Pantheon Report

Generated at 2019-01-17 09:31:53 (UTC).

Tested in mahimahi: `mm-delay 10 mm-link 12mbps.trace 12mbps.trace --uplink-queue=droptail --uplink-queue-args=packets=1 --downlink-queue=droptail --downlink-queue-args=packets=1`

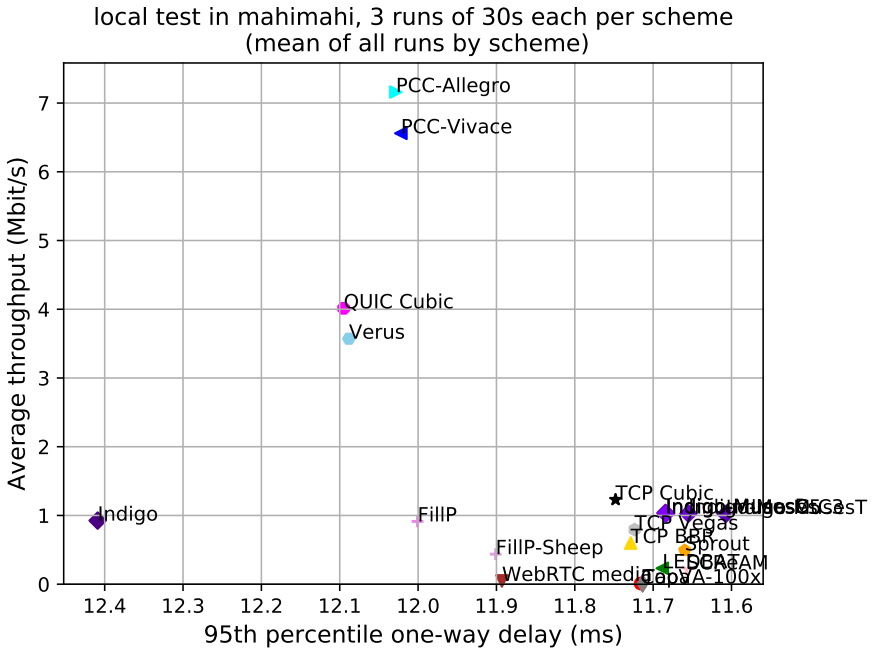
Repeated the test of 21 congestion control schemes 3 times.

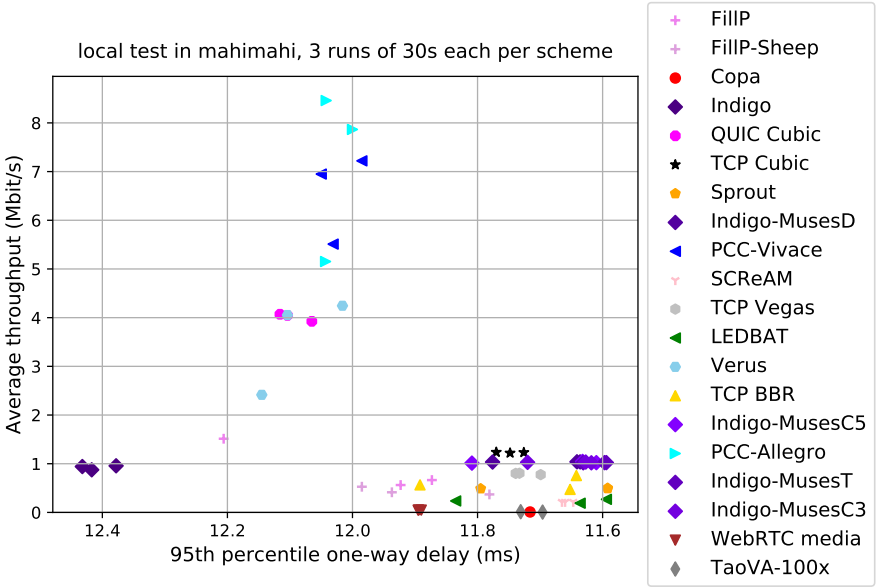
Each test lasted for 30 seconds running 1 flow.

```
System info:
Linux 4.15.0-1026-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 @ c80a283586bf7b0cc1fe08c69c8f60d56498f81c
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ c3eee875824760ec5b2fd207fefe166e1afe2170
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-Allegro
PCC-Vivace
QUIC Cubic
Verus
Indigo
FillP
TCP Cubic
TCP Vegas
TCP BBR
Sprout
FillP-Sheep
WebRTC media
TaoVA-100x
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
0
1
2
3
4
5
6
7
12.4
12.3
12.2
12.1
12.0
11.9
11.8
11.7
11.6


local test in mahimahi, 3 runs of 30s each per scheme
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
0
1
2
3
4
5
6
7
8
12.4
12.2
12.0
11.8
11.6
FillP
FillP-Sheep
Copa
Indigo
QUIC Cubic
TCP Cubic
Sprout
Indigo-MusesD
PCC-Vivace
SCReAM
TCP Vegas
LEDBAT
Verus
TCP BBR
Indigo-MusesC5
PCC-Allegro
Indigo-MusesT
Indigo-MusesC3
WebRTC media
TaoVA-100x

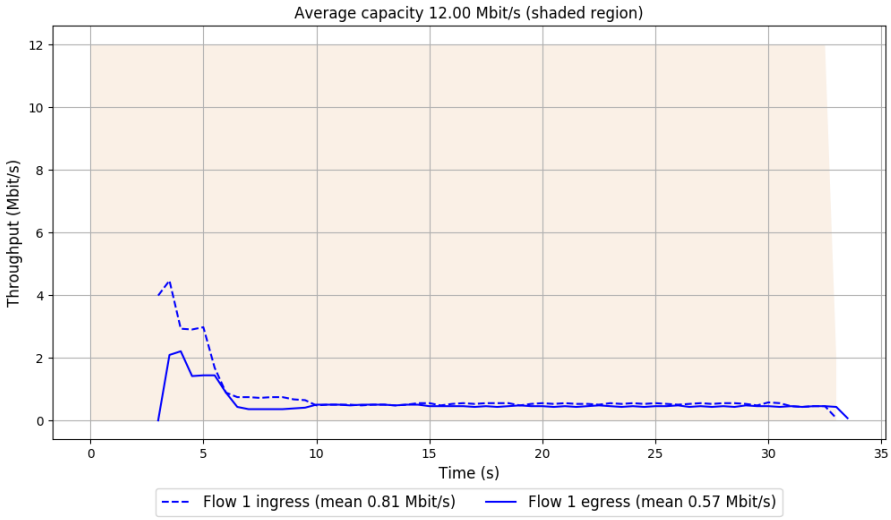
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.60	11.73	30.26
Copa	1	0.01	11.72	86.62
TCP Cubic	3	1.23	11.75	8.68
FillP	3	0.91	12.00	44.62
FillP-Sheep	3	0.44	11.90	37.78
Indigo	3	0.93	12.41	95.94
Indigo-MusesC3	3	1.03	11.66	16.90
Indigo-MusesC5	3	1.03	11.68	17.56
Indigo-MusesD	3	1.04	11.68	25.61
Indigo-MusesT	3	1.02	11.61	21.51
LEDBAT	3	0.23	11.69	49.40
PCC-Allegro	3	7.16	12.03	3.37
PCC-Expr	0	N/A	N/A	N/A
QUIC Cubic	3	4.01	12.09	8.16
SCReAM	3	0.21	11.66	0.00
Sprout	3	0.49	11.66	7.39
TaoVA-100x	2	0.01	11.71	57.79
TCP Vegas	3	0.79	11.72	17.35
Verus	3	3.57	12.09	98.77
PCC-Vivace	3	6.56	12.02	0.85
WebRTC media	3	0.05	11.89	19.53

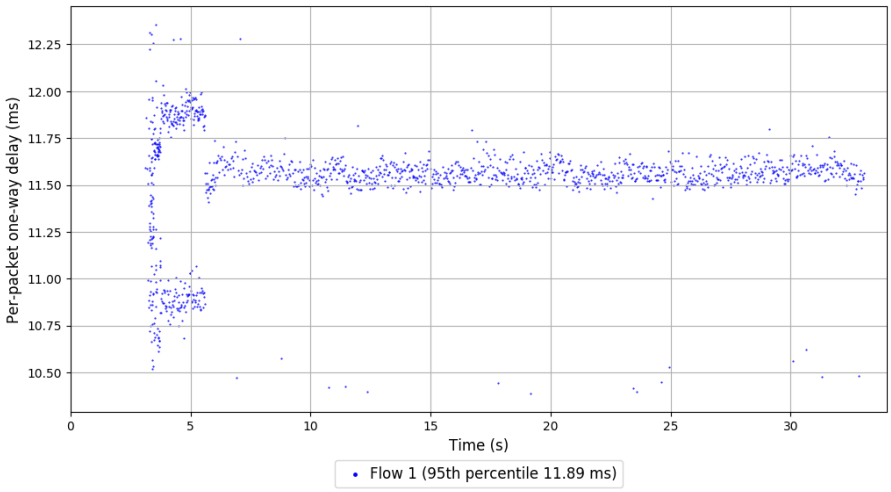
```
Run 1: Statistics of TCP BBR

Start at: 2019-01-17 09:00:45
End at: 2019-01-17 09:01:15

# Below is generated by plot.py at 2019-01-17 09:29:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.57 Mbit/s (4.7% utilization)
95th percentile per-packet one-way delay: 11.892 ms
Loss rate: 30.58%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 11.892 ms
Loss rate: 30.58%
```

Run 1: Report of TCP BBR — Data Link



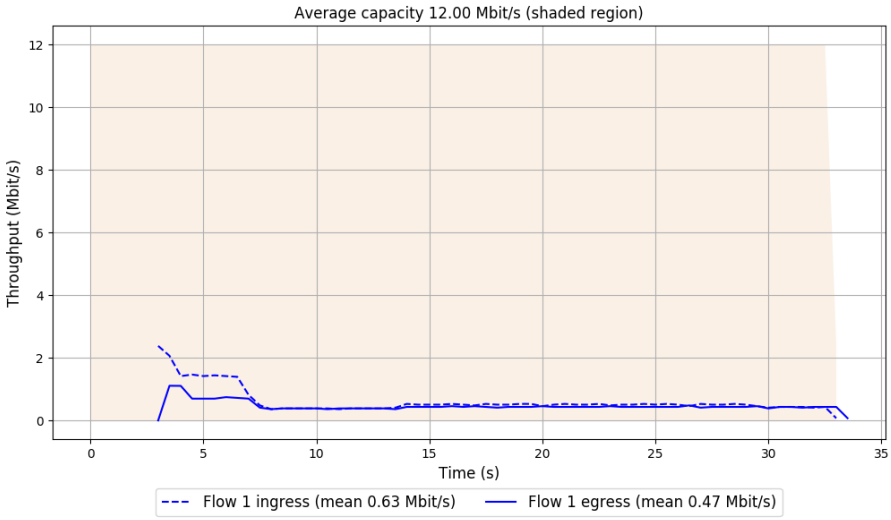


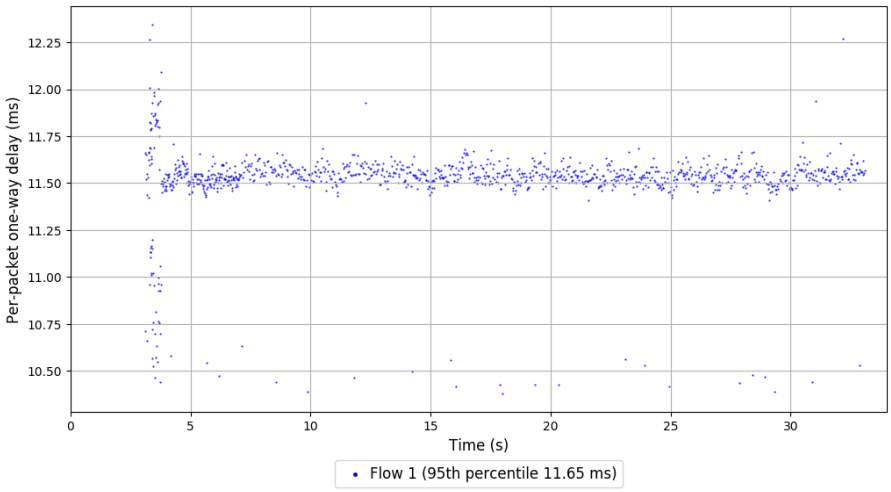
```
Run 2: Statistics of TCP BBR

Start at: 2019-01-17 09:13:13
End at: 2019-01-17 09:13:43

# Below is generated by plot.py at 2019-01-17 09:29:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.47 Mbit/s (3.9% utilization)
95th percentile per-packet one-way delay: 11.652 ms
Loss rate: 24.71%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 11.652 ms
Loss rate: 24.71%
```

Run 2: Report of TCP BBR — Data Link



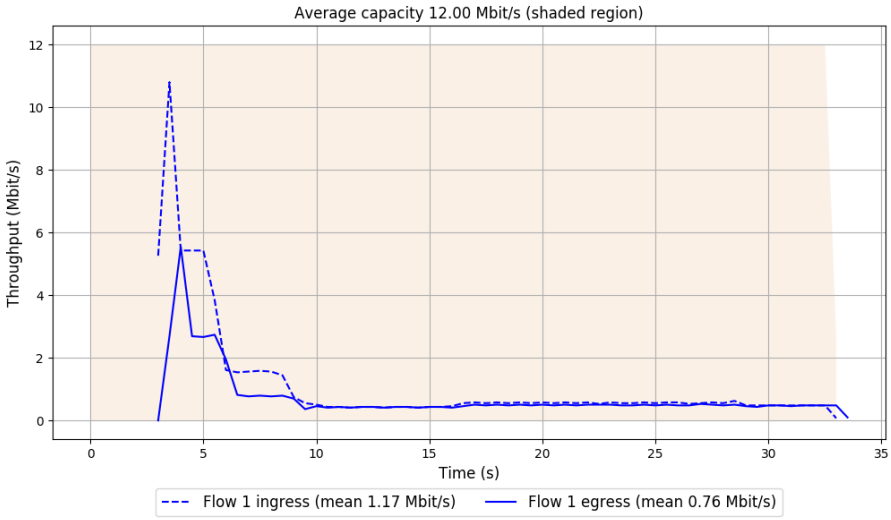


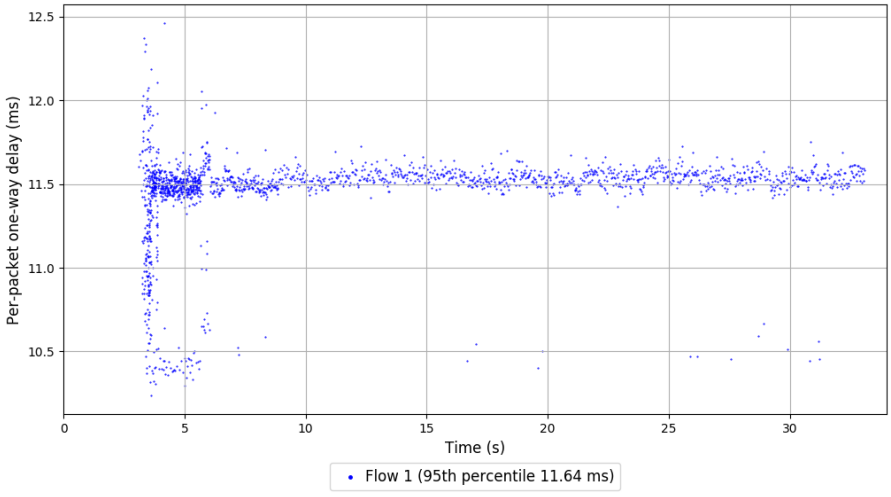
```
Run 3: Statistics of TCP BBR

Start at: 2019-01-17 09:25:41
End at: 2019-01-17 09:26:11

# Below is generated by plot.py at 2019-01-17 09:29:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.76 Mbit/s (6.3% utilization)
95th percentile per-packet one-way delay: 11.642 ms
Loss rate: 35.49%
-- Flow 1:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 11.642 ms
Loss rate: 35.49%
```

Run 3: Report of TCP BBR — Data Link

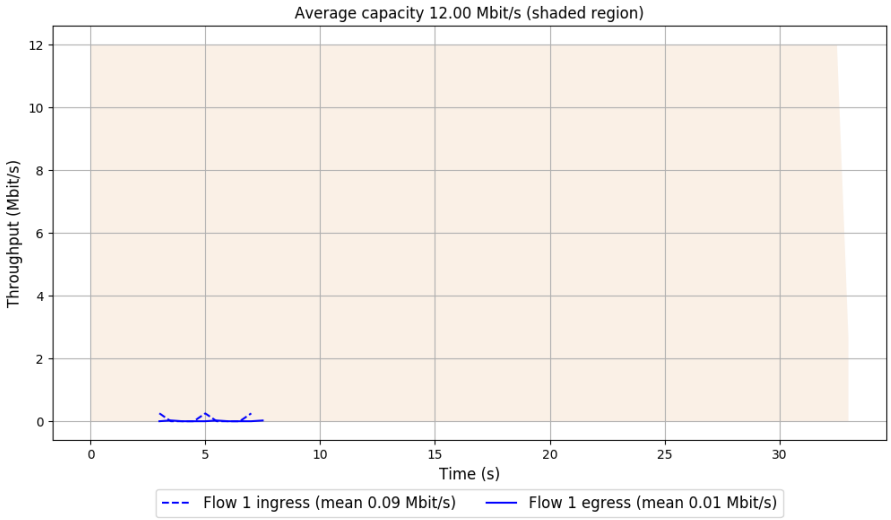


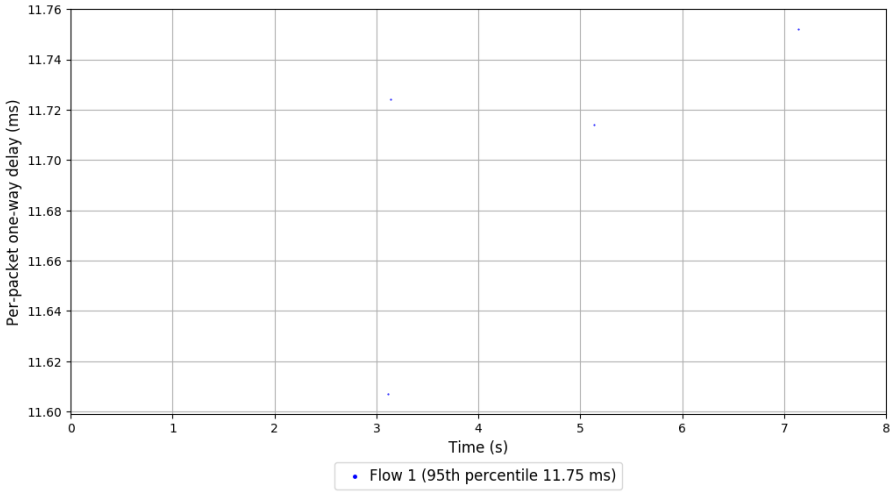


```
Run 1: Statistics of Copa

Start at: 2019-01-17 09:02:30
End at: 2019-01-17 09:03:00
```

Run 1: Report of Copa — Data Link



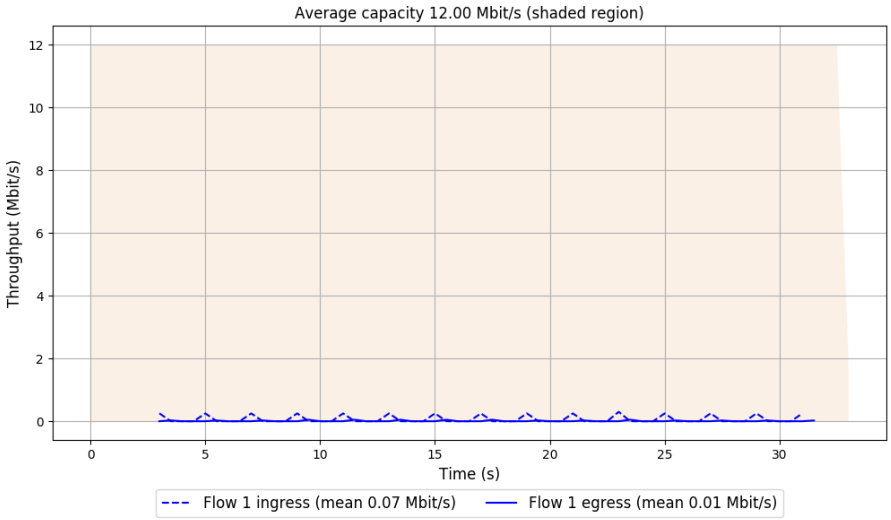


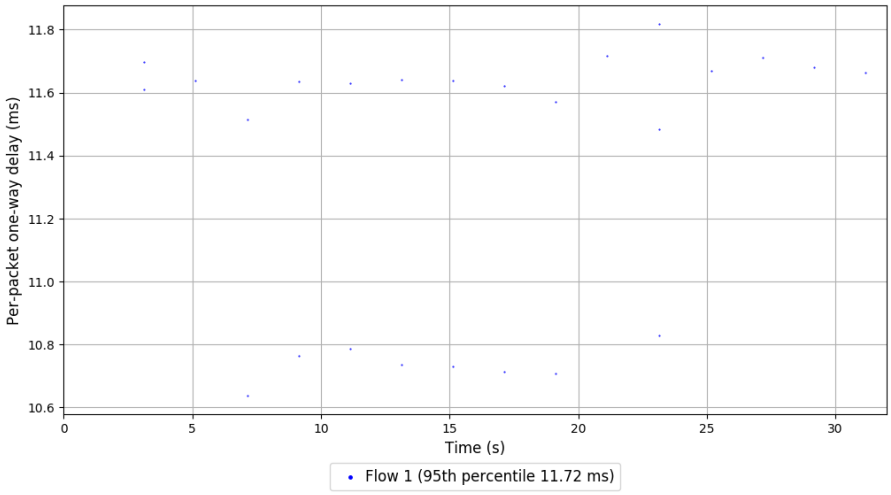
```
Run 2: Statistics of Copa

Start at: 2019-01-17 09:14:58
End at: 2019-01-17 09:15:28

# Below is generated by plot.py at 2019-01-17 09:29:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.1% utilization)
95th percentile per-packet one-way delay: 11.716 ms
Loss rate: 86.62%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 11.716 ms
Loss rate: 86.62%
```

Run 2: Report of Copa — Data Link

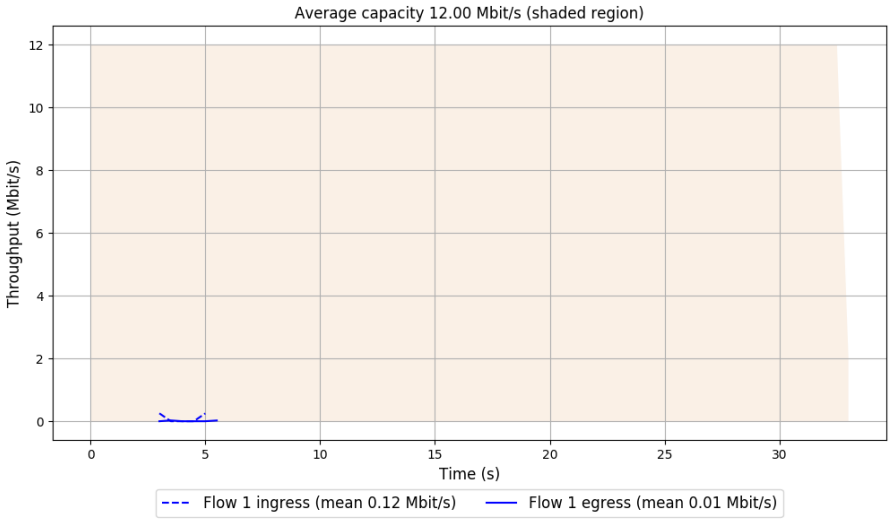


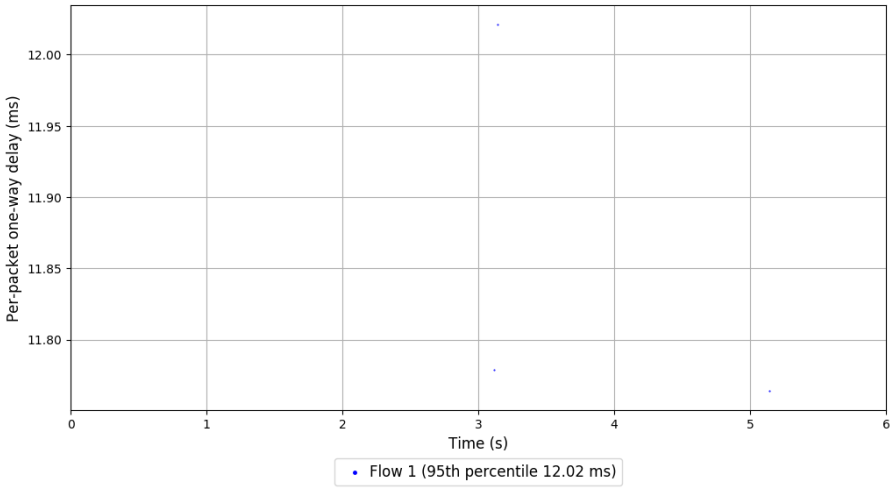


```
Run 3: Statistics of Copa

Start at: 2019-01-17 09:27:26
End at: 2019-01-17 09:27:56
```

Run 3: Report of Copa — Data Link



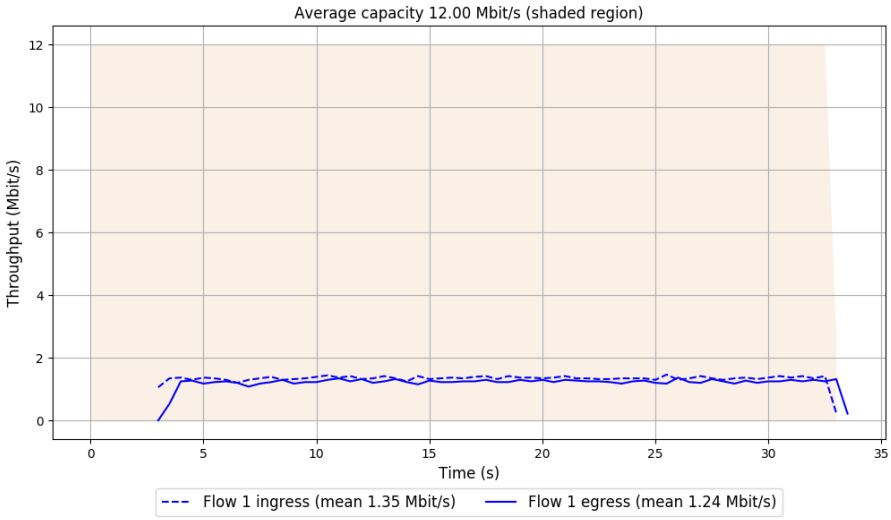


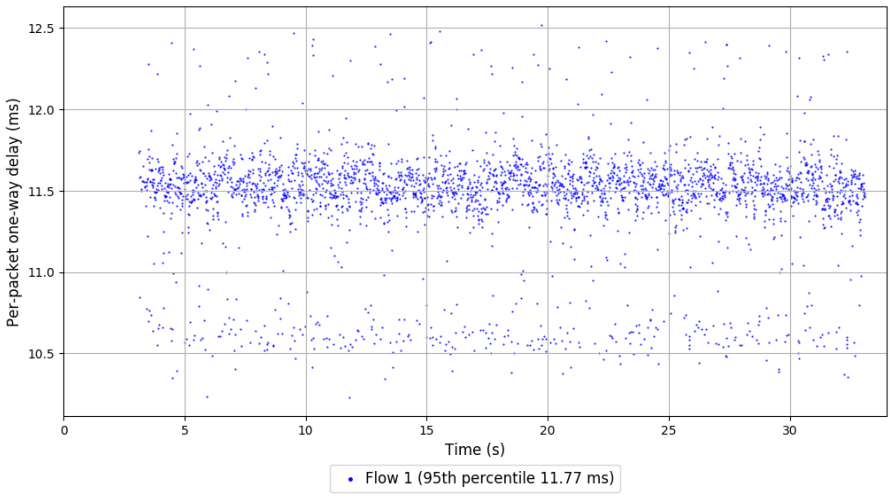
```
Run 1: Statistics of TCP Cubic

Start at: 2019-01-17 08:56:38
End at: 2019-01-17 08:57:08

# Below is generated by plot.py at 2019-01-17 09:29:40
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.24 Mbit/s (10.3% utilization)
95th percentile per-packet one-way delay: 11.770 ms
Loss rate: 8.63%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 11.770 ms
Loss rate: 8.63%
```

Run 1: Report of TCP Cubic — Data Link



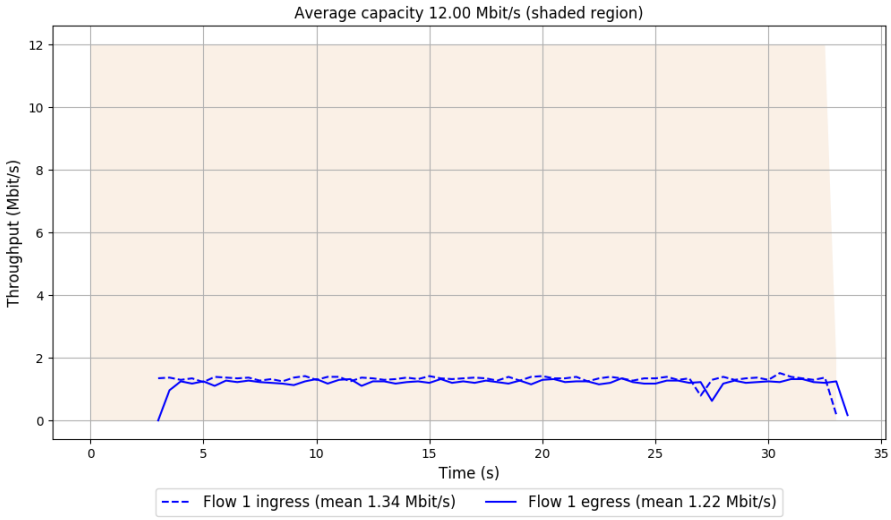


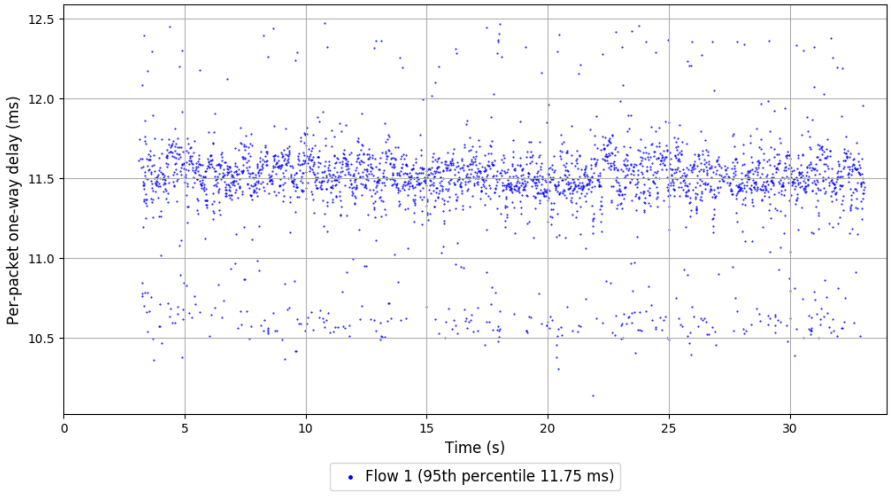
```
Run 2: Statistics of TCP Cubic

Start at: 2019-01-17 09:09:01
End at: 2019-01-17 09:09:31

# Below is generated by plot.py at 2019-01-17 09:29:40
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.22 Mbit/s (10.2% utilization)
95th percentile per-packet one-way delay: 11.748 ms
Loss rate: 8.80%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 11.748 ms
Loss rate: 8.80%
```

Run 2: Report of TCP Cubic — Data Link



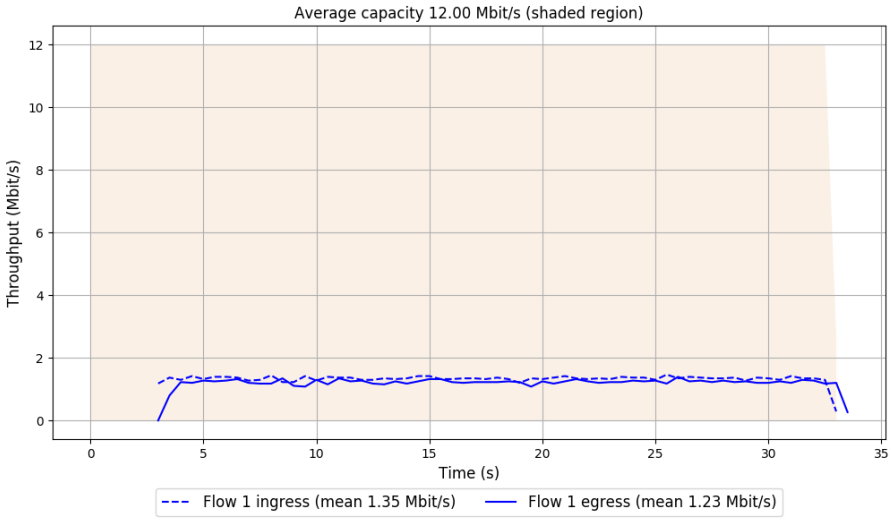


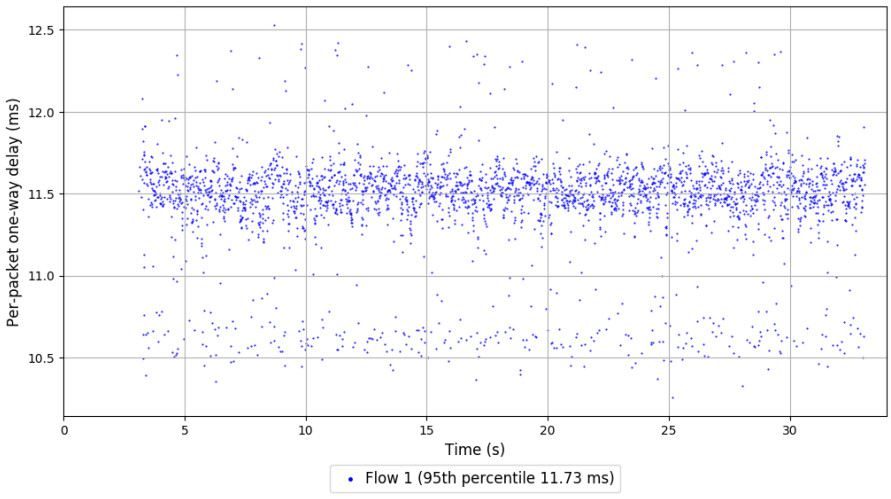
```
Run 3: Statistics of TCP Cubic

Start at: 2019-01-17 09:21:30
End at: 2019-01-17 09:22:00

# Below is generated by plot.py at 2019-01-17 09:29:44
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.23 Mbit/s (10.3% utilization)
95th percentile per-packet one-way delay: 11.726 ms
Loss rate: 8.62%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 11.726 ms
Loss rate: 8.62%
```

Run 3: Report of TCP Cubic — Data Link



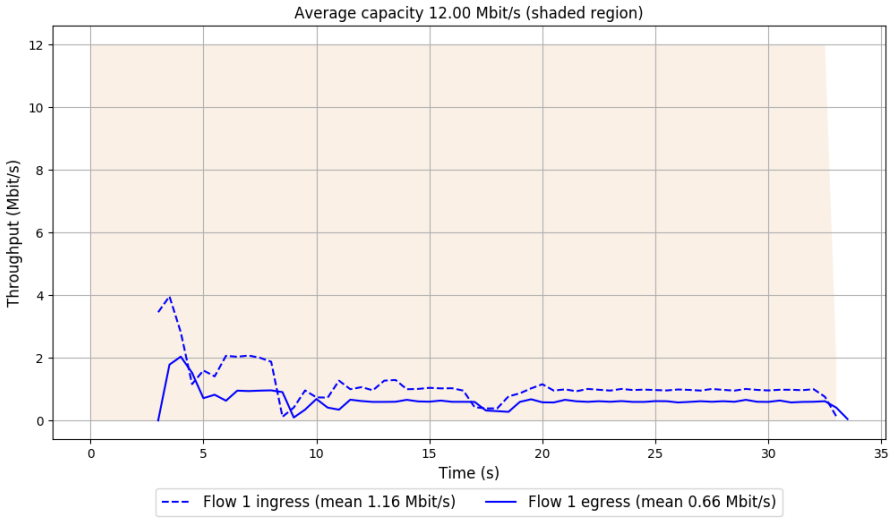


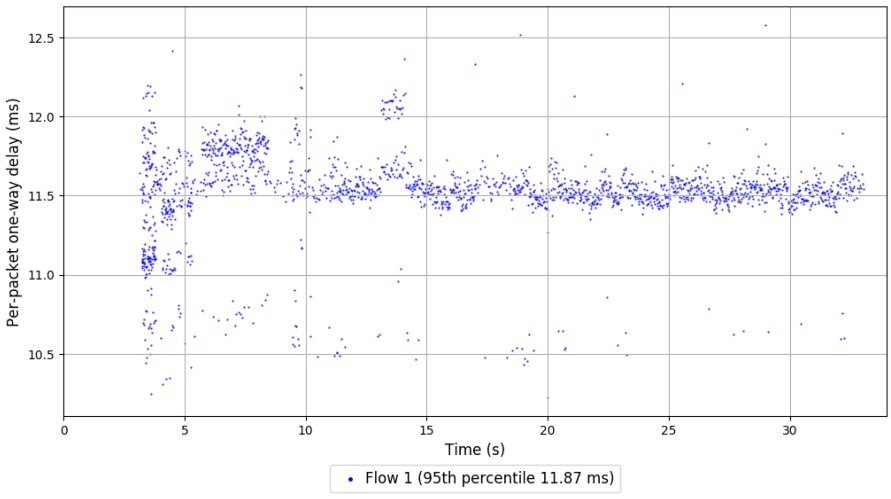
```
Run 1: Statistics of FillP

Start at: 2019-01-17 08:53:42
End at: 2019-01-17 08:54:12

# Below is generated by plot.py at 2019-01-17 09:29:45
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.66 Mbit/s (5.5% utilization)
95th percentile per-packet one-way delay: 11.873 ms
Loss rate: 42.90%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 11.873 ms
Loss rate: 42.90%
```

Run 1: Report of FillP — Data Link



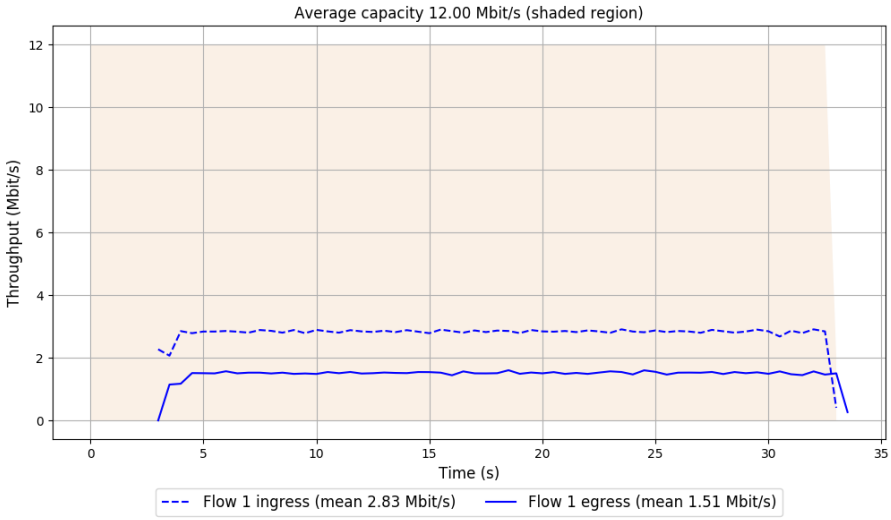


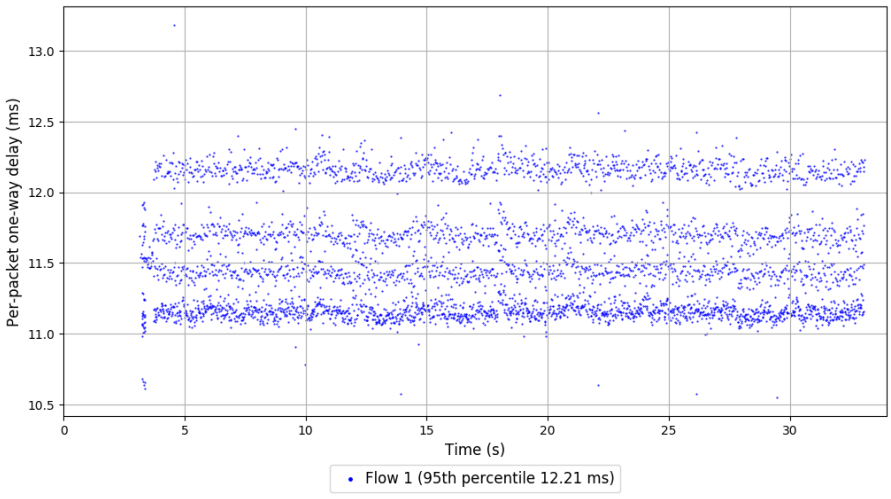
```
Run 2: Statistics of FillP

Start at: 2019-01-17 09:06:05
End at: 2019-01-17 09:06:35

# Below is generated by plot.py at 2019-01-17 09:29:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.51 Mbit/s (12.6% utilization)
95th percentile per-packet one-way delay: 12.206 ms
Loss rate: 46.54%
-- Flow 1:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 12.206 ms
Loss rate: 46.54%
```

Run 2: Report of FillP — Data Link



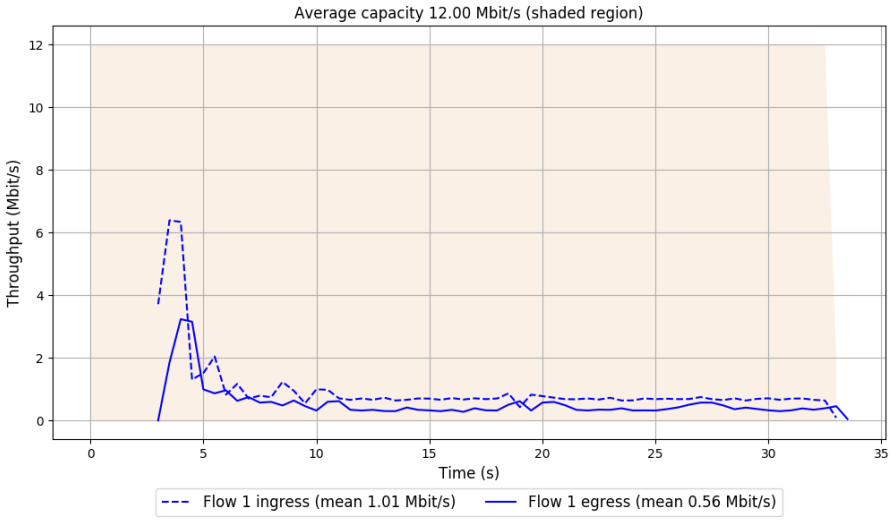


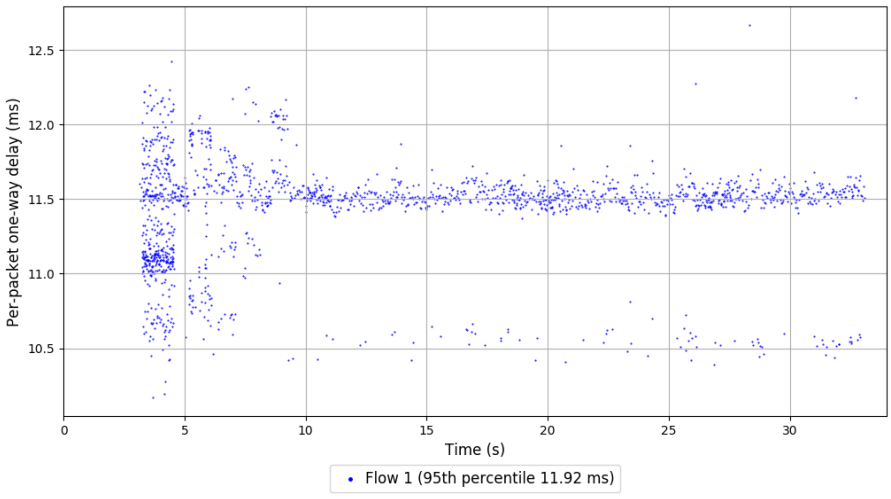
```
Run 3: Statistics of FillP

Start at: 2019-01-17 09:18:34
End at: 2019-01-17 09:19:04

# Below is generated by plot.py at 2019-01-17 09:29:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.56 Mbit/s (4.7% utilization)
95th percentile per-packet one-way delay: 11.923 ms
Loss rate: 44.41%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 11.923 ms
Loss rate: 44.41%
```

Run 3: Report of FillP — Data Link



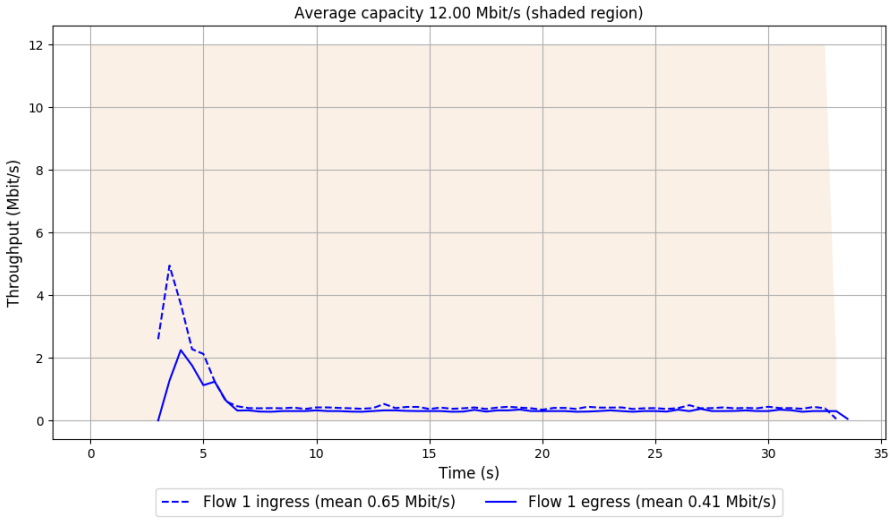


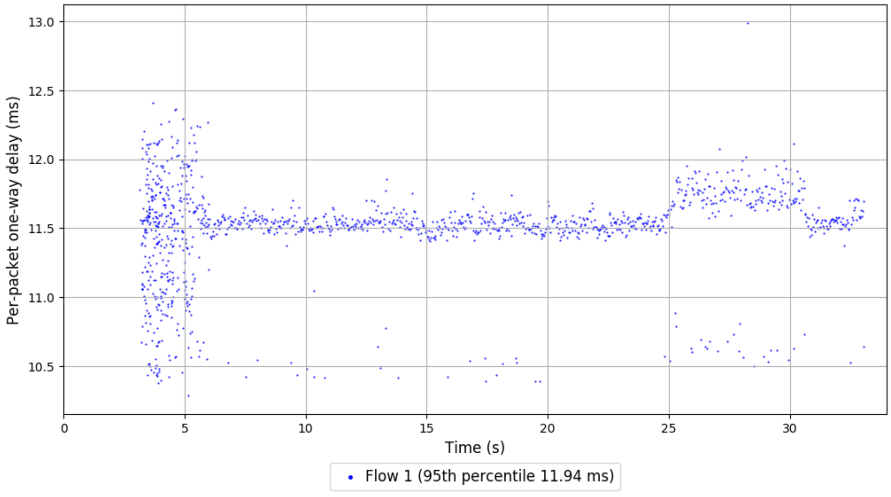
```
Run 1: Statistics of FillP-Sheep

Start at: 2019-01-17 08:58:58
End at: 2019-01-17 08:59:28

# Below is generated by plot.py at 2019-01-17 09:29:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.41 Mbit/s (3.4% utilization)
95th percentile per-packet one-way delay: 11.937 ms
Loss rate: 36.31%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 11.937 ms
Loss rate: 36.31%
```

Run 1: Report of FillP-Sheep — Data Link



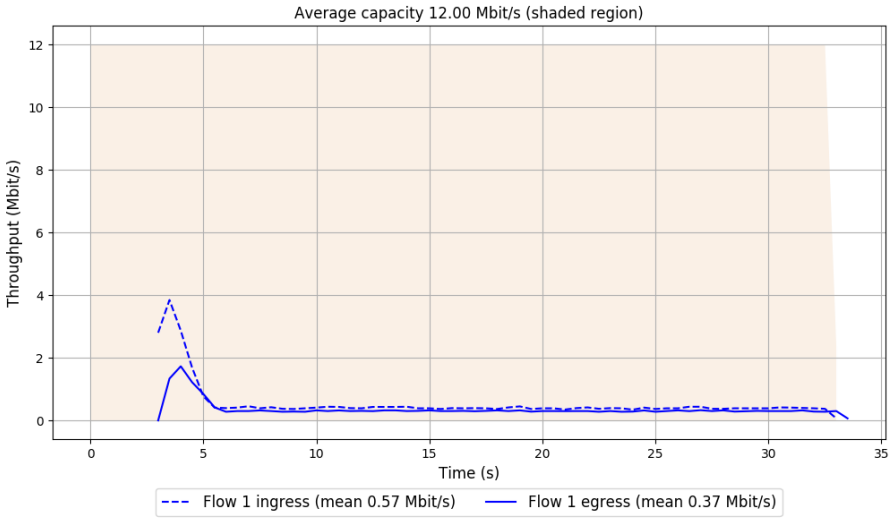


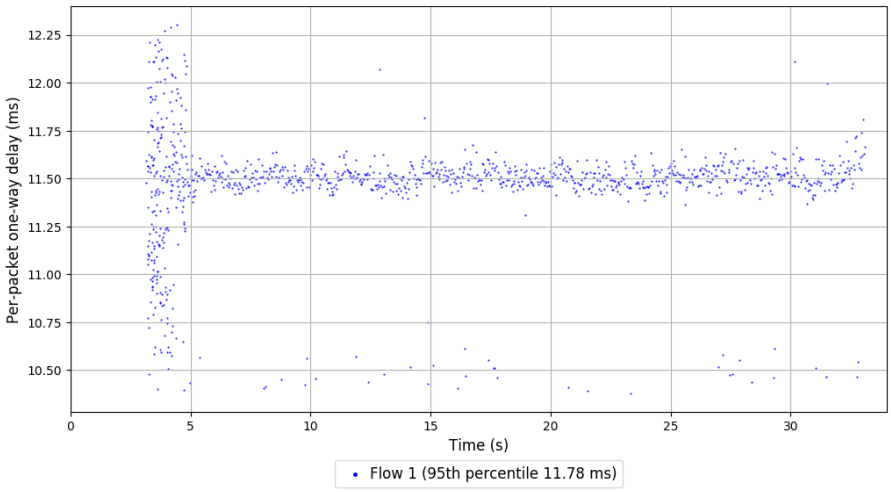
```
Run 2: Statistics of FillP-Sheep

Start at: 2019-01-17 09:11:21
End at: 2019-01-17 09:11:51

# Below is generated by plot.py at 2019-01-17 09:29:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.37 Mbit/s (3.1% utilization)
95th percentile per-packet one-way delay: 11.781 ms
Loss rate: 34.57%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 11.781 ms
Loss rate: 34.57%
```

Run 2: Report of FillP-Sheep — Data Link



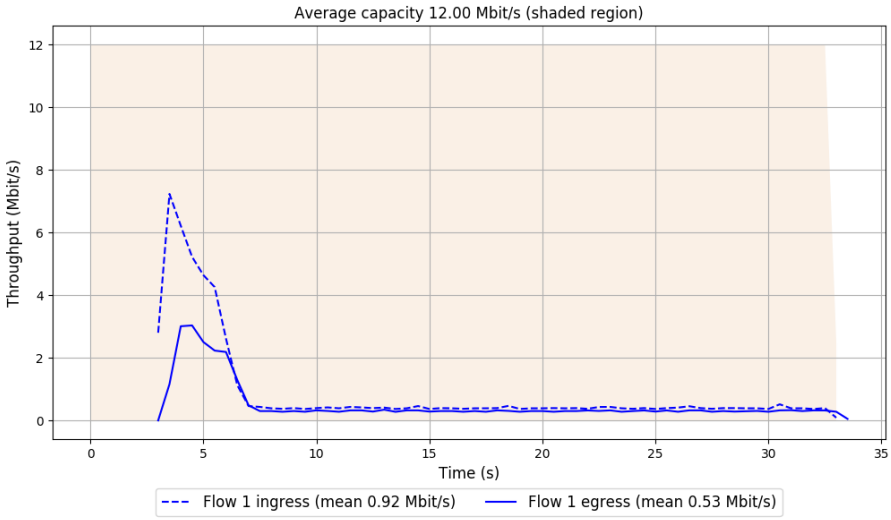


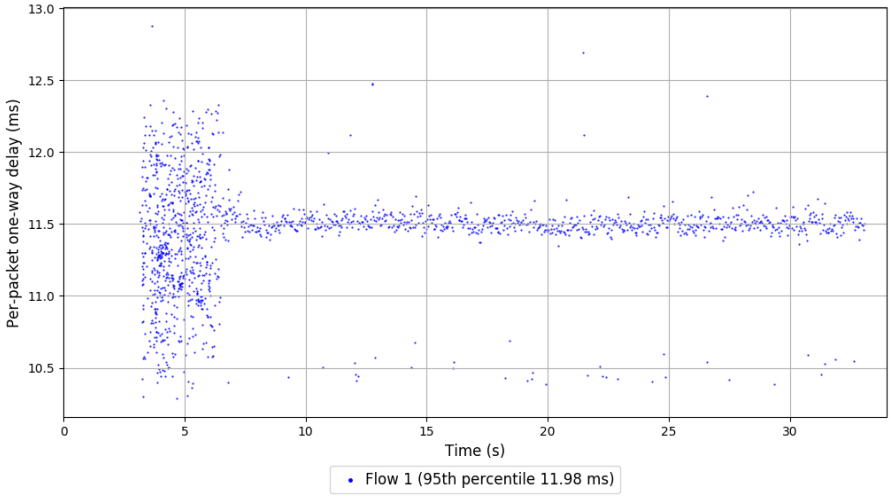
```
Run 3: Statistics of FillP-Sheep

Start at: 2019-01-17 09:23:49
End at: 2019-01-17 09:24:19

# Below is generated by plot.py at 2019-01-17 09:29:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.53 Mbit/s (4.4% utilization)
95th percentile per-packet one-way delay: 11.985 ms
Loss rate: 42.46%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 11.985 ms
Loss rate: 42.46%
```

Run 3: Report of FillP-Sheep — Data Link



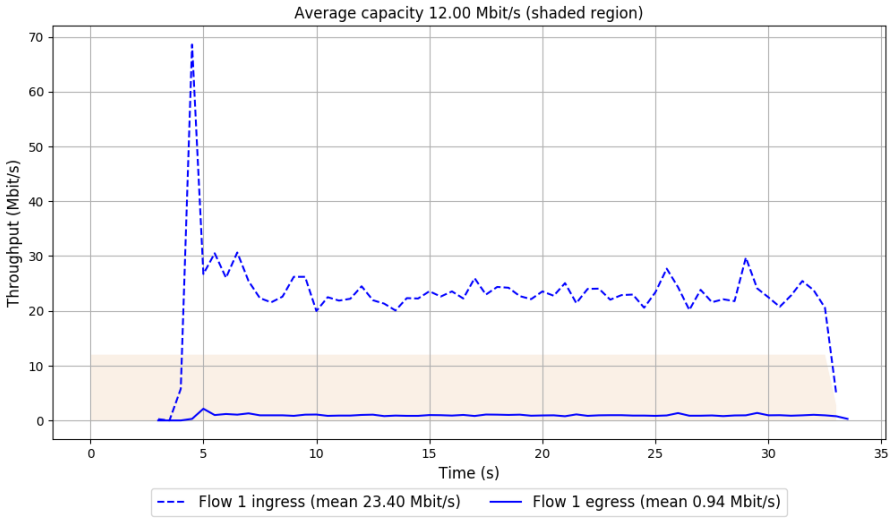


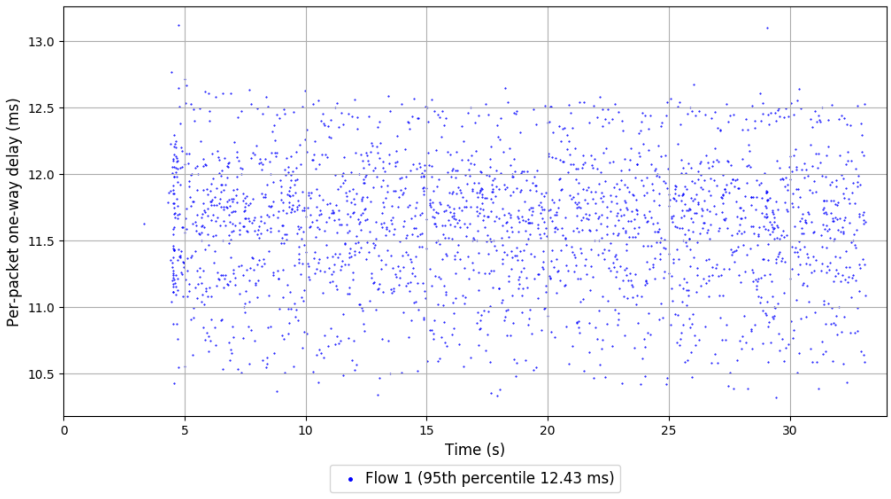
```
Run 1: Statistics of Indigo

Start at: 2019-01-17 08:54:17
End at: 2019-01-17 08:54:47

# Below is generated by plot.py at 2019-01-17 09:29:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.94 Mbit/s (7.9% utilization)
95th percentile per-packet one-way delay: 12.432 ms
Loss rate: 95.97%
-- Flow 1:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 12.432 ms
Loss rate: 95.97%
```

Run 1: Report of Indigo — Data Link



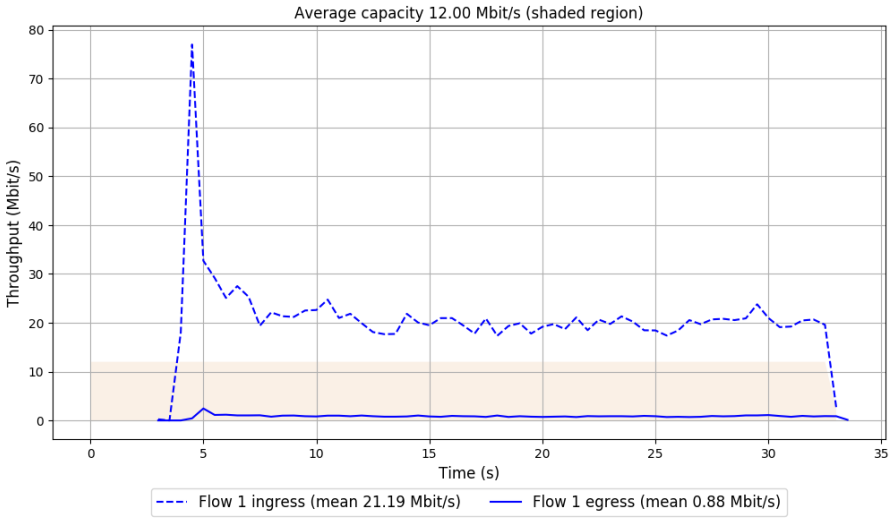


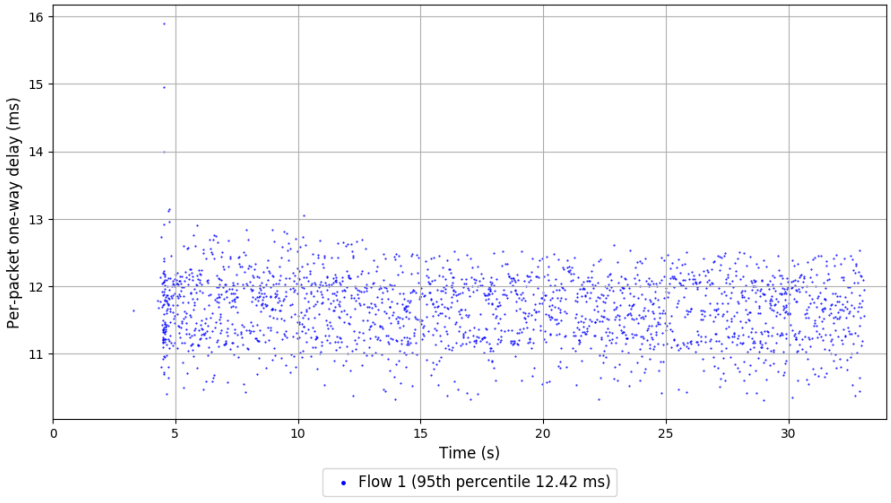
```
Run 2: Statistics of Indigo

Start at: 2019-01-17 09:06:40
End at: 2019-01-17 09:07:10

# Below is generated by plot.py at 2019-01-17 09:30:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.88 Mbit/s (7.3% utilization)
95th percentile per-packet one-way delay: 12.417 ms
Loss rate: 95.87%
-- Flow 1:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 12.417 ms
Loss rate: 95.87%
```

Run 2: Report of Indigo — Data Link



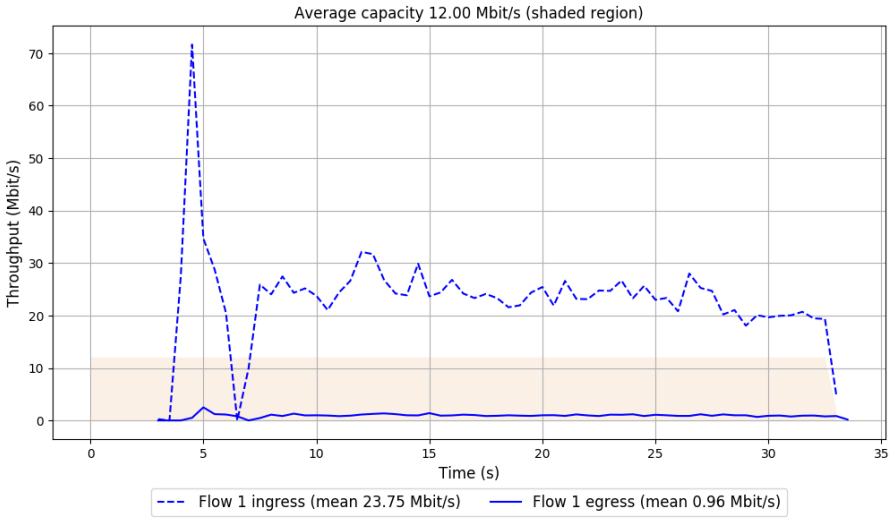


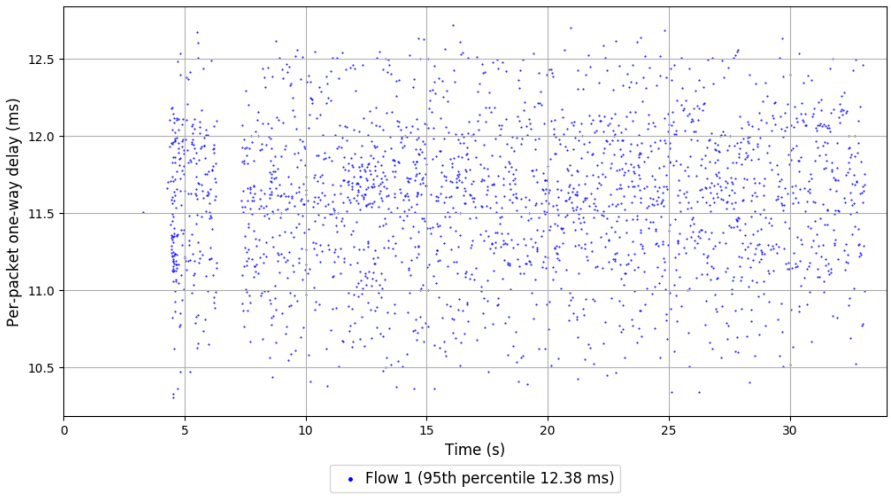
```
Run 3: Statistics of Indigo

Start at: 2019-01-17 09:19:09
End at: 2019-01-17 09:19:39

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.96 Mbit/s (8.0% utilization)
95th percentile per-packet one-way delay: 12.378 ms
Loss rate: 95.97%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 12.378 ms
Loss rate: 95.97%
```

Run 3: Report of Indigo — Data Link



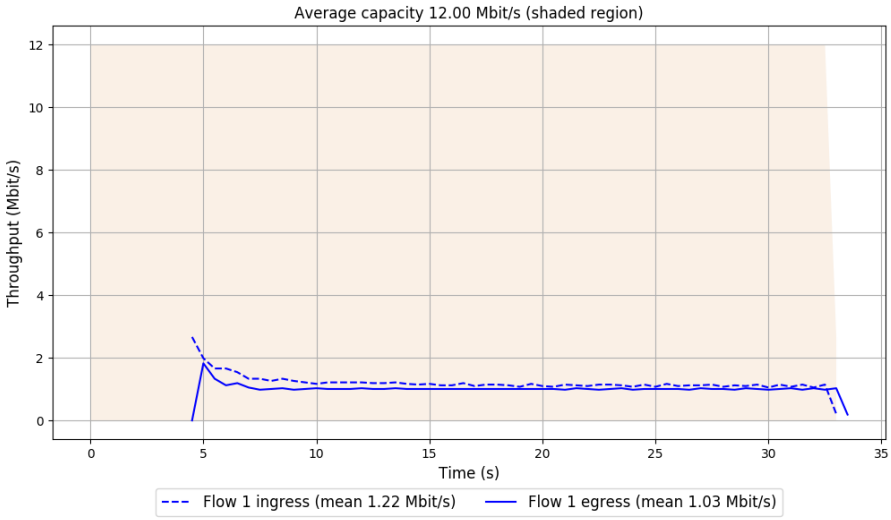


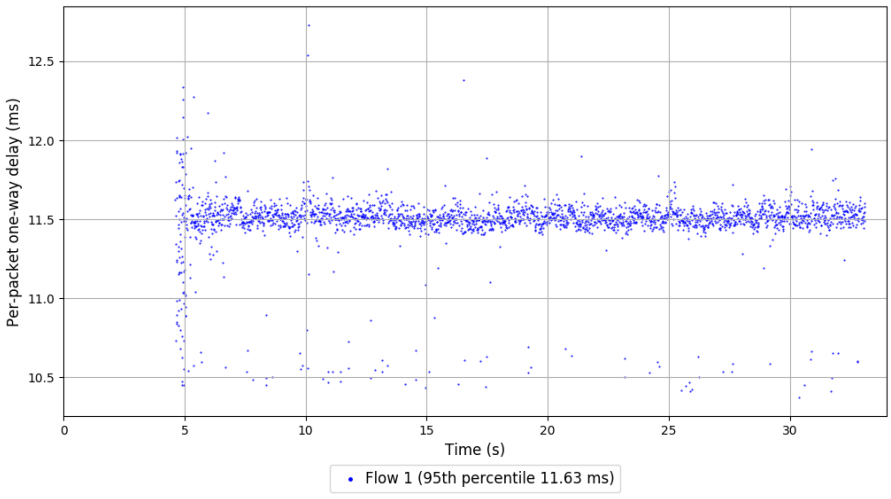
```
Run 1: Statistics of Indigo-MusesC3

Start at: 2019-01-17 08:54:52
End at: 2019-01-17 08:55:22

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.03 Mbit/s (8.6% utilization)
95th percentile per-packet one-way delay: 11.627 ms
Loss rate: 15.39%
-- Flow 1:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 11.627 ms
Loss rate: 15.39%
```

Run 1: Report of Indigo-MusesC3 — Data Link



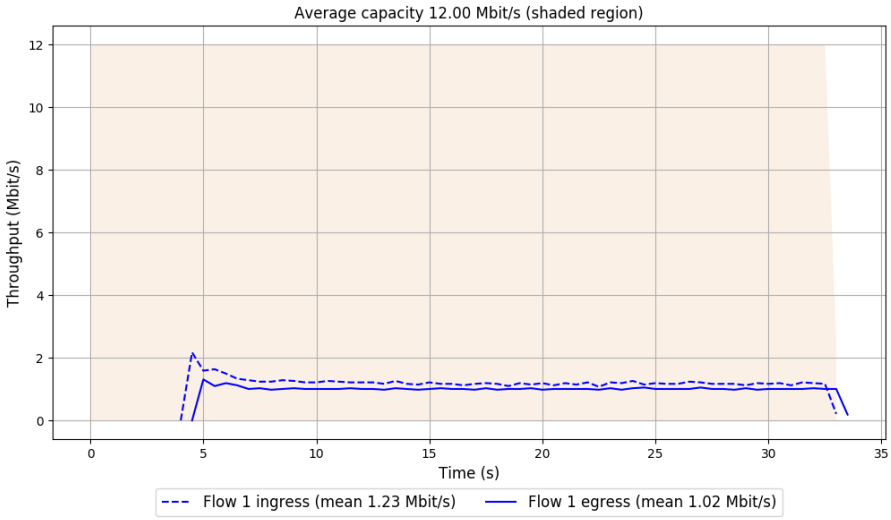


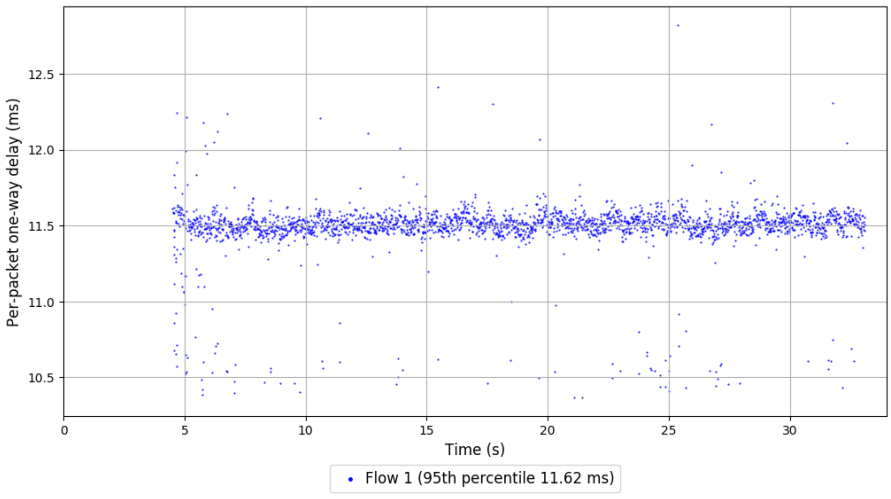
```
Run 2: Statistics of Indigo-MusesC3

Start at: 2019-01-17 09:07:16
End at: 2019-01-17 09:07:46

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.02 Mbit/s (8.5% utilization)
95th percentile per-packet one-way delay: 11.618 ms
Loss rate: 17.12%
-- Flow 1:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 11.618 ms
Loss rate: 17.12%
```

Run 2: Report of Indigo-MusesC3 — Data Link



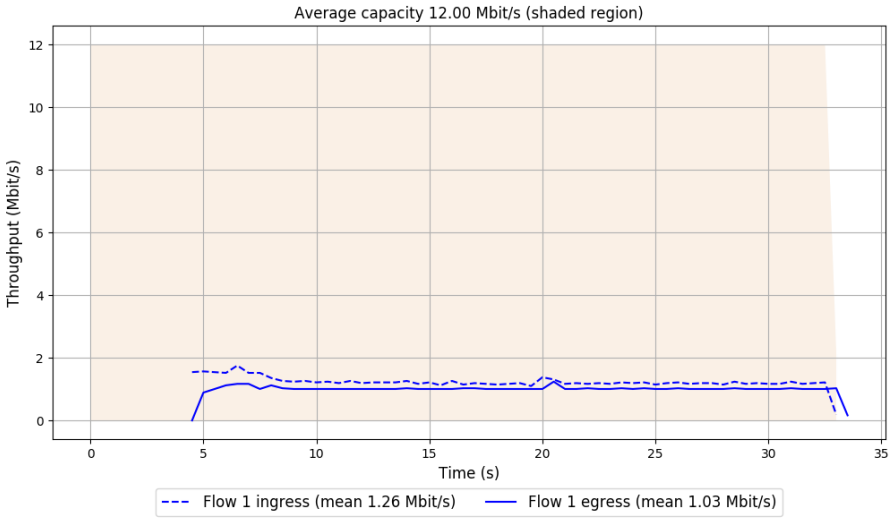


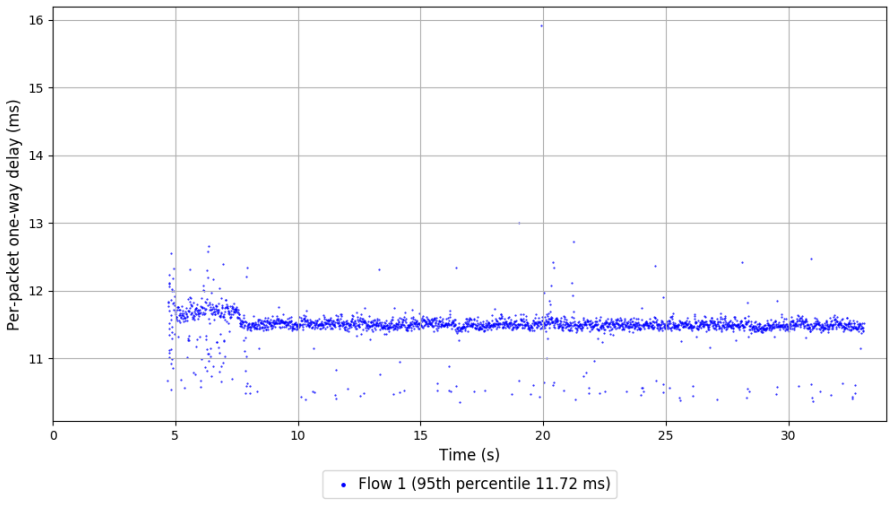
```
Run 3: Statistics of Indigo-MusesC3

Start at: 2019-01-17 09:19:44
End at: 2019-01-17 09:20:14

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.03 Mbit/s (8.6% utilization)
95th percentile per-packet one-way delay: 11.720 ms
Loss rate: 18.18%
-- Flow 1:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 11.720 ms
Loss rate: 18.18%
```

Run 3: Report of Indigo-MusesC3 — Data Link



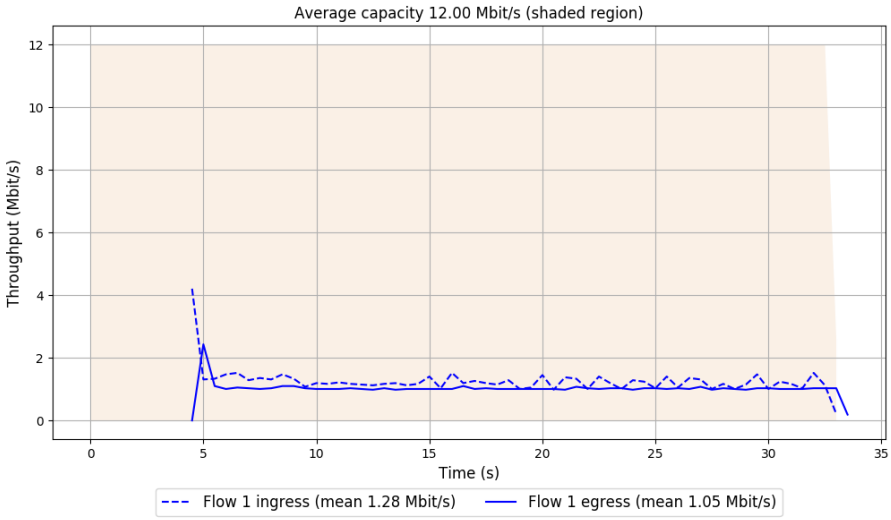


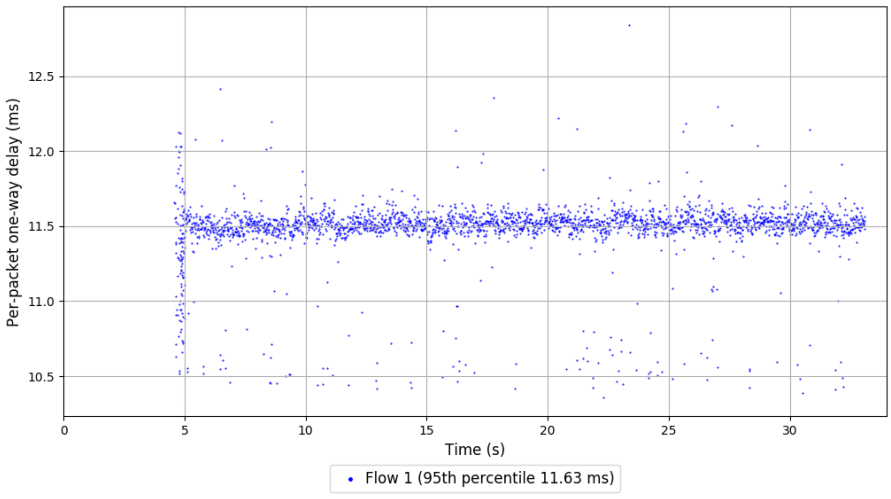
```
Run 1: Statistics of Indigo-MusesC5

Start at: 2019-01-17 08:57:13
End at: 2019-01-17 08:57:43

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.05 Mbit/s (8.7% utilization)
95th percentile per-packet one-way delay: 11.632 ms
Loss rate: 18.08%
-- Flow 1:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 11.632 ms
Loss rate: 18.08%
```

Run 1: Report of Indigo-MusesC5 — Data Link



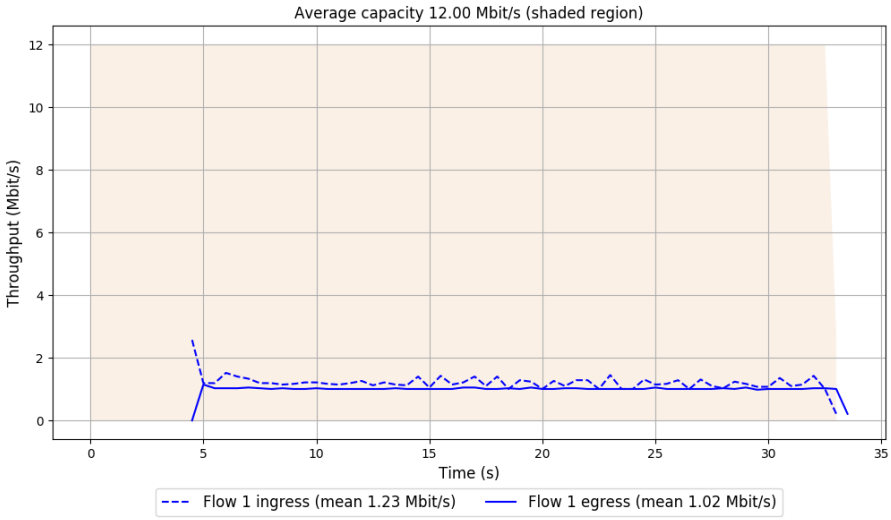


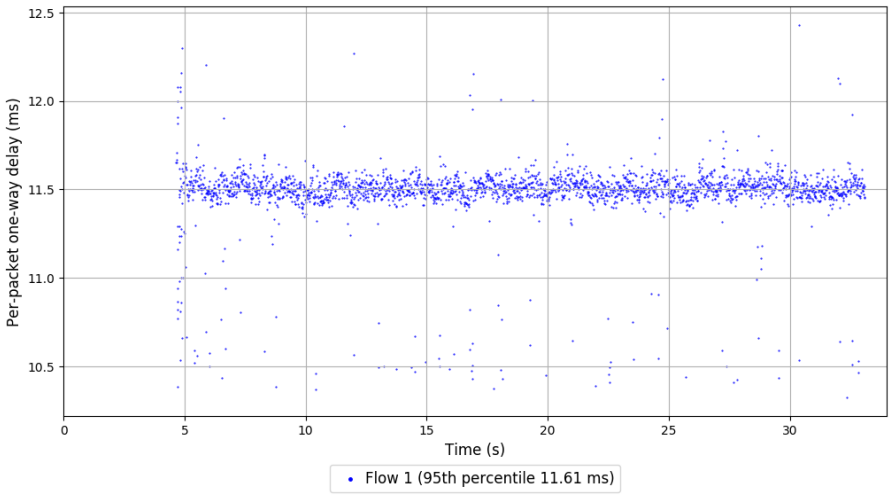
```
Run 2: Statistics of Indigo-MusesC5

Start at: 2019-01-17 09:09:36
End at: 2019-01-17 09:10:06

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.02 Mbit/s (8.5% utilization)
95th percentile per-packet one-way delay: 11.610 ms
Loss rate: 16.78%
-- Flow 1:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 11.610 ms
Loss rate: 16.78%
```

Run 2: Report of Indigo-MusesC5 — Data Link



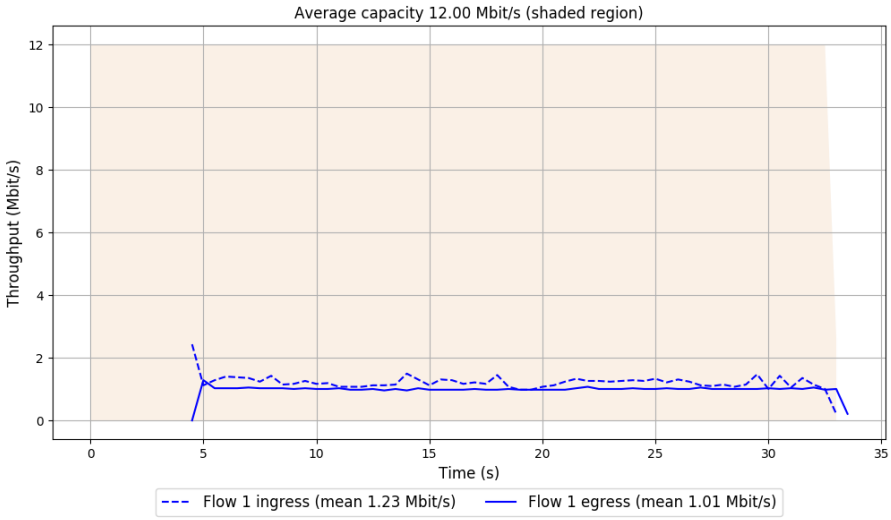


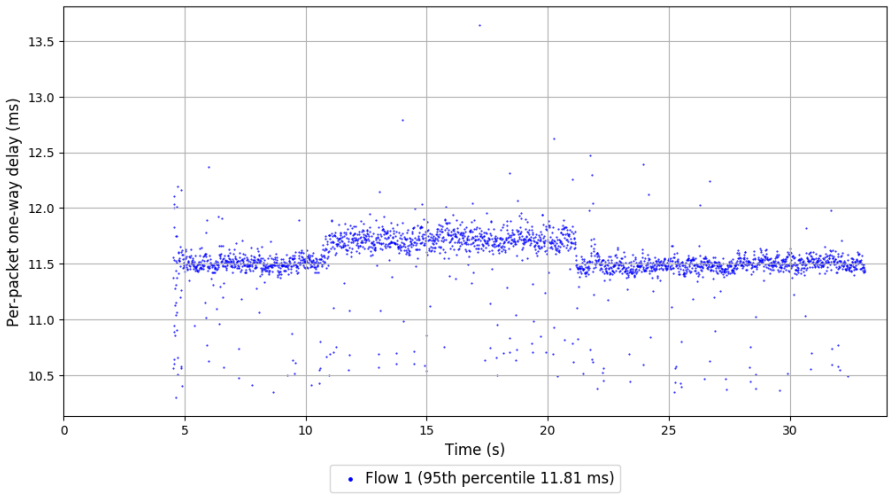
```
Run 3: Statistics of Indigo-MusesC5

Start at: 2019-01-17 09:22:05
End at: 2019-01-17 09:22:35

# Below is generated by plot.py at 2019-01-17 09:30:04
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.01 Mbit/s (8.4% utilization)
95th percentile per-packet one-way delay: 11.809 ms
Loss rate: 17.82%
-- Flow 1:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 11.809 ms
Loss rate: 17.82%
```

Run 3: Report of Indigo-MusesC5 — Data Link



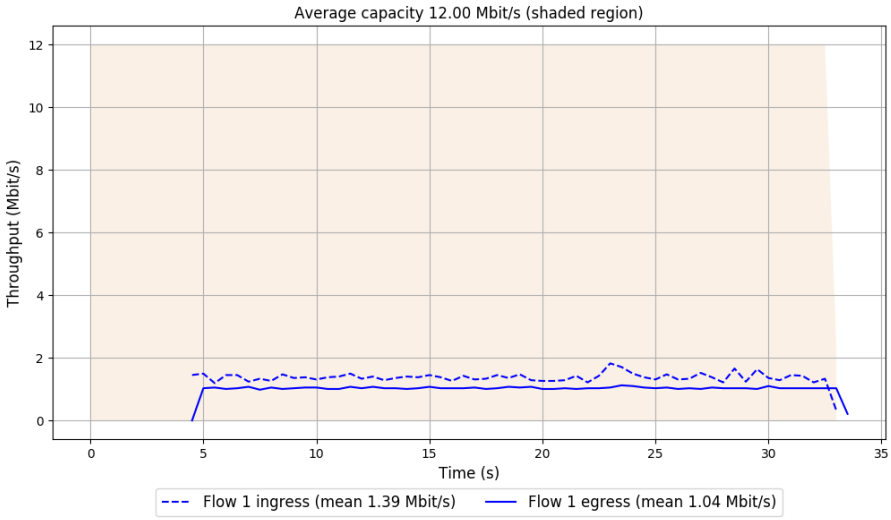


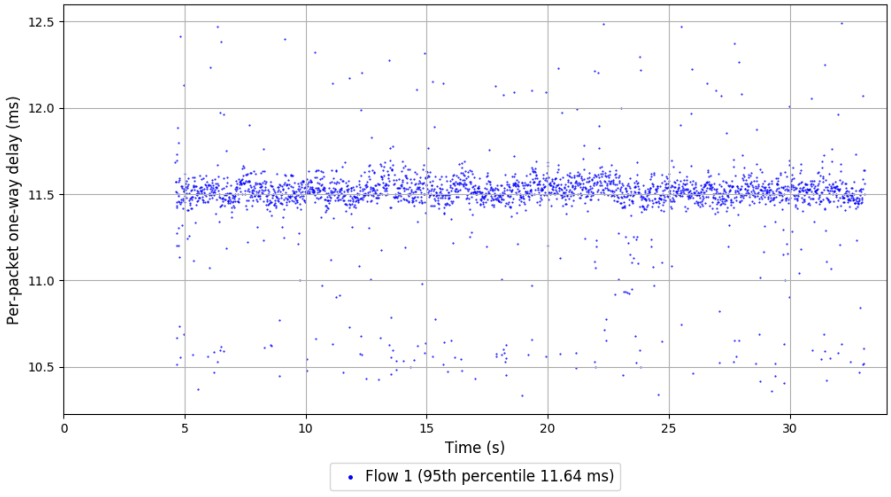
```
Run 1: Statistics of Indigo-MusesD

Start at: 2019-01-17 09:01:55
End at: 2019-01-17 09:02:25

# Below is generated by plot.py at 2019-01-17 09:30:08
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.04 Mbit/s (8.7% utilization)
95th percentile per-packet one-way delay: 11.641 ms
Loss rate: 25.26%
-- Flow 1:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 11.641 ms
Loss rate: 25.26%
```

Run 1: Report of Indigo-MusesD — Data Link



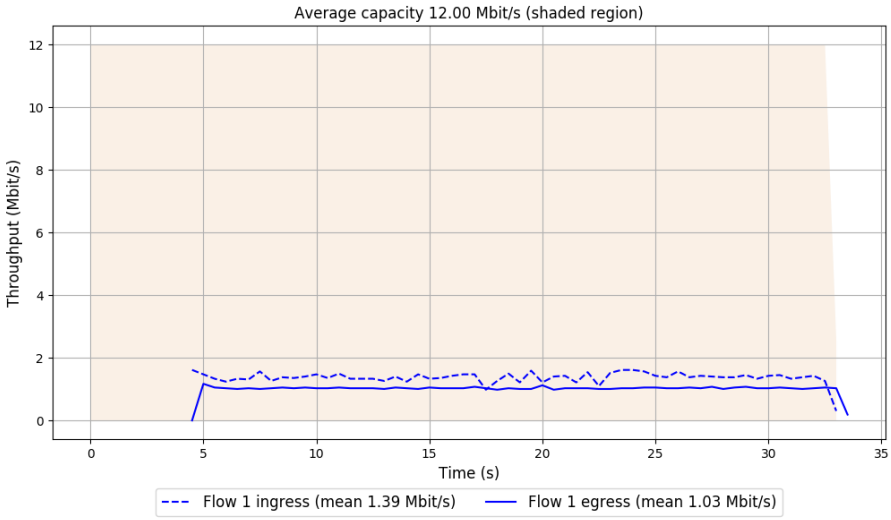


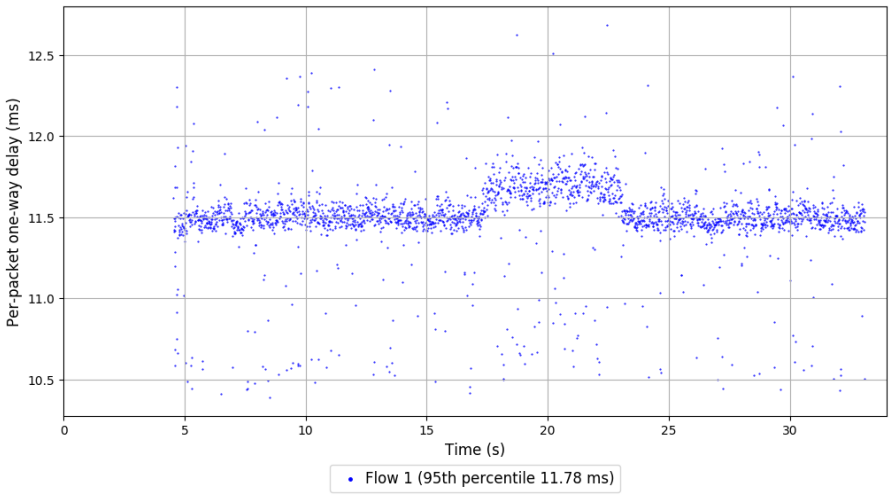
```
Run 2: Statistics of Indigo-MusesD

Start at: 2019-01-17 09:14:23
End at: 2019-01-17 09:14:53

# Below is generated by plot.py at 2019-01-17 09:30:09
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.03 Mbit/s (8.6% utilization)
95th percentile per-packet one-way delay: 11.776 ms
Loss rate: 25.59%
-- Flow 1:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 11.776 ms
Loss rate: 25.59%
```

Run 2: Report of Indigo-MusesD — Data Link



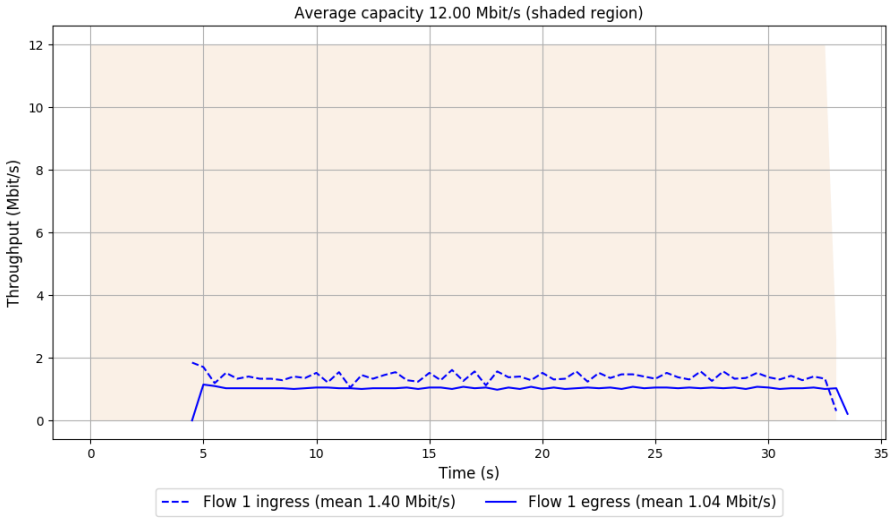


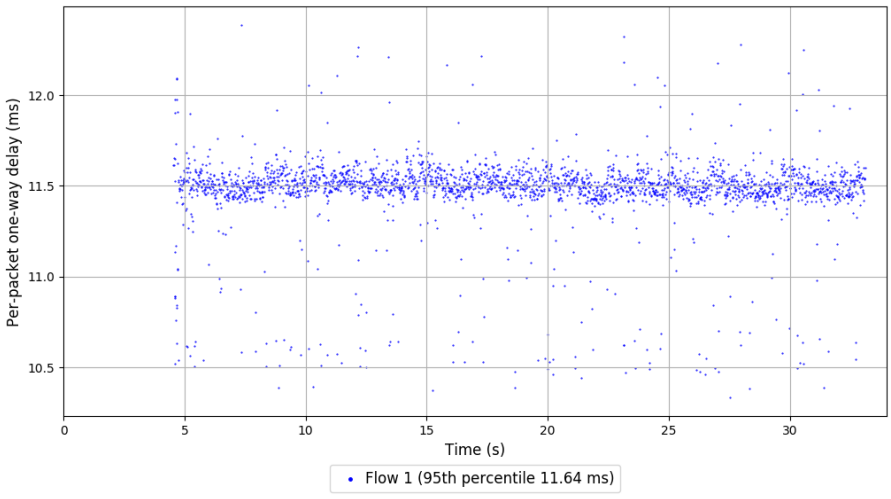
```
Run 3: Statistics of Indigo-MusesD

Start at: 2019-01-17 09:26:51
End at: 2019-01-17 09:27:21

# Below is generated by plot.py at 2019-01-17 09:30:09
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.04 Mbit/s (8.6% utilization)
95th percentile per-packet one-way delay: 11.636 ms
Loss rate: 25.97%
-- Flow 1:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 11.636 ms
Loss rate: 25.97%
```

Run 3: Report of Indigo-MusesD — Data Link



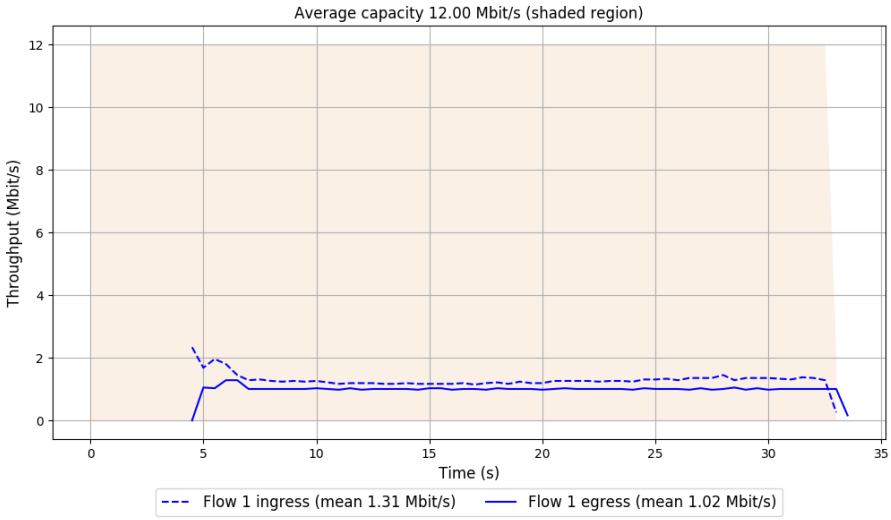


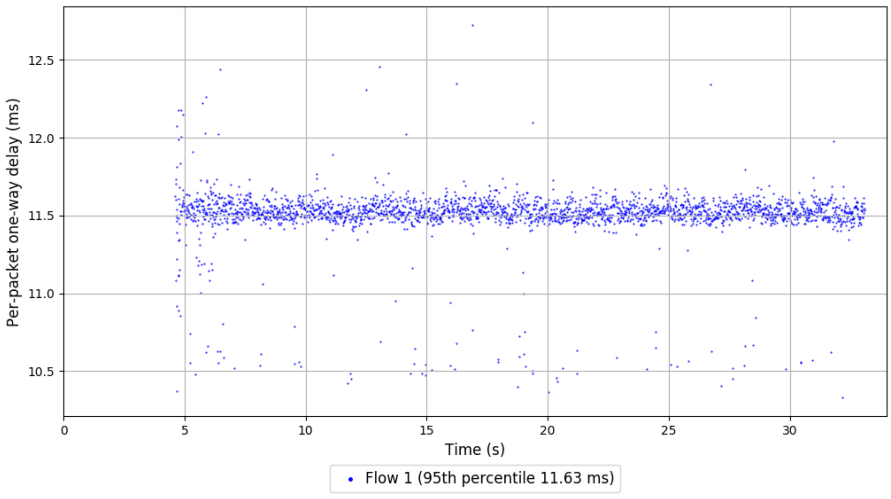
```
Run 1: Statistics of Indigo-MusesT

Start at: 2019-01-17 08:58:23
End at: 2019-01-17 08:58:53

# Below is generated by plot.py at 2019-01-17 09:30:09
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.02 Mbit/s (8.5% utilization)
95th percentile per-packet one-way delay: 11.631 ms
Loss rate: 22.42%
-- Flow 1:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 11.631 ms
Loss rate: 22.42%
```

Run 1: Report of Indigo-MusesT — Data Link



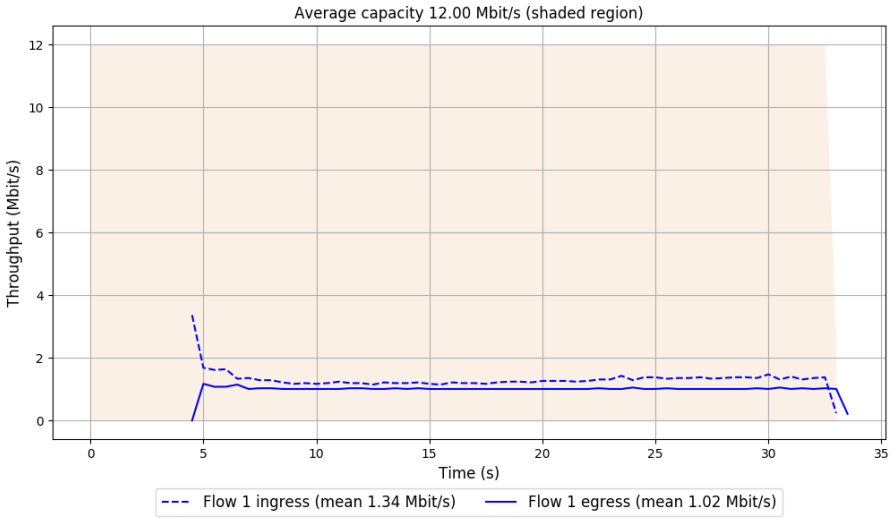


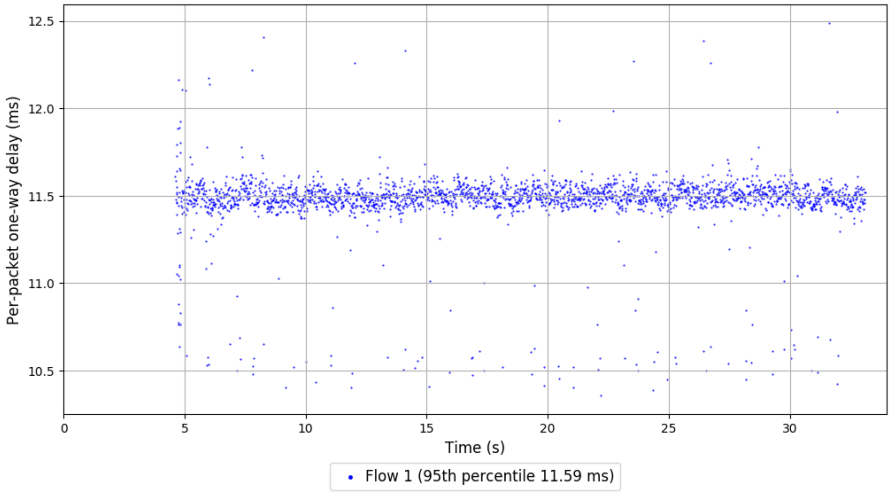
```
Run 2: Statistics of Indigo-MusesT

Start at: 2019-01-17 09:10:46
End at: 2019-01-17 09:11:16

# Below is generated by plot.py at 2019-01-17 09:30:10
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.02 Mbit/s (8.5% utilization)
95th percentile per-packet one-way delay: 11.594 ms
Loss rate: 23.43%
-- Flow 1:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 11.594 ms
Loss rate: 23.43%
```

Run 2: Report of Indigo-MusesT — Data Link



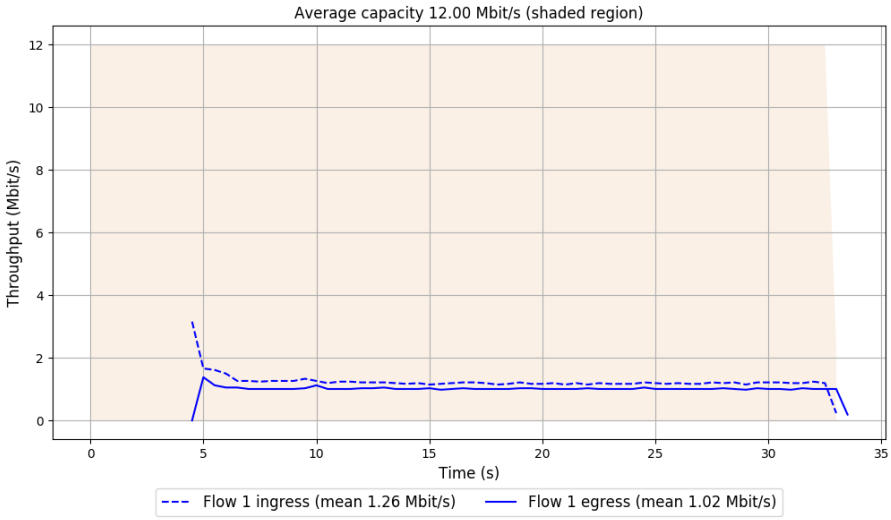


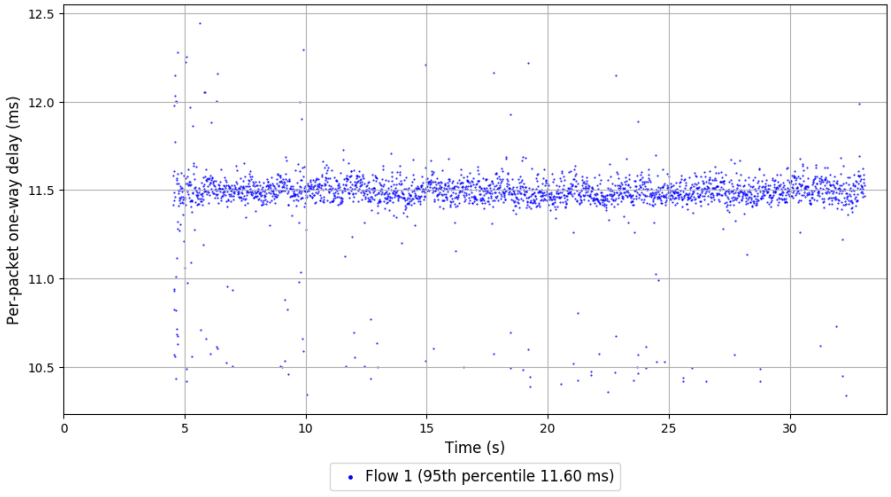
```
Run 3: Statistics of Indigo-MusesT

Start at: 2019-01-17 09:23:15
End at: 2019-01-17 09:23:45

# Below is generated by plot.py at 2019-01-17 09:30:12
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 1.02 Mbit/s (8.5% utilization)
95th percentile per-packet one-way delay: 11.597 ms
Loss rate: 18.67%
-- Flow 1:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 11.597 ms
Loss rate: 18.67%
```

Run 3: Report of Indigo-MusesT — Data Link



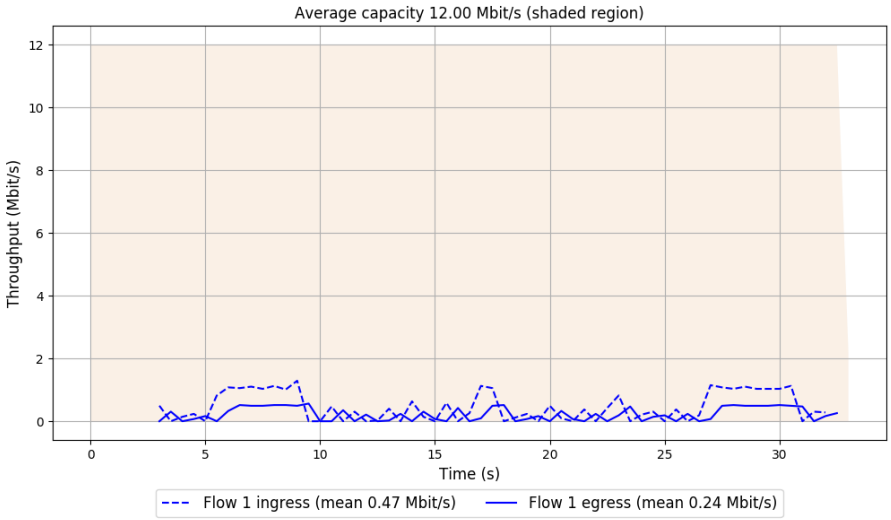


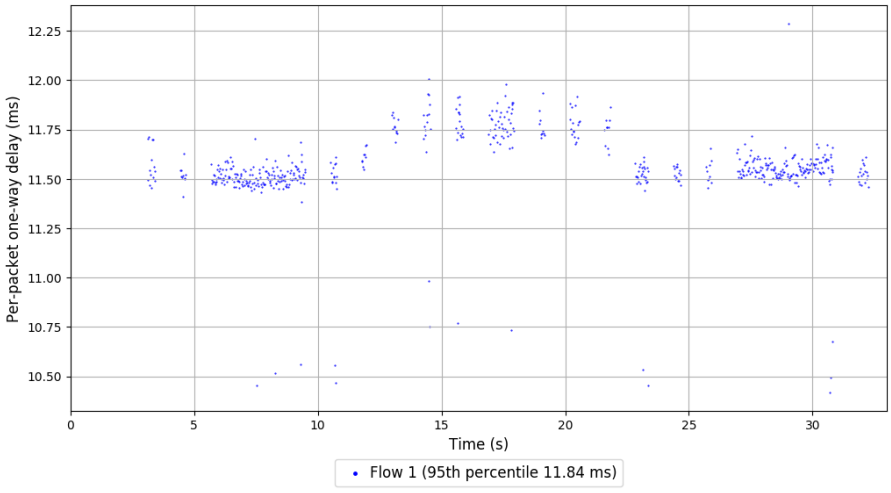
```
Run 1: Statistics of LEDBAT

Start at: 2019-01-17 09:01:20
End at: 2019-01-17 09:01:50

# Below is generated by plot.py at 2019-01-17 09:30:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.24 Mbit/s (2.0% utilization)
95th percentile per-packet one-way delay: 11.835 ms
Loss rate: 49.52%
-- Flow 1:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 11.835 ms
Loss rate: 49.52%
```

Run 1: Report of LEDBAT — Data Link



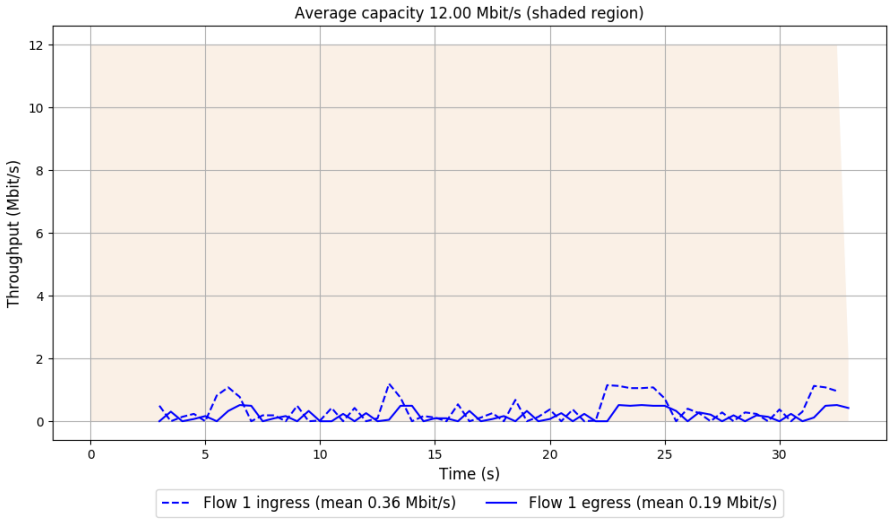


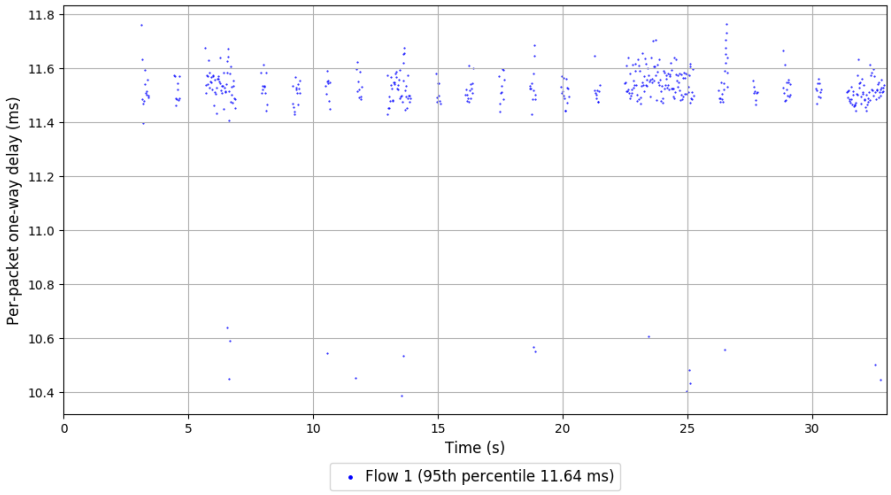
```
Run 2: Statistics of LEDBAT

Start at: 2019-01-17 09:13:48
End at: 2019-01-17 09:14:18

# Below is generated by plot.py at 2019-01-17 09:30:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.19 Mbit/s (1.6% utilization)
95th percentile per-packet one-way delay: 11.636 ms
Loss rate: 47.88%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 11.636 ms
Loss rate: 47.88%
```

Run 2: Report of LEDBAT — Data Link



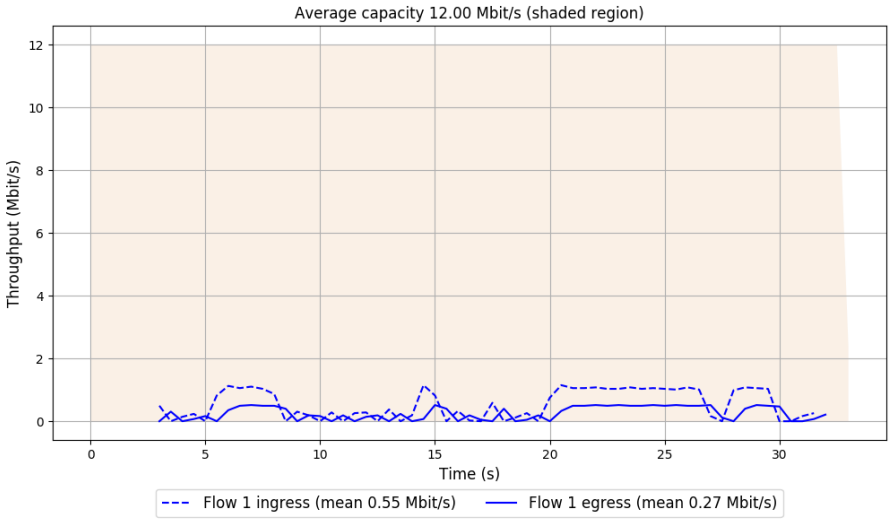


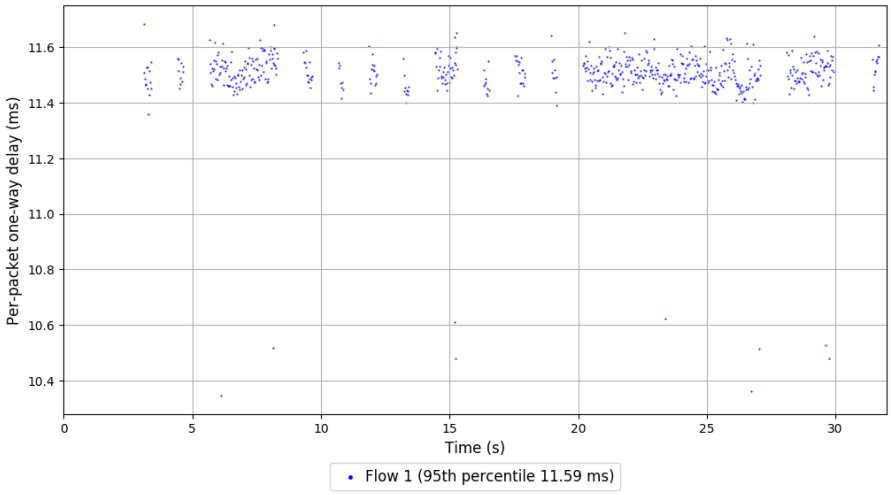
```
Run 3: Statistics of LEDBAT

Start at: 2019-01-17 09:26:16
End at: 2019-01-17 09:26:46

# Below is generated by plot.py at 2019-01-17 09:30:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.27 Mbit/s (2.2% utilization)
95th percentile per-packet one-way delay: 11.594 ms
Loss rate: 50.79%
-- Flow 1:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 11.594 ms
Loss rate: 50.79%
```

Run 3: Report of LEDBAT — Data Link



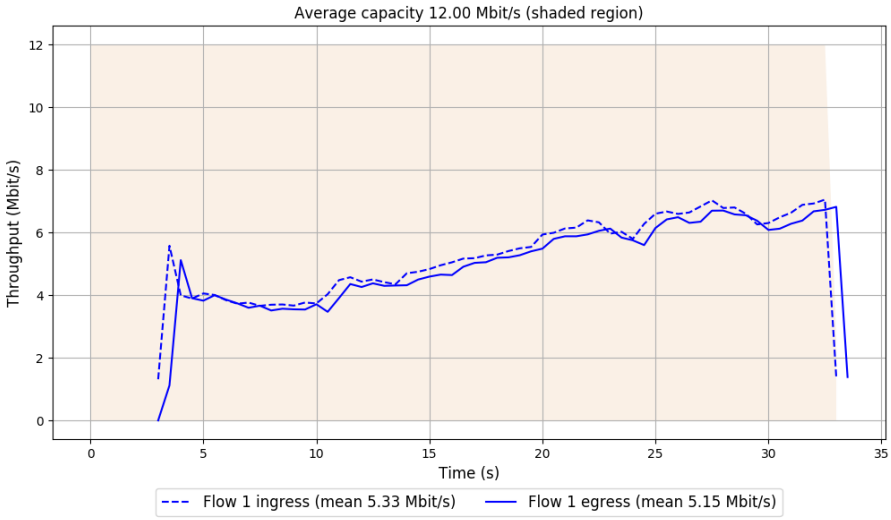


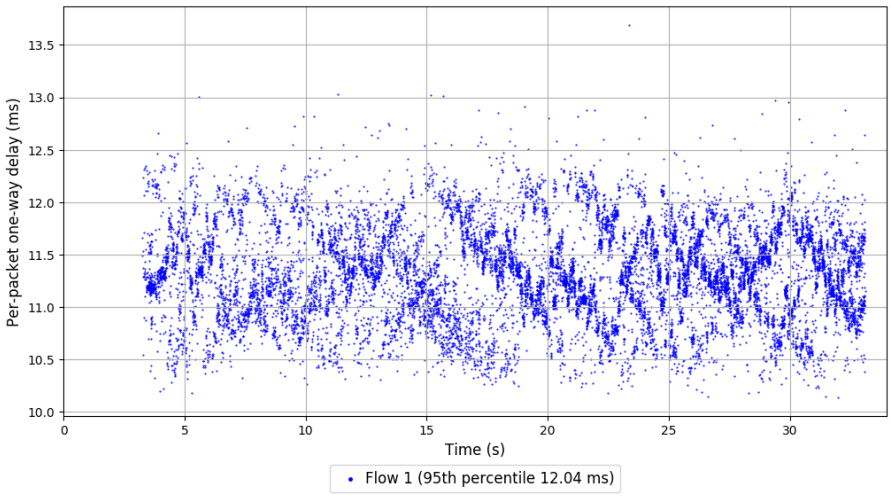
```
Run 1: Statistics of PCC-Allegro

Start at: 2019-01-17 09:00:10
End at: 2019-01-17 09:00:40

# Below is generated by plot.py at 2019-01-17 09:30:21
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.15 Mbit/s (42.9% utilization)
95th percentile per-packet one-way delay: 12.043 ms
Loss rate: 3.27%
-- Flow 1:
Average throughput: 5.15 Mbit/s
95th percentile per-packet one-way delay: 12.043 ms
Loss rate: 3.27%
```

Run 1: Report of PCC-Allegro — Data Link



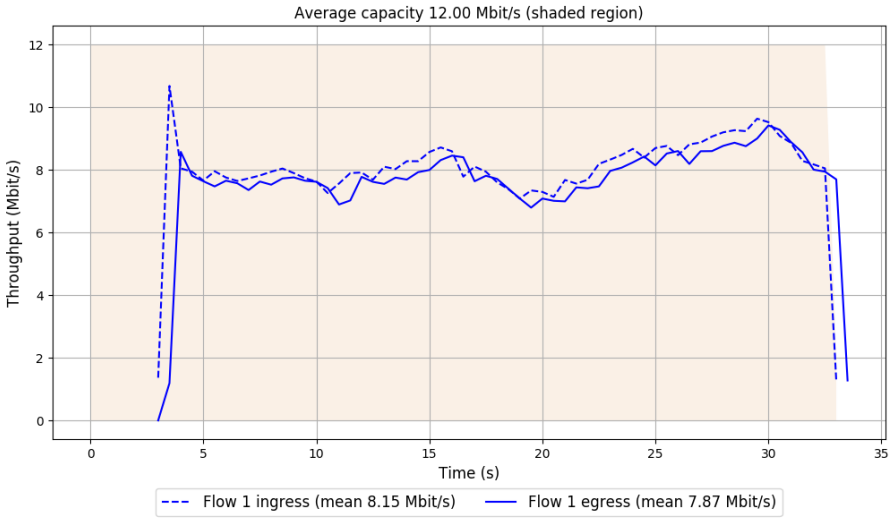


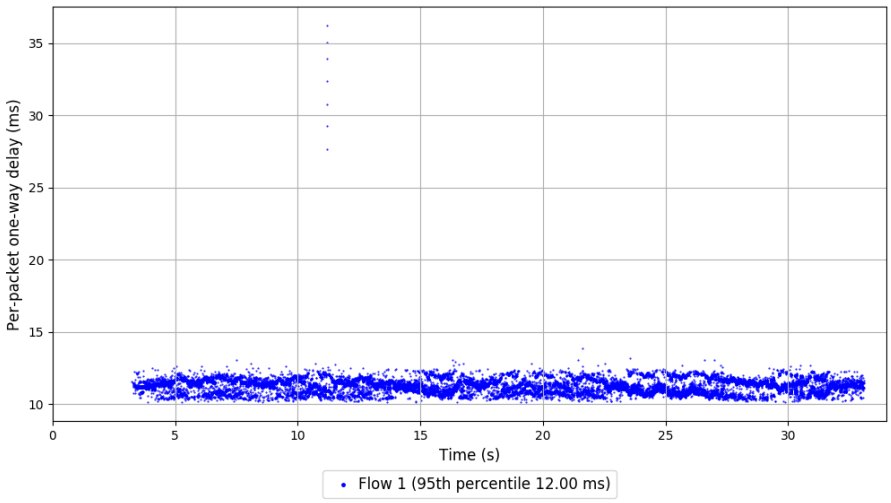
```
Run 2: Statistics of PCC-Allegro

Start at: 2019-01-17 09:12:38
End at: 2019-01-17 09:13:08

# Below is generated by plot.py at 2019-01-17 09:30:27
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 7.87 Mbit/s (65.5% utilization)
95th percentile per-packet one-way delay: 12.000 ms
Loss rate: 3.49%
-- Flow 1:
Average throughput: 7.87 Mbit/s
95th percentile per-packet one-way delay: 12.000 ms
Loss rate: 3.49%
```

Run 2: Report of PCC-Allegro — Data Link



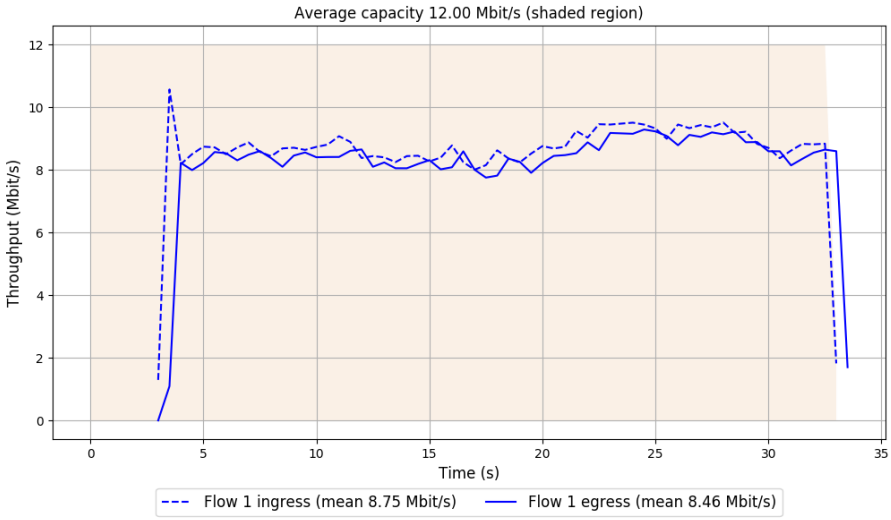


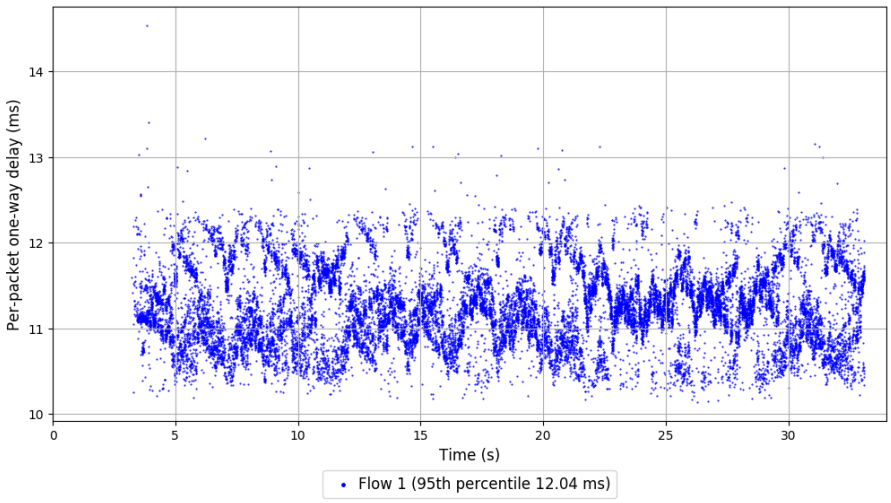
```
Run 3: Statistics of PCC-Allegro

Start at: 2019-01-17 09:25:05
End at: 2019-01-17 09:25:35

# Below is generated by plot.py at 2019-01-17 09:30:28
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 8.46 Mbit/s (70.5% utilization)
95th percentile per-packet one-way delay: 12.042 ms
Loss rate: 3.36%
-- Flow 1:
Average throughput: 8.46 Mbit/s
95th percentile per-packet one-way delay: 12.042 ms
Loss rate: 3.36%
```

Run 3: Report of PCC-Allegro — Data Link

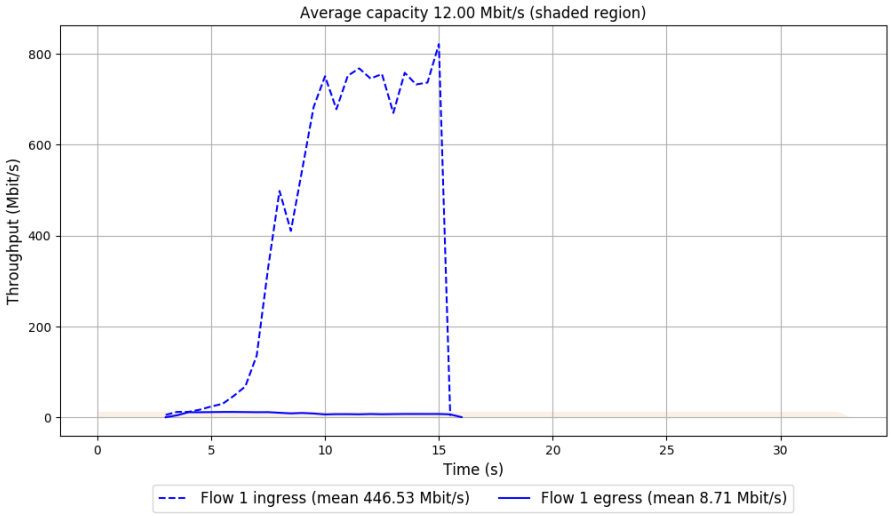


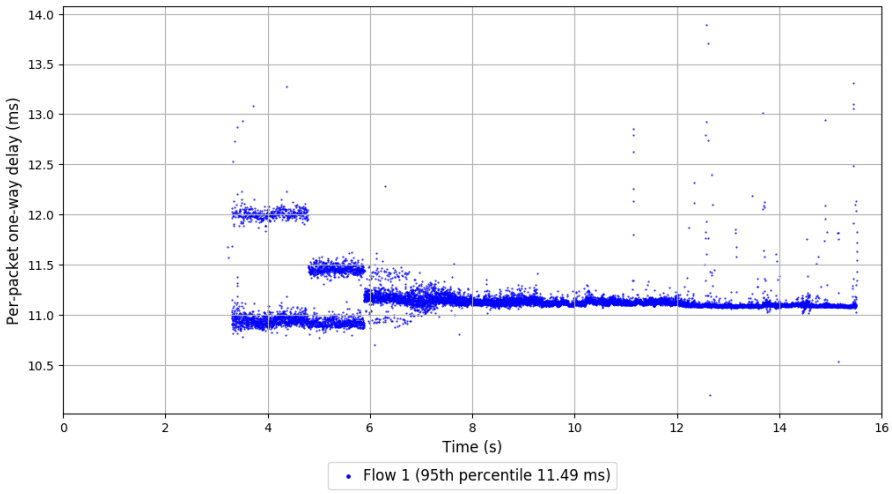


```
Run 1: Statistics of PCC-Expr

Start at: 2019-01-17 09:03:40
End at: 2019-01-17 09:04:10
```

Run 1: Report of PCC-Expr — Data Link

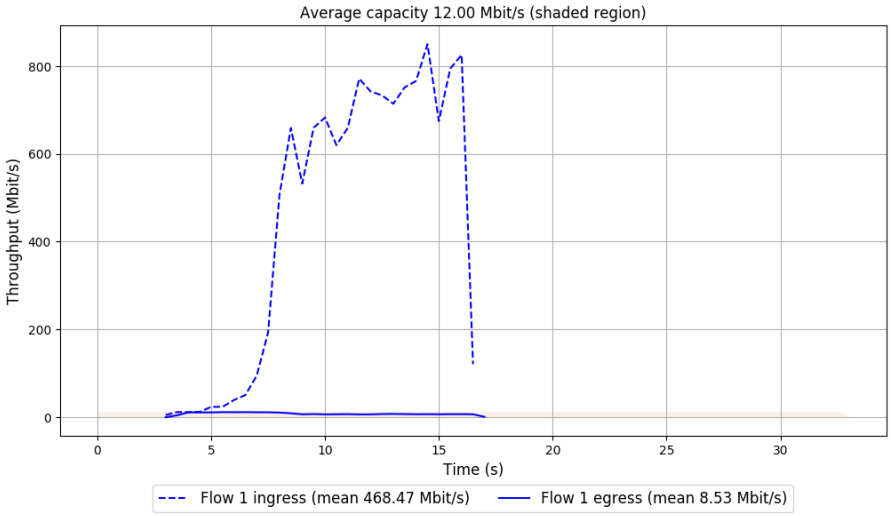


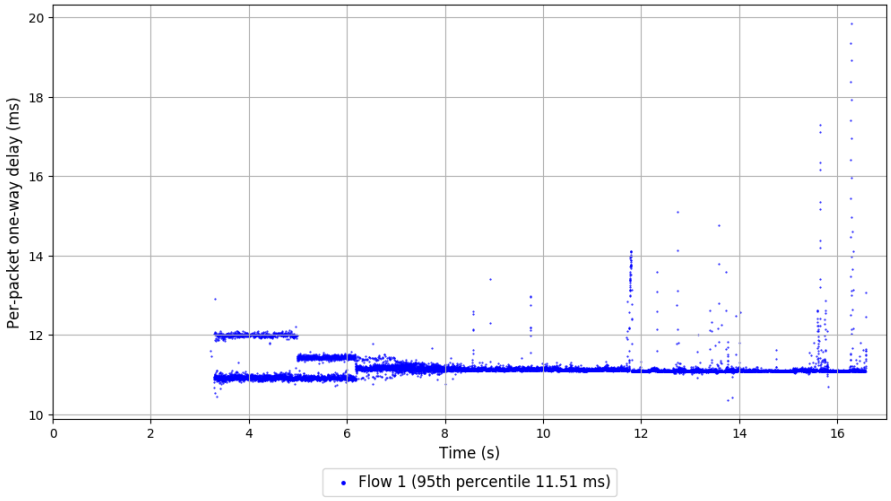


```
Run 2: Statistics of PCC-Expr

Start at: 2019-01-17 09:16:08
End at: 2019-01-17 09:16:38
```

Run 2: Report of PCC-Expr — Data Link

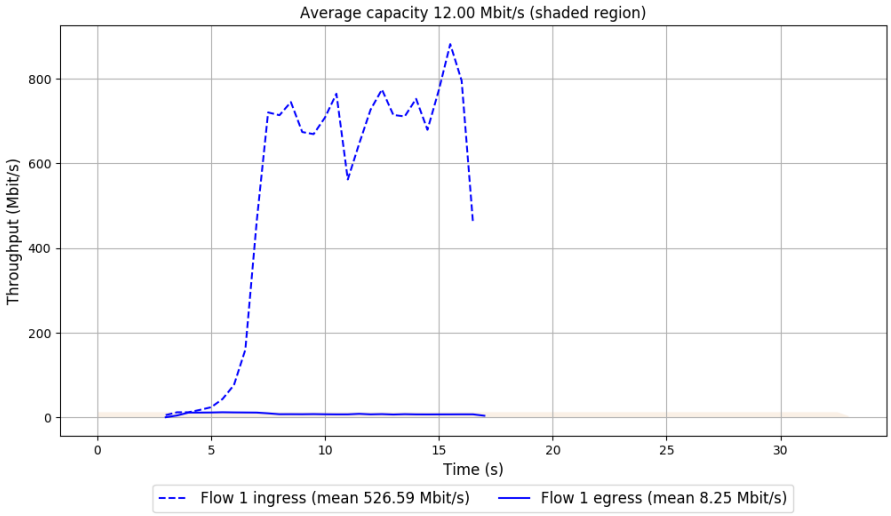


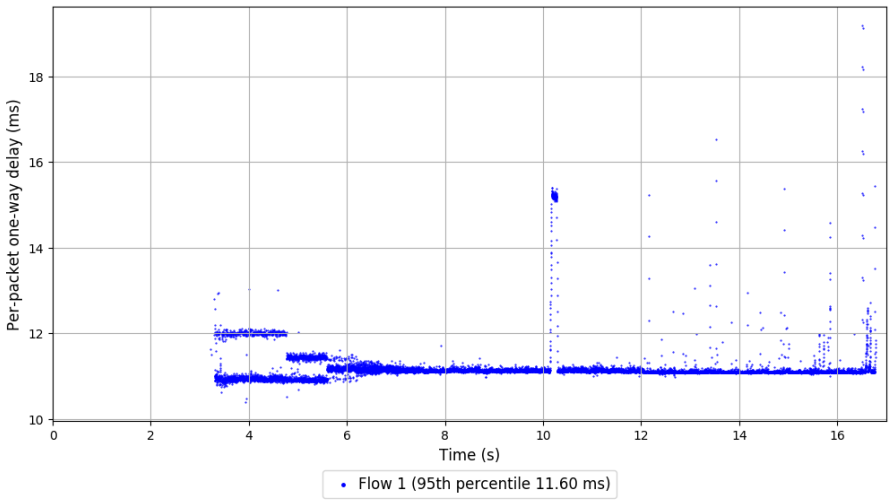


```
Run 3: Statistics of PCC-Expr

Start at: 2019-01-17 09:28:35
End at: 2019-01-17 09:29:05
```

Run 3: Report of PCC-Expr — Data Link



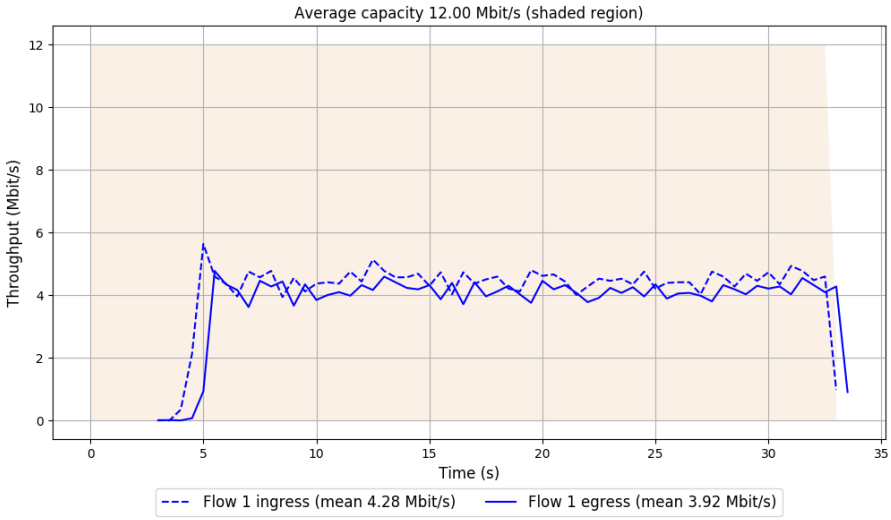


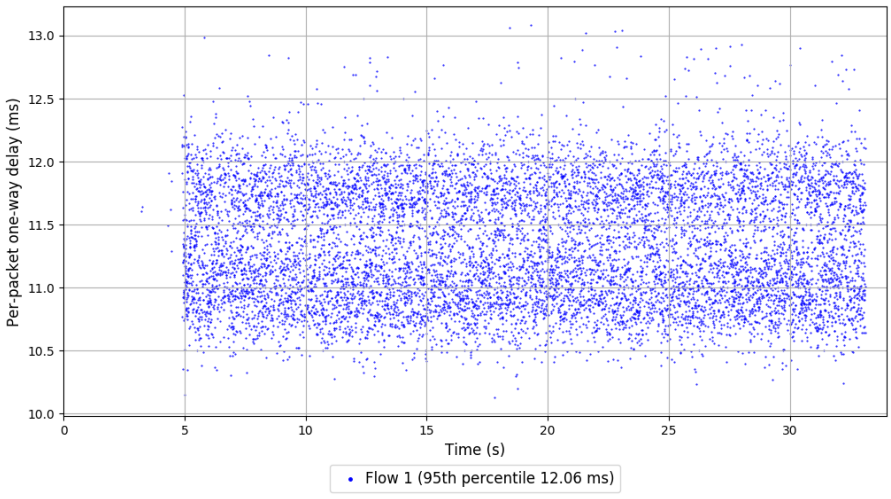
```
Run 1: Statistics of QUIC Cubic

Start at: 2019-01-17 08:51:56
End at: 2019-01-17 08:52:26

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.92 Mbit/s (32.7% utilization)
95th percentile per-packet one-way delay: 12.065 ms
Loss rate: 8.27%
-- Flow 1:
Average throughput: 3.92 Mbit/s
95th percentile per-packet one-way delay: 12.065 ms
Loss rate: 8.27%
```

Run 1: Report of QUIC Cubic — Data Link



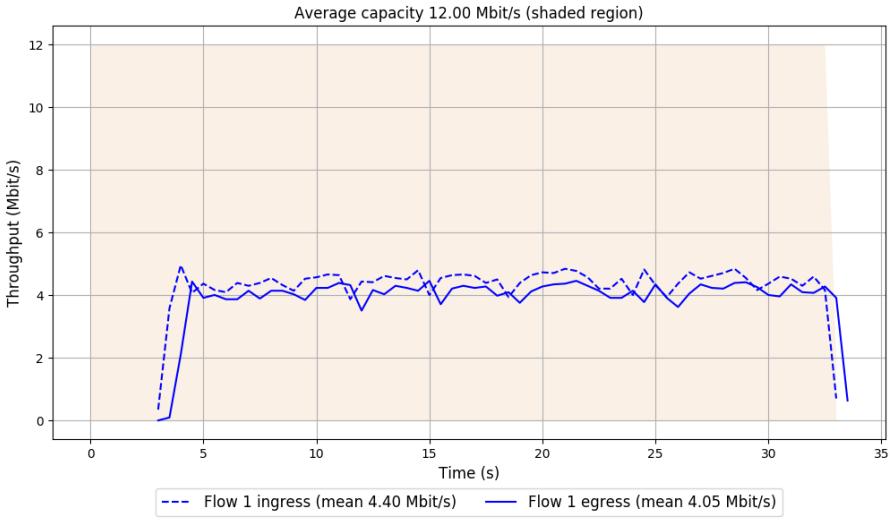


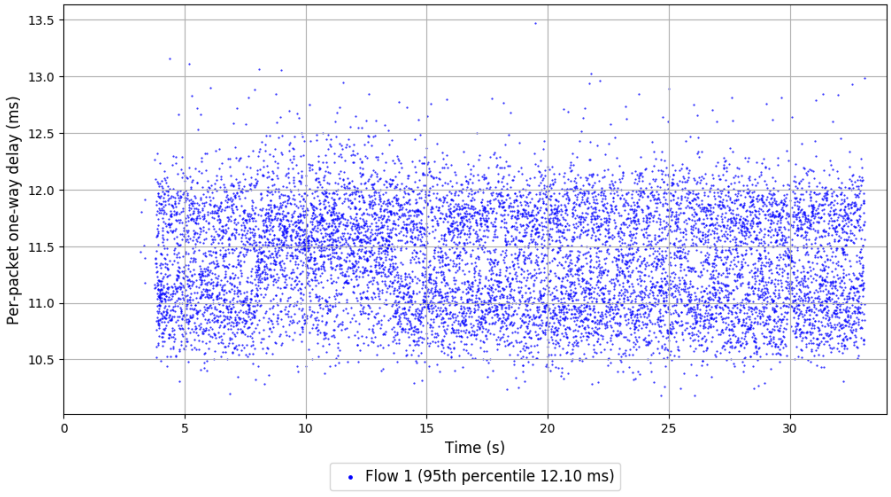
```
Run 2: Statistics of QUIC Cubic

Start at: 2019-01-17 09:04:20
End at: 2019-01-17 09:04:51

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.05 Mbit/s (33.7% utilization)
95th percentile per-packet one-way delay: 12.104 ms
Loss rate: 8.02%
-- Flow 1:
Average throughput: 4.05 Mbit/s
95th percentile per-packet one-way delay: 12.104 ms
Loss rate: 8.02%
```

Run 2: Report of QUIC Cubic — Data Link



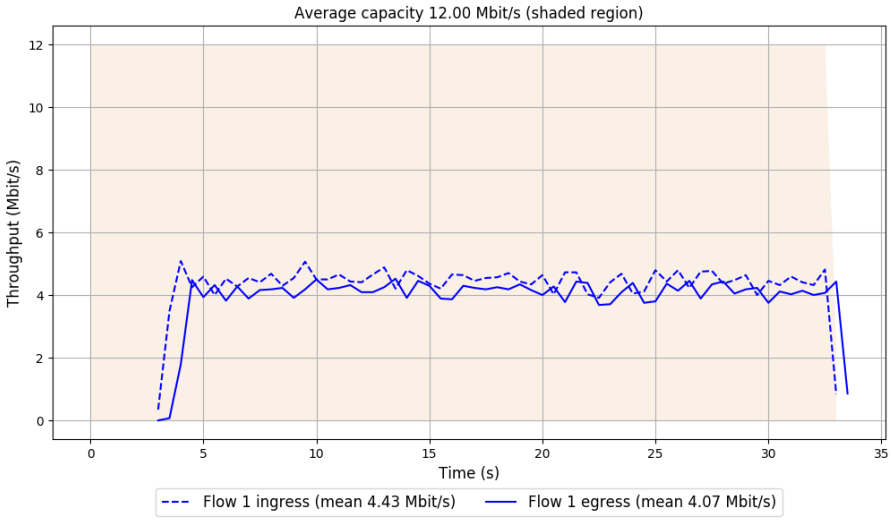


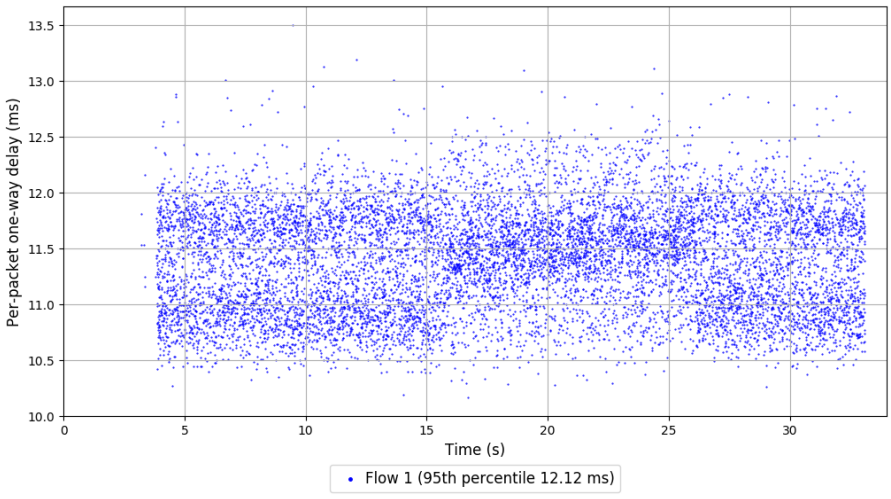
```
Run 3: Statistics of QUIC Cubic

Start at: 2019-01-17 09:16:49
End at: 2019-01-17 09:17:19

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.07 Mbit/s (33.9% utilization)
95th percentile per-packet one-way delay: 12.116 ms
Loss rate: 8.19%
-- Flow 1:
Average throughput: 4.07 Mbit/s
95th percentile per-packet one-way delay: 12.116 ms
Loss rate: 8.19%
```

Run 3: Report of QUIC Cubic — Data Link



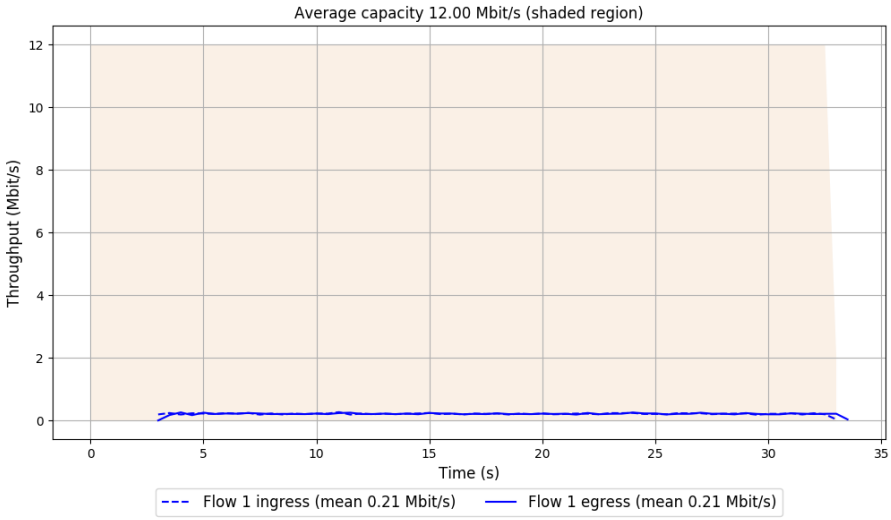


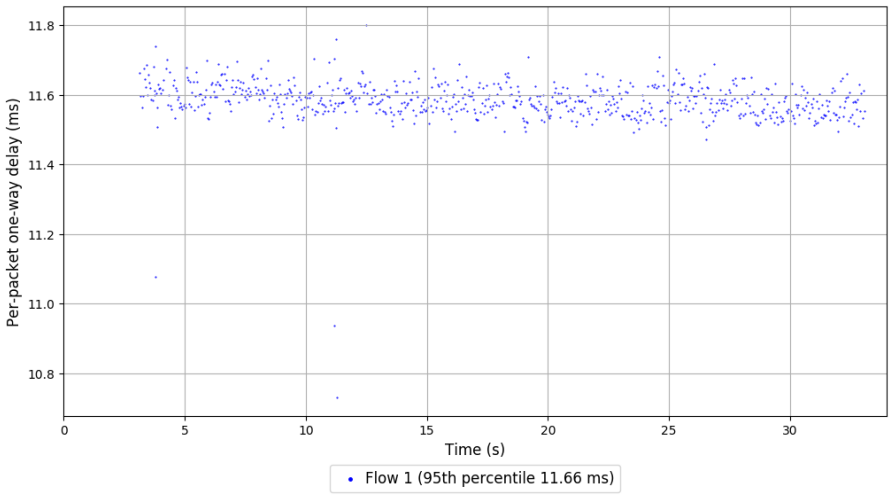
```
Run 1: Statistics of SCReAM

Start at: 2019-01-17 09:03:05
End at: 2019-01-17 09:03:35

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.21 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 11.660 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 11.660 ms
Loss rate: 0.00%
```

Run 1: Report of SCReAM — Data Link



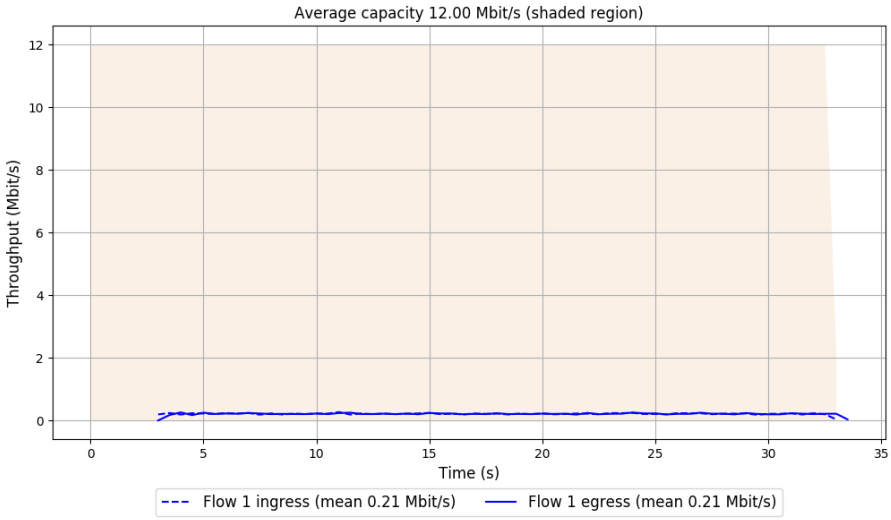


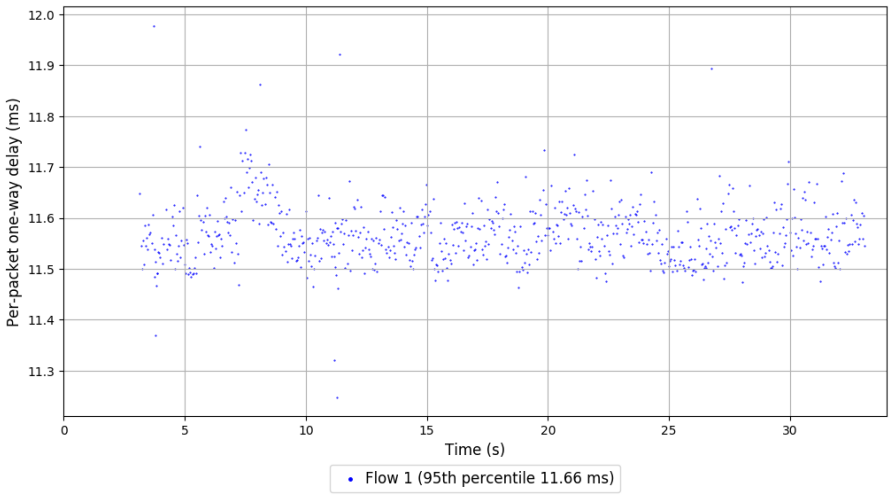
```
Run 2: Statistics of SCReAM

Start at: 2019-01-17 09:15:33
End at: 2019-01-17 09:16:03

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.21 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 11.665 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 11.665 ms
Loss rate: 0.00%
```

Run 2: Report of SCReAM — Data Link



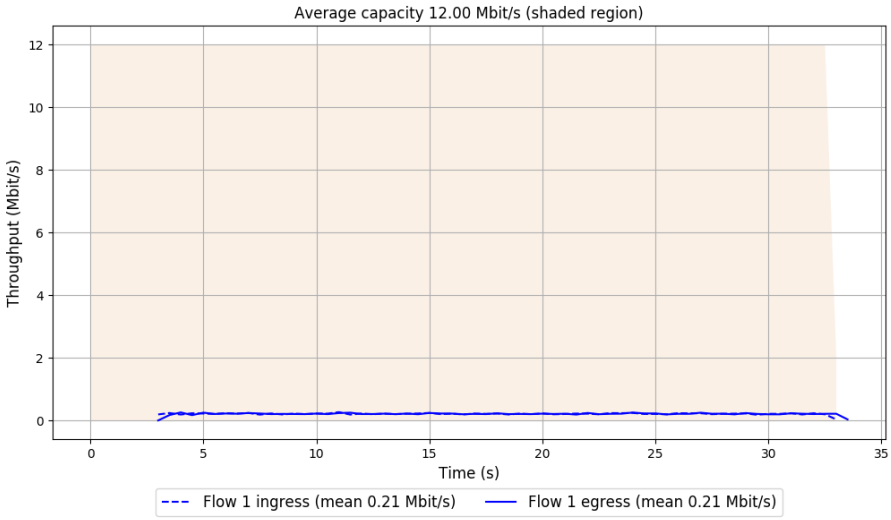


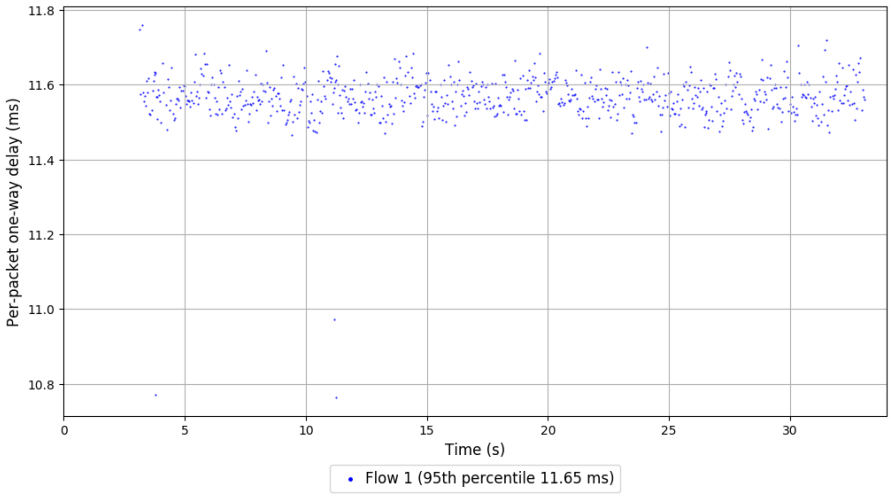
```
Run 3: Statistics of SCReAM

Start at: 2019-01-17 09:28:00
End at: 2019-01-17 09:28:30

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.21 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 11.647 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 11.647 ms
Loss rate: 0.00%
```

Run 3: Report of SCReAM — Data Link



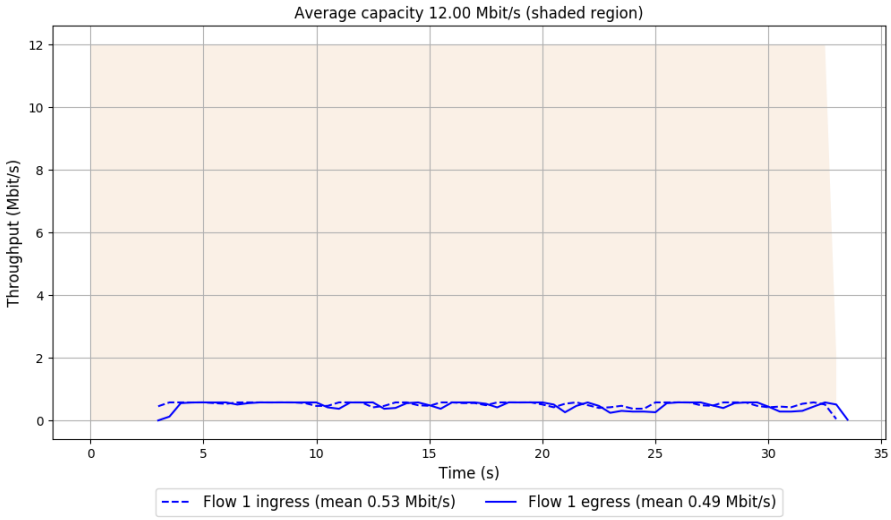


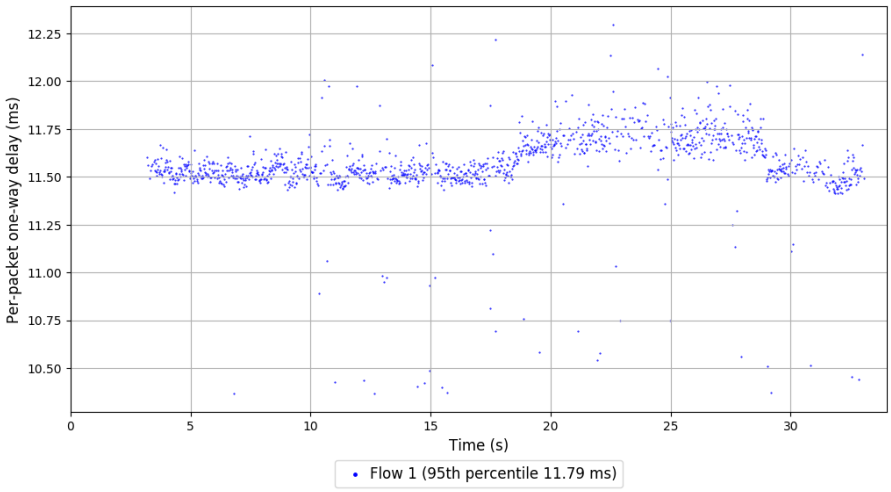
```
Run 1: Statistics of Sprout

Start at: 2019-01-17 08:56:03
End at: 2019-01-17 08:56:33

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.49 Mbit/s (4.1% utilization)
95th percentile per-packet one-way delay: 11.795 ms
Loss rate: 7.52%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 11.795 ms
Loss rate: 7.52%
```

Run 1: Report of Sprout — Data Link



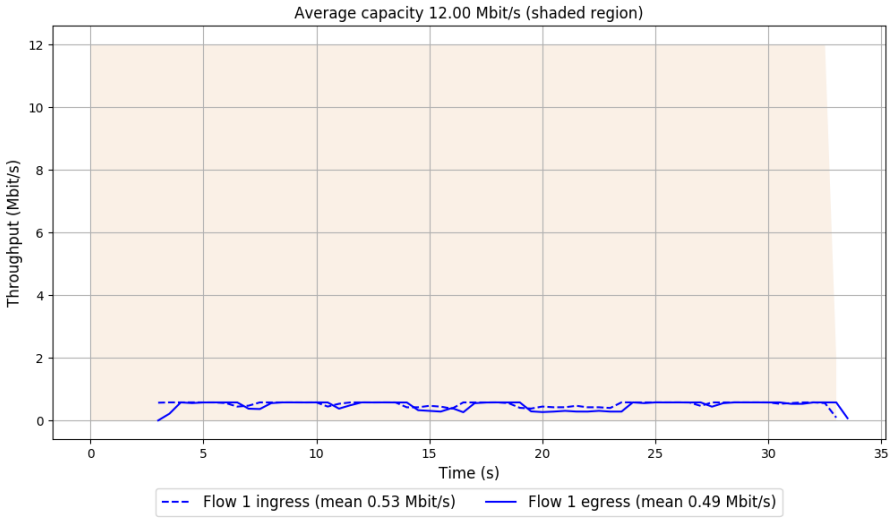


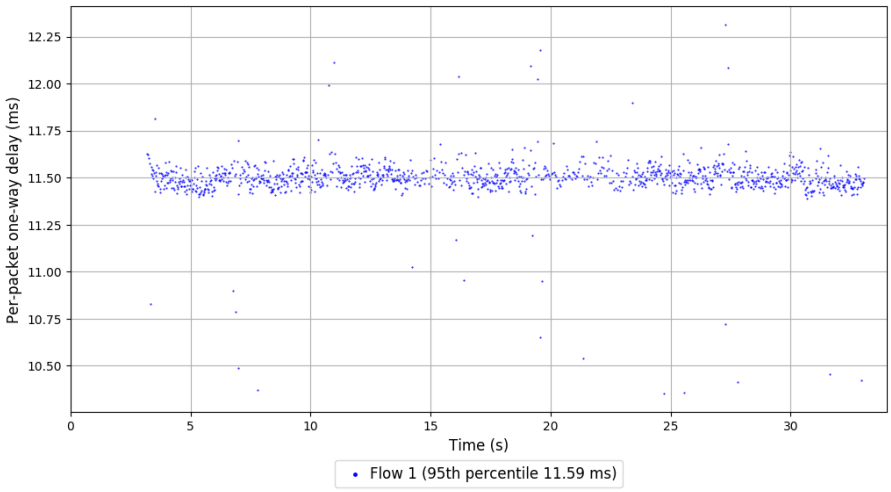
```
Run 2: Statistics of Sprout

Start at: 2019-01-17 09:08:26
End at: 2019-01-17 09:08:56

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.49 Mbit/s (4.1% utilization)
95th percentile per-packet one-way delay: 11.592 ms
Loss rate: 7.85%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 11.592 ms
Loss rate: 7.85%
```

Run 2: Report of Sprout — Data Link



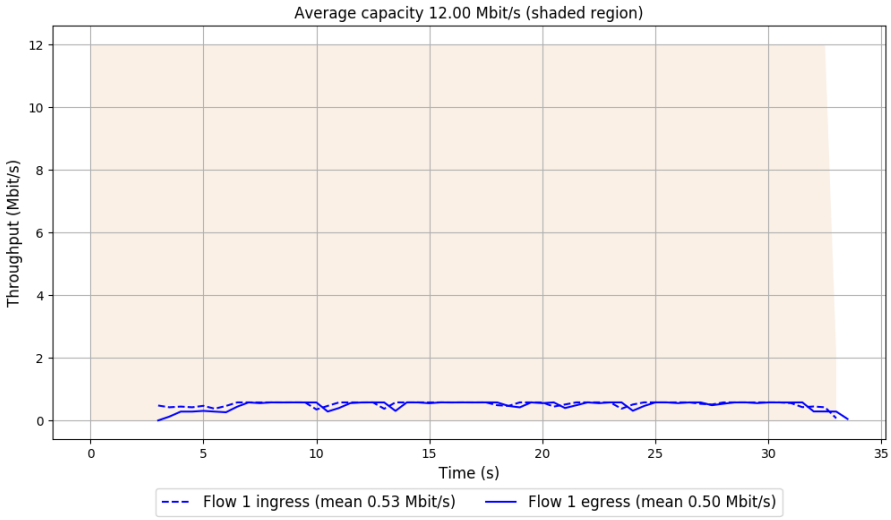


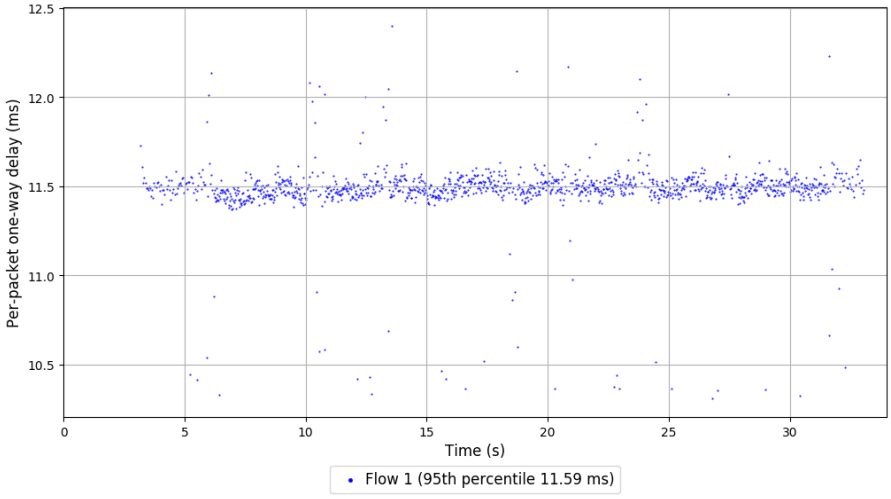
```
Run 3: Statistics of Sprout

Start at: 2019-01-17 09:20:55
End at: 2019-01-17 09:21:25

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.50 Mbit/s (4.1% utilization)
95th percentile per-packet one-way delay: 11.592 ms
Loss rate: 6.79%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 11.592 ms
Loss rate: 6.79%
```

Run 3: Report of Sprout — Data Link



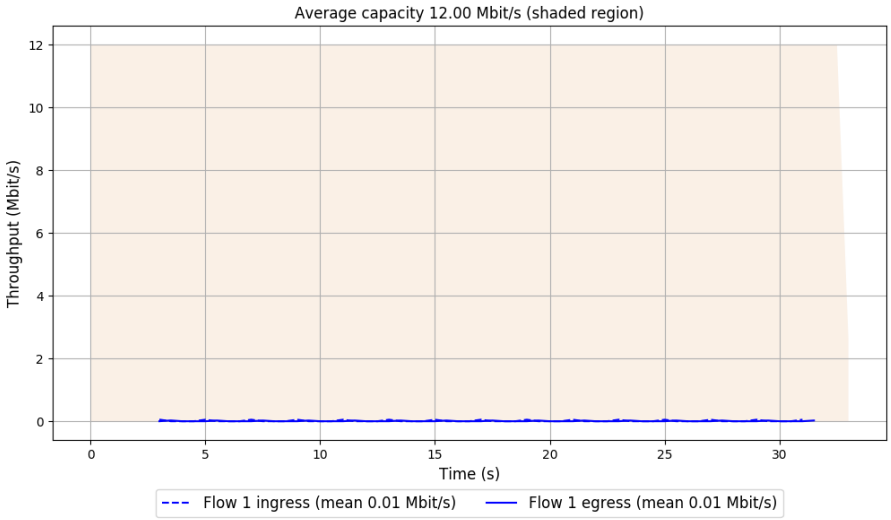


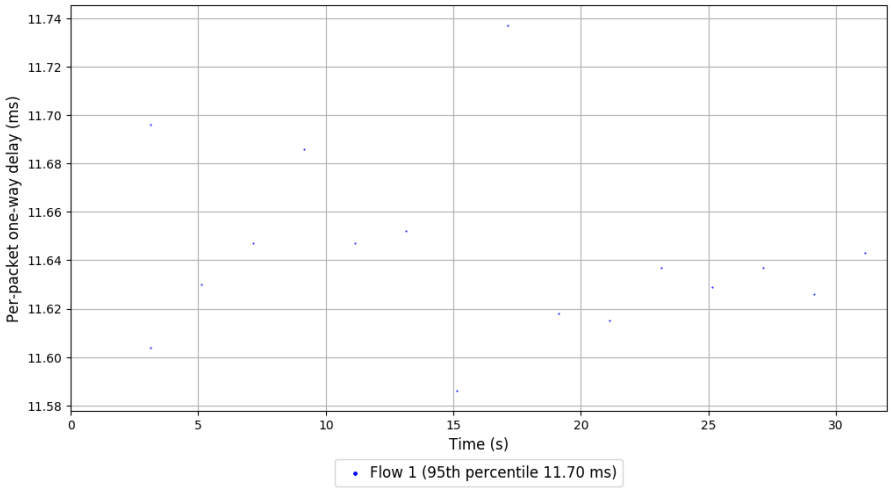
```
Run 1: Statistics of TaoVA-100x

Start at: 2019-01-17 08:52:31
End at: 2019-01-17 08:53:01

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.1% utilization)
95th percentile per-packet one-way delay: 11.696 ms
Loss rate: 51.91%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 11.696 ms
Loss rate: 51.91%
```

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



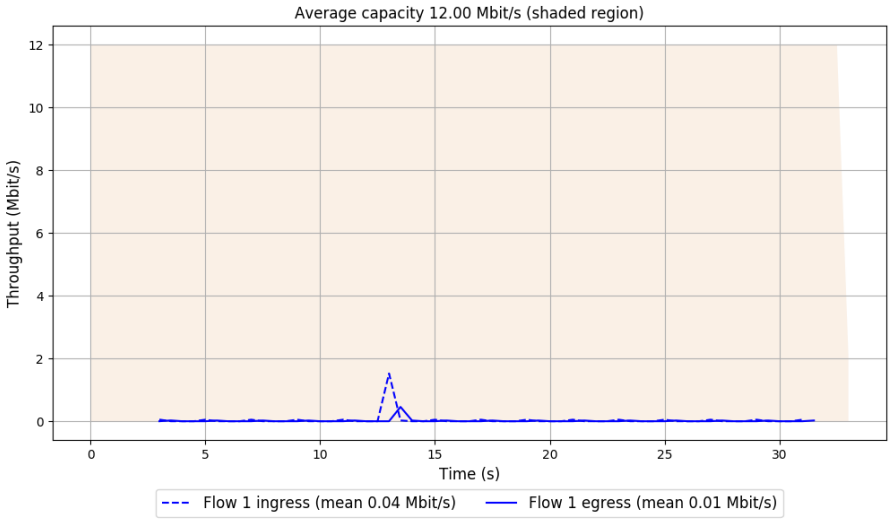


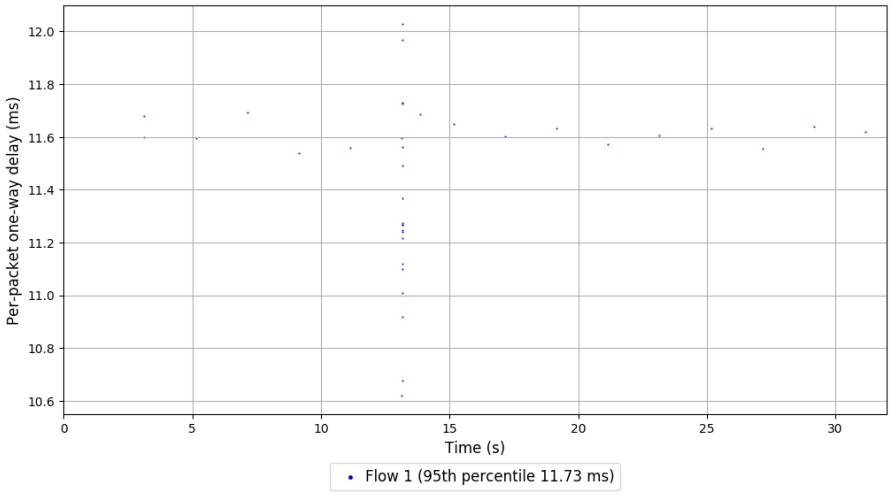
```
Run 2: Statistics of TaoVA-100x

Start at: 2019-01-17 09:04:56
End at: 2019-01-17 09:05:26

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.01 Mbit/s (0.1% utilization)
95th percentile per-packet one-way delay: 11.731 ms
Loss rate: 63.67%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 11.731 ms
Loss rate: 63.67%
```

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

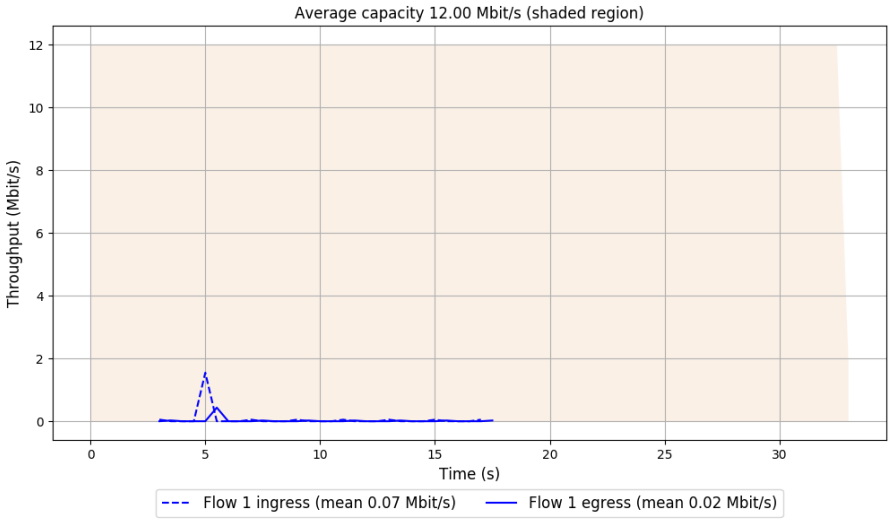


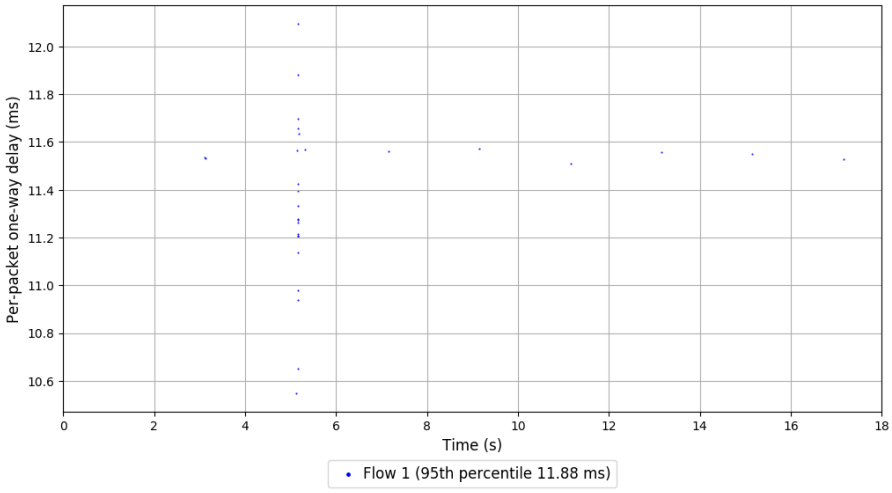


```
Run 3: Statistics of TaoVA-100x

Start at: 2019-01-17 09:17:24
End at: 2019-01-17 09:17:54
```

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



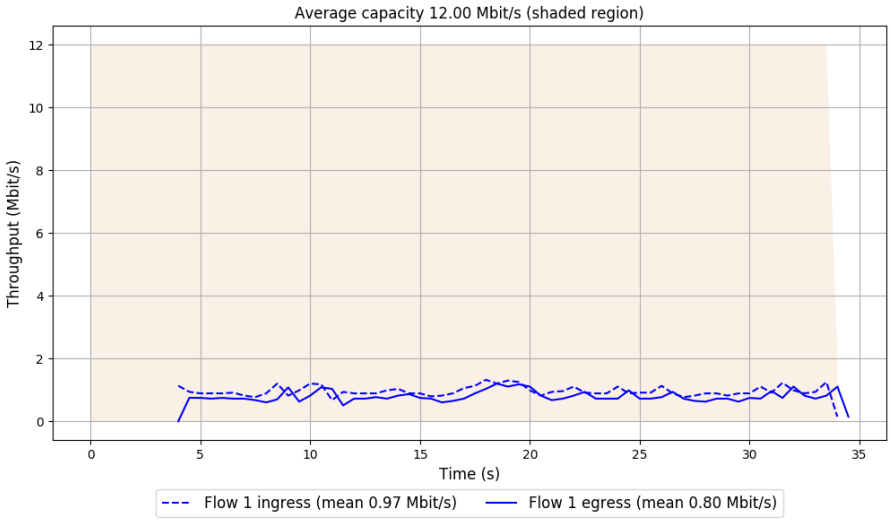


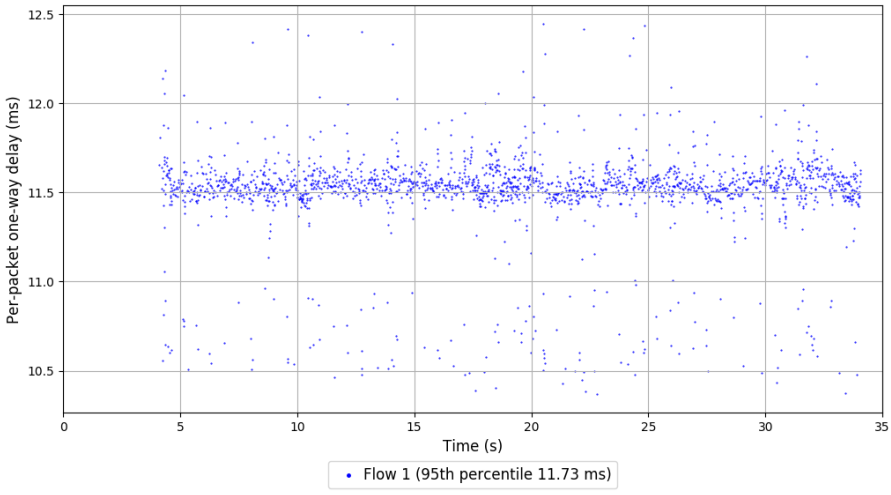
```
Run 1: Statistics of TCP Vegas

Start at: 2019-01-17 08:53:07
End at: 2019-01-17 08:53:37

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.80 Mbit/s (6.7% utilization)
95th percentile per-packet one-way delay: 11.733 ms
Loss rate: 16.88%
-- Flow 1:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 11.733 ms
Loss rate: 16.88%
```

Run 1: Report of TCP Vegas — Data Link



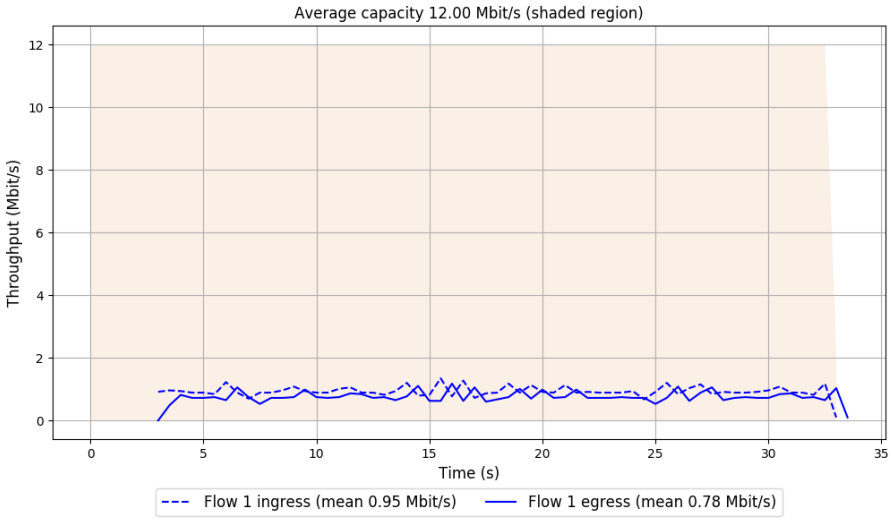


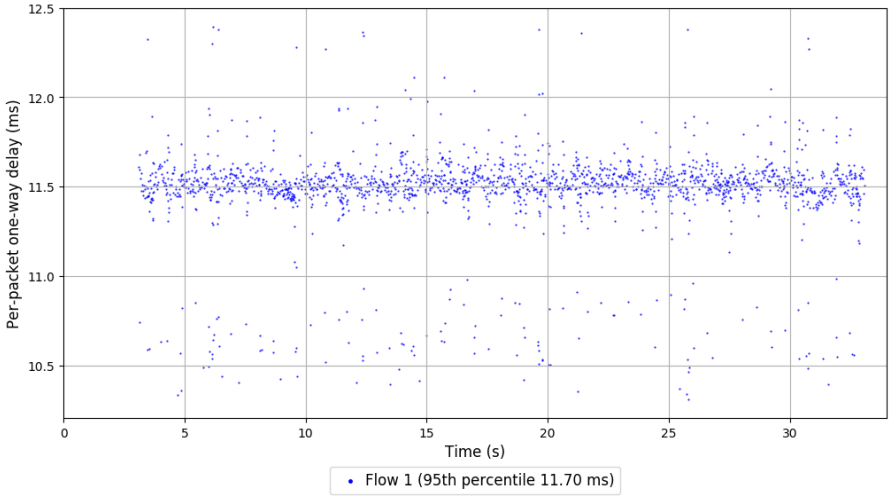
```
Run 2: Statistics of TCP Vegas

Start at: 2019-01-17 09:05:30
End at: 2019-01-17 09:06:00

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.78 Mbit/s (6.5% utilization)
95th percentile per-packet one-way delay: 11.699 ms
Loss rate: 17.95%
-- Flow 1:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 11.699 ms
Loss rate: 17.95%
```

Run 2: Report of TCP Vegas — Data Link



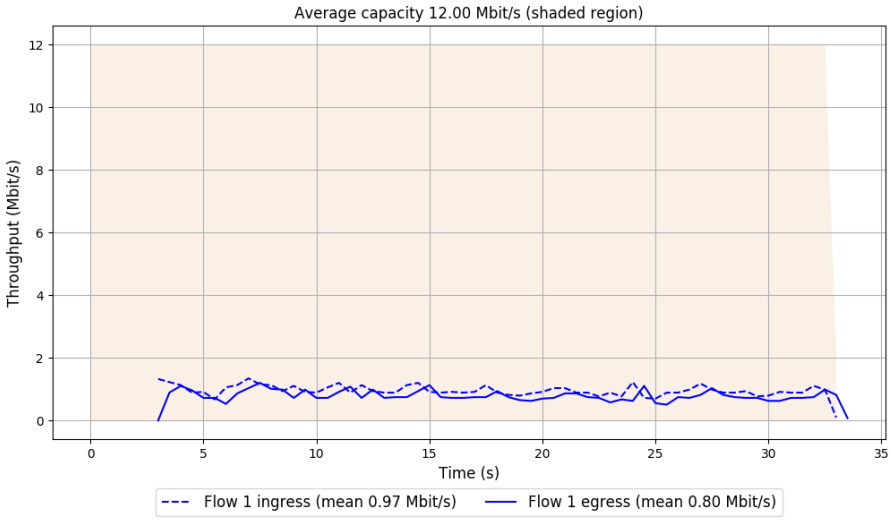


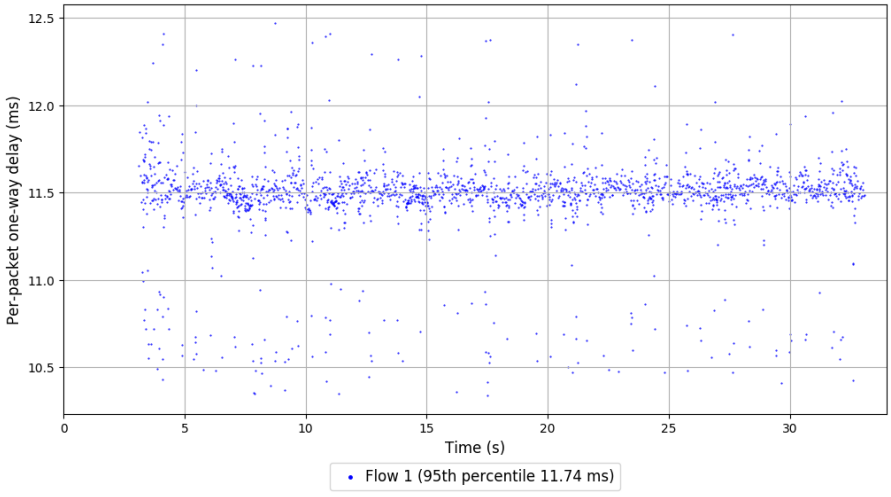
```
Run 3: Statistics of TCP Vegas

Start at: 2019-01-17 09:17:59
End at: 2019-01-17 09:18:29

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.80 Mbit/s (6.7% utilization)
95th percentile per-packet one-way delay: 11.739 ms
Loss rate: 17.22%
-- Flow 1:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 11.739 ms
Loss rate: 17.22%
```

Run 3: Report of TCP Vegas — Data Link



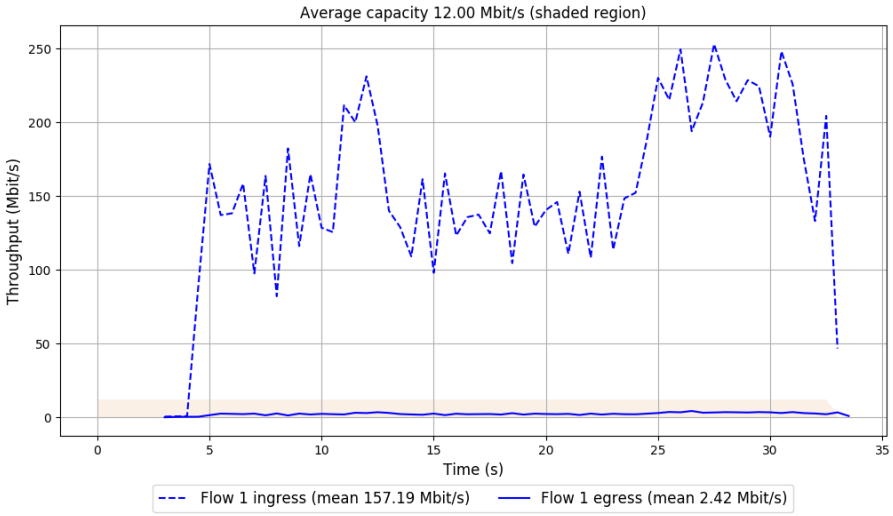


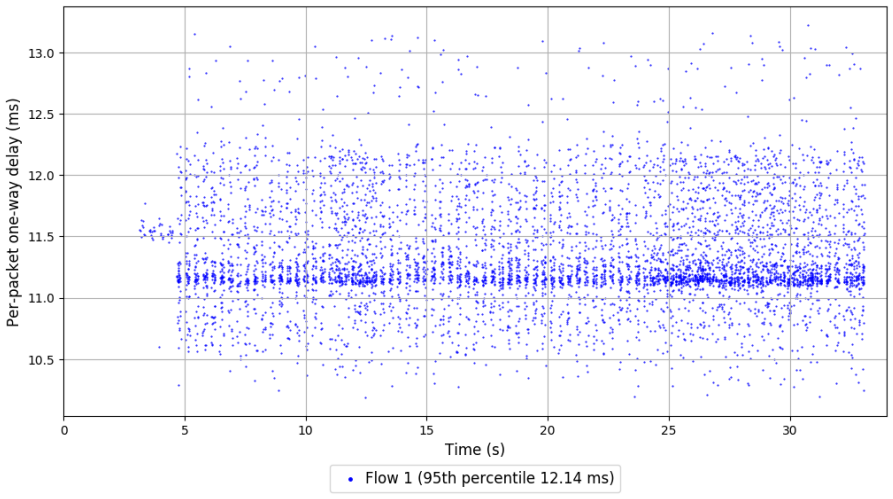
```
Run 1: Statistics of Verus

Start at: 2019-01-17 08:59:33
End at: 2019-01-17 09:00:03

# Below is generated by plot.py at 2019-01-17 09:31:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.42 Mbit/s (20.1% utilization)
95th percentile per-packet one-way delay: 12.145 ms
Loss rate: 98.46%
-- Flow 1:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 12.145 ms
Loss rate: 98.46%
```

Run 1: Report of Verus — Data Link



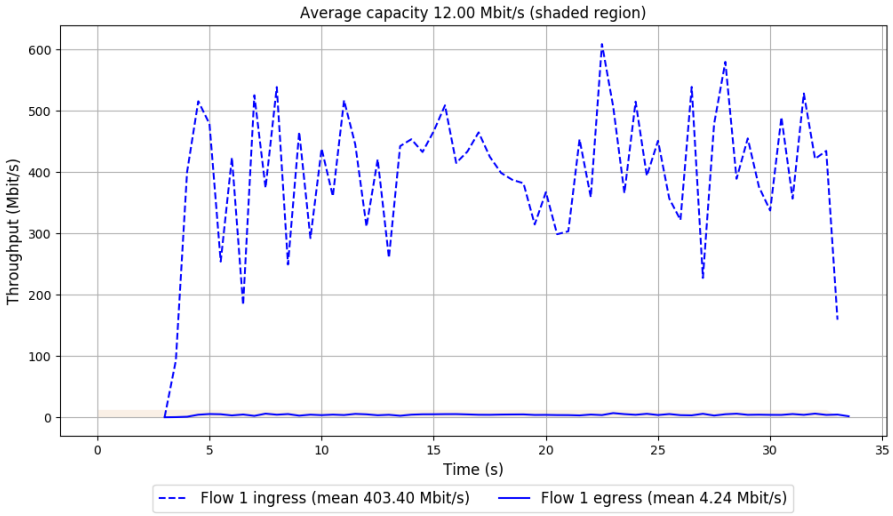


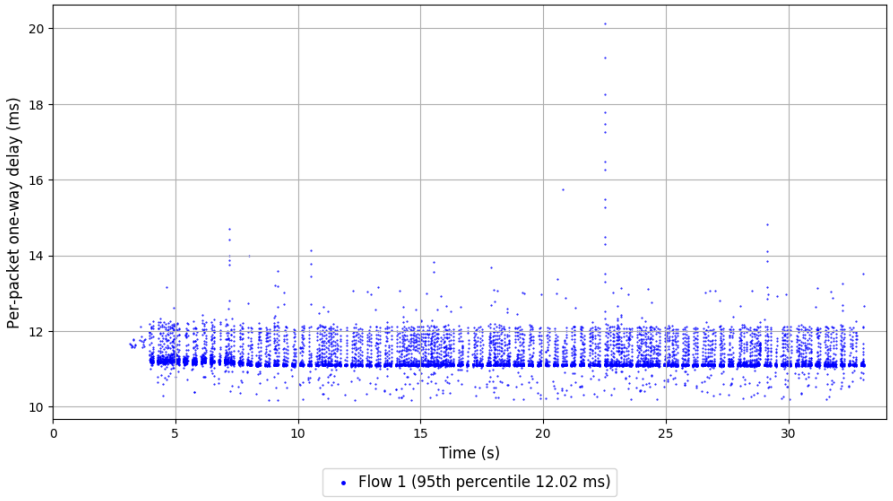
```
Run 2: Statistics of Verus

Start at: 2019-01-17 09:11:56
End at: 2019-01-17 09:12:26

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.24 Mbit/s (35.4% utilization)
95th percentile per-packet one-way delay: 12.016 ms
Loss rate: 98.95%
-- Flow 1:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 12.016 ms
Loss rate: 98.95%
```

Run 2: Report of Verus — Data Link



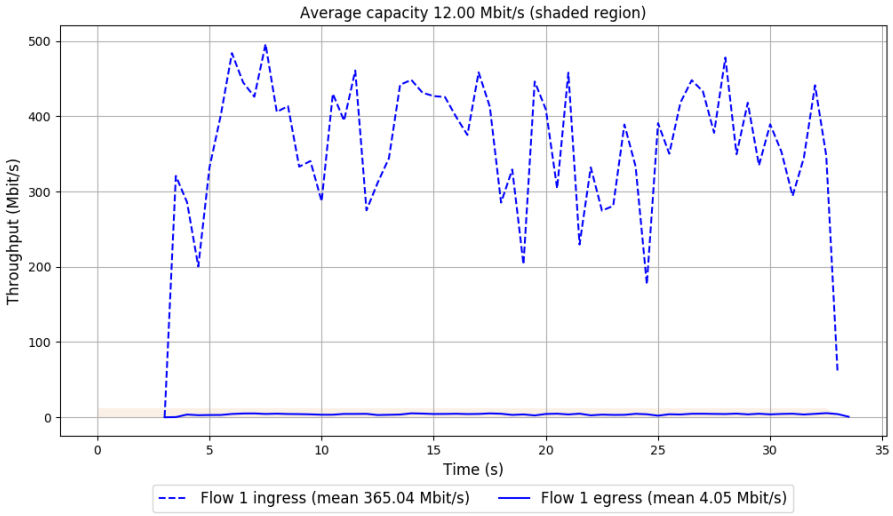


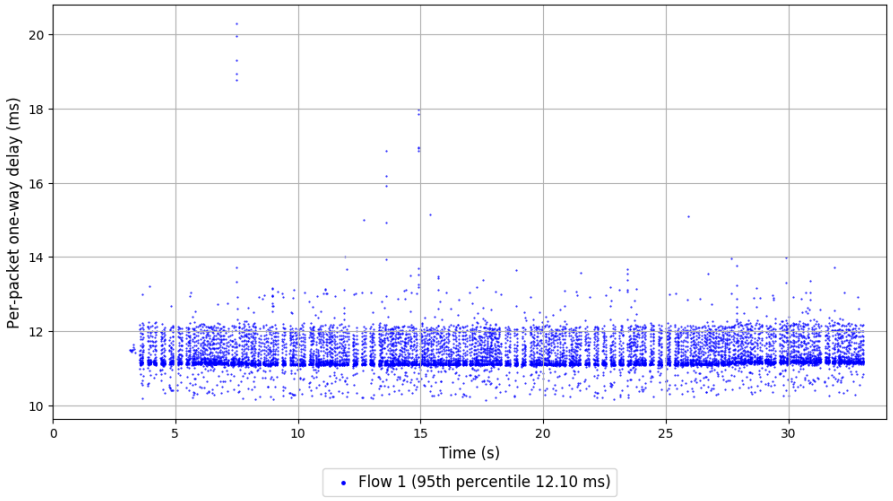
```
Run 3: Statistics of Verus

Start at: 2019-01-17 09:24:24
End at: 2019-01-17 09:24:54

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.05 Mbit/s (33.8% utilization)
95th percentile per-packet one-way delay: 12.104 ms
Loss rate: 98.89%
-- Flow 1:
Average throughput: 4.05 Mbit/s
95th percentile per-packet one-way delay: 12.104 ms
Loss rate: 98.89%
```

Run 3: Report of Verus — Data Link



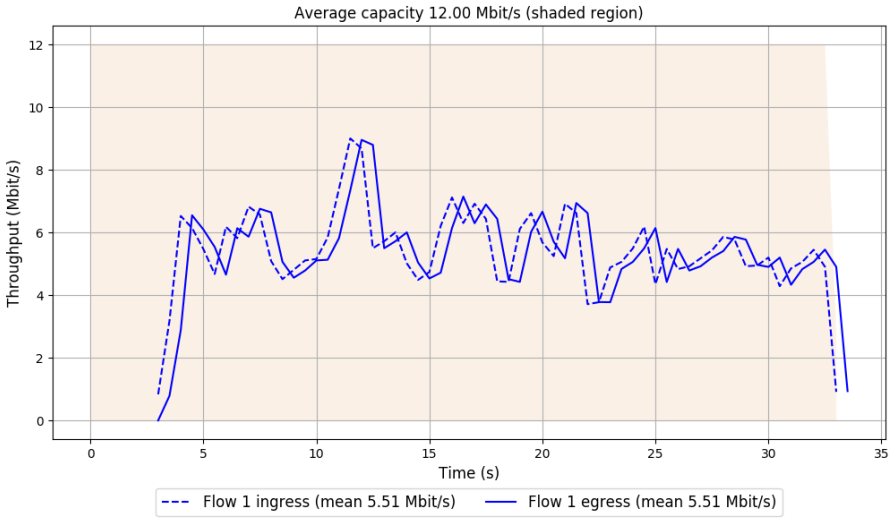


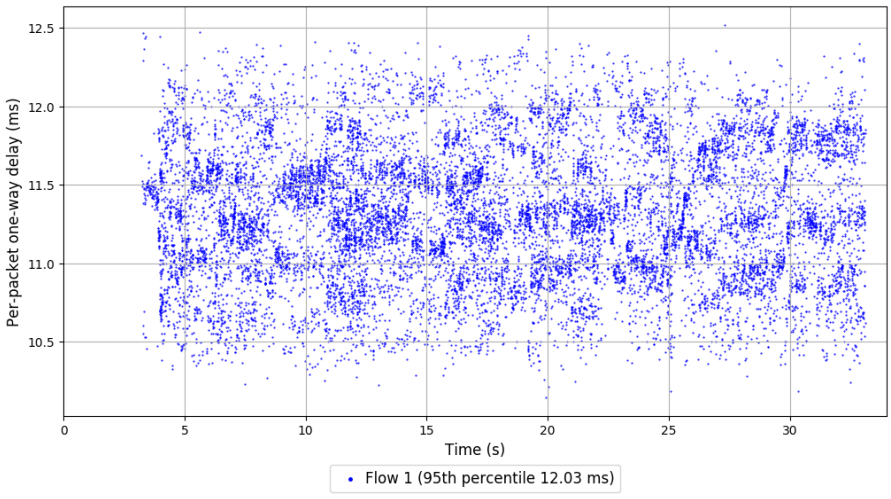
```
Run 1: Statistics of PCC-Vivace

Start at: 2019-01-17 08:55:27
End at: 2019-01-17 08:55:57

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.51 Mbit/s (45.9% utilization)
95th percentile per-packet one-way delay: 12.031 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 5.51 Mbit/s
95th percentile per-packet one-way delay: 12.031 ms
Loss rate: 0.10%
```

Run 1: Report of PCC-Vivace — Data Link



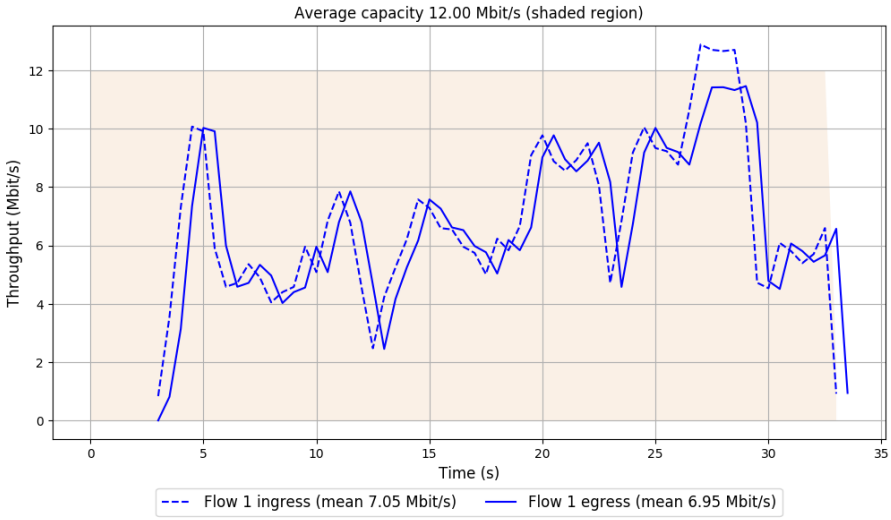


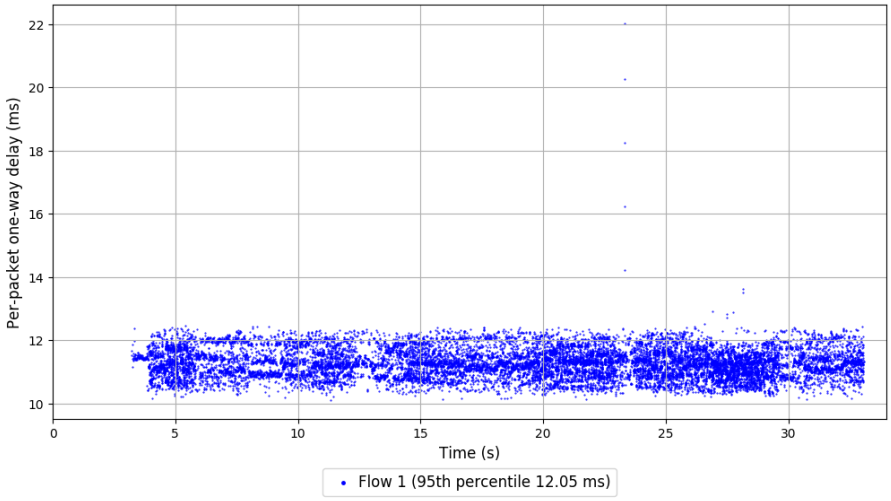
```
Run 2: Statistics of PCC-Vivace

Start at: 2019-01-17 09:07:51
End at: 2019-01-17 09:08:21

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 6.95 Mbit/s (57.9% utilization)
95th percentile per-packet one-way delay: 12.050 ms
Loss rate: 1.52%
-- Flow 1:
Average throughput: 6.95 Mbit/s
95th percentile per-packet one-way delay: 12.050 ms
Loss rate: 1.52%
```

Run 2: Report of PCC-Vivace — Data Link



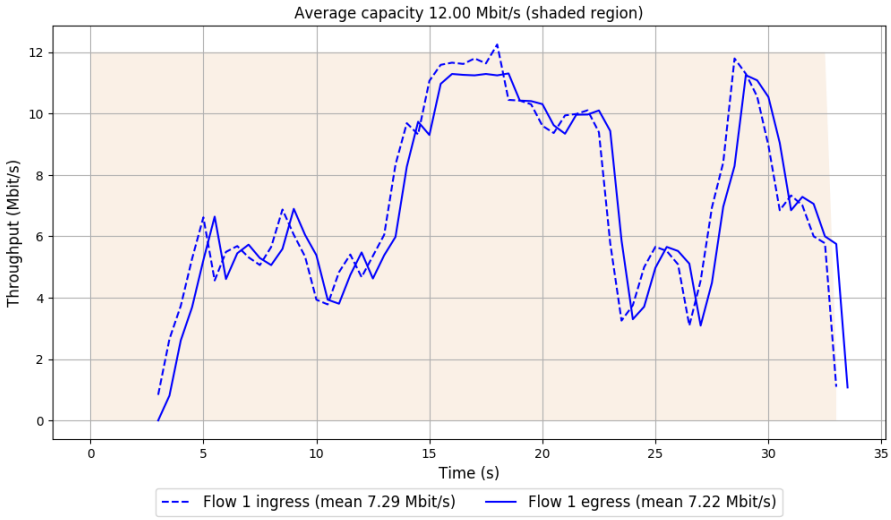


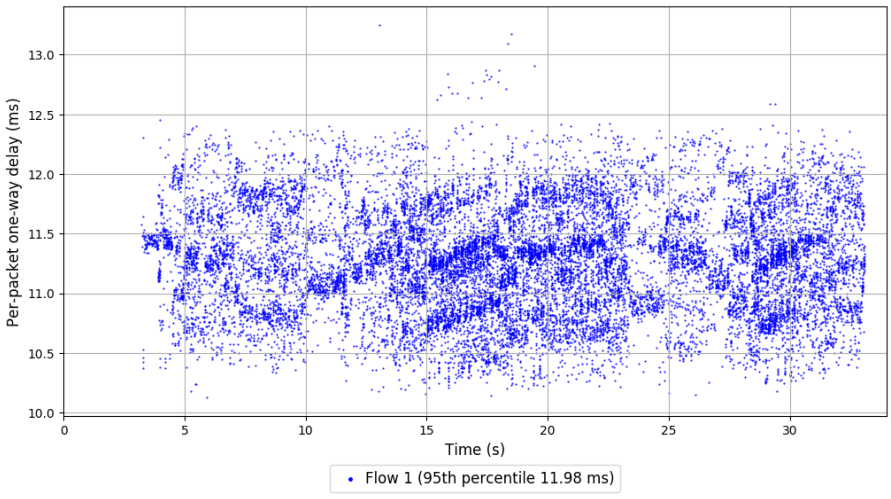
```
Run 3: Statistics of PCC-Vivace

Start at: 2019-01-17 09:20:19
End at: 2019-01-17 09:20:49

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 7.22 Mbit/s (60.2% utilization)
95th percentile per-packet one-way delay: 11.985 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 7.22 Mbit/s
95th percentile per-packet one-way delay: 11.985 ms
Loss rate: 0.93%
```

Run 3: Report of PCC-Vivace — Data Link



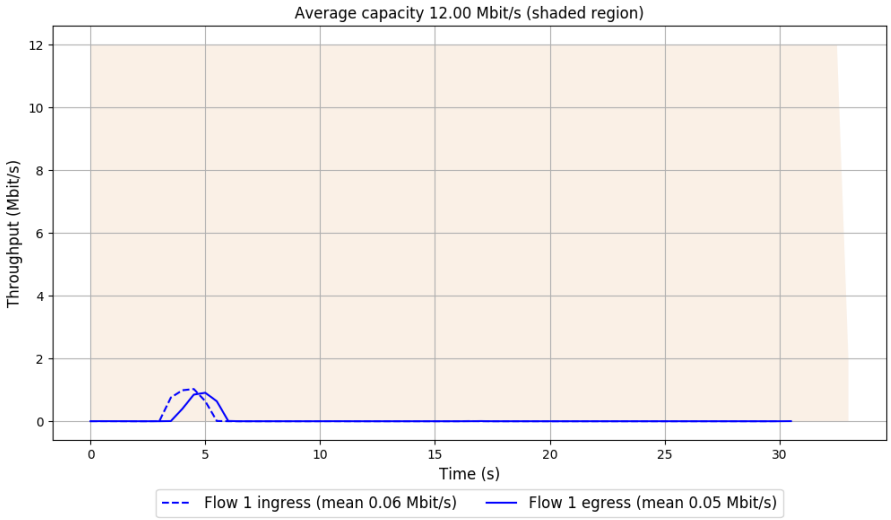


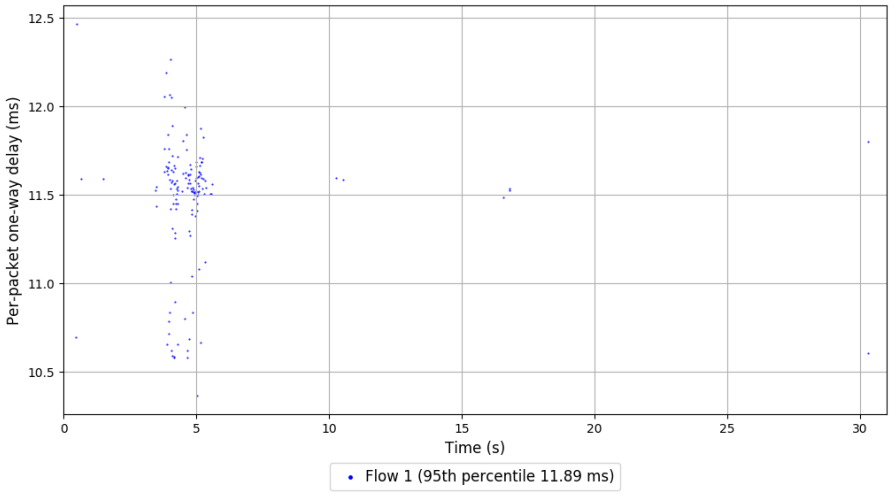
```
Run 1: Statistics of WebRTC media

Start at: 2019-01-17 08:57:48
End at: 2019-01-17 08:58:18

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.05 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 11.890 ms
Loss rate: 17.95%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 11.890 ms
Loss rate: 17.95%
```

Run 1: Report of WebRTC media — Data Link



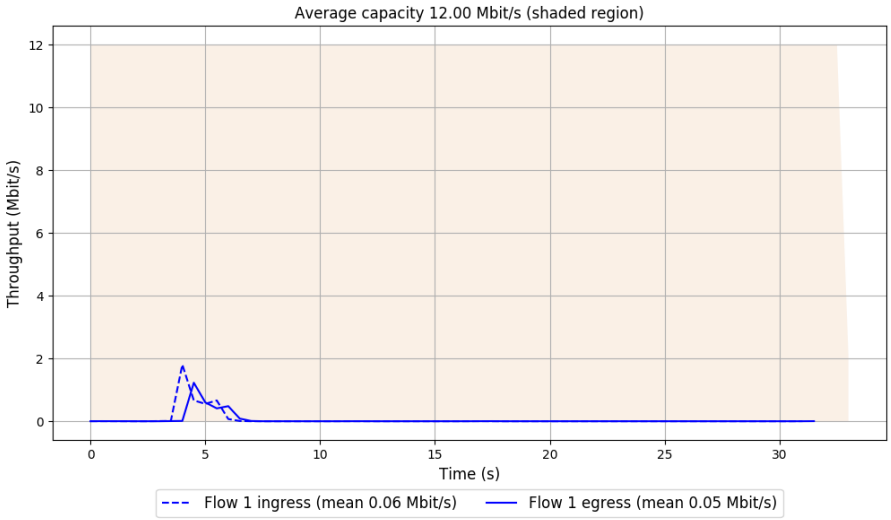


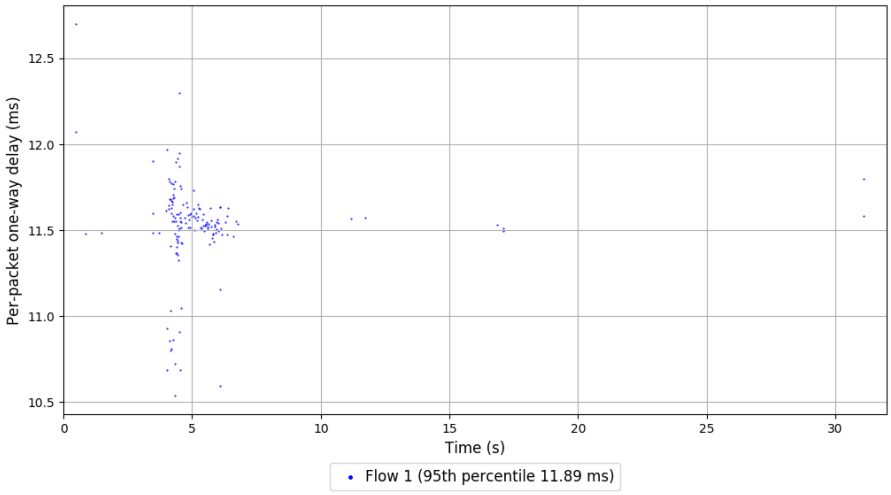
```
Run 2: Statistics of WebRTC media

Start at: 2019-01-17 09:10:11
End at: 2019-01-17 09:10:41

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.05 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 11.895 ms
Loss rate: 25.11%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 11.895 ms
Loss rate: 25.11%
```

Run 2: Report of WebRTC media — Data Link





```
Run 3: Statistics of WebRTC media

Start at: 2019-01-17 09:22:40
End at: 2019-01-17 09:23:10

# Below is generated by plot.py at 2019-01-17 09:31:52
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.05 Mbit/s (0.4% utilization)
95th percentile per-packet one-way delay: 11.894 ms
Loss rate: 15.52%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 11.894 ms
Loss rate: 15.52%
```

Run 3: Report of WebRTC media — Data Link