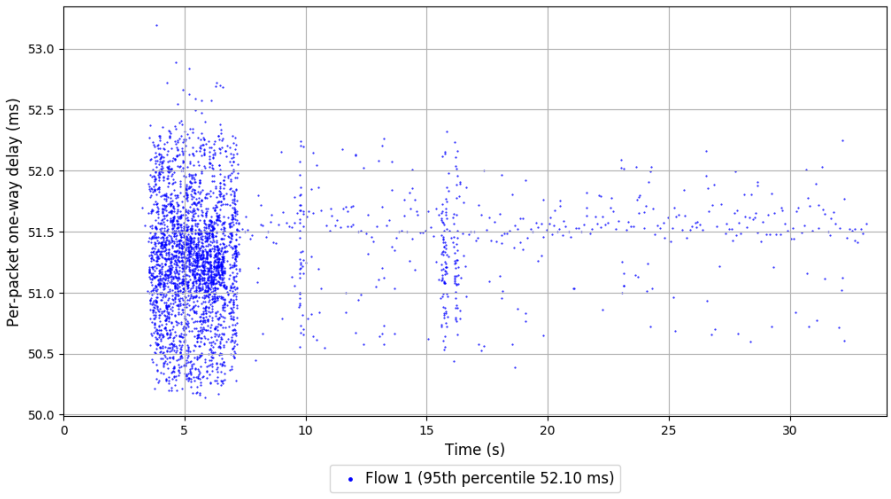
```
Run 2: Statistics of FillP

Start at: 2018-10-26 02:41:59
End at: 2018-10-26 02:42:29

# Below is generated by plot.py at 2018-10-26 03:00:41
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 1.12 Mbit/s (1.9% utilization)
95th percentile per-packet one-way delay: 52.097 ms
Loss rate: 61.57%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 52.097 ms
Loss rate: 61.57%
```

Run 2: Report of FillP — Data Link



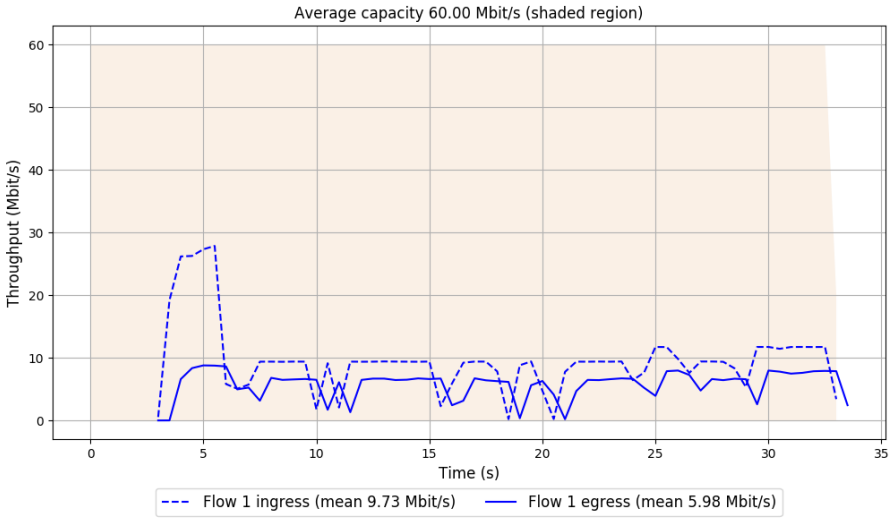


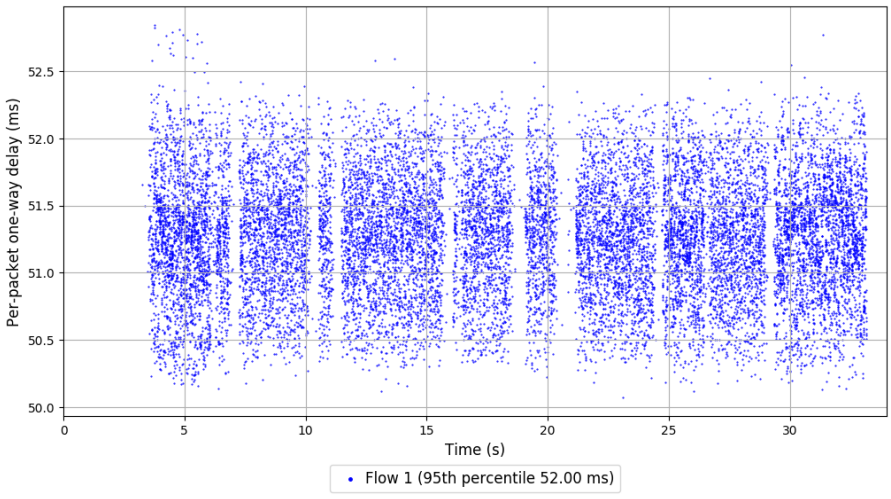
```
Run 3: Statistics of FillP

Start at: 2018-10-26 02:52:48
End at: 2018-10-26 02:53:18

# Below is generated by plot.py at 2018-10-26 03:00:46
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 5.98 Mbit/s (10.0% utilization)
95th percentile per-packet one-way delay: 52.000 ms
Loss rate: 38.71%
-- Flow 1:
Average throughput: 5.98 Mbit/s
95th percentile per-packet one-way delay: 52.000 ms
Loss rate: 38.71%
```

Run 3: Report of FillP — Data Link



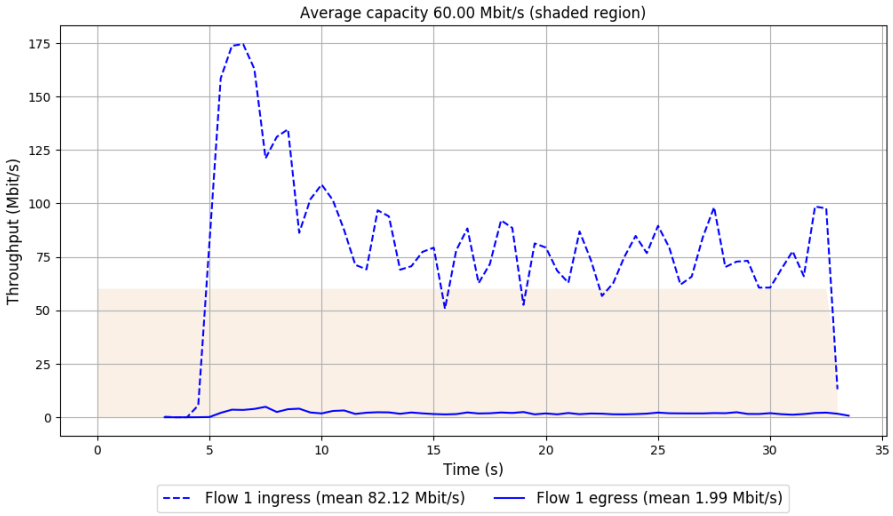


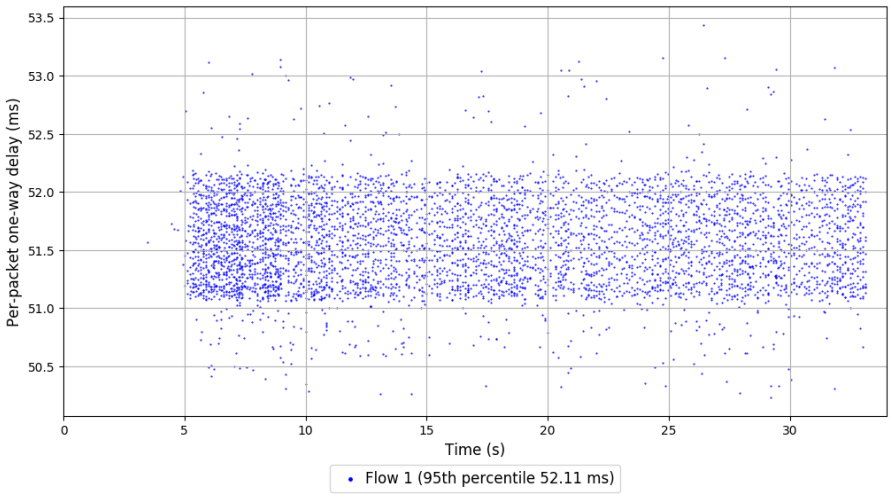
```
Run 1: Statistics of Indigo

Start at: 2018-10-26 02:28:12
End at: 2018-10-26 02:28:42

# Below is generated by plot.py at 2018-10-26 03:00:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 1.99 Mbit/s (3.3% utilization)
95th percentile per-packet one-way delay: 52.113 ms
Loss rate: 97.58%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 52.113 ms
Loss rate: 97.58%
```

Run 1: Report of Indigo — Data Link



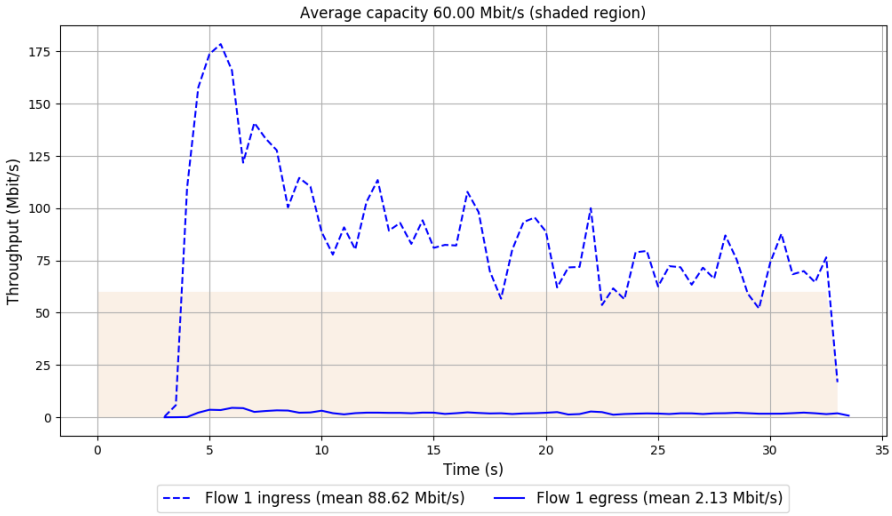


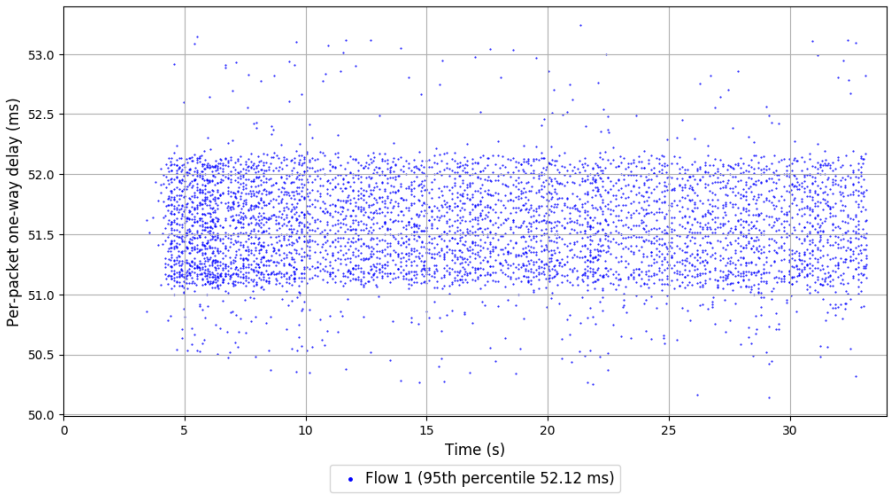
```
Run 2: Statistics of Indigo

Start at: 2018-10-26 02:38:59
End at: 2018-10-26 02:39:29

# Below is generated by plot.py at 2018-10-26 03:01:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 2.13 Mbit/s (3.5% utilization)
95th percentile per-packet one-way delay: 52.117 ms
Loss rate: 97.60%
-- Flow 1:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 52.117 ms
Loss rate: 97.60%
```

Run 2: Report of Indigo — Data Link



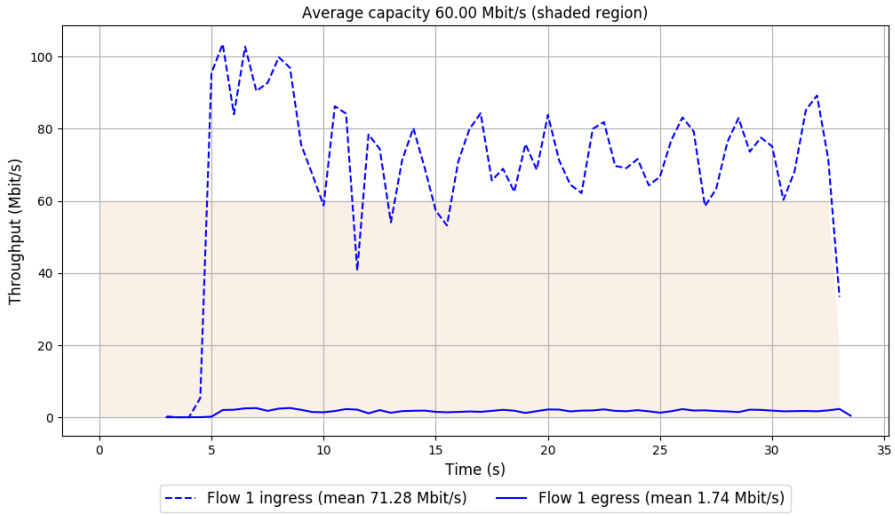


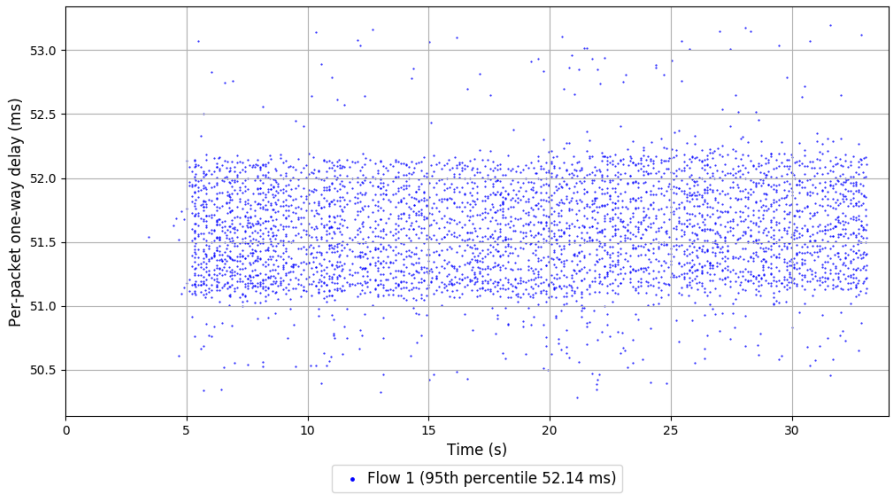
```
Run 3: Statistics of Indigo

Start at: 2018-10-26 02:49:44
End at: 2018-10-26 02:50:14

# Below is generated by plot.py at 2018-10-26 03:01:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 1.74 Mbit/s (2.9% utilization)
95th percentile per-packet one-way delay: 52.142 ms
Loss rate: 97.57%
-- Flow 1:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 52.142 ms
Loss rate: 97.57%
```

Run 3: Report of Indigo — Data Link



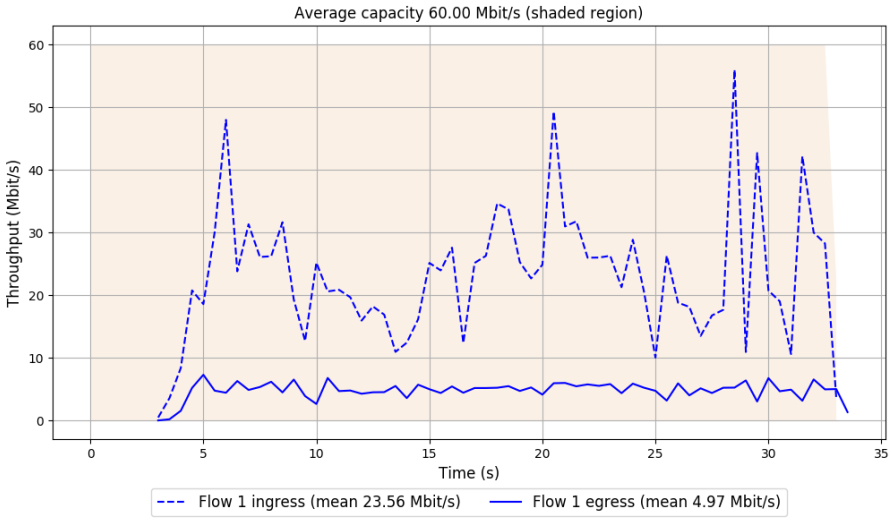


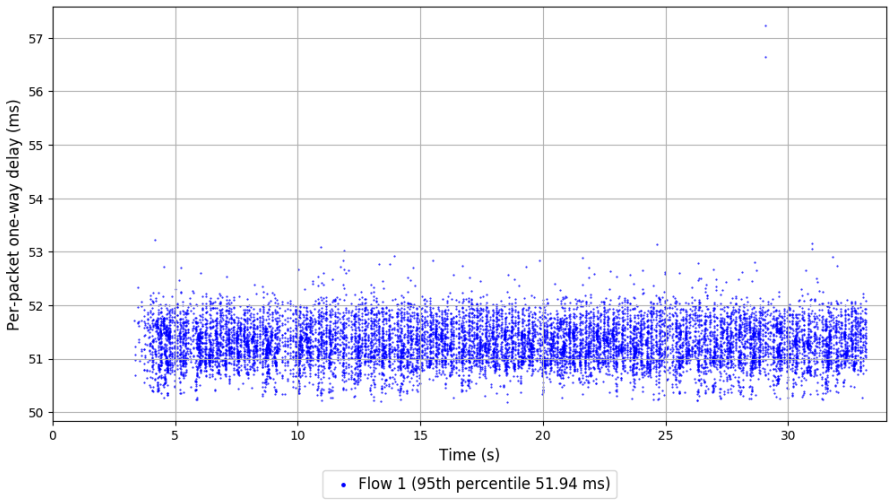
```
Run 1: Statistics of Indigo-96d2da3

Start at: 2018-10-26 02:33:37
End at: 2018-10-26 02:34:07

# Below is generated by plot.py at 2018-10-26 03:01:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 4.97 Mbit/s (8.3% utilization)
95th percentile per-packet one-way delay: 51.937 ms
Loss rate: 78.89%
-- Flow 1:
Average throughput: 4.97 Mbit/s
95th percentile per-packet one-way delay: 51.937 ms
Loss rate: 78.89%
```

Run 1: Report of Indigo-96d2da3 — Data Link



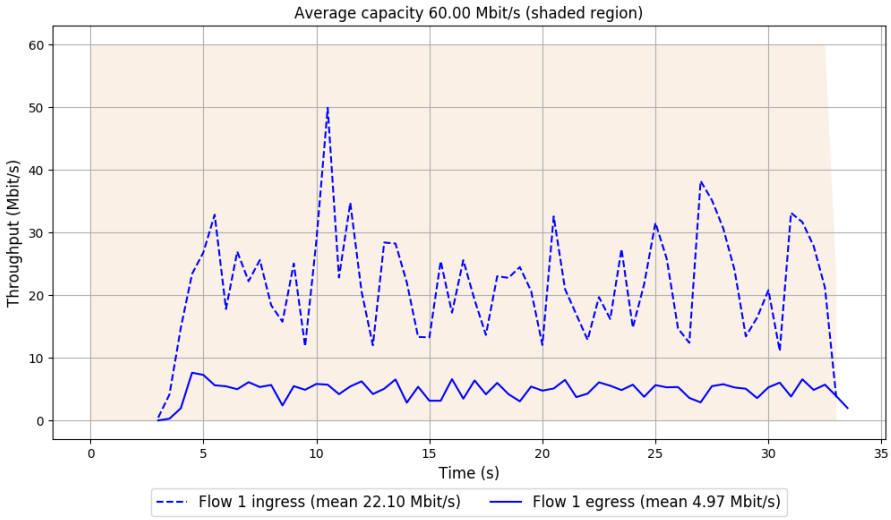


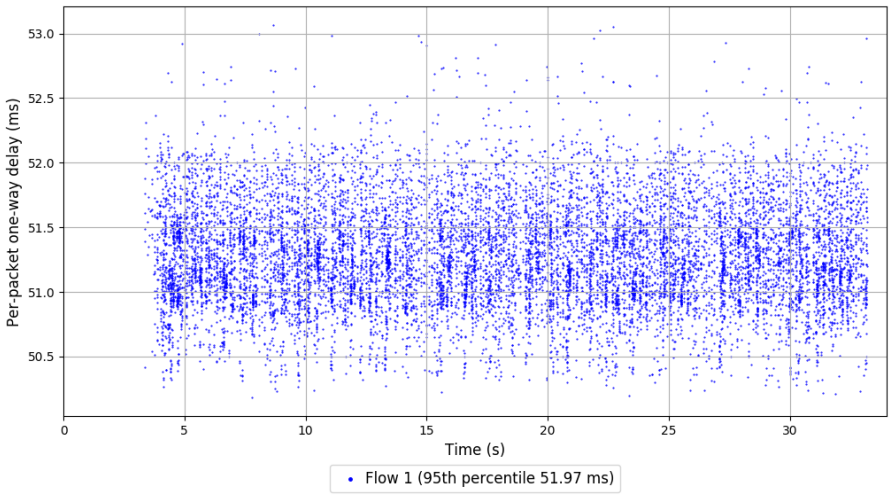
```
Run 2: Statistics of Indigo-96d2da3

Start at: 2018-10-26 02:44:23
End at: 2018-10-26 02:44:53

# Below is generated by plot.py at 2018-10-26 03:01:06
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 4.97 Mbit/s (8.3% utilization)
95th percentile per-packet one-way delay: 51.972 ms
Loss rate: 77.53%
-- Flow 1:
Average throughput: 4.97 Mbit/s
95th percentile per-packet one-way delay: 51.972 ms
Loss rate: 77.53%
```

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



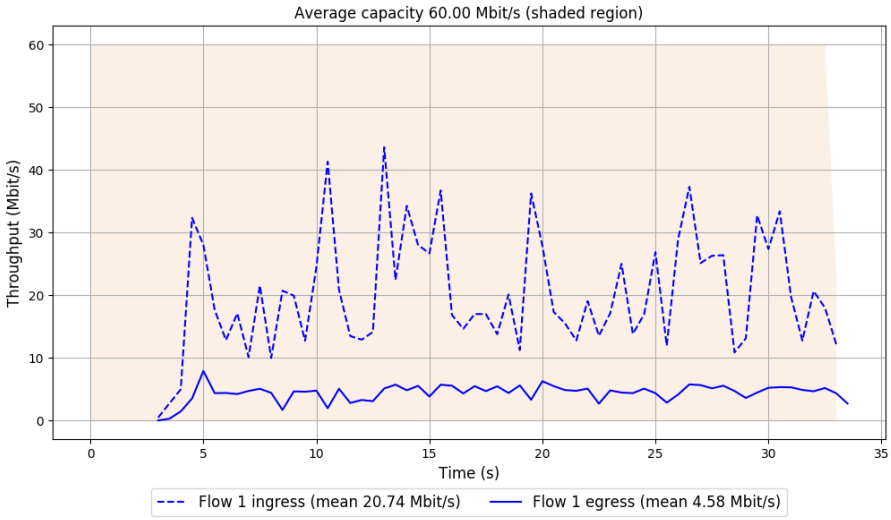


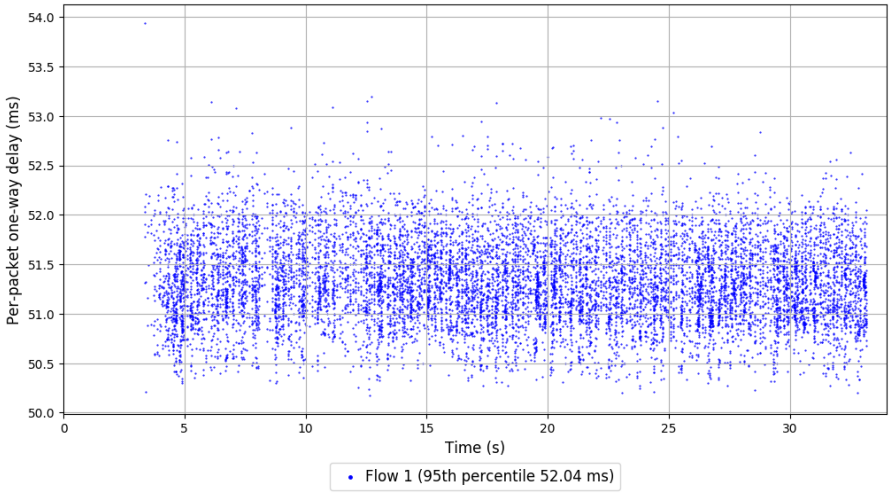
```
Run 3: Statistics of Indigo-96d2da3

Start at: 2018-10-26 02:55:11
End at: 2018-10-26 02:55:41

# Below is generated by plot.py at 2018-10-26 03:01:07
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 4.58 Mbit/s (7.6% utilization)
95th percentile per-packet one-way delay: 52.038 ms
Loss rate: 77.97%
-- Flow 1:
Average throughput: 4.58 Mbit/s
95th percentile per-packet one-way delay: 52.038 ms
Loss rate: 77.97%
```

Run 3: Report of Indigo-96d2da3 — Data Link



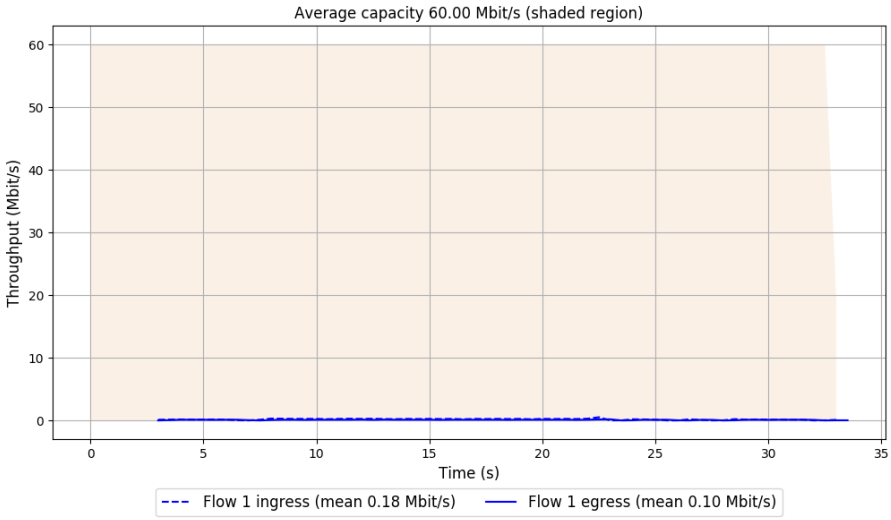


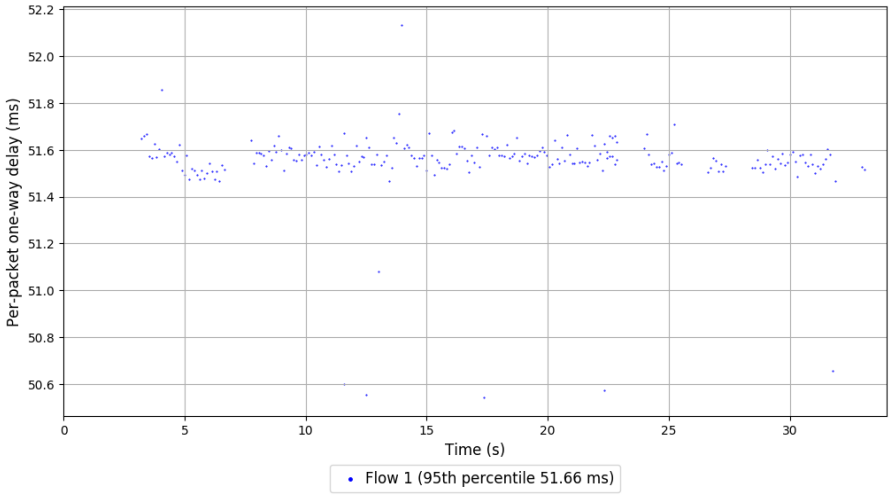
```
Run 1: Statistics of LEDBAT

Start at: 2018-10-26 02:36:00
End at: 2018-10-26 02:36:30

# Below is generated by plot.py at 2018-10-26 03:01:07
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.10 Mbit/s (0.2% utilization)
95th percentile per-packet one-way delay: 51.662 ms
Loss rate: 46.43%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 51.662 ms
Loss rate: 46.43%
```

Run 1: Report of LEDBAT — Data Link



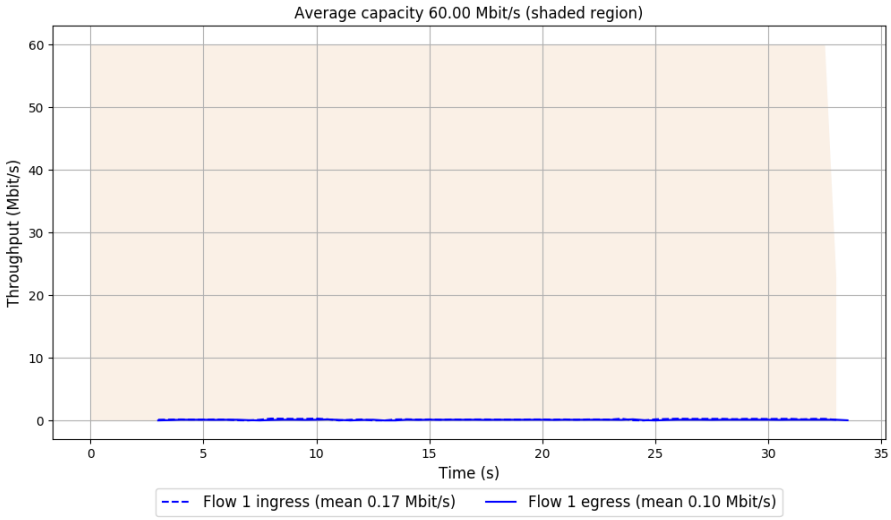


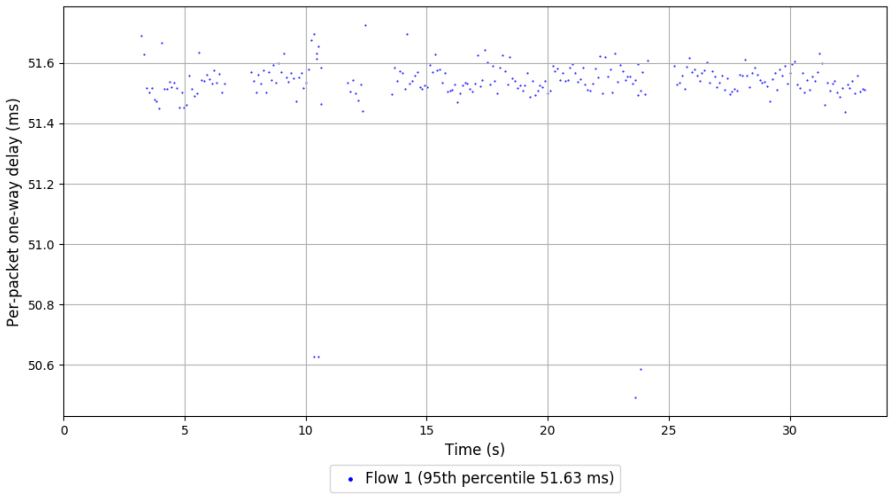
```
Run 2: Statistics of LEDBAT

Start at: 2018-10-26 02:46:46
End at: 2018-10-26 02:47:16

# Below is generated by plot.py at 2018-10-26 03:01:07
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.10 Mbit/s (0.2% utilization)
95th percentile per-packet one-way delay: 51.628 ms
Loss rate: 41.98%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 51.628 ms
Loss rate: 41.98%
```

Run 2: Report of LEDBAT — Data Link



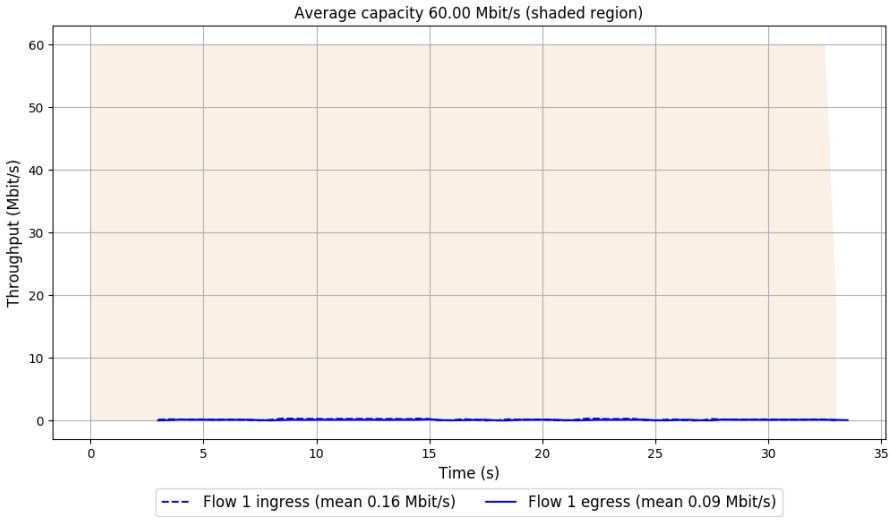


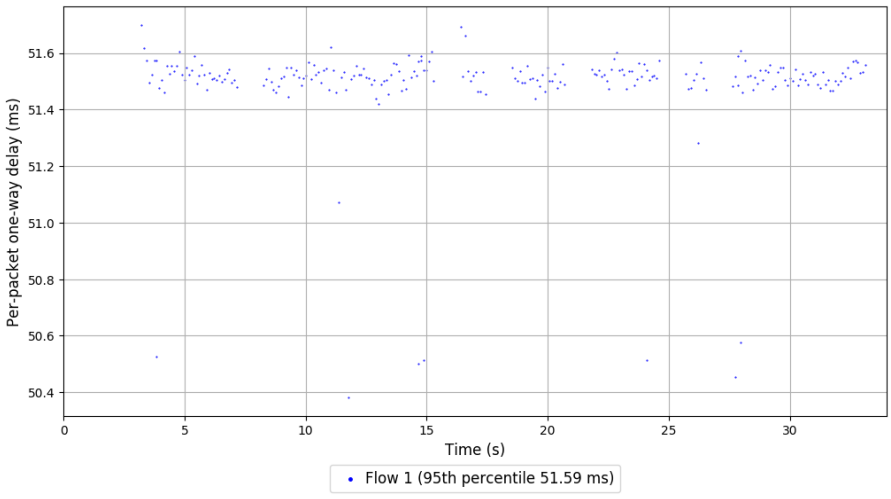
```
Run 3: Statistics of LEDBAT

Start at: 2018-10-26 02:57:34
End at: 2018-10-26 02:58:04

# Below is generated by plot.py at 2018-10-26 03:01:08
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.09 Mbit/s (0.2% utilization)
95th percentile per-packet one-way delay: 51.588 ms
Loss rate: 41.56%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 51.588 ms
Loss rate: 41.56%
```

Run 3: Report of LEDBAT — Data Link



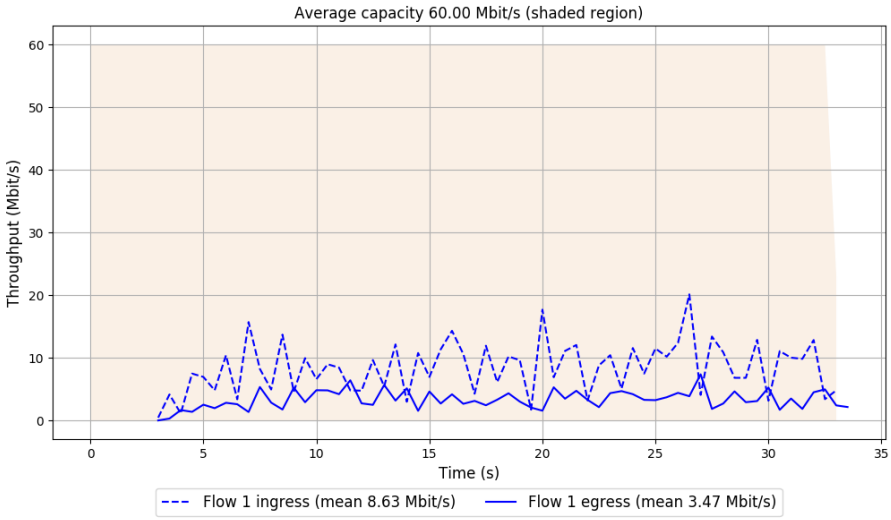


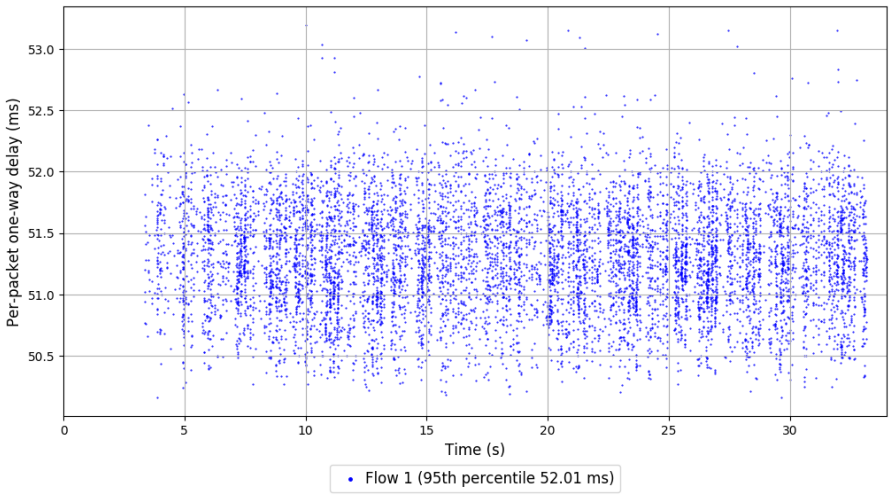
```
Run 1: Statistics of Indigo-Muses

Start at: 2018-10-26 02:28:50
End at: 2018-10-26 02:29:20

# Below is generated by plot.py at 2018-10-26 03:01:19
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 3.47 Mbit/s (5.8% utilization)
95th percentile per-packet one-way delay: 52.011 ms
Loss rate: 59.87%
-- Flow 1:
Average throughput: 3.47 Mbit/s
95th percentile per-packet one-way delay: 52.011 ms
Loss rate: 59.87%
```

Run 1: Report of Indigo-Muses — Data Link



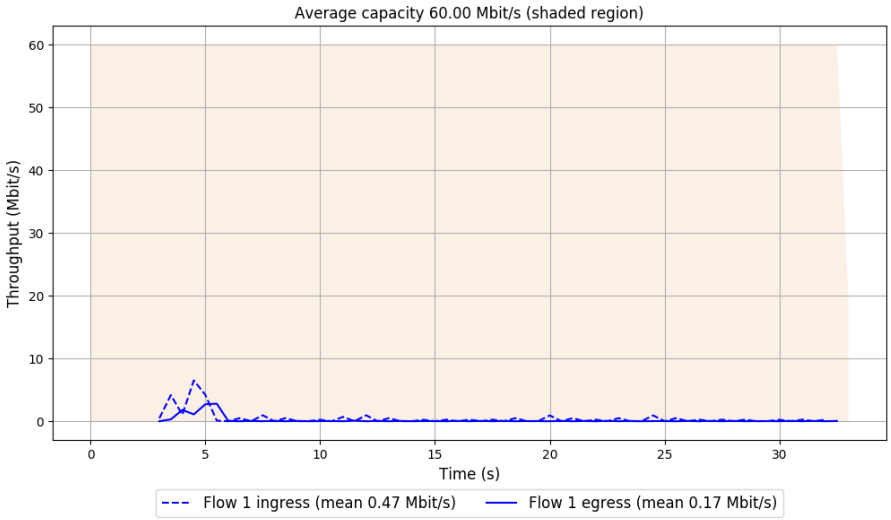


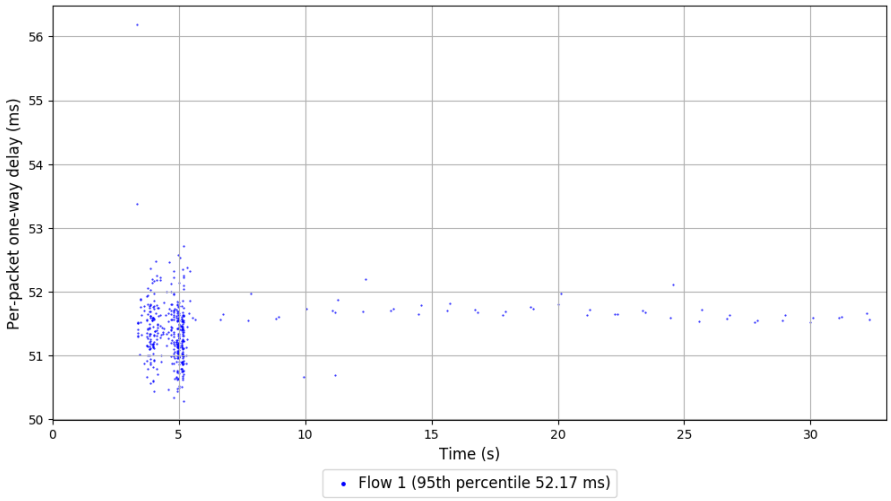
```
Run 2: Statistics of Indigo-Muses

Start at: 2018-10-26 02:39:36
End at: 2018-10-26 02:40:06

# Below is generated by plot.py at 2018-10-26 03:01:19
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.17 Mbit/s (0.3% utilization)
95th percentile per-packet one-way delay: 52.172 ms
Loss rate: 64.01%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 52.172 ms
Loss rate: 64.01%
```

Run 2: Report of Indigo-Muses — Data Link



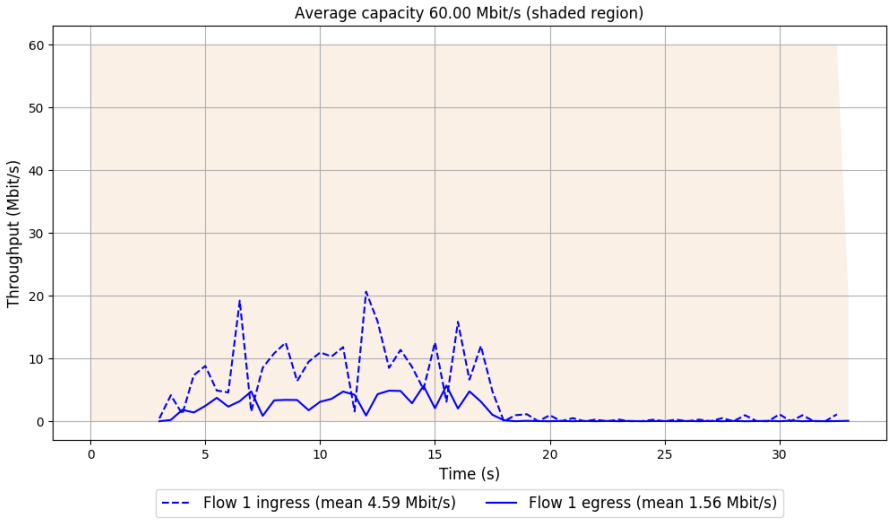


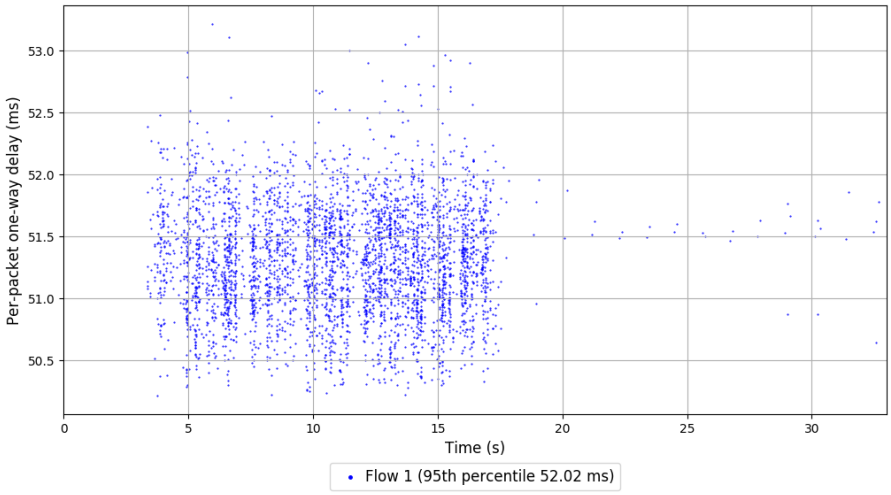
```
Run 3: Statistics of Indigo-Muses

Start at: 2018-10-26 02:50:21
End at: 2018-10-26 02:50:51

# Below is generated by plot.py at 2018-10-26 03:01:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 1.56 Mbit/s (2.6% utilization)
95th percentile per-packet one-way delay: 52.020 ms
Loss rate: 66.08%
-- Flow 1:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 52.020 ms
Loss rate: 66.08%
```

Run 3: Report of Indigo-Muses — Data Link



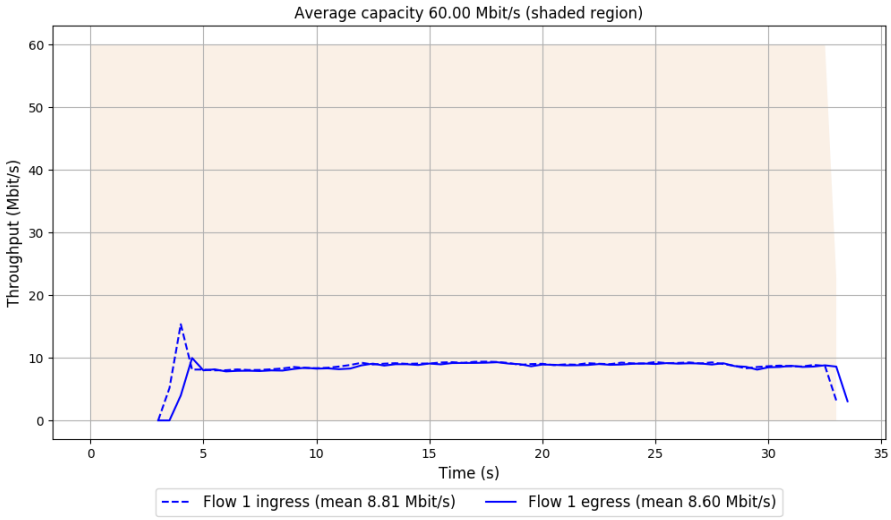


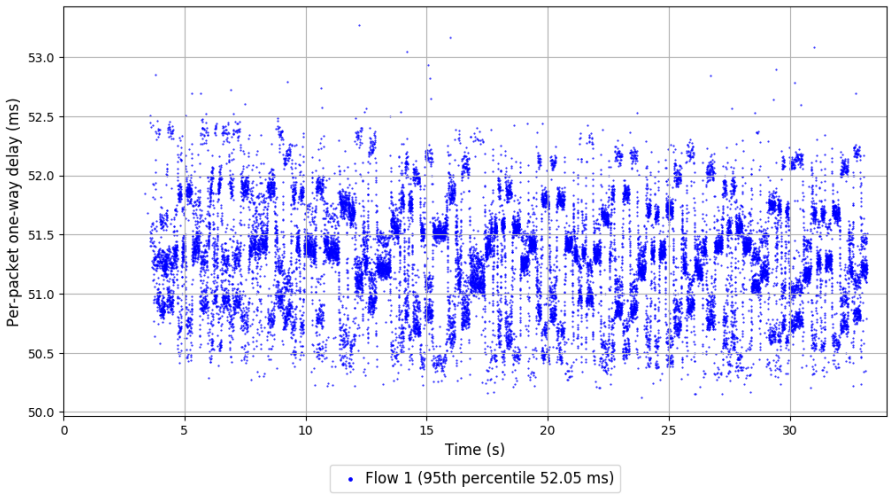
```
Run 1: Statistics of PCC-Allegro

Start at: 2018-10-26 02:29:26
End at: 2018-10-26 02:29:56

# Below is generated by plot.py at 2018-10-26 03:01:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 8.60 Mbit/s (14.3% utilization)
95th percentile per-packet one-way delay: 52.046 ms
Loss rate: 2.63%
-- Flow 1:
Average throughput: 8.60 Mbit/s
95th percentile per-packet one-way delay: 52.046 ms
Loss rate: 2.63%
```

Run 1: Report of PCC-Allegro — Data Link



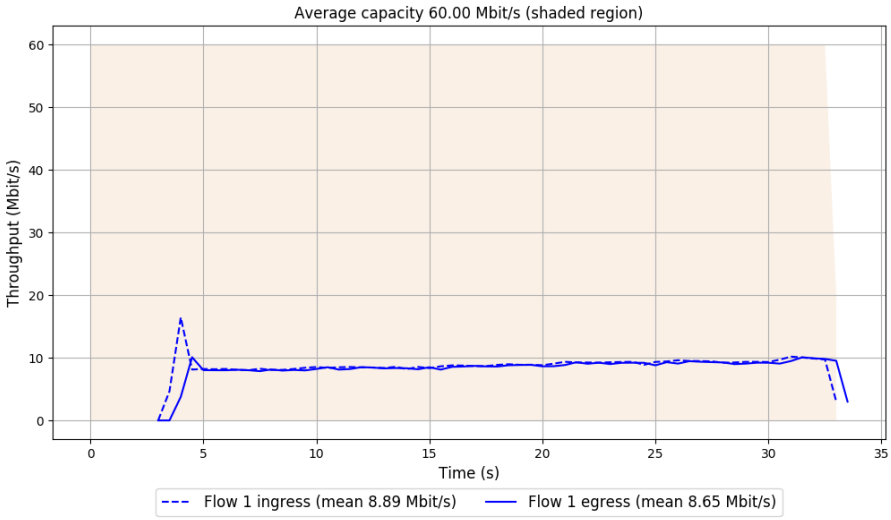


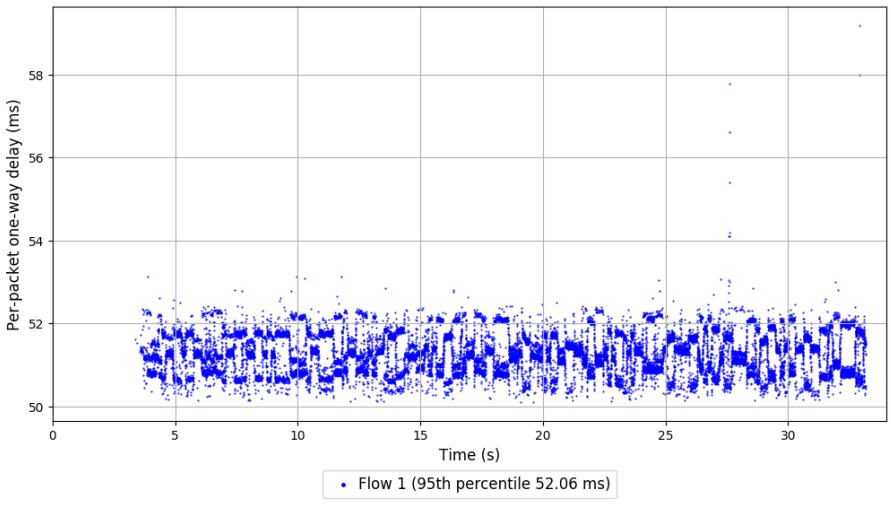
```
Run 2: Statistics of PCC-Allegro

Start at: 2018-10-26 02:40:11
End at: 2018-10-26 02:40:41

# Below is generated by plot.py at 2018-10-26 03:01:29
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 8.65 Mbit/s (14.4% utilization)
95th percentile per-packet one-way delay: 52.062 ms
Loss rate: 2.82%
-- Flow 1:
Average throughput: 8.65 Mbit/s
95th percentile per-packet one-way delay: 52.062 ms
Loss rate: 2.82%
```

Run 2: Report of PCC-Allegro — Data Link



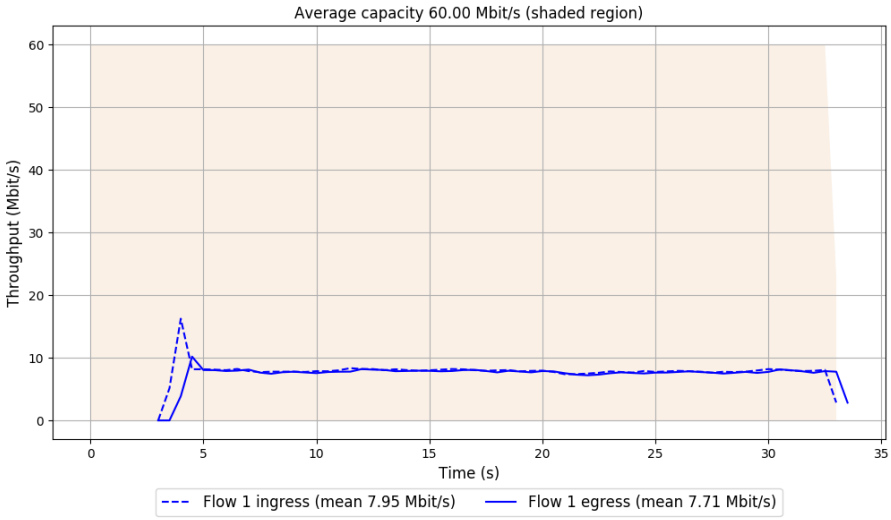


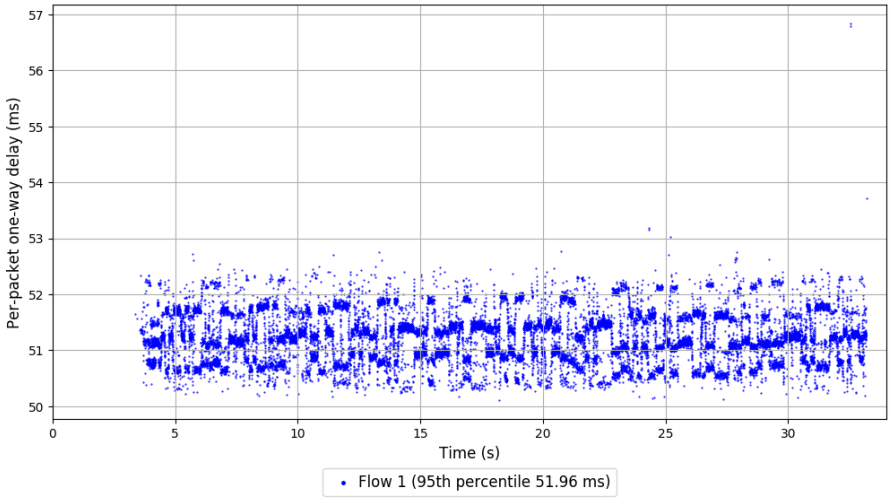
```
Run 3: Statistics of PCC-Allegro

Start at: 2018-10-26 02:50:57
End at: 2018-10-26 02:51:27

# Below is generated by plot.py at 2018-10-26 03:01:30
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 7.71 Mbit/s (12.8% utilization)
95th percentile per-packet one-way delay: 51.963 ms
Loss rate: 3.25%
-- Flow 1:
Average throughput: 7.71 Mbit/s
95th percentile per-packet one-way delay: 51.963 ms
Loss rate: 3.25%
```

Run 3: Report of PCC-Allegro — Data Link



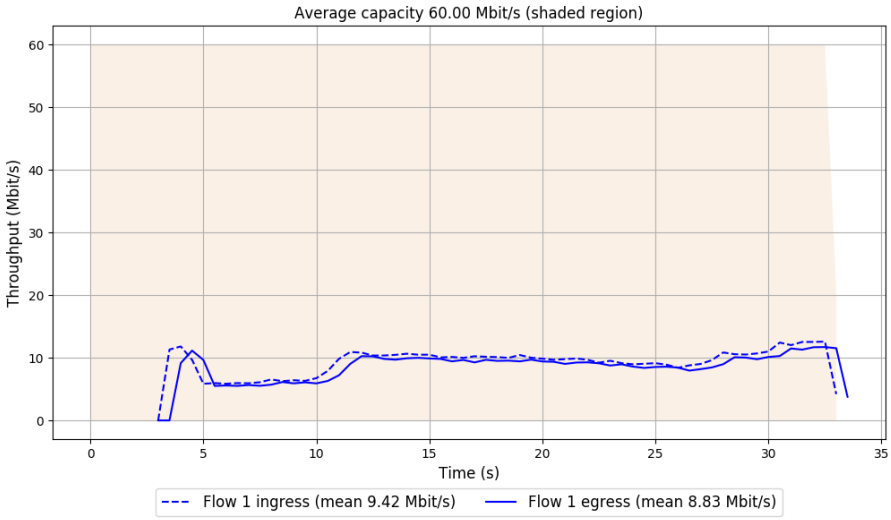


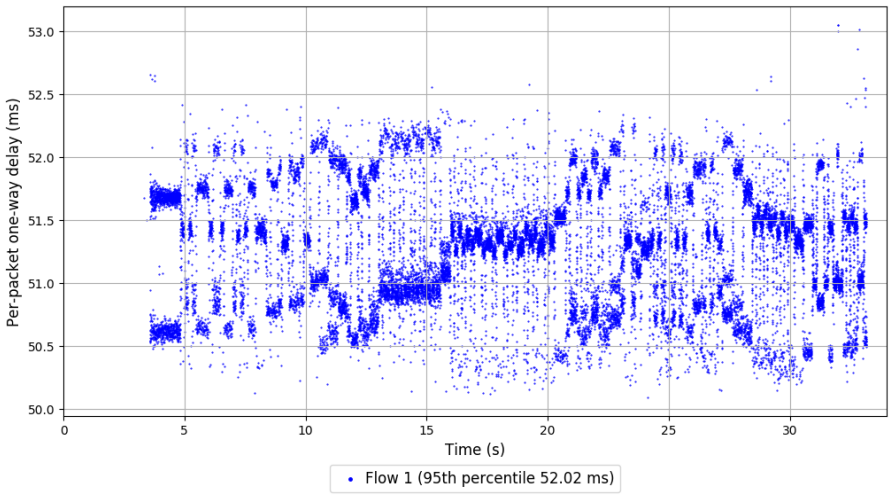
```
Run 1: Statistics of PCC-Expr

Start at: 2018-10-26 02:30:37
End at: 2018-10-26 02:31:07

# Below is generated by plot.py at 2018-10-26 03:01:35
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 8.83 Mbit/s (14.7% utilization)
95th percentile per-packet one-way delay: 52.018 ms
Loss rate: 6.37%
-- Flow 1:
Average throughput: 8.83 Mbit/s
95th percentile per-packet one-way delay: 52.018 ms
Loss rate: 6.37%
```

Run 1: Report of PCC-Expr — Data Link



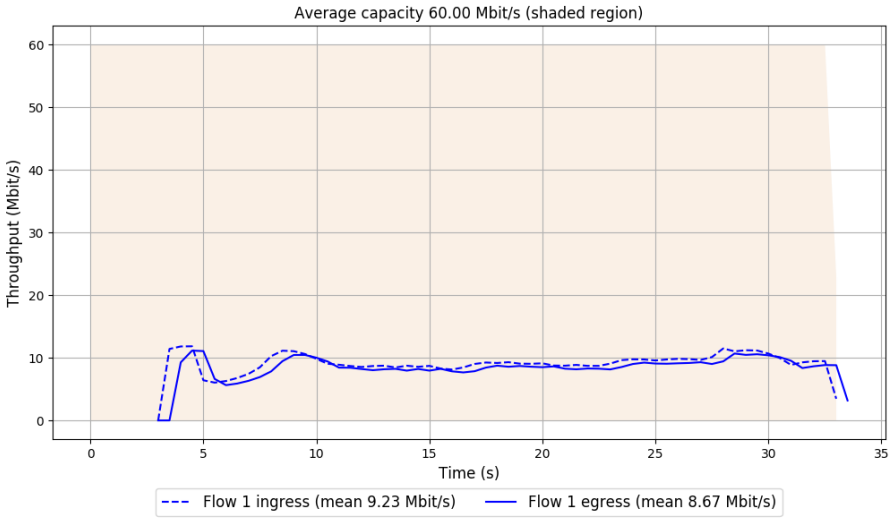


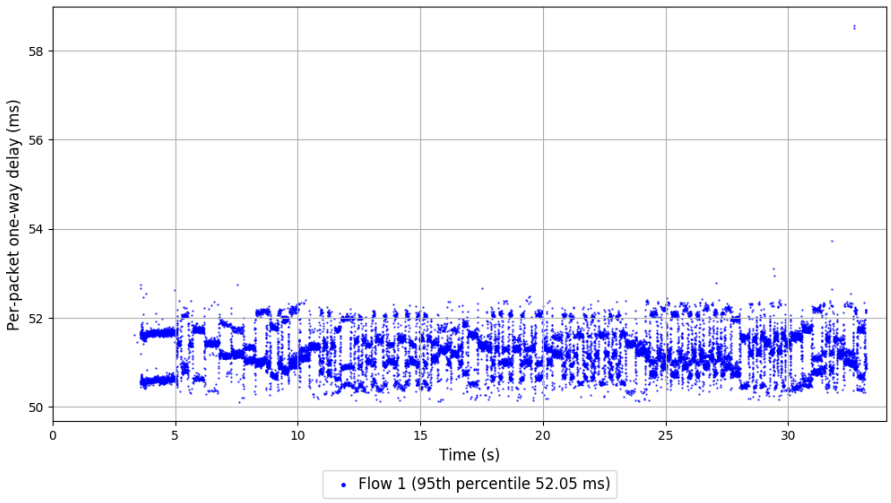
```
Run 2: Statistics of PCC-Expr

Start at: 2018-10-26 02:41:23
End at: 2018-10-26 02:41:53

# Below is generated by plot.py at 2018-10-26 03:01:35
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 8.67 Mbit/s (14.4% utilization)
95th percentile per-packet one-way delay: 52.048 ms
Loss rate: 6.24%
-- Flow 1:
Average throughput: 8.67 Mbit/s
95th percentile per-packet one-way delay: 52.048 ms
Loss rate: 6.24%
```

Run 2: Report of PCC-Expr — Data Link



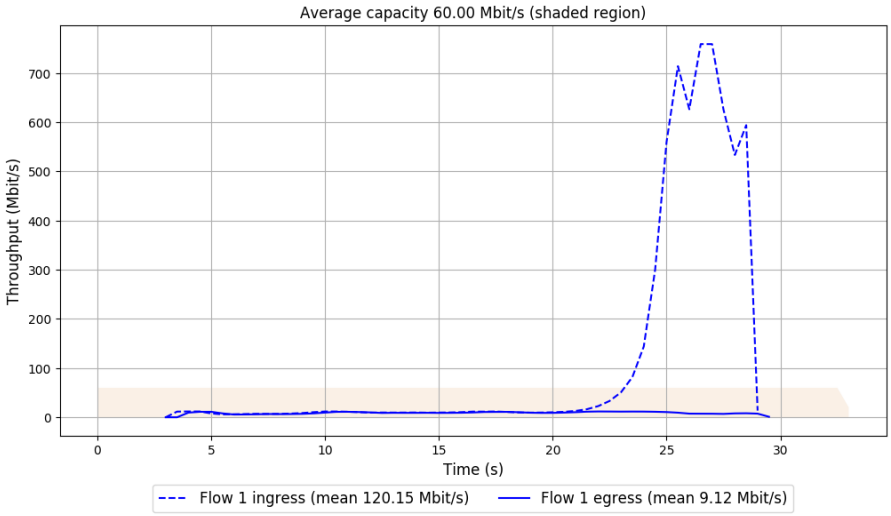


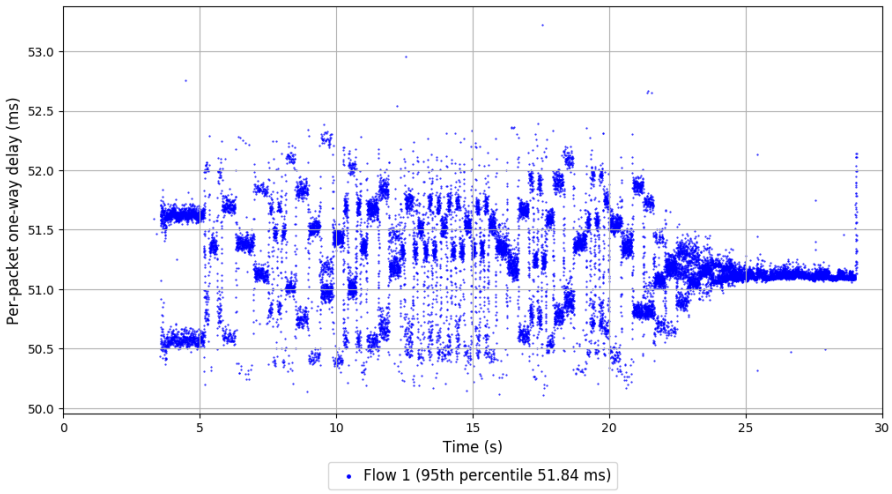
```
Run 3: Statistics of PCC-Expr

Start at: 2018-10-26 02:52:09
End at: 2018-10-26 02:52:39

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 9.12 Mbit/s (15.2% utilization)
95th percentile per-packet one-way delay: 51.839 ms
Loss rate: 92.41%
-- Flow 1:
Average throughput: 9.12 Mbit/s
95th percentile per-packet one-way delay: 51.839 ms
Loss rate: 92.41%
```

Run 3: Report of PCC-Expr — Data Link



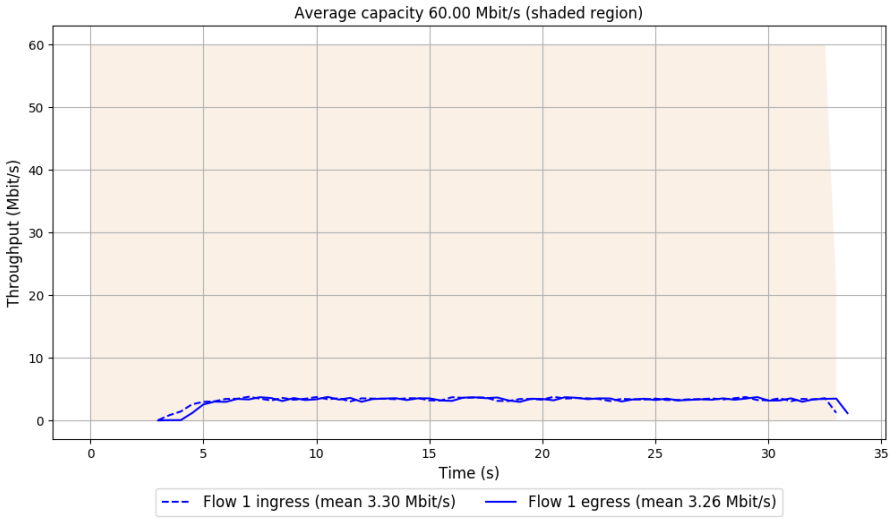


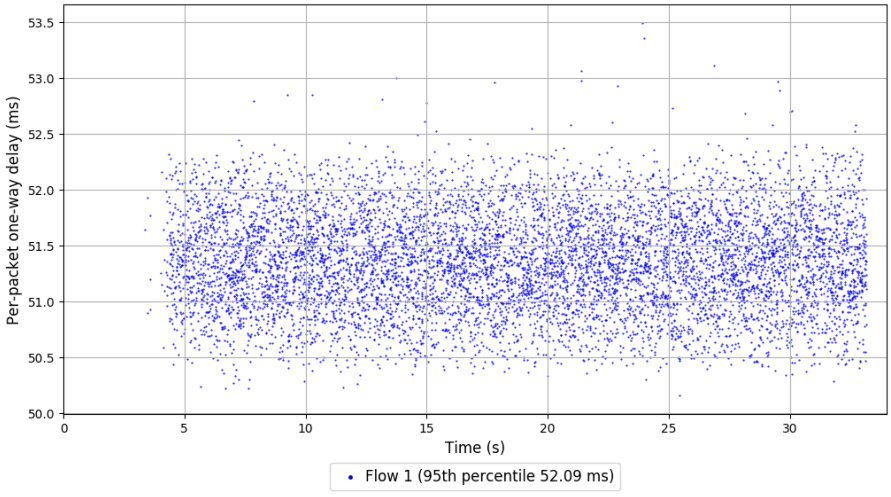
```
Run 1: Statistics of QUIC Cubic

Start at: 2018-10-26 02:30:02
End at: 2018-10-26 02:30:32

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 3.26 Mbit/s (5.4% utilization)
95th percentile per-packet one-way delay: 52.086 ms
Loss rate: 1.35%
-- Flow 1:
Average throughput: 3.26 Mbit/s
95th percentile per-packet one-way delay: 52.086 ms
Loss rate: 1.35%
```

Run 1: Report of QUIC Cubic — Data Link



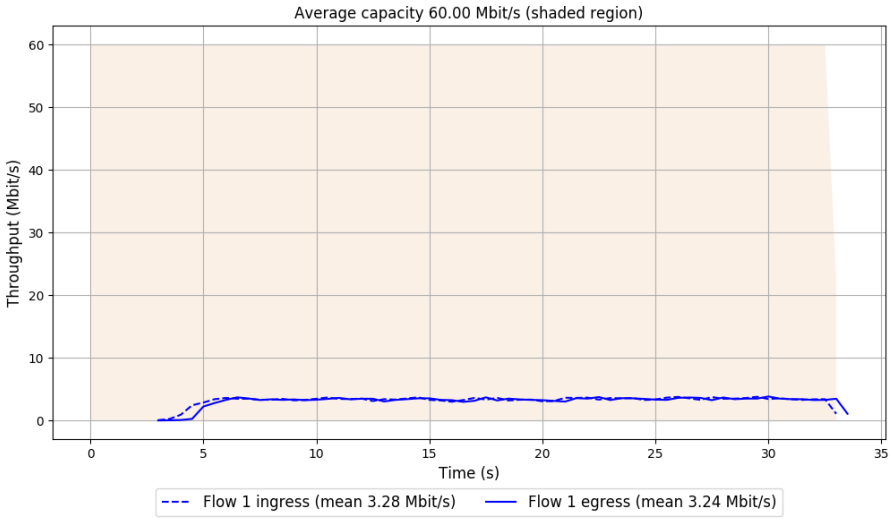


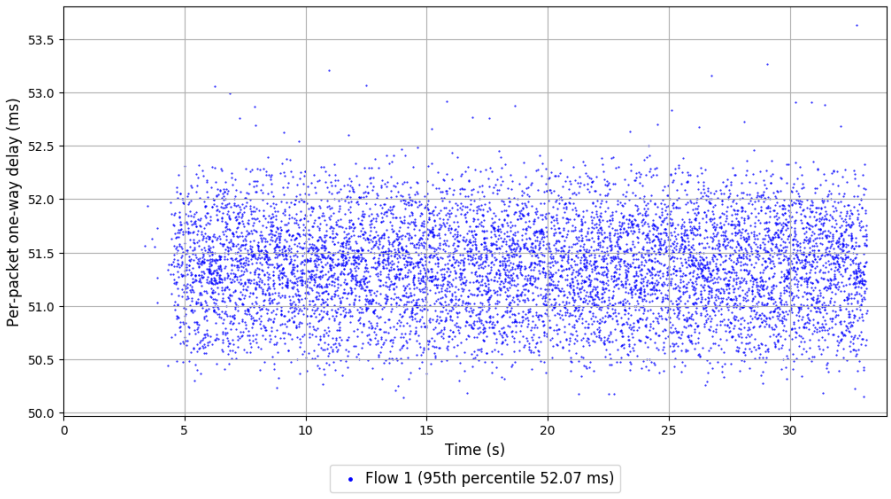
```
Run 2: Statistics of QUIC Cubic

Start at: 2018-10-26 02:40:47
End at: 2018-10-26 02:41:18

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 3.24 Mbit/s (5.4% utilization)
95th percentile per-packet one-way delay: 52.074 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 52.074 ms
Loss rate: 1.33%
```

Run 2: Report of QUIC Cubic — Data Link



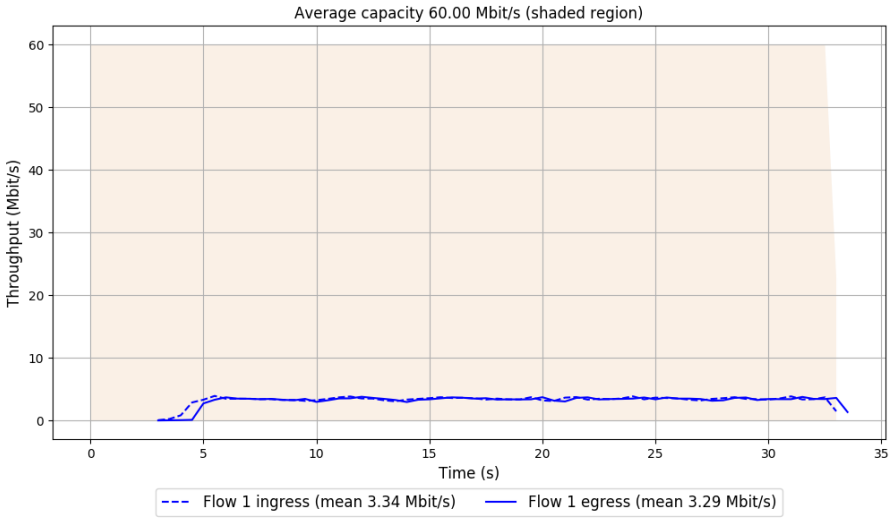


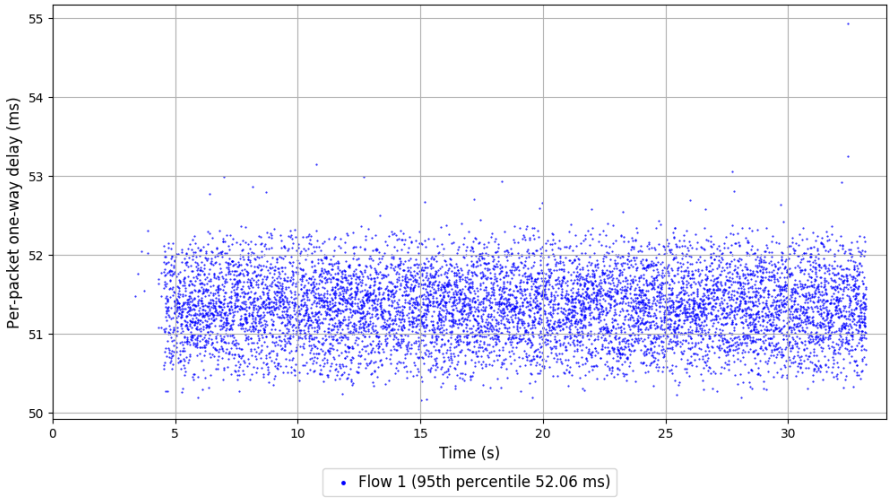
```
Run 3: Statistics of QUIC Cubic

Start at: 2018-10-26 02:51:33
End at: 2018-10-26 02:52:03

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 3.29 Mbit/s (5.5% utilization)
95th percentile per-packet one-way delay: 52.057 ms
Loss rate: 1.48%
-- Flow 1:
Average throughput: 3.29 Mbit/s
95th percentile per-packet one-way delay: 52.057 ms
Loss rate: 1.48%
```

Run 3: Report of QUIC Cubic — Data Link



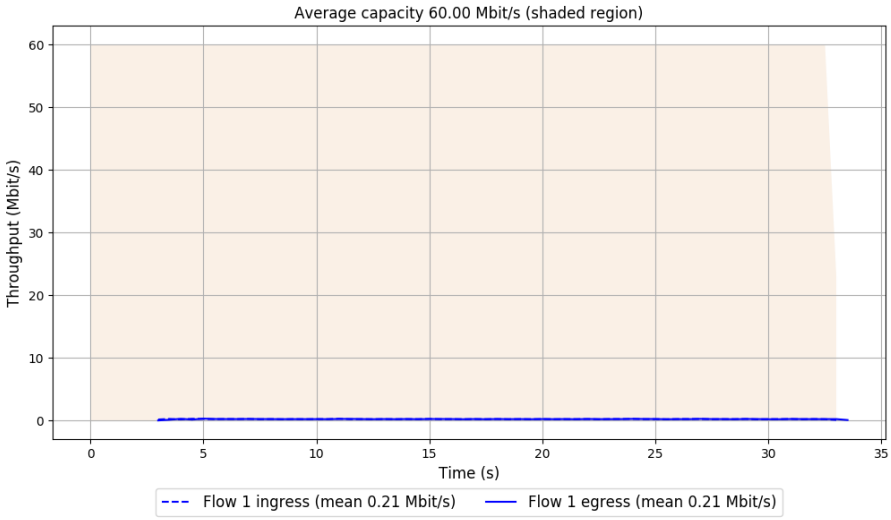


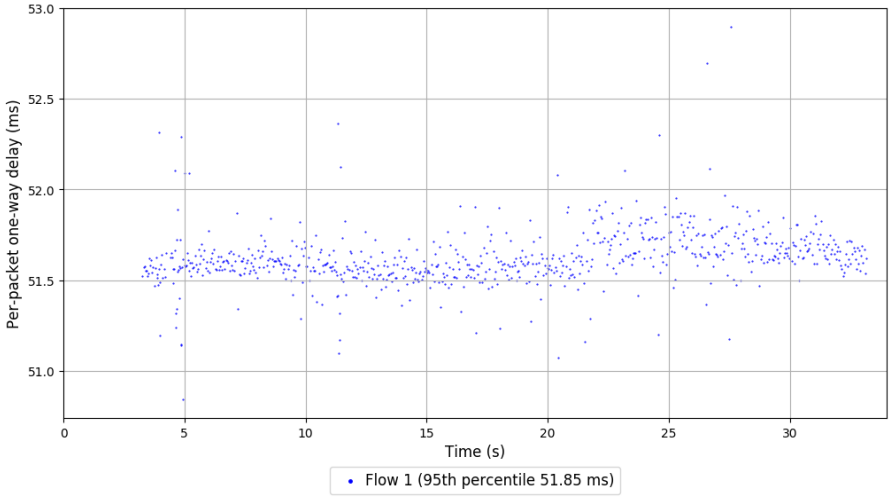
```
Run 1: Statistics of SCReAM

Start at: 2018-10-26 02:34:13
End at: 2018-10-26 02:34:43

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.21 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 51.855 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 51.855 ms
Loss rate: 0.26%
```

Run 1: Report of SCReAM — Data Link



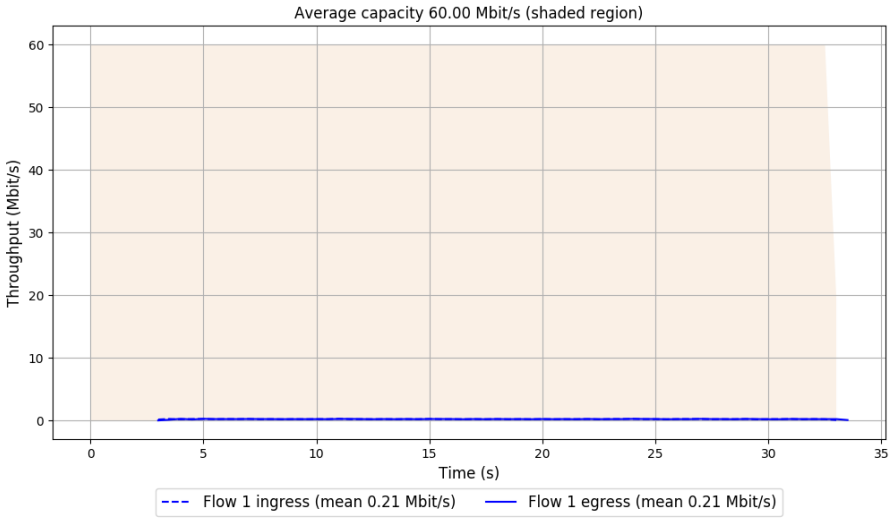


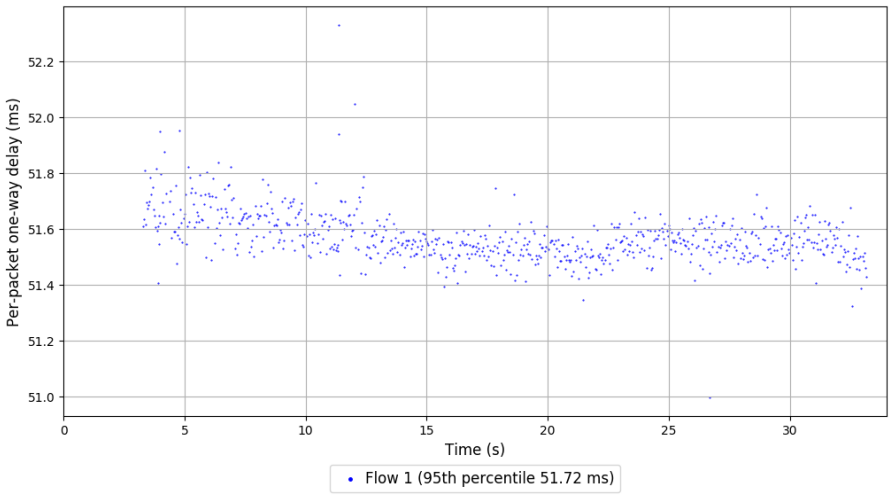
```
Run 2: Statistics of SCReAM

Start at: 2018-10-26 02:44:59
End at: 2018-10-26 02:45:29

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.21 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 51.723 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 51.723 ms
Loss rate: 0.13%
```

Run 2: Report of SCReAM — Data Link



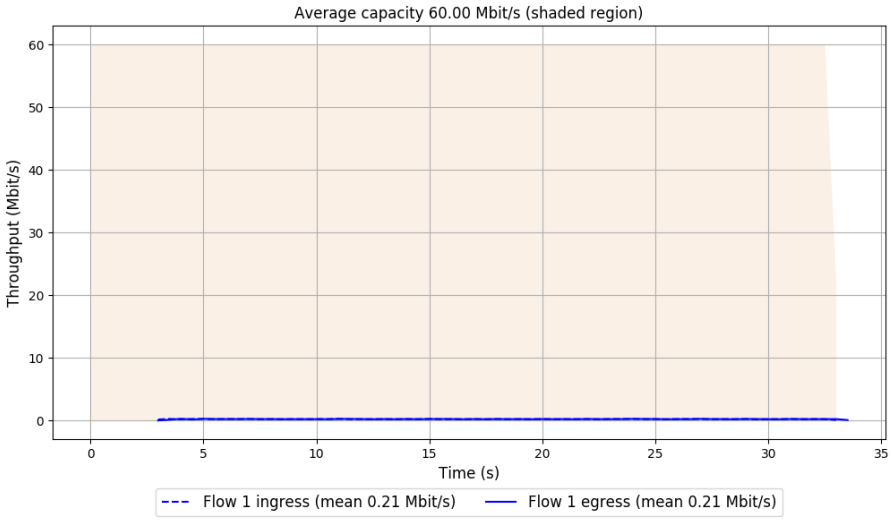


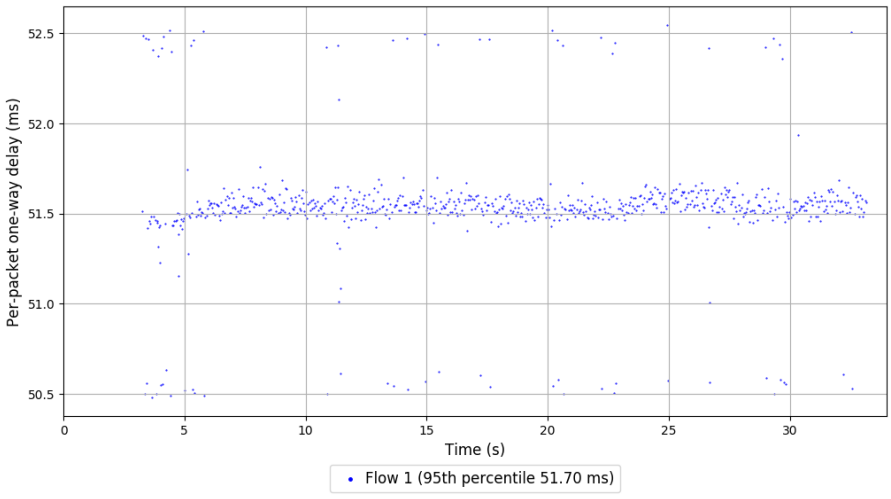
```
Run 3: Statistics of SCReAM

Start at: 2018-10-26 02:55:47
End at: 2018-10-26 02:56:17

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.21 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 51.697 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 51.697 ms
Loss rate: 0.26%
```

Run 3: Report of SCReAM — Data Link



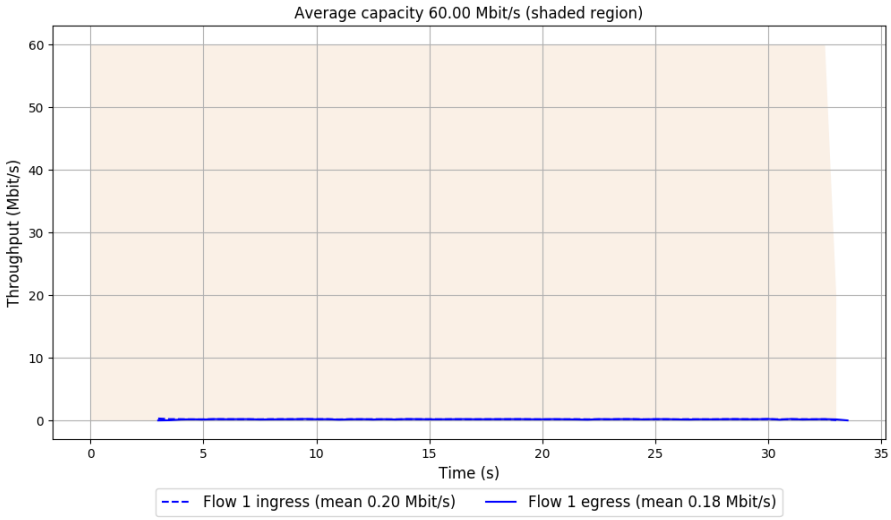


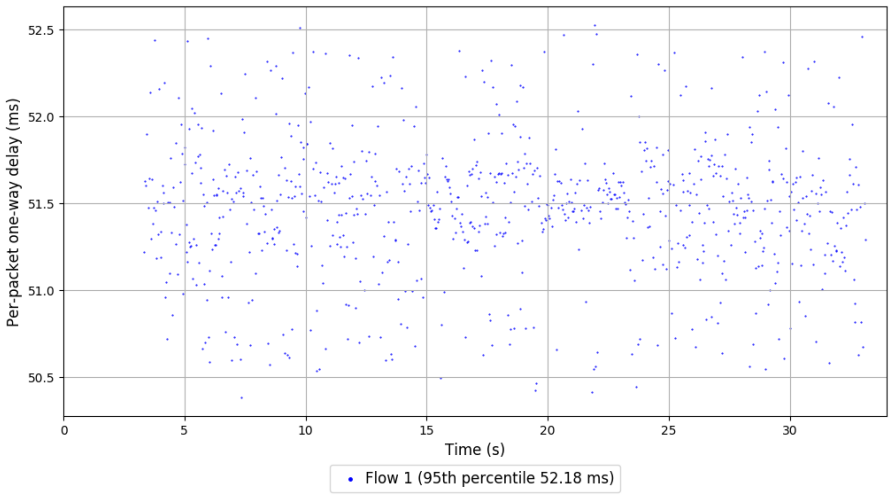
```
Run 1: Statistics of Sprout

Start at: 2018-10-26 02:27:37
End at: 2018-10-26 02:28:07

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.18 Mbit/s (0.3% utilization)
95th percentile per-packet one-way delay: 52.179 ms
Loss rate: 8.45%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 52.179 ms
Loss rate: 8.45%
```

Run 1: Report of Sprout — Data Link



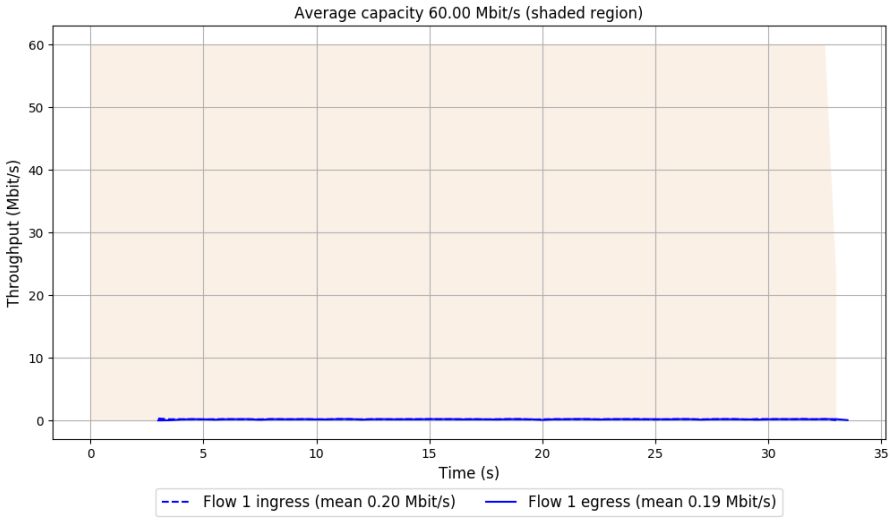


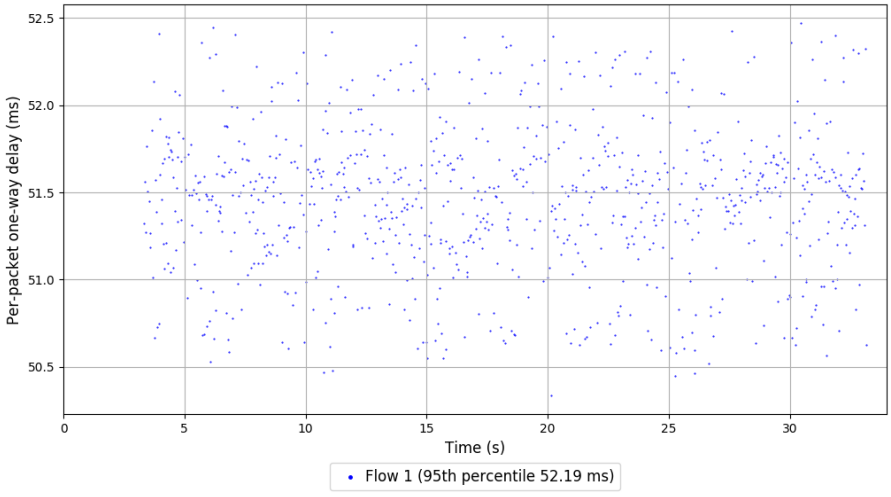
```
Run 2: Statistics of Sprout

Start at: 2018-10-26 02:38:23
End at: 2018-10-26 02:38:53

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.19 Mbit/s (0.3% utilization)
95th percentile per-packet one-way delay: 52.193 ms
Loss rate: 9.21%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 52.193 ms
Loss rate: 9.21%
```

Run 2: Report of Sprout — Data Link



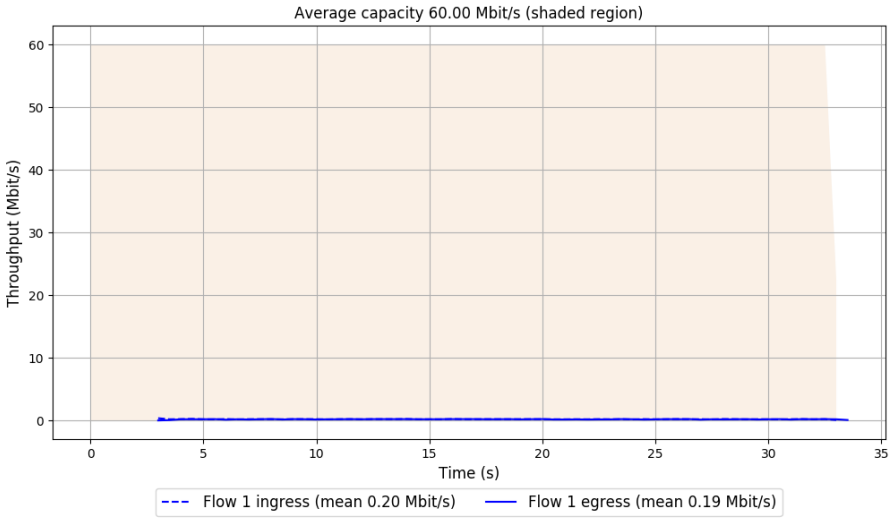


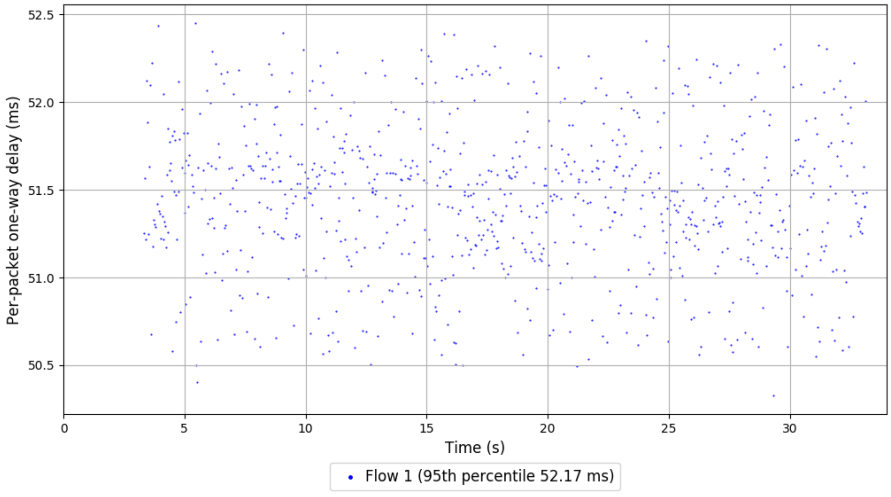
```
Run 3: Statistics of Sprout

Start at: 2018-10-26 02:49:09
End at: 2018-10-26 02:49:39

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.19 Mbit/s (0.3% utilization)
95th percentile per-packet one-way delay: 52.167 ms
Loss rate: 9.19%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 52.167 ms
Loss rate: 9.19%
```

Run 3: Report of Sprout — Data Link



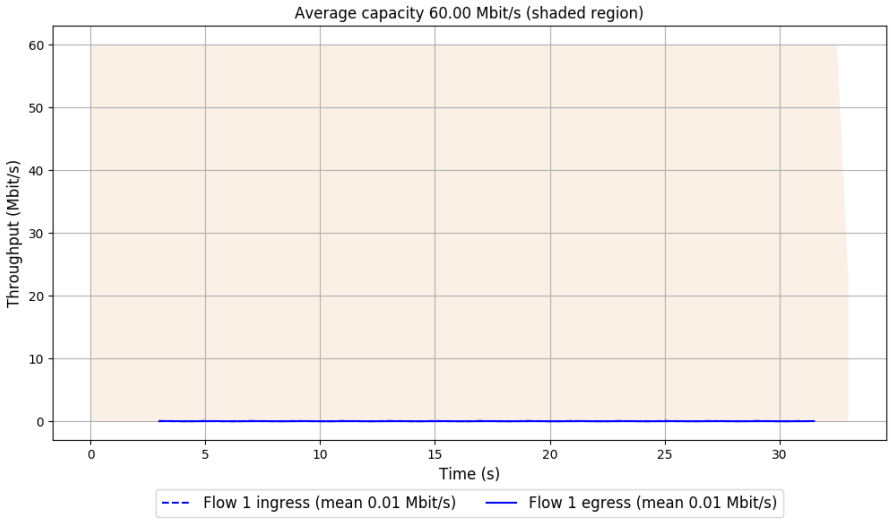


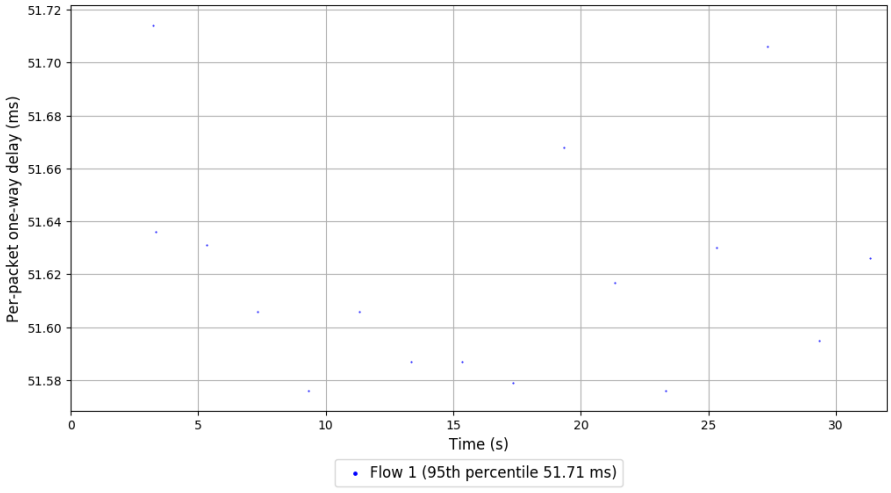
```
Run 1: Statistics of TaoVA-100x

Start at: 2018-10-26 02:37:12
End at: 2018-10-26 02:37:42

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.0% utilization)
95th percentile per-packet one-way delay: 51.706 ms
Loss rate: 51.91%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 51.706 ms
Loss rate: 51.91%
```

Run 1: Report of TaoVA-100x — Data Link



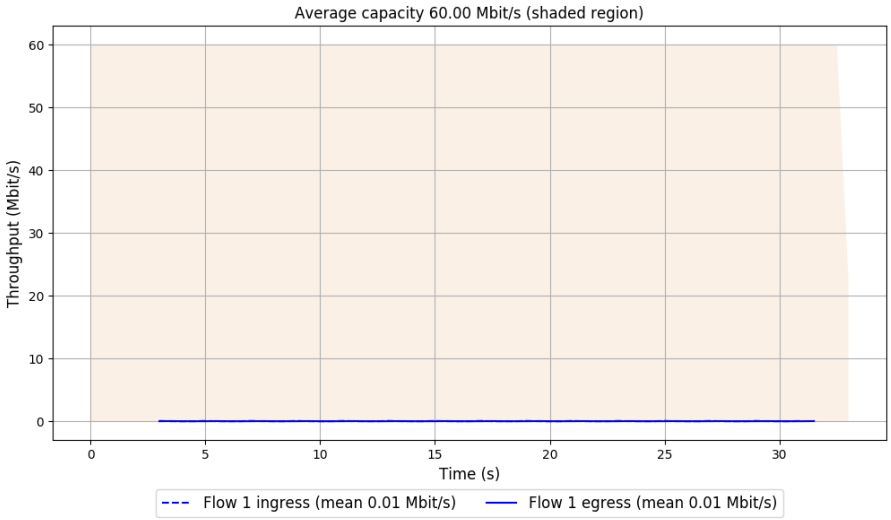


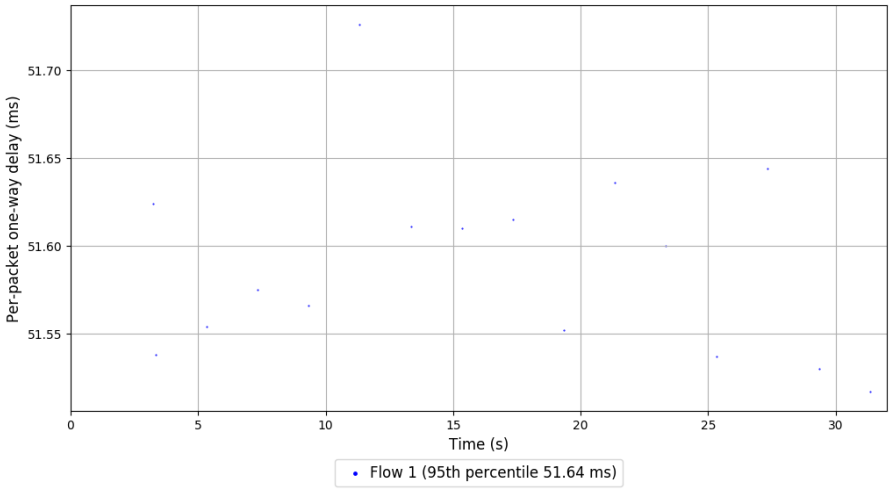
```
Run 2: Statistics of TaoVA-100x

Start at: 2018-10-26 02:47:57
End at: 2018-10-26 02:48:27

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.0% utilization)
95th percentile per-packet one-way delay: 51.644 ms
Loss rate: 51.91%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 51.644 ms
Loss rate: 51.91%
```

Run 2: Report of TaoVA-100x — Data Link



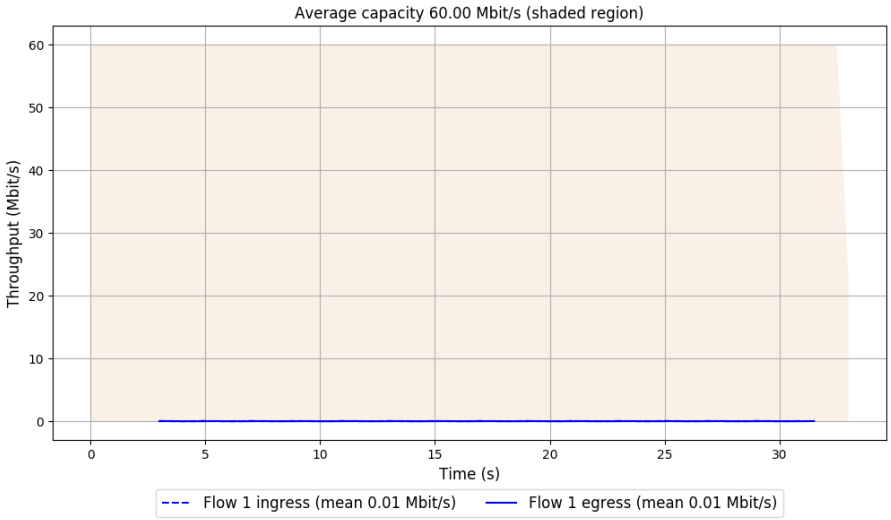


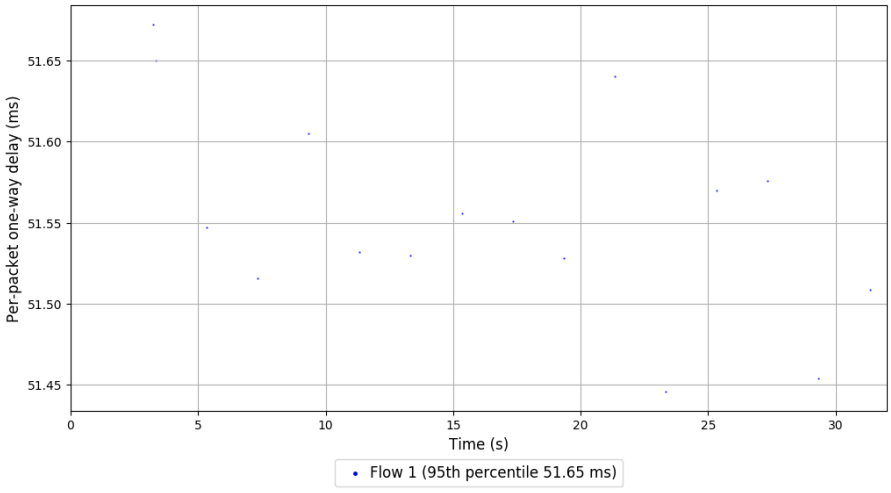
```
Run 3: Statistics of TaoVA-100x

Start at: 2018-10-26 02:58:46
End at: 2018-10-26 02:59:16

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.0% utilization)
95th percentile per-packet one-way delay: 51.650 ms
Loss rate: 51.91%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 51.650 ms
Loss rate: 51.91%
```

Run 3: Report of TaoVA-100x — Data Link



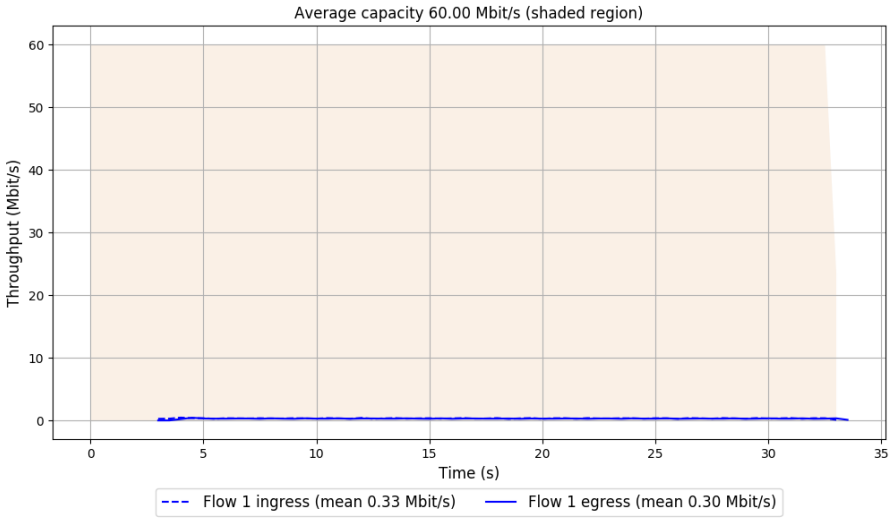


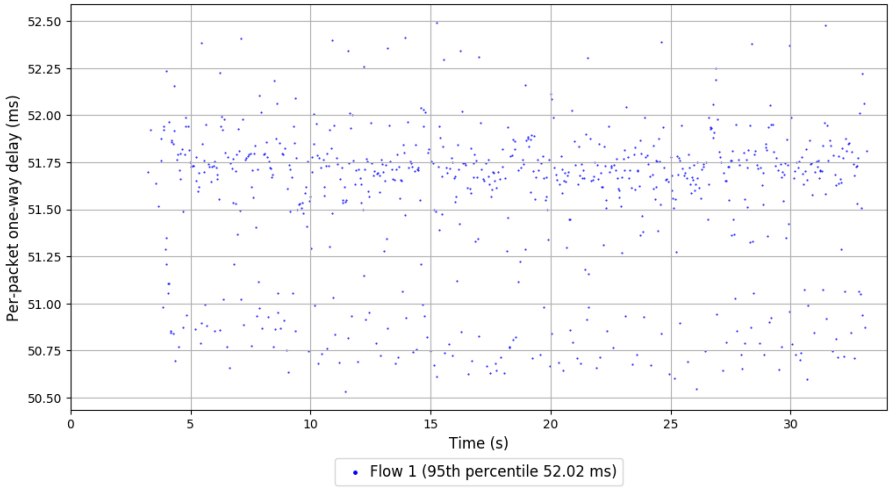
```
Run 1: Statistics of TCP Vegas

Start at: 2018-10-26 02:36:36
End at: 2018-10-26 02:37:06

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.30 Mbit/s (0.5% utilization)
95th percentile per-packet one-way delay: 52.018 ms
Loss rate: 10.95%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 52.018 ms
Loss rate: 10.95%
```

Run 1: Report of TCP Vegas — Data Link



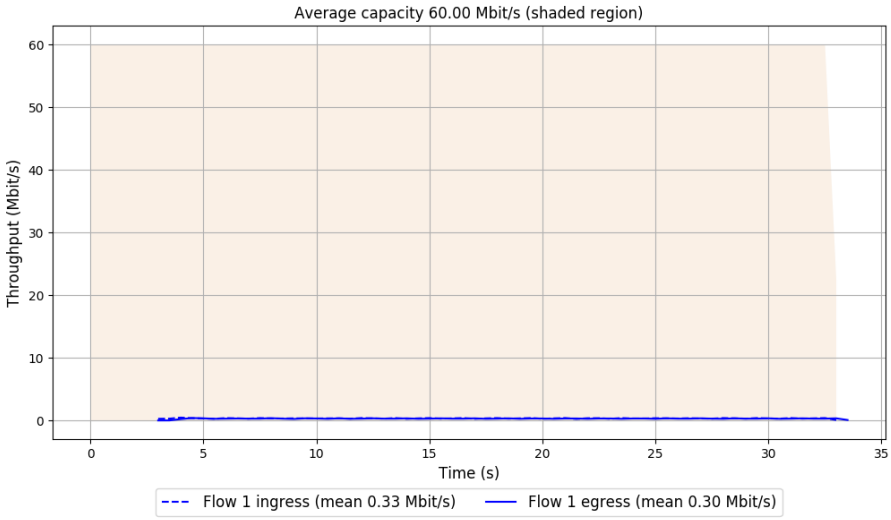


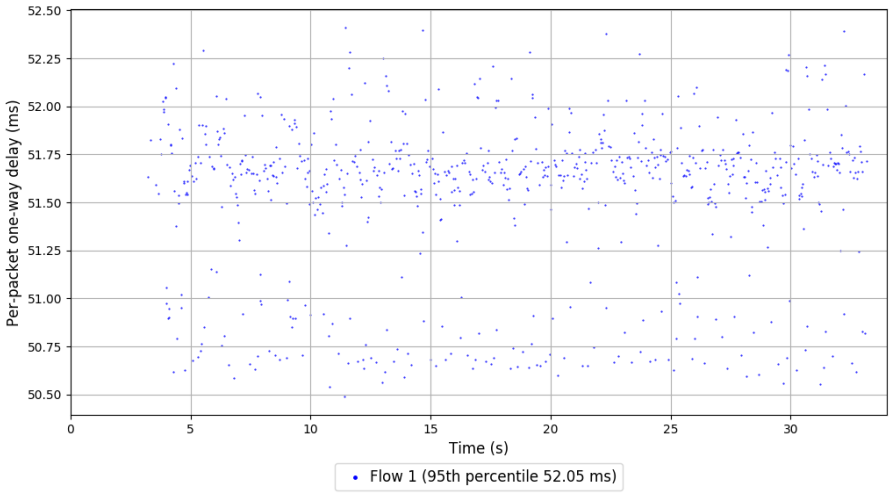
```
Run 2: Statistics of TCP Vegas

Start at: 2018-10-26 02:47:22
End at: 2018-10-26 02:47:52

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.30 Mbit/s (0.5% utilization)
95th percentile per-packet one-way delay: 52.050 ms
Loss rate: 10.96%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 52.050 ms
Loss rate: 10.96%
```

Run 2: Report of TCP Vegas — Data Link



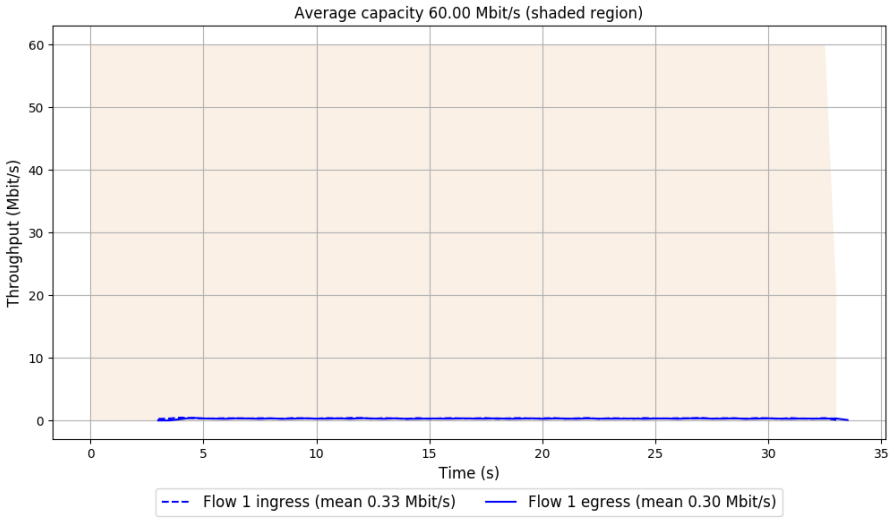


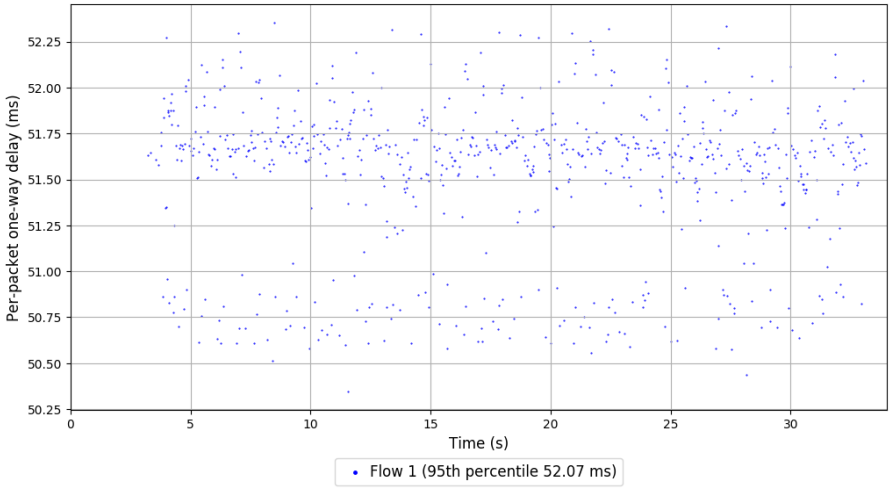
```
Run 3: Statistics of TCP Vegas

Start at: 2018-10-26 02:58:10
End at: 2018-10-26 02:58:40

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.30 Mbit/s (0.5% utilization)
95th percentile per-packet one-way delay: 52.067 ms
Loss rate: 11.38%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 52.067 ms
Loss rate: 11.38%
```

Run 3: Report of TCP Vegas — Data Link



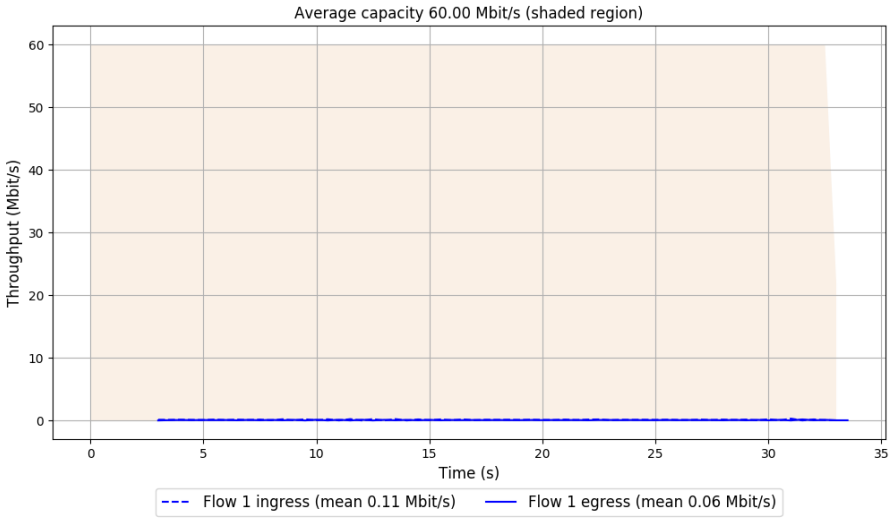


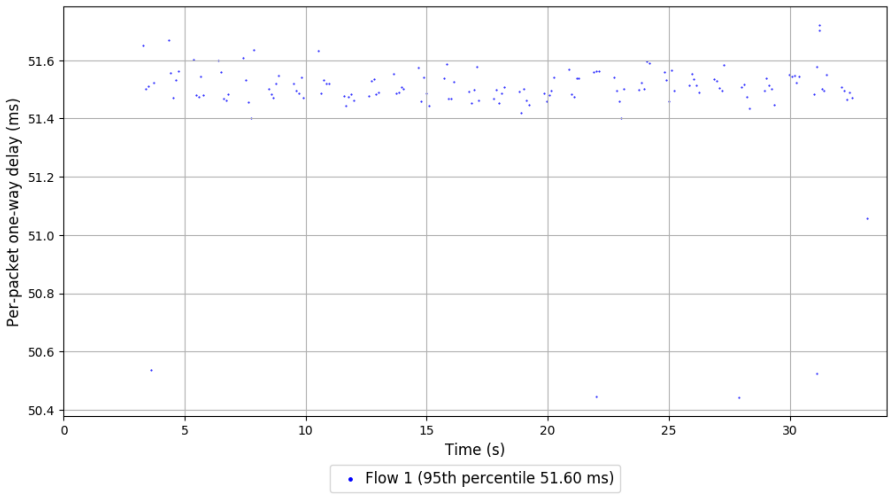
```
Run 1: Statistics of Verus

Start at: 2018-10-26 02:37:47
End at: 2018-10-26 02:38:17

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.06 Mbit/s (0.1% utilization)
95th percentile per-packet one-way delay: 51.602 ms
Loss rate: 44.36%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 51.602 ms
Loss rate: 44.36%
```

Run 1: Report of Verus — Data Link



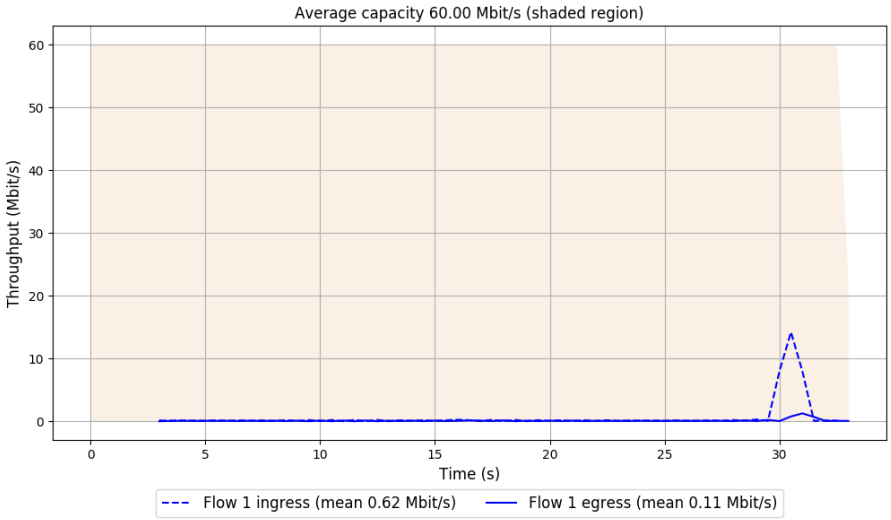


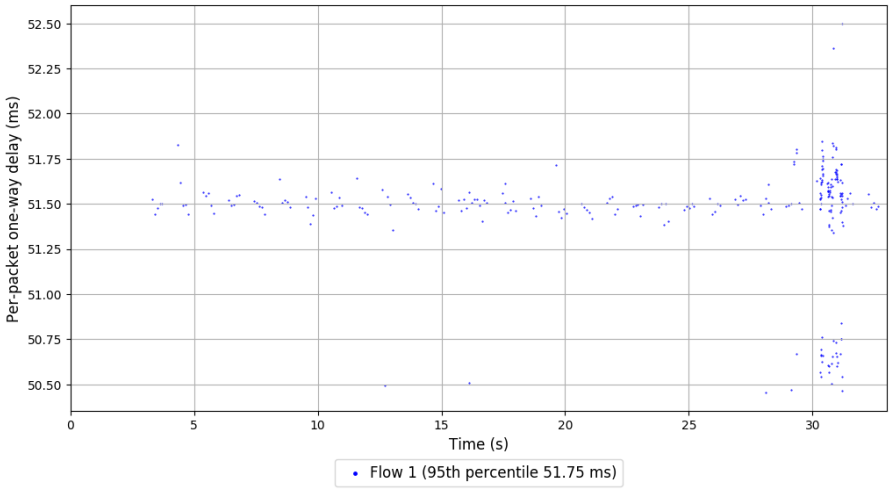
```
Run 2: Statistics of Verus

Start at: 2018-10-26 02:48:33
End at: 2018-10-26 02:49:03

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.11 Mbit/s (0.2% utilization)
95th percentile per-packet one-way delay: 51.751 ms
Loss rate: 82.82%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 51.751 ms
Loss rate: 82.82%
```

Run 2: Report of Verus — Data Link



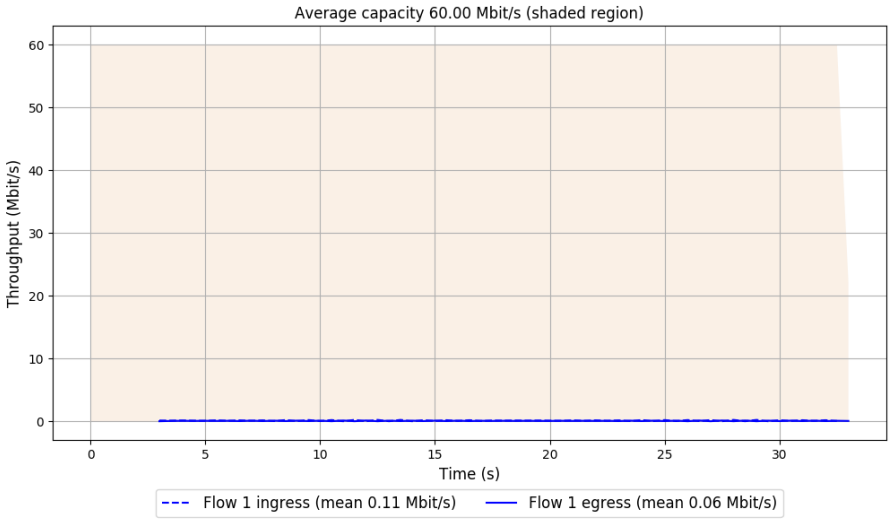


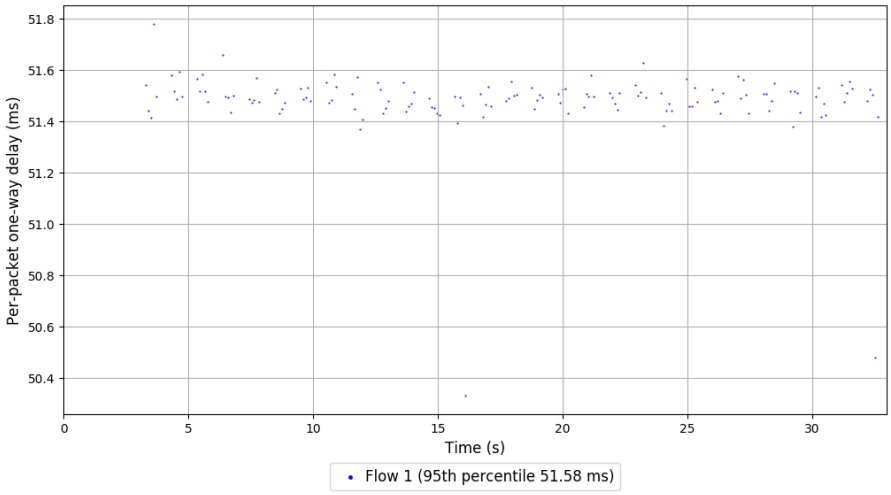
```
Run 3: Statistics of Verus

Start at: 2018-10-26 02:59:22
End at: 2018-10-26 02:59:52

# Below is generated by plot.py at 2018-10-26 03:02:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.06 Mbit/s (0.1% utilization)
95th percentile per-packet one-way delay: 51.578 ms
Loss rate: 44.44%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 51.578 ms
Loss rate: 44.44%
```

Run 3: Report of Verus — Data Link



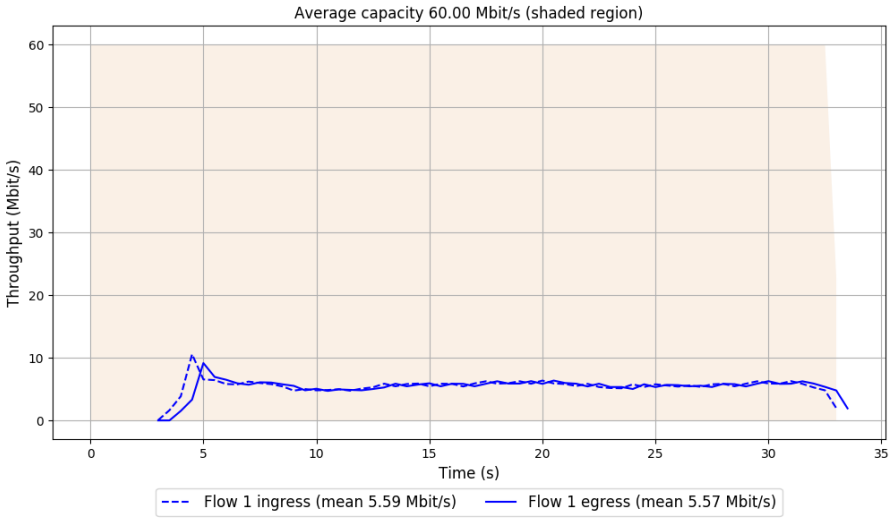


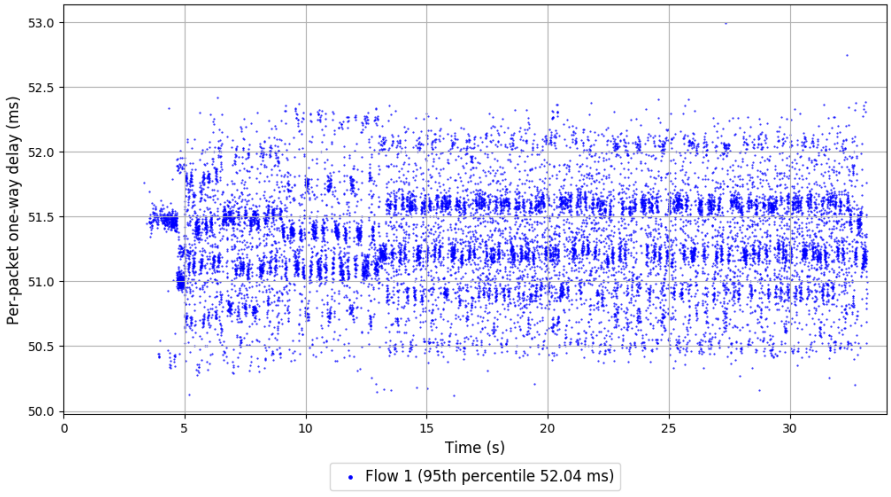
```
Run 1: Statistics of PCC-Vivace

Start at: 2018-10-26 02:31:49
End at: 2018-10-26 02:32:19

# Below is generated by plot.py at 2018-10-26 03:02:28
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 5.57 Mbit/s (9.3% utilization)
95th percentile per-packet one-way delay: 52.041 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 5.57 Mbit/s
95th percentile per-packet one-way delay: 52.041 ms
Loss rate: 0.49%
```

Run 1: Report of PCC-Vivace — Data Link



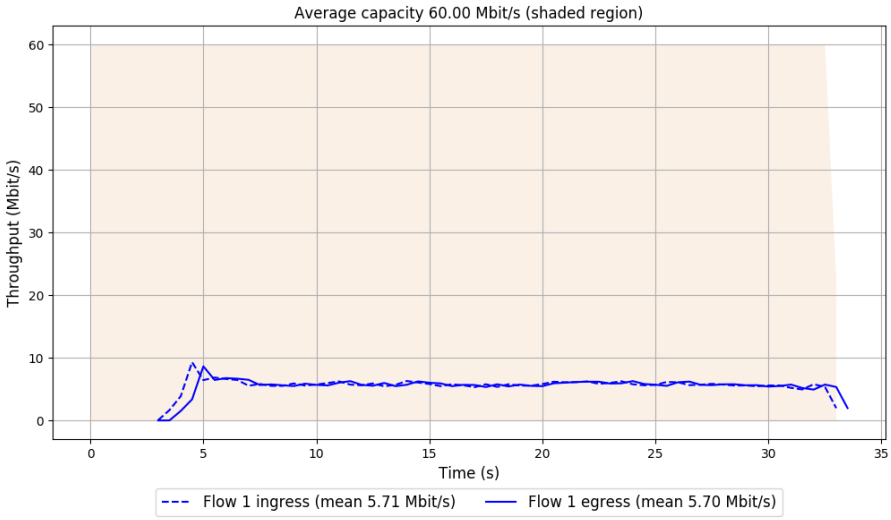


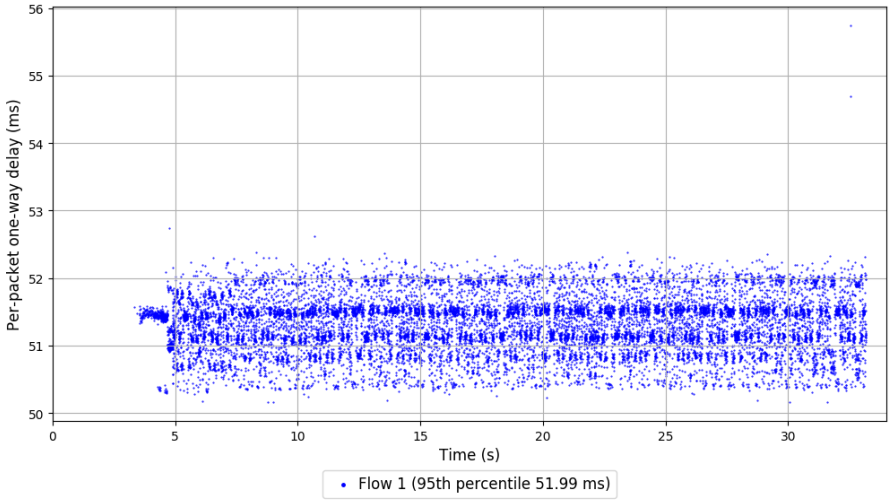
```
Run 2: Statistics of PCC-Vivace

Start at: 2018-10-26 02:42:35
End at: 2018-10-26 02:43:05

# Below is generated by plot.py at 2018-10-26 03:02:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 5.70 Mbit/s (9.5% utilization)
95th percentile per-packet one-way delay: 51.987 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 5.70 Mbit/s
95th percentile per-packet one-way delay: 51.987 ms
Loss rate: 0.39%
```

Run 2: Report of PCC-Vivace — Data Link



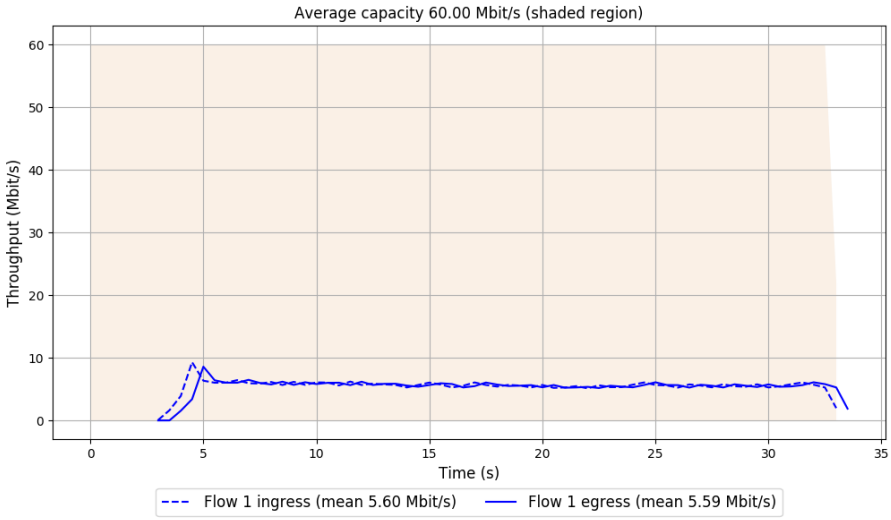


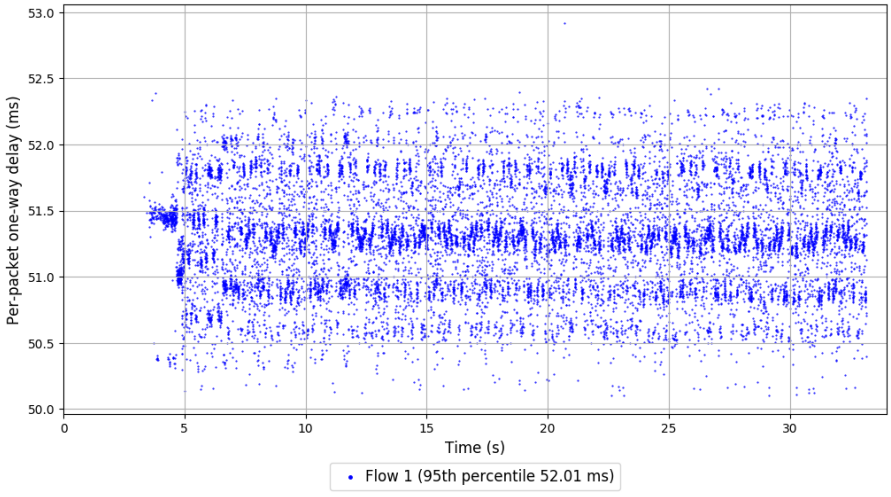
```
Run 3: Statistics of PCC-Vivace

Start at: 2018-10-26 02:53:24
End at: 2018-10-26 02:53:54

# Below is generated by plot.py at 2018-10-26 03:02:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 5.59 Mbit/s (9.3% utilization)
95th percentile per-packet one-way delay: 52.008 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 5.59 Mbit/s
95th percentile per-packet one-way delay: 52.008 ms
Loss rate: 0.40%
```

Run 3: Report of PCC-Vivace — Data Link



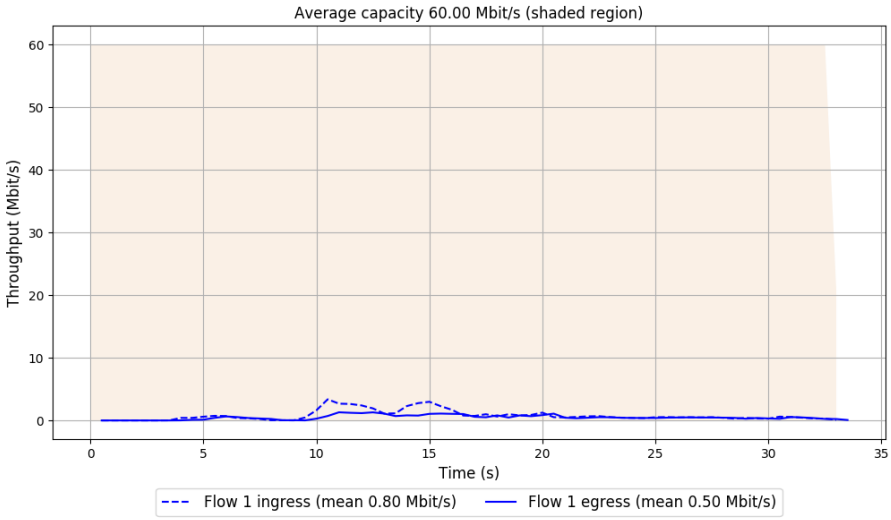


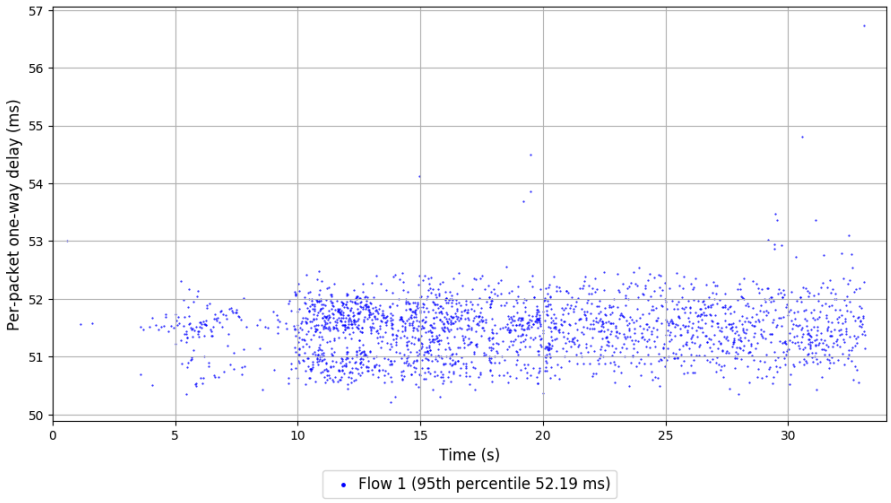
```
Run 1: Statistics of WebRTC media

Start at: 2018-10-26 02:34:49
End at: 2018-10-26 02:35:19

# Below is generated by plot.py at 2018-10-26 03:02:33
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.50 Mbit/s (0.8% utilization)
95th percentile per-packet one-way delay: 52.185 ms
Loss rate: 37.62%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 52.185 ms
Loss rate: 37.62%
```

Run 1: Report of WebRTC media — Data Link



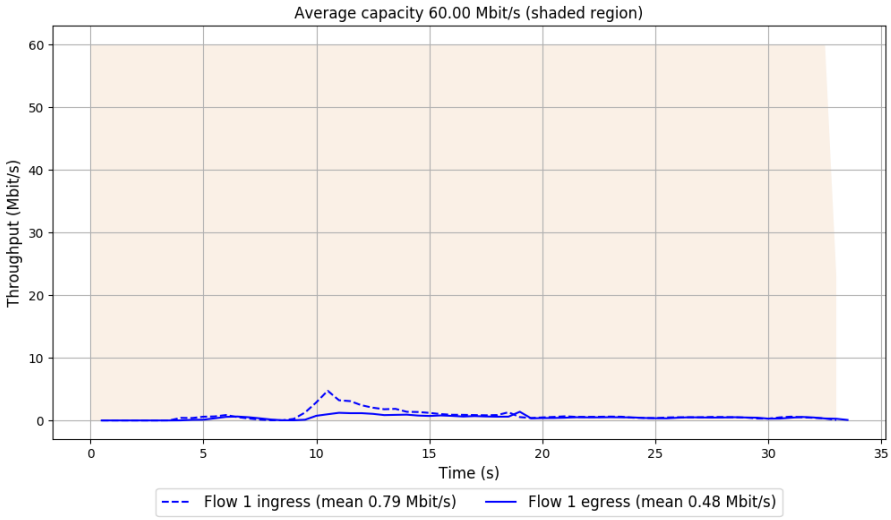


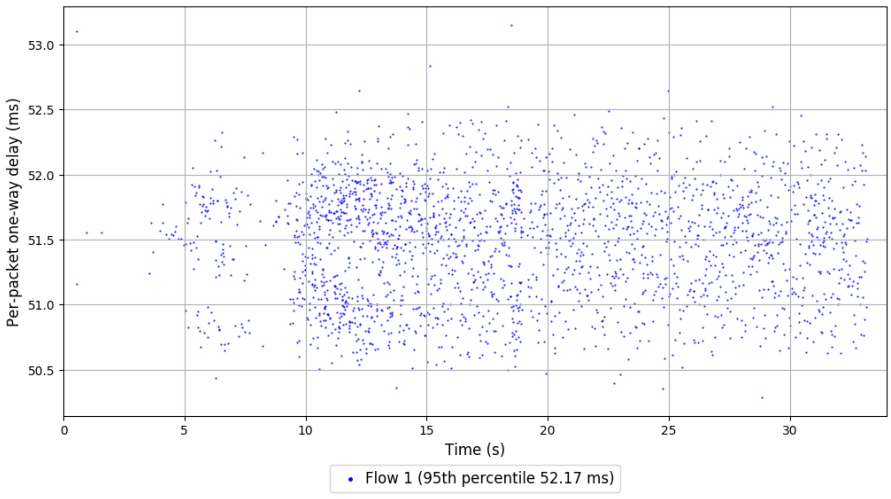
```
Run 2: Statistics of WebRTC media

Start at: 2018-10-26 02:45:35
End at: 2018-10-26 02:46:05

# Below is generated by plot.py at 2018-10-26 03:02:33
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.48 Mbit/s (0.8% utilization)
95th percentile per-packet one-way delay: 52.169 ms
Loss rate: 39.17%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 52.169 ms
Loss rate: 39.17%
```

Run 2: Report of WebRTC media — Data Link





```
Run 3: Statistics of WebRTC media

Start at: 2018-10-26 02:56:23
End at: 2018-10-26 02:56:53

# Below is generated by plot.py at 2018-10-26 03:02:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 60.00 Mbit/s
Average throughput: 0.49 Mbit/s (0.8% utilization)
95th percentile per-packet one-way delay: 52.174 ms
Loss rate: 39.20%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 52.174 ms
Loss rate: 39.20%
```

Run 3: Report of WebRTC media — Data Link