

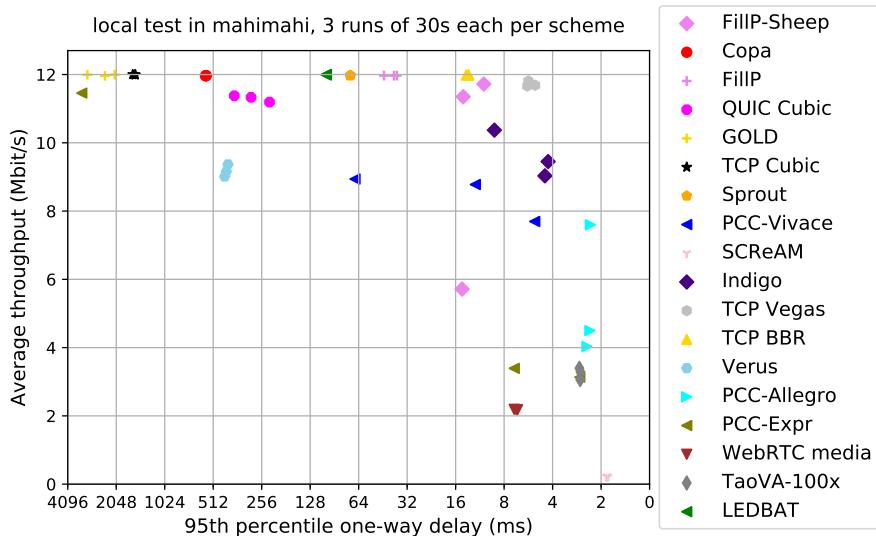
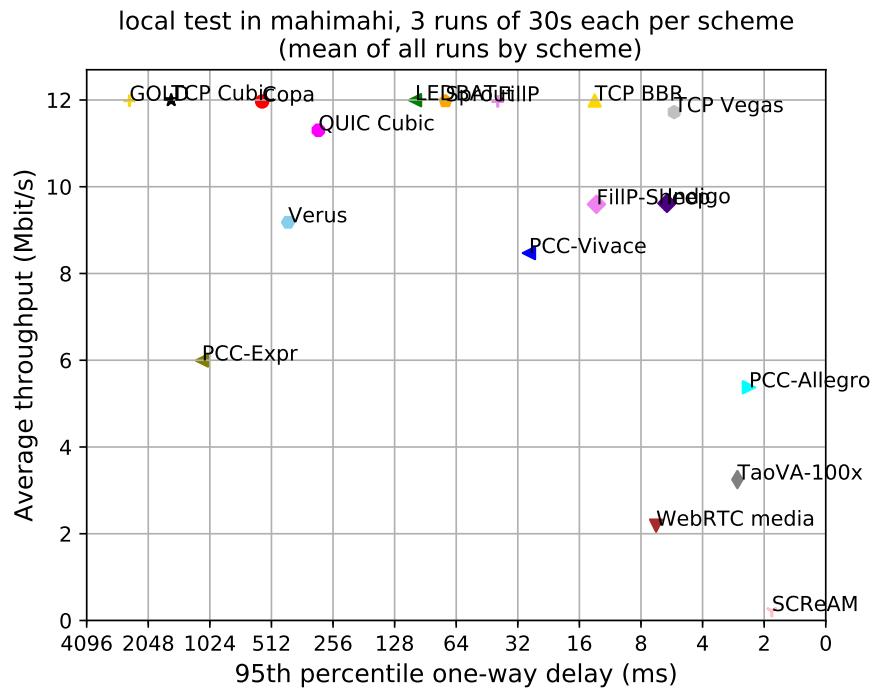
Pantheon Report

Generated at 2019-07-01 22:41:42 (UTC).
Tested in mahimahi: `mm-link 12mbps.trace 12mbps.trace`
Repeated the test of 19 congestion control schemes 3 times.
Each test lasted for 30 seconds running 1 flow.

System info:
Linux 4.15.0-54-generic
net.core.default_qdisc = fq
net.core.rmem_default = 212992
net.core.rmem_max = 212992
net.core.wmem_default = 212992
net.core.wmem_max = 212992
net.ipv4.tcp_rmem = 4096 87380 6291456
net.ipv4.tcp_wmem = 4096 16384 4194304

Git summary:
branch: master @ 3c188adffc9950ff7cecd05e495651968115682f
third_party/fillp @ d6da1459332fceef56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fc45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/gold @ e47bed6d7495aa223eec8de2c7a43035967074ef
M environment/_pycache_/_datagram_pb2.cpython-36.opt-1.pyc
M environment/_pycache_/_datagram_pb2.cpython-36.pyc
M environment/_pycache_/_environment.cpython-36.opt-1.pyc
M environment/_pycache_/_helpers.cpython-36.opt-1.pyc
M environment/_pycache_/_helpers.cpython-36.pyc
M environment/_pycache_/_mahimahi.cpython-36.opt-1.pyc
M environment/_pycache_/_project_root.cpython-36.opt-1.pyc
M environment/_pycache_/_project_root.cpython-36.pyc
M environment/_pycache_/_receiver.cpython-36.opt-1.pyc
M environment/_pycache_/_receiver.cpython-36.pyc
M environment/logs.txt
M model
third_party/goldLSTM @ bee193b4fb769cdcc8728fbda188cef78b0c883
M sender-receiver/sender_receiver/envs/sender_receiver_env.py
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
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
```



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	11.99	13.47	0.04
Copa	3	11.97	568.40	1.92
TCP Cubic	3	11.99	1581.87	4.79
FillP	3	11.97	40.09	0.12
FillP-Sheep	3	9.60	13.21	0.01
GOLD	3	11.98	2530.99	7.46
GoldLSTM	0	N/A	N/A	N/A
Indigo	3	9.62	5.97	0.02
LEDBAT	3	12.00	101.80	0.33
PCC-Allegro	3	5.38	2.37	0.01
PCC-Expr	3	5.99	1120.81	3.95
QUIC Cubic	3	11.30	301.88	1.22
SCReAM	3	0.22	1.75	0.00
Sprout	3	11.98	72.18	0.23
TaoVA-100x	3	3.25	2.70	0.00
TCP Vegas	3	11.72	5.51	0.00
Verus	3	9.18	424.38	0.02
PCC-Vivace	3	8.47	28.24	0.00
WebRTC media	3	2.18	6.75	0.00

4

Run 1: Statistics of TCP BBR

Start at: 2019-07-01 22:10:14

End at: 2019-07-01 22:10:44

Below is generated by plot.py at 2019-07-01 22:39:33

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.99 Mbit/s (99.9% utilization)

95th percentile per-packet one-way delay: 13.247 ms

Loss rate: 0.04%

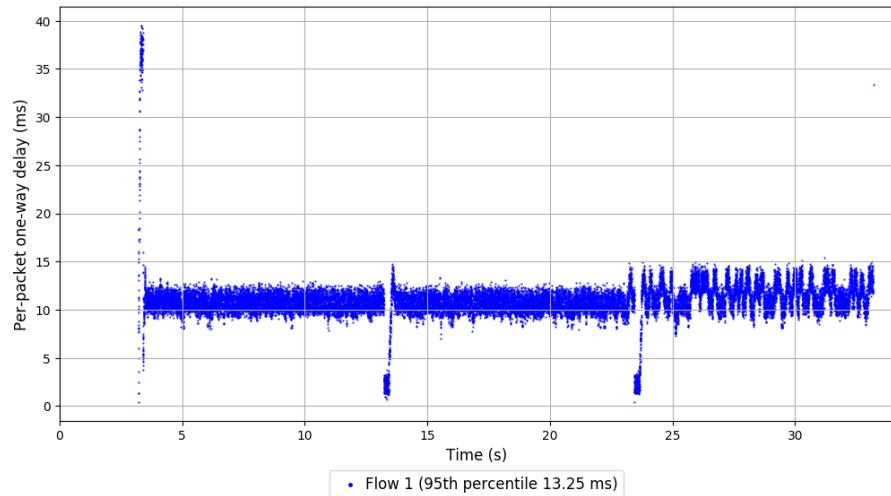
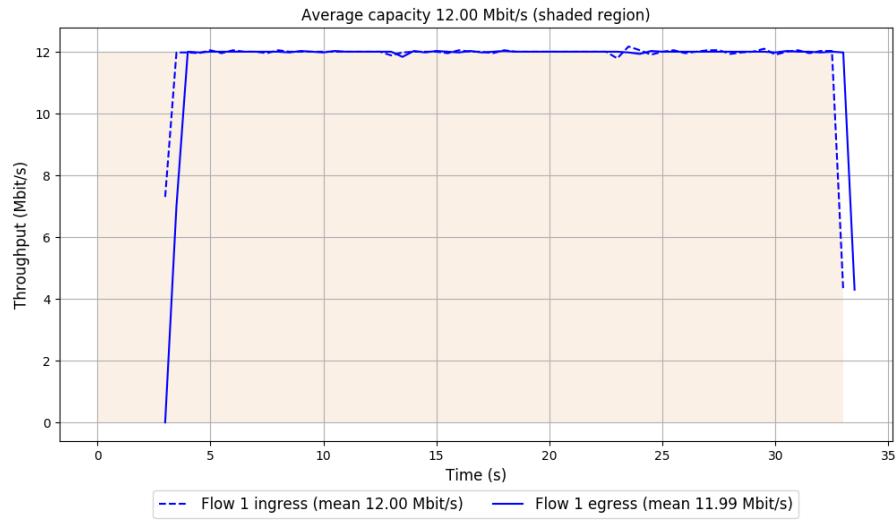
-- Flow 1:

Average throughput: 11.99 Mbit/s

95th percentile per-packet one-way delay: 13.247 ms

Loss rate: 0.04%

Run 1: Report of TCP BBR — Data Link



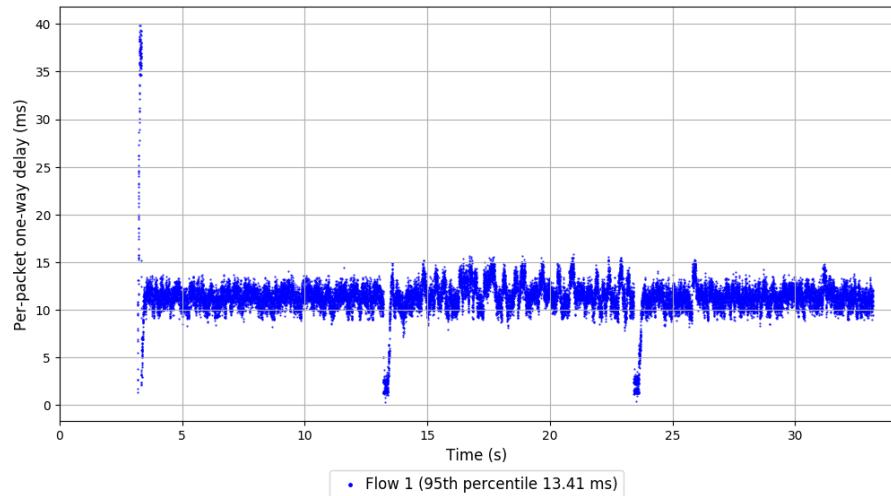
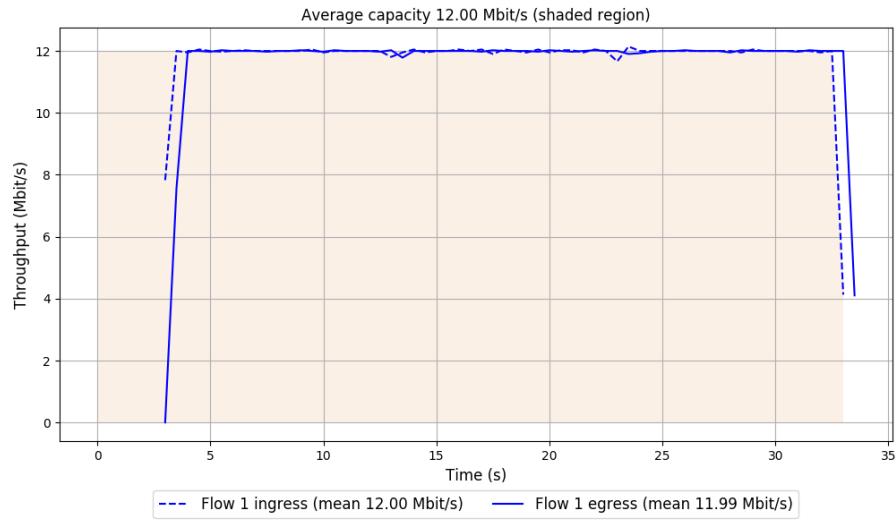
Run 2: Statistics of TCP BBR

Start at: 2019-07-01 22:21:07

End at: 2019-07-01 22:21:37

```
# Below is generated by plot.py at 2019-07-01 22:39:33
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (99.9% utilization)
95th percentile per-packet one-way delay: 13.411 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 13.411 ms
Loss rate: 0.04%
```

Run 2: Report of TCP BBR — Data Link



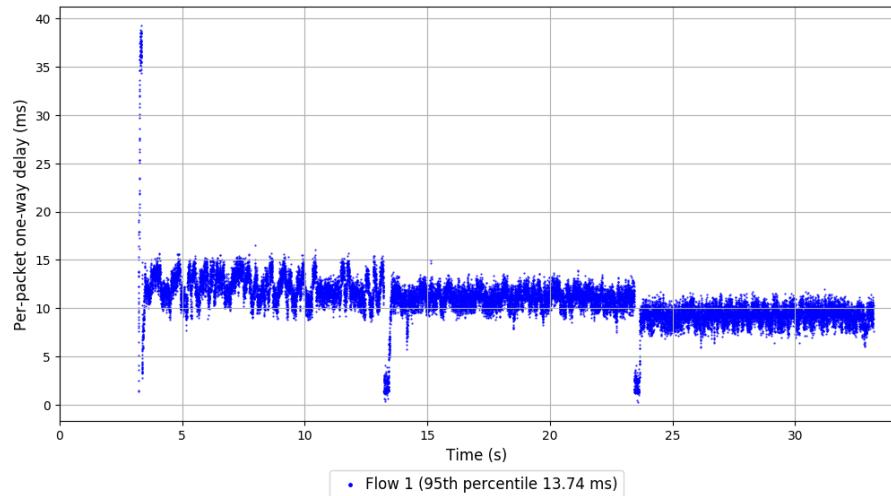
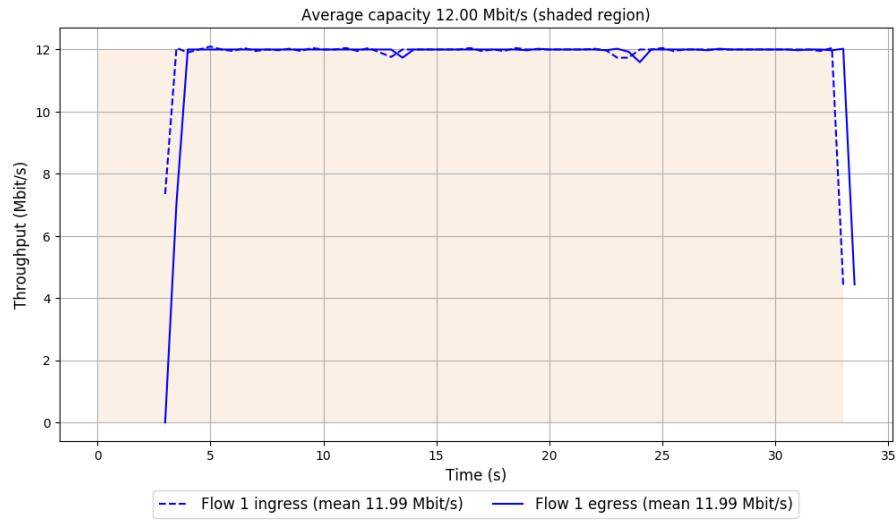
Run 3: Statistics of TCP BBR

Start at: 2019-07-01 22:31:57

End at: 2019-07-01 22:32:27

```
# Below is generated by plot.py at 2019-07-01 22:39:34
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (99.9% utilization)
95th percentile per-packet one-way delay: 13.741 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 13.741 ms
Loss rate: 0.03%
```

Run 3: Report of TCP BBR — Data Link



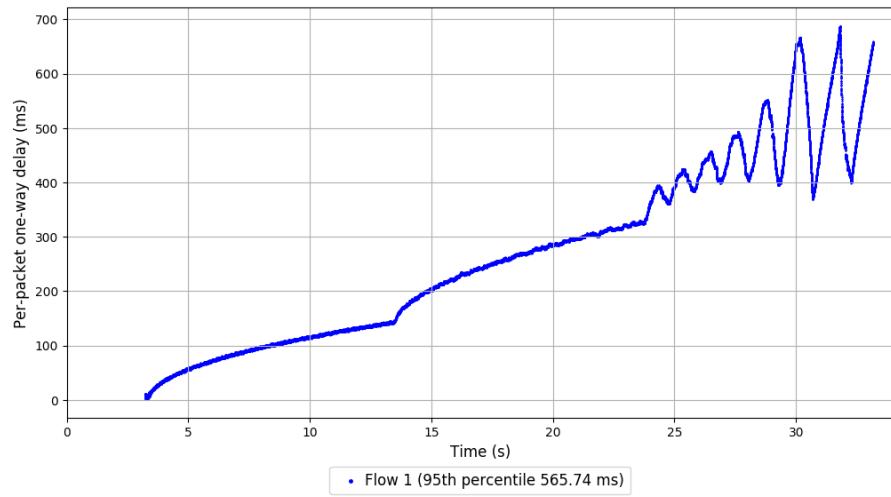
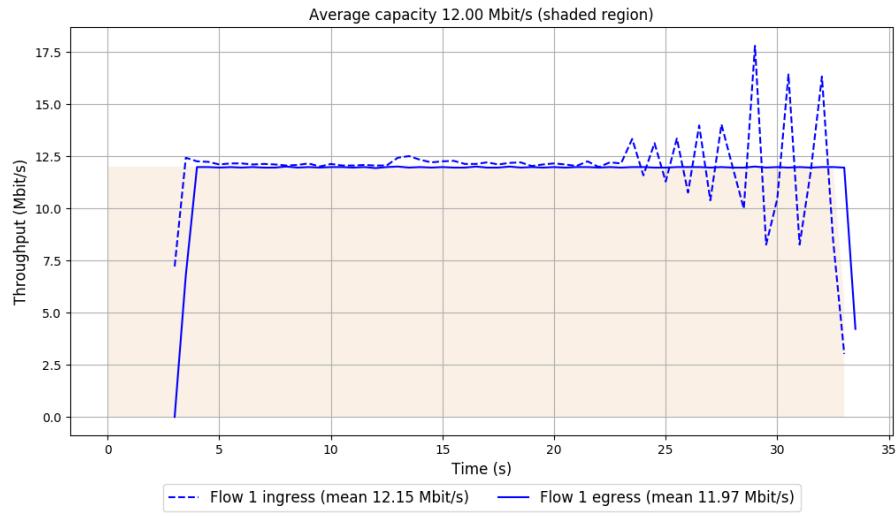
Run 1: Statistics of Copa

Start at: 2019-07-01 22:05:39

End at: 2019-07-01 22:06:09

```
# Below is generated by plot.py at 2019-07-01 22:39:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.97 Mbit/s (99.7% utilization)
95th percentile per-packet one-way delay: 565.740 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 11.97 Mbit/s
95th percentile per-packet one-way delay: 565.740 ms
Loss rate: 1.50%
```

Run 1: Report of Copa — Data Link



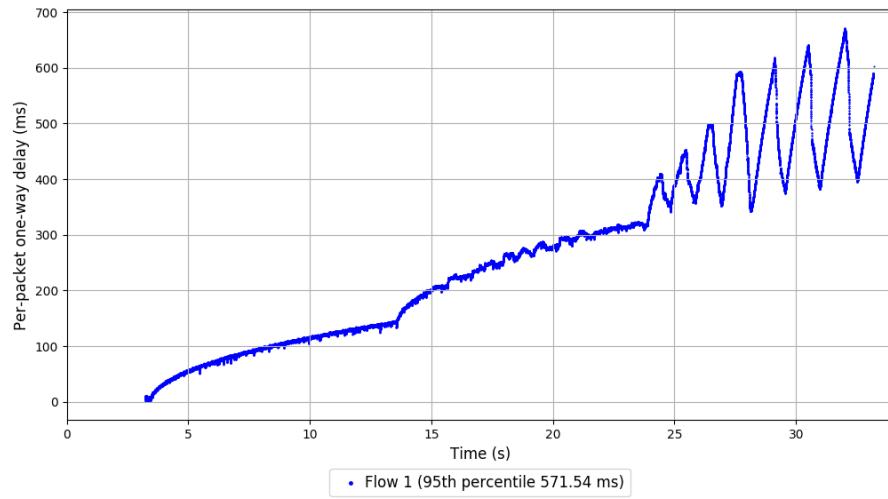
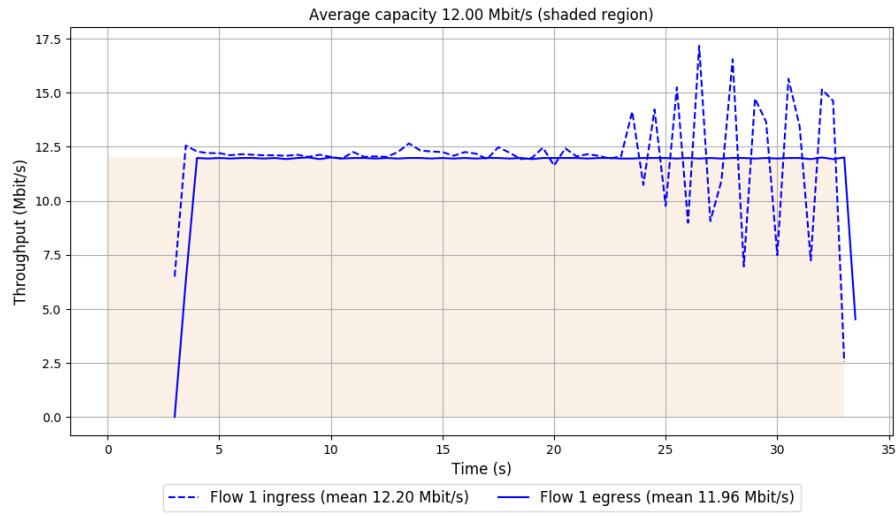
Run 2: Statistics of Copa

Start at: 2019-07-01 22:16:32

End at: 2019-07-01 22:17:02

```
# Below is generated by plot.py at 2019-07-01 22:39:49
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.96 Mbit/s (99.7% utilization)
95th percentile per-packet one-way delay: 571.540 ms
Loss rate: 1.91%
-- Flow 1:
Average throughput: 11.96 Mbit/s
95th percentile per-packet one-way delay: 571.540 ms
Loss rate: 1.91%
```

Run 2: Report of Copa — Data Link



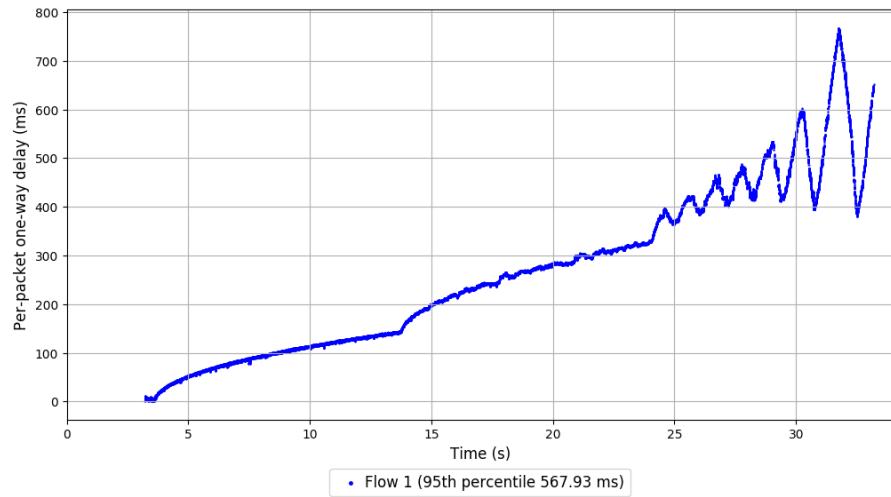
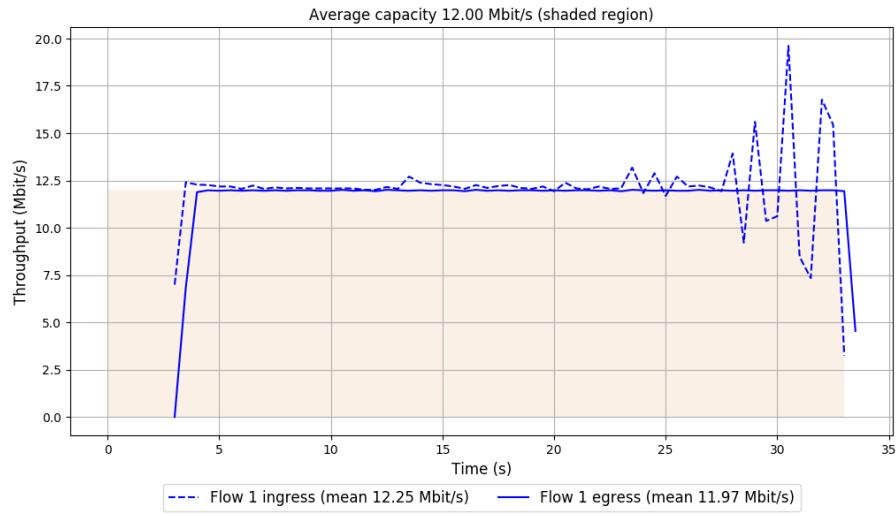
Run 3: Statistics of Copa

Start at: 2019-07-01 22:27:22

End at: 2019-07-01 22:27:52

```
# Below is generated by plot.py at 2019-07-01 22:39:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.97 Mbit/s (99.7% utilization)
95th percentile per-packet one-way delay: 567.928 ms
Loss rate: 2.34%
-- Flow 1:
Average throughput: 11.97 Mbit/s
95th percentile per-packet one-way delay: 567.928 ms
Loss rate: 2.34%
```

Run 3: Report of Copa — Data Link

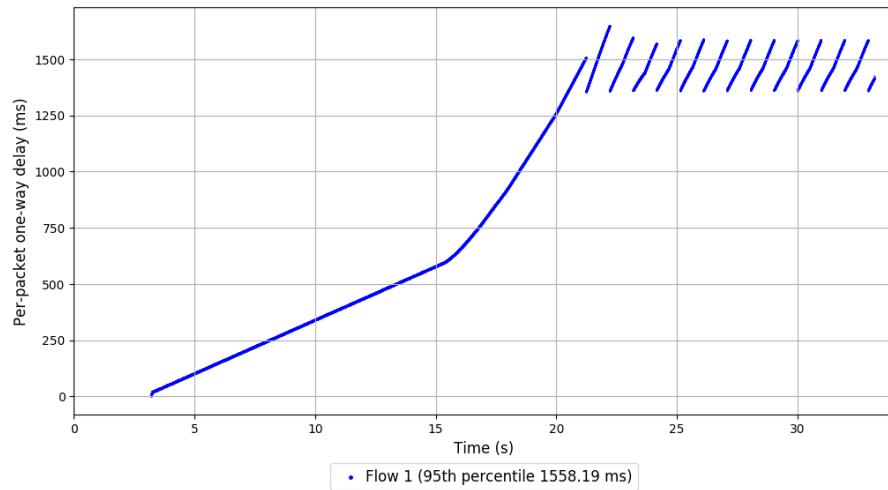
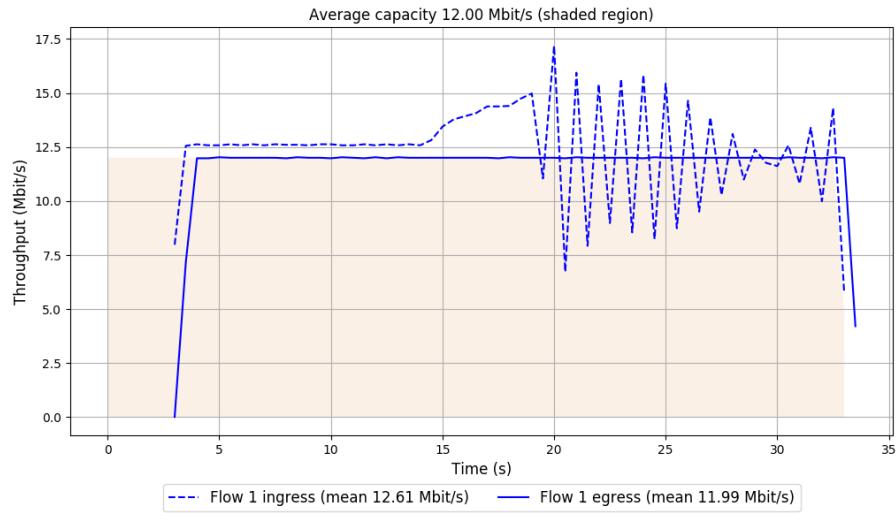


```
Run 1: Statistics of TCP Cubic

Start at: 2019-07-01 22:07:57
End at: 2019-07-01 22:08:27

# Below is generated by plot.py at 2019-07-01 22:39:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (100.0% utilization)
95th percentile per-packet one-way delay: 1558.186 ms
Loss rate: 4.91%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 1558.186 ms
Loss rate: 4.91%
```

Run 1: Report of TCP Cubic — Data Link

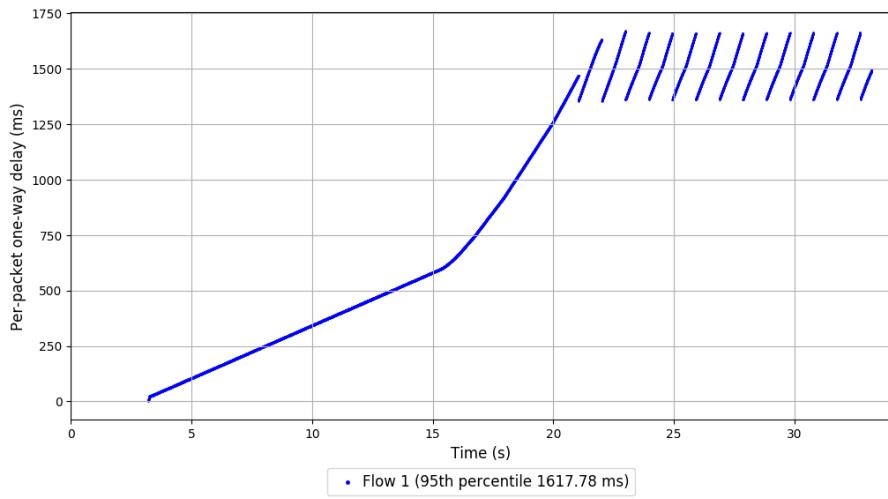
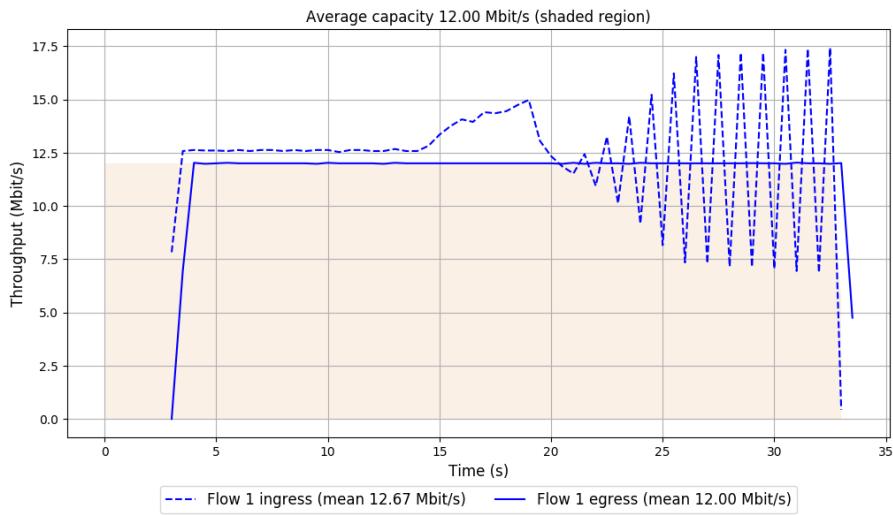


```
Run 2: Statistics of TCP Cubic

Start at: 2019-07-01 22:18:50
End at: 2019-07-01 22:19:20

# Below is generated by plot.py at 2019-07-01 22:39:50
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 12.00 Mbit/s (100.0% utilization)
95th percentile per-packet one-way delay: 1617.781 ms
Loss rate: 4.69%
-- Flow 1:
Average throughput: 12.00 Mbit/s
95th percentile per-packet one-way delay: 1617.781 ms
Loss rate: 4.69%
```

Run 2: Report of TCP Cubic — Data Link

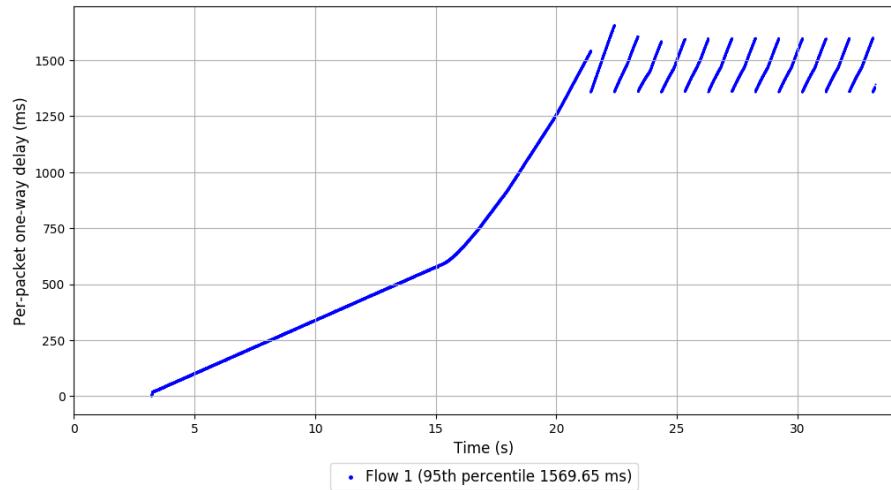
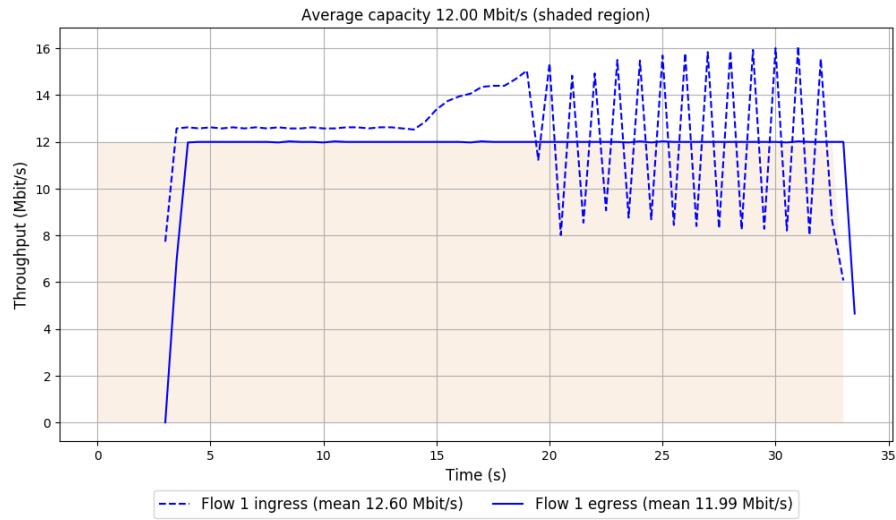


```
Run 3: Statistics of TCP Cubic

Start at: 2019-07-01 22:29:40
End at: 2019-07-01 22:30:10

# Below is generated by plot.py at 2019-07-01 22:39:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (99.9% utilization)
95th percentile per-packet one-way delay: 1569.652 ms
Loss rate: 4.76%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 1569.652 ms
Loss rate: 4.76%
```

Run 3: Report of TCP Cubic — Data Link

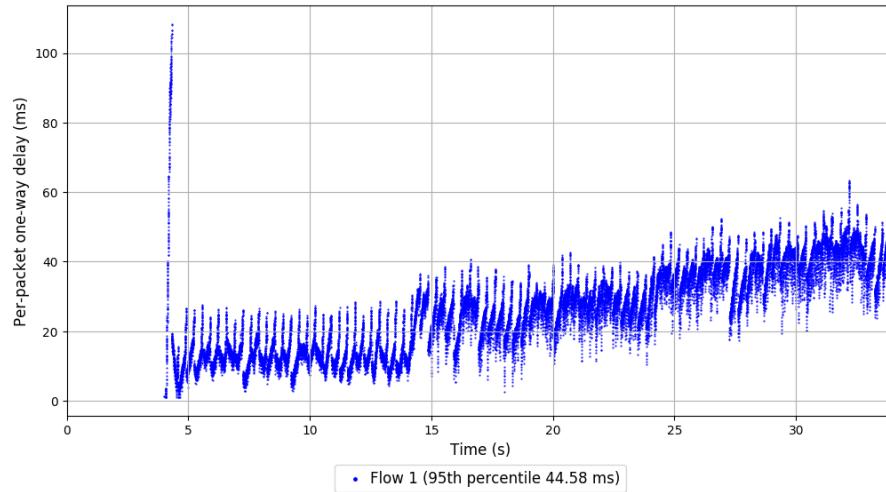
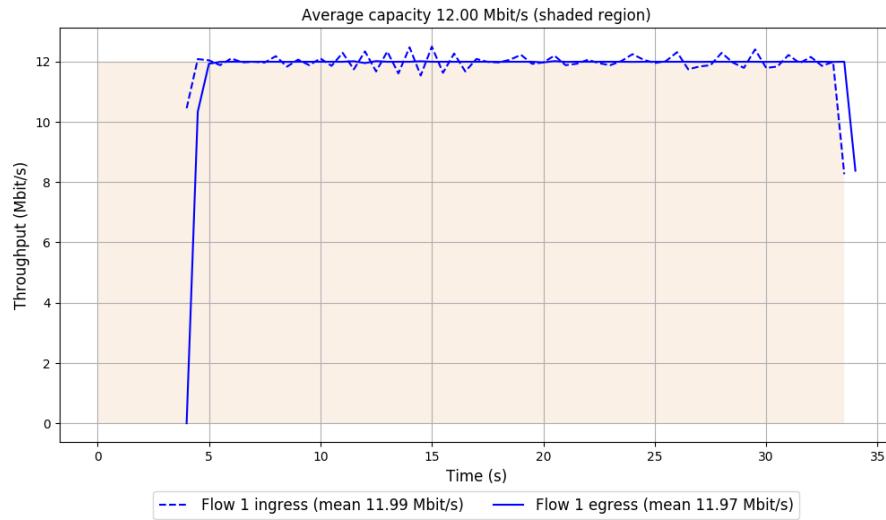


```
Run 1: Statistics of FillP

Start at: 2019-07-01 22:11:57
End at: 2019-07-01 22:12:27

# Below is generated by plot.py at 2019-07-01 22:40:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.97 Mbit/s (99.7% utilization)
95th percentile per-packet one-way delay: 44.576 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 11.97 Mbit/s
95th percentile per-packet one-way delay: 44.576 ms
Loss rate: 0.12%
```

Run 1: Report of FillP — Data Link



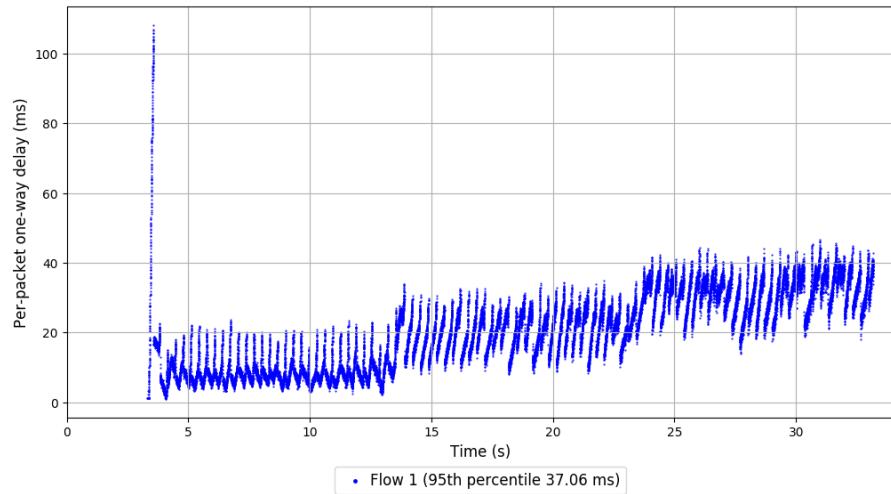
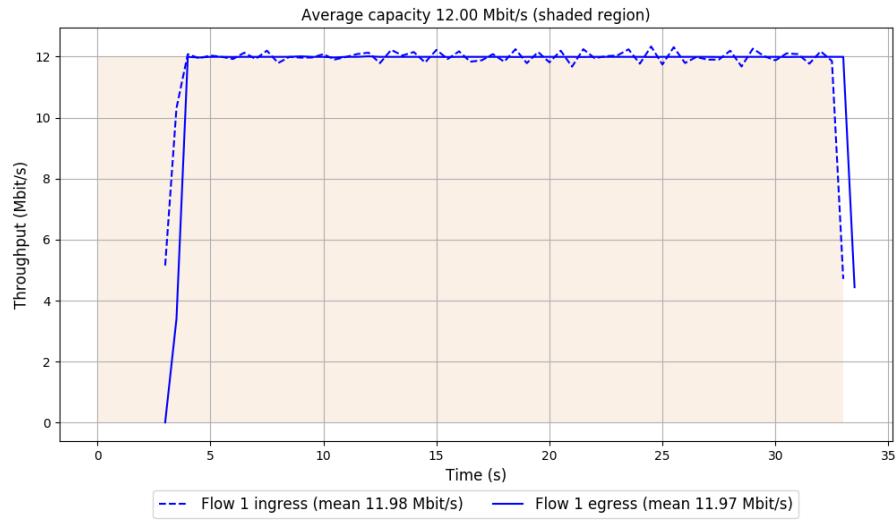
Run 2: Statistics of FillP

Start at: 2019-07-01 22:22:49

End at: 2019-07-01 22:23:19

```
# Below is generated by plot.py at 2019-07-01 22:40:02
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.97 Mbit/s (99.8% utilization)
95th percentile per-packet one-way delay: 37.063 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 11.97 Mbit/s
95th percentile per-packet one-way delay: 37.063 ms
Loss rate: 0.14%
```

Run 2: Report of FillP — Data Link



```
Run 3: Statistics of FillP
```

```
Start at: 2019-07-01 22:33:39
```

```
End at: 2019-07-01 22:34:09
```

```
# Below is generated by plot.py at 2019-07-01 22:40:02
```

```
# Datalink statistics
```

```
-- Total of 1 flow:
```

```
Average capacity: 12.00 Mbit/s
```

```
Average throughput: 11.97 Mbit/s (99.7% utilization)
```

```
95th percentile per-packet one-way delay: 38.638 ms
```

```
Loss rate: 0.10%
```

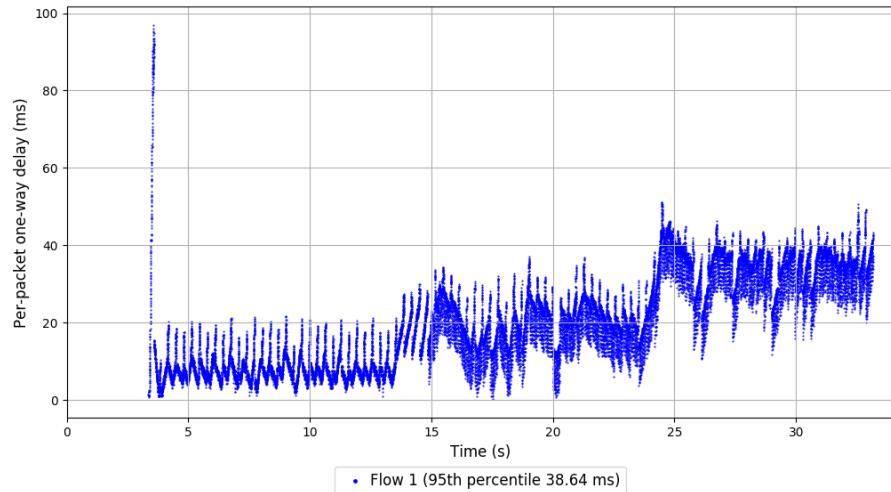
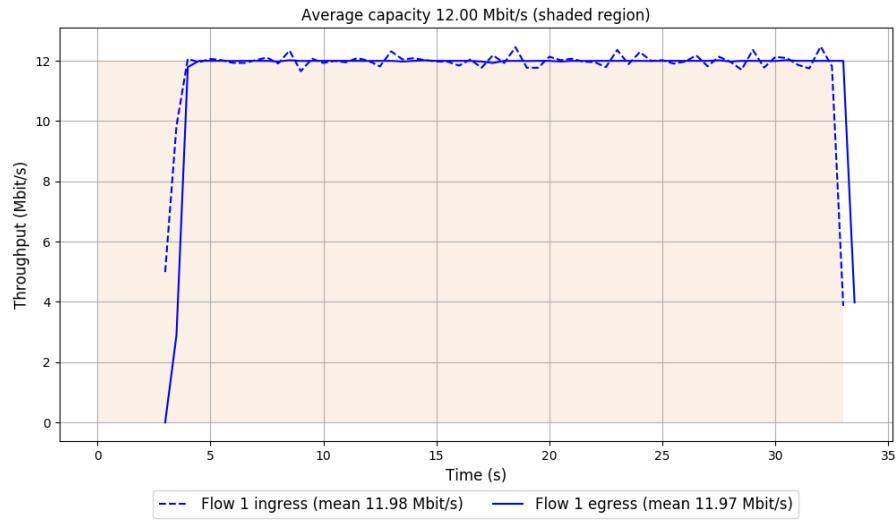
```
-- Flow 1:
```

```
Average throughput: 11.97 Mbit/s
```

```
95th percentile per-packet one-way delay: 38.638 ms
```

```
Loss rate: 0.10%
```

Run 3: Report of FillP — Data Link

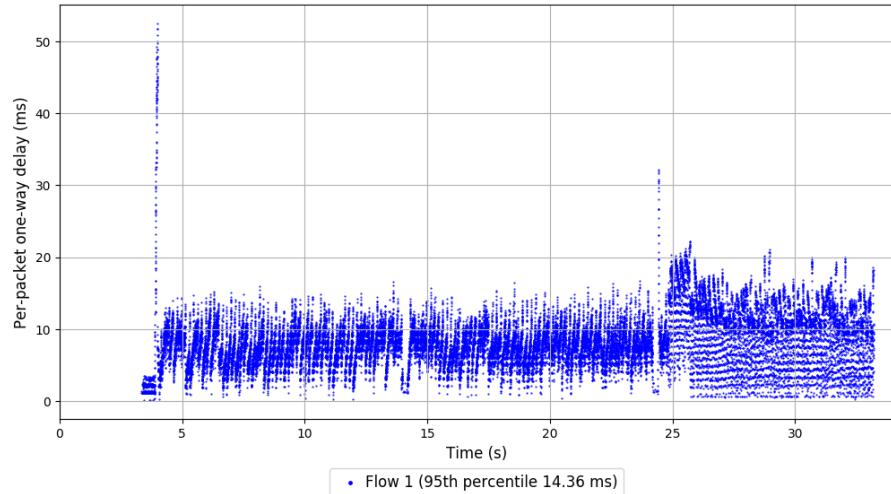
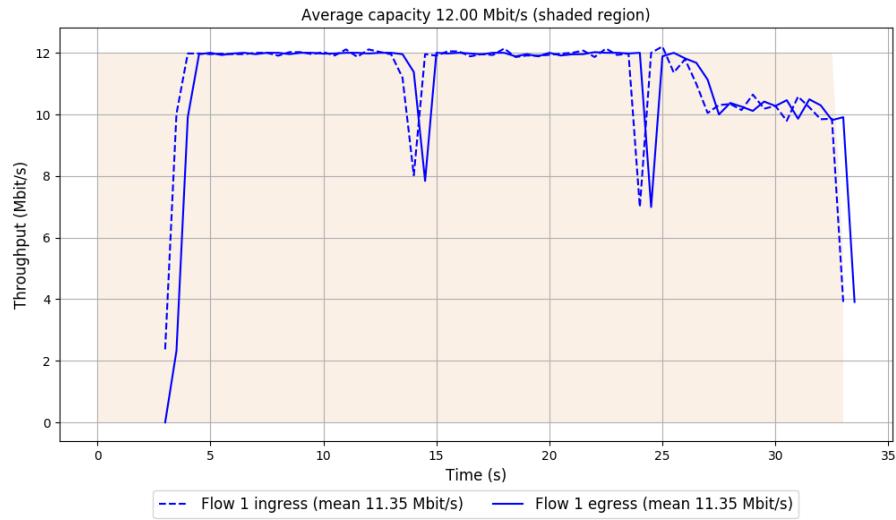


```
Run 1: Statistics of FillP-Sheep

Start at: 2019-07-01 22:05:05
End at: 2019-07-01 22:05:35

# Below is generated by plot.py at 2019-07-01 22:40:05
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.35 Mbit/s (94.6% utilization)
95th percentile per-packet one-way delay: 14.358 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 11.35 Mbit/s
95th percentile per-packet one-way delay: 14.358 ms
Loss rate: 0.00%
```

Run 1: Report of FillP-Sheep — Data Link

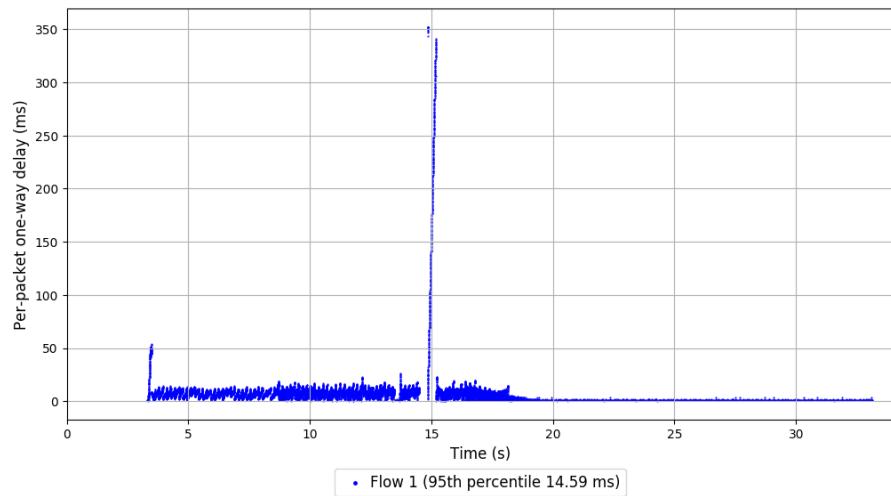
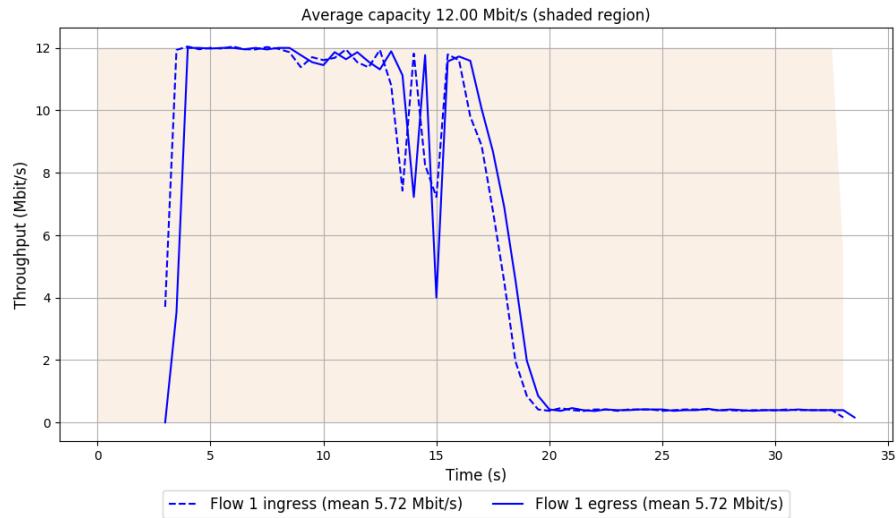


```
Run 2: Statistics of FillP-Sheep

Start at: 2019-07-01 22:15:58
End at: 2019-07-01 22:16:28

# Below is generated by plot.py at 2019-07-01 22:40:07
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 5.72 Mbit/s (47.6% utilization)
95th percentile per-packet one-way delay: 14.587 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.72 Mbit/s
95th percentile per-packet one-way delay: 14.587 ms
Loss rate: 0.00%
```

Run 2: Report of FillP-Sheep — Data Link

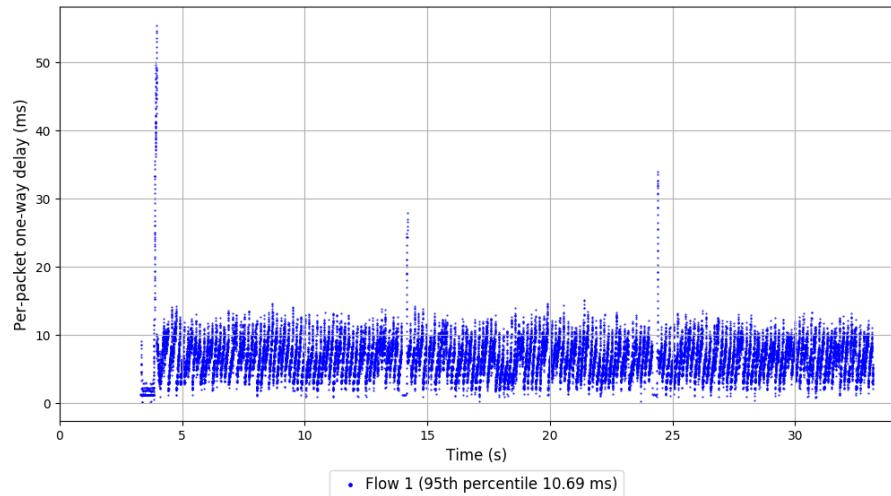


```
Run 3: Statistics of FillP-Sheep

Start at: 2019-07-01 22:26:48
End at: 2019-07-01 22:27:18

# Below is generated by plot.py at 2019-07-01 22:40:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.72 Mbit/s (97.7% utilization)
95th percentile per-packet one-way delay: 10.687 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 11.72 Mbit/s
95th percentile per-packet one-way delay: 10.687 ms
Loss rate: 0.03%
```

Run 3: Report of FillP-Sheep — Data Link

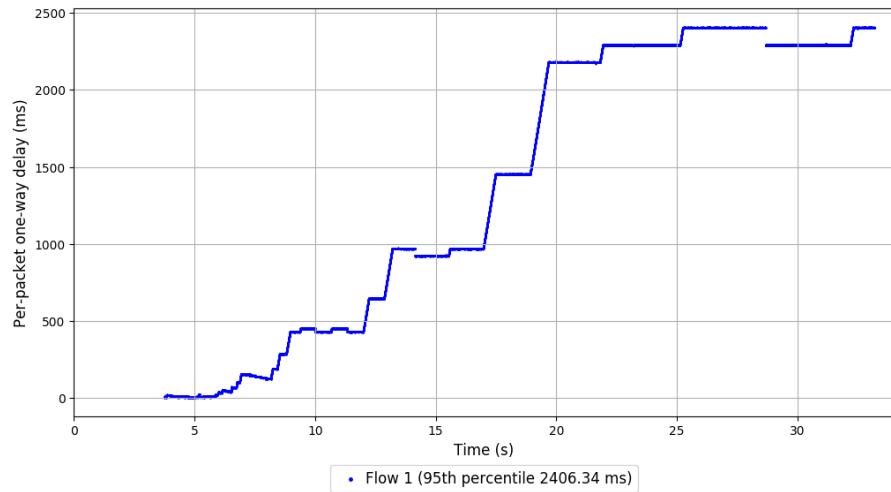
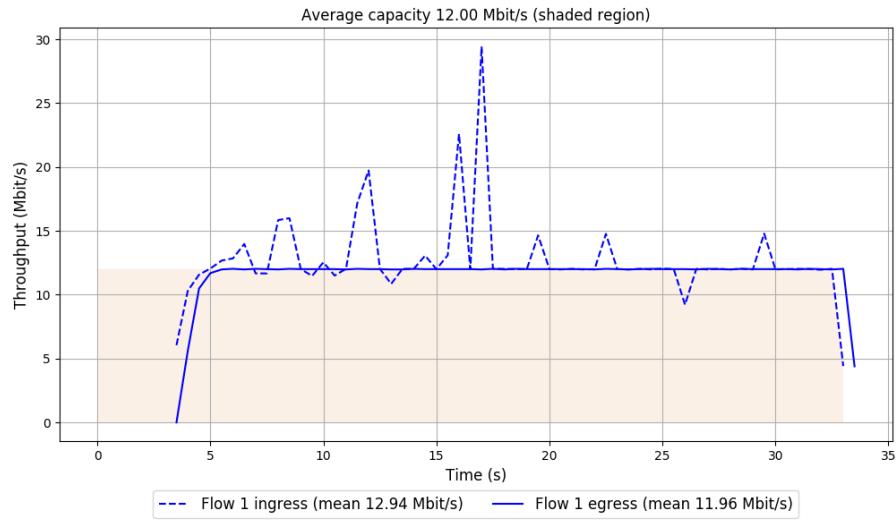


```
Run 1: Statistics of GOLD

Start at: 2019-07-01 22:07:22
End at: 2019-07-01 22:07:52

# Below is generated by plot.py at 2019-07-01 22:40:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.96 Mbit/s (99.7% utilization)
95th percentile per-packet one-way delay: 2406.345 ms
Loss rate: 7.58%
-- Flow 1:
Average throughput: 11.96 Mbit/s
95th percentile per-packet one-way delay: 2406.345 ms
Loss rate: 7.58%
```

Run 1: Report of GOLD — Data Link



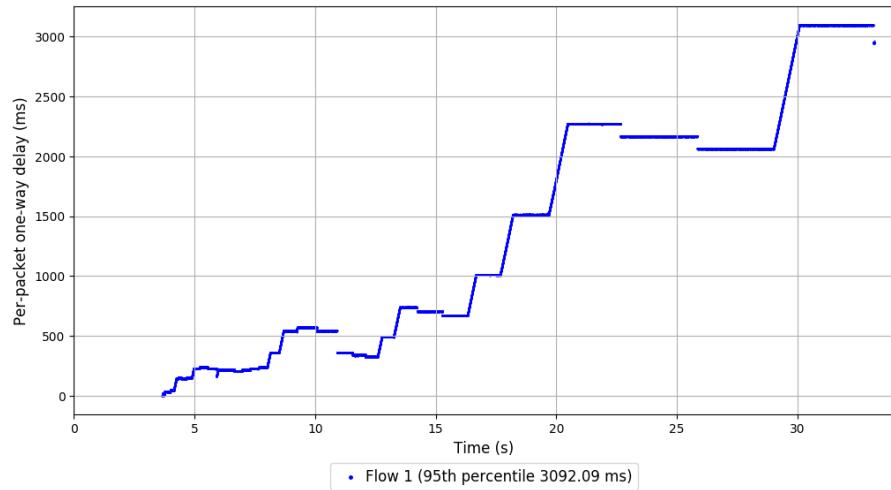
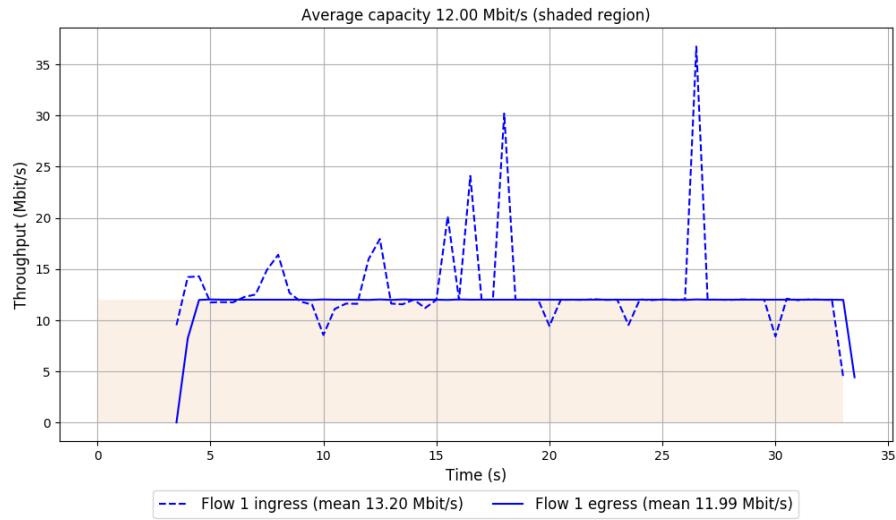
Run 2: Statistics of GOLD

Start at: 2019-07-01 22:18:15

End at: 2019-07-01 22:18:45

```
# Below is generated by plot.py at 2019-07-01 22:40:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (99.9% utilization)
95th percentile per-packet one-way delay: 3092.092 ms
Loss rate: 9.07%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 3092.092 ms
Loss rate: 9.07%
```

Run 2: Report of GOLD — Data Link



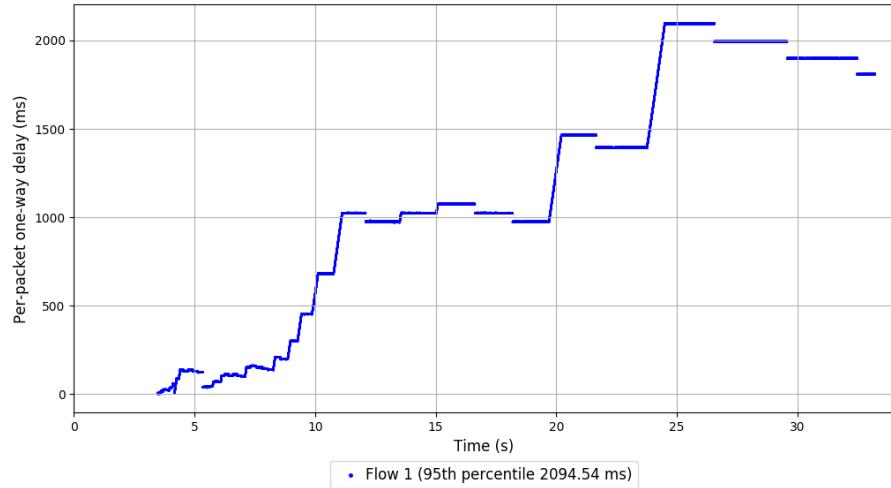
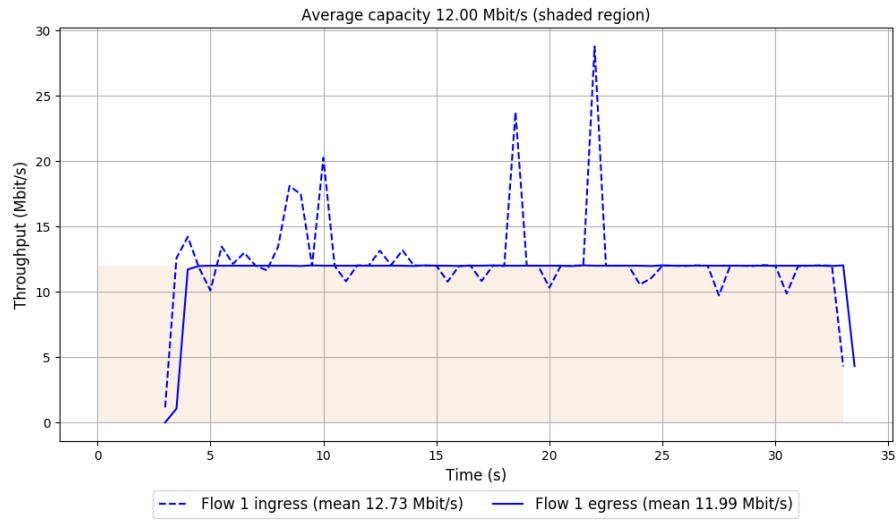
Run 3: Statistics of GOLD

Start at: 2019-07-01 22:29:06

End at: 2019-07-01 22:29:36

```
# Below is generated by plot.py at 2019-07-01 22:40:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (99.9% utilization)
95th percentile per-packet one-way delay: 2094.543 ms
Loss rate: 5.74%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 2094.543 ms
Loss rate: 5.74%
```

Run 3: Report of GOLD — Data Link

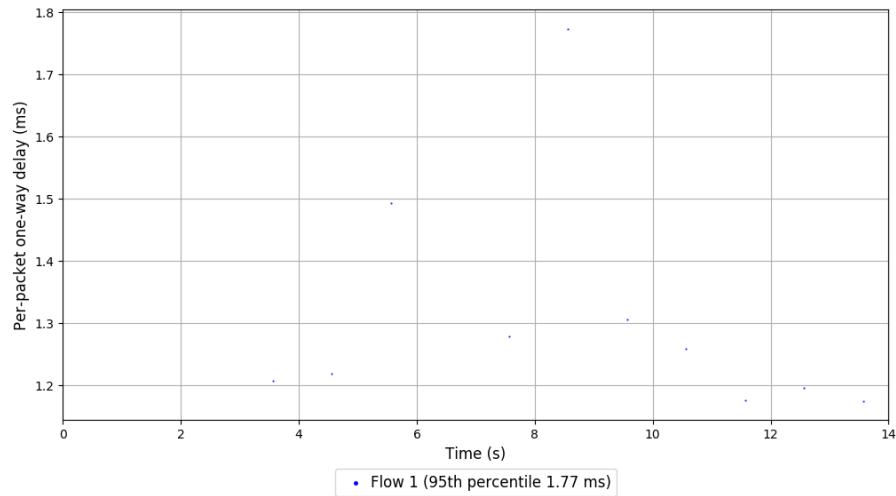
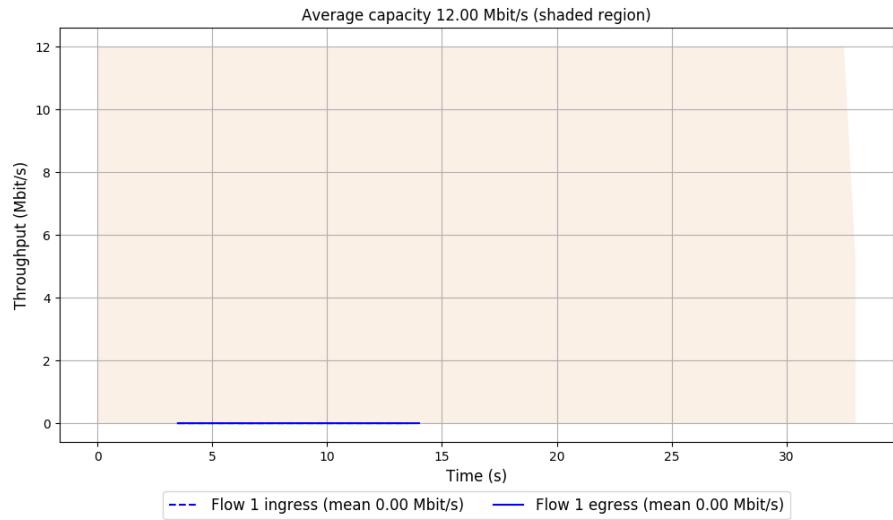


Run 1: Statistics of GoldLSTM

Start at: 2019-07-01 22:10:49

End at: 2019-07-01 22:11:19

Run 1: Report of GoldLSTM — Data Link

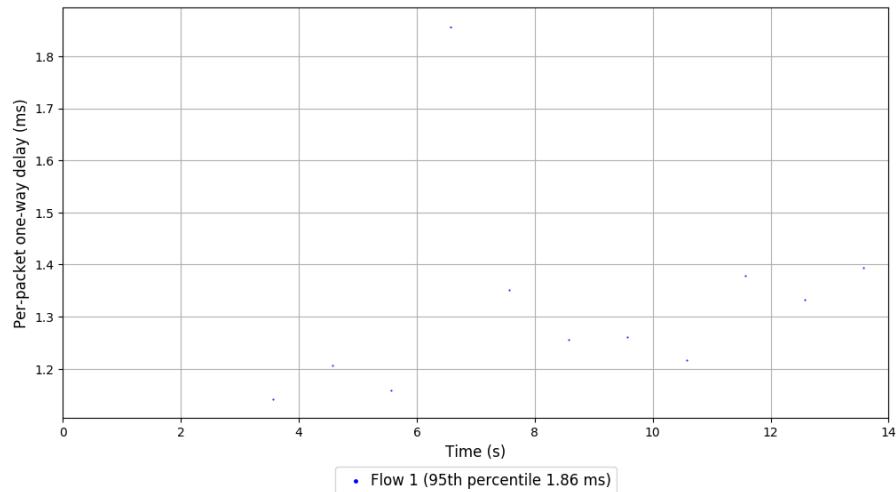
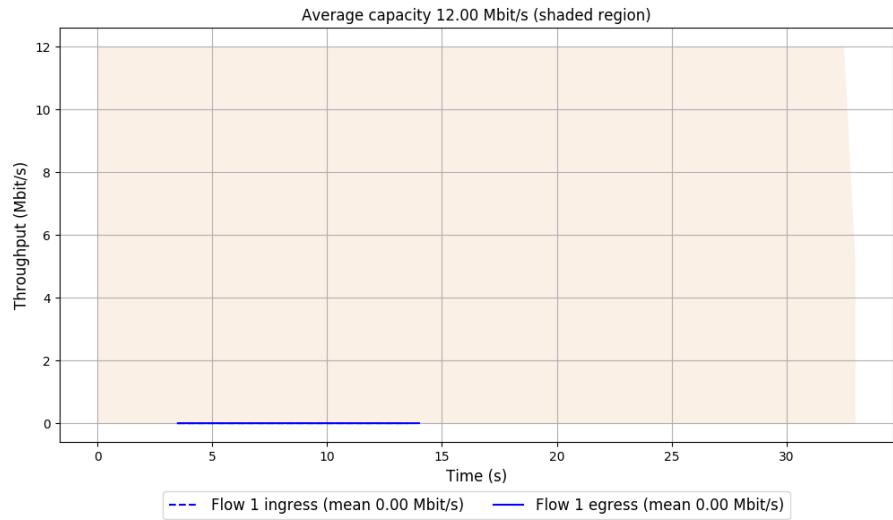


Run 2: Statistics of GoldLSTM

Start at: 2019-07-01 22:21:41

End at: 2019-07-01 22:22:11

Run 2: Report of GoldLSTM — Data Link

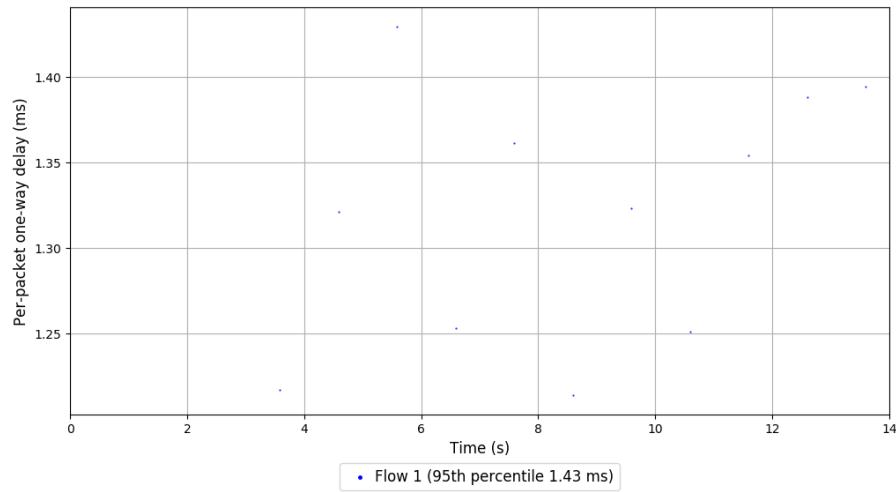
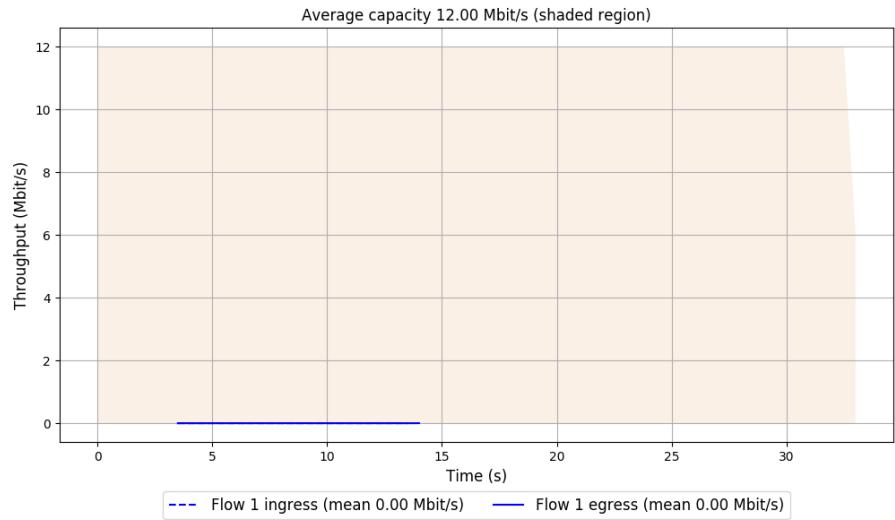


Run 3: Statistics of GoldLSTM

Start at: 2019-07-01 22:32:31

End at: 2019-07-01 22:33:02

Run 3: Report of GoldLSTM — Data Link



Run 1: Statistics of Indigo

Start at: 2019-07-01 22:06:14

End at: 2019-07-01 22:06:44

Below is generated by plot.py at 2019-07-01 22:40:25

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 10.37 Mbit/s (86.4% utilization)

95th percentile per-packet one-way delay: 9.193 ms

Loss rate: 0.03%

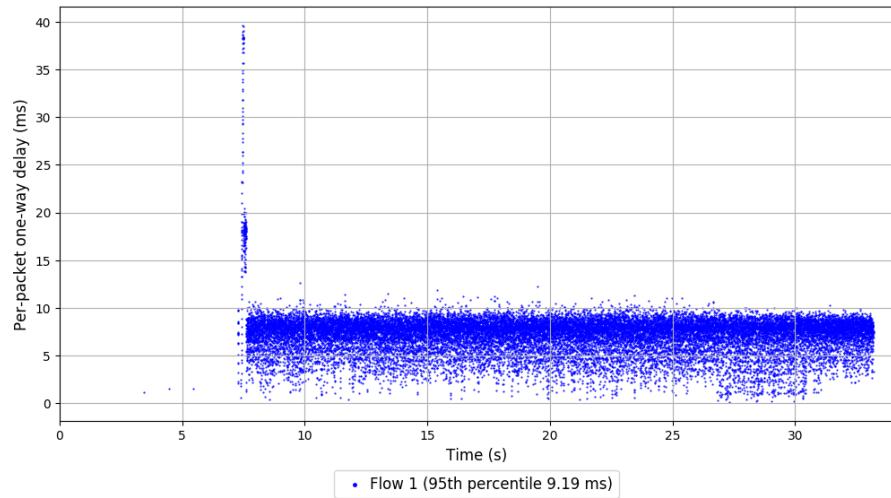
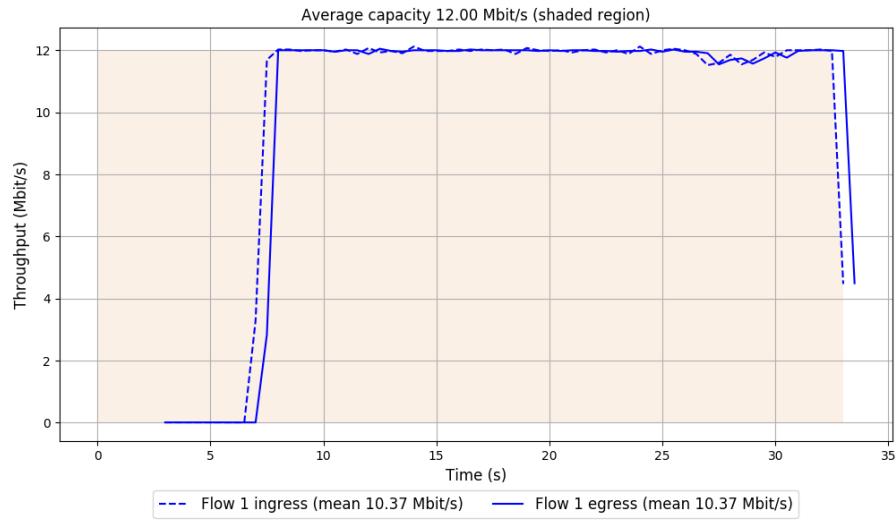
-- Flow 1:

Average throughput: 10.37 Mbit/s

95th percentile per-packet one-way delay: 9.193 ms

Loss rate: 0.03%

Run 1: Report of Indigo — Data Link



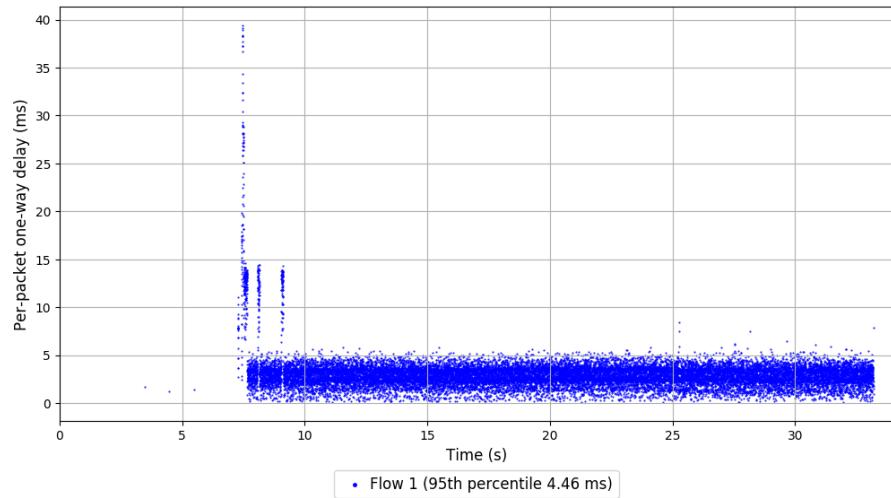
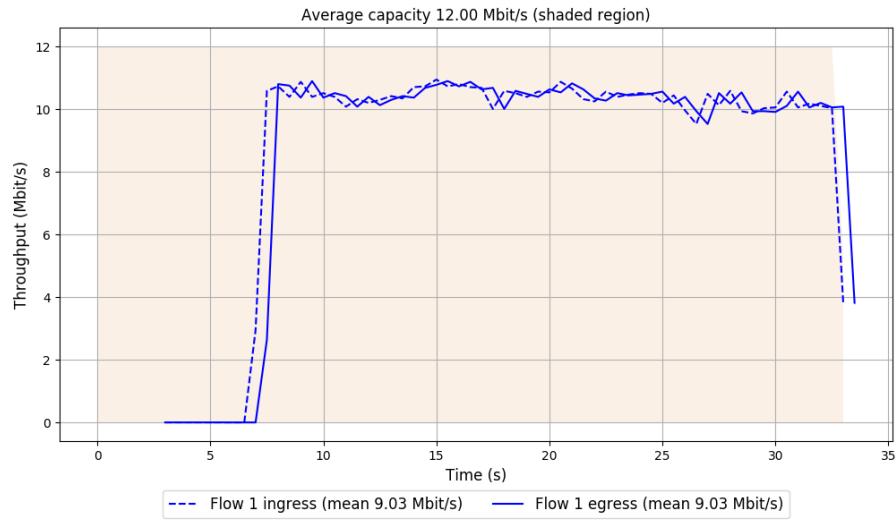
Run 2: Statistics of Indigo

Start at: 2019-07-01 22:17:07

End at: 2019-07-01 22:17:37

```
# Below is generated by plot.py at 2019-07-01 22:40:26
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.03 Mbit/s (75.3% utilization)
95th percentile per-packet one-way delay: 4.465 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 9.03 Mbit/s
95th percentile per-packet one-way delay: 4.465 ms
Loss rate: 0.01%
```

Run 2: Report of Indigo — Data Link



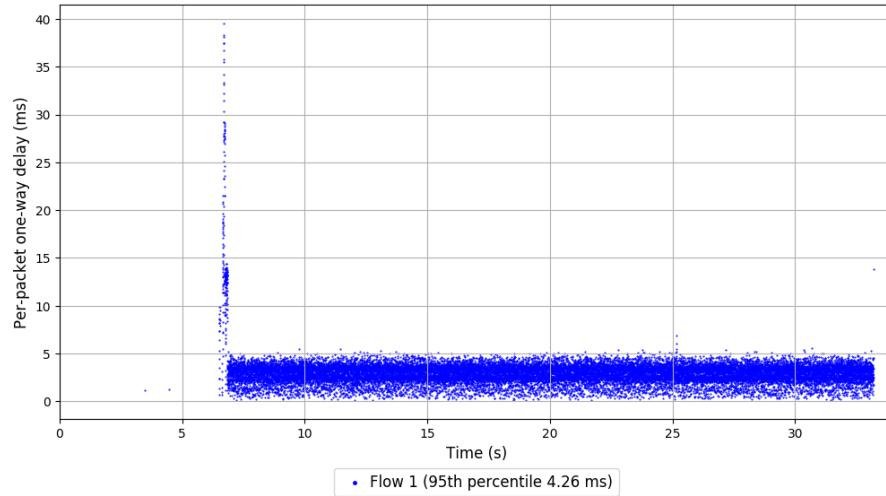
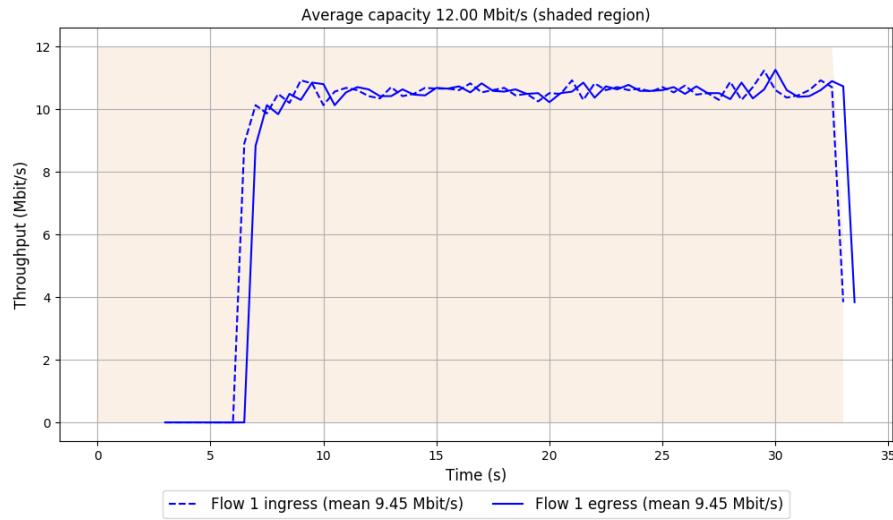
Run 3: Statistics of Indigo

Start at: 2019-07-01 22:27:57

End at: 2019-07-01 22:28:27

```
# Below is generated by plot.py at 2019-07-01 22:40:29
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.45 Mbit/s (78.8% utilization)
95th percentile per-packet one-way delay: 4.264 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 9.45 Mbit/s
95th percentile per-packet one-way delay: 4.264 ms
Loss rate: 0.01%
```

Run 3: Report of Indigo — Data Link

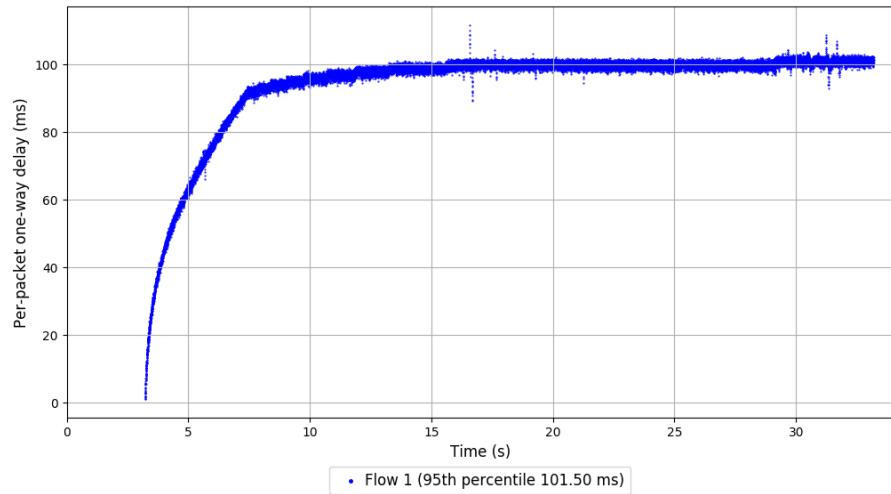
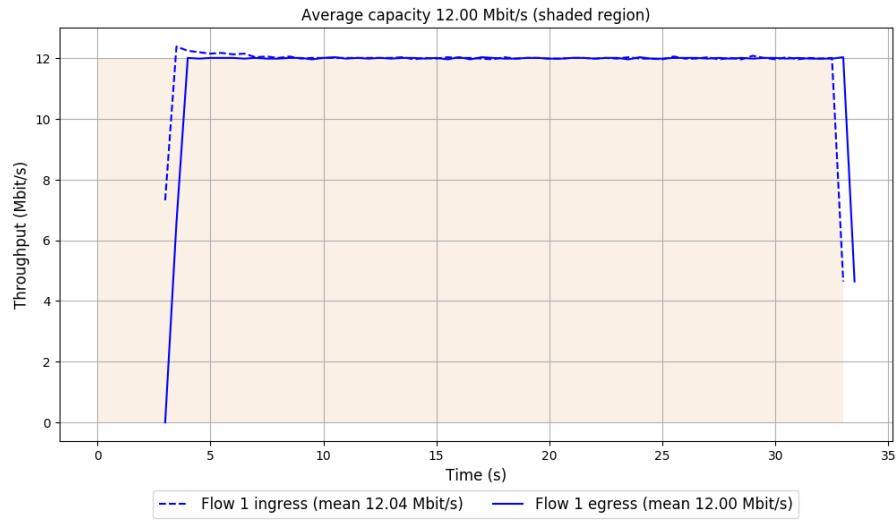


```
Run 1: Statistics of LEDBAT

Start at: 2019-07-01 22:14:48
End at: 2019-07-01 22:15:18

# Below is generated by plot.py at 2019-07-01 22:40:32
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 12.00 Mbit/s (100.0% utilization)
95th percentile per-packet one-way delay: 101.500 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 12.00 Mbit/s
95th percentile per-packet one-way delay: 101.500 ms
Loss rate: 0.33%
```

Run 1: Report of LEDBAT — Data Link



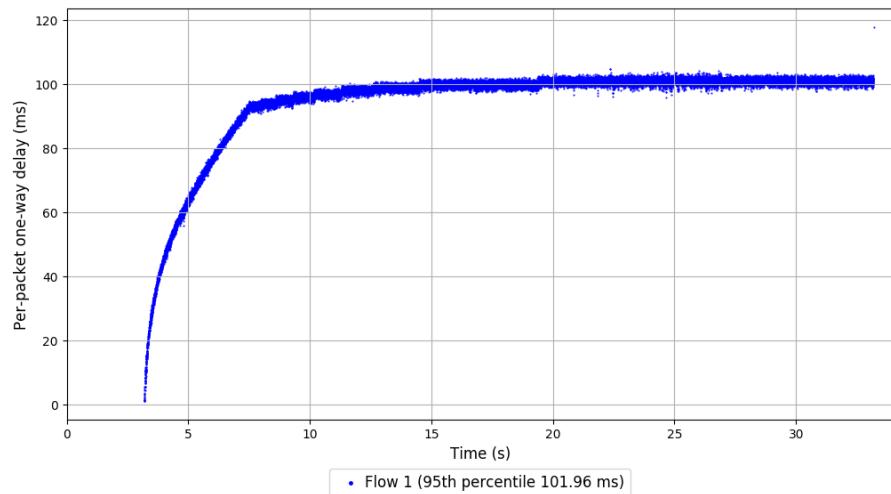
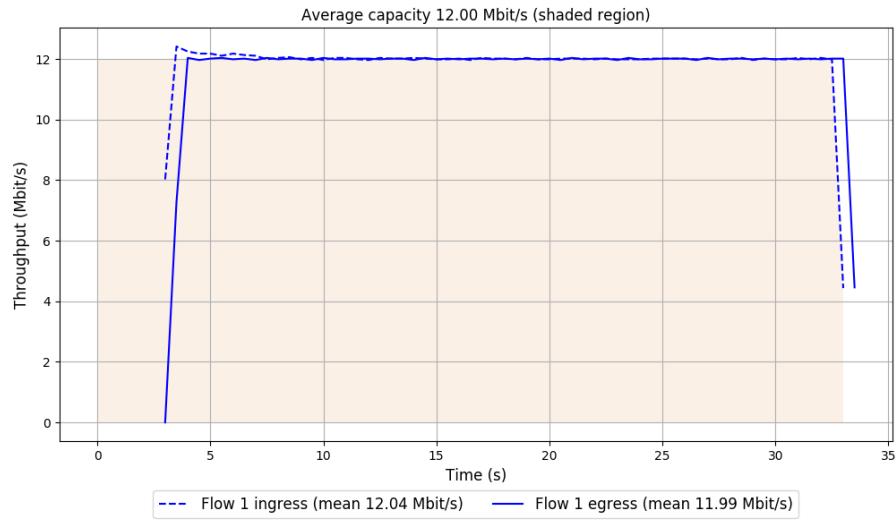
Run 2: Statistics of LEDBAT

Start at: 2019-07-01 22:25:40

End at: 2019-07-01 22:26:10

```
# Below is generated by plot.py at 2019-07-01 22:40:37
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.99 Mbit/s (99.9% utilization)
95th percentile per-packet one-way delay: 101.959 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 101.959 ms
Loss rate: 0.33%
```

Run 2: Report of LEDBAT — Data Link



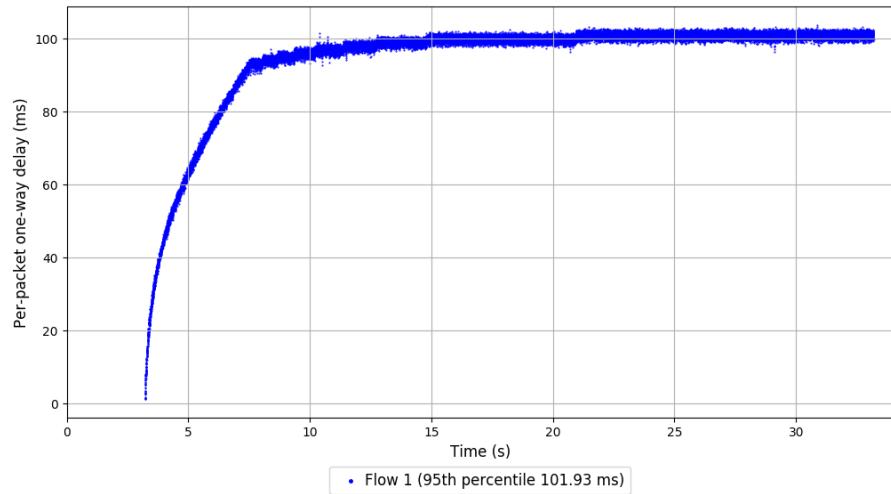
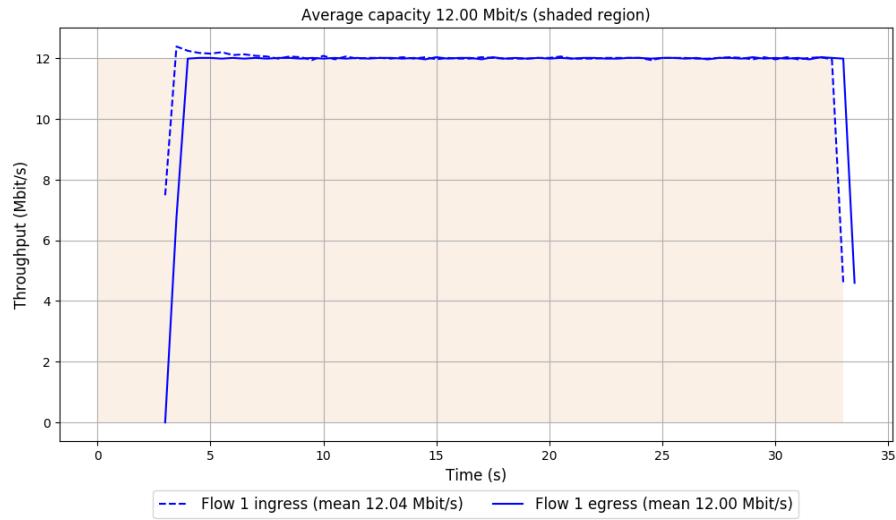
Run 3: Statistics of LEDBAT

Start at: 2019-07-01 22:36:30

End at: 2019-07-01 22:37:00

```
# Below is generated by plot.py at 2019-07-01 22:40:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 12.00 Mbit/s (100.0% utilization)
95th percentile per-packet one-way delay: 101.926 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 12.00 Mbit/s
95th percentile per-packet one-way delay: 101.926 ms
Loss rate: 0.34%
```

Run 3: Report of LEDBAT — Data Link

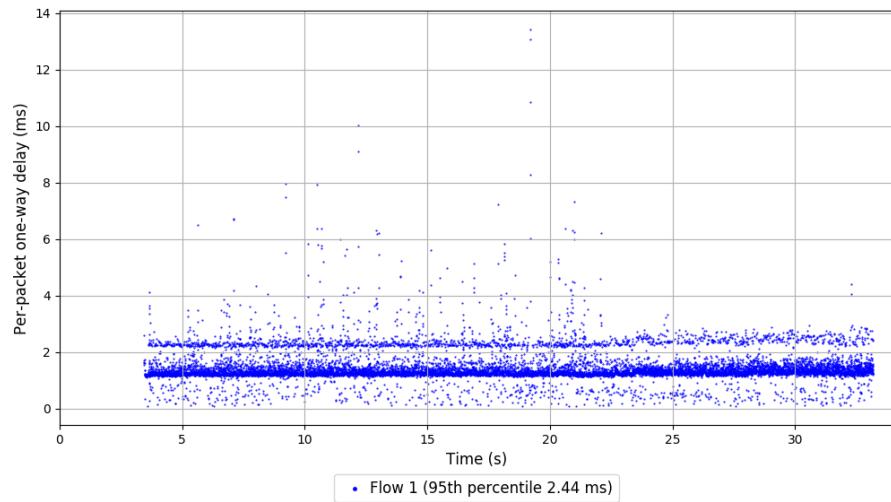
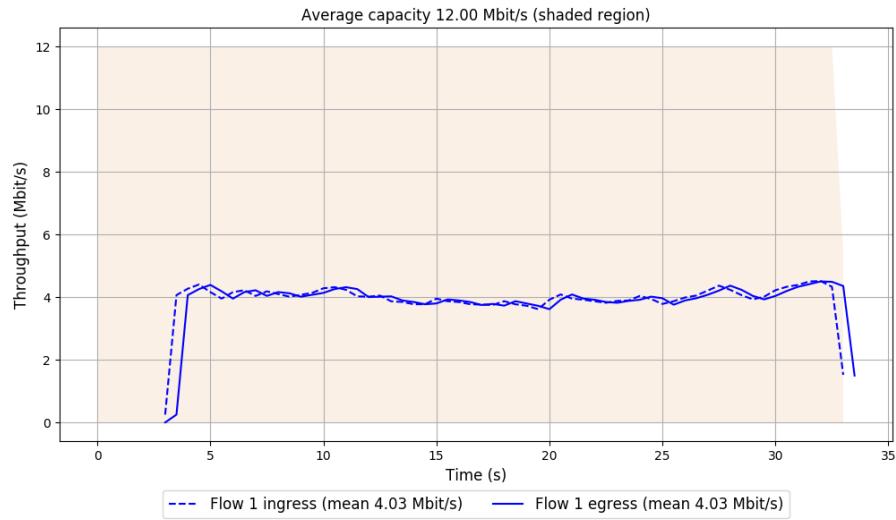


```
Run 1: Statistics of PCC-Allegro

Start at: 2019-07-01 22:13:40
End at: 2019-07-01 22:14:10

# Below is generated by plot.py at 2019-07-01 22:40:38
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.03 Mbit/s (33.6% utilization)
95th percentile per-packet one-way delay: 2.445 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 4.03 Mbit/s
95th percentile per-packet one-way delay: 2.445 ms
Loss rate: 0.01%
```

Run 1: Report of PCC-Allegro — Data Link

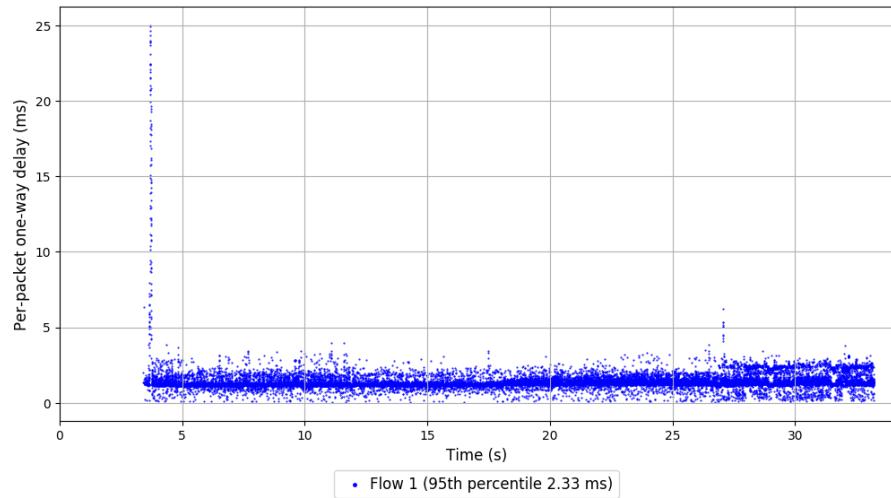
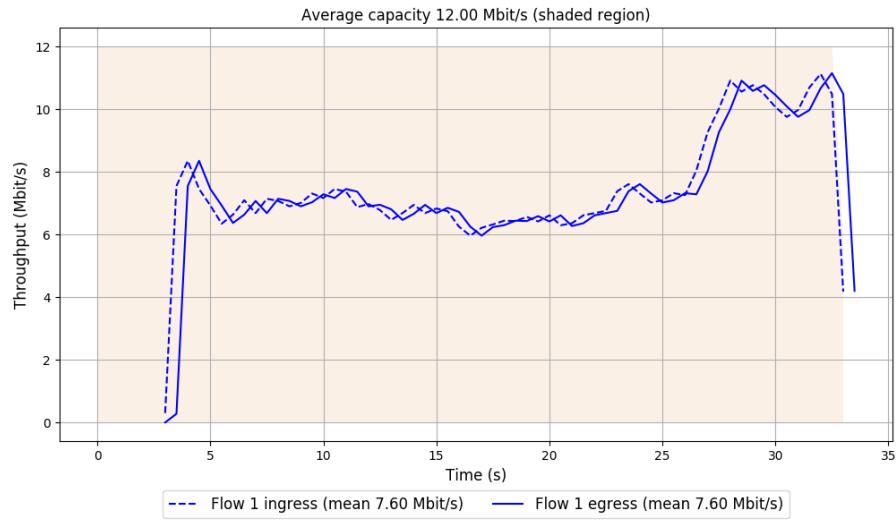


```
Run 2: Statistics of PCC-Allegro

Start at: 2019-07-01 22:24:31
End at: 2019-07-01 22:25:01

# Below is generated by plot.py at 2019-07-01 22:40:40
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 7.60 Mbit/s (63.3% utilization)
95th percentile per-packet one-way delay: 2.329 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 7.60 Mbit/s
95th percentile per-packet one-way delay: 2.329 ms
Loss rate: 0.00%
```

Run 2: Report of PCC-Allegro — Data Link

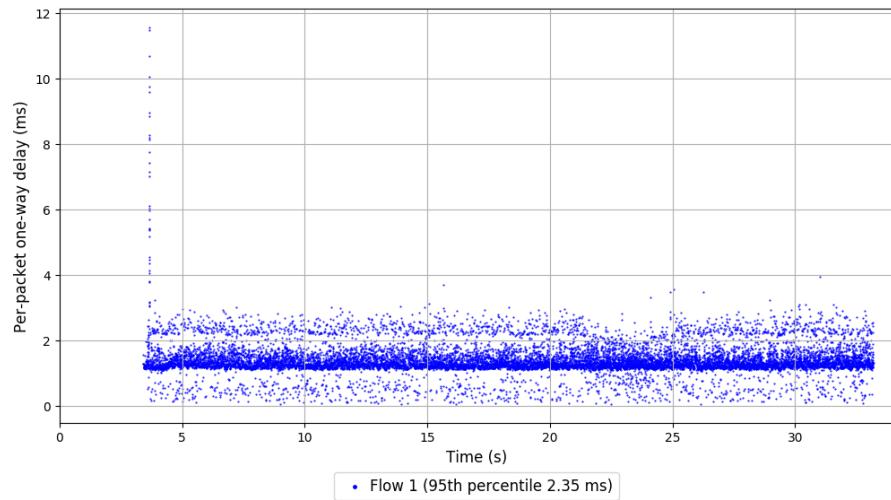
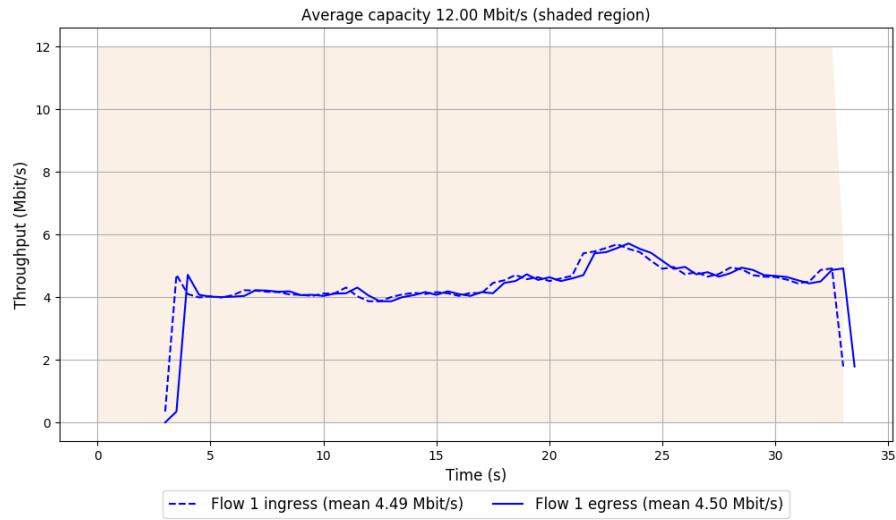


```
Run 3: Statistics of PCC-Allegro

Start at: 2019-07-01 22:35:22
End at: 2019-07-01 22:35:52

# Below is generated by plot.py at 2019-07-01 22:40:41
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 4.50 Mbit/s (37.5% utilization)
95th percentile per-packet one-way delay: 2.347 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 4.50 Mbit/s
95th percentile per-packet one-way delay: 2.347 ms
Loss rate: 0.01%
```

Run 3: Report of PCC-Allegro — Data Link



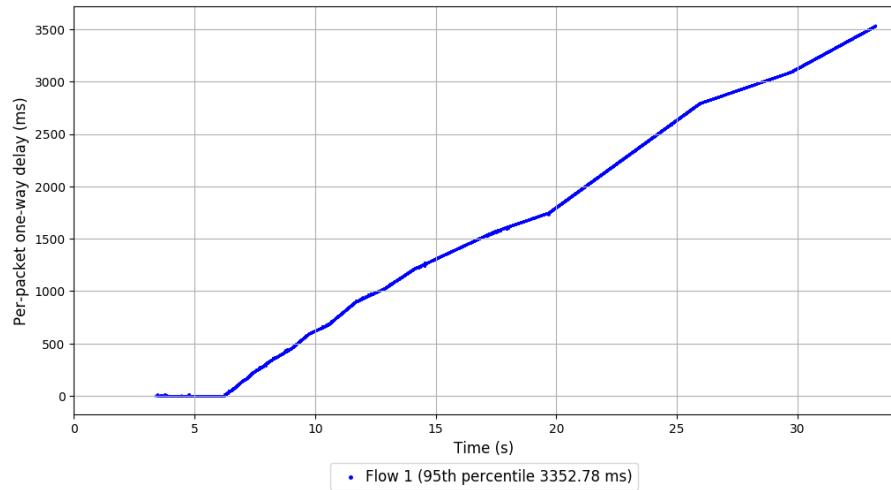
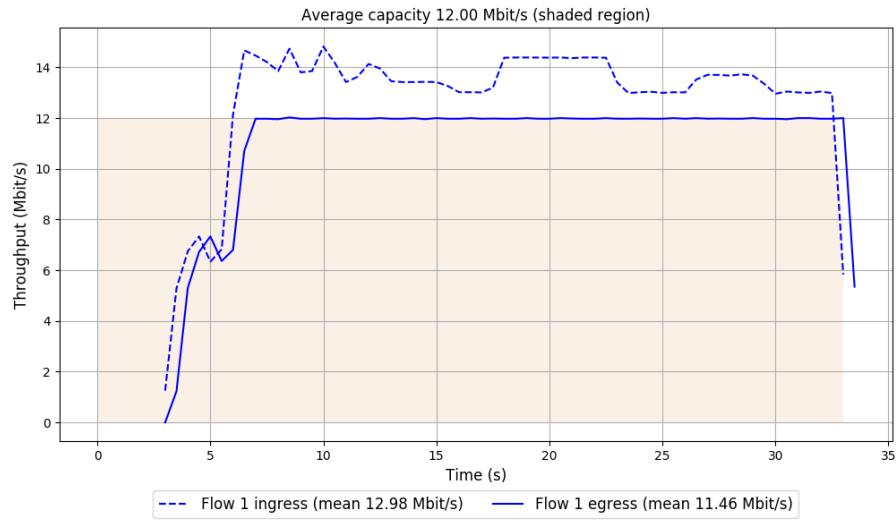
```
Run 1: Statistics of PCC-Expr
```

```
Start at: 2019-07-01 22:15:23
```

```
End at: 2019-07-01 22:15:53
```

```
# Below is generated by plot.py at 2019-07-01 22:40:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.46 Mbit/s (95.5% utilization)
95th percentile per-packet one-way delay: 3352.778 ms
Loss rate: 11.84%
-- Flow 1:
Average throughput: 11.46 Mbit/s
95th percentile per-packet one-way delay: 3352.778 ms
Loss rate: 11.84%
```

Run 1: Report of PCC-Expr — Data Link

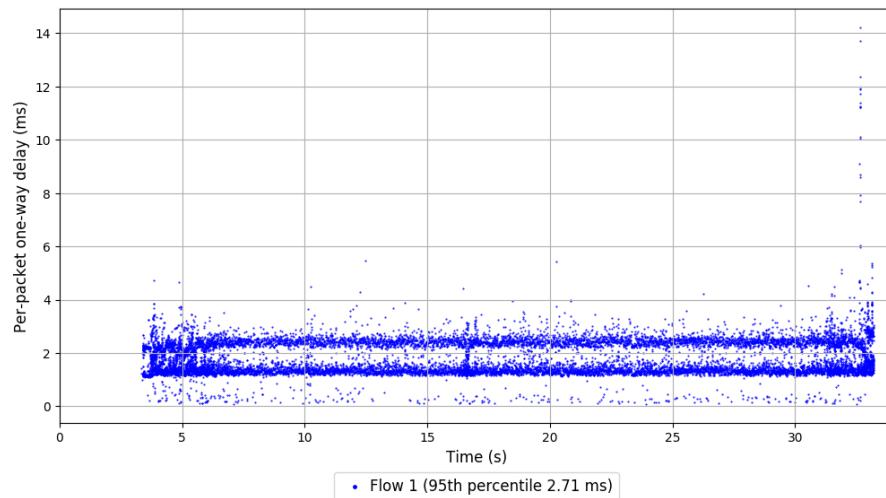
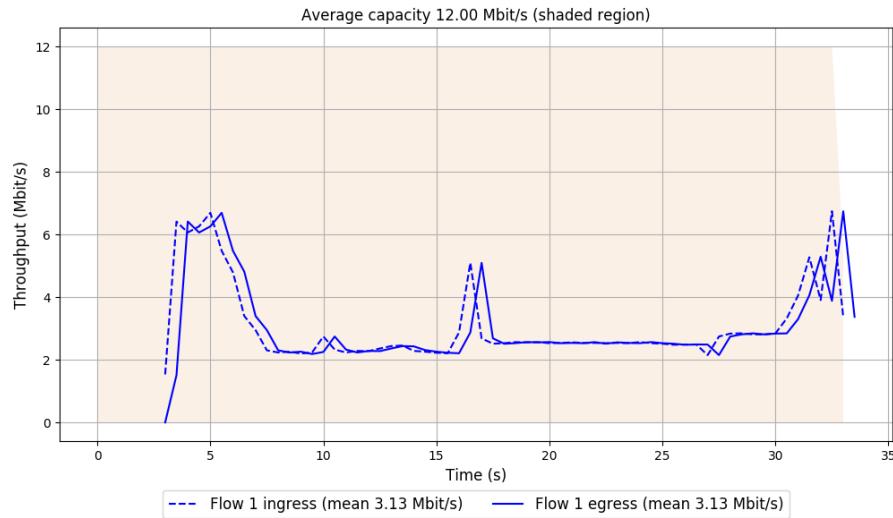


```
Run 2: Statistics of PCC-Expr

Start at: 2019-07-01 22:26:14
End at: 2019-07-01 22:26:44

# Below is generated by plot.py at 2019-07-01 22:40:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.13 Mbit/s (26.1% utilization)
95th percentile per-packet one-way delay: 2.713 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 3.13 Mbit/s
95th percentile per-packet one-way delay: 2.713 ms
Loss rate: 0.01%
```

Run 2: Report of PCC-Expr — Data Link

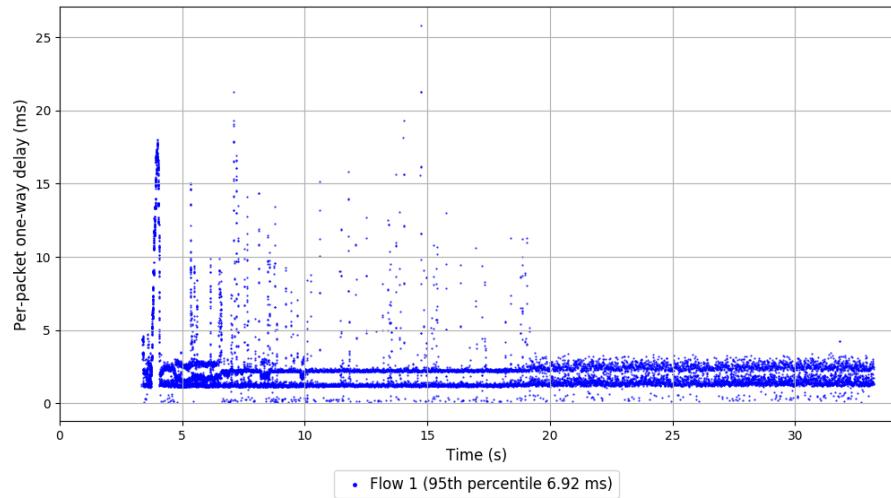
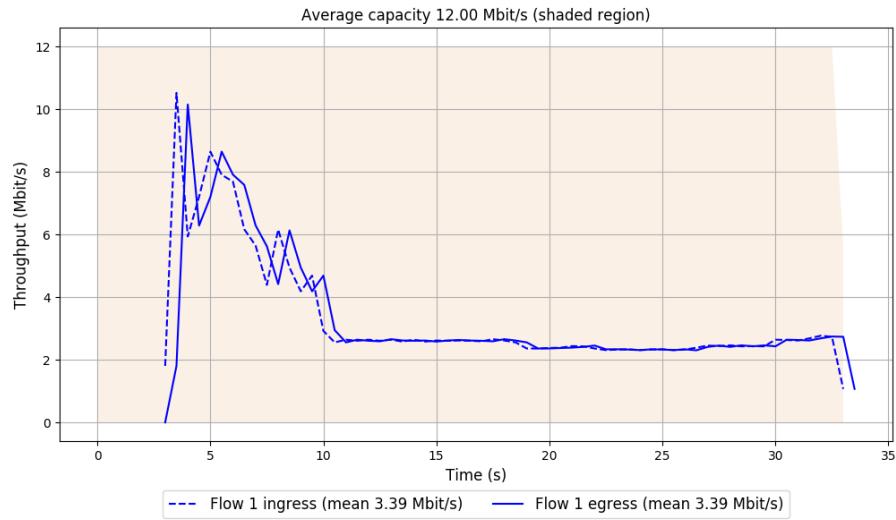


```
Run 3: Statistics of PCC-Expr

Start at: 2019-07-01 22:37:04
End at: 2019-07-01 22:37:35

# Below is generated by plot.py at 2019-07-01 22:40:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.39 Mbit/s (28.3% utilization)
95th percentile per-packet one-way delay: 6.924 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 3.39 Mbit/s
95th percentile per-packet one-way delay: 6.924 ms
Loss rate: 0.01%
```

Run 3: Report of PCC-Expr — Data Link

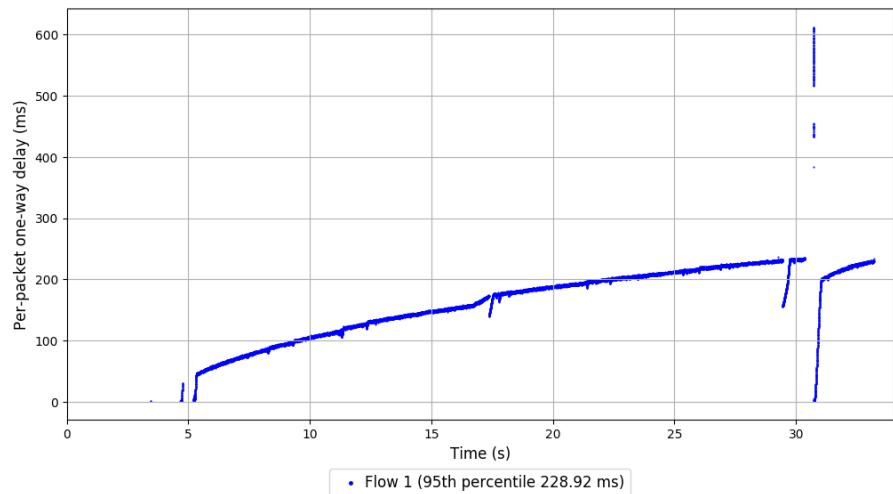
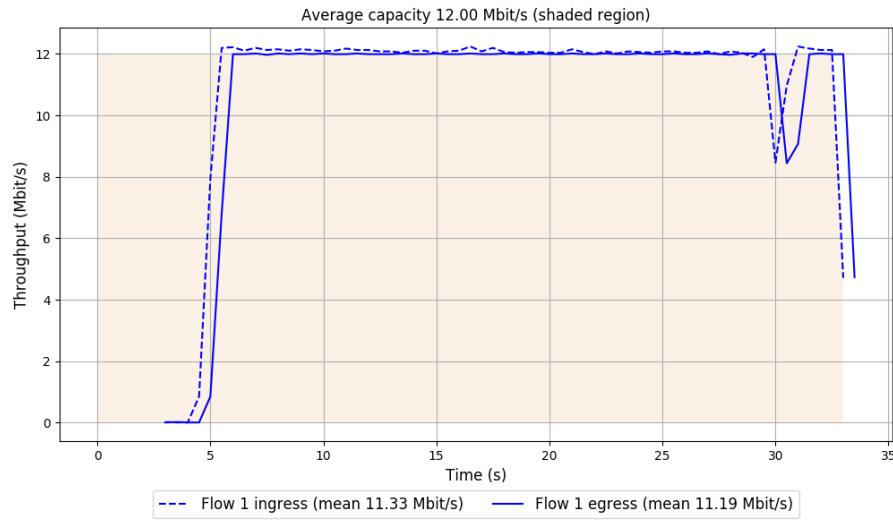


```
Run 1: Statistics of QUIC Cubic

Start at: 2019-07-01 22:13:06
End at: 2019-07-01 22:13:36

# Below is generated by plot.py at 2019-07-01 22:40:54
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.19 Mbit/s (93.3% utilization)
95th percentile per-packet one-way delay: 228.922 ms
Loss rate: 1.21%
-- Flow 1:
Average throughput: 11.19 Mbit/s
95th percentile per-packet one-way delay: 228.922 ms
Loss rate: 1.21%
```

Run 1: Report of QUIC Cubic — Data Link

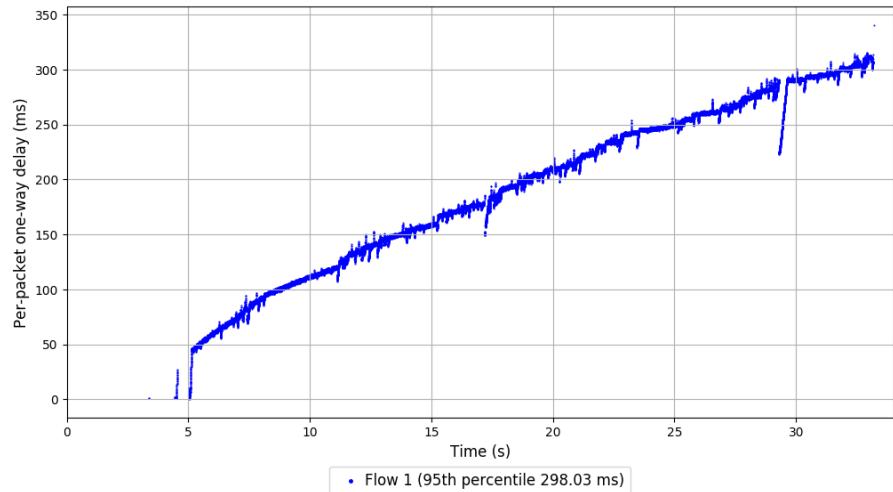
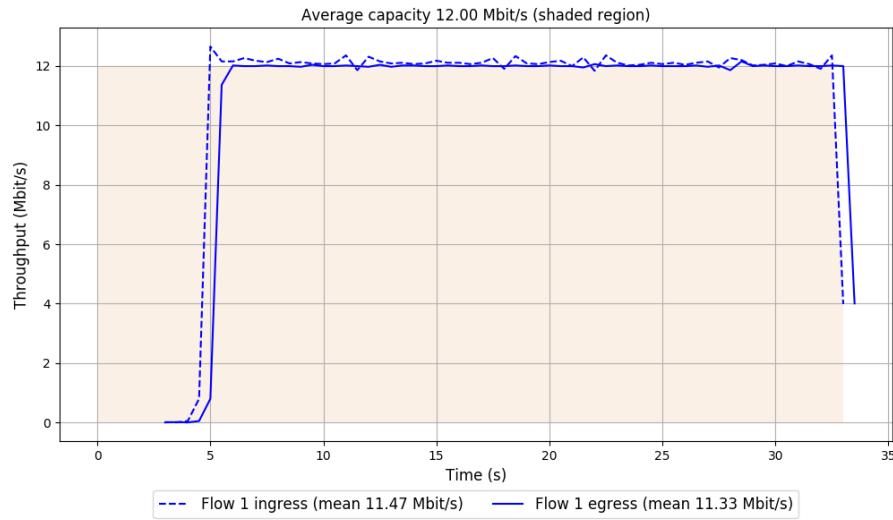


```
Run 2: Statistics of QUIC Cubic

Start at: 2019-07-01 22:23:57
End at: 2019-07-01 22:24:27

# Below is generated by plot.py at 2019-07-01 22:40:56
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.33 Mbit/s (94.4% utilization)
95th percentile per-packet one-way delay: 298.034 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 11.33 Mbit/s
95th percentile per-packet one-way delay: 298.034 ms
Loss rate: 1.10%
```

Run 2: Report of QUIC Cubic — Data Link

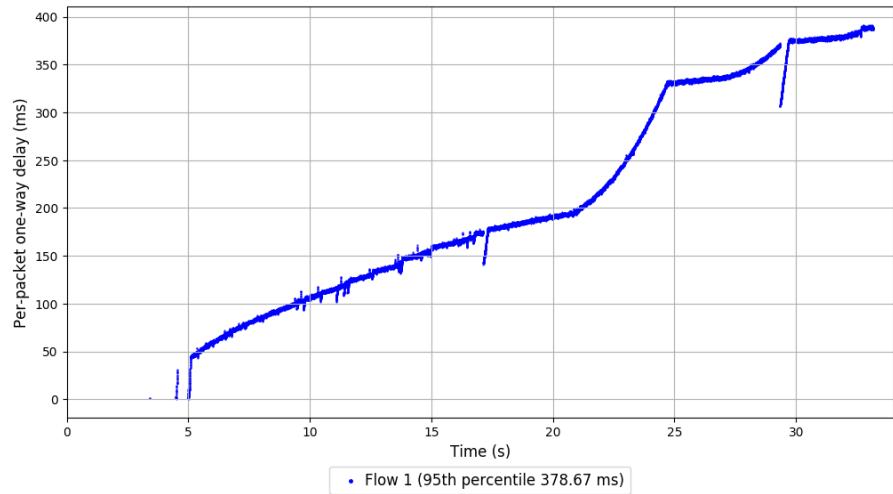
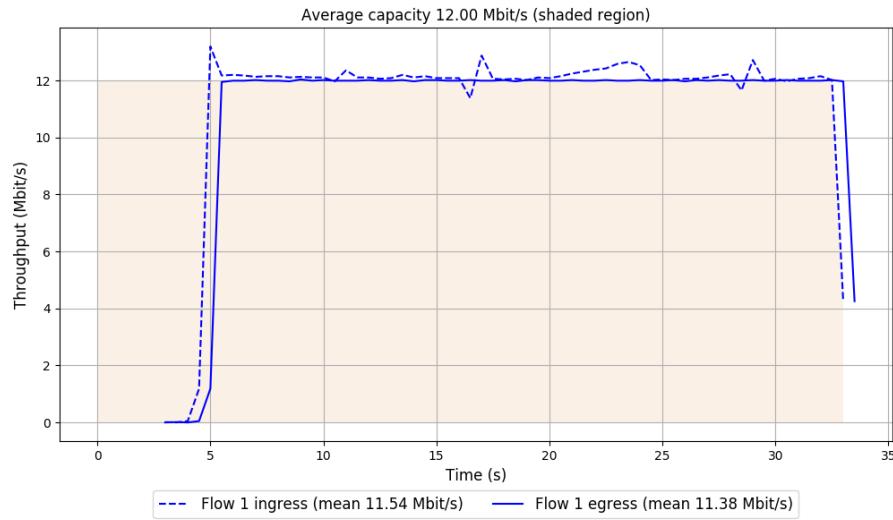


```
Run 3: Statistics of QUIC Cubic

Start at: 2019-07-01 22:34:48
End at: 2019-07-01 22:35:18

# Below is generated by plot.py at 2019-07-01 22:40:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.38 Mbit/s (94.8% utilization)
95th percentile per-packet one-way delay: 378.669 ms
Loss rate: 1.36%
-- Flow 1:
Average throughput: 11.38 Mbit/s
95th percentile per-packet one-way delay: 378.669 ms
Loss rate: 1.36%
```

Run 3: Report of QUIC Cubic — Data Link

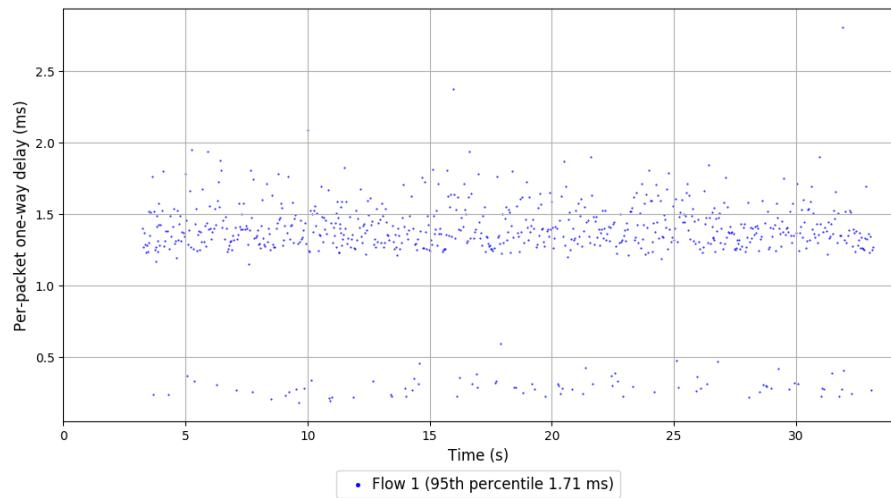
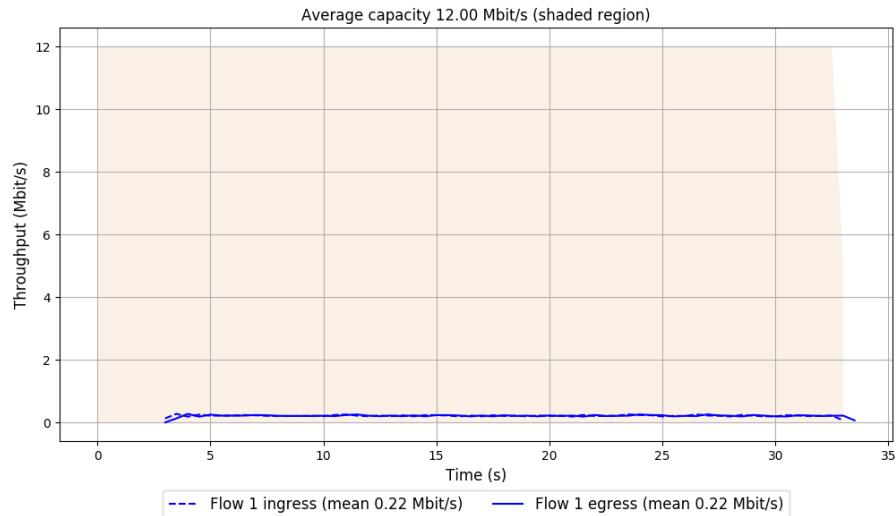


```
Run 1: Statistics of SCReAM

Start at: 2019-07-01 22:12:32
End at: 2019-07-01 22:13:02

# Below is generated by plot.py at 2019-07-01 22:40:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.22 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 1.711 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1.711 ms
Loss rate: 0.00%
```

Run 1: Report of SCReAM — Data Link



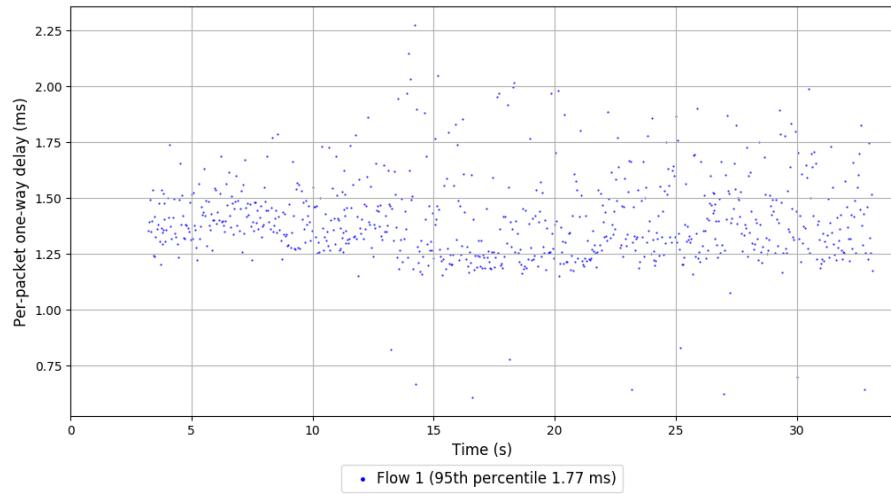
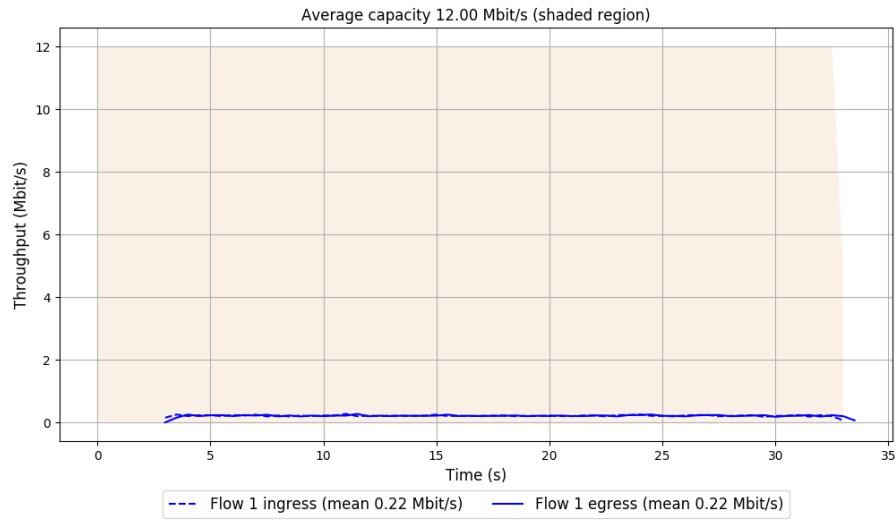
Run 2: Statistics of SCReAM

Start at: 2019-07-01 22:23:23

End at: 2019-07-01 22:23:53

```
# Below is generated by plot.py at 2019-07-01 22:40:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.22 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 1.771 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1.771 ms
Loss rate: 0.00%
```

Run 2: Report of SCReAM — Data Link



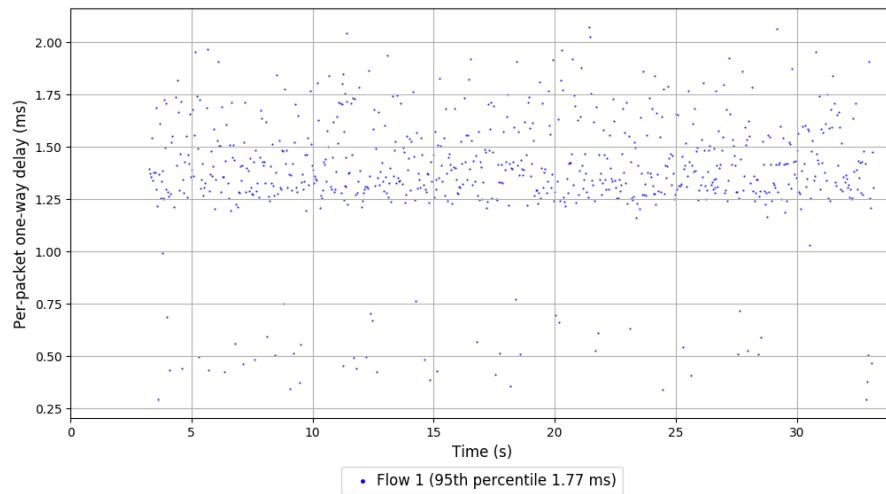
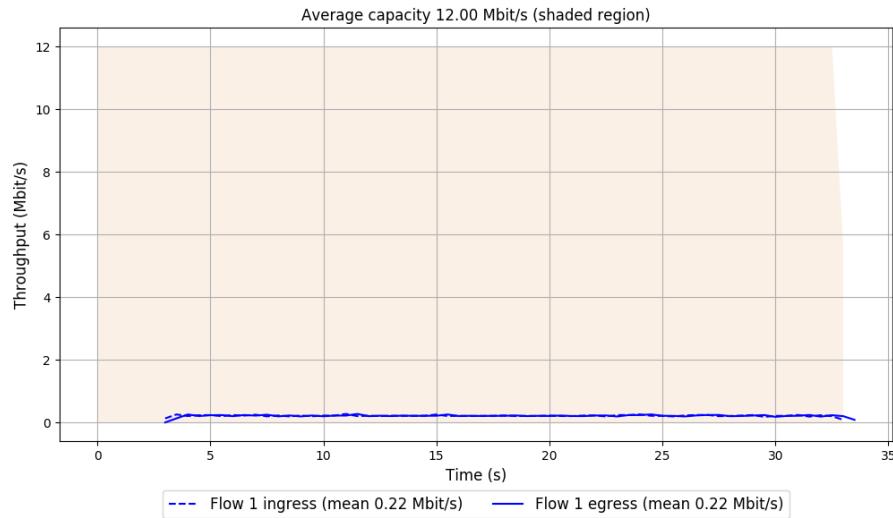
Run 3: Statistics of SCReAM

Start at: 2019-07-01 22:34:14

End at: 2019-07-01 22:34:44

```
# Below is generated by plot.py at 2019-07-01 22:40:59
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 0.22 Mbit/s (1.8% utilization)
95th percentile per-packet one-way delay: 1.774 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1.774 ms
Loss rate: 0.00%
```

Run 3: Report of SCReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-07-01 22:08:31

End at: 2019-07-01 22:09:01

Below is generated by plot.py at 2019-07-01 22:41:08

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 11.98 Mbit/s (99.8% utilization)

95th percentile per-packet one-way delay: 71.777 ms

Loss rate: 0.23%

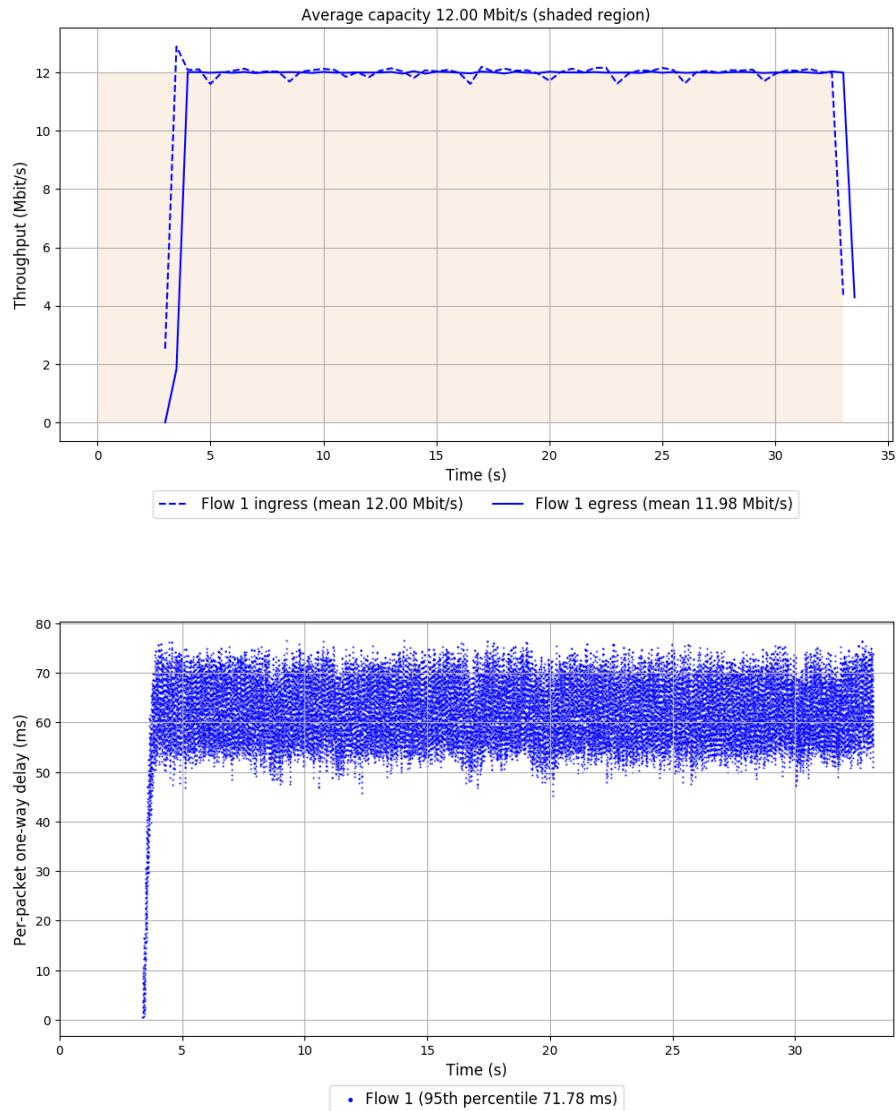
-- Flow 1:

Average throughput: 11.98 Mbit/s

95th percentile per-packet one-way delay: 71.777 ms

Loss rate: 0.23%

Run 1: Report of Sprout — Data Link



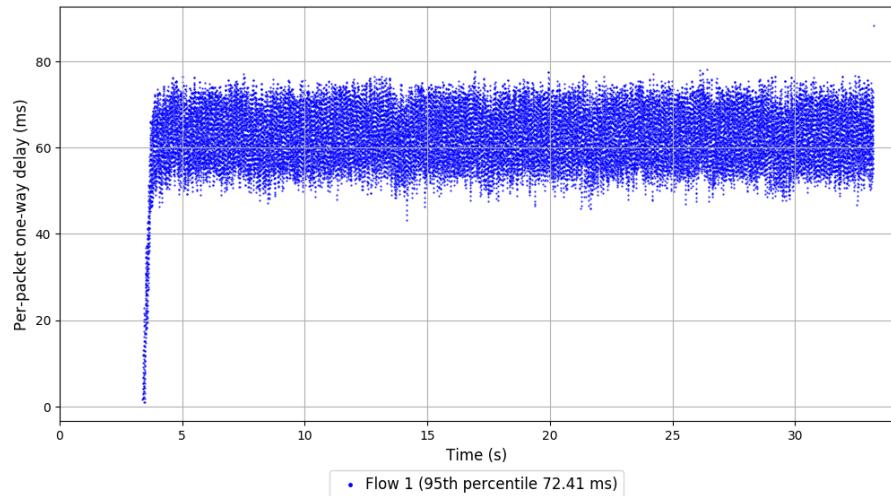
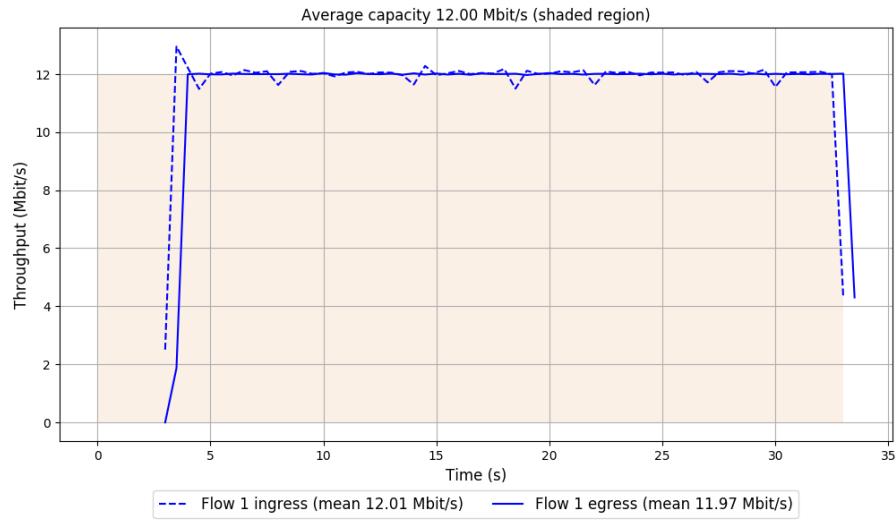
Run 2: Statistics of Sprout

Start at: 2019-07-01 22:19:24

End at: 2019-07-01 22:19:54

```
# Below is generated by plot.py at 2019-07-01 22:41:11
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.97 Mbit/s (99.7% utilization)
95th percentile per-packet one-way delay: 72.406 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 11.97 Mbit/s
95th percentile per-packet one-way delay: 72.406 ms
Loss rate: 0.21%
```

Run 2: Report of Sprout — Data Link



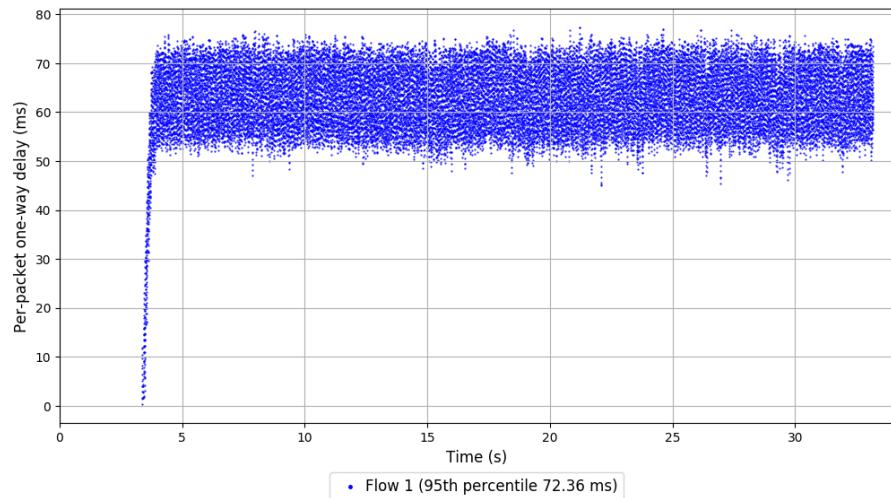
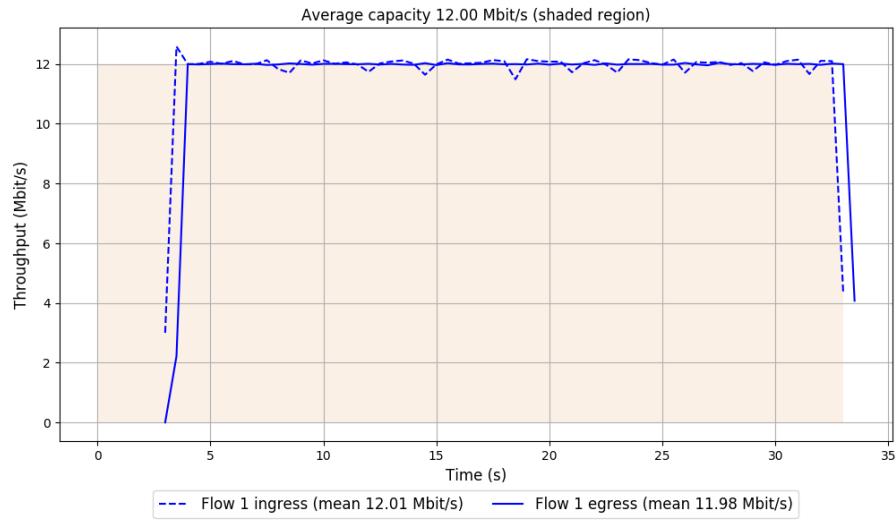
Run 3: Statistics of Sprout

Start at: 2019-07-01 22:30:15

End at: 2019-07-01 22:30:45

```
# Below is generated by plot.py at 2019-07-01 22:41:11
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.98 Mbit/s (99.8% utilization)
95th percentile per-packet one-way delay: 72.362 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 11.98 Mbit/s
95th percentile per-packet one-way delay: 72.362 ms
Loss rate: 0.25%
```

Run 3: Report of Sprout — Data Link

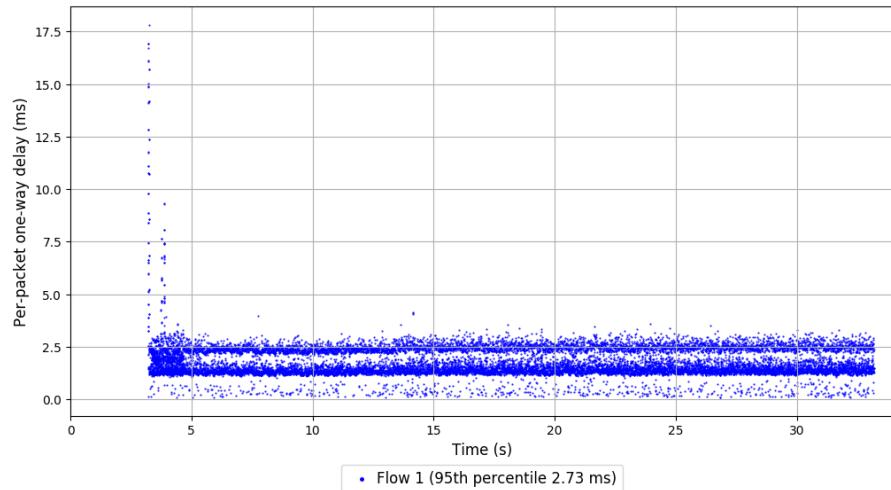
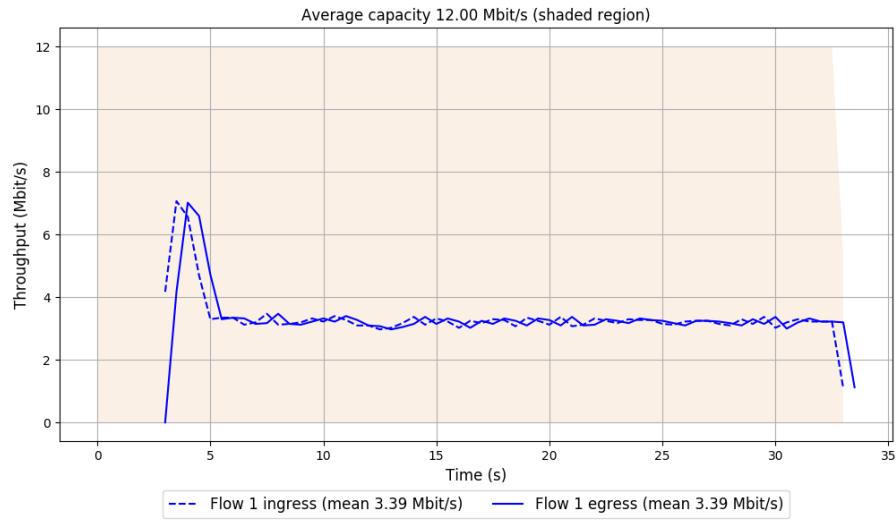


```
Run 1: Statistics of TaoVA-100x

Start at: 2019-07-01 22:11:22
End at: 2019-07-01 22:11:52

# Below is generated by plot.py at 2019-07-01 22:41:11
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.39 Mbit/s (28.3% utilization)
95th percentile per-packet one-way delay: 2.727 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.39 Mbit/s
95th percentile per-packet one-way delay: 2.727 ms
Loss rate: 0.00%
```

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

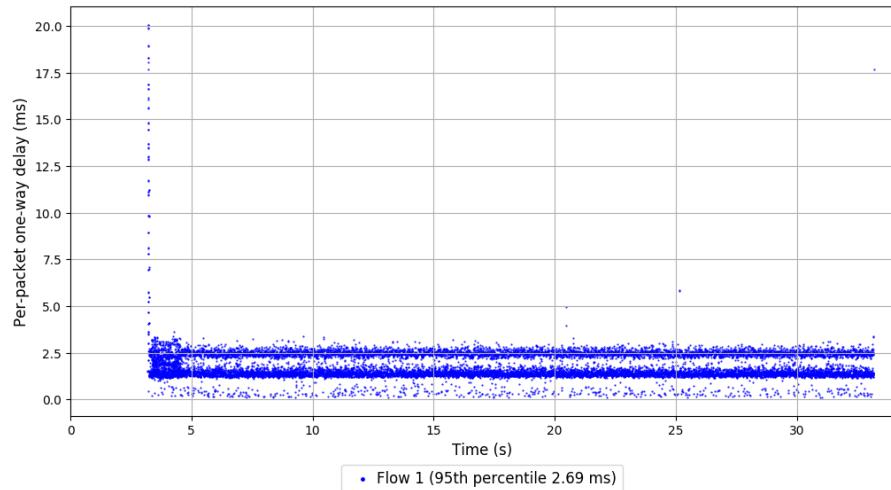
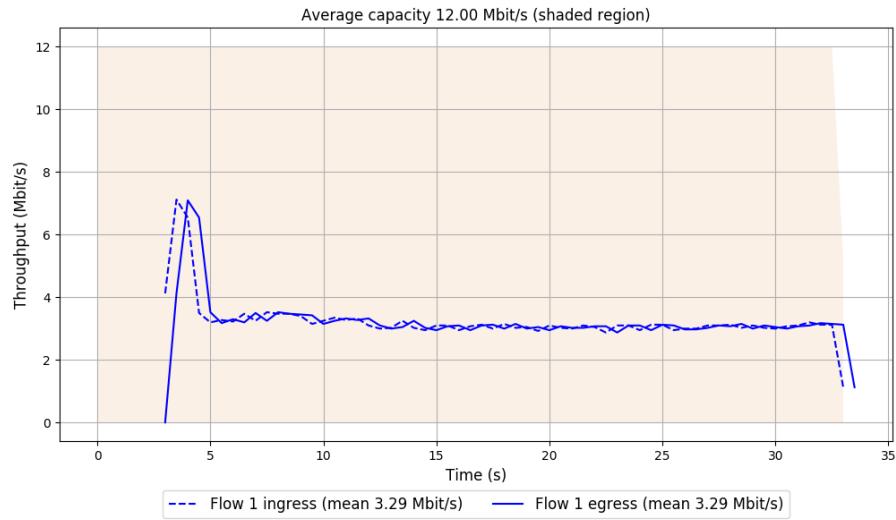


```
Run 2: Statistics of TaoVA-100x

Start at: 2019-07-01 22:22:15
End at: 2019-07-01 22:22:45

# Below is generated by plot.py at 2019-07-01 22:41:13
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.29 Mbit/s (27.4% utilization)
95th percentile per-packet one-way delay: 2.687 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.29 Mbit/s
95th percentile per-packet one-way delay: 2.687 ms
Loss rate: 0.00%
```

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

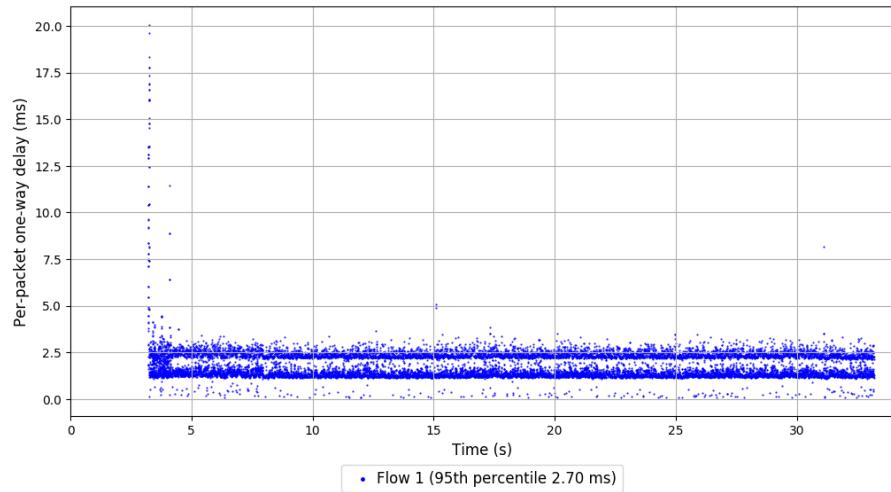
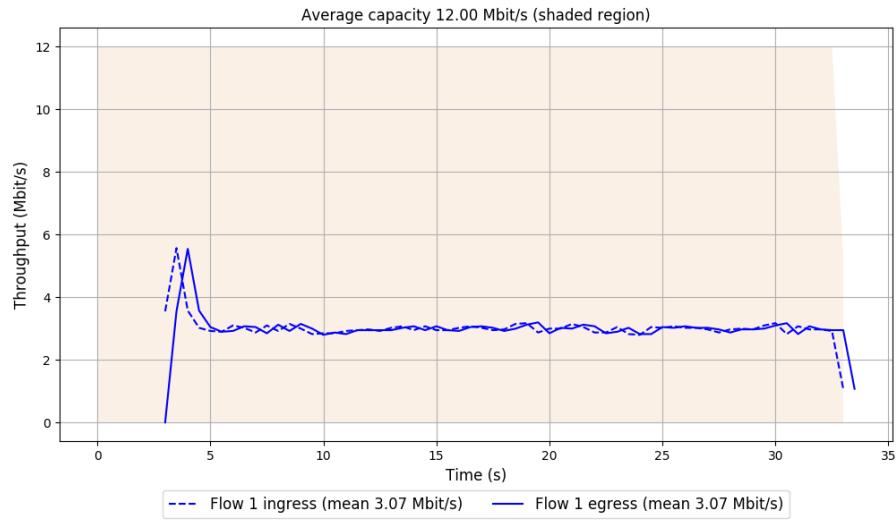


```
Run 3: Statistics of TaoVA-100x

Start at: 2019-07-01 22:33:05
End at: 2019-07-01 22:33:35

# Below is generated by plot.py at 2019-07-01 22:41:15
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 3.07 Mbit/s (25.5% utilization)
95th percentile per-packet one-way delay: 2.697 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.07 Mbit/s
95th percentile per-packet one-way delay: 2.697 ms
Loss rate: 0.00%
```

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

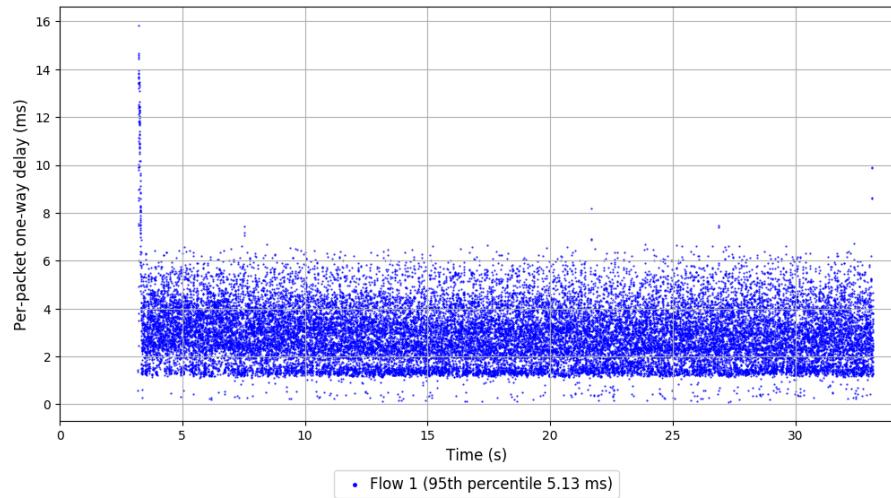
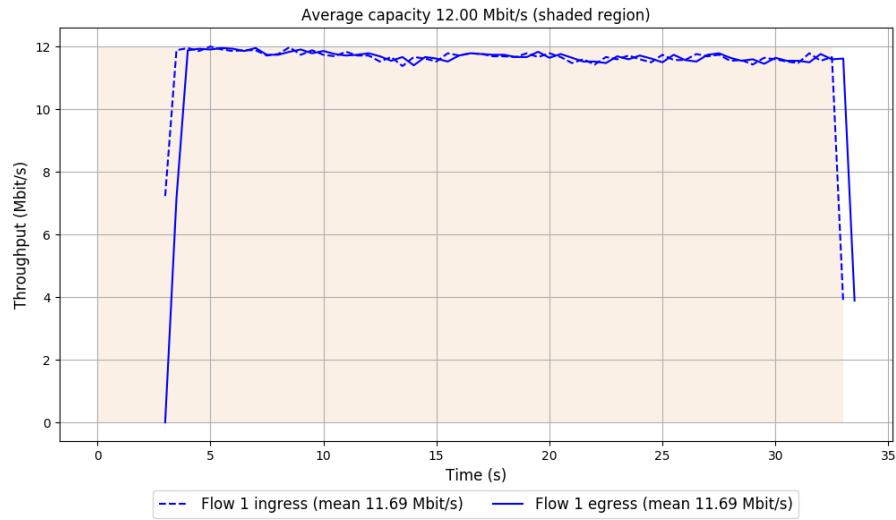


```
Run 1: Statistics of TCP Vegas

Start at: 2019-07-01 22:09:40
End at: 2019-07-01 22:10:10

# Below is generated by plot.py at 2019-07-01 22:41:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.69 Mbit/s (97.4% utilization)
95th percentile per-packet one-way delay: 5.133 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 5.133 ms
Loss rate: 0.00%
```

Run 1: Report of TCP Vegas — Data Link



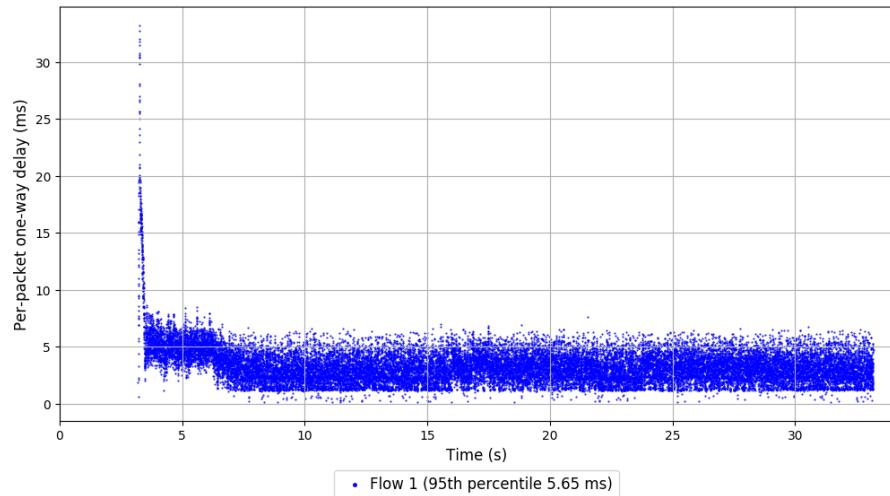
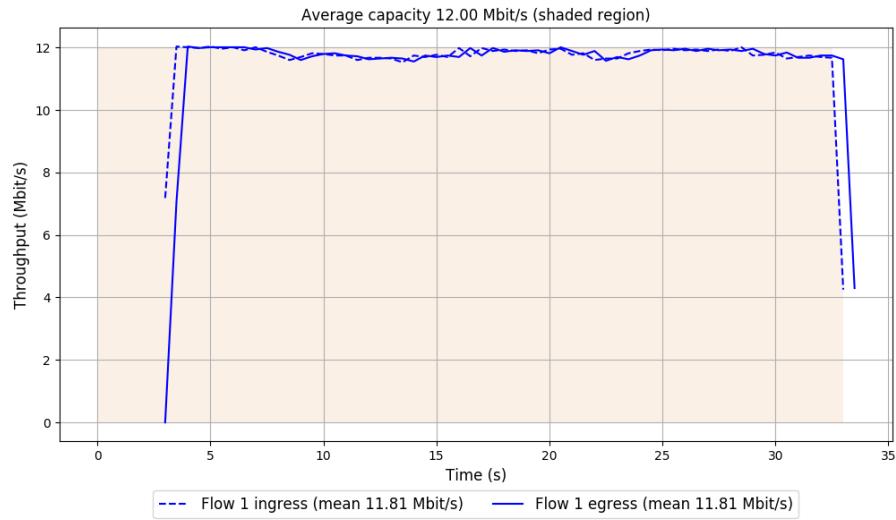
Run 2: Statistics of TCP Vegas

Start at: 2019-07-01 22:20:33

End at: 2019-07-01 22:21:03

```
# Below is generated by plot.py at 2019-07-01 22:41:20
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.81 Mbit/s (98.4% utilization)
95th percentile per-packet one-way delay: 5.654 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 11.81 Mbit/s
95th percentile per-packet one-way delay: 5.654 ms
Loss rate: 0.00%
```

Run 2: Report of TCP Vegas — Data Link



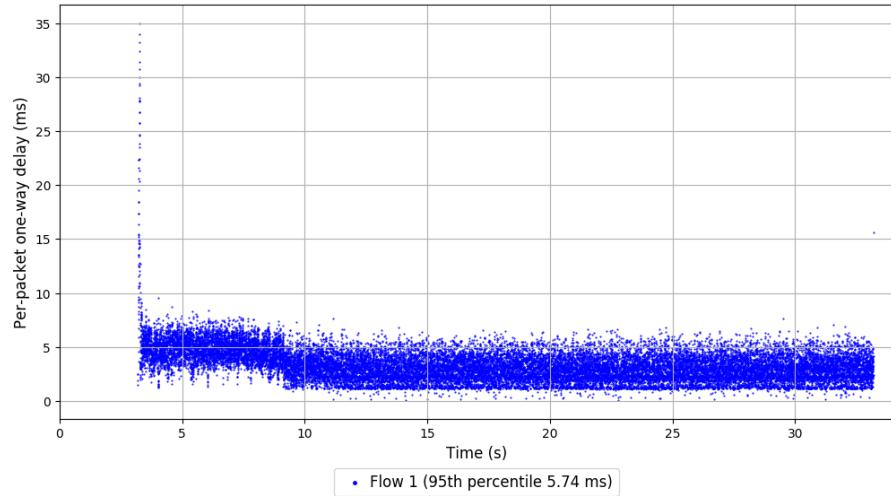
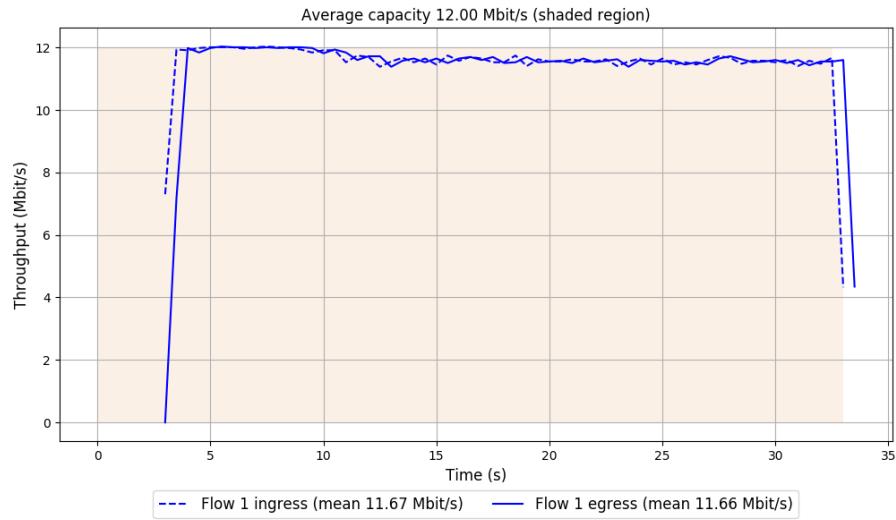
Run 3: Statistics of TCP Vegas

Start at: 2019-07-01 22:31:23

End at: 2019-07-01 22:31:53

```
# Below is generated by plot.py at 2019-07-01 22:41:25
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 11.66 Mbit/s (97.2% utilization)
95th percentile per-packet one-way delay: 5.744 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 11.66 Mbit/s
95th percentile per-packet one-way delay: 5.744 ms
Loss rate: 0.01%
```

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-07-01 22:06:48

End at: 2019-07-01 22:07:18

Below is generated by plot.py at 2019-07-01 22:41:25

Datalink statistics

-- Total of 1 flow:

Average capacity: 12.00 Mbit/s

Average throughput: 9.01 Mbit/s (75.1% utilization)

95th percentile per-packet one-way delay: 434.587 ms

Loss rate: 0.02%

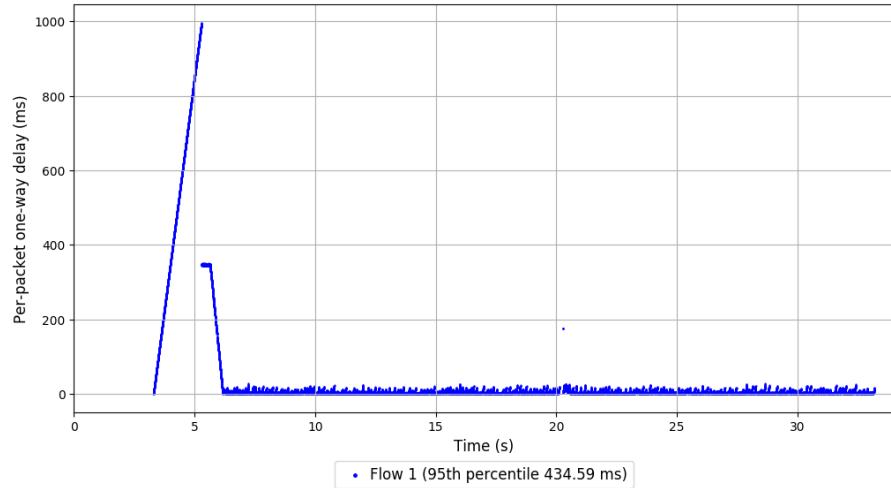
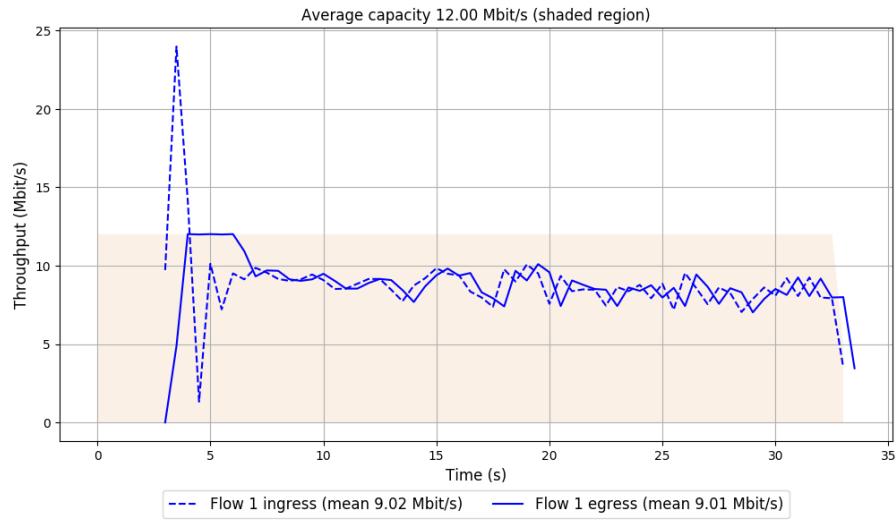
-- Flow 1:

Average throughput: 9.01 Mbit/s

95th percentile per-packet one-way delay: 434.587 ms

Loss rate: 0.02%

Run 1: Report of Verus — Data Link



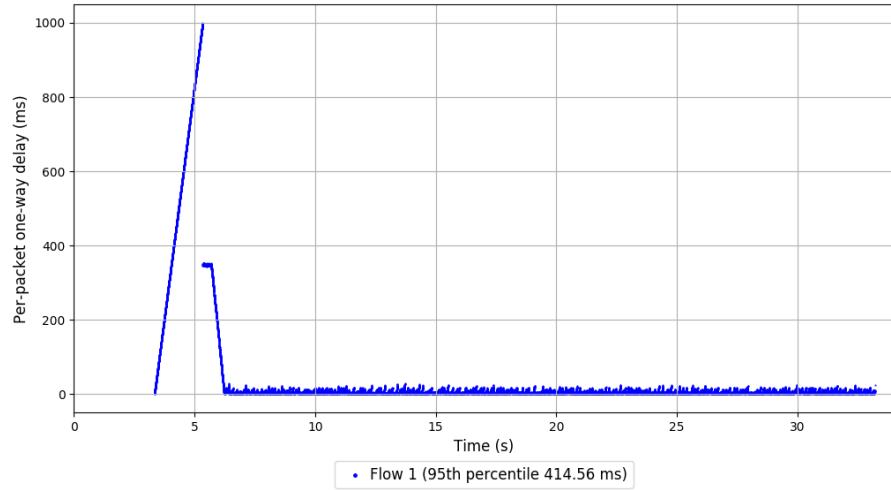
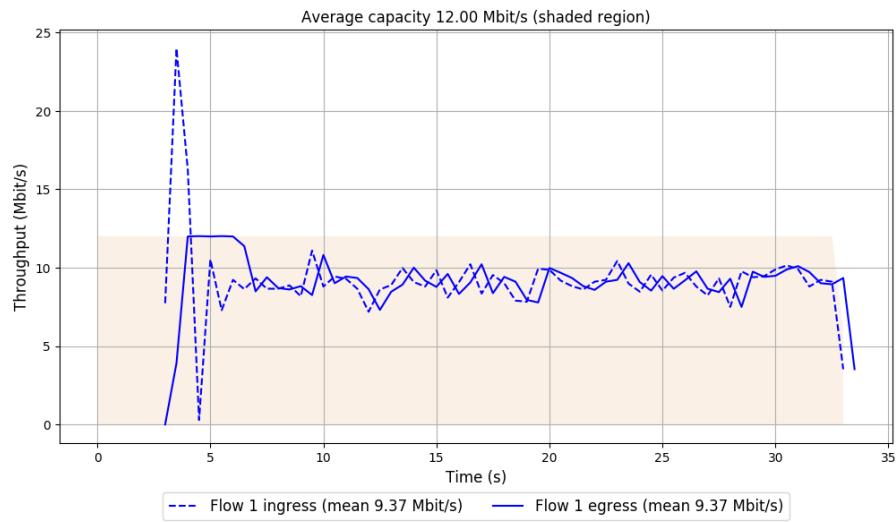
Run 2: Statistics of Verus

Start at: 2019-07-01 22:17:41

End at: 2019-07-01 22:18:11

```
# Below is generated by plot.py at 2019-07-01 22:41:28
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.37 Mbit/s (78.1% utilization)
95th percentile per-packet one-way delay: 414.563 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 9.37 Mbit/s
95th percentile per-packet one-way delay: 414.563 ms
Loss rate: 0.01%
```

Run 2: Report of Verus — Data Link



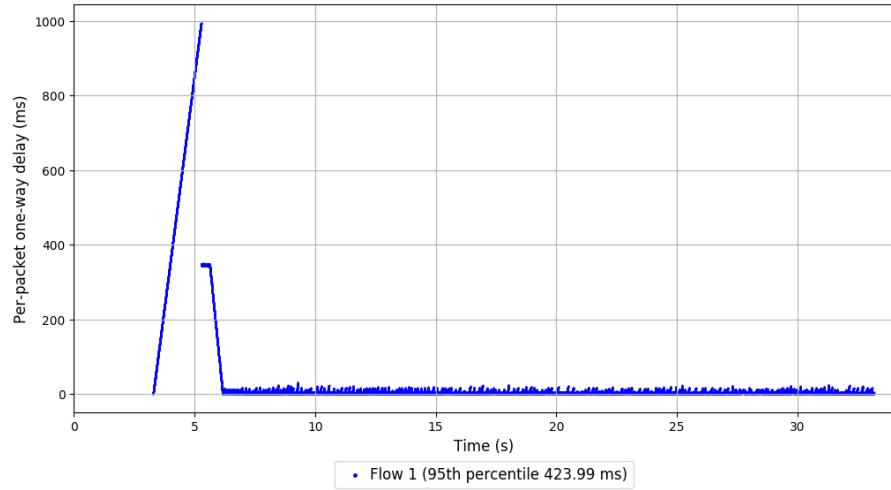
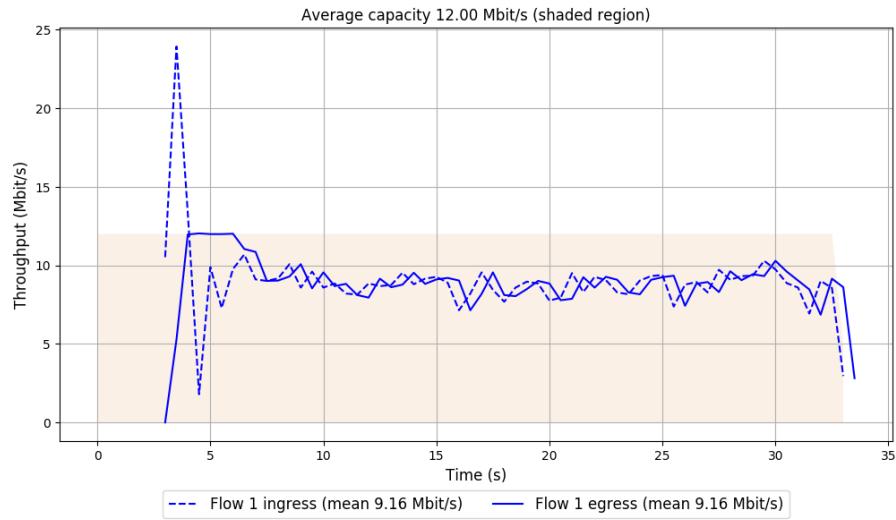
Run 3: Statistics of Verus

Start at: 2019-07-01 22:28:32

End at: 2019-07-01 22:29:02

```
# Below is generated by plot.py at 2019-07-01 22:41:31
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 9.16 Mbit/s (76.3% utilization)
95th percentile per-packet one-way delay: 423.991 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 9.16 Mbit/s
95th percentile per-packet one-way delay: 423.991 ms
Loss rate: 0.03%
```

Run 3: Report of Verus — Data Link

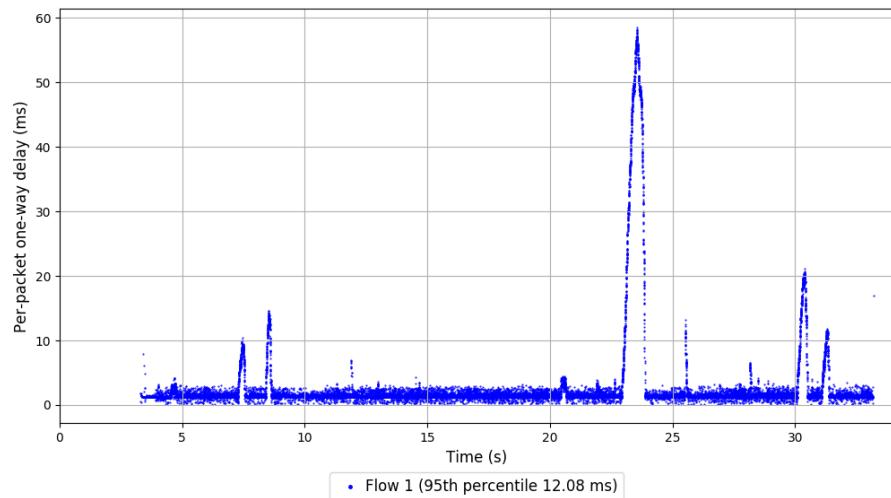


```
Run 1: Statistics of PCC-Vivace

Start at: 2019-07-01 22:09:06
End at: 2019-07-01 22:09:36

# Below is generated by plot.py at 2019-07-01 22:41:33
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 8.78 Mbit/s (73.1% utilization)
95th percentile per-packet one-way delay: 12.078 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 8.78 Mbit/s
95th percentile per-packet one-way delay: 12.078 ms
Loss rate: 0.00%
```

Run 1: Report of PCC-Vivace — Data Link

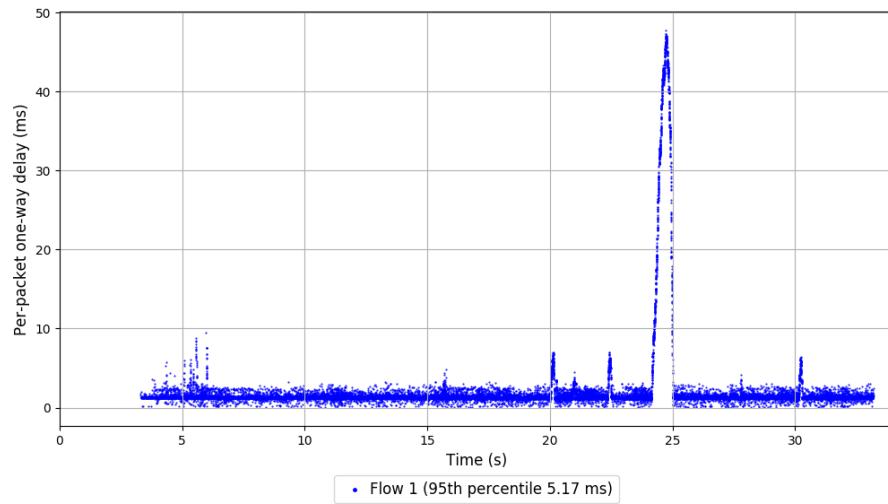
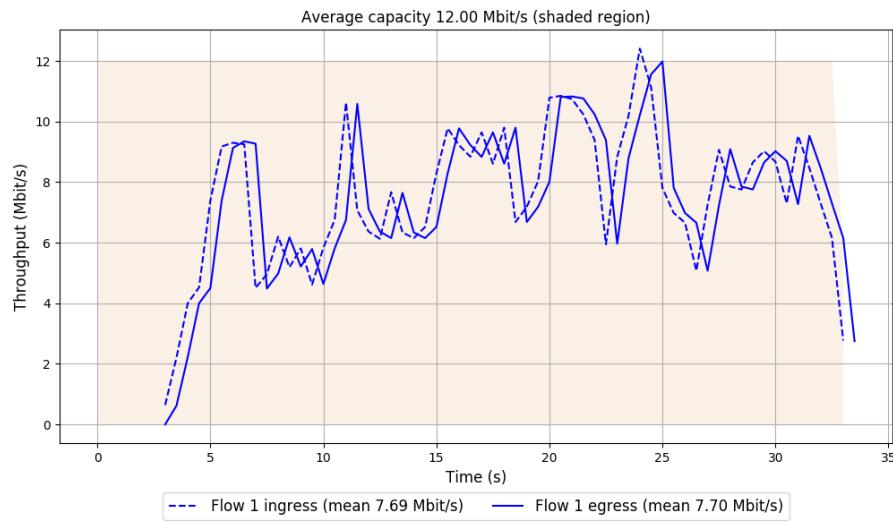


```
Run 2: Statistics of PCC-Vivace

Start at: 2019-07-01 22:19:58
End at: 2019-07-01 22:20:29

# Below is generated by plot.py at 2019-07-01 22:41:33
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 7.70 Mbit/s (64.1% utilization)
95th percentile per-packet one-way delay: 5.167 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 7.70 Mbit/s
95th percentile per-packet one-way delay: 5.167 ms
Loss rate: 0.01%
```

Run 2: Report of PCC-Vivace — Data Link

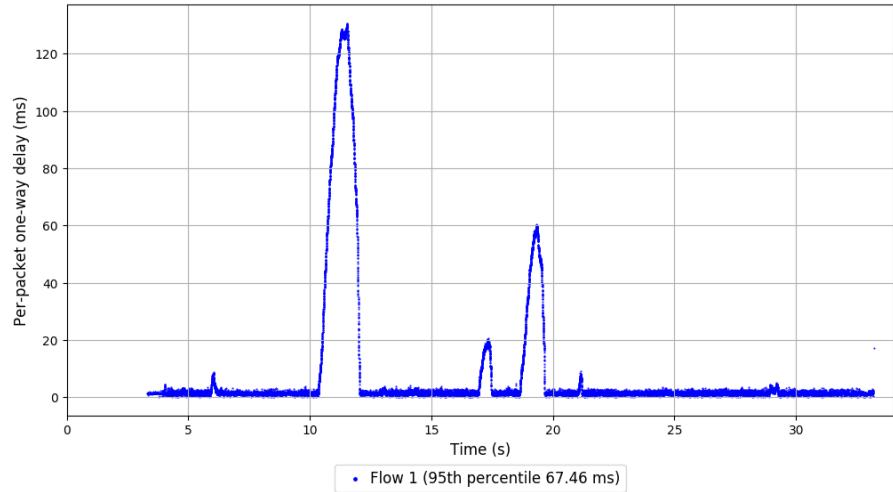
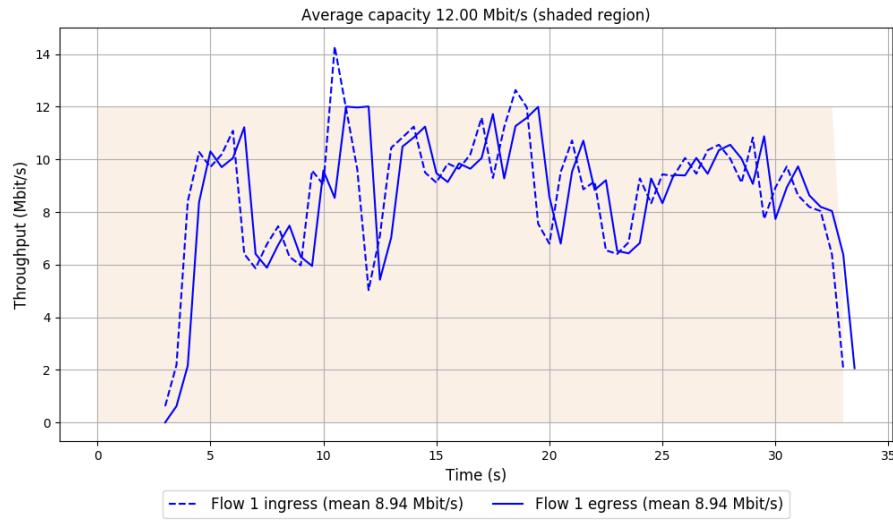


```
Run 3: Statistics of PCC-Vivace

Start at: 2019-07-01 22:30:49
End at: 2019-07-01 22:31:19

# Below is generated by plot.py at 2019-07-01 22:41:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 8.94 Mbit/s (74.5% utilization)
95th percentile per-packet one-way delay: 67.463 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 8.94 Mbit/s
95th percentile per-packet one-way delay: 67.463 ms
Loss rate: 0.00%
```

Run 3: Report of PCC-Vivace — Data Link

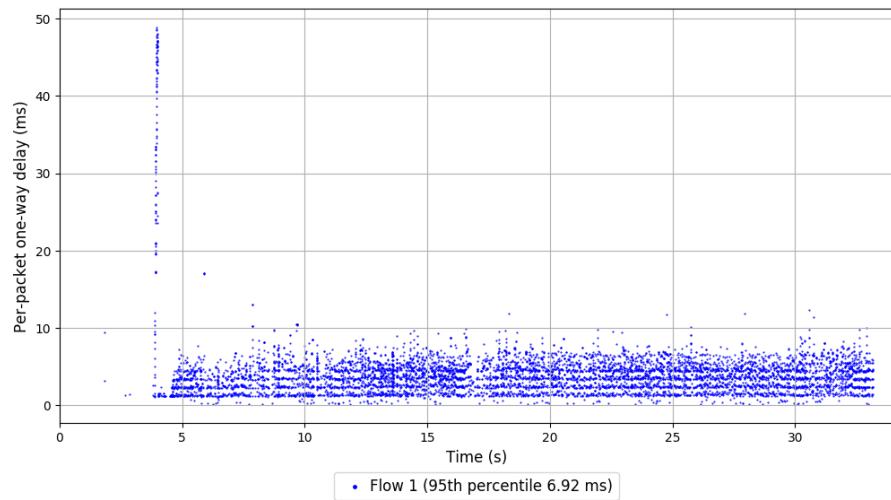
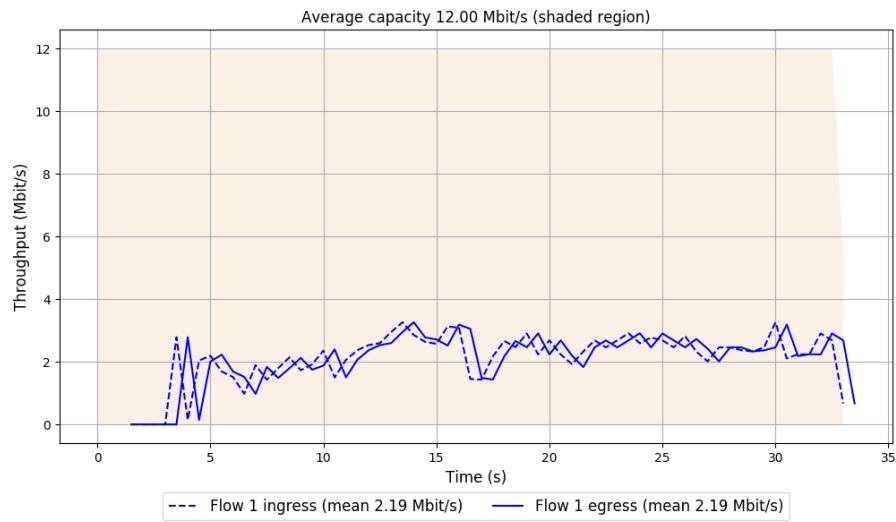


```
Run 1: Statistics of WebRTC media

Start at: 2019-07-01 22:14:14
End at: 2019-07-01 22:14:44

# Below is generated by plot.py at 2019-07-01 22:41:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.19 Mbit/s (18.3% utilization)
95th percentile per-packet one-way delay: 6.923 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 6.923 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link

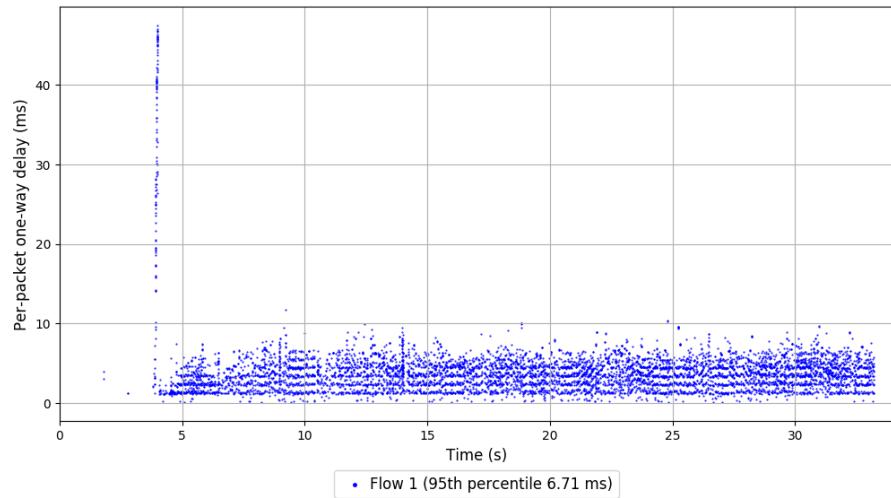
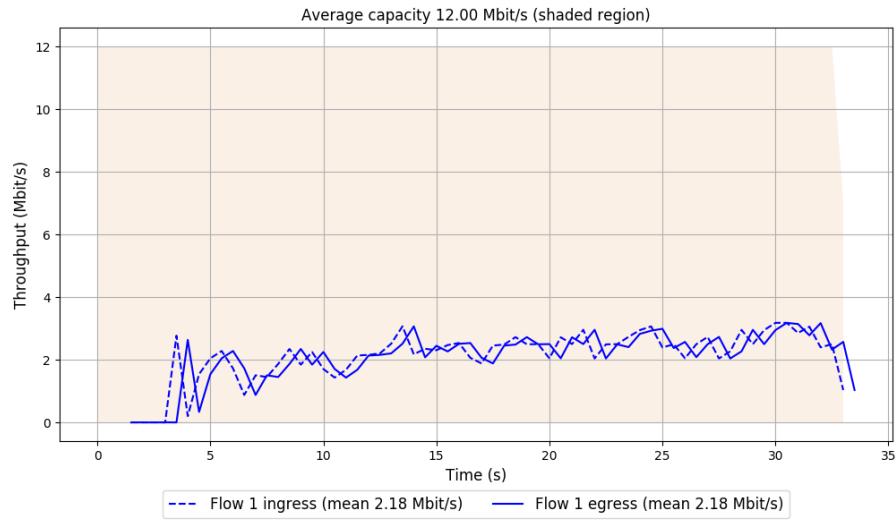


```
Run 2: Statistics of WebRTC media

Start at: 2019-07-01 22:25:06
End at: 2019-07-01 22:25:36

# Below is generated by plot.py at 2019-07-01 22:41:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.18 Mbit/s (18.2% utilization)
95th percentile per-packet one-way delay: 6.713 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 6.713 ms
Loss rate: 0.00%
```

Run 2: Report of WebRTC media — Data Link



```
Run 3: Statistics of WebRTC media

Start at: 2019-07-01 22:35:56
End at: 2019-07-01 22:36:26

# Below is generated by plot.py at 2019-07-01 22:41:39
# Datalink statistics
-- Total of 1 flow:
Average capacity: 12.00 Mbit/s
Average throughput: 2.18 Mbit/s (18.2% utilization)
95th percentile per-packet one-way delay: 6.608 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 6.608 ms
Loss rate: 0.00%
```

Run 3: Report of WebRTC media — Data Link

