

Pantheon Report

Generated at 2018-09-07 09:57:48 (UTC).

Data path: AWS California 1 on *ens5 (local)* → Stanford cellular on *ppp0 (remote)*.

Repeated the test of 18 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

System info:

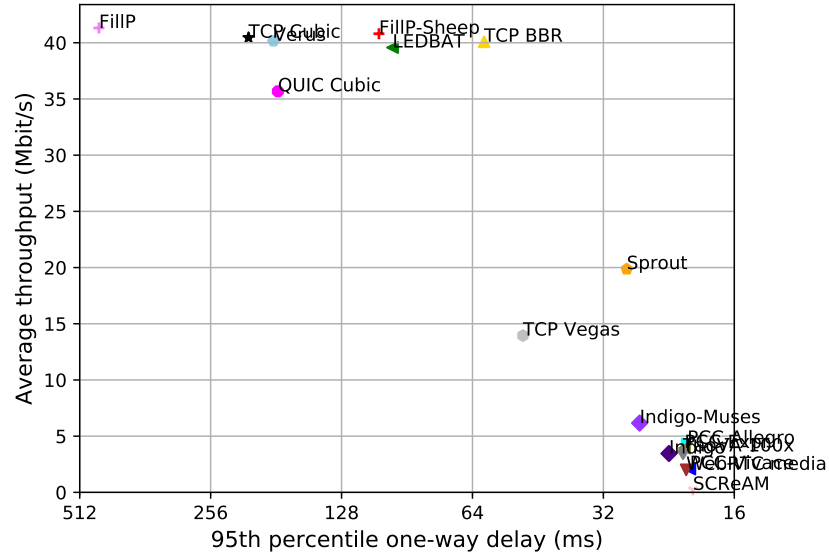
```
Linux 4.15.0-1020-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
net.ipv4.tcp_mem = 536870912 536870912 536870912
```

Git summary:

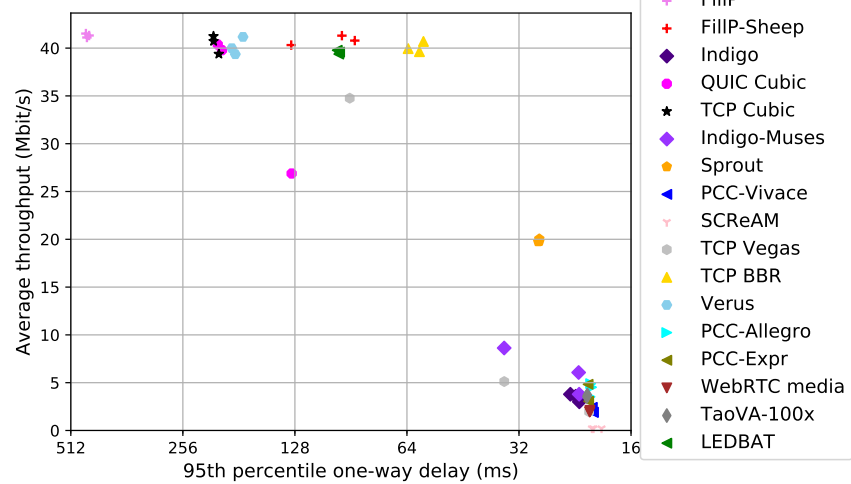
```
branch: muses @ e0a9b05ad97d268013b7cc9a9c95637b593a1b4c
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 7631aea3923a3598767c87765ae5103aca0678d3
third_party/pantheon-tunnel @ cbfce6db5ff5740dafa1771f813cd646339e1952
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-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
```

```
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from AWS California 1 to Stanford cellular, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS California 1 to Stanford cellular, 3 runs of 30s each per scheme



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	40.09	60.18	0.11
Copa	0	N/A	N/A	N/A
TCP Cubic	3	40.45	209.46	0.44
FillP	3	41.32	462.37	29.09
FillP-Sheep	3	40.80	105.00	1.79
Indigo	3	3.46	22.61	0.00
LEDBAT	3	39.58	97.74	0.27
Indigo-Muses	3	6.17	26.42	0.00
PCC-Allegro	3	4.32	20.53	0.00
PCC-Expr	2	3.94	20.84	35.59
QUIC Cubic	3	35.68	179.29	0.69
SCReAM	3	0.22	19.92	0.00
Sprout	3	19.86	28.28	0.00
TaoVA-100x	2	3.63	20.99	15.02
TCP Vegas	3	13.95	48.99	0.01
Verus	3	40.17	183.54	1.06
PCC-Vivace	3	2.08	20.25	0.00
WebRTC media	3	2.00	20.64	0.00

Run 1: Statistics of TCP BBR

Start at: 2018-09-07 08:54:06

End at: 2018-09-07 08:54:36

Local clock offset: 0.945 ms

Remote clock offset: 0.139 ms

Below is generated by plot.py at 2018-09-07 09:56:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.70 Mbit/s

95th percentile per-packet one-way delay: 57.787 ms

Loss rate: 0.15%

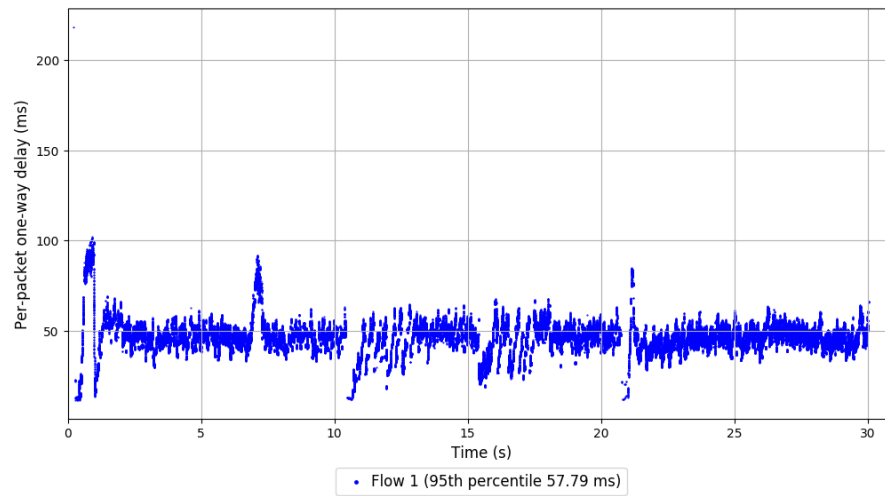
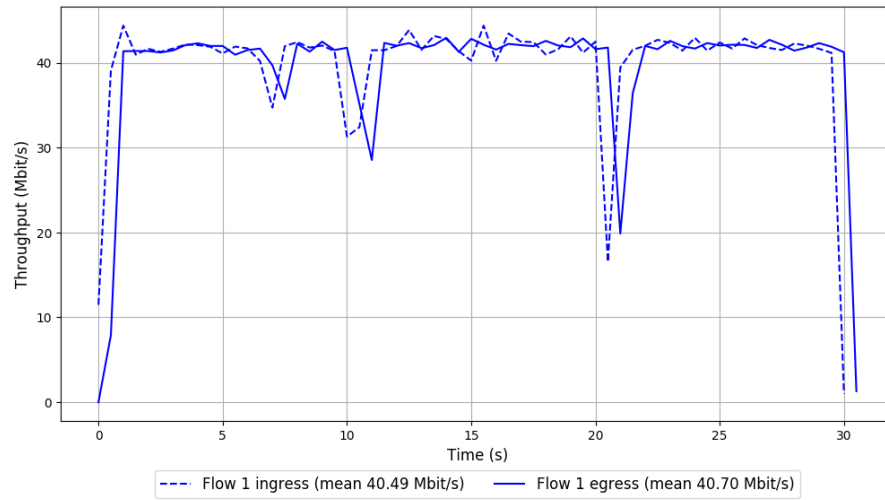
-- Flow 1:

Average throughput: 40.70 Mbit/s

95th percentile per-packet one-way delay: 57.787 ms

Loss rate: 0.15%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-07 09:17:52

End at: 2018-09-07 09:18:22

Local clock offset: 1.084 ms

Remote clock offset: 0.176 ms

Below is generated by plot.py at 2018-09-07 09:56:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 39.95 Mbit/s

95th percentile per-packet one-way delay: 63.523 ms

Loss rate: 0.06%

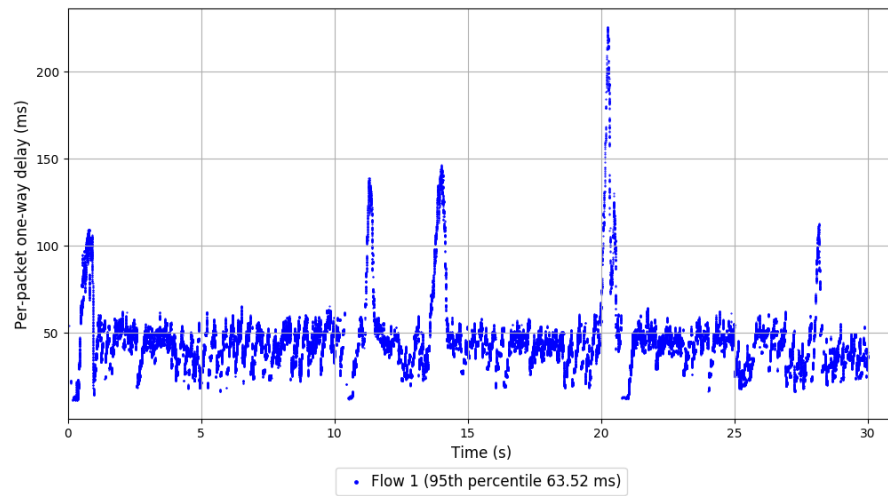
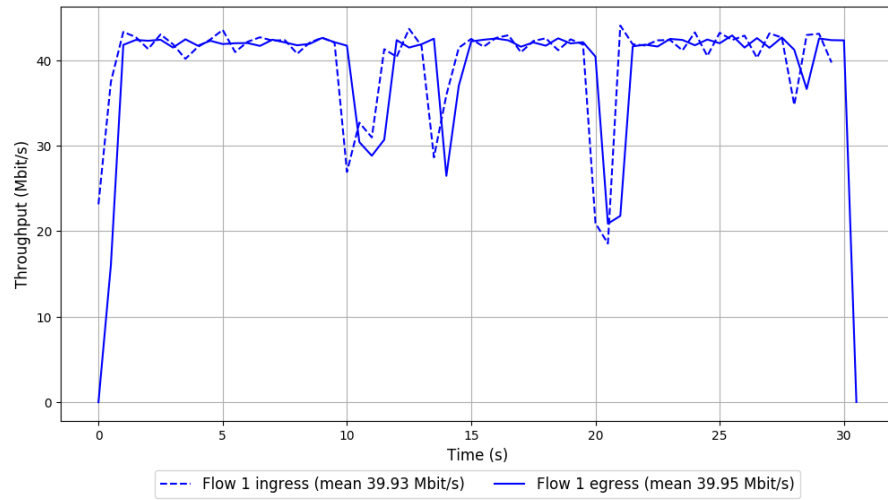
-- Flow 1:

Average throughput: 39.95 Mbit/s

95th percentile per-packet one-way delay: 63.523 ms

Loss rate: 0.06%

Run 2: Report of TCP BBR — Data Link

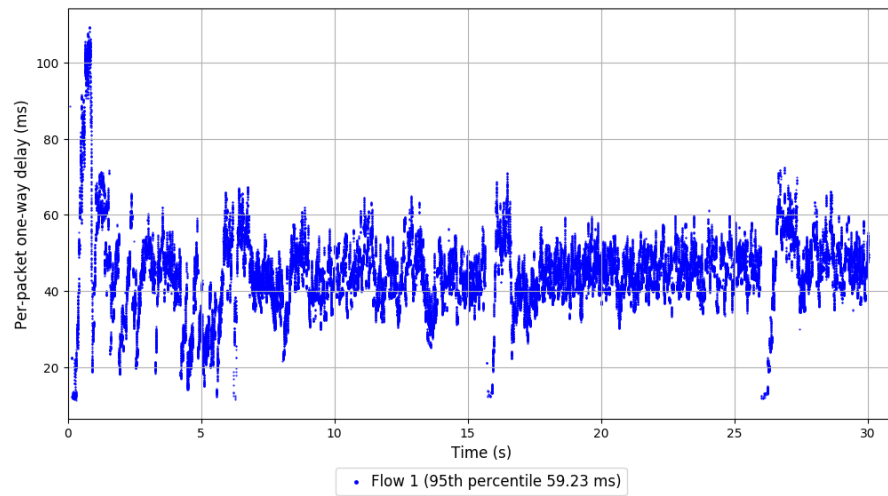
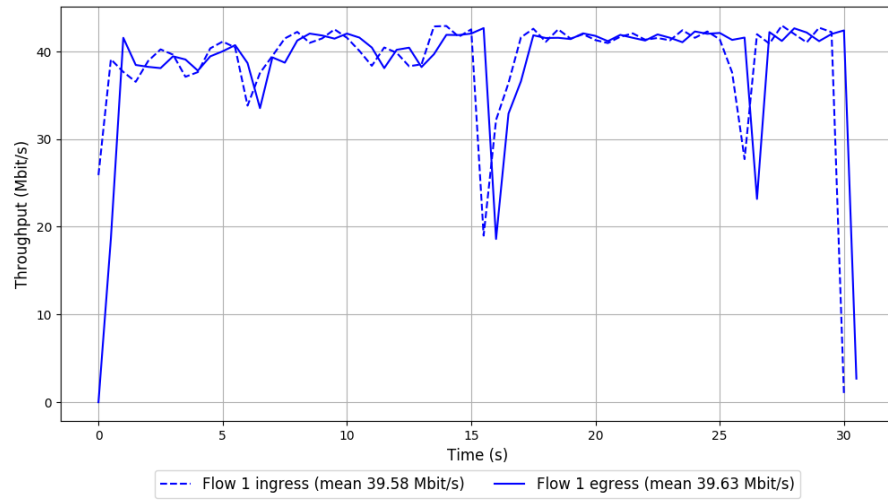


Run 3: Statistics of TCP BBR

Start at: 2018-09-07 09:41:40
End at: 2018-09-07 09:42:10
Local clock offset: 0.668 ms
Remote clock offset: -0.317 ms

Below is generated by plot.py at 2018-09-07 09:56:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 39.63 Mbit/s
95th percentile per-packet one-way delay: 59.229 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 39.63 Mbit/s
95th percentile per-packet one-way delay: 59.229 ms
Loss rate: 0.11%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

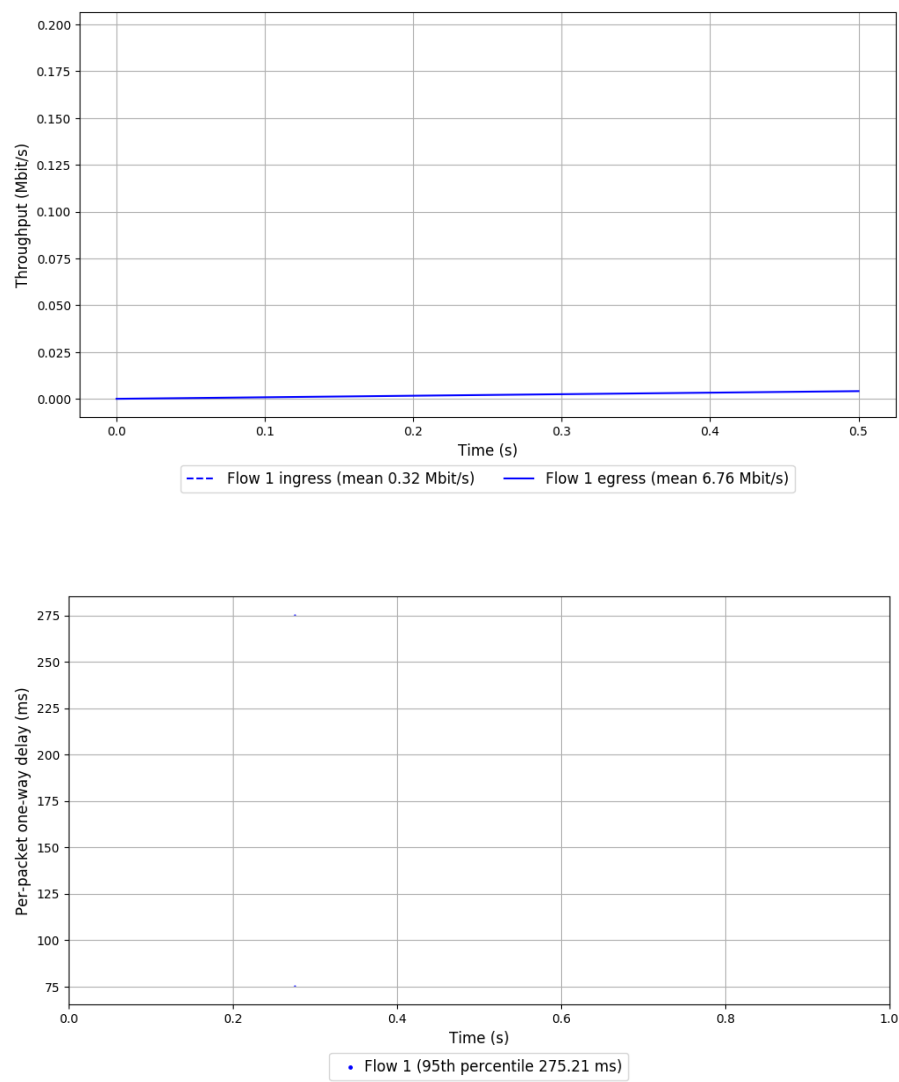
Start at: 2018-09-07 08:44:53

End at: 2018-09-07 08:45:23

Local clock offset: 0.749 ms

Remote clock offset: 0.219 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

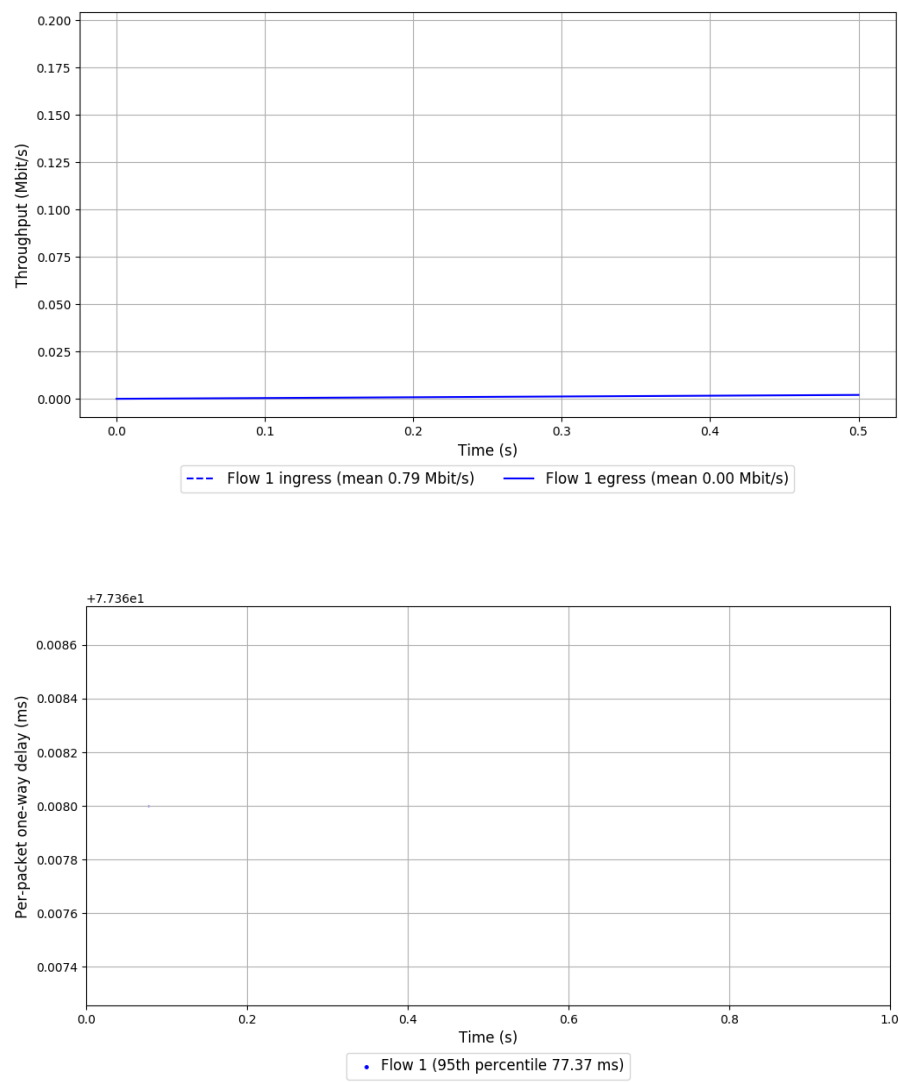
Start at: 2018-09-07 09:08:39

End at: 2018-09-07 09:09:09

Local clock offset: 1.12 ms

Remote clock offset: 0.195 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

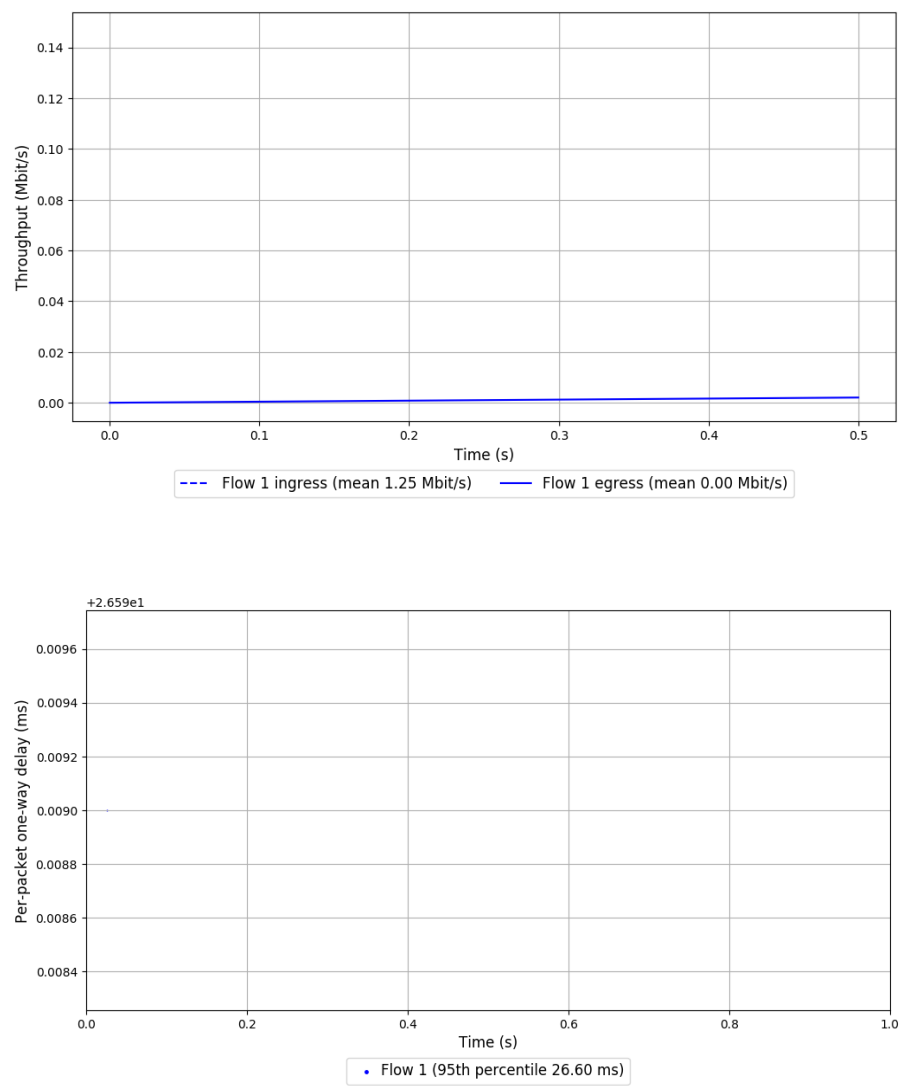
Start at: 2018-09-07 09:32:27

End at: 2018-09-07 09:32:57

Local clock offset: 0.754 ms

Remote clock offset: -0.27 ms

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-07 08:47:30

End at: 2018-09-07 08:48:00

Local clock offset: 0.92 ms

Remote clock offset: 0.249 ms

Below is generated by plot.py at 2018-09-07 09:56:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.72 Mbit/s

95th percentile per-packet one-way delay: 211.667 ms

Loss rate: 0.43%

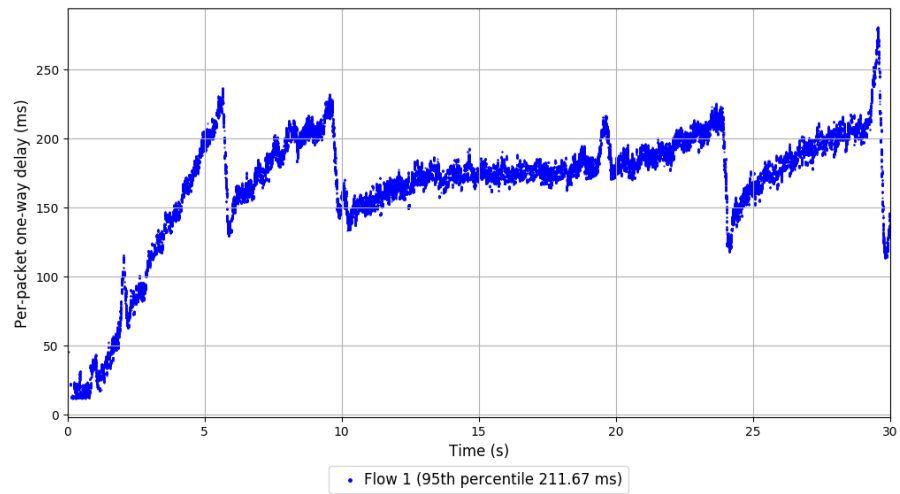
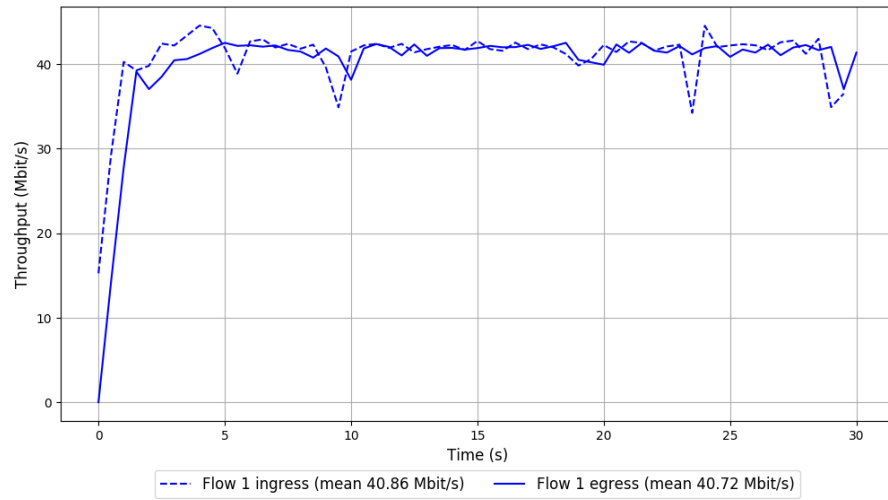
-- Flow 1:

Average throughput: 40.72 Mbit/s

95th percentile per-packet one-way delay: 211.667 ms

Loss rate: 0.43%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-07 09:11:17

End at: 2018-09-07 09:11:47

Local clock offset: 1.173 ms

Remote clock offset: 0.204 ms

Below is generated by plot.py at 2018-09-07 09:56:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 39.39 Mbit/s

95th percentile per-packet one-way delay: 204.908 ms

Loss rate: 0.46%

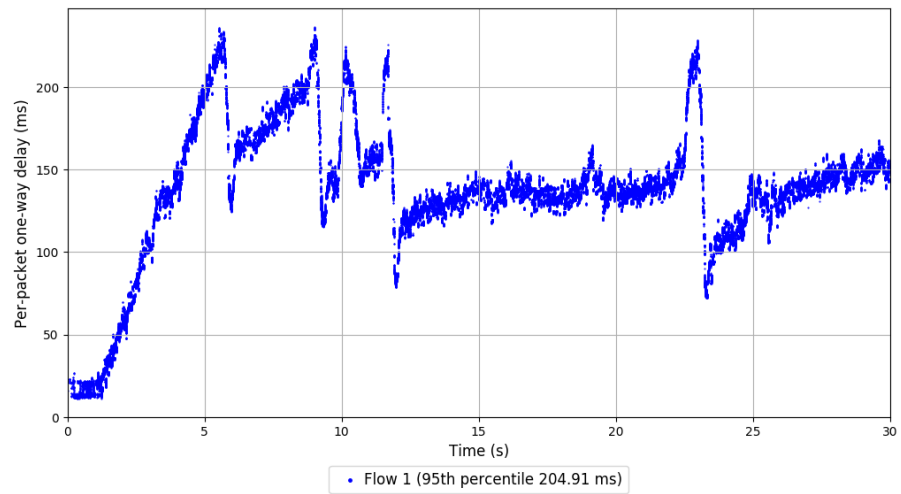
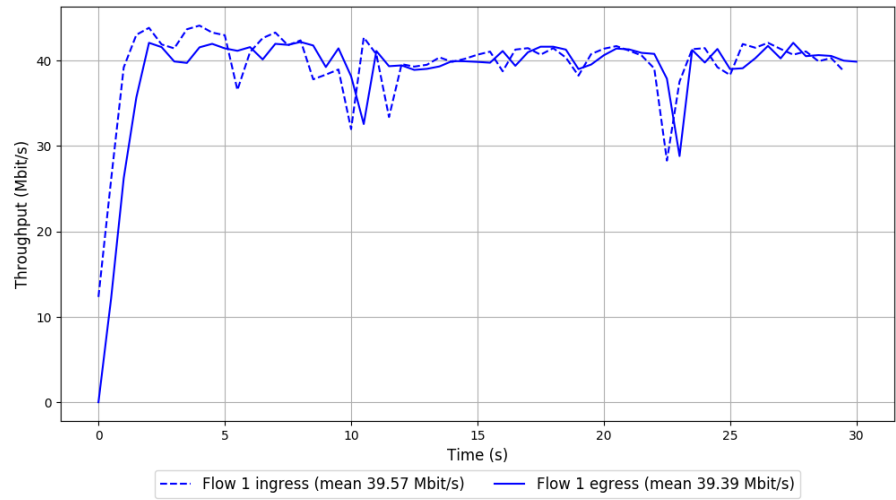
-- Flow 1:

Average throughput: 39.39 Mbit/s

95th percentile per-packet one-way delay: 204.908 ms

Loss rate: 0.46%

Run 2: Report of TCP Cubic — Data Link

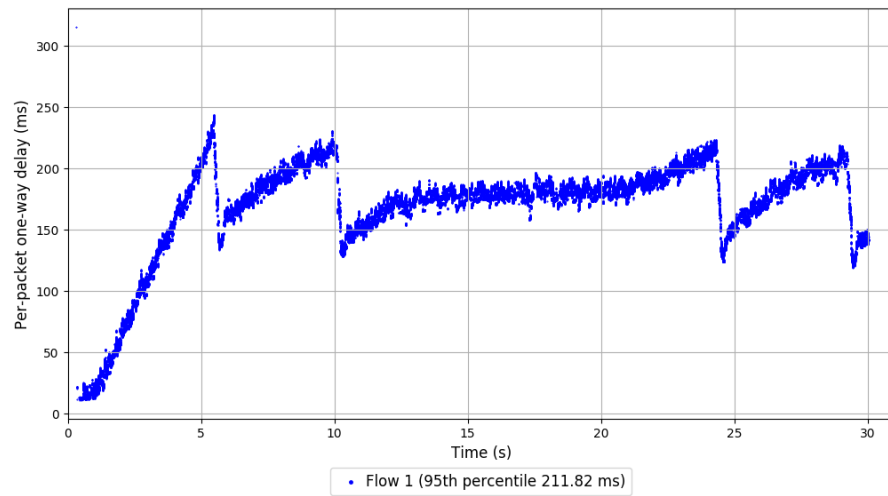
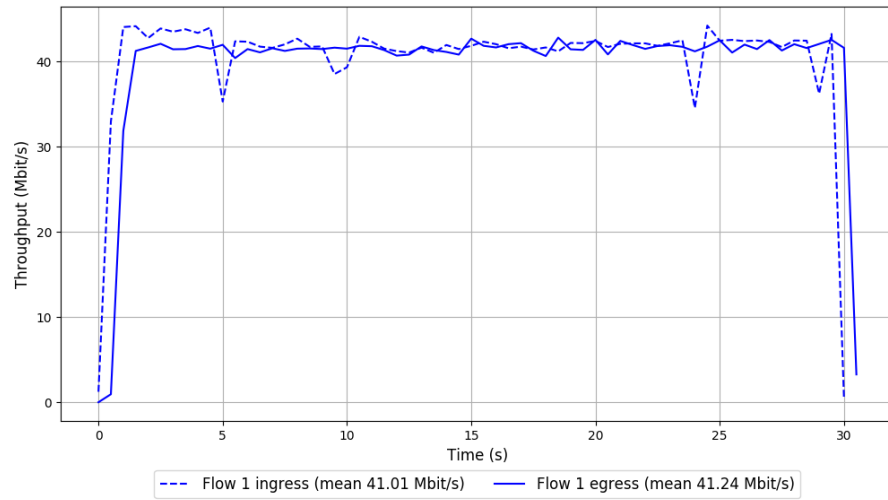


Run 3: Statistics of TCP Cubic

Start at: 2018-09-07 09:35:04
End at: 2018-09-07 09:35:34
Local clock offset: 0.641 ms
Remote clock offset: -0.257 ms

Below is generated by plot.py at 2018-09-07 09:56:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 41.24 Mbit/s
95th percentile per-packet one-way delay: 211.816 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 41.24 Mbit/s
95th percentile per-packet one-way delay: 211.816 ms
Loss rate: 0.42%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2018-09-07 09:03:23

End at: 2018-09-07 09:03:53

Local clock offset: 1.093 ms

Remote clock offset: 0.121 ms

Below is generated by plot.py at 2018-09-07 09:56:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 41.32 Mbit/s

95th percentile per-packet one-way delay: 457.224 ms

Loss rate: 33.30%

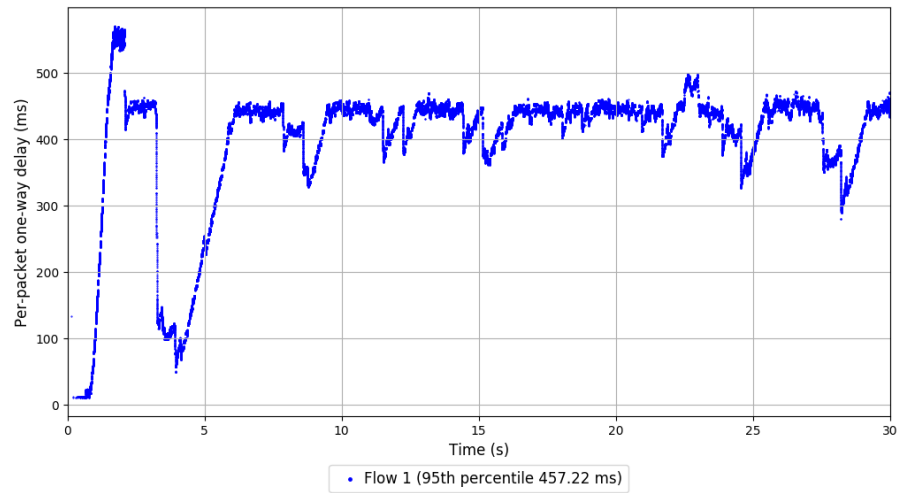
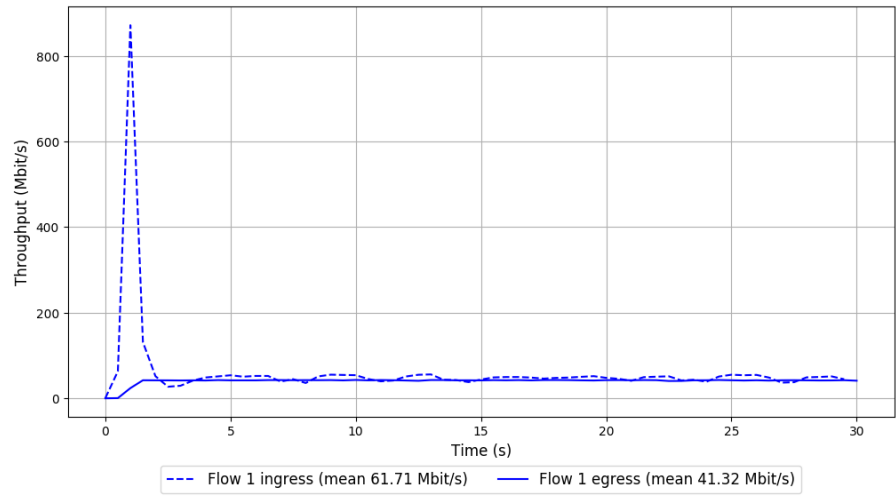
-- Flow 1:

Average throughput: 41.32 Mbit/s

95th percentile per-packet one-way delay: 457.224 ms

Loss rate: 33.30%

Run 1: Report of FillP — Data Link

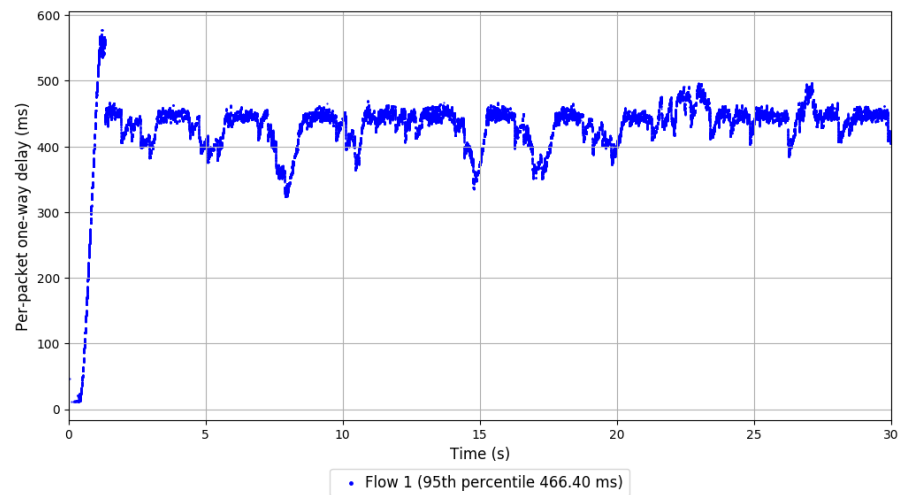
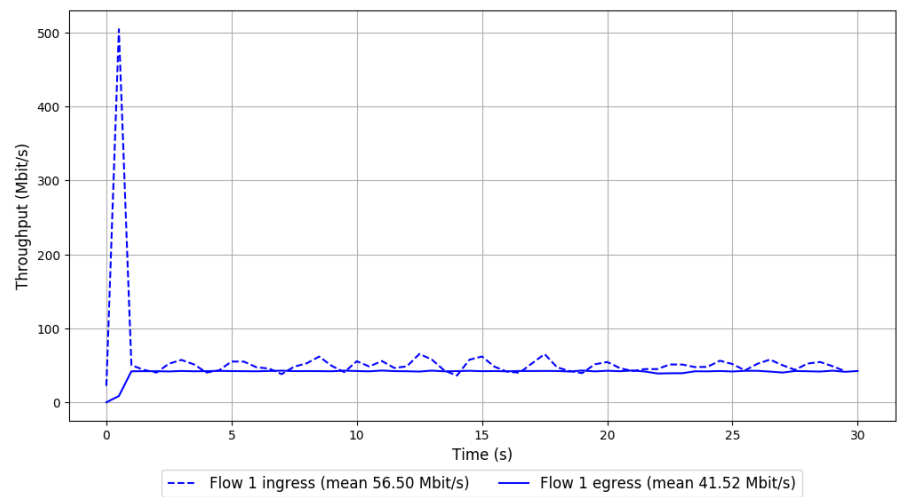


Run 2: Statistics of FillP

Start at: 2018-09-07 09:27:09
End at: 2018-09-07 09:27:39
Local clock offset: 0.839 ms
Remote clock offset: -0.144 ms

Below is generated by plot.py at 2018-09-07 09:56:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 41.52 Mbit/s
95th percentile per-packet one-way delay: 466.401 ms
Loss rate: 26.58%
-- Flow 1:
Average throughput: 41.52 Mbit/s
95th percentile per-packet one-way delay: 466.401 ms
Loss rate: 26.58%

Run 2: Report of FillP — Data Link

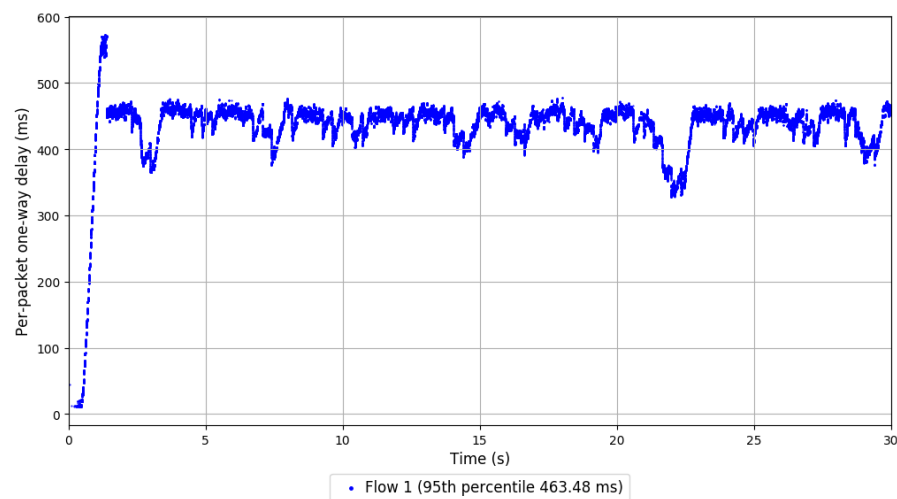
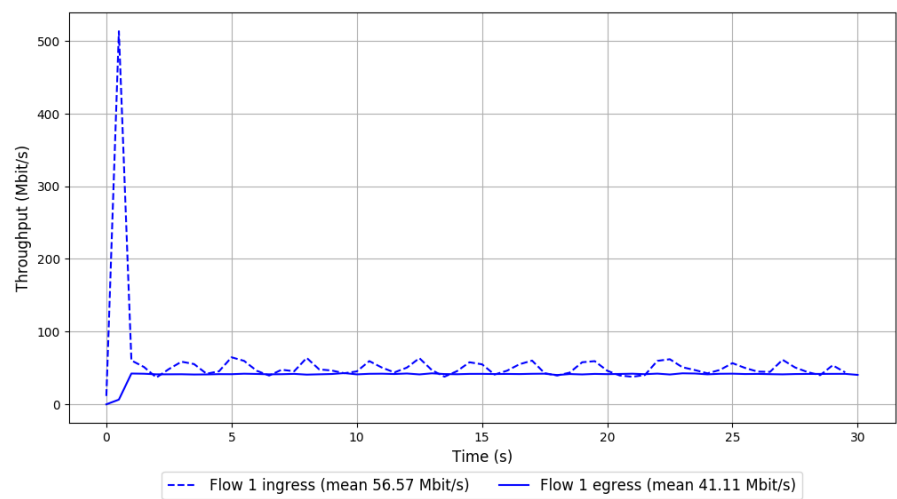


Run 3: Statistics of FillP

Start at: 2018-09-07 09:50:57
End at: 2018-09-07 09:51:27
Local clock offset: 0.708 ms
Remote clock offset: -0.411 ms

Below is generated by plot.py at 2018-09-07 09:57:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 41.11 Mbit/s
95th percentile per-packet one-way delay: 463.477 ms
Loss rate: 27.38%
-- Flow 1:
Average throughput: 41.11 Mbit/s
95th percentile per-packet one-way delay: 463.477 ms
Loss rate: 27.38%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2018-09-07 08:51:27

End at: 2018-09-07 08:51:57

Local clock offset: 0.973 ms

Remote clock offset: 0.126 ms

Below is generated by plot.py at 2018-09-07 09:57:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.32 Mbit/s

95th percentile per-packet one-way delay: 130.945 ms

Loss rate: 2.23%

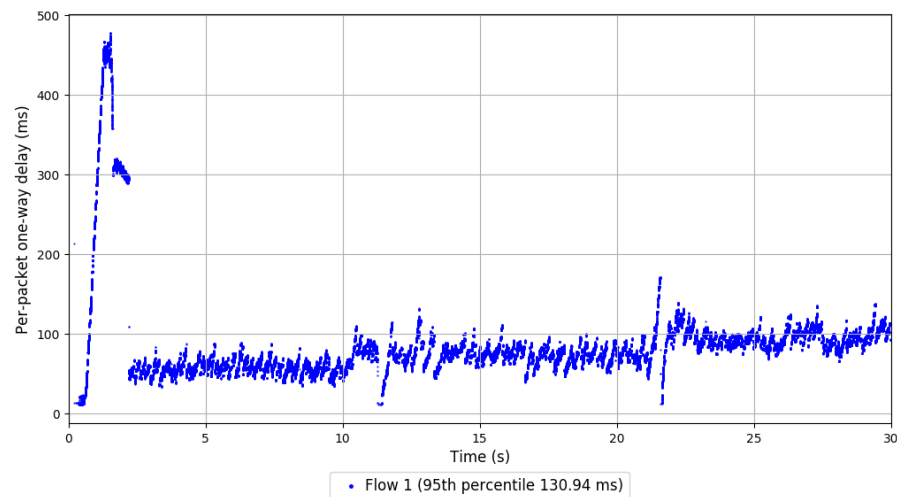
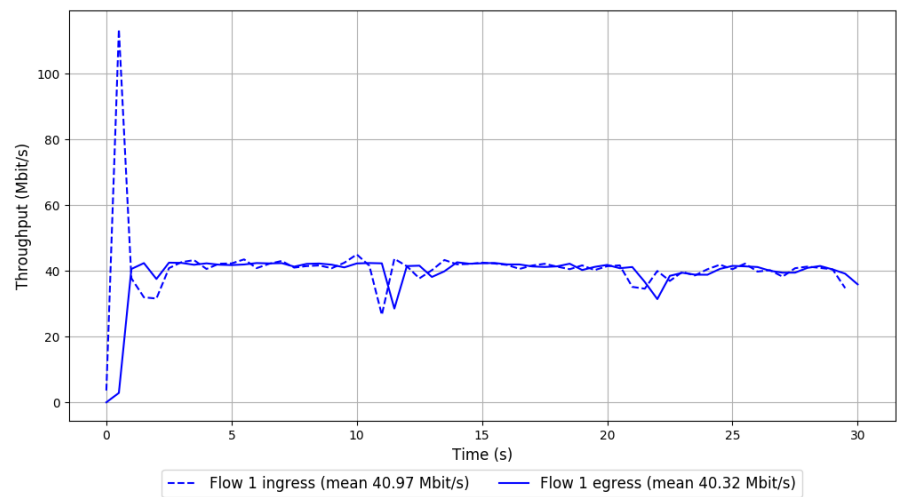
-- Flow 1:

Average throughput: 40.32 Mbit/s

95th percentile per-packet one-way delay: 130.945 ms

Loss rate: 2.23%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2018-09-07 09:15:14

End at: 2018-09-07 09:15:44

Local clock offset: 1.115 ms

Remote clock offset: 0.202 ms

Below is generated by plot.py at 2018-09-07 09:57:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.79 Mbit/s

95th percentile per-packet one-way delay: 88.370 ms

Loss rate: 1.51%

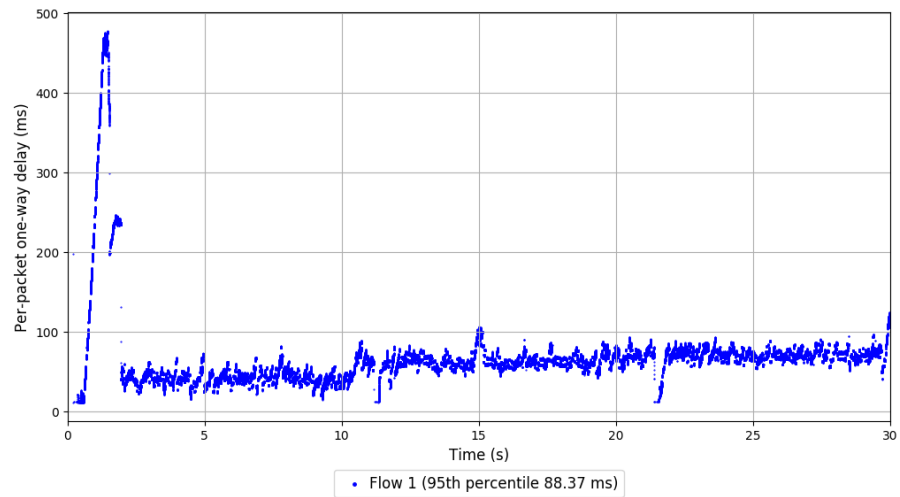
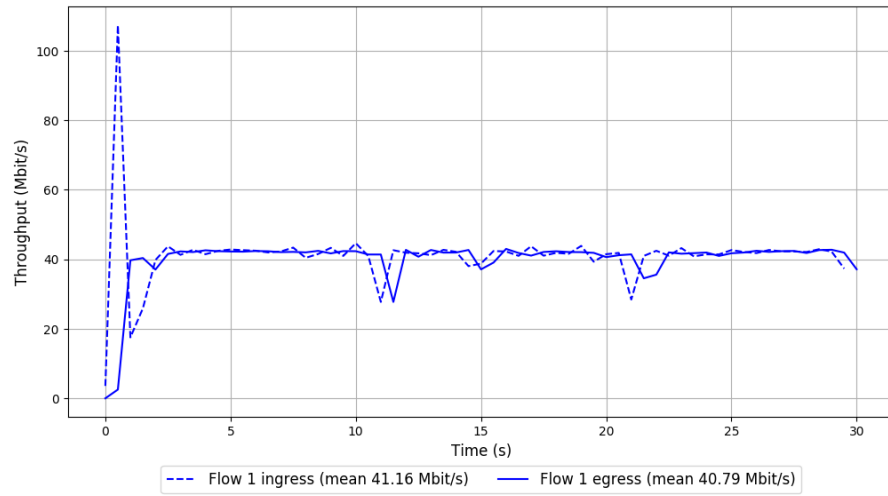
-- Flow 1:

Average throughput: 40.79 Mbit/s

95th percentile per-packet one-way delay: 88.370 ms

Loss rate: 1.51%

Run 2: Report of FillP-Sheep — Data Link

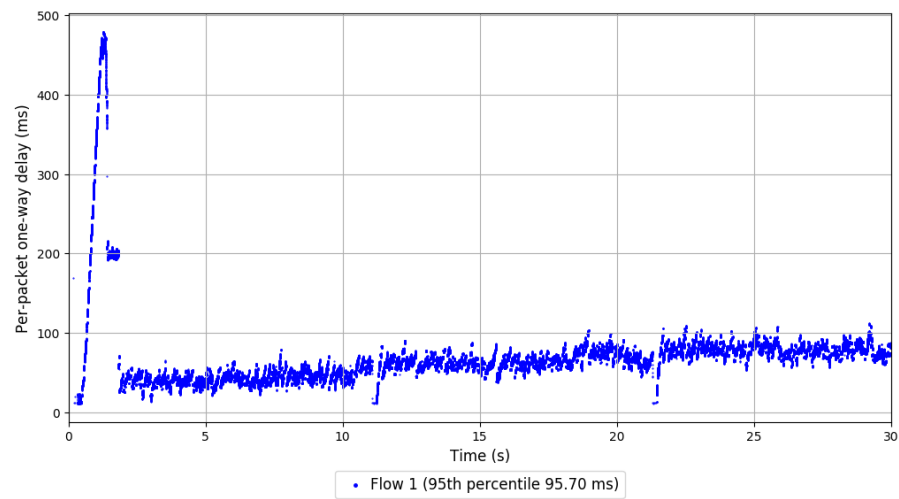
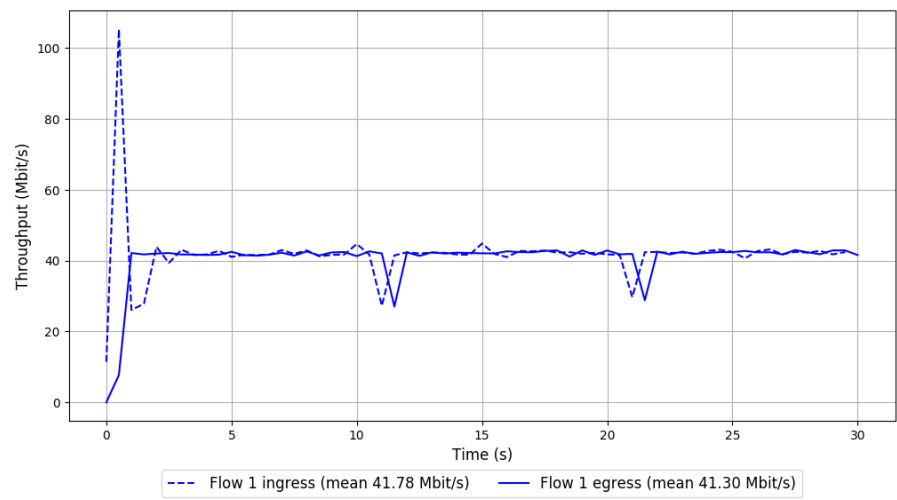


Run 3: Statistics of FillP-Sheep

Start at: 2018-09-07 09:39:02
End at: 2018-09-07 09:39:32
Local clock offset: 0.687 ms
Remote clock offset: -0.327 ms

Below is generated by plot.py at 2018-09-07 09:57:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 41.30 Mbit/s
95th percentile per-packet one-way delay: 95.699 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 41.30 Mbit/s
95th percentile per-packet one-way delay: 95.699 ms
Loss rate: 1.64%

Run 3: Report of FillP-Sheep — Data Link

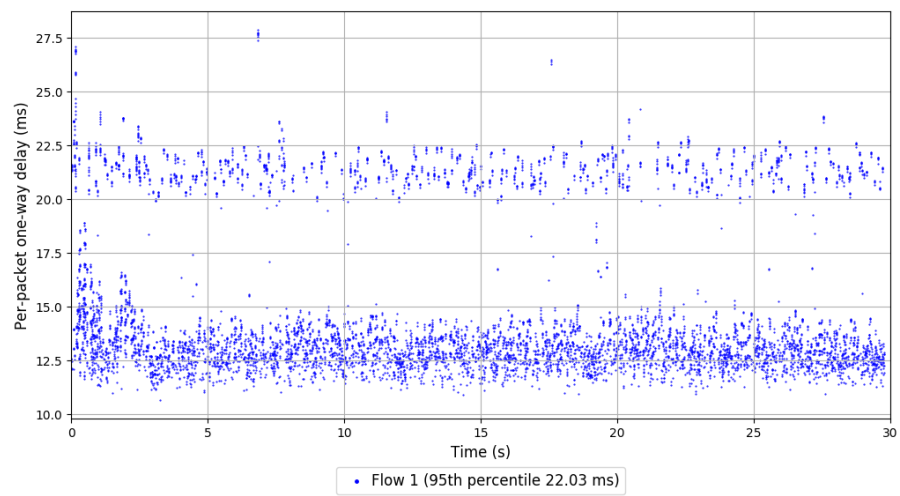
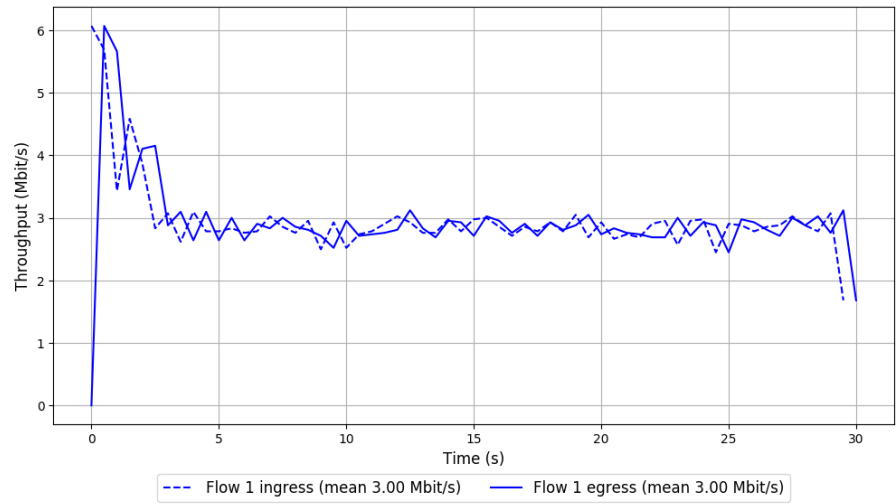


```
Run 1: Statistics of Indigo

Start at: 2018-09-07 09:04:43
End at: 2018-09-07 09:05:13
Local clock offset: 1.092 ms
Remote clock offset: 0.13 ms

# Below is generated by plot.py at 2018-09-07 09:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 22.030 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 22.030 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link

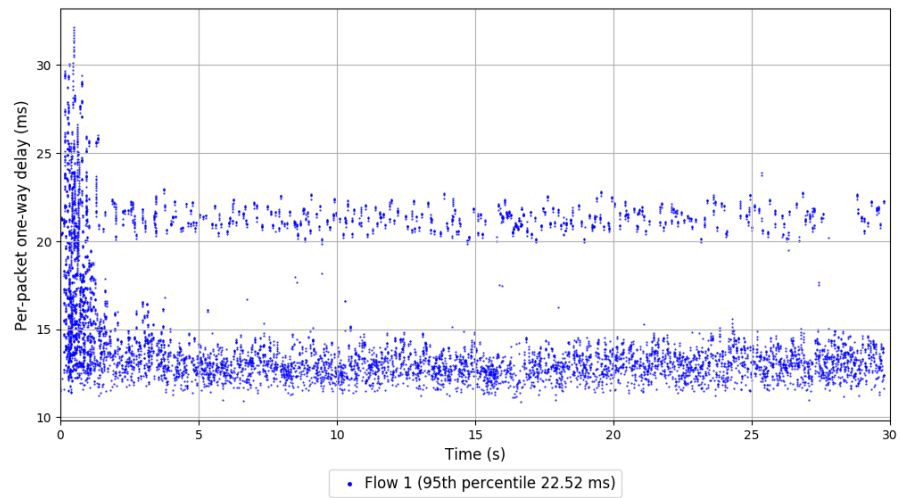
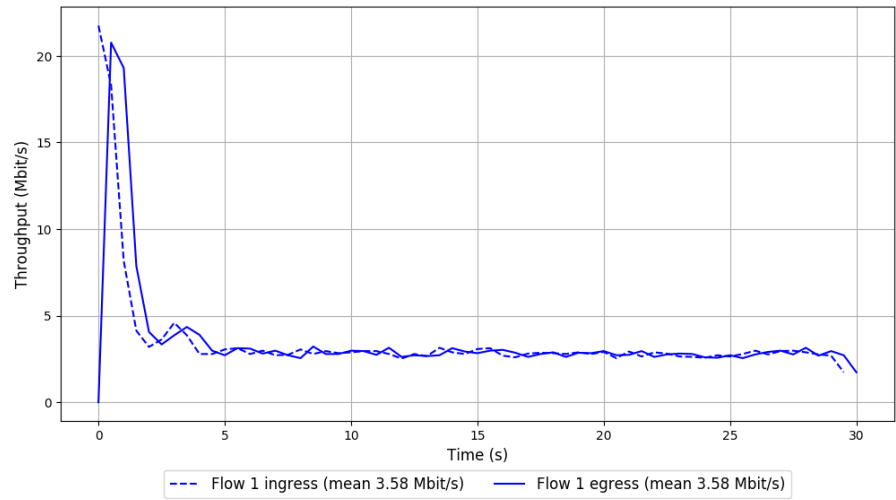


Run 2: Statistics of Indigo

Start at: 2018-09-07 09:28:29
End at: 2018-09-07 09:29:00
Local clock offset: 0.818 ms
Remote clock offset: -0.119 ms

Below is generated by plot.py at 2018-09-07 09:57:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.58 Mbit/s
95th percentile per-packet one-way delay: 22.523 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.58 Mbit/s
95th percentile per-packet one-way delay: 22.523 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link

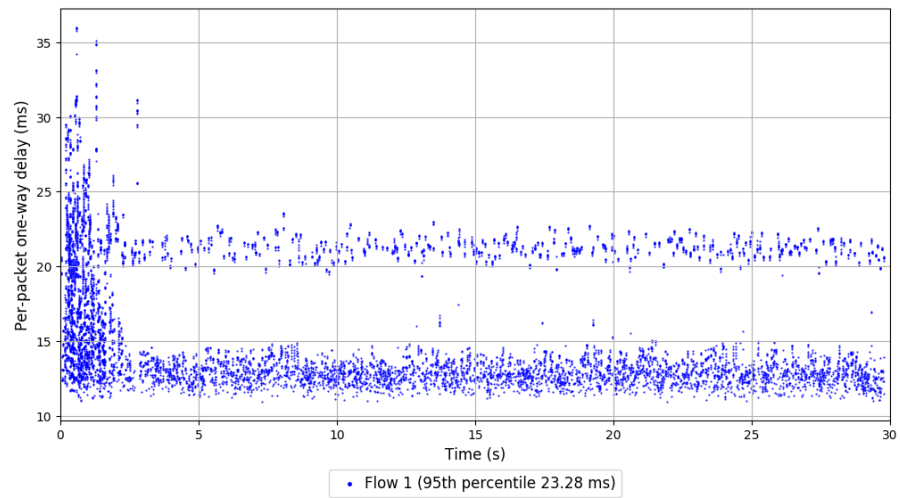
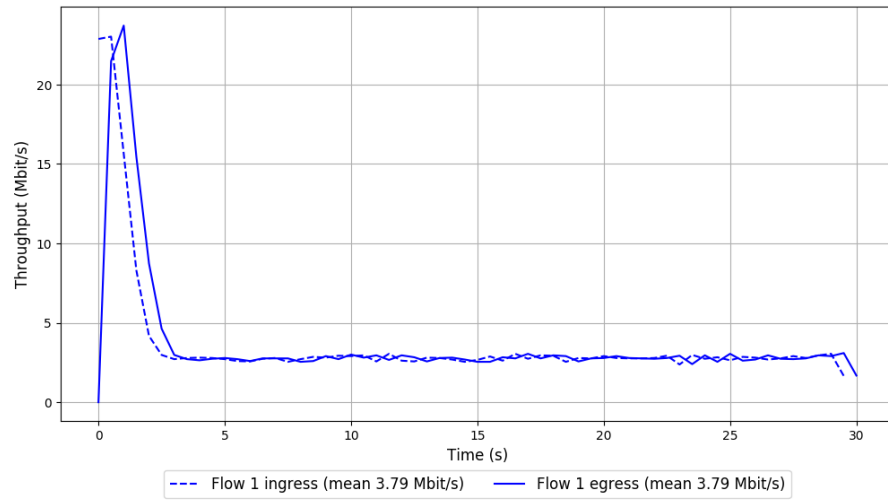


Run 3: Statistics of Indigo

Start at: 2018-09-07 09:52:17
End at: 2018-09-07 09:52:47
Local clock offset: 0.719 ms
Remote clock offset: -0.359 ms

Below is generated by plot.py at 2018-09-07 09:57:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.79 Mbit/s
95th percentile per-packet one-way delay: 23.283 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.79 Mbit/s
95th percentile per-packet one-way delay: 23.283 ms
Loss rate: 0.00%

Run 3: Report of Indigo — Data Link

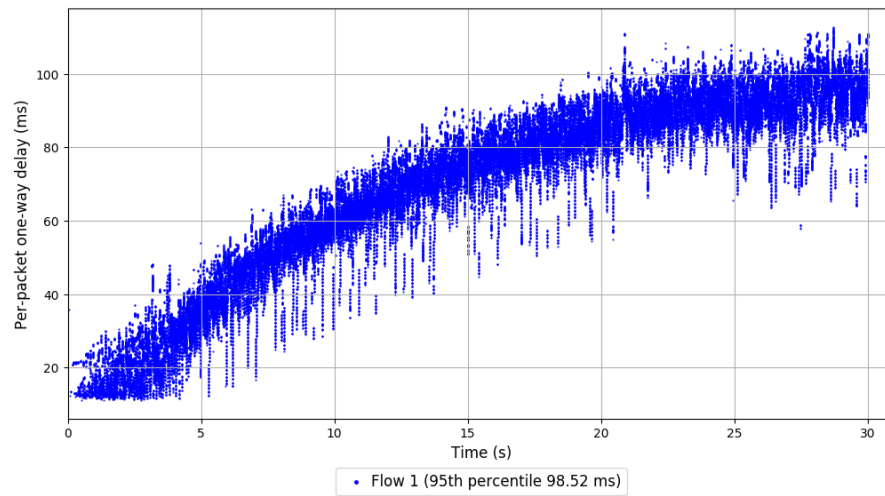
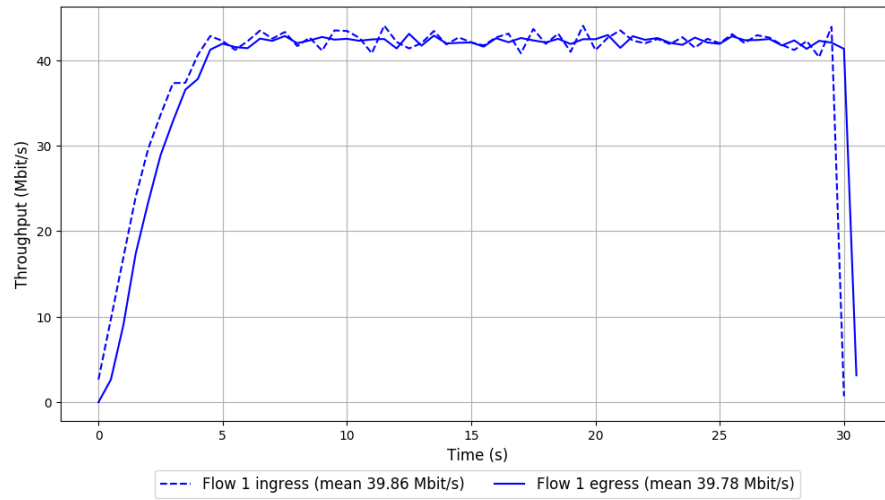


```
Run 1: Statistics of LEDBAT

Start at: 2018-09-07 09:02:02
End at: 2018-09-07 09:02:32
Local clock offset: 1.109 ms
Remote clock offset: 0.113 ms

# Below is generated by plot.py at 2018-09-07 09:57:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 39.78 Mbit/s
95th percentile per-packet one-way delay: 98.523 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 39.78 Mbit/s
95th percentile per-packet one-way delay: 98.523 ms
Loss rate: 0.27%
```

Run 1: Report of LEDBAT — Data Link

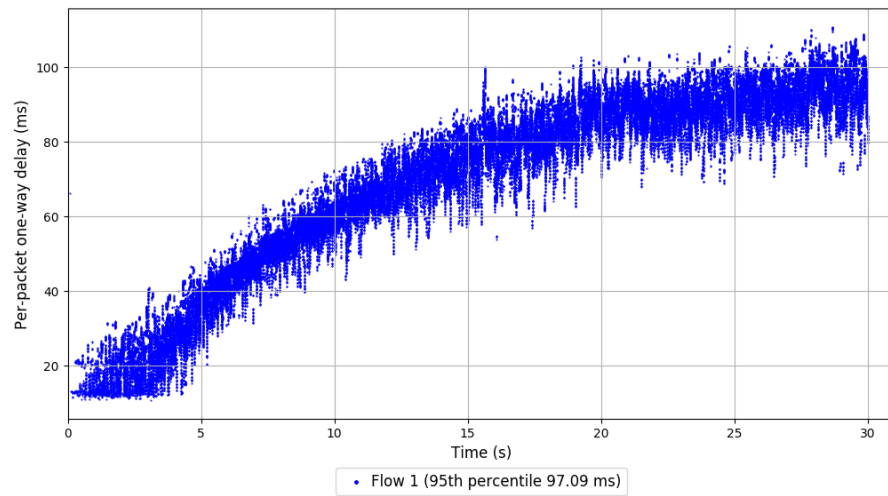
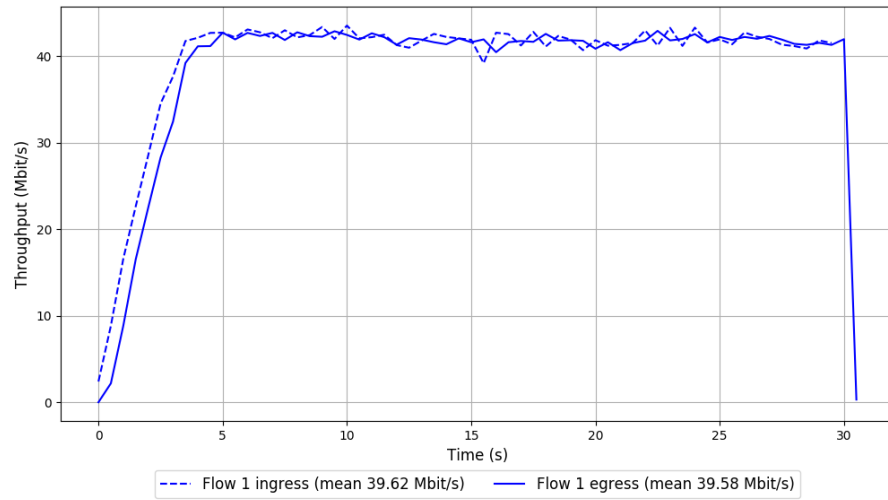


Run 2: Statistics of LEDBAT

Start at: 2018-09-07 09:25:49
End at: 2018-09-07 09:26:19
Local clock offset: 0.863 ms
Remote clock offset: -0.149 ms

Below is generated by plot.py at 2018-09-07 09:57:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 39.58 Mbit/s
95th percentile per-packet one-way delay: 97.092 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 39.58 Mbit/s
95th percentile per-packet one-way delay: 97.092 ms
Loss rate: 0.27%

Run 2: Report of LEDBAT — Data Link

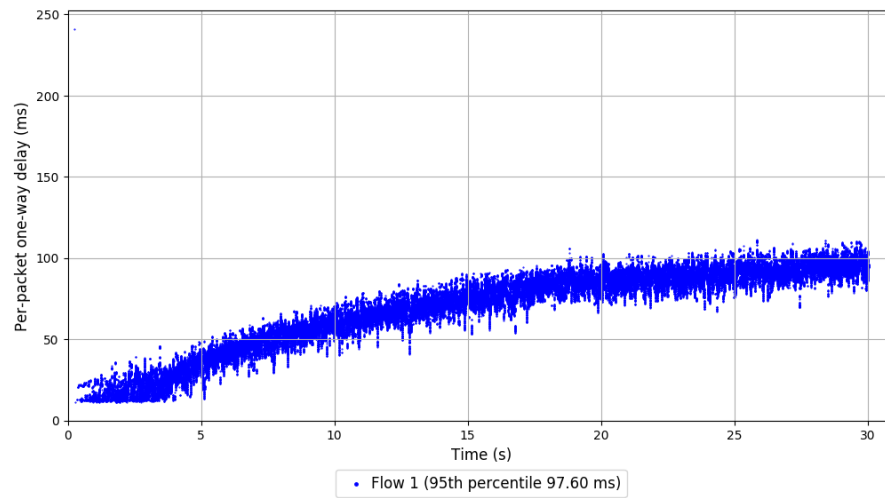
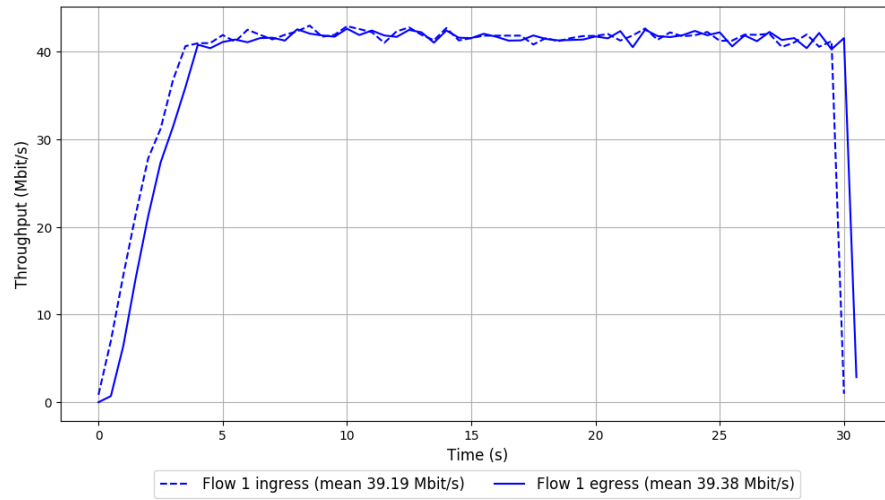


Run 3: Statistics of LEDBAT

Start at: 2018-09-07 09:49:37
End at: 2018-09-07 09:50:07
Local clock offset: 0.611 ms
Remote clock offset: -0.366 ms

Below is generated by plot.py at 2018-09-07 09:57:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 39.38 Mbit/s
95th percentile per-packet one-way delay: 97.596 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 39.38 Mbit/s
95th percentile per-packet one-way delay: 97.596 ms
Loss rate: 0.26%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Indigo-Muses

Start at: 2018-09-07 08:59:24

End at: 2018-09-07 08:59:54

Local clock offset: 0.973 ms

Remote clock offset: 0.197 ms

Below is generated by plot.py at 2018-09-07 09:57:07

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.63 Mbit/s

95th percentile per-packet one-way delay: 35.070 ms

Loss rate: 0.00%

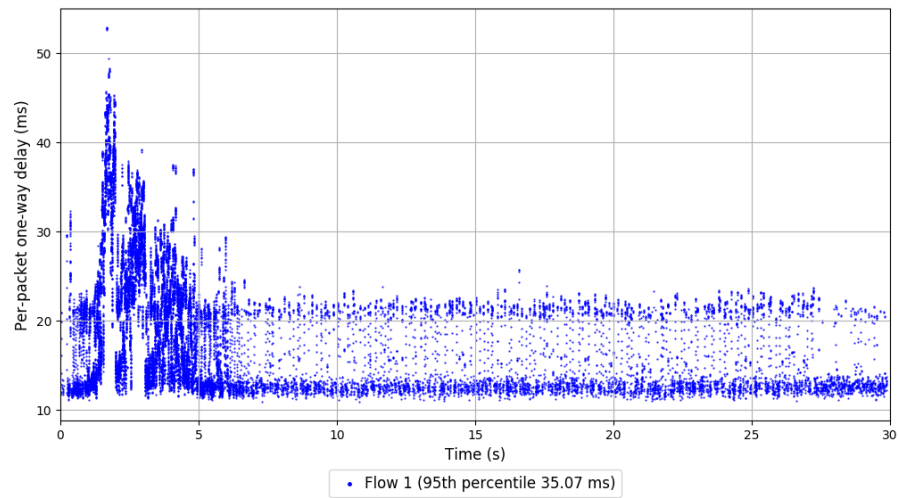
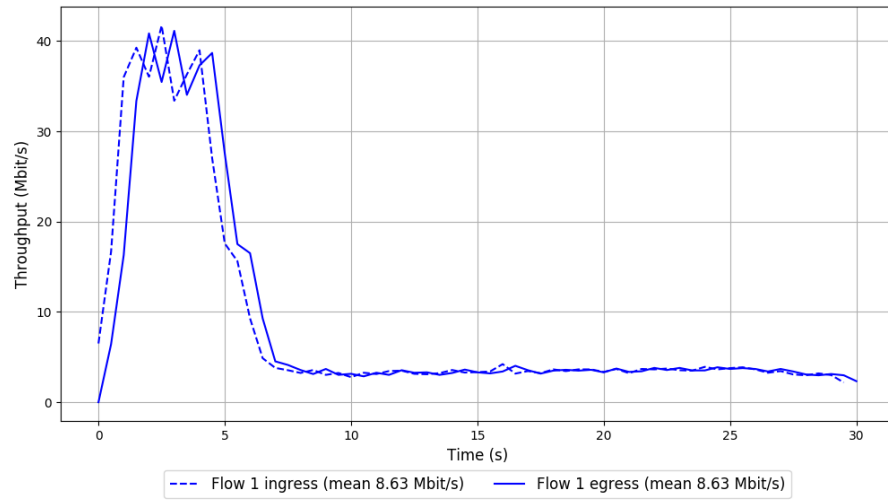
-- Flow 1:

Average throughput: 8.63 Mbit/s

95th percentile per-packet one-way delay: 35.070 ms

Loss rate: 0.00%

Run 1: Report of Indigo-Muses — Data Link

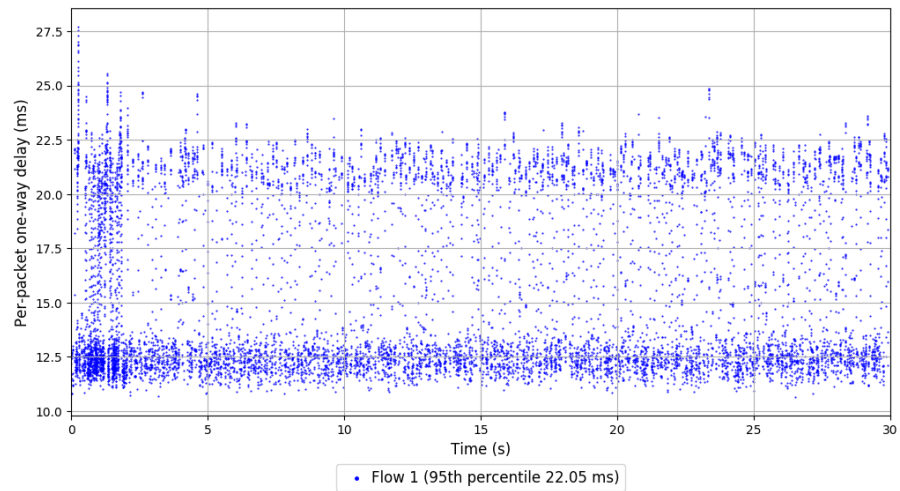
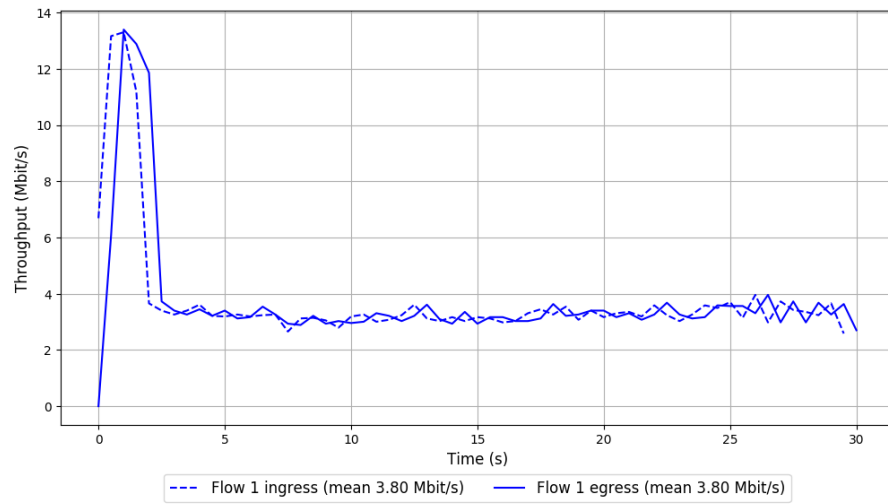


Run 2: Statistics of Indigo-Muses

Start at: 2018-09-07 09:23:11
End at: 2018-09-07 09:23:41
Local clock offset: 0.821 ms
Remote clock offset: -0.082 ms

Below is generated by plot.py at 2018-09-07 09:57:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 22.054 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 22.054 ms
Loss rate: 0.00%

Run 2: Report of Indigo-Muses — Data Link

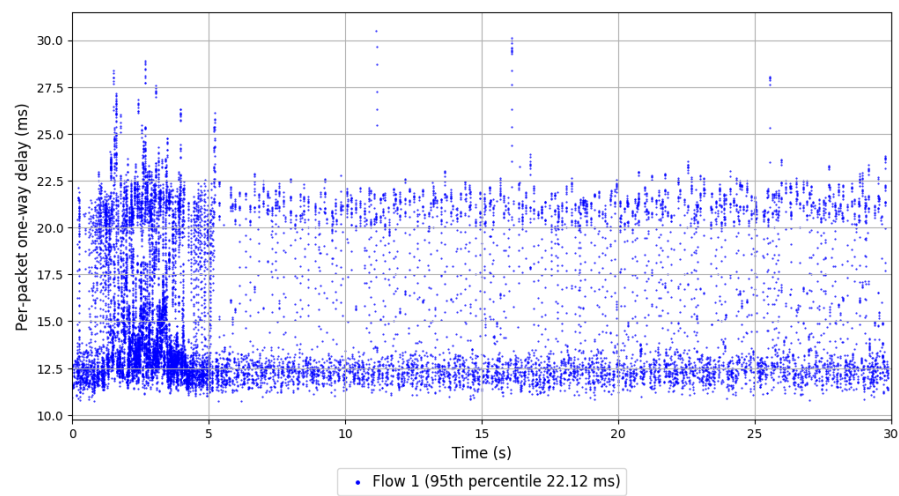
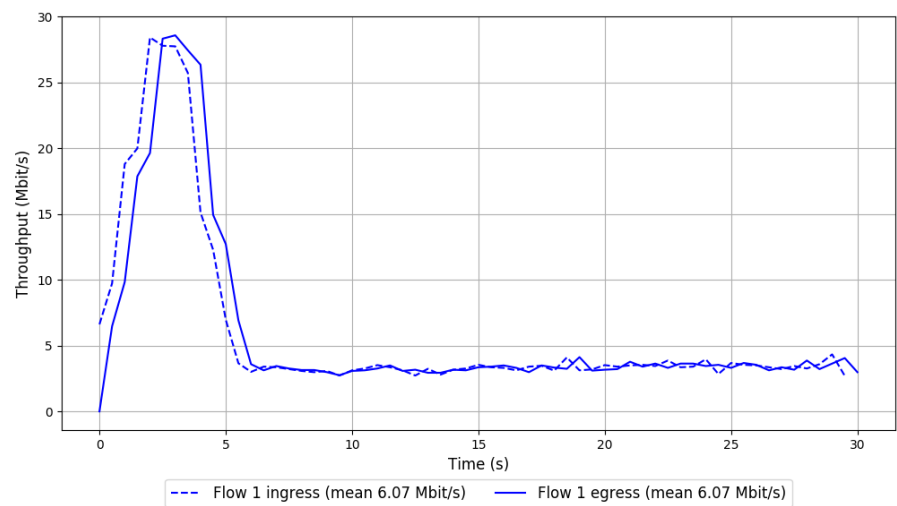


Run 3: Statistics of Indigo-Muses

Start at: 2018-09-07 09:46:59
End at: 2018-09-07 09:47:29
Local clock offset: 0.689 ms
Remote clock offset: -0.365 ms

Below is generated by plot.py at 2018-09-07 09:57:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.07 Mbit/s
95th percentile per-packet one-way delay: 22.124 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 6.07 Mbit/s
95th percentile per-packet one-way delay: 22.124 ms
Loss rate: 0.00%

Run 3: Report of Indigo-Muses — Data Link

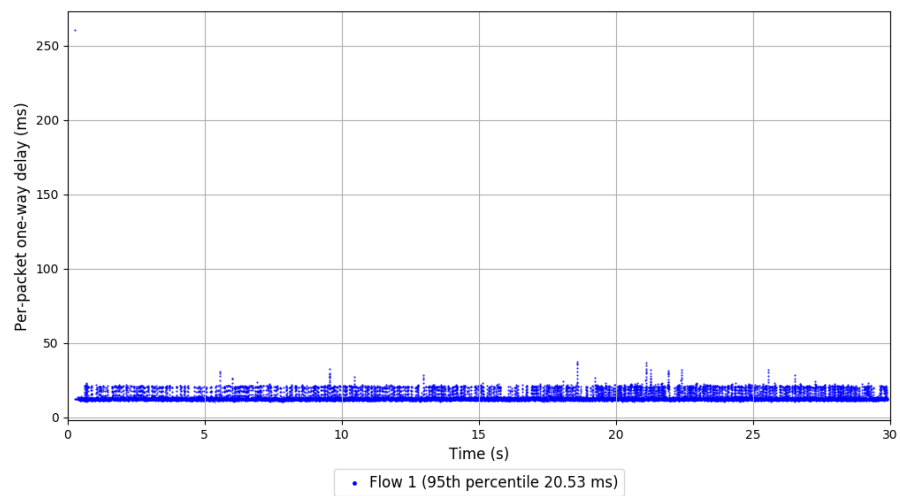
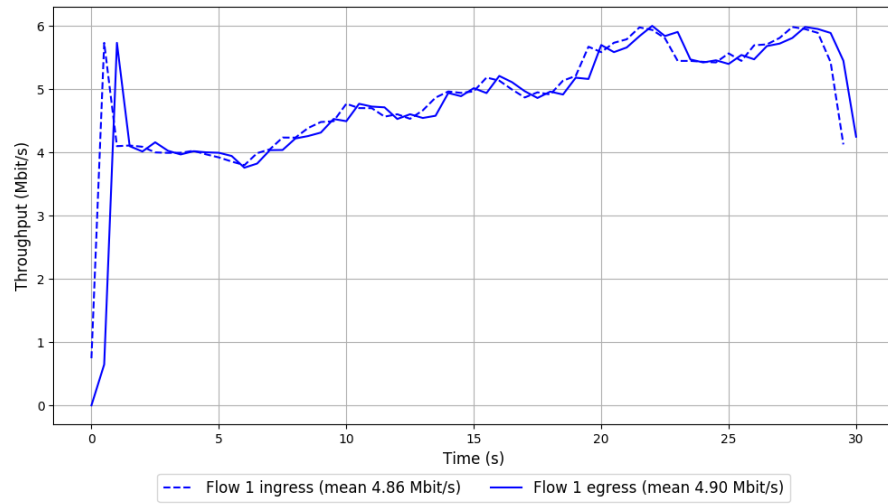


```
Run 1: Statistics of PCC-Allegro

Start at: 2018-09-07 08:50:08
End at: 2018-09-07 08:50:38
Local clock offset: 0.958 ms
Remote clock offset: 0.142 ms

# Below is generated by plot.py at 2018-09-07 09:57:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.90 Mbit/s
95th percentile per-packet one-way delay: 20.533 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 4.90 Mbit/s
95th percentile per-packet one-way delay: 20.533 ms
Loss rate: 0.00%
```

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-09-07 09:13:55

End at: 2018-09-07 09:14:25

Local clock offset: 1.183 ms

Remote clock offset: 0.186 ms

Below is generated by plot.py at 2018-09-07 09:57:07

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.52 Mbit/s

95th percentile per-packet one-way delay: 20.422 ms

Loss rate: 0.00%

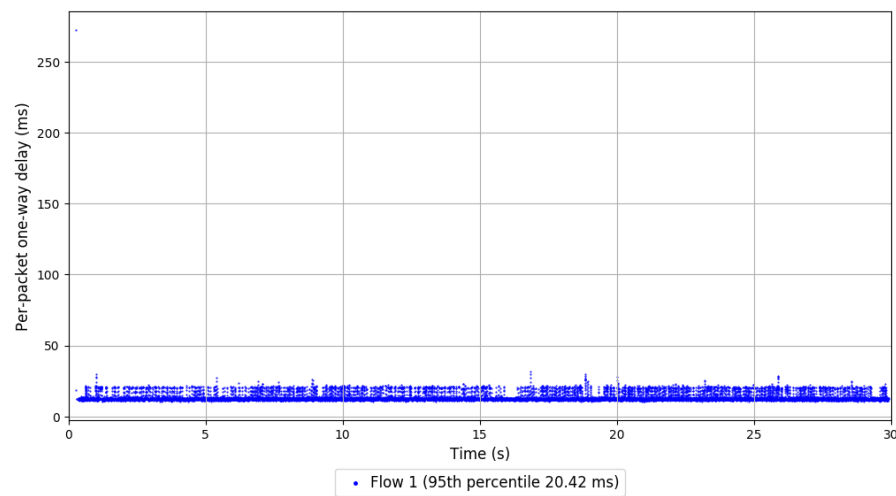
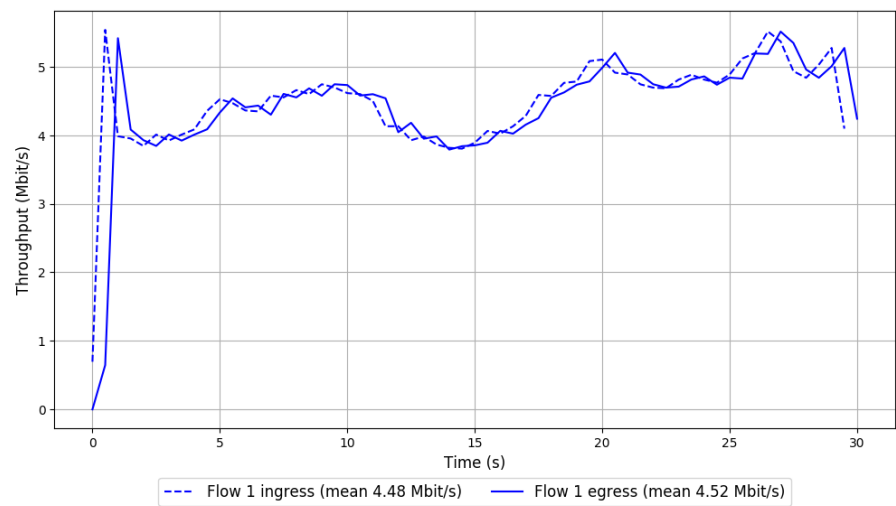
-- Flow 1:

Average throughput: 4.52 Mbit/s

95th percentile per-packet one-way delay: 20.422 ms

Loss rate: 0.00%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-09-07 09:37:43

End at: 2018-09-07 09:38:13

Local clock offset: 0.599 ms

Remote clock offset: -0.26 ms

Below is generated by plot.py at 2018-09-07 09:57:07

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.53 Mbit/s

95th percentile per-packet one-way delay: 20.621 ms

Loss rate: 0.00%

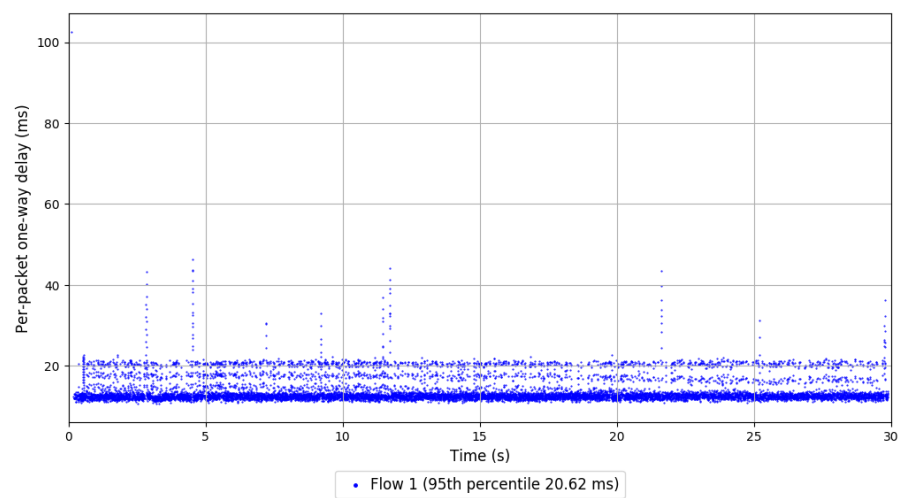
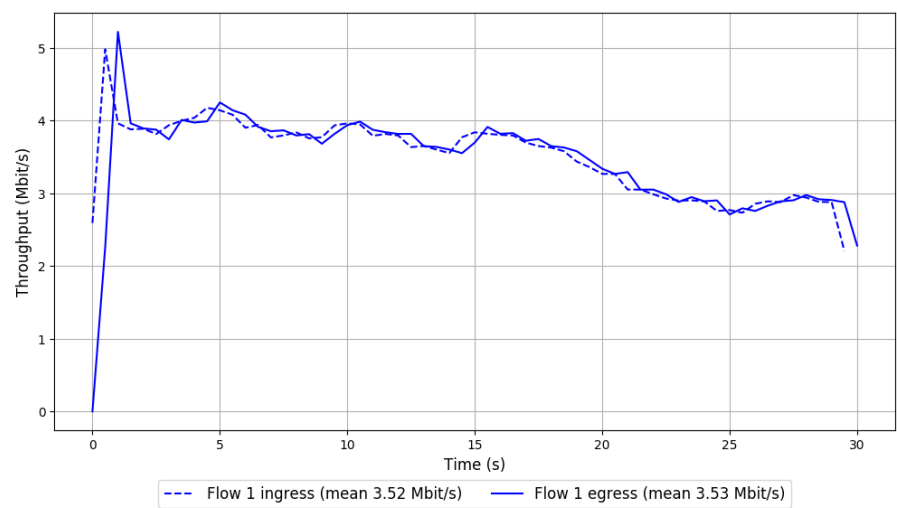
-- Flow 1:

Average throughput: 3.53 Mbit/s

95th percentile per-packet one-way delay: 20.621 ms

Loss rate: 0.00%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

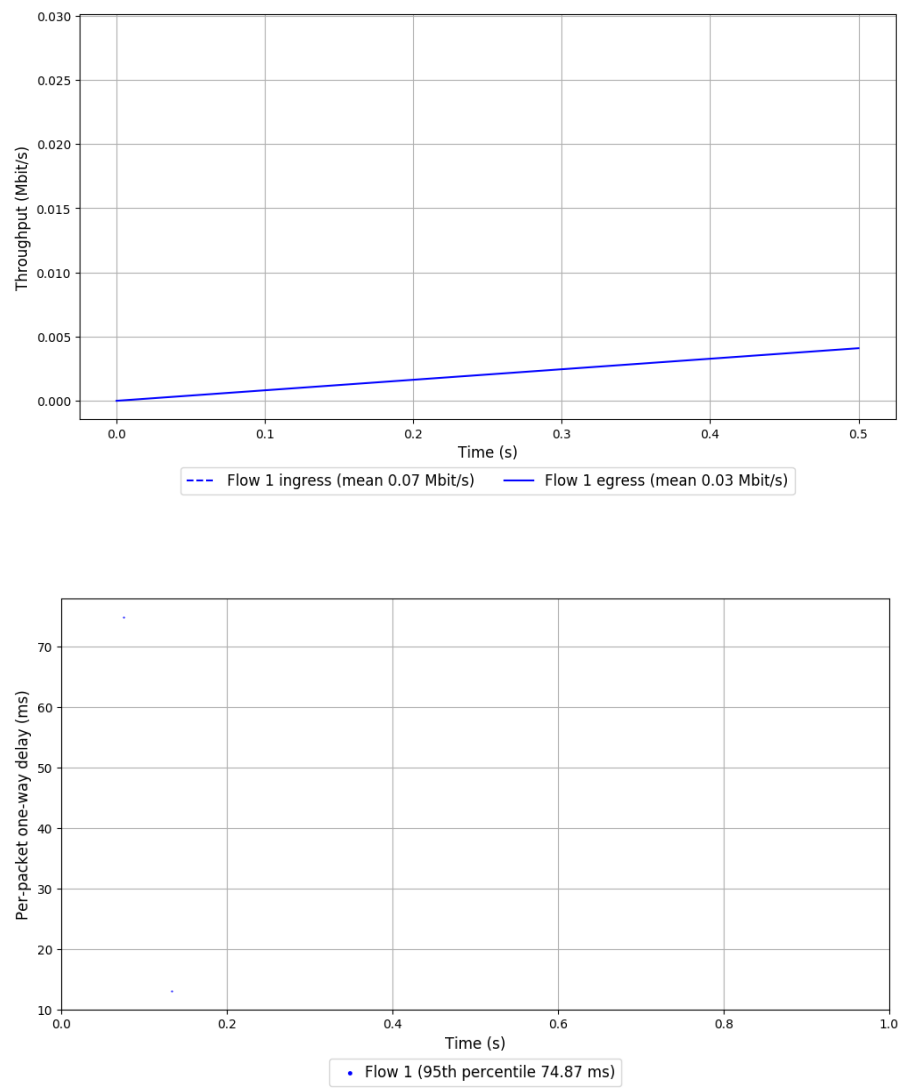
Start at: 2018-09-07 08:46:11

End at: 2018-09-07 08:46:41

Local clock offset: 0.775 ms

Remote clock offset: 0.137 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2018-09-07 09:09:58

End at: 2018-09-07 09:10:28

Local clock offset: 1.136 ms

Remote clock offset: 0.201 ms

Below is generated by plot.py at 2018-09-07 09:57:07

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.83 Mbit/s

95th percentile per-packet one-way delay: 20.873 ms

Loss rate: 39.98%

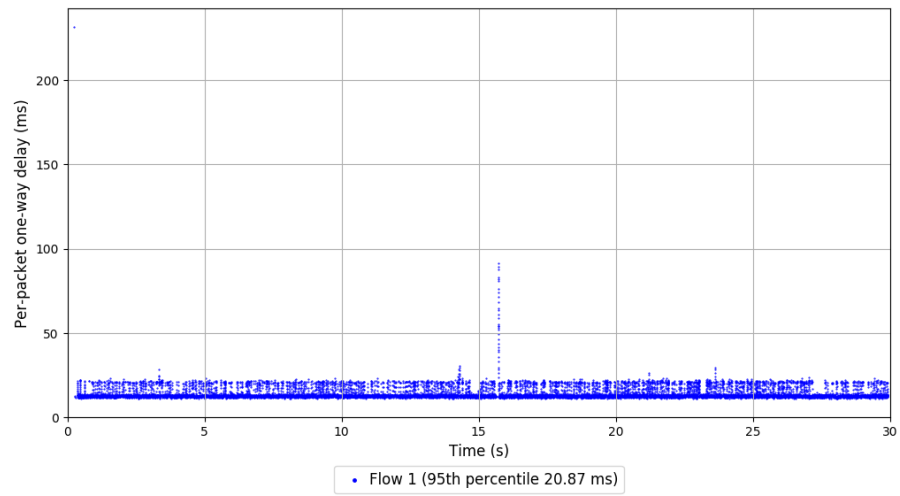
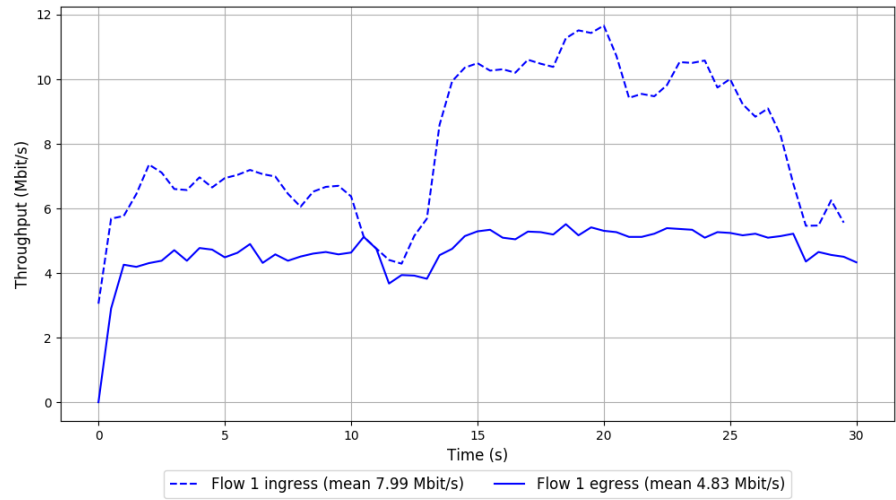
-- Flow 1:

Average throughput: 4.83 Mbit/s

95th percentile per-packet one-way delay: 20.873 ms

Loss rate: 39.98%

Run 2: Report of PCC-Expr — Data Link

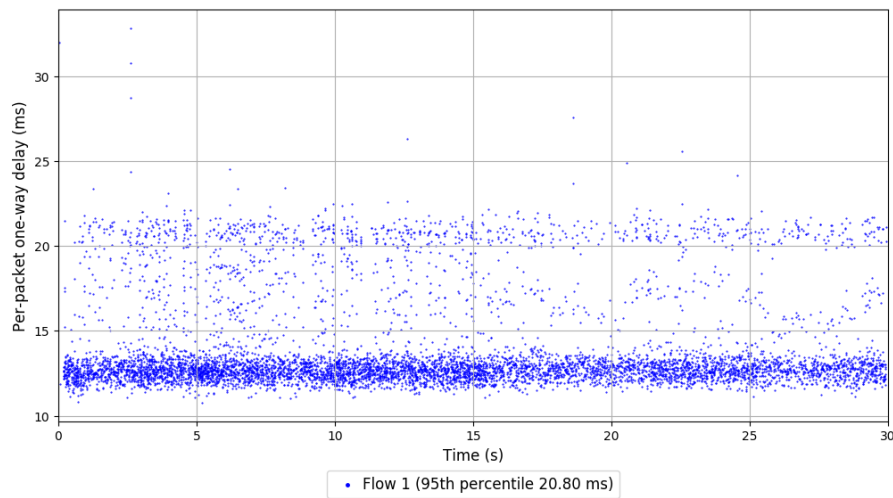
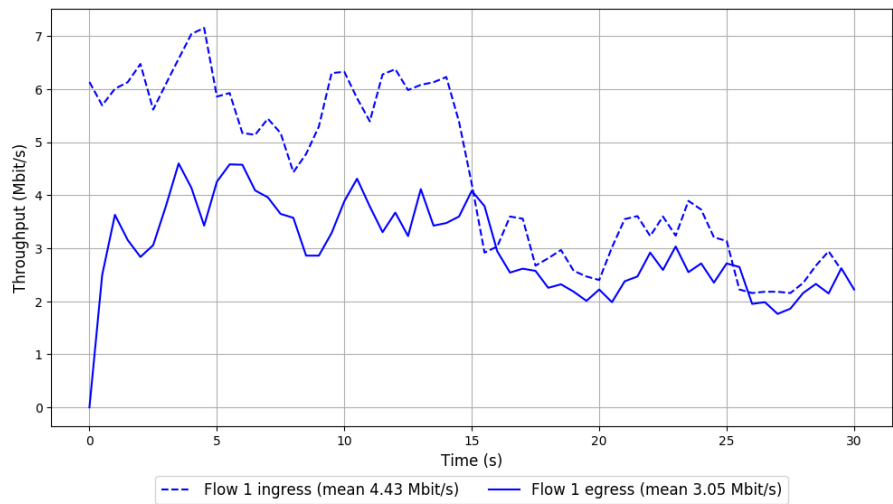


Run 3: Statistics of PCC-Expr

Start at: 2018-09-07 09:33:45
End at: 2018-09-07 09:34:16
Local clock offset: 0.644 ms
Remote clock offset: -0.225 ms

Below is generated by plot.py at 2018-09-07 09:57:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.05 Mbit/s
95th percentile per-packet one-way delay: 20.799 ms
Loss rate: 31.19%
-- Flow 1:
Average throughput: 3.05 Mbit/s
95th percentile per-packet one-way delay: 20.799 ms
Loss rate: 31.19%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-09-07 08:56:46

End at: 2018-09-07 08:57:16

Local clock offset: 0.971 ms

Remote clock offset: 0.098 ms

Below is generated by plot.py at 2018-09-07 09:57:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.88 Mbit/s

95th percentile per-packet one-way delay: 130.635 ms

Loss rate: 0.84%

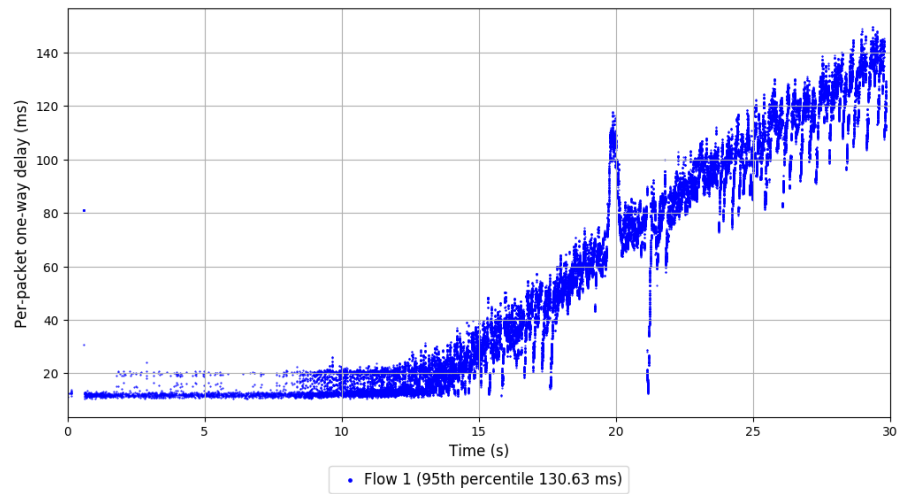
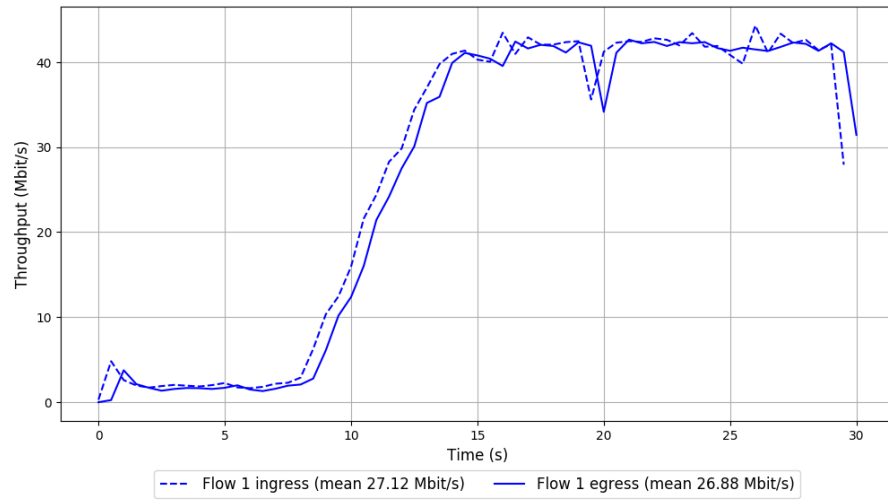
-- Flow 1:

Average throughput: 26.88 Mbit/s

95th percentile per-packet one-way delay: 130.635 ms

Loss rate: 0.84%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-09-07 09:20:33

End at: 2018-09-07 09:21:03

Local clock offset: 0.972 ms

Remote clock offset: 0.081 ms

Below is generated by plot.py at 2018-09-07 09:57:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 39.79 Mbit/s

95th percentile per-packet one-way delay: 200.978 ms

Loss rate: 0.67%

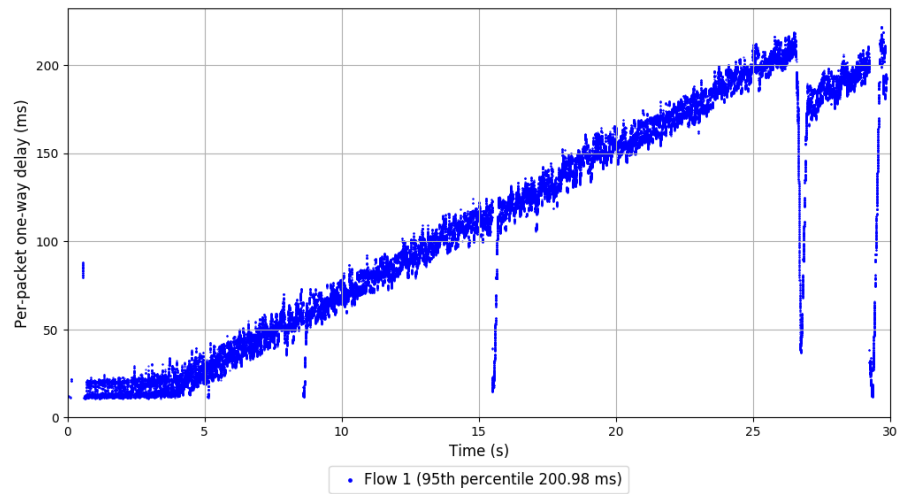
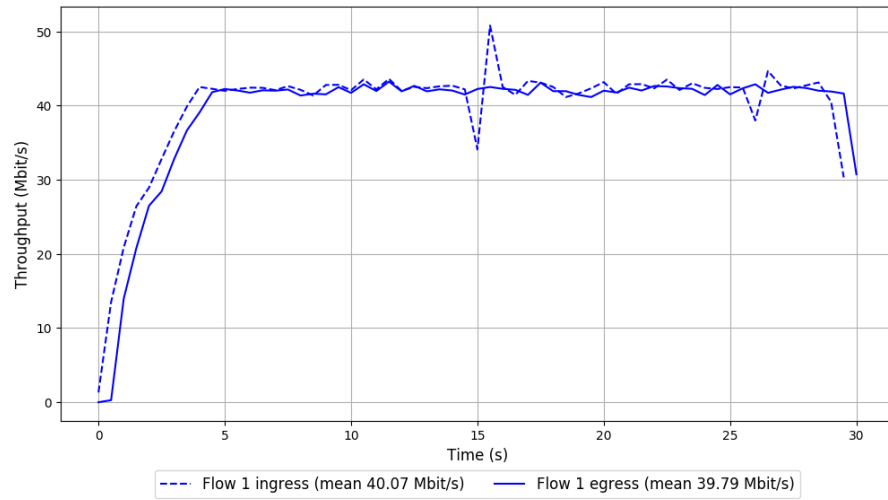
-- Flow 1:

Average throughput: 39.79 Mbit/s

95th percentile per-packet one-way delay: 200.978 ms

Loss rate: 0.67%

Run 2: Report of QUIC Cubic — Data Link

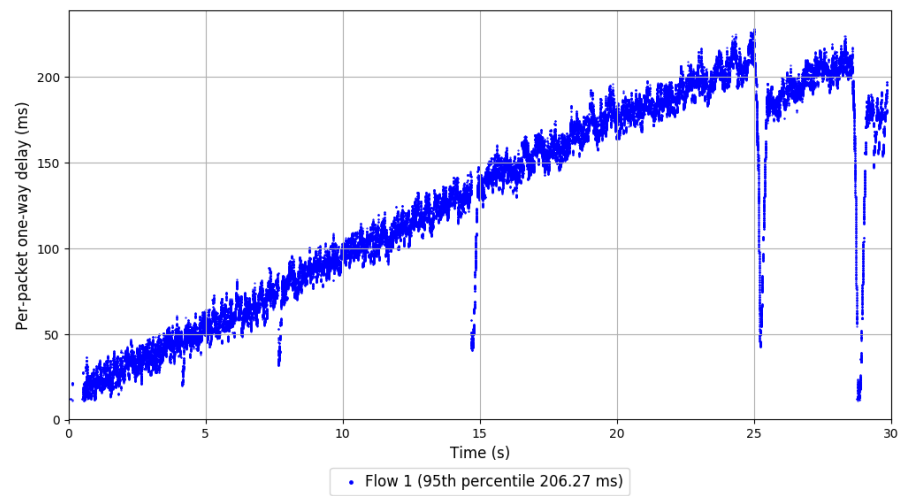
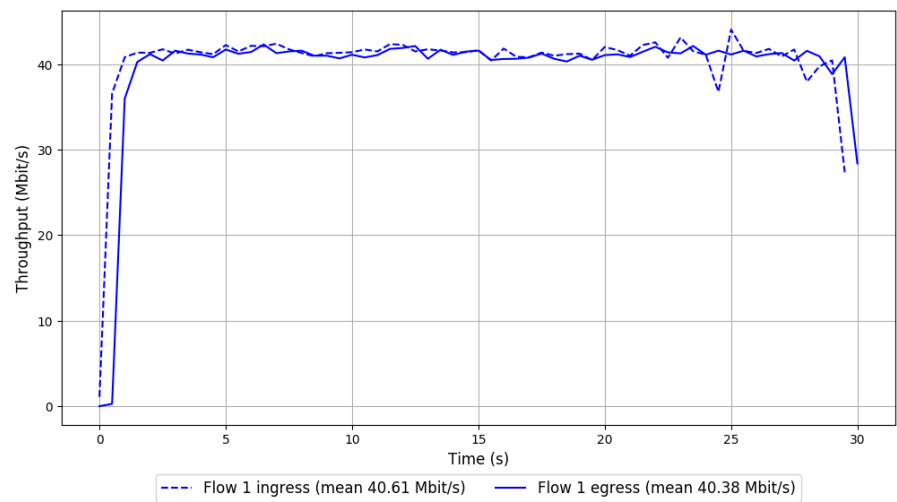


Run 3: Statistics of QUIC Cubic

Start at: 2018-09-07 09:44:21
End at: 2018-09-07 09:44:51
Local clock offset: 0.648 ms
Remote clock offset: -0.283 ms

Below is generated by plot.py at 2018-09-07 09:57:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 40.38 Mbit/s
95th percentile per-packet one-way delay: 206.267 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 40.38 Mbit/s
95th percentile per-packet one-way delay: 206.267 ms
Loss rate: 0.56%

Run 3: Report of QUIC Cubic — Data Link

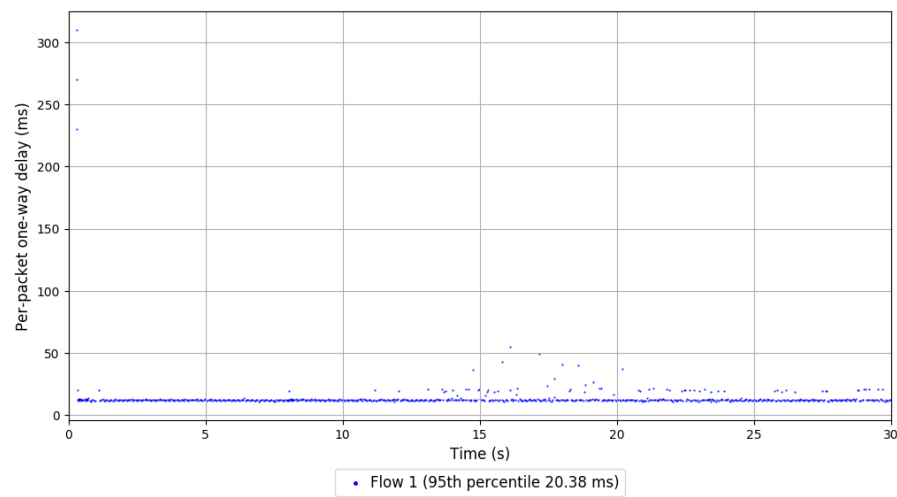
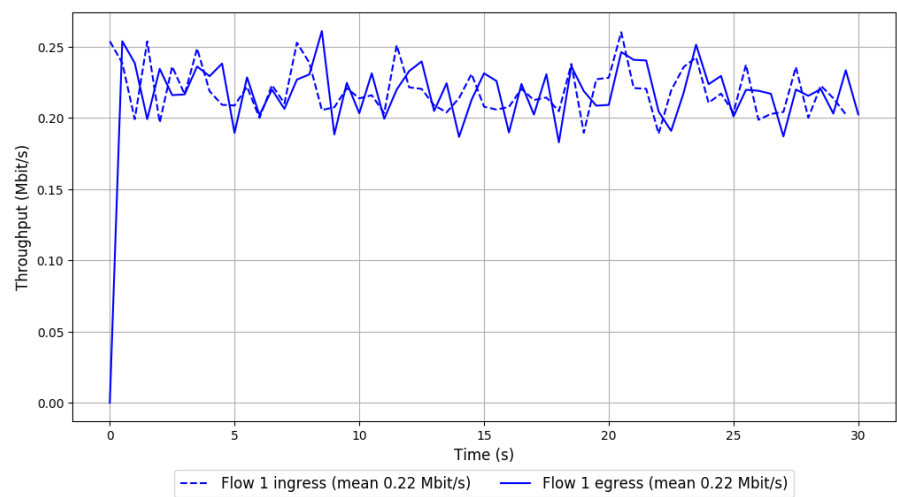


```
Run 1: Statistics of SCReAM

Start at: 2018-09-07 08:48:50
End at: 2018-09-07 08:49:20
Local clock offset: 0.925 ms
Remote clock offset: 0.22 ms

# Below is generated by plot.py at 2018-09-07 09:57:39
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.379 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.379 ms
Loss rate: 0.00%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-09-07 09:12:37

End at: 2018-09-07 09:13:07

Local clock offset: 1.199 ms

Remote clock offset: 0.177 ms

Below is generated by plot.py at 2018-09-07 09:57:39

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 19.205 ms

Loss rate: 0.00%

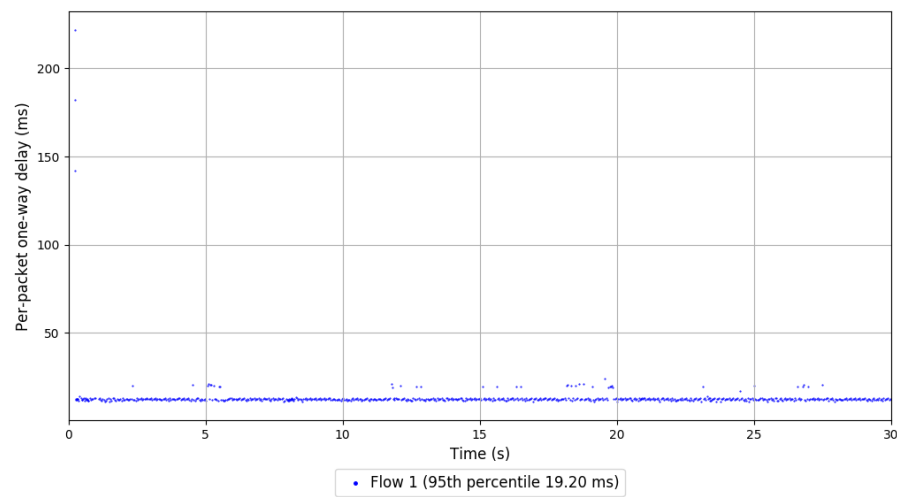
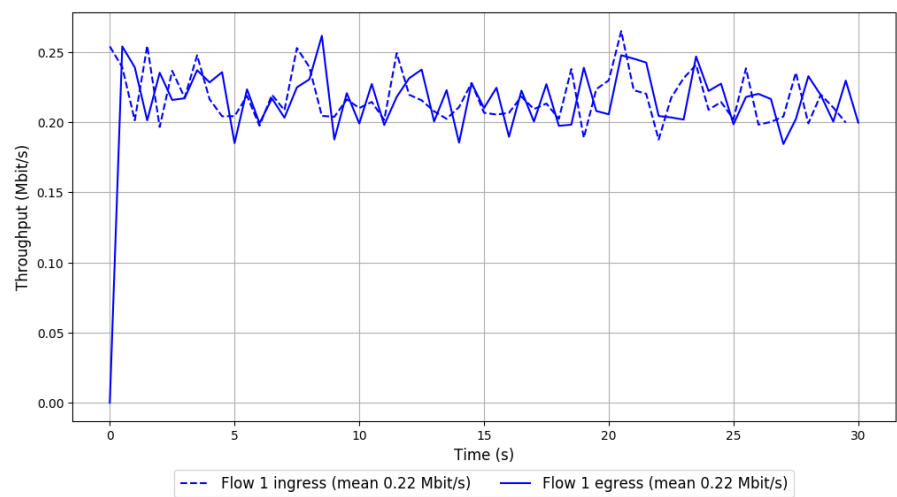
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 19.205 ms

Loss rate: 0.00%

Run 2: Report of SReAM — Data Link

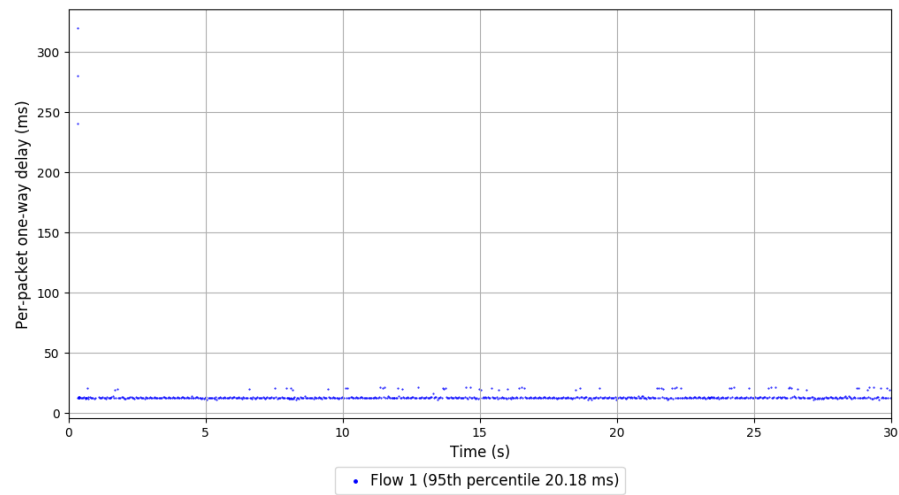
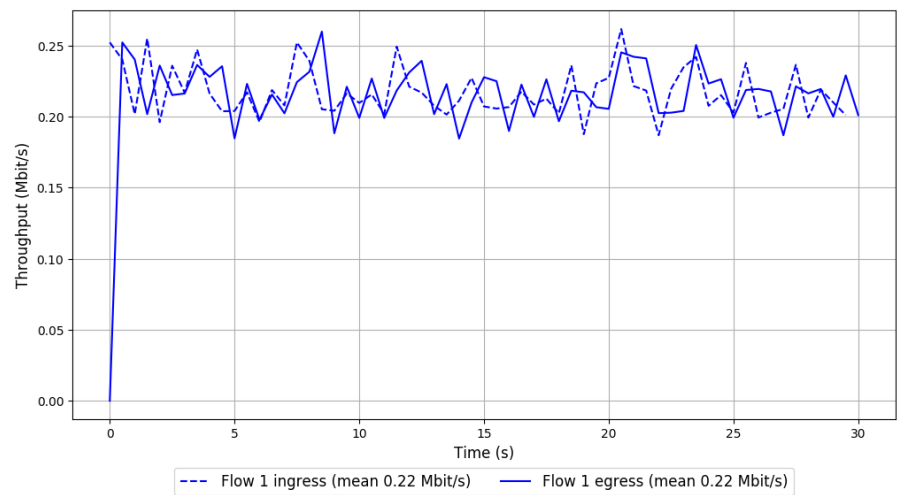


Run 3: Statistics of SCReAM

Start at: 2018-09-07 09:36:24
End at: 2018-09-07 09:36:54
Local clock offset: 0.718 ms
Remote clock offset: -0.302 ms

Below is generated by plot.py at 2018-09-07 09:57:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.184 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.184 ms
Loss rate: 0.00%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-09-07 09:00:43

End at: 2018-09-07 09:01:13

Local clock offset: 1.085 ms

Remote clock offset: 0.09 ms

Below is generated by plot.py at 2018-09-07 09:57:39

Datalink statistics

-- Total of 1 flow:

Average throughput: 20.04 Mbit/s

95th percentile per-packet one-way delay: 28.222 ms

Loss rate: 0.00%

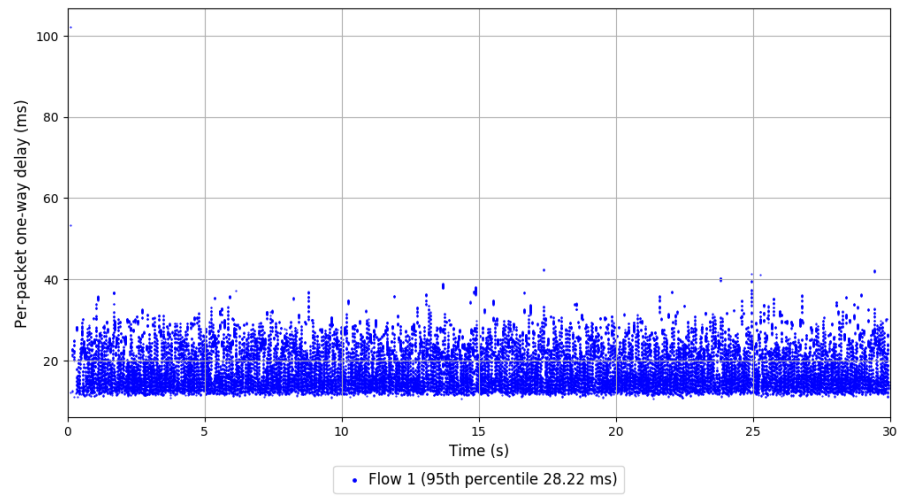
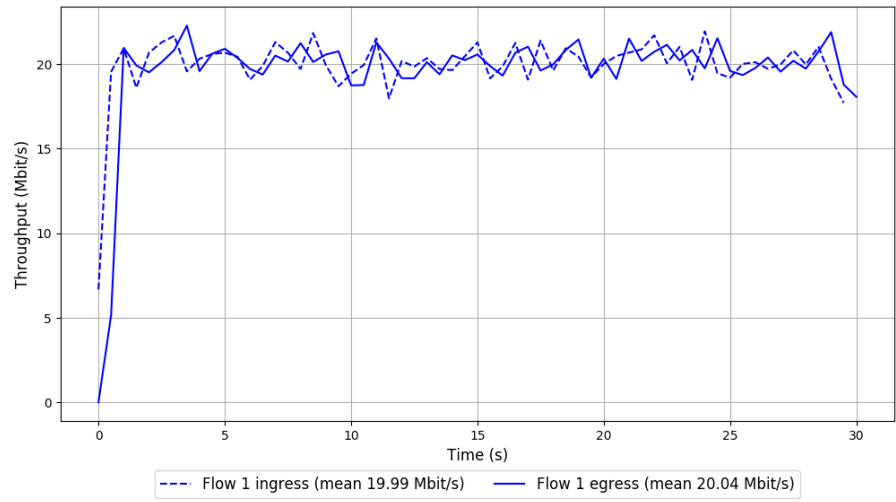
-- Flow 1:

Average throughput: 20.04 Mbit/s

95th percentile per-packet one-way delay: 28.222 ms

Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

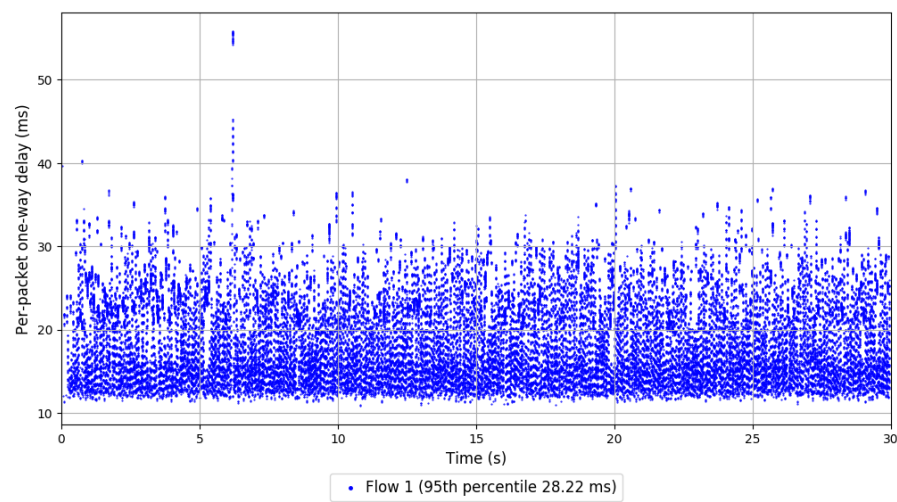
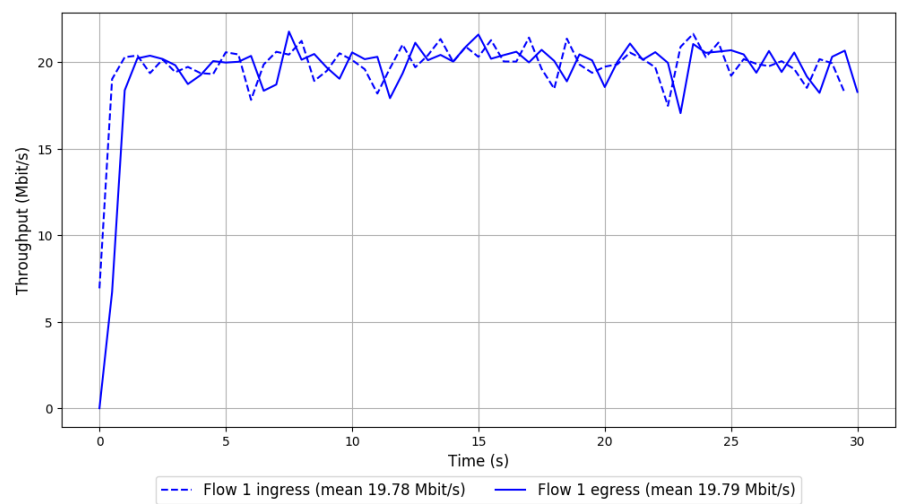


Run 2: Statistics of Sprout

Start at: 2018-09-07 09:24:30
End at: 2018-09-07 09:25:00
Local clock offset: 0.891 ms
Remote clock offset: -0.044 ms

Below is generated by plot.py at 2018-09-07 09:57:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 19.79 Mbit/s
95th percentile per-packet one-way delay: 28.222 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 19.79 Mbit/s
95th percentile per-packet one-way delay: 28.222 ms
Loss rate: 0.00%

Run 2: Report of Sprout — Data Link

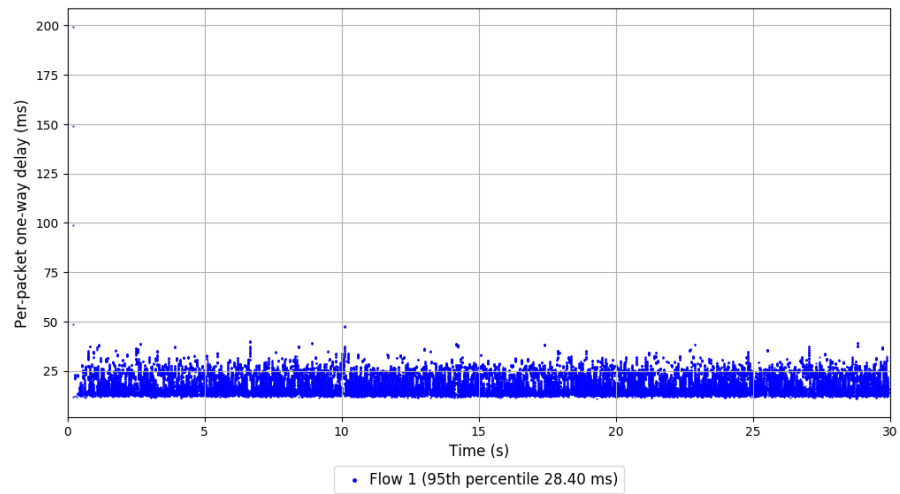
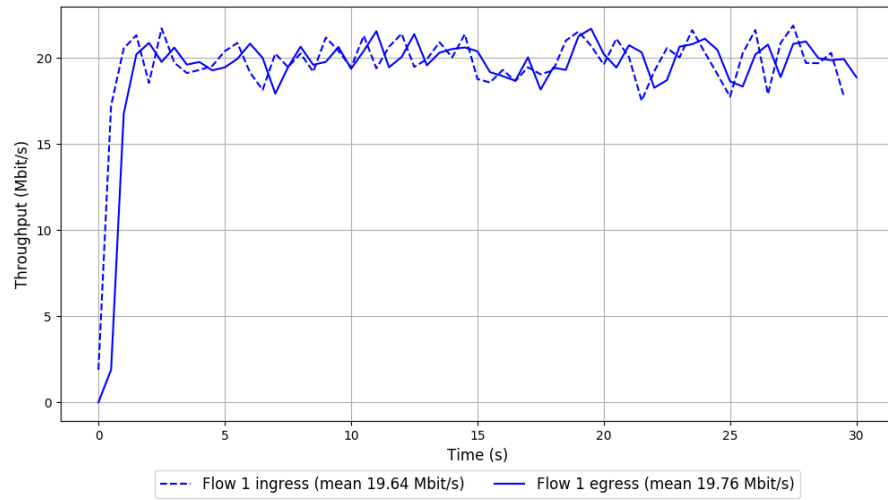


Run 3: Statistics of Sprout

Start at: 2018-09-07 09:48:18
End at: 2018-09-07 09:48:48
Local clock offset: 0.61 ms
Remote clock offset: -0.325 ms

Below is generated by plot.py at 2018-09-07 09:57:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 19.76 Mbit/s
95th percentile per-packet one-way delay: 28.404 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 19.76 Mbit/s
95th percentile per-packet one-way delay: 28.404 ms
Loss rate: 0.00%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

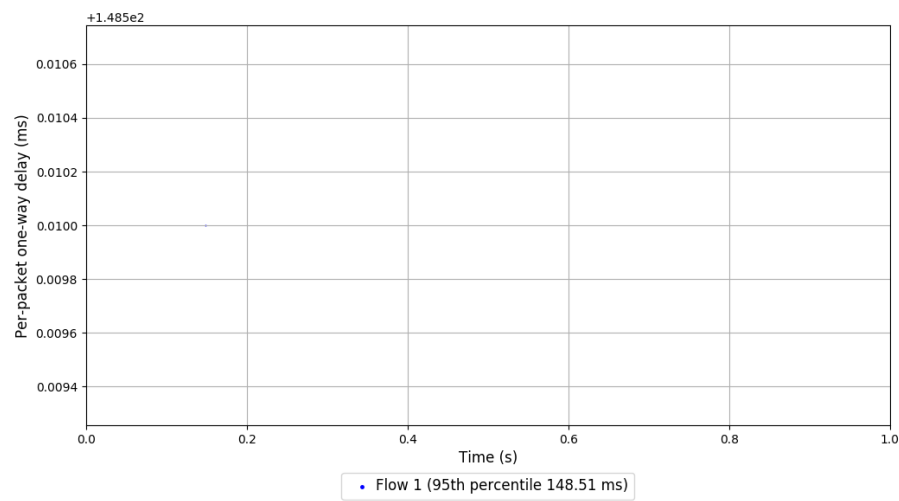
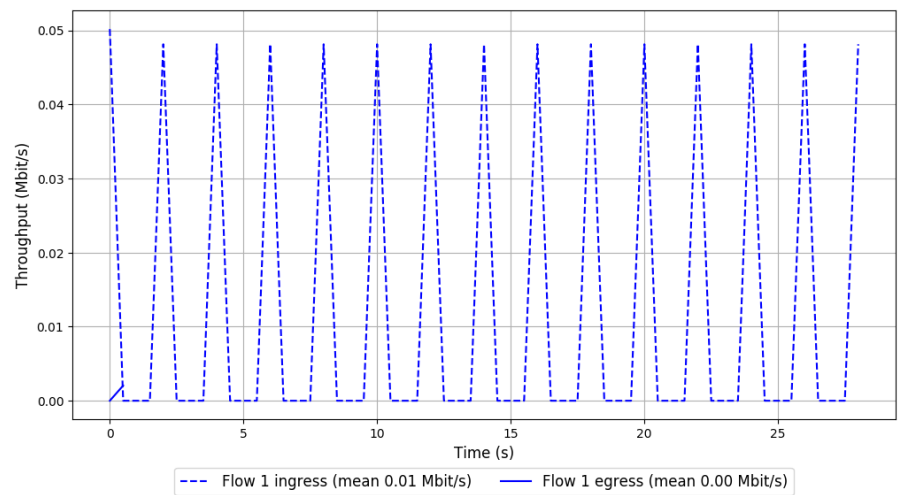
Start at: 2018-09-07 08:52:47

End at: 2018-09-07 08:53:17

Local clock offset: 0.929 ms

Remote clock offset: 0.094 ms

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-09-07 09:16:33

End at: 2018-09-07 09:17:03

Local clock offset: 1.122 ms

Remote clock offset: 0.135 ms

Below is generated by plot.py at 2018-09-07 09:57:39

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.71 Mbit/s

95th percentile per-packet one-way delay: 20.955 ms

Loss rate: 12.19%

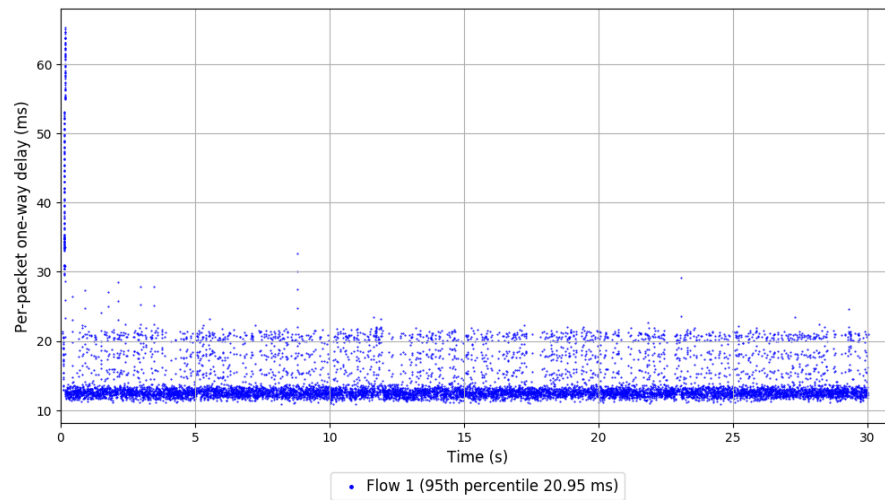
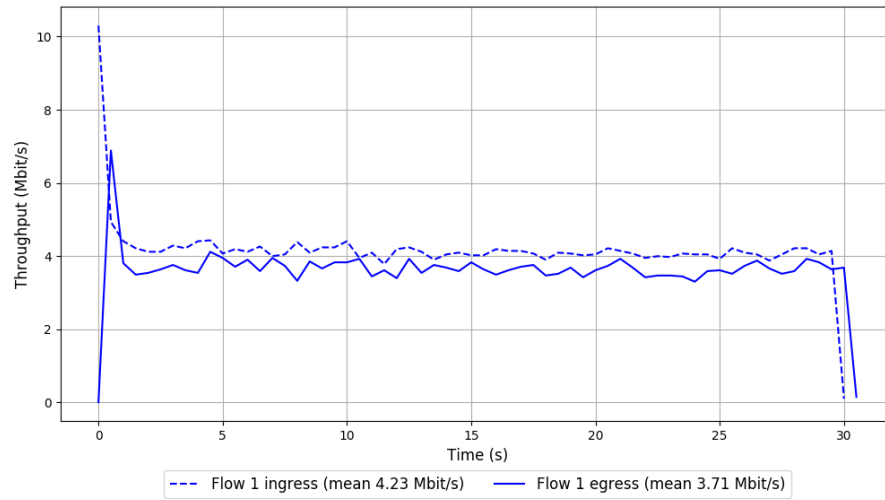
-- Flow 1:

Average throughput: 3.71 Mbit/s

95th percentile per-packet one-way delay: 20.955 ms

Loss rate: 12.19%

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

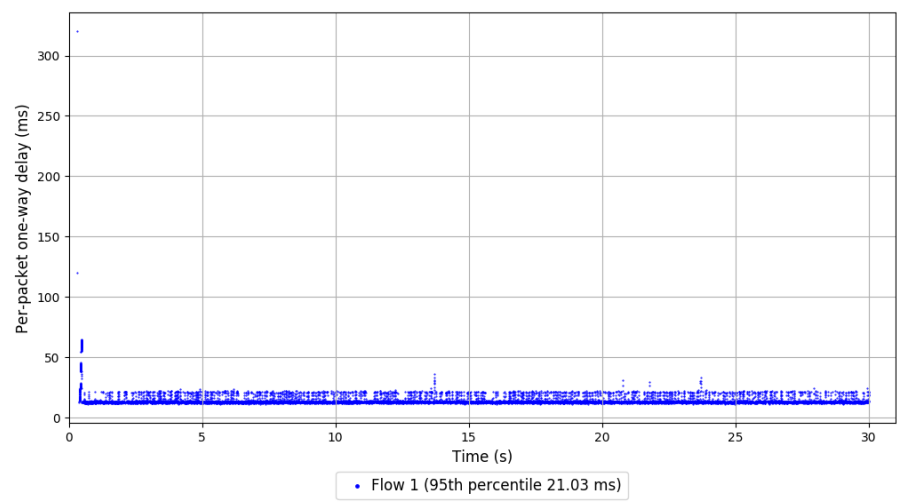
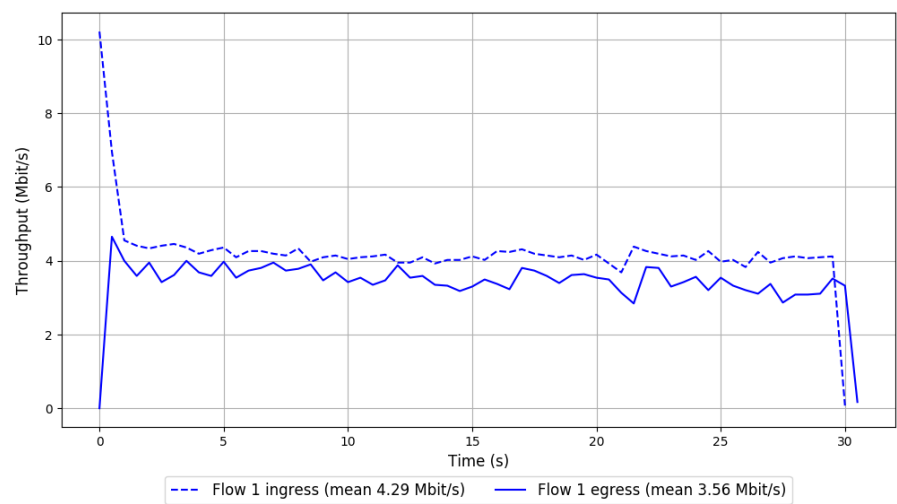


Run 3: Statistics of TaoVA-100x

Start at: 2018-09-07 09:40:21
End at: 2018-09-07 09:40:52
Local clock offset: 0.672 ms
Remote clock offset: -0.291 ms

Below is generated by plot.py at 2018-09-07 09:57:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.56 Mbit/s
95th percentile per-packet one-way delay: 21.033 ms
Loss rate: 17.85%
-- Flow 1:
Average throughput: 3.56 Mbit/s
95th percentile per-packet one-way delay: 21.033 ms
Loss rate: 17.85%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-09-07 09:06:02

End at: 2018-09-07 09:06:32

Local clock offset: 1.09 ms

Remote clock offset: 0.196 ms

Below is generated by plot.py at 2018-09-07 09:57:39

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 20.736 ms

Loss rate: 0.00%

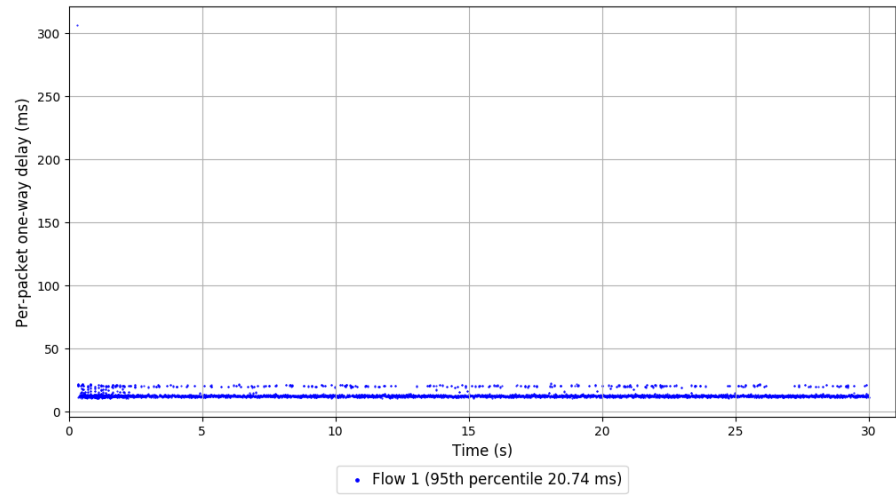
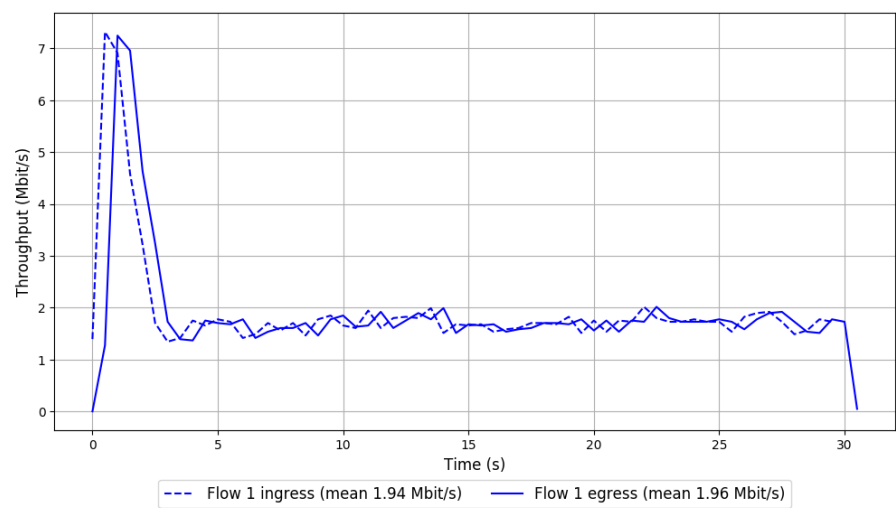
-- Flow 1:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 20.736 ms

Loss rate: 0.00%

Run 1: Report of TCP Vegas — Data Link

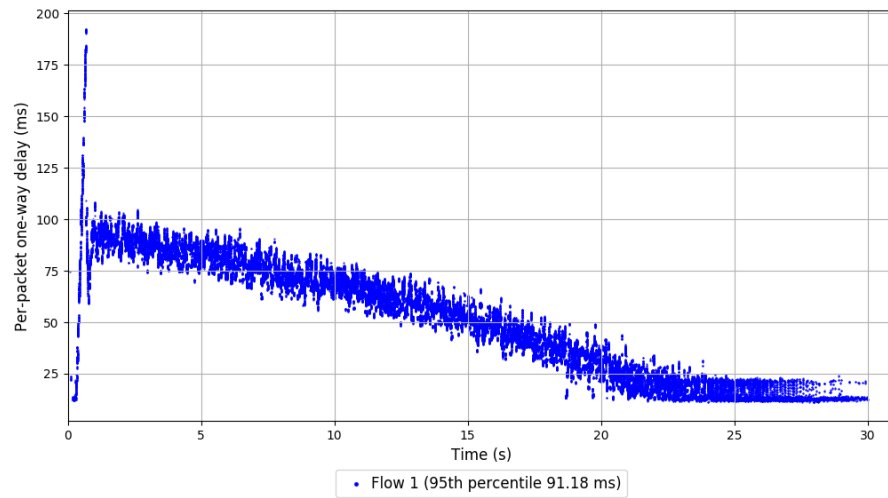
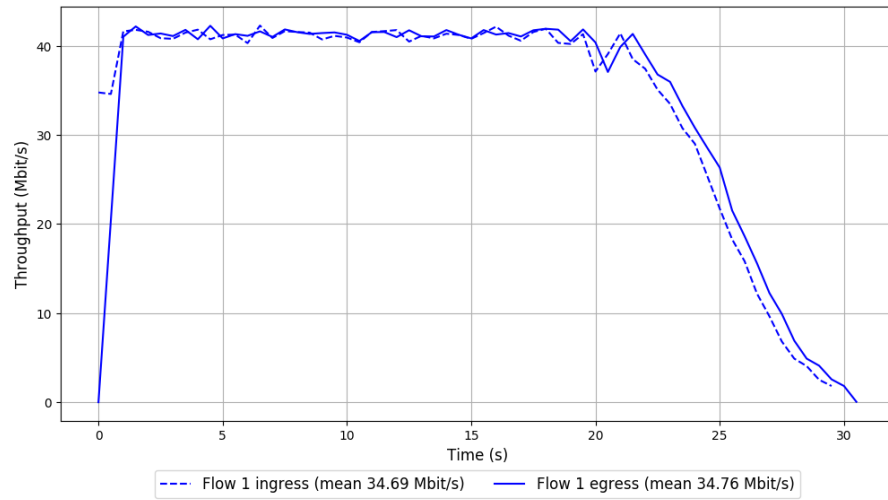


Run 2: Statistics of TCP Vegas

Start at: 2018-09-07 09:29:48
End at: 2018-09-07 09:30:18
Local clock offset: 0.71 ms
Remote clock offset: -0.142 ms

Below is generated by plot.py at 2018-09-07 09:57:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 34.76 Mbit/s
95th percentile per-packet one-way delay: 91.184 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 34.76 Mbit/s
95th percentile per-packet one-way delay: 91.184 ms
Loss rate: 0.00%

Run 2: Report of TCP Vegas — Data Link

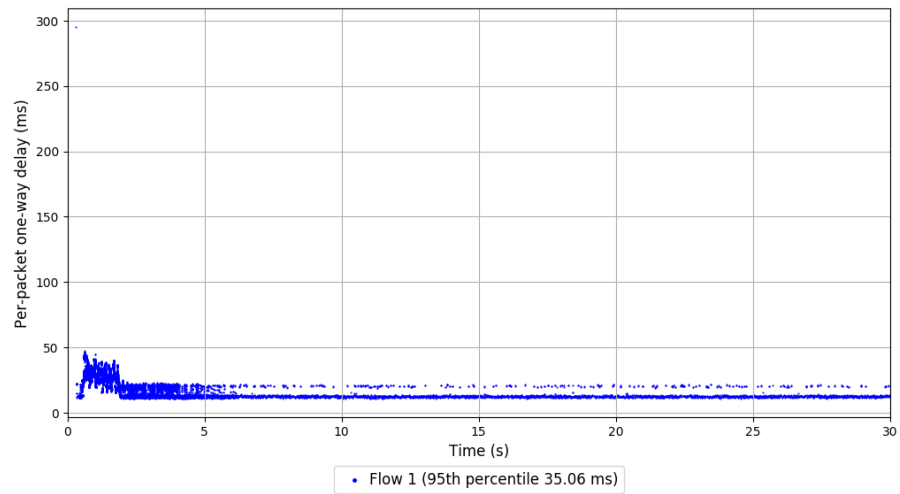
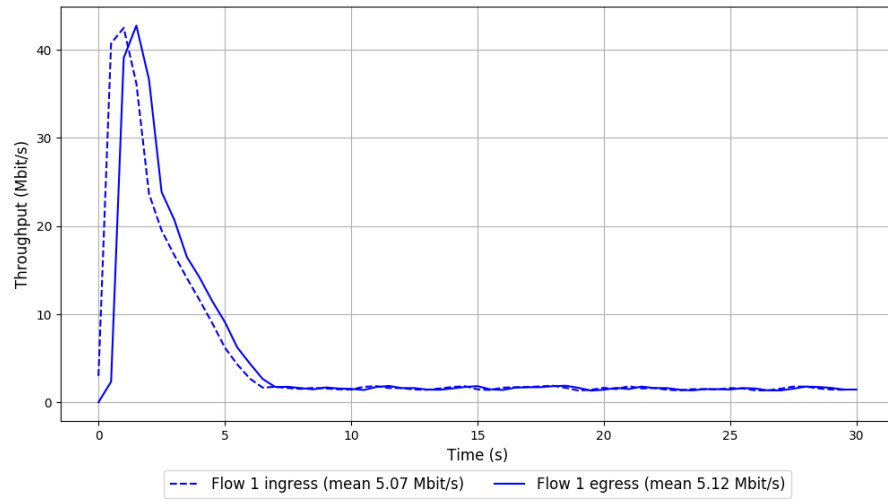


Run 3: Statistics of TCP Vegas

Start at: 2018-09-07 09:53:35
End at: 2018-09-07 09:54:05
Local clock offset: 0.703 ms
Remote clock offset: -0.241 ms

Below is generated by plot.py at 2018-09-07 09:57:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.12 Mbit/s
95th percentile per-packet one-way delay: 35.056 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 5.12 Mbit/s
95th percentile per-packet one-way delay: 35.056 ms
Loss rate: 0.04%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-09-07 08:55:26

End at: 2018-09-07 08:55:56

Local clock offset: 1.034 ms

Remote clock offset: 0.06 ms

Below is generated by plot.py at 2018-09-07 09:57:45

Datalink statistics

-- Total of 1 flow:

Average throughput: 39.36 Mbit/s

95th percentile per-packet one-way delay: 185.060 ms

Loss rate: 1.10%

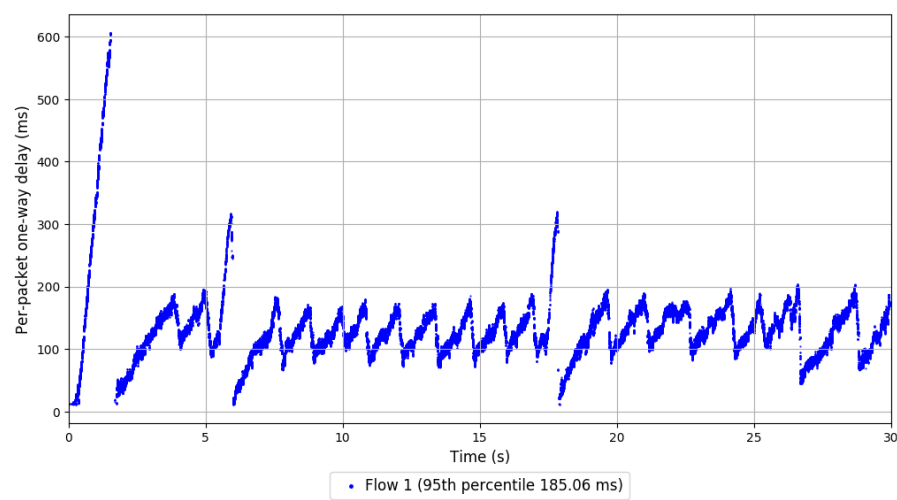
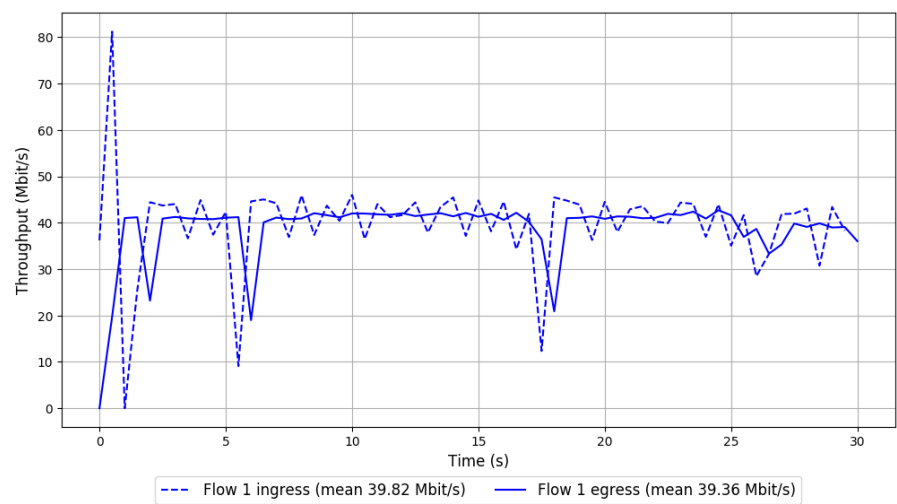
-- Flow 1:

Average throughput: 39.36 Mbit/s

95th percentile per-packet one-way delay: 185.060 ms

Loss rate: 1.10%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-09-07 09:19:12

End at: 2018-09-07 09:19:42

Local clock offset: 0.939 ms

Remote clock offset: 0.198 ms

Below is generated by plot.py at 2018-09-07 09:57:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 41.17 Mbit/s

95th percentile per-packet one-way delay: 176.448 ms

Loss rate: 1.02%

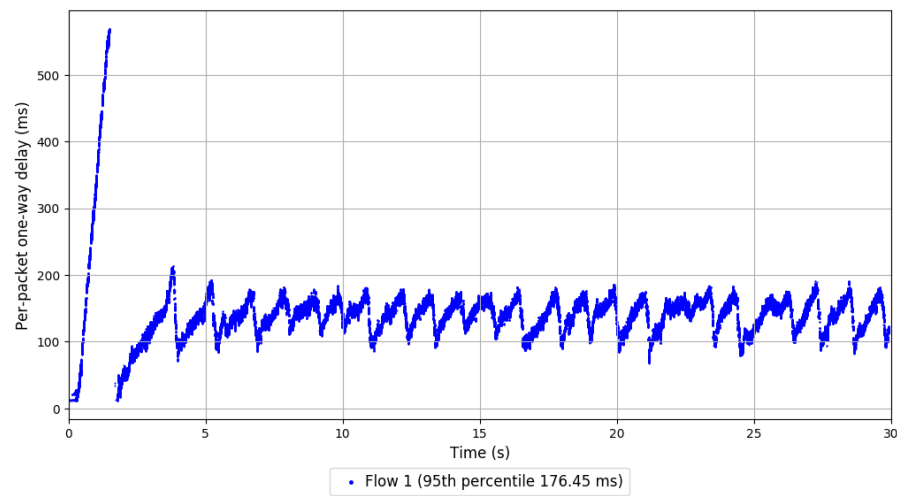
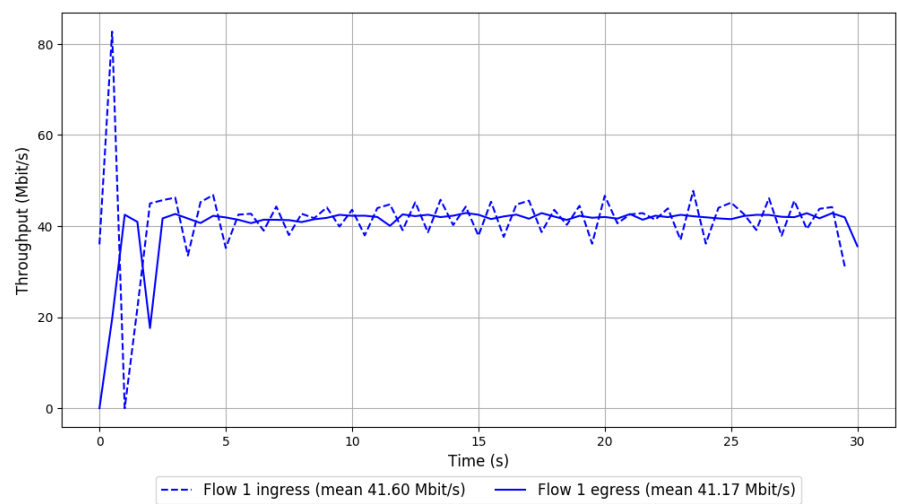
-- Flow 1:

Average throughput: 41.17 Mbit/s

95th percentile per-packet one-way delay: 176.448 ms

Loss rate: 1.02%

Run 2: Report of Verus — Data Link

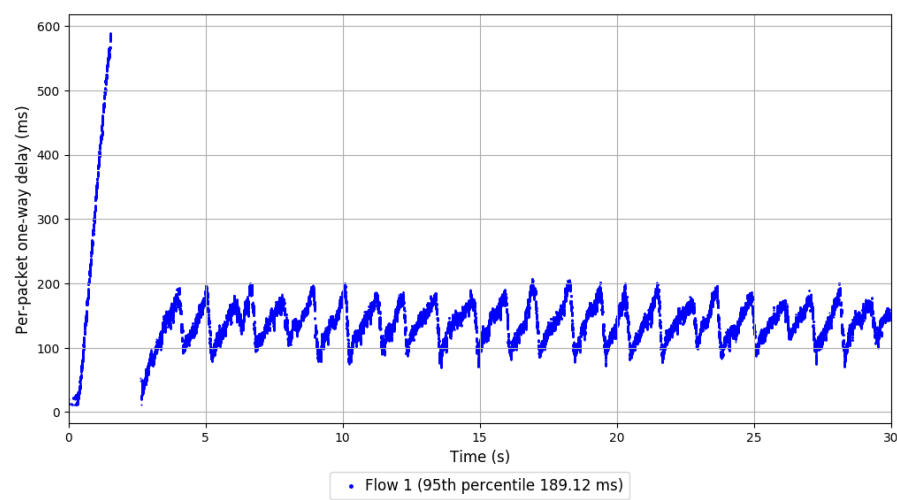
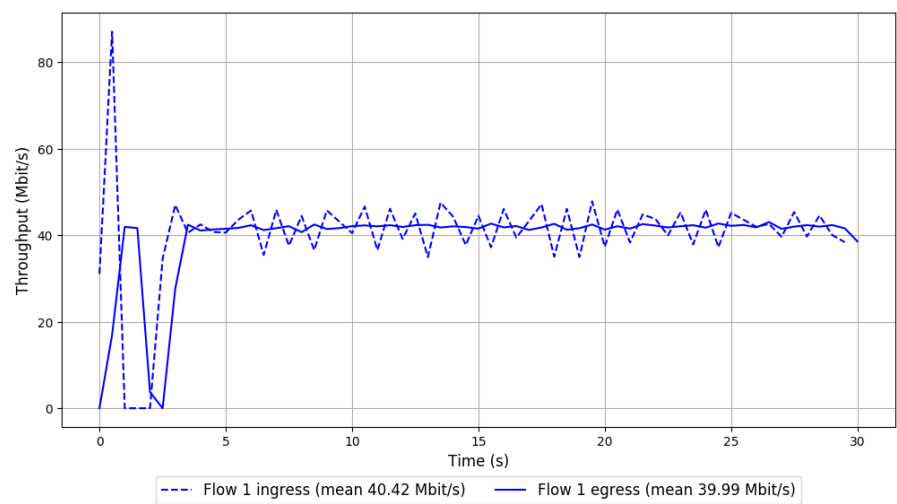


Run 3: Statistics of Verus

Start at: 2018-09-07 09:43:00
End at: 2018-09-07 09:43:30
Local clock offset: 0.572 ms
Remote clock offset: -0.317 ms

Below is generated by plot.py at 2018-09-07 09:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 39.99 Mbit/s
95th percentile per-packet one-way delay: 189.115 ms
Loss rate: 1.07%
-- Flow 1:
Average throughput: 39.99 Mbit/s
95th percentile per-packet one-way delay: 189.115 ms
Loss rate: 1.07%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-09-07 09:07:20

End at: 2018-09-07 09:07:50

Local clock offset: 1.132 ms

Remote clock offset: 0.181 ms

Below is generated by plot.py at 2018-09-07 09:57:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 20.215 ms

Loss rate: 0.00%

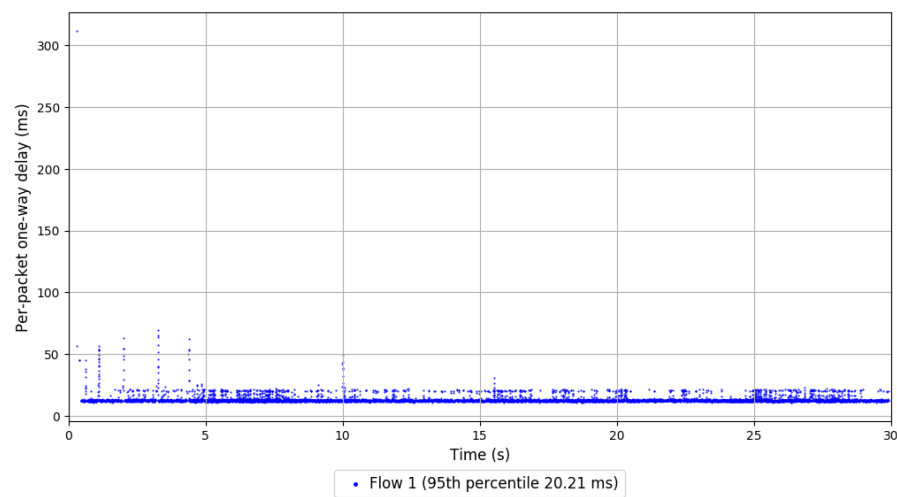
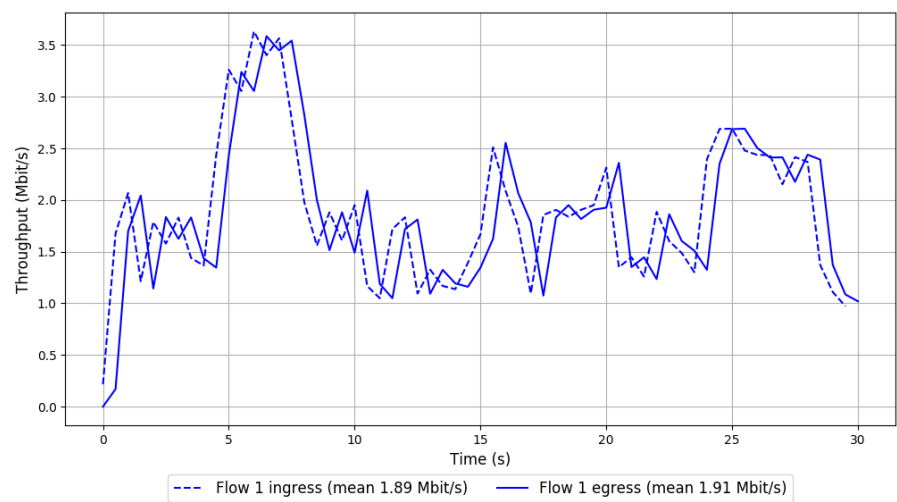
-- Flow 1:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 20.215 ms

Loss rate: 0.00%

Run 1: Report of PCC-Vivace — Data Link

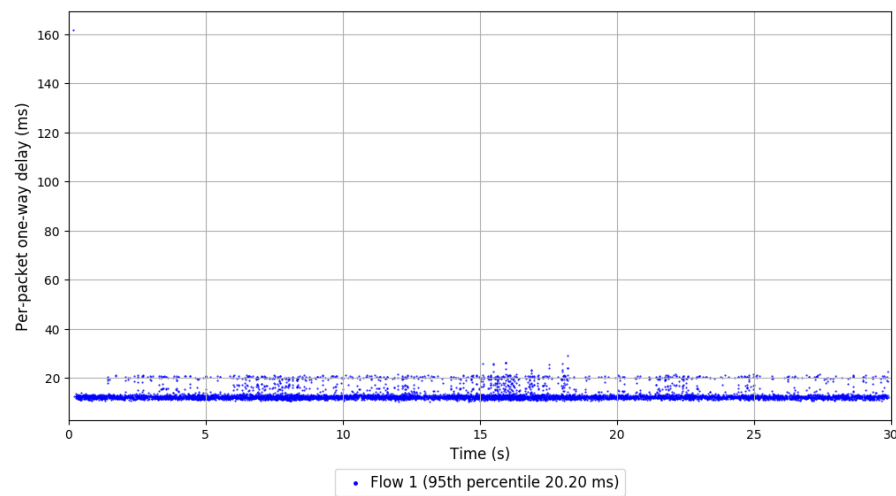
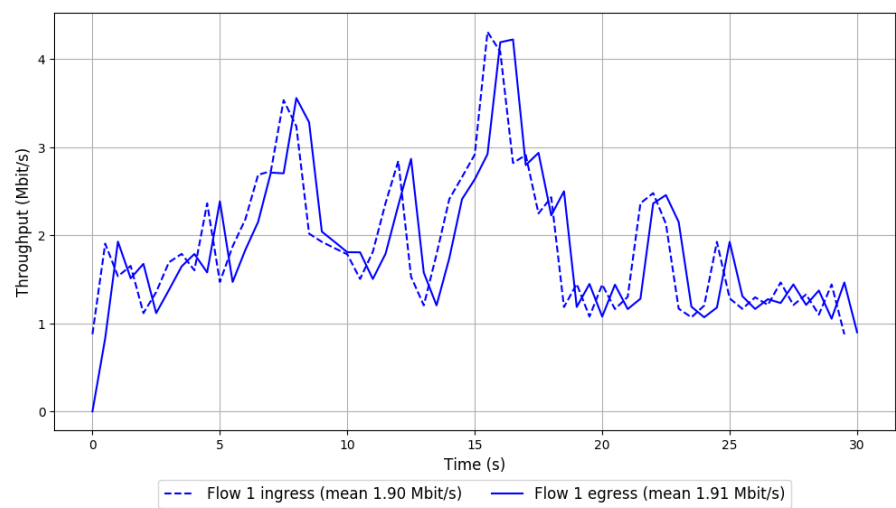


Run 2: Statistics of PCC-Vivace

Start at: 2018-09-07 09:31:08
End at: 2018-09-07 09:31:38
Local clock offset: 0.773 ms
Remote clock offset: -0.163 ms

Below is generated by plot.py at 2018-09-07 09:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 20.202 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 20.202 ms
Loss rate: 0.00%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-09-07 09:54:54

End at: 2018-09-07 09:55:24

Local clock offset: 0.644 ms

Remote clock offset: -0.221 ms

Below is generated by plot.py at 2018-09-07 09:57:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.42 Mbit/s

95th percentile per-packet one-way delay: 20.334 ms

Loss rate: 0.00%

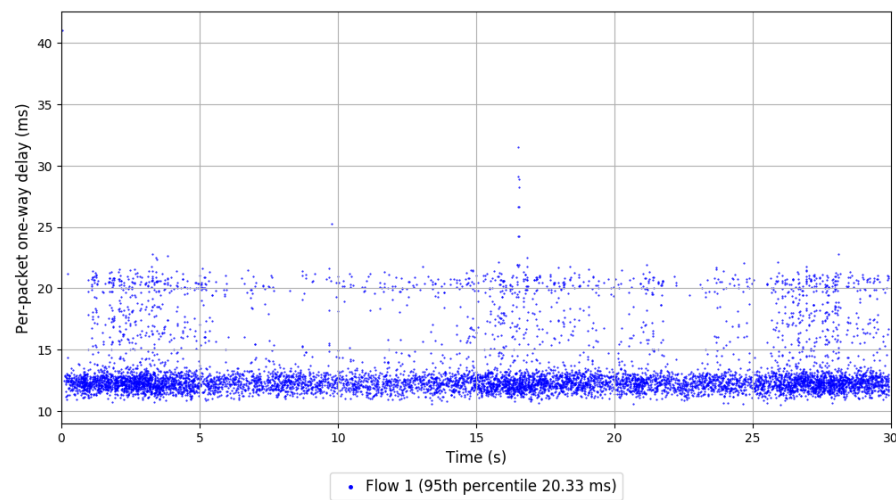
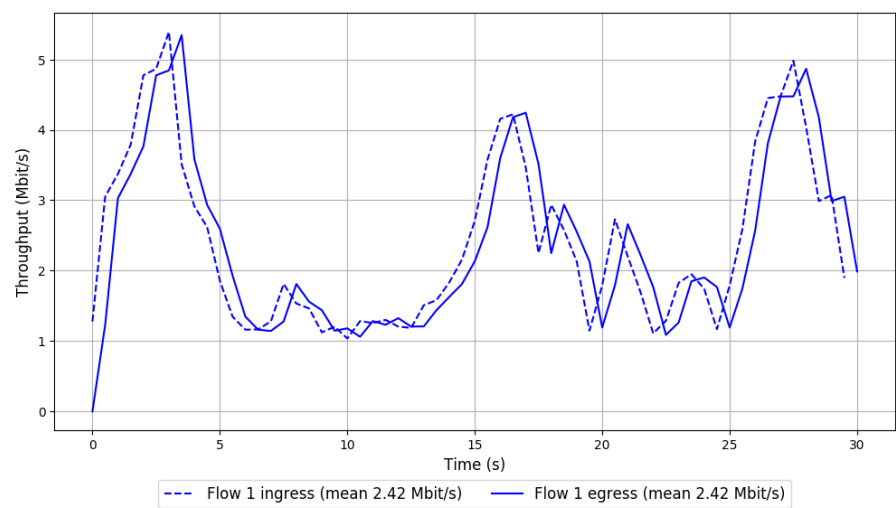
-- Flow 1:

Average throughput: 2.42 Mbit/s

95th percentile per-packet one-way delay: 20.334 ms

Loss rate: 0.00%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-09-07 08:58:06

End at: 2018-09-07 08:58:36

Local clock offset: 1.062 ms

Remote clock offset: 0.072 ms

Below is generated by plot.py at 2018-09-07 09:57:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.11 Mbit/s

95th percentile per-packet one-way delay: 20.627 ms

Loss rate: 0.00%

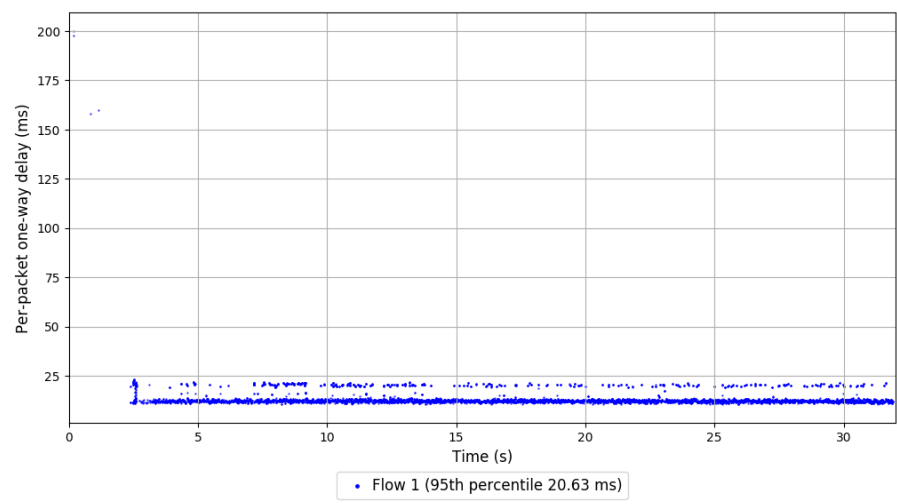
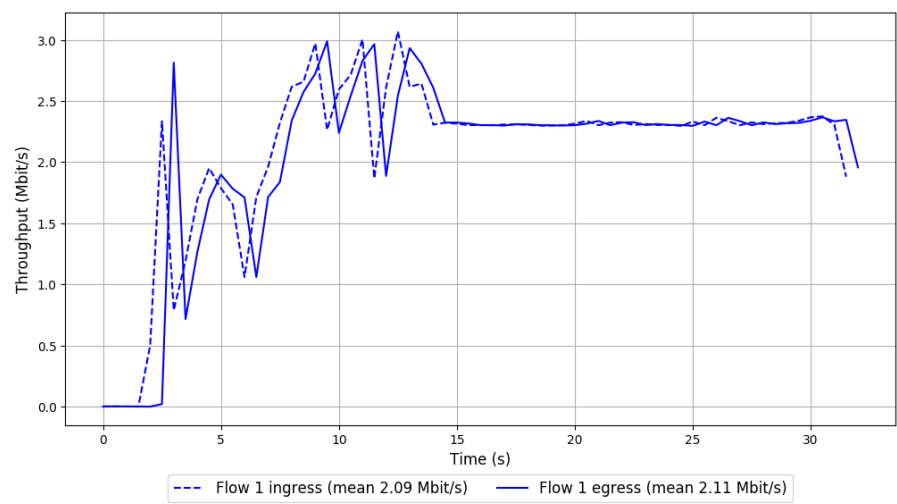
-- Flow 1:

Average throughput: 2.11 Mbit/s

95th percentile per-packet one-way delay: 20.627 ms

Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

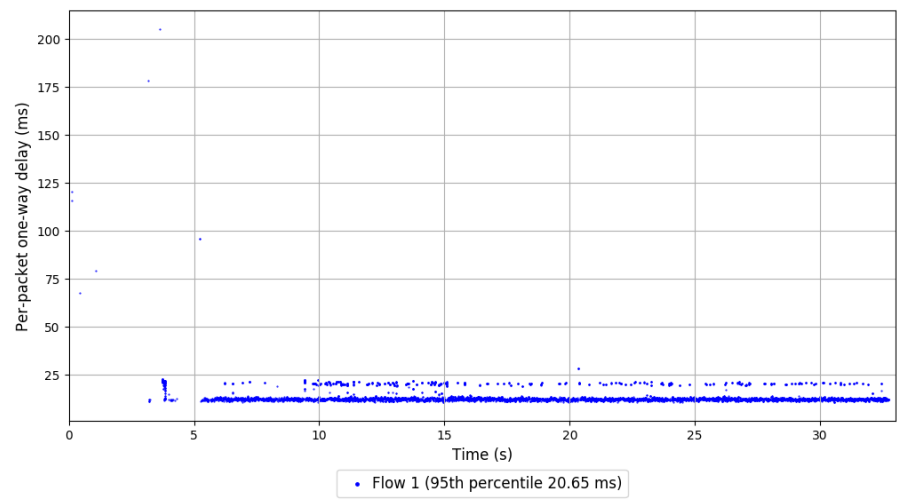
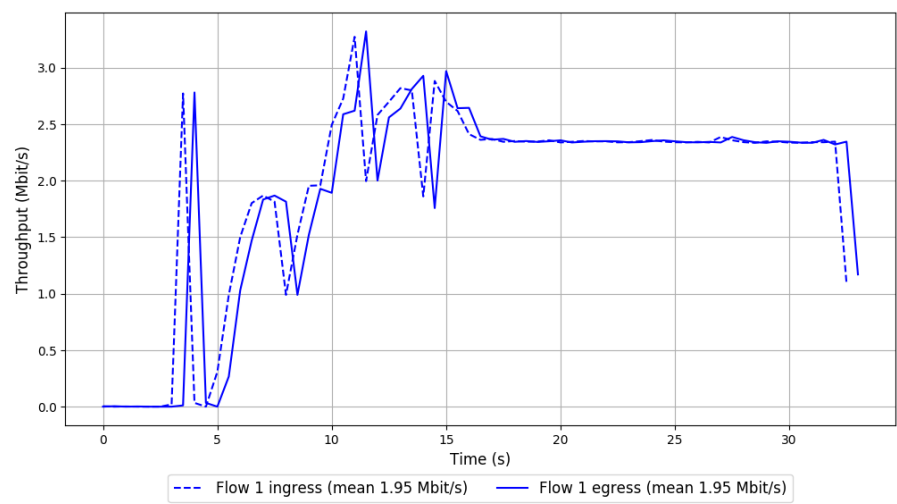


Run 2: Statistics of WebRTC media

Start at: 2018-09-07 09:21:53
End at: 2018-09-07 09:22:23
Local clock offset: 0.944 ms
Remote clock offset: -0.035 ms

Below is generated by plot.py at 2018-09-07 09:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 20.653 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 20.653 ms
Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-09-07 09:45:41
End at: 2018-09-07 09:46:11
Local clock offset: 0.67 ms
Remote clock offset: -0.338 ms

Below is generated by plot.py at 2018-09-07 09:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 20.653 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 20.653 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

