

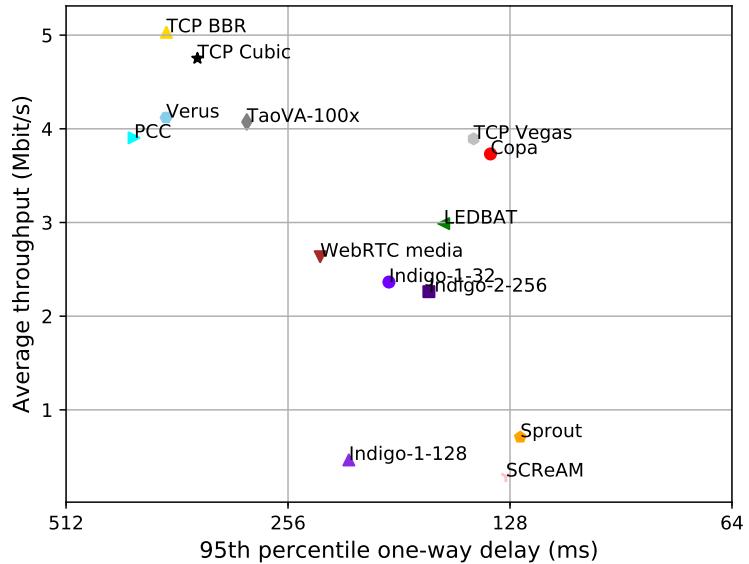
Pantheon Report

Generated at 2018-01-26 02:15:44 (UTC).
Data path: China ppp0 (*remote*) → AWS Korea Ethernet (*local*).
Repeated the test of 15 congestion control schemes 3 times.
Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).
NTP offsets were measured against `ntp.nict.jp` and have been applied to correct the timestamps in logs.

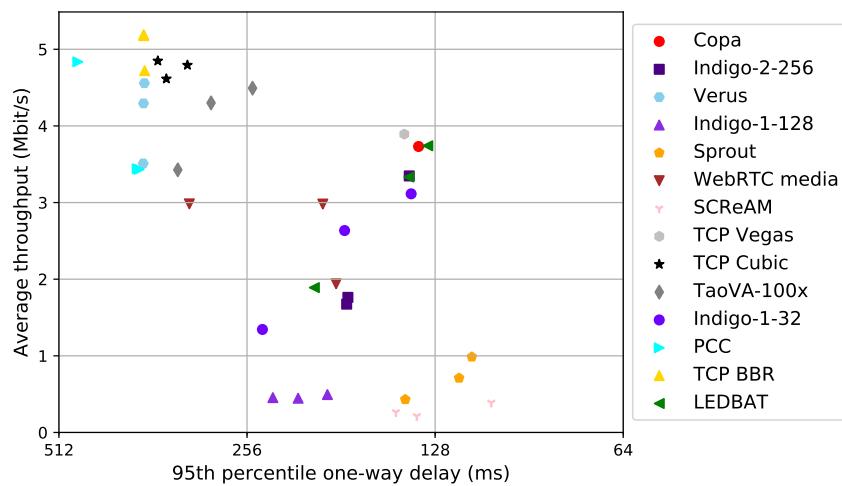
Git summary:

```
branch: master @ f23294ec38436c9f802847d477a41b7343ec76e6
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179aab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
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/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bf7e749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
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 @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from China ppp0 to AWS Korea Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from China ppp0 to AWS Korea Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



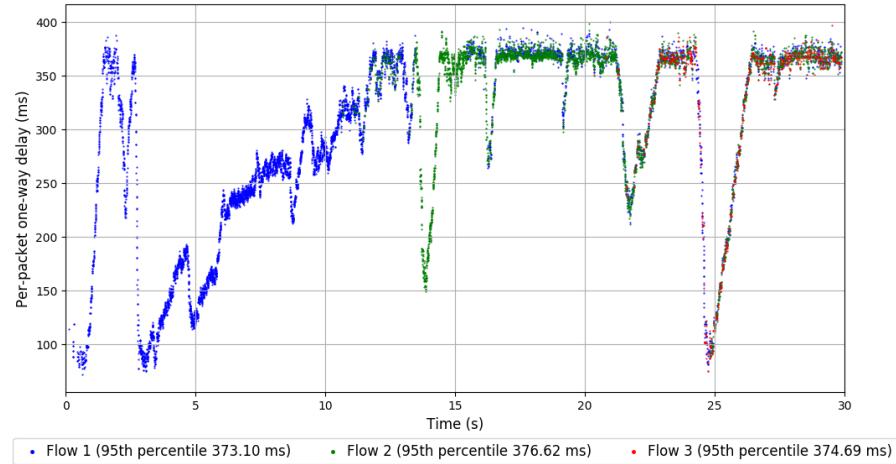
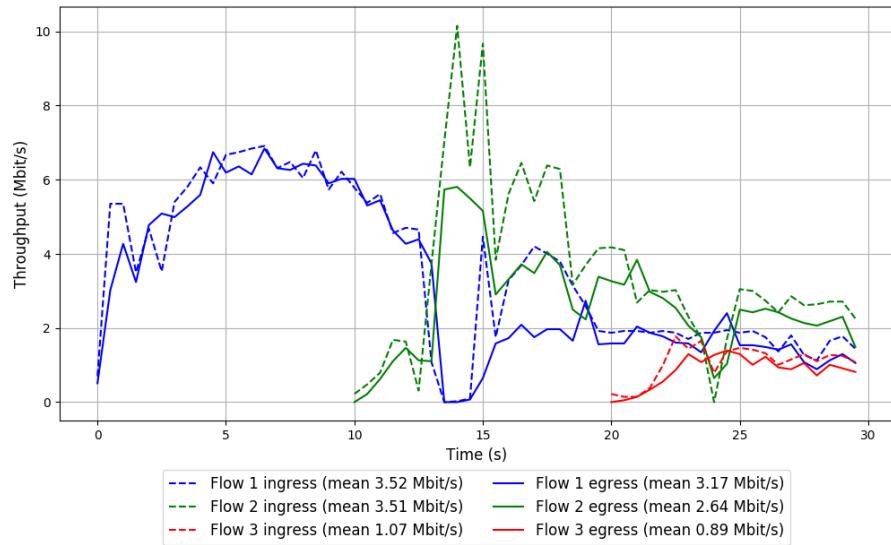
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	3.45	1.91	1.01	371.42	377.10	378.71	9.69	21.43	27.24
TCP Cubic		3.35	1.59	1.09	343.53	332.07	227.01	1.35	1.70	3.64
LEDBAT		1.89	1.14	1.05	155.24	158.55	166.11	1.24	1.42	2.48
PCC		2.32	1.62	1.58	378.02	377.87	779.29	20.56	24.35	74.09
QUIC Cubic		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCReAM		0.12	0.15	0.20	132.71	127.37	119.37	0.39	0.68	1.43
WebRTC media		1.78	0.66	0.21	215.91	248.74	254.90	1.20	1.51	3.44
Sprout		0.34	0.34	0.44	123.38	125.27	120.81	1.15	1.16	1.05
TaoVA-100x		2.37	2.02	1.40	268.17	294.22	339.65	1.50	6.35	20.73
TCP Vegas		2.47	1.55	1.21	139.47	147.85	139.30	0.31	1.04	1.41
Verus		3.64	0.55	0.47	372.73	406.44	382.30	30.95	58.08	46.93
Copa		2.49	1.45	1.11	133.87	143.78	162.13	0.22	0.60	2.48
Indigo-2-256		1.08	1.15	1.08	162.81	166.24	164.31	1.06	1.07	1.84
Indigo-1-32		1.09	1.14	1.21	212.65	164.19	167.29	3.99	1.17	1.51
Indigo-1-128		0.21	0.22	0.37	200.77	167.25	212.50	3.53	2.81	1.59

Run 1: Statistics of TCP BBR

```
Start at: 2018-01-26 00:34:24
End at: 2018-01-26 00:34:54
Local clock offset: -0.533 ms
Remote clock offset: -9.495 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.19 Mbit/s
95th percentile per-packet one-way delay: 374.629 ms
Loss rate: 16.90%
-- Flow 1:
Average throughput: 3.17 Mbit/s
95th percentile per-packet one-way delay: 373.104 ms
Loss rate: 10.52%
-- Flow 2:
Average throughput: 2.64 Mbit/s
95th percentile per-packet one-way delay: 376.622 ms
Loss rate: 25.94%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 374.689 ms
Loss rate: 20.75%
```

Run 1: Report of TCP BBR — Data Link

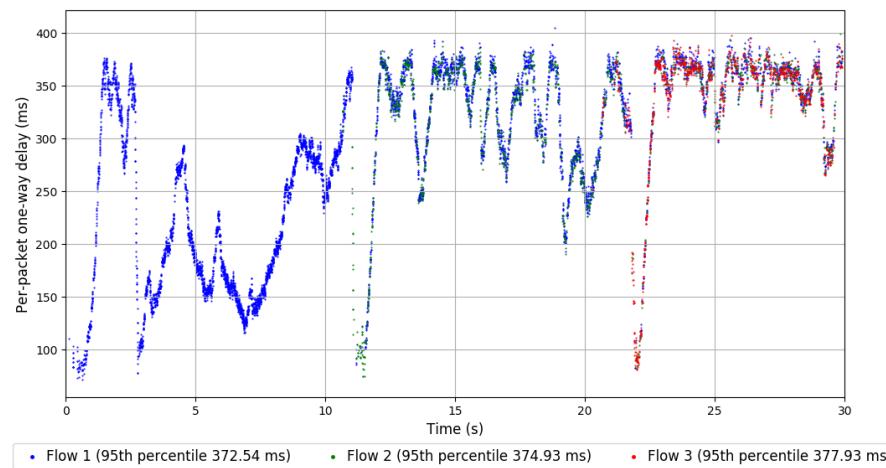
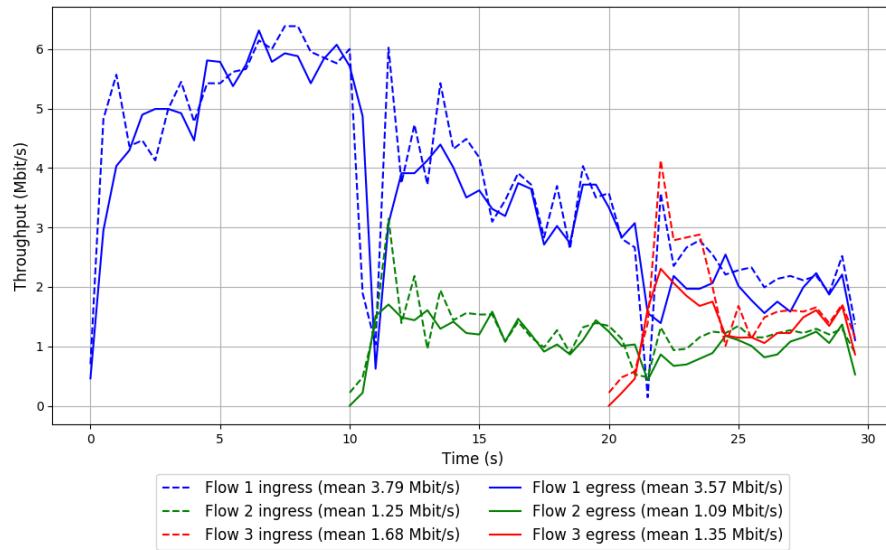


Run 2: Statistics of TCP BBR

```
Start at: 2018-01-26 00:53:21
End at: 2018-01-26 00:53:51
Local clock offset: 0.117 ms
Remote clock offset: -10.181 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.72 Mbit/s
95th percentile per-packet one-way delay: 373.381 ms
Loss rate: 9.14%
-- Flow 1:
Average throughput: 3.57 Mbit/s
95th percentile per-packet one-way delay: 372.537 ms
Loss rate: 6.23%
-- Flow 2:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 374.929 ms
Loss rate: 13.73%
-- Flow 3:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 377.926 ms
Loss rate: 22.09%
```

Run 2: Report of TCP BBR — Data Link

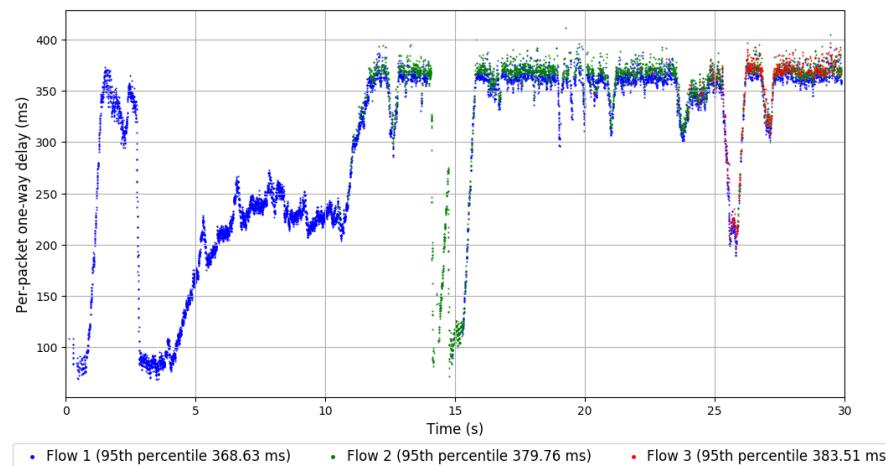
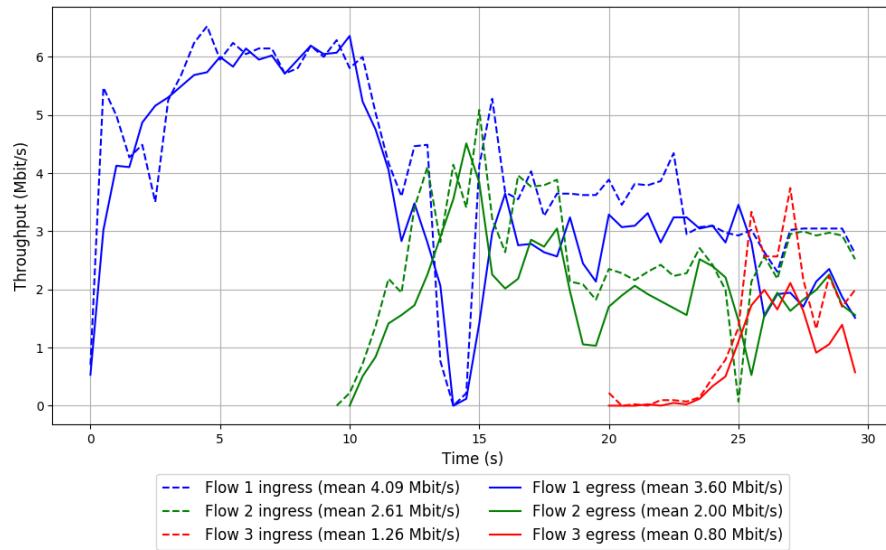


Run 3: Statistics of TCP BBR

```
Start at: 2018-01-26 01:12:19
End at: 2018-01-26 01:12:49
Local clock offset: 0.131 ms
Remote clock offset: -10.504 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.18 Mbit/s
95th percentile per-packet one-way delay: 374.659 ms
Loss rate: 17.52%
-- Flow 1:
Average throughput: 3.60 Mbit/s
95th percentile per-packet one-way delay: 368.628 ms
Loss rate: 12.32%
-- Flow 2:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 379.761 ms
Loss rate: 24.61%
-- Flow 3:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 383.508 ms
Loss rate: 38.89%
```

Run 3: Report of TCP BBR — Data Link

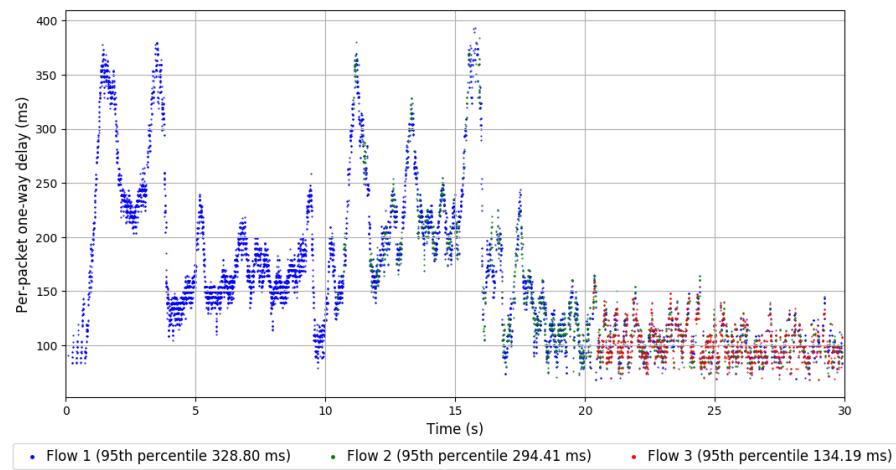
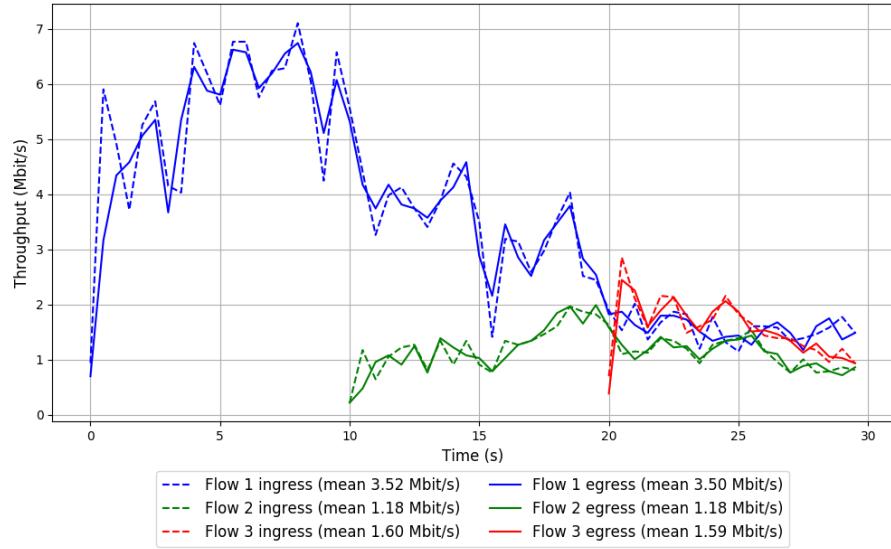


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2018-01-26 00:27:17
End at: 2018-01-26 00:27:47
Local clock offset: -0.62 ms
Remote clock offset: -9.242 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.79 Mbit/s
95th percentile per-packet one-way delay: 318.865 ms
Loss rate: 1.37%
-- Flow 1:
Average throughput: 3.50 Mbit/s
95th percentile per-packet one-way delay: 328.798 ms
Loss rate: 1.31%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 294.406 ms
Loss rate: 1.33%
-- Flow 3:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 134.188 ms
Loss rate: 1.89%
```

Run 1: Report of TCP Cubic — Data Link

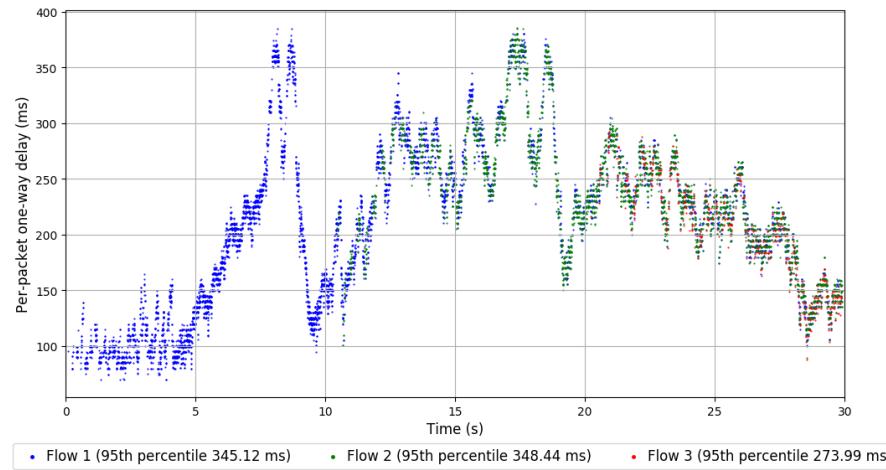
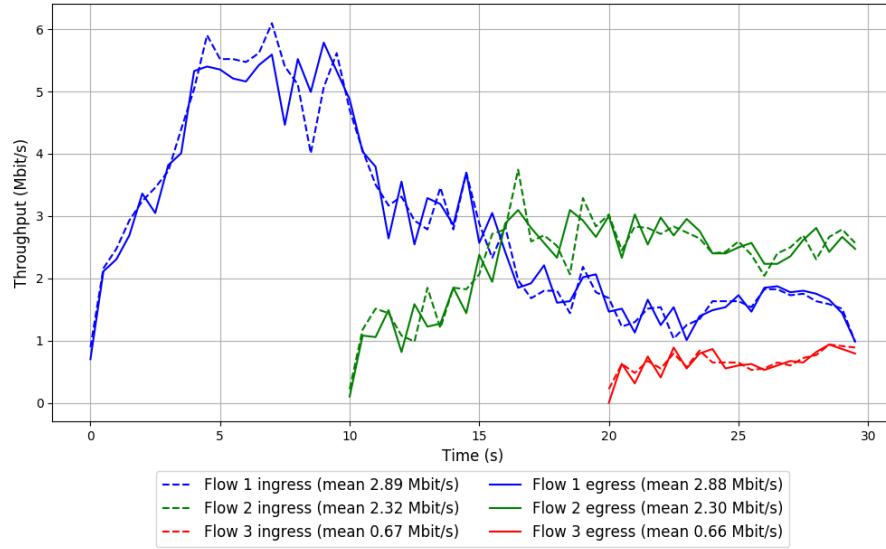


Run 2: Statistics of TCP Cubic

```
Start at: 2018-01-26 00:46:15
End at: 2018-01-26 00:46:45
Local clock offset: -0.119 ms
Remote clock offset: -9.926 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.61 Mbit/s
95th percentile per-packet one-way delay: 344.601 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 345.123 ms
Loss rate: 0.68%
-- Flow 2:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 348.441 ms
Loss rate: 1.80%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 273.989 ms
Loss rate: 3.26%
```

Run 2: Report of TCP Cubic — Data Link

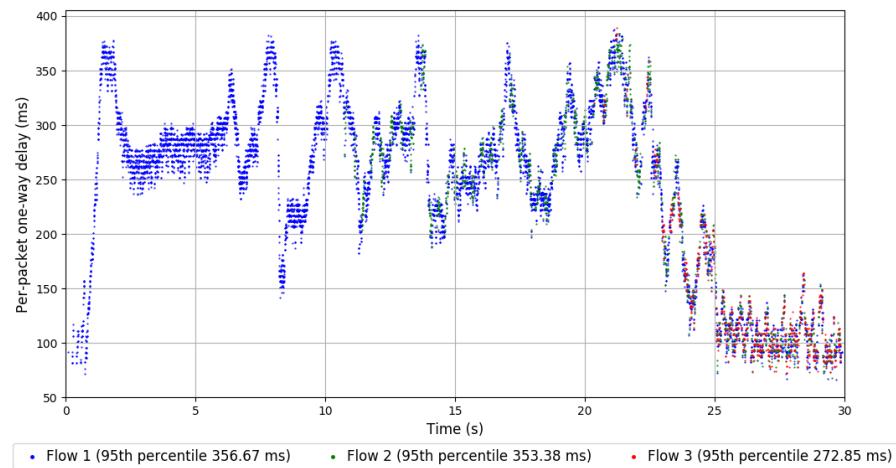
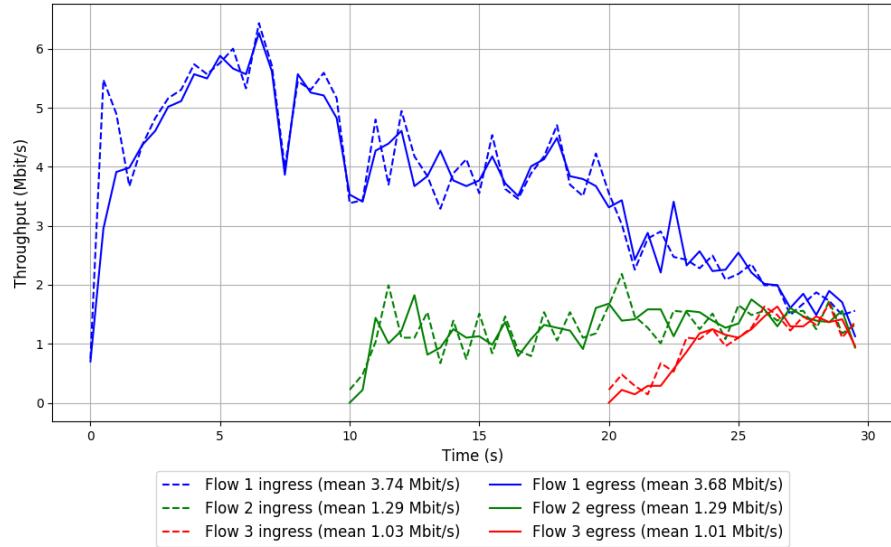


Run 3: Statistics of TCP Cubic

```
Start at: 2018-01-26 01:05:12
End at: 2018-01-26 01:05:42
Local clock offset: -0.403 ms
Remote clock offset: -10.648 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.85 Mbit/s
95th percentile per-packet one-way delay: 355.626 ms
Loss rate: 2.29%
-- Flow 1:
Average throughput: 3.68 Mbit/s
95th percentile per-packet one-way delay: 356.667 ms
Loss rate: 2.05%
-- Flow 2:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 353.376 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 272.845 ms
Loss rate: 5.77%
```

Run 3: Report of TCP Cubic — Data Link

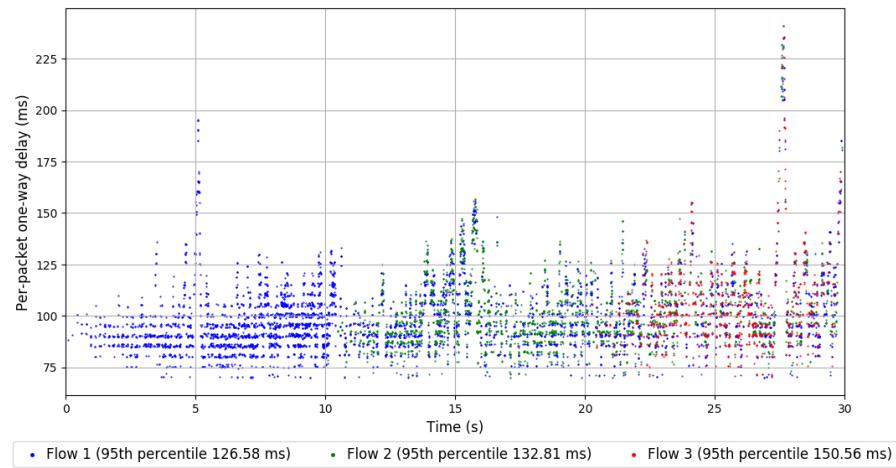
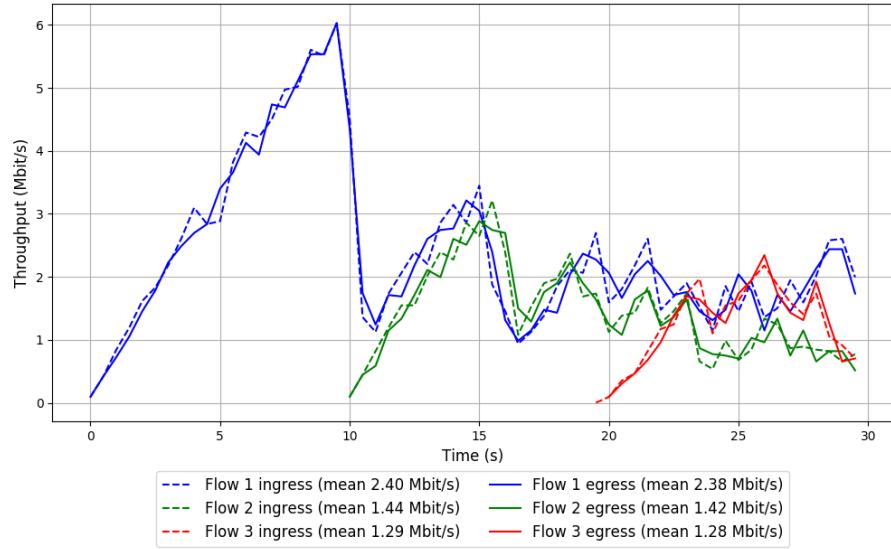


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2018-01-26 00:22:33
End at: 2018-01-26 00:23:03
Local clock offset: -0.539 ms
Remote clock offset: -9.151 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.74 Mbit/s
95th percentile per-packet one-way delay: 131.512 ms
Loss rate: 1.46%
-- Flow 1:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 126.582 ms
Loss rate: 1.29%
-- Flow 2:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 132.805 ms
Loss rate: 1.56%
-- Flow 3:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 150.556 ms
Loss rate: 2.20%
```

Run 1: Report of LEDBAT — Data Link

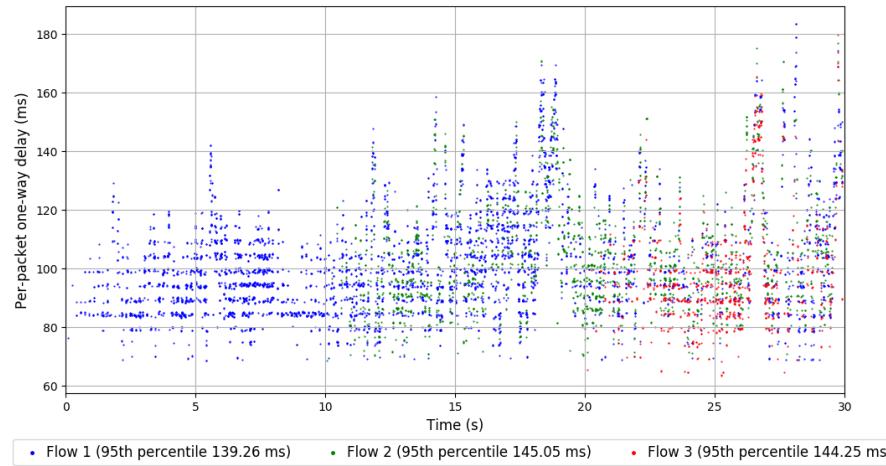
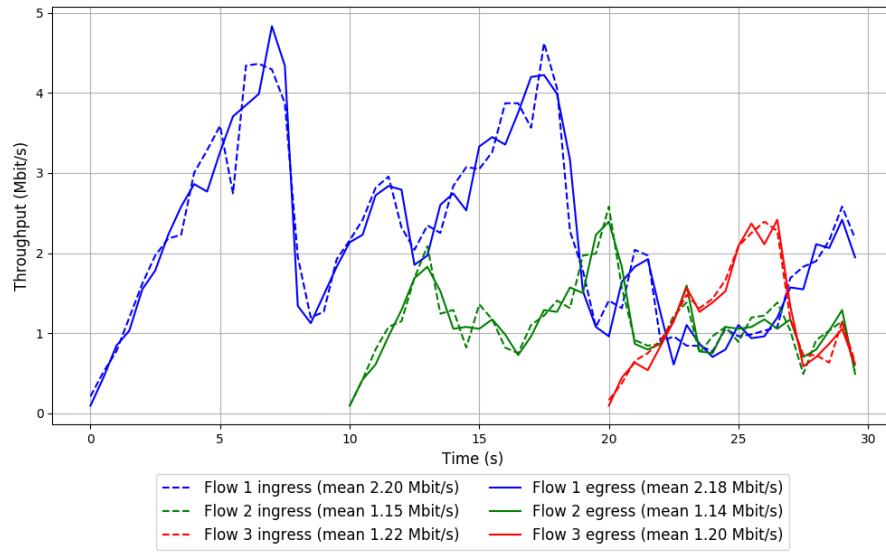


Run 2: Statistics of LEDBAT

```
Start at: 2018-01-26 00:41:31
End at: 2018-01-26 00:42:01
Local clock offset: -0.205 ms
Remote clock offset: -9.736 ms

# Below is generated by plot.py at 2018-01-26 02:15:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.33 Mbit/s
95th percentile per-packet one-way delay: 141.036 ms
Loss rate: 1.30%
-- Flow 1:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 139.257 ms
Loss rate: 1.30%
-- Flow 2:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 145.053 ms
Loss rate: 1.18%
-- Flow 3:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 144.248 ms
Loss rate: 1.57%
```

Run 2: Report of LEDBAT — Data Link

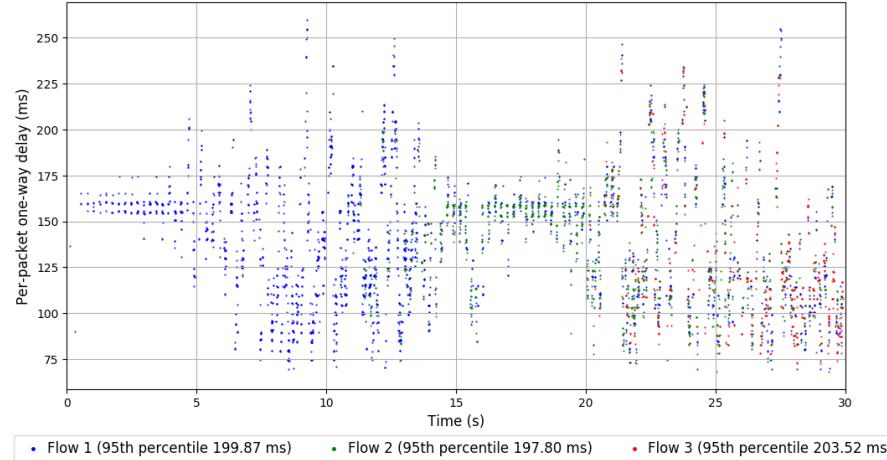
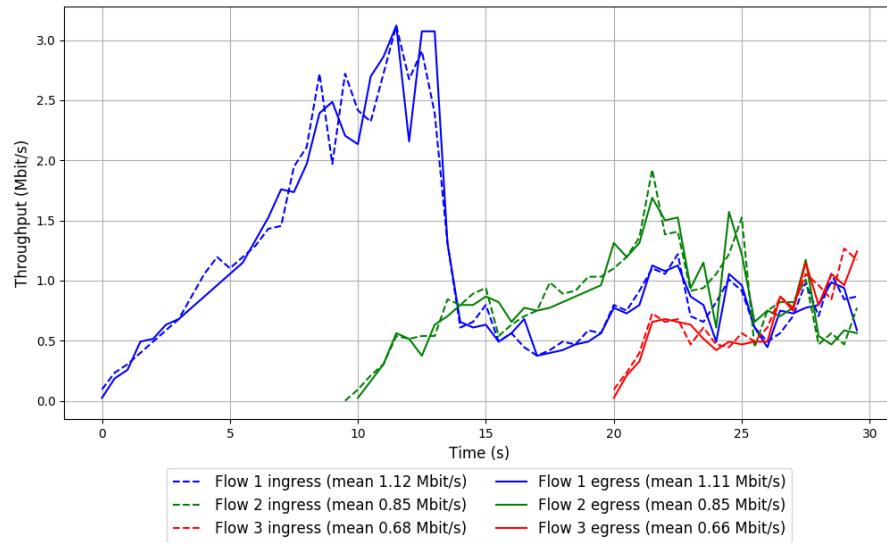


Run 3: Statistics of LEDBAT

```
Start at: 2018-01-26 01:00:29
End at: 2018-01-26 01:00:59
Local clock offset: -0.058 ms
Remote clock offset: -10.464 ms

# Below is generated by plot.py at 2018-01-26 02:15:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 199.767 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 199.867 ms
Loss rate: 1.12%
-- Flow 2:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 197.800 ms
Loss rate: 1.52%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 203.522 ms
Loss rate: 3.68%
```

Run 3: Report of LEDBAT — Data Link

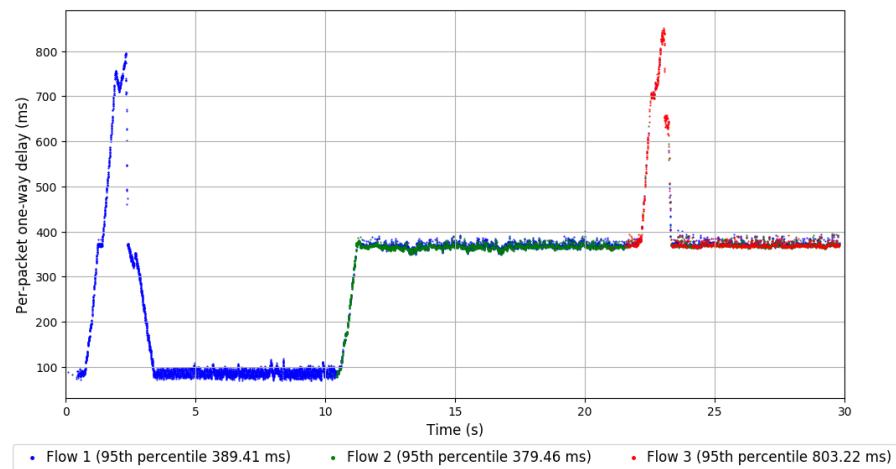
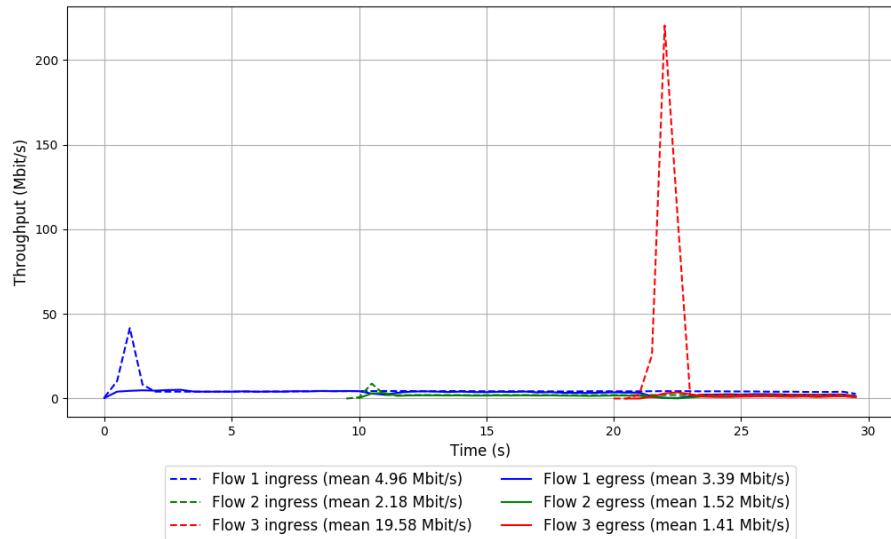


Run 1: Statistics of PCC

```
Start at: 2018-01-26 00:30:50
End at: 2018-01-26 00:31:20
Local clock offset: -0.725 ms
Remote clock offset: -9.368 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.84 Mbit/s
95th percentile per-packet one-way delay: 477.515 ms
Loss rate: 62.58%
-- Flow 1:
Average throughput: 3.39 Mbit/s
95th percentile per-packet one-way delay: 389.413 ms
Loss rate: 31.99%
-- Flow 2:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 379.460 ms
Loss rate: 30.62%
-- Flow 3:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 803.217 ms
Loss rate: 93.29%
```

Run 1: Report of PCC — Data Link

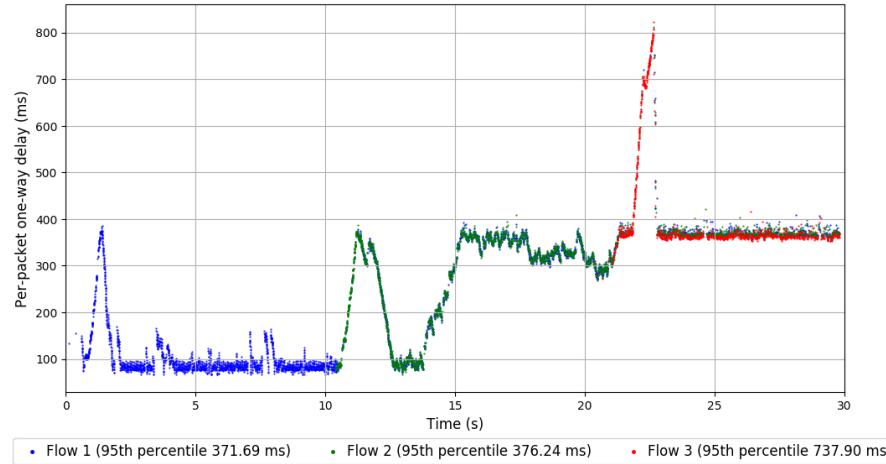
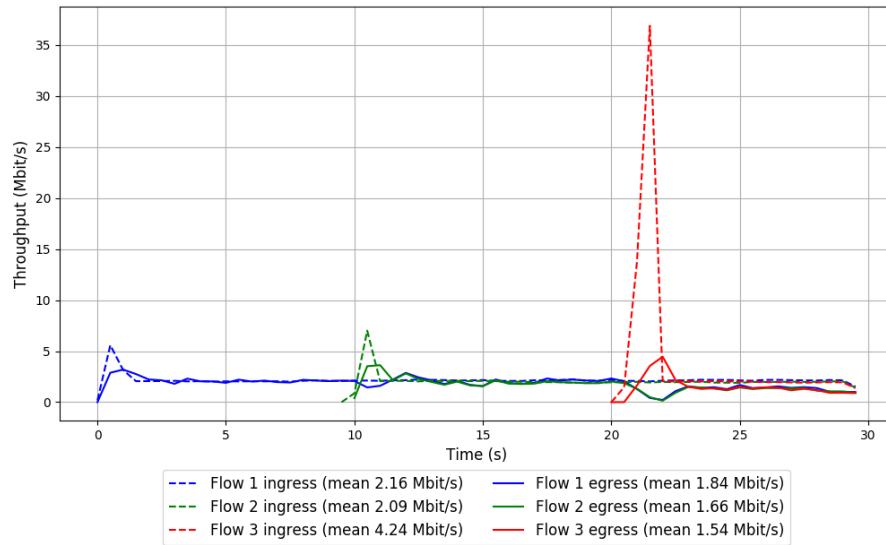


Run 2: Statistics of PCC

```
Start at: 2018-01-26 00:49:48
End at: 2018-01-26 00:50:18
Local clock offset: -0.236 ms
Remote clock offset: -10.039 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.43 Mbit/s
95th percentile per-packet one-way delay: 380.778 ms
Loss rate: 31.03%
-- Flow 1:
Average throughput: 1.84 Mbit/s
95th percentile per-packet one-way delay: 371.689 ms
Loss rate: 15.49%
-- Flow 2:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 376.241 ms
Loss rate: 21.18%
-- Flow 3:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 737.903 ms
Loss rate: 64.89%
```

Run 2: Report of PCC — Data Link

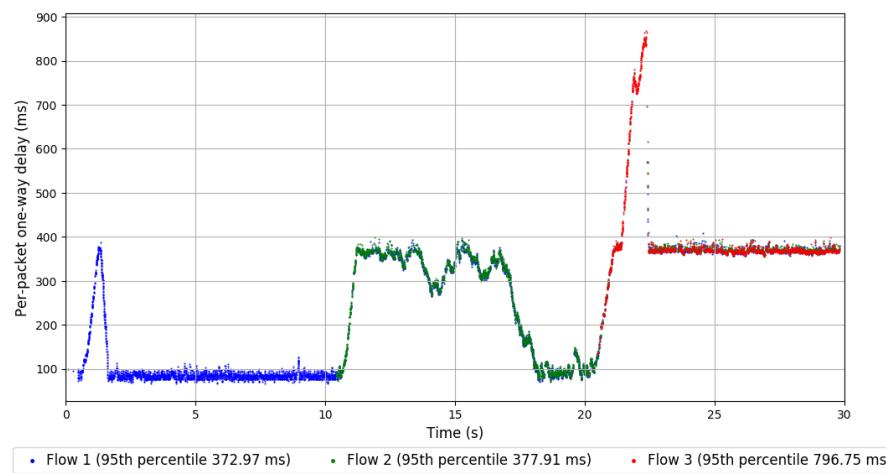
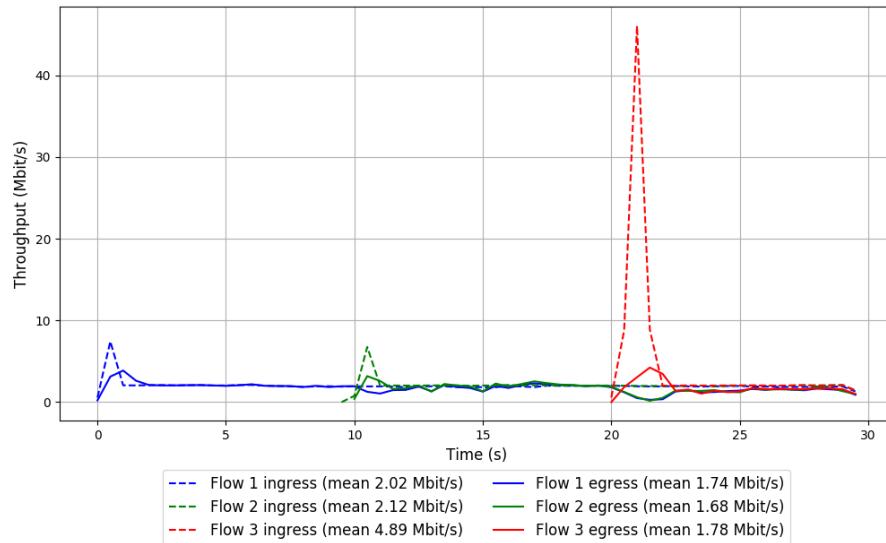


Run 3: Statistics of PCC

```
Start at: 2018-01-26 01:08:46
End at: 2018-01-26 01:09:16
Local clock offset: 0.415 ms
Remote clock offset: -10.548 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 383.710 ms
Loss rate: 32.11%
-- Flow 1:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 372.969 ms
Loss rate: 14.19%
-- Flow 2:
Average throughput: 1.68 Mbit/s
95th percentile per-packet one-way delay: 377.912 ms
Loss rate: 21.25%
-- Flow 3:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 796.748 ms
Loss rate: 64.09%
```

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

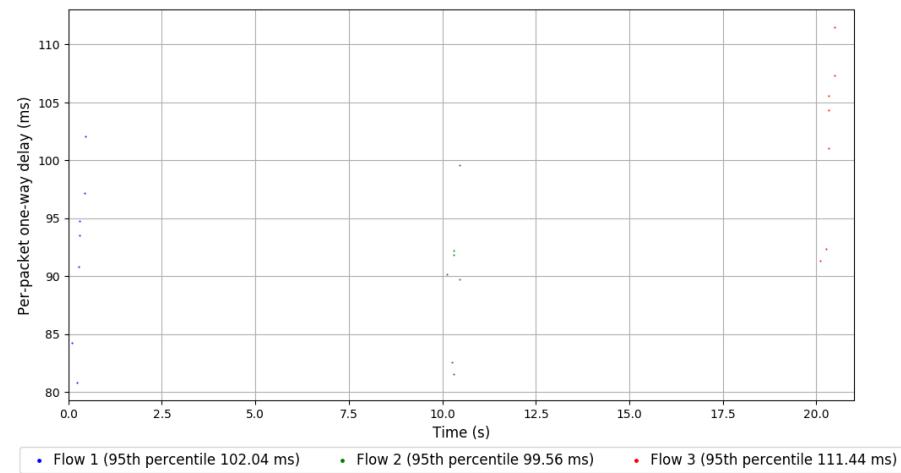
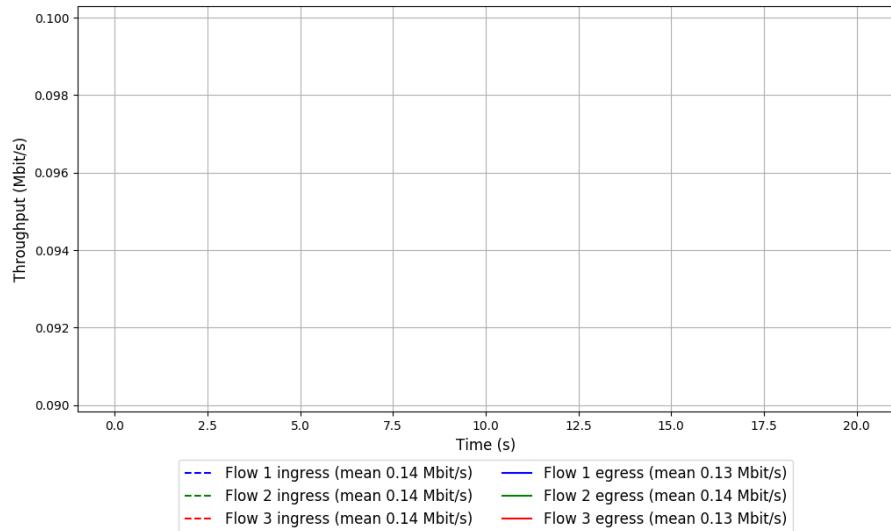
Start at: 2018-01-26 00:33:13

End at: 2018-01-26 00:33:43

Local clock offset: -0.192 ms

Remote clock offset: -9.403 ms

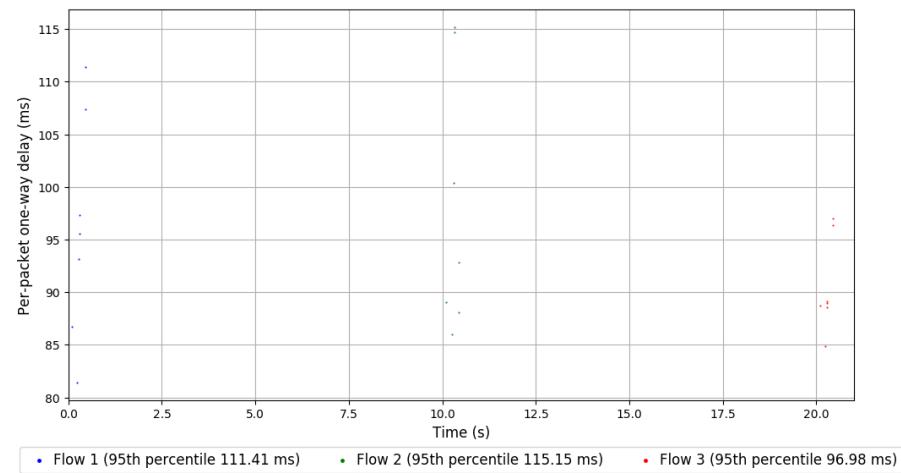
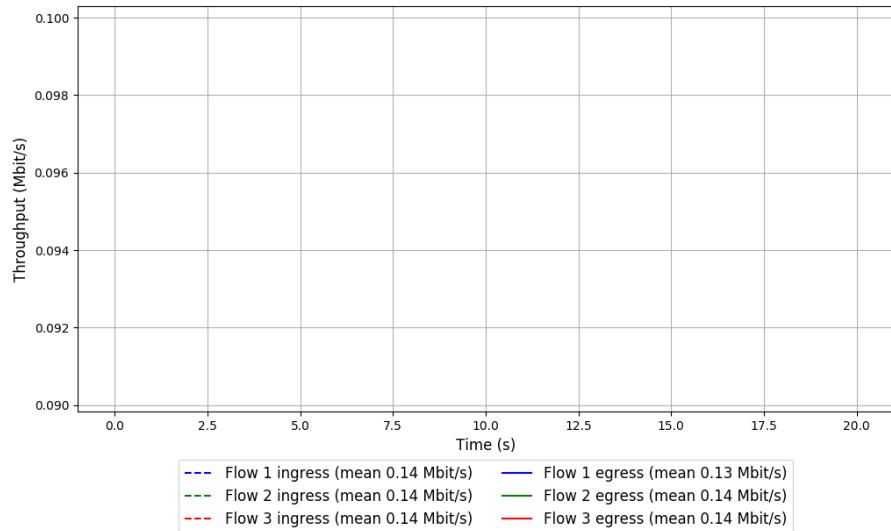
Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-01-26 00:52:10
End at: 2018-01-26 00:52:40
Local clock offset: -0.302 ms
Remote clock offset: -10.079 ms

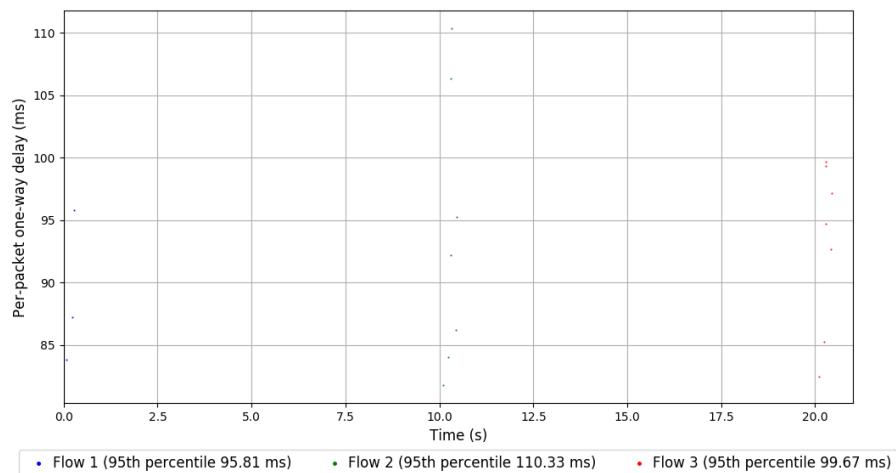
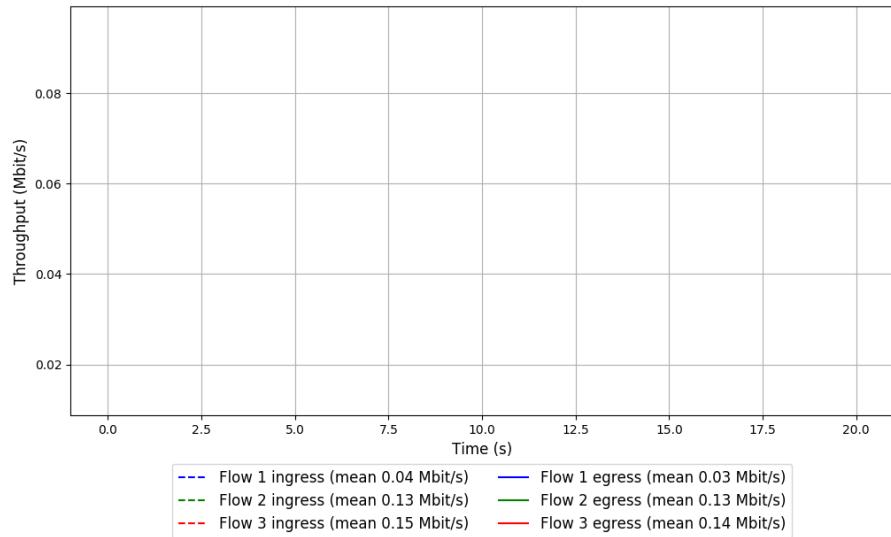
Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-01-26 01:11:08
End at: 2018-01-26 01:11:38
Local clock offset: 0.077 ms
Remote clock offset: -10.527 ms

Run 3: Report of QUIC Cubic — Data Link

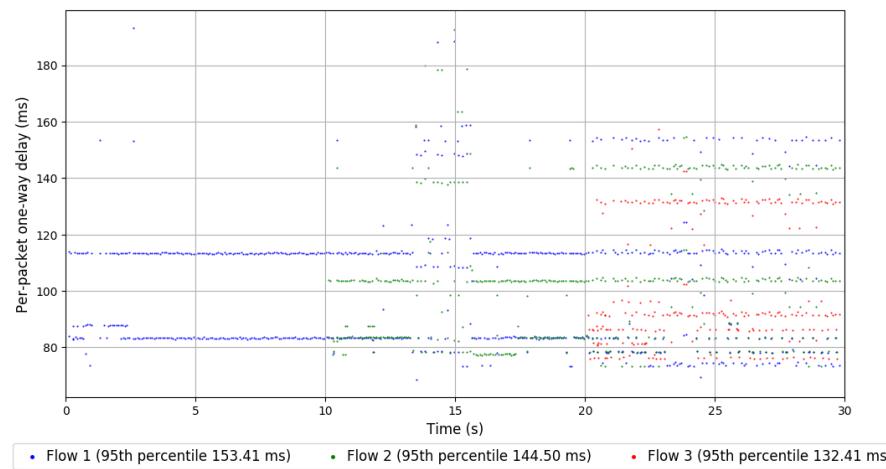
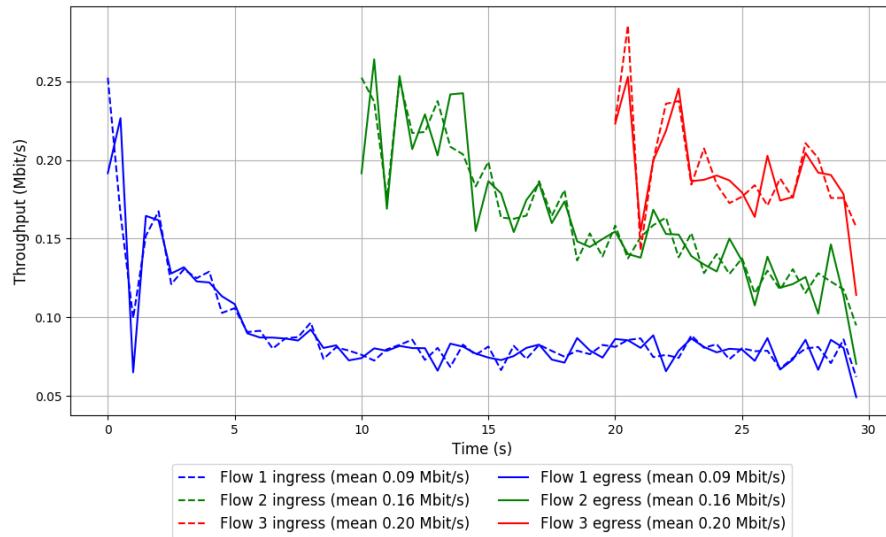


```
Run 1: Statistics of SCReAM

Start at: 2018-01-26 00:32:02
End at: 2018-01-26 00:32:32
Local clock offset: -0.765 ms
Remote clock offset: -9.4 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 147.932 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 153.414 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 144.496 ms
Loss rate: 0.76%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 132.408 ms
Loss rate: 1.81%
```

Run 1: Report of SCReAM — Data Link

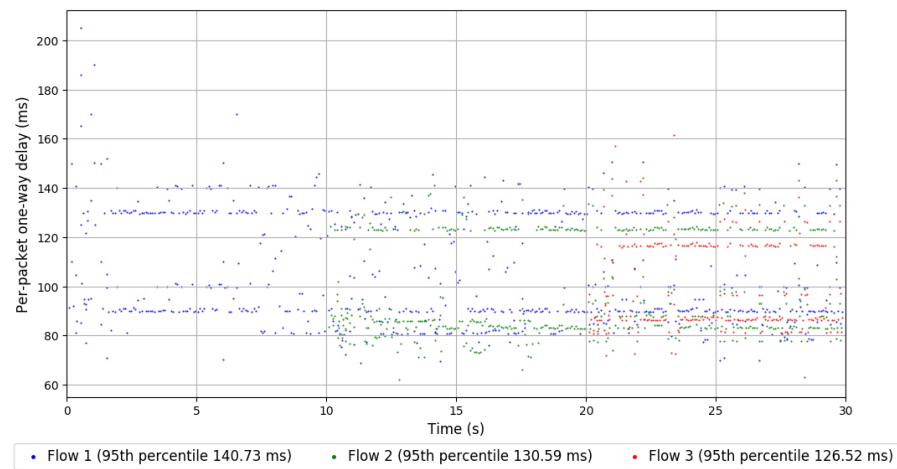
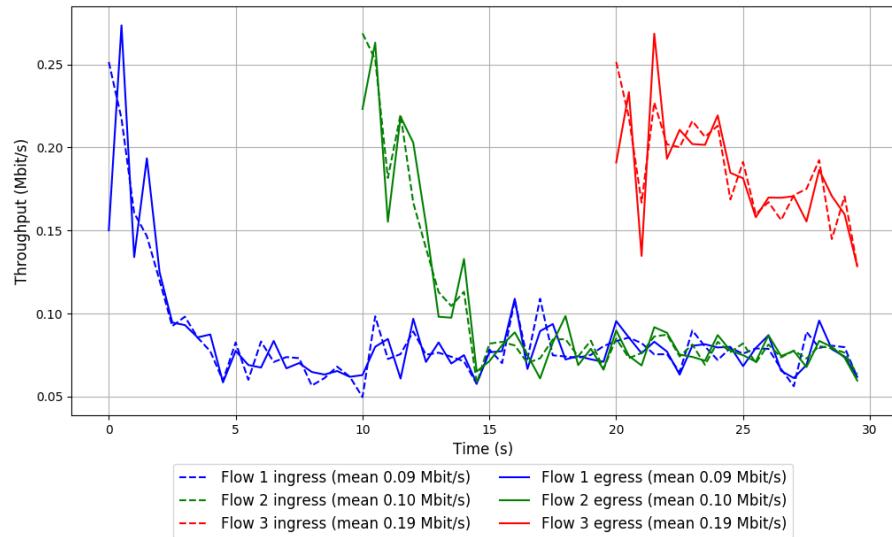


Run 2: Statistics of SCReAM

```
Start at: 2018-01-26 00:50:59
End at: 2018-01-26 00:51:30
Local clock offset: -0.041 ms
Remote clock offset: -10.089 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 136.926 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 140.727 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 130.585 ms
Loss rate: 0.50%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 126.524 ms
Loss rate: 1.00%
```

Run 2: Report of SCReAM — Data Link

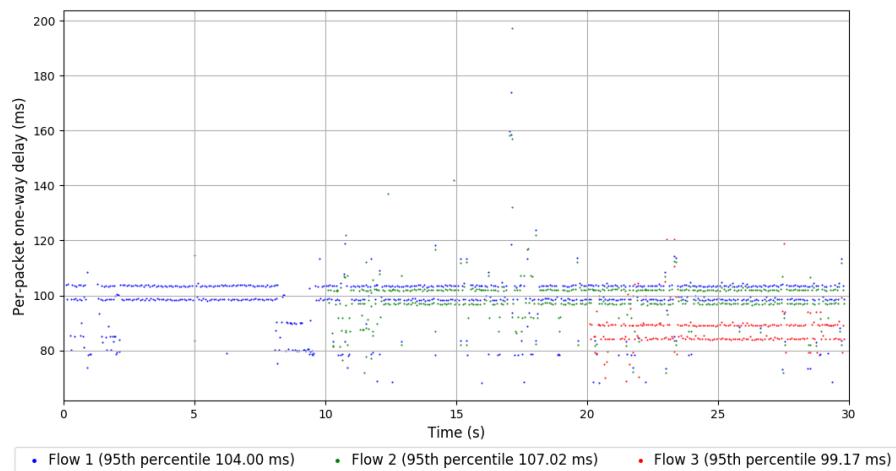
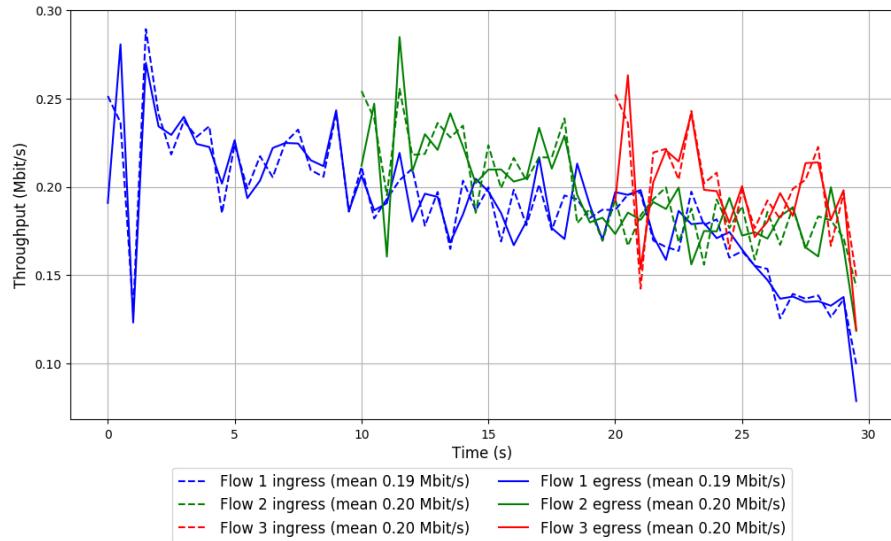


Run 3: Statistics of SCReAM

```
Start at: 2018-01-26 01:09:57
End at: 2018-01-26 01:10:27
Local clock offset: 0.291 ms
Remote clock offset: -10.553 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 104.078 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 104.001 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 107.018 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 99.175 ms
Loss rate: 1.47%
```

Run 3: Report of SCReAM — Data Link

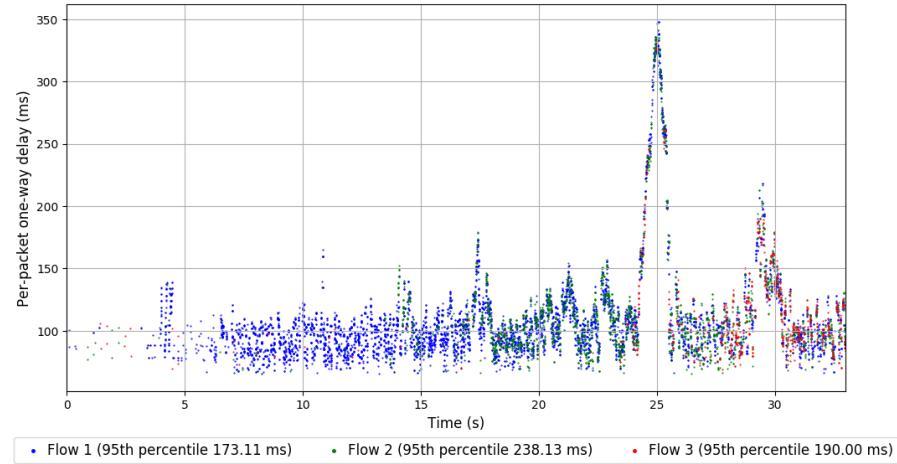
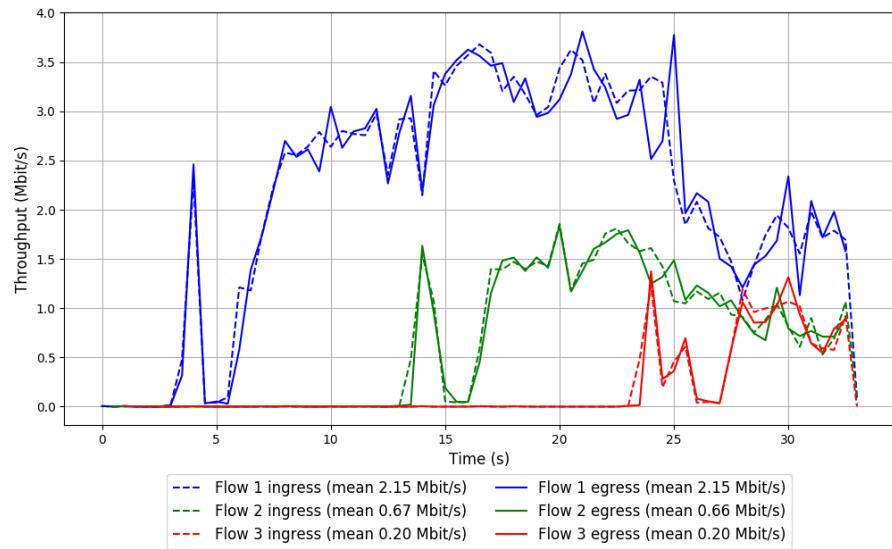


```
Run 1: Statistics of WebRTC media

Start at: 2018-01-26 00:24:55
End at: 2018-01-26 00:25:25
Local clock offset: -1.282 ms
Remote clock offset: -9.183 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.98 Mbit/s
95th percentile per-packet one-way delay: 193.640 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 173.108 ms
Loss rate: 0.68%
-- Flow 2:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 238.131 ms
Loss rate: 1.57%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 189.996 ms
Loss rate: 2.12%
```

Run 1: Report of WebRTC media — Data Link

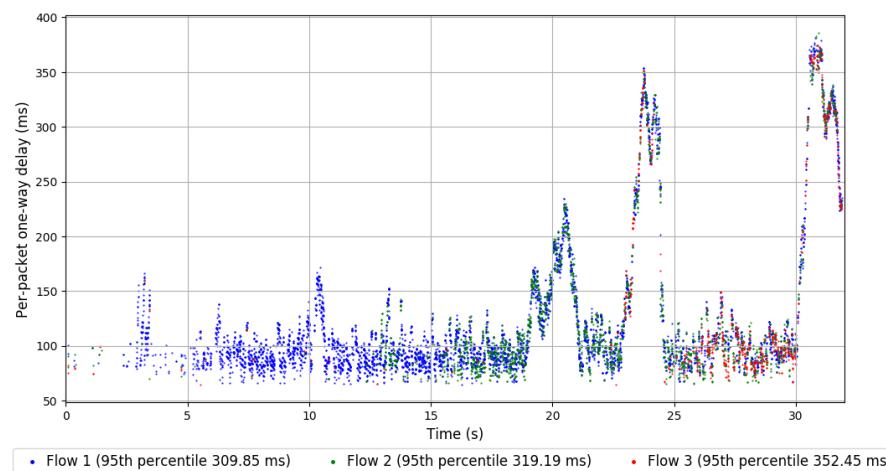
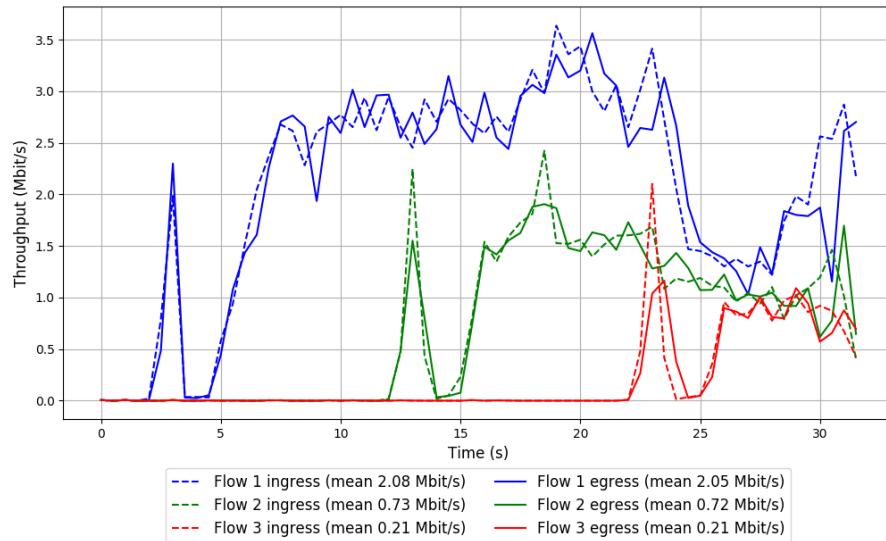


Run 2: Statistics of WebRTC media

```
Start at: 2018-01-26 00:43:53
End at: 2018-01-26 00:44:23
Local clock offset: -3.005 ms
Remote clock offset: -9.804 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.98 Mbit/s
95th percentile per-packet one-way delay: 316.601 ms
Loss rate: 2.01%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 309.847 ms
Loss rate: 1.98%
-- Flow 2:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 319.189 ms
Loss rate: 1.79%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 352.449 ms
Loss rate: 3.12%
```

Run 2: Report of WebRTC media — Data Link

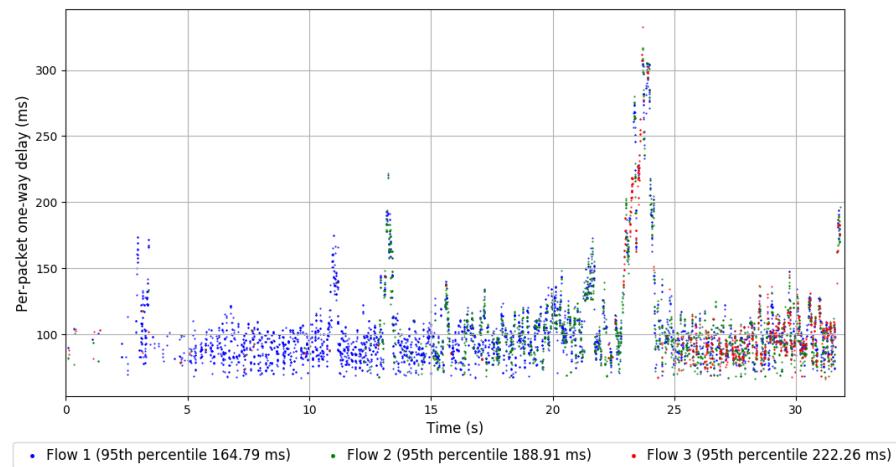
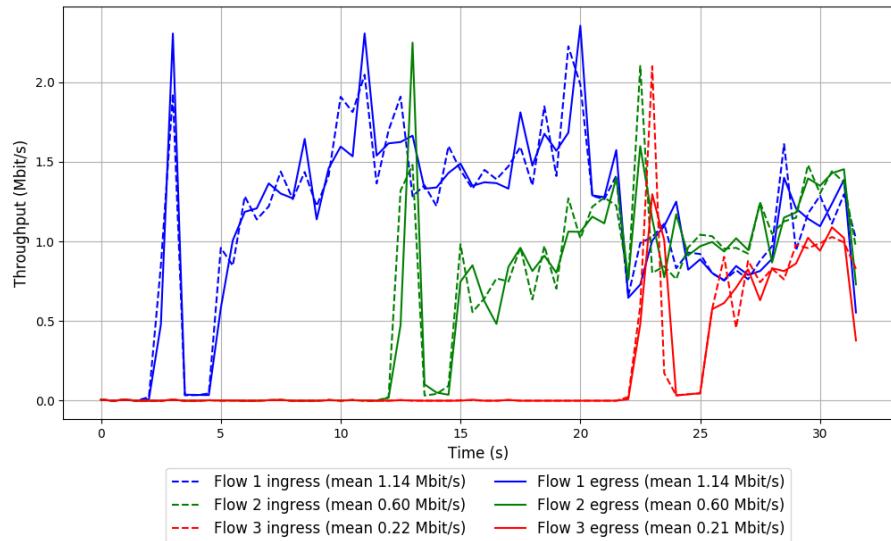


```
Run 3: Statistics of WebRTC media

Start at: 2018-01-26 01:02:50
End at: 2018-01-26 01:03:20
Local clock offset: -0.163 ms
Remote clock offset: -10.654 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 184.371 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 164.788 ms
Loss rate: 0.93%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 188.912 ms
Loss rate: 1.18%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 222.260 ms
Loss rate: 5.07%
```

Run 3: Report of WebRTC media — Data Link

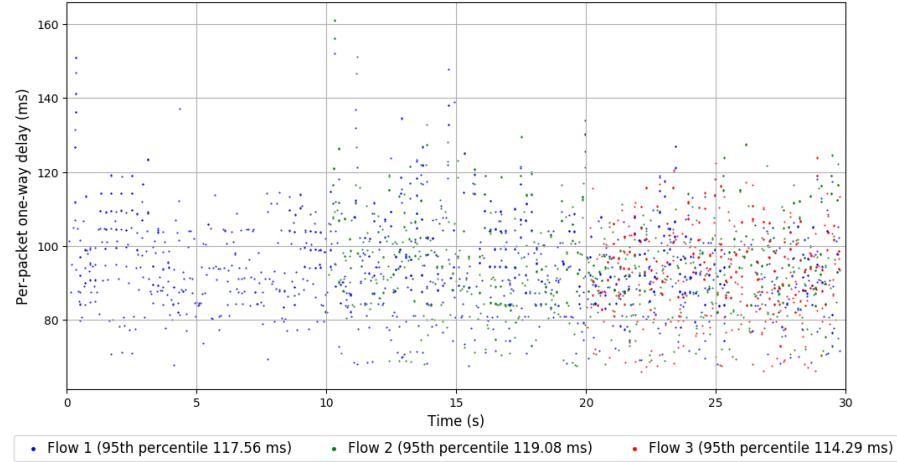
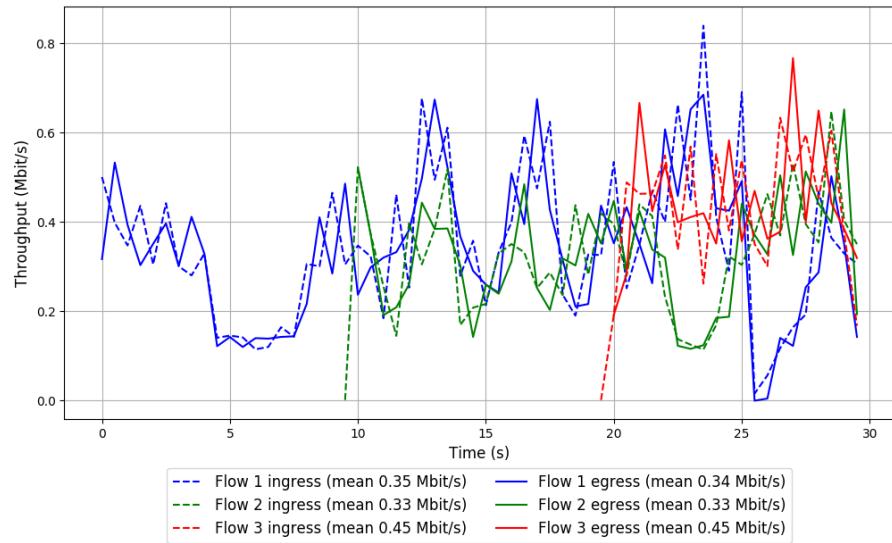


Run 1: Statistics of Sprout

```
Start at: 2018-01-26 00:35:35
End at: 2018-01-26 00:36:05
Local clock offset: -0.511 ms
Remote clock offset: -9.504 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 117.183 ms
Loss rate: 1.58%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 117.565 ms
Loss rate: 2.46%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 119.081 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 114.292 ms
Loss rate: 0.05%
```

Run 1: Report of Sprout — Data Link

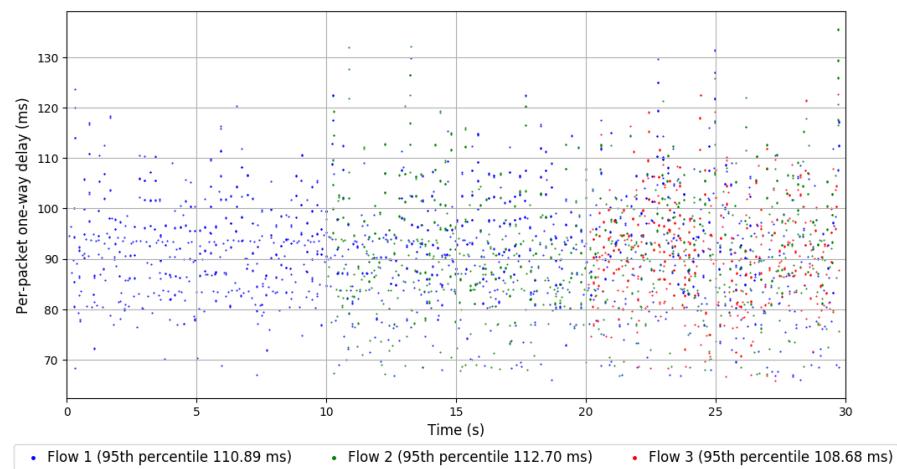
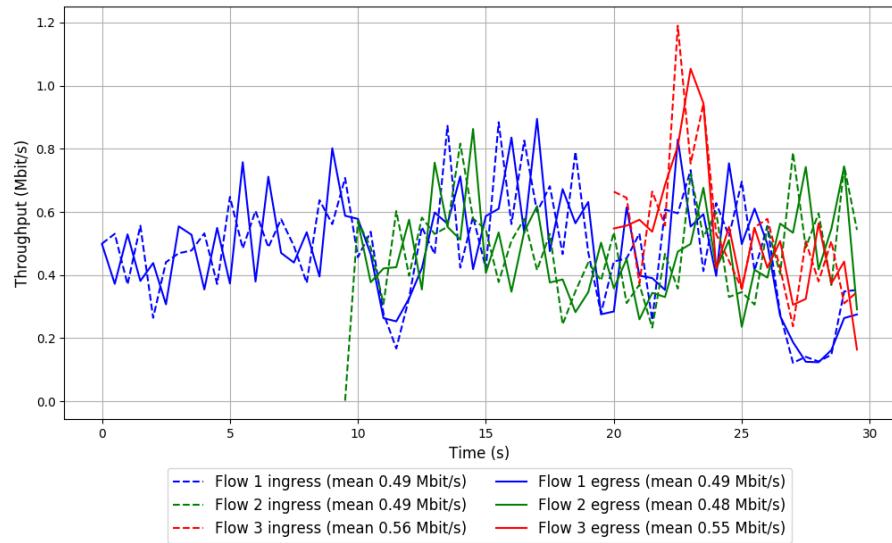


Run 2: Statistics of Sprout

```
Start at: 2018-01-26 00:54:33
End at: 2018-01-26 00:55:03
Local clock offset: 0.079 ms
Remote clock offset: -10.205 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 111.814 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 110.889 ms
Loss rate: 0.94%
-- Flow 2:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 112.700 ms
Loss rate: 2.22%
-- Flow 3:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 108.683 ms
Loss rate: 2.42%
```

Run 2: Report of Sprout — Data Link

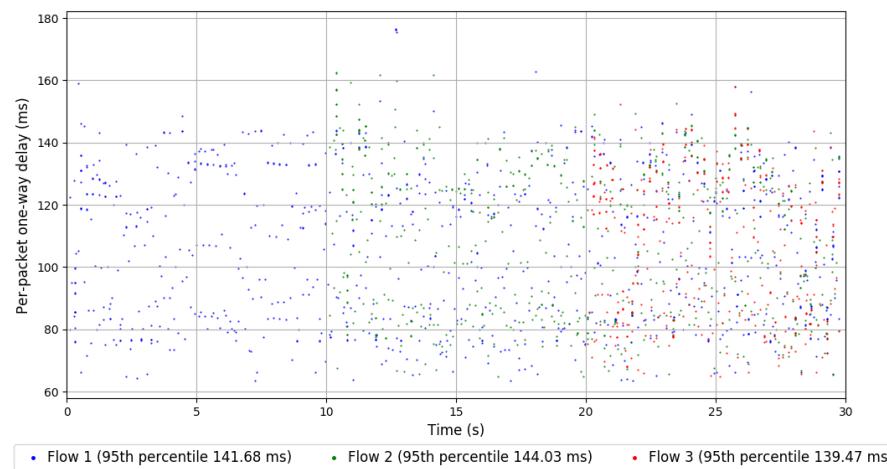
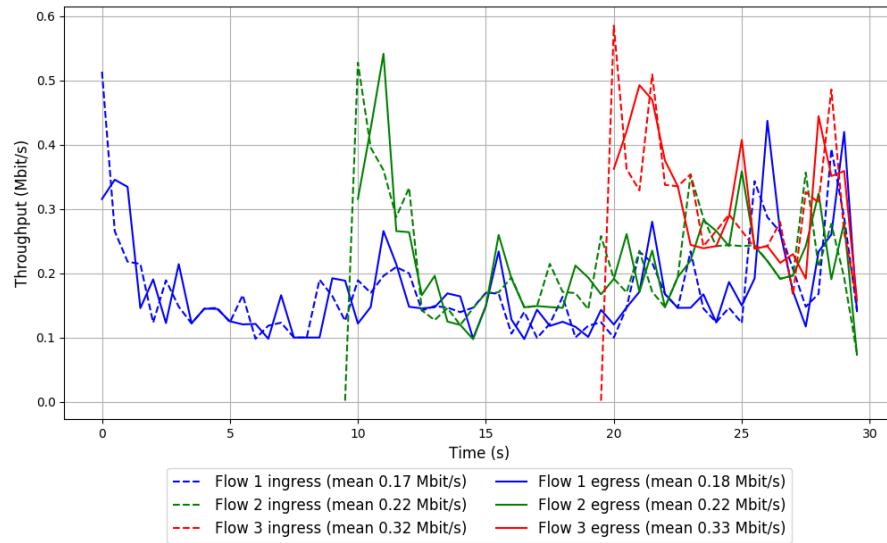


Run 3: Statistics of Sprout

```
Start at: 2018-01-26 01:13:30
End at: 2018-01-26 01:14:00
Local clock offset: -2.562 ms
Remote clock offset: -10.375 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 142.879 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 141.681 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 144.030 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 139.468 ms
Loss rate: 0.69%
```

Run 3: Report of Sprout — Data Link

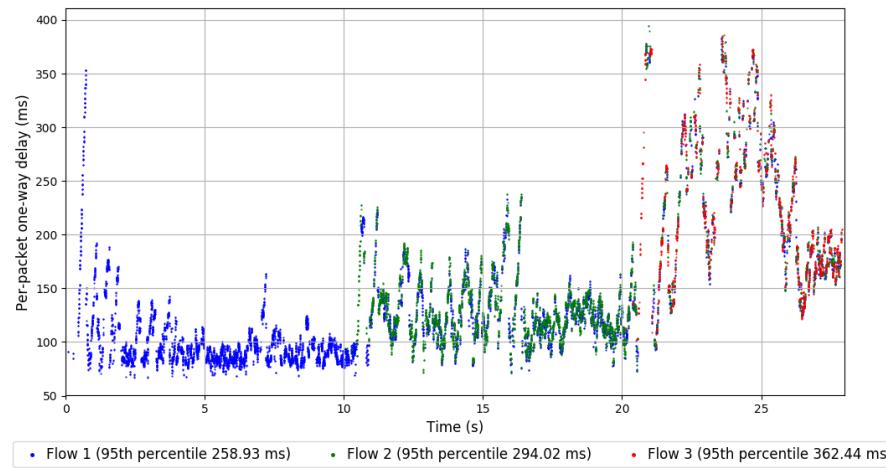
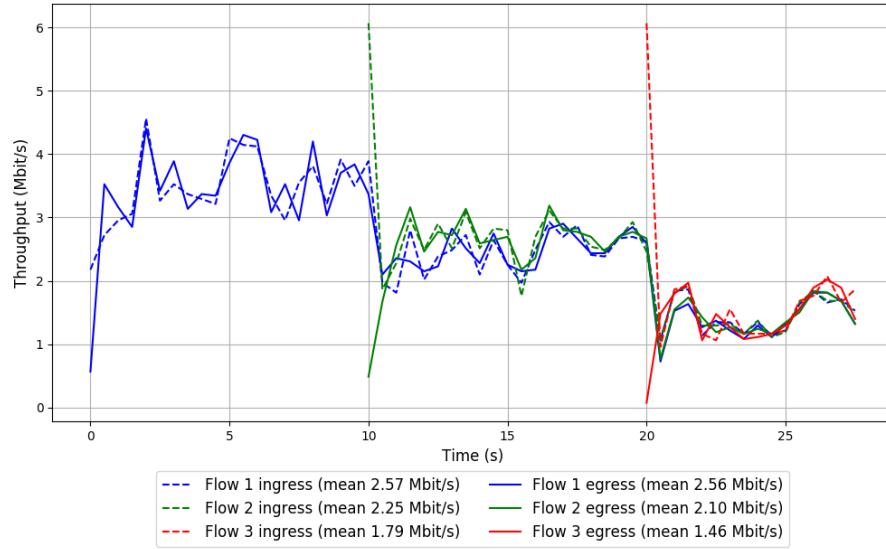


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-01-26 00:39:08
End at: 2018-01-26 00:39:38
Local clock offset: -0.373 ms
Remote clock offset: -9.623 ms

# Below is generated by plot.py at 2018-01-26 02:15:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.30 Mbit/s
95th percentile per-packet one-way delay: 292.265 ms
Loss rate: 5.32%
-- Flow 1:
Average throughput: 2.56 Mbit/s
95th percentile per-packet one-way delay: 258.930 ms
Loss rate: 1.11%
-- Flow 2:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 294.021 ms
Loss rate: 7.51%
-- Flow 3:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 362.442 ms
Loss rate: 20.45%
```

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

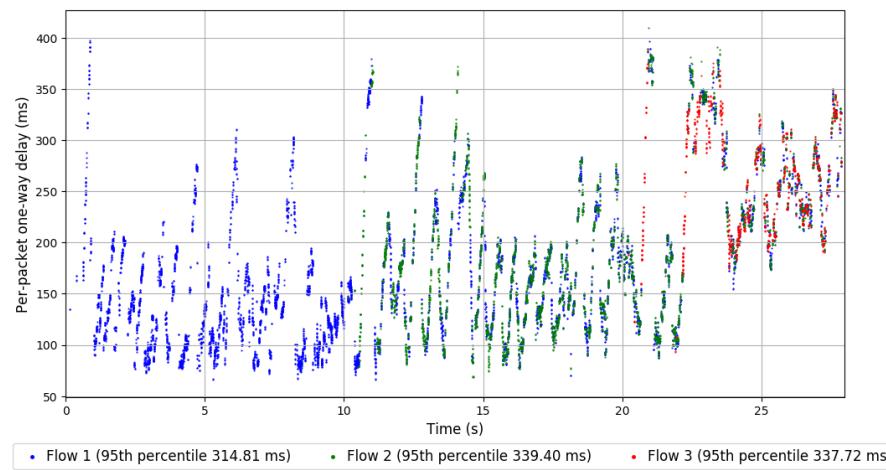
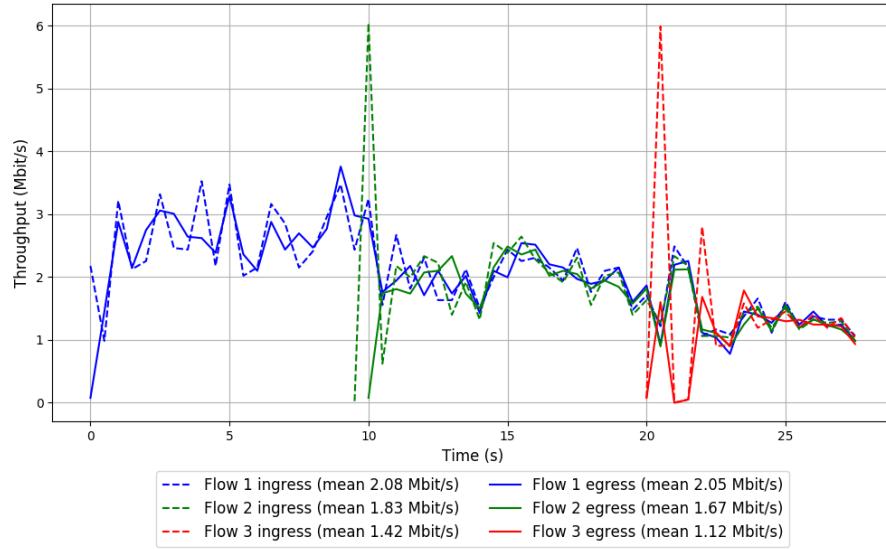


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-01-26 00:58:06
End at: 2018-01-26 00:58:36
Local clock offset: -0.504 ms
Remote clock offset: -10.399 ms

# Below is generated by plot.py at 2018-01-26 02:15:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.43 Mbit/s
95th percentile per-packet one-way delay: 330.391 ms
Loss rate: 6.86%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 314.813 ms
Loss rate: 2.25%
-- Flow 2:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 339.405 ms
Loss rate: 9.38%
-- Flow 3:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 337.723 ms
Loss rate: 23.38%
```

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

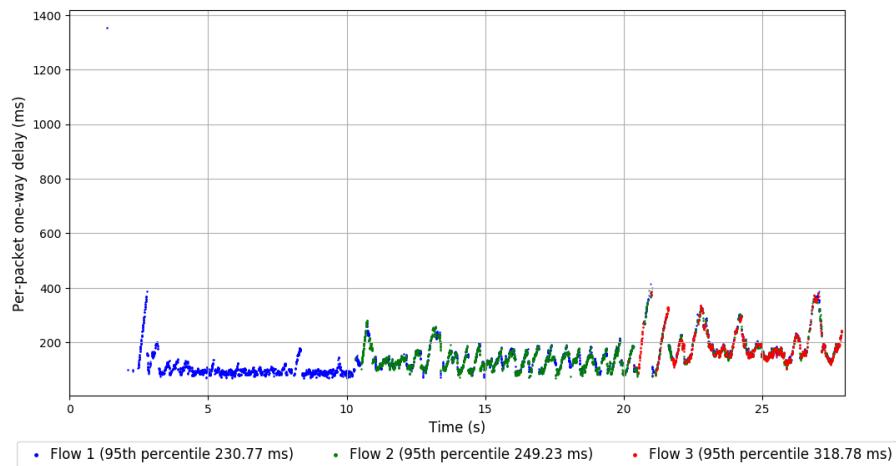
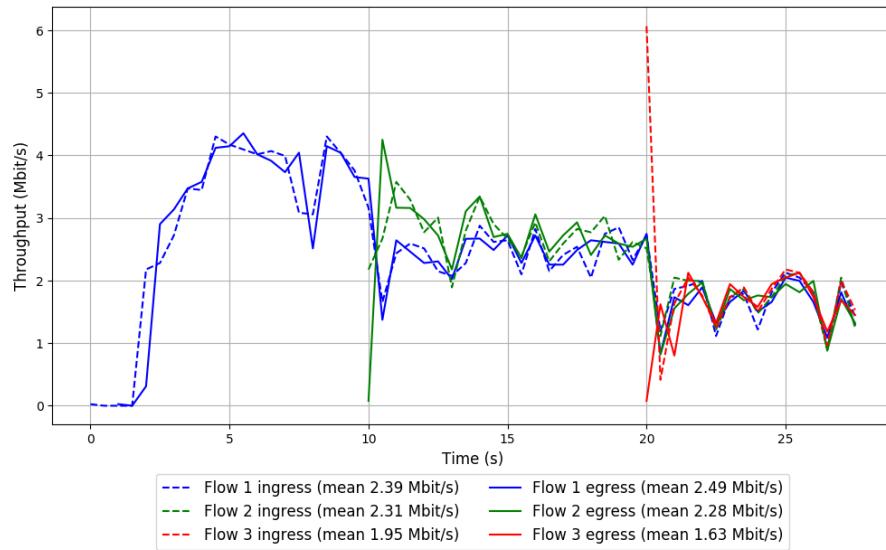


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-01-26 01:17:03
End at: 2018-01-26 01:17:33
Local clock offset: 0.143 ms
Remote clock offset: -10.439 ms

# Below is generated by plot.py at 2018-01-26 02:15:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.49 Mbit/s
95th percentile per-packet one-way delay: 250.853 ms
Loss rate: 3.62%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 230.770 ms
Loss rate: 1.13%
-- Flow 2:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 249.228 ms
Loss rate: 2.17%
-- Flow 3:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 318.778 ms
Loss rate: 18.35%
```

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



Run 1: Statistics of TCP Vegas

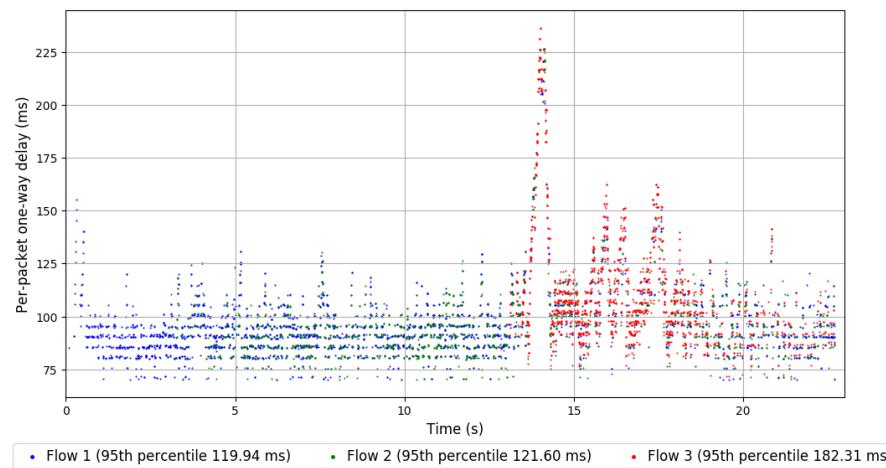
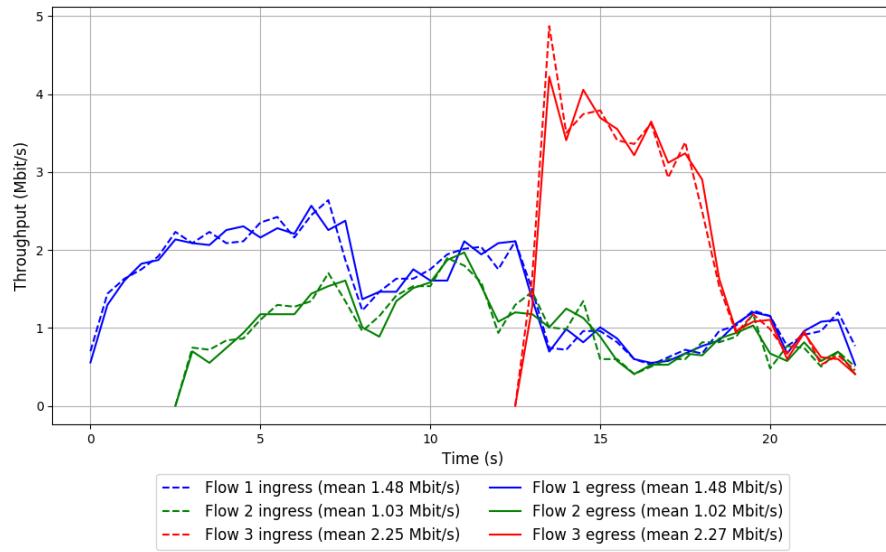
Start at: 2018-01-26 00:37:57

End at: 2018-01-26 00:38:27

Local clock offset: -0.441 ms

Remote clock offset: -9.508 ms

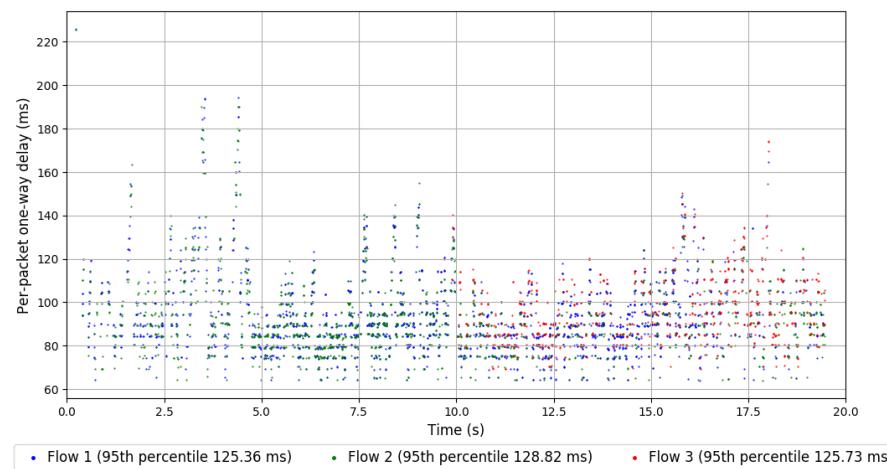
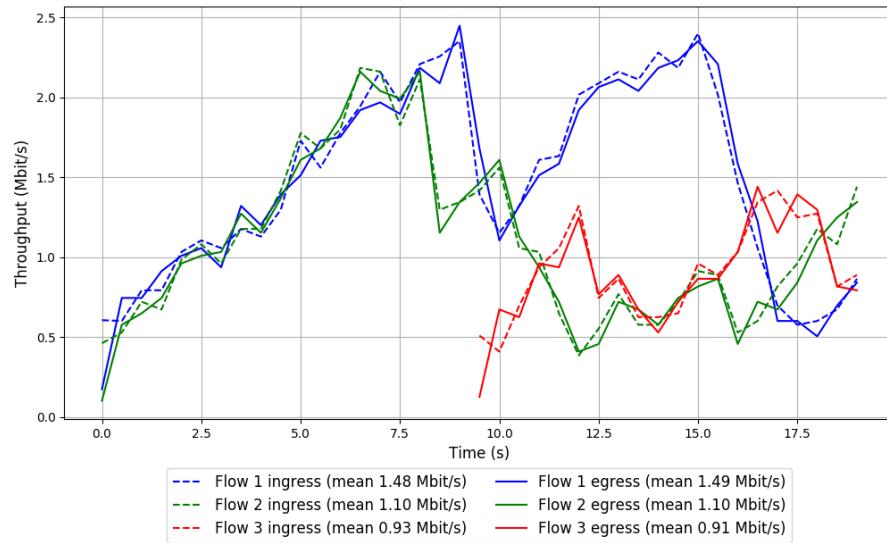
Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-01-26 00:56:55
End at: 2018-01-26 00:57:25
Local clock offset: 0.116 ms
Remote clock offset: -10.322 ms

Run 2: Report of TCP Vegas — Data Link

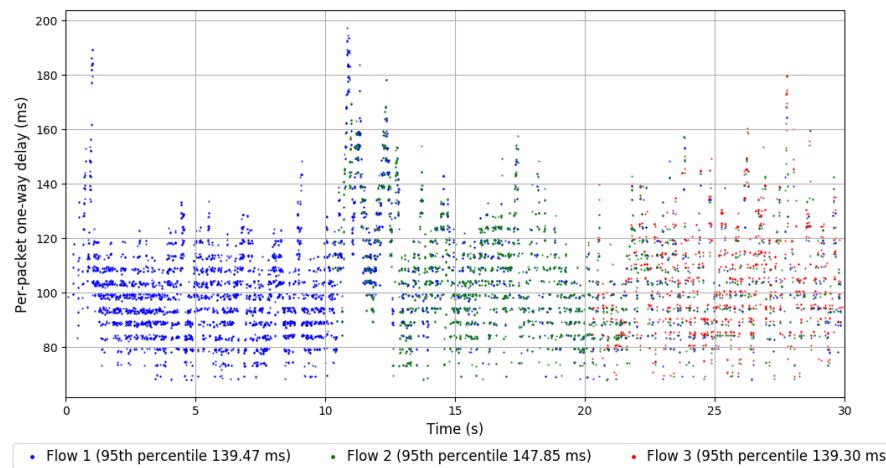
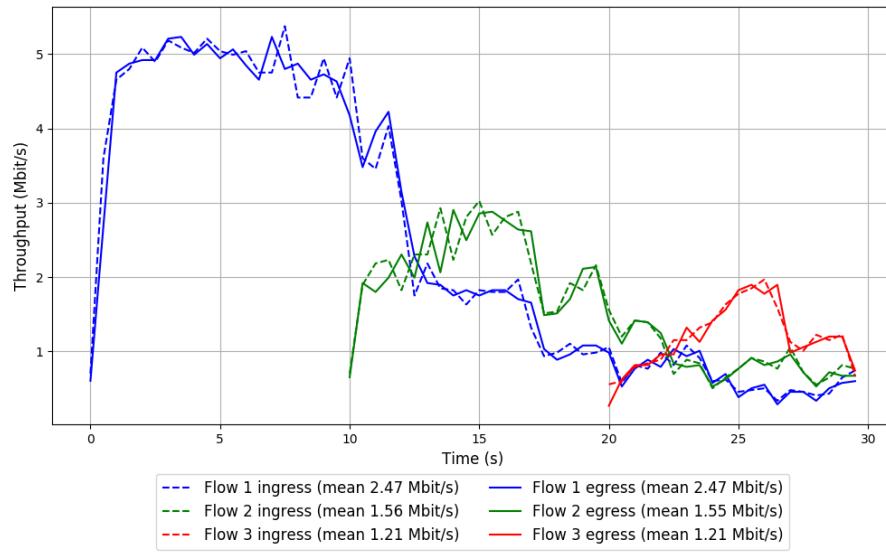


Run 3: Statistics of TCP Vegas

```
Start at: 2018-01-26 01:15:52
End at: 2018-01-26 01:16:22
Local clock offset: -0.286 ms
Remote clock offset: -10.467 ms

# Below is generated by plot.py at 2018-01-26 02:15:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.89 Mbit/s
95th percentile per-packet one-way delay: 143.410 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 2.47 Mbit/s
95th percentile per-packet one-way delay: 139.470 ms
Loss rate: 0.31%
-- Flow 2:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 147.855 ms
Loss rate: 1.04%
-- Flow 3:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 139.296 ms
Loss rate: 1.41%
```

Run 3: Report of TCP Vegas — Data Link

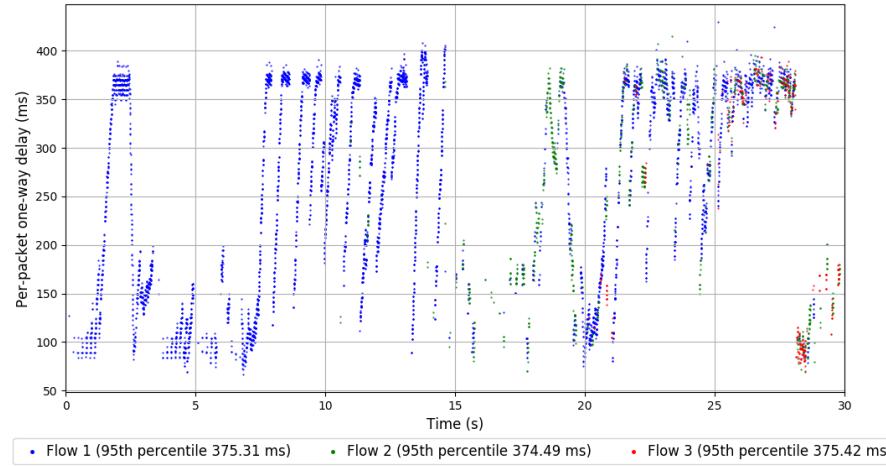
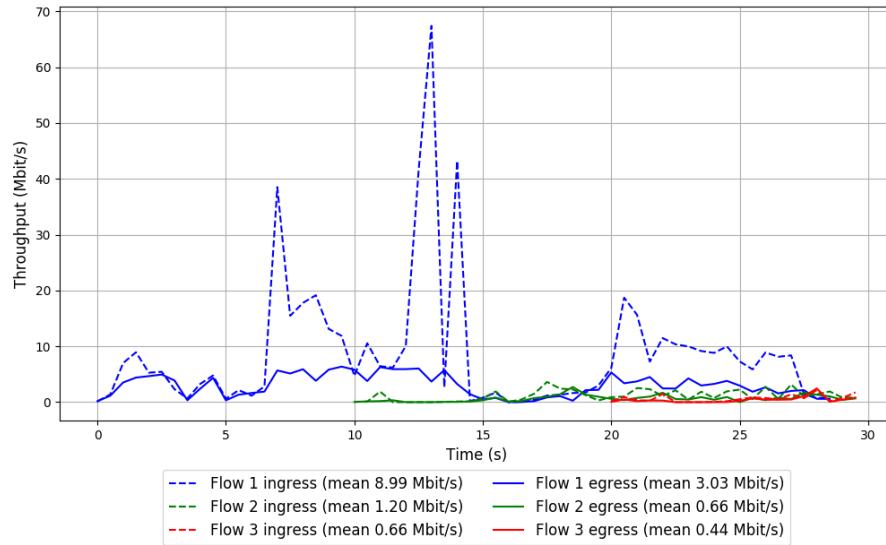


```
Run 1: Statistics of Verus
```

```
Start at: 2018-01-26 00:28:28
End at: 2018-01-26 00:28:58
Local clock offset: -0.5 ms
Remote clock offset: -9.332 ms

# Below is generated by plot.py at 2018-01-26 02:15:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.51 Mbit/s
95th percentile per-packet one-way delay: 375.306 ms
Loss rate: 63.83%
-- Flow 1:
Average throughput: 3.03 Mbit/s
95th percentile per-packet one-way delay: 375.306 ms
Loss rate: 66.25%
-- Flow 2:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 374.490 ms
Loss rate: 45.20%
-- Flow 3:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 375.415 ms
Loss rate: 34.97%
```

Run 1: Report of Verus — Data Link

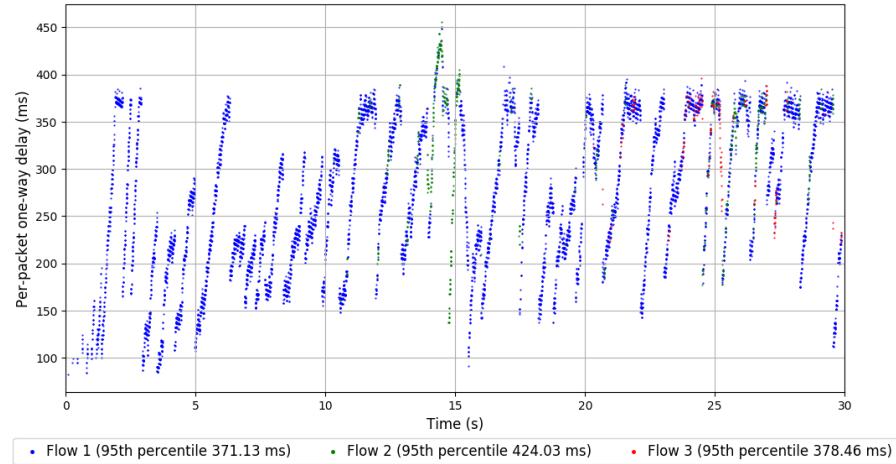
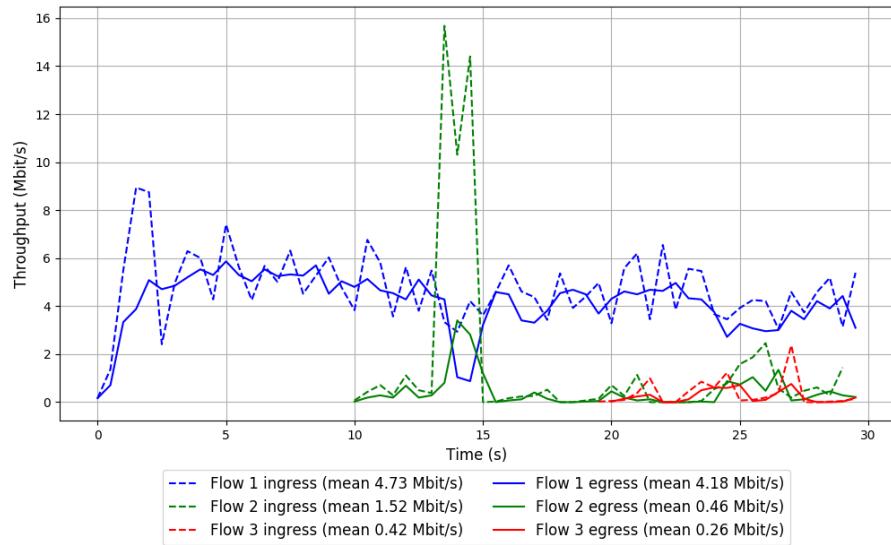


Run 2: Statistics of Verus

```
Start at: 2018-01-26 00:47:26
End at: 2018-01-26 00:47:56
Local clock offset: -0.651 ms
Remote clock offset: -9.938 ms

# Below is generated by plot.py at 2018-01-26 02:15:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.56 Mbit/s
95th percentile per-packet one-way delay: 373.713 ms
Loss rate: 22.26%
-- Flow 1:
Average throughput: 4.18 Mbit/s
95th percentile per-packet one-way delay: 371.127 ms
Loss rate: 12.04%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 424.029 ms
Loss rate: 69.71%
-- Flow 3:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 378.462 ms
Loss rate: 38.46%
```

Run 2: Report of Verus — Data Link

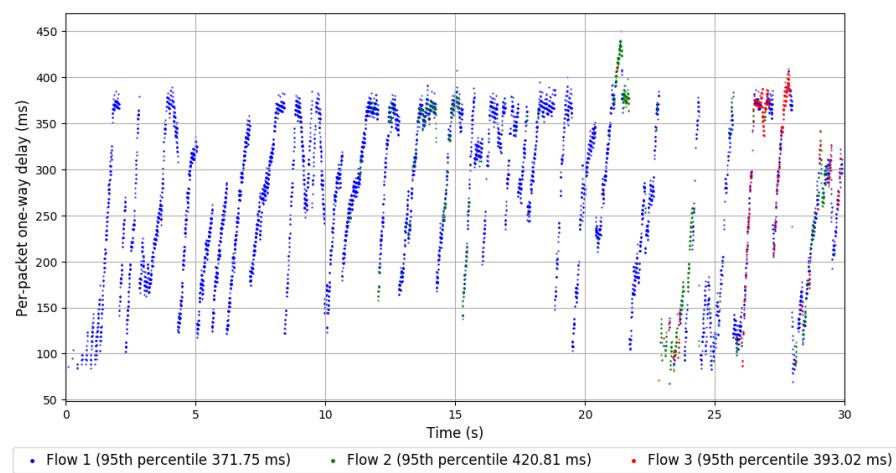
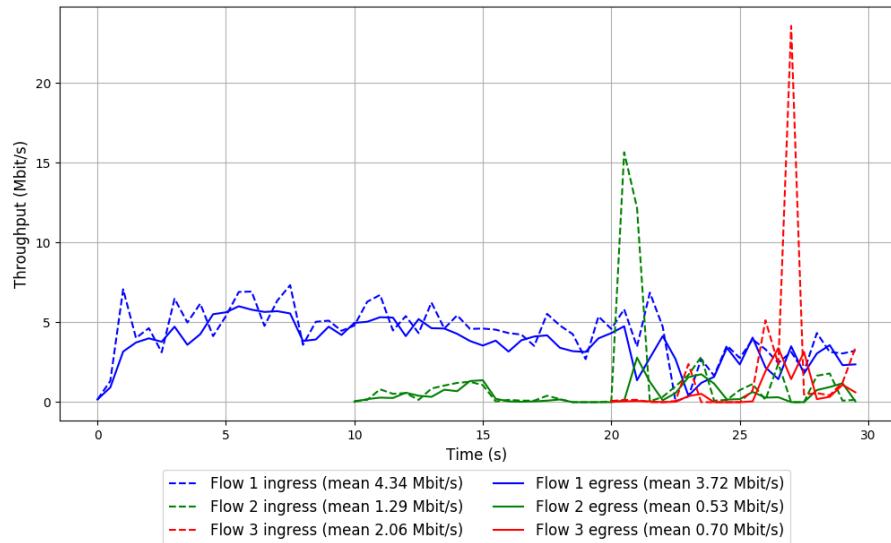


Run 3: Statistics of Verus

```
Start at: 2018-01-26 01:06:23
End at: 2018-01-26 01:06:53
Local clock offset: -0.41 ms
Remote clock offset: -10.635 ms

# Below is generated by plot.py at 2018-01-26 02:15:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 374.867 ms
Loss rate: 27.16%
-- Flow 1:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 371.745 ms
Loss rate: 14.57%
-- Flow 2:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 420.811 ms
Loss rate: 59.33%
-- Flow 3:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 393.016 ms
Loss rate: 67.36%
```

Run 3: Report of Verus — Data Link

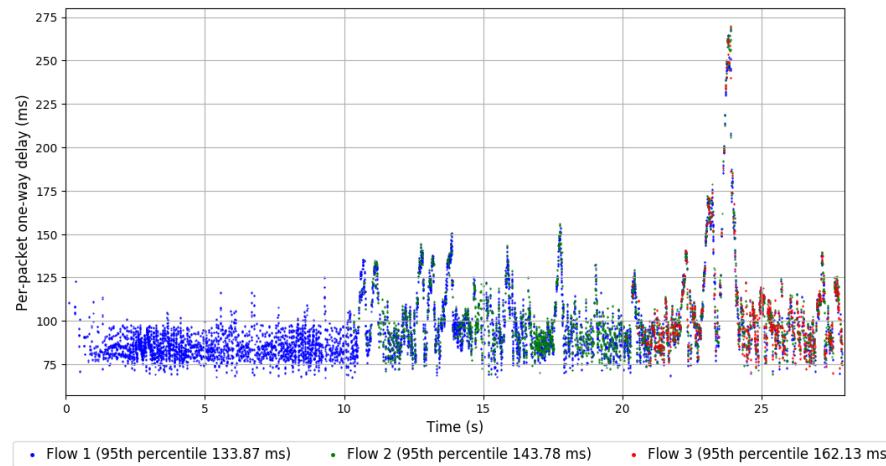
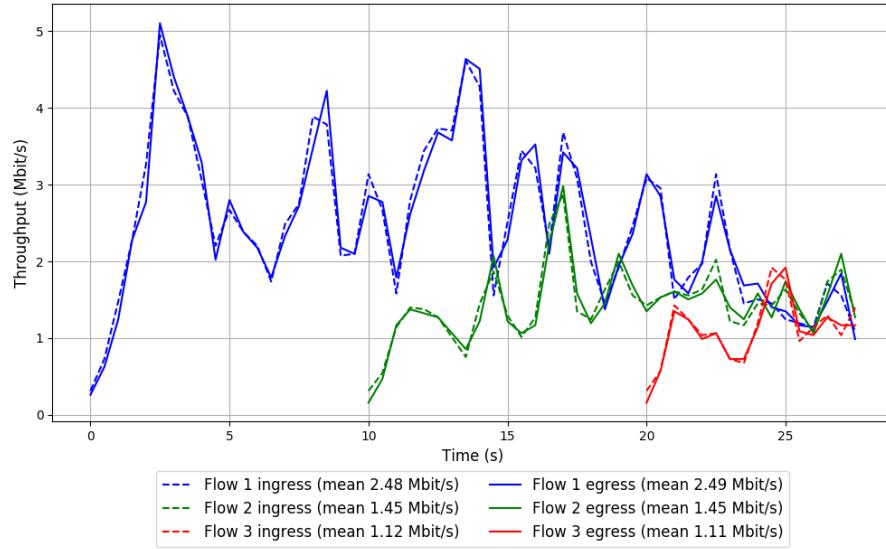


Run 1: Statistics of Copa

```
Start at: 2018-01-26 00:23:44
End at: 2018-01-26 00:24:14
Local clock offset: -0.396 ms
Remote clock offset: -9.138 ms

# Below is generated by plot.py at 2018-01-26 02:15:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.73 Mbit/s
95th percentile per-packet one-way delay: 136.042 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 133.868 ms
Loss rate: 0.22%
-- Flow 2:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 143.784 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 162.131 ms
Loss rate: 2.48%
```

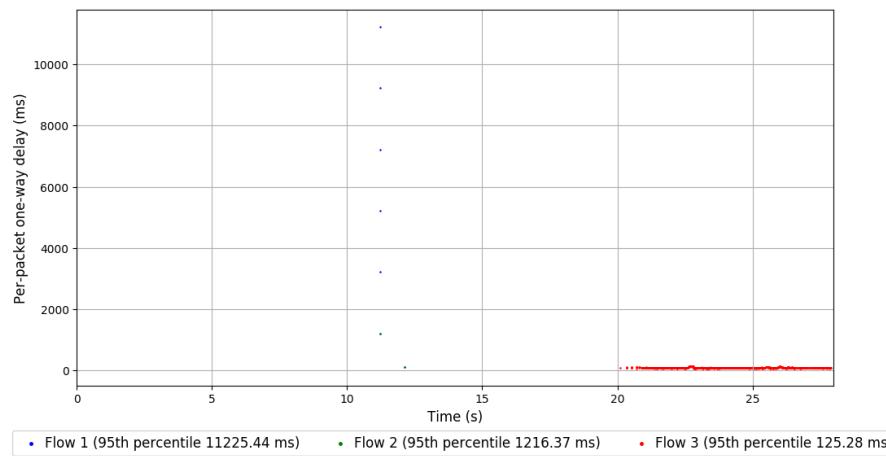
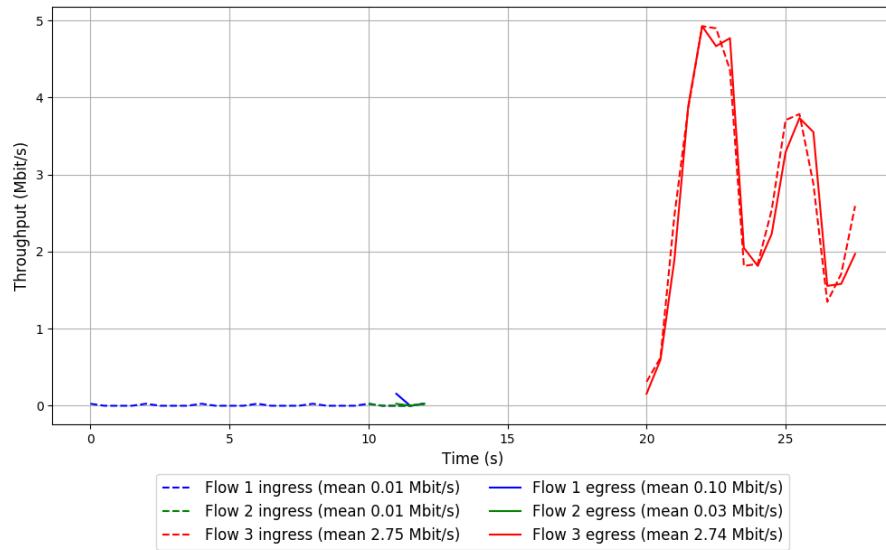
Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-01-26 00:42:42
End at: 2018-01-26 00:43:12
Local clock offset: -0.092 ms
Remote clock offset: -9.772 ms

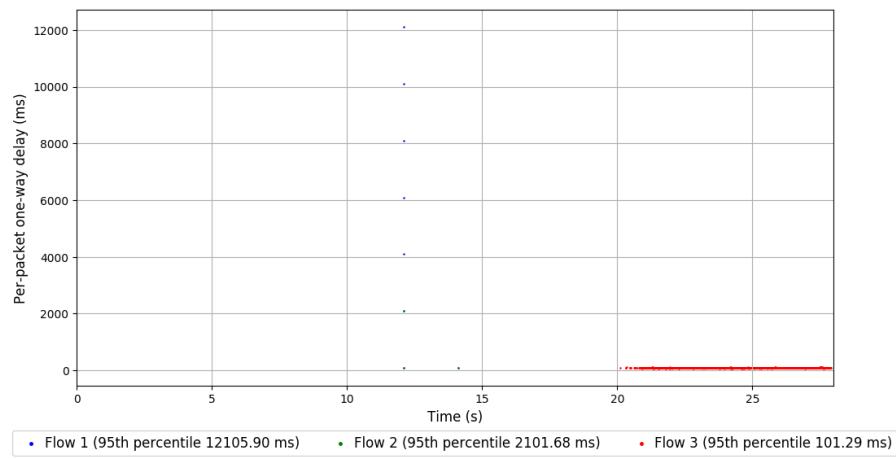
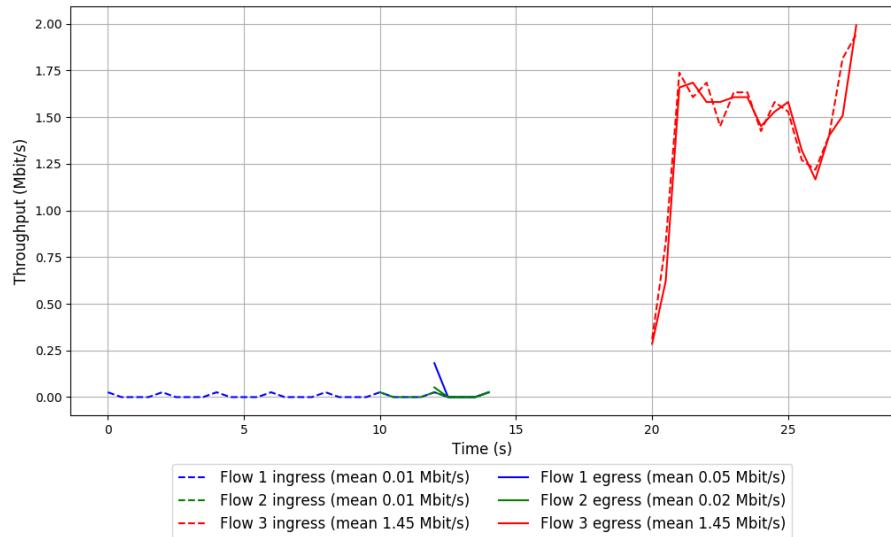
Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-01-26 01:01:40
End at: 2018-01-26 01:02:10
Local clock offset: 0.018 ms
Remote clock offset: -10.568 ms

Run 3: Report of Copa — Data Link

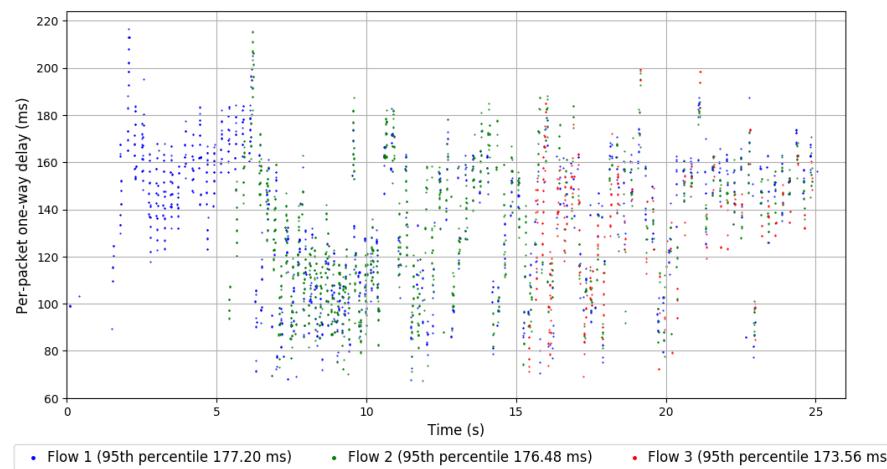
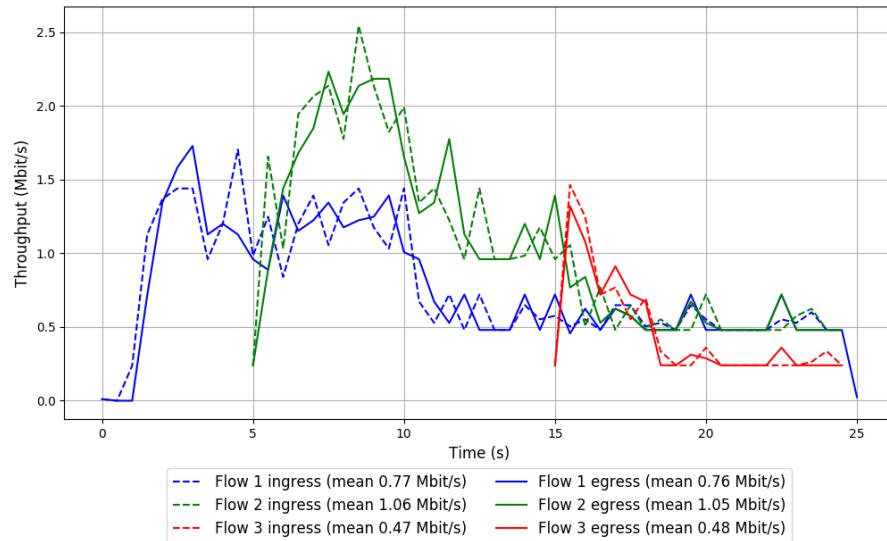


```
Run 1: Statistics of Indigo-2-256

Start at: 2018-01-26 00:29:40
End at: 2018-01-26 00:30:10
Local clock offset: -0.637 ms
Remote clock offset: -9.368 ms

# Below is generated by plot.py at 2018-01-26 02:15:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 176.529 ms
Loss rate: 1.40%
-- Flow 1:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 177.201 ms
Loss rate: 1.37%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 176.481 ms
Loss rate: 1.45%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 173.556 ms
Loss rate: 1.31%
```

Run 1: Report of Indigo-2-256 — Data Link

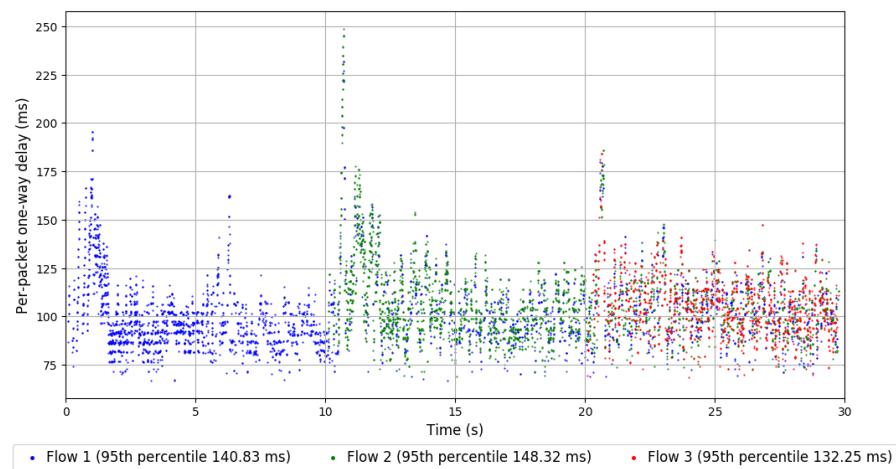
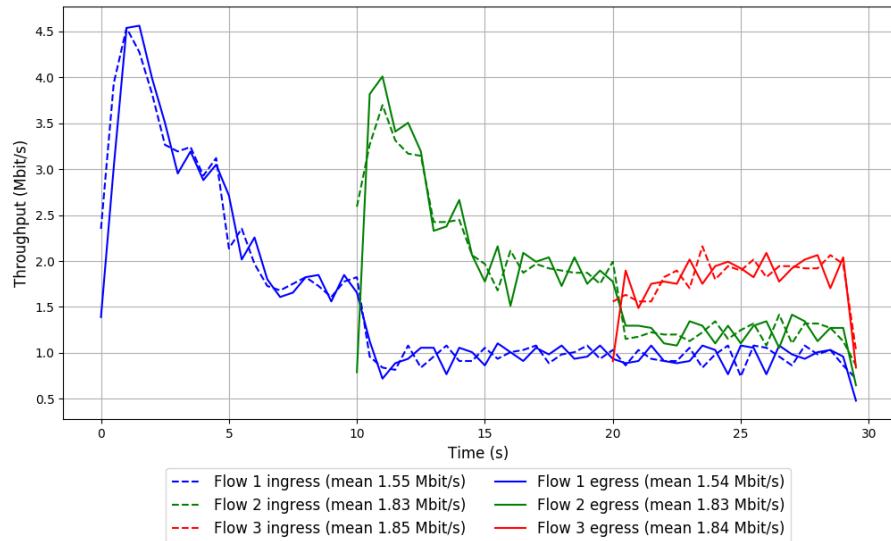


Run 2: Statistics of Indigo-2-256

```
Start at: 2018-01-26 00:48:37
End at: 2018-01-26 00:49:07
Local clock offset: 0.104 ms
Remote clock offset: -10.007 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.35 Mbit/s
95th percentile per-packet one-way delay: 140.812 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 140.834 ms
Loss rate: 1.32%
-- Flow 2:
Average throughput: 1.83 Mbit/s
95th percentile per-packet one-way delay: 148.317 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 1.84 Mbit/s
95th percentile per-packet one-way delay: 132.248 ms
Loss rate: 1.92%
```

Run 2: Report of Indigo-2-256 — Data Link

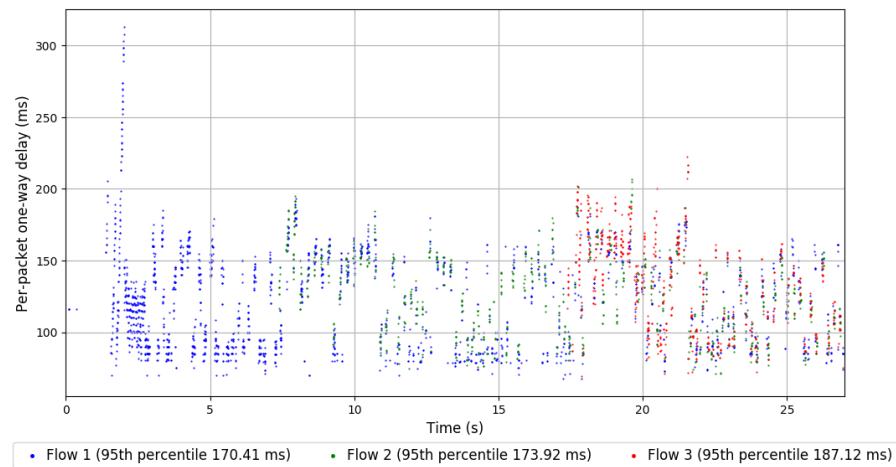
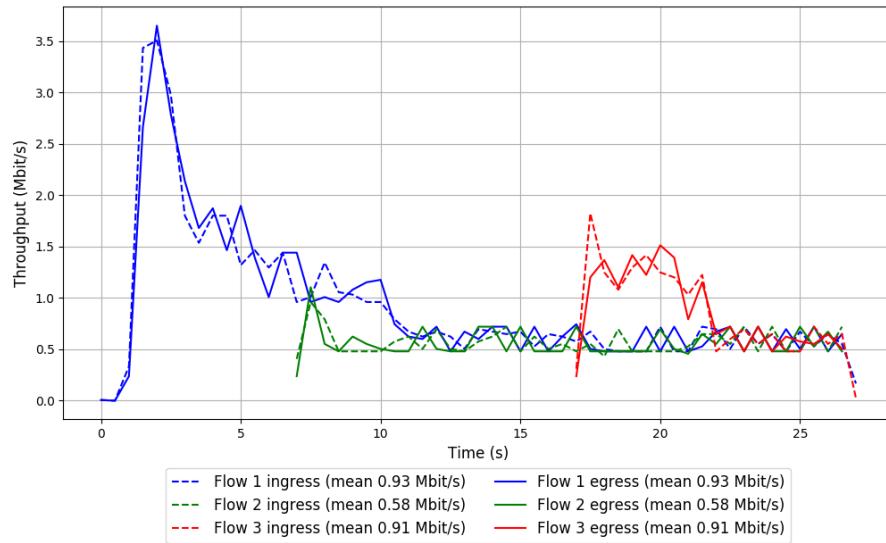


Run 3: Statistics of Indigo-2-256

```
Start at: 2018-01-26 01:07:35
End at: 2018-01-26 01:08:05
Local clock offset: -0.111 ms
Remote clock offset: -10.523 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 177.325 ms
Loss rate: 1.01%
-- Flow 1:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 170.408 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 173.921 ms
Loss rate: 1.16%
-- Flow 3:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 187.122 ms
Loss rate: 2.30%
```

Run 3: Report of Indigo-2-256 — Data Link

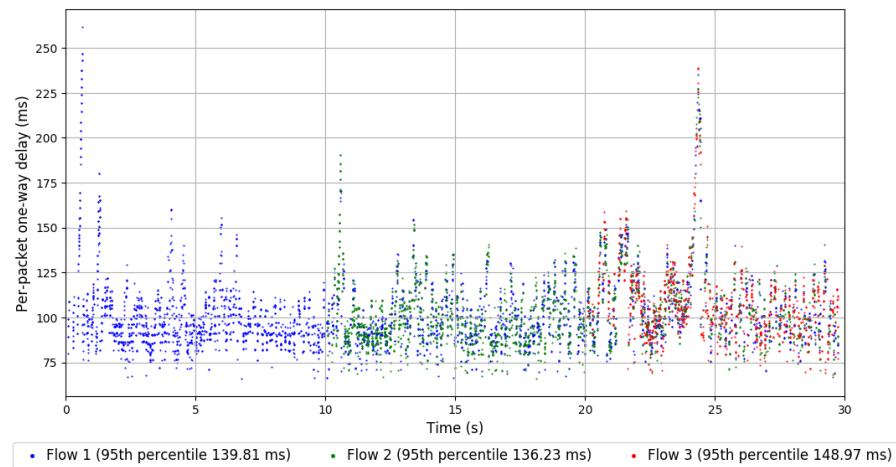
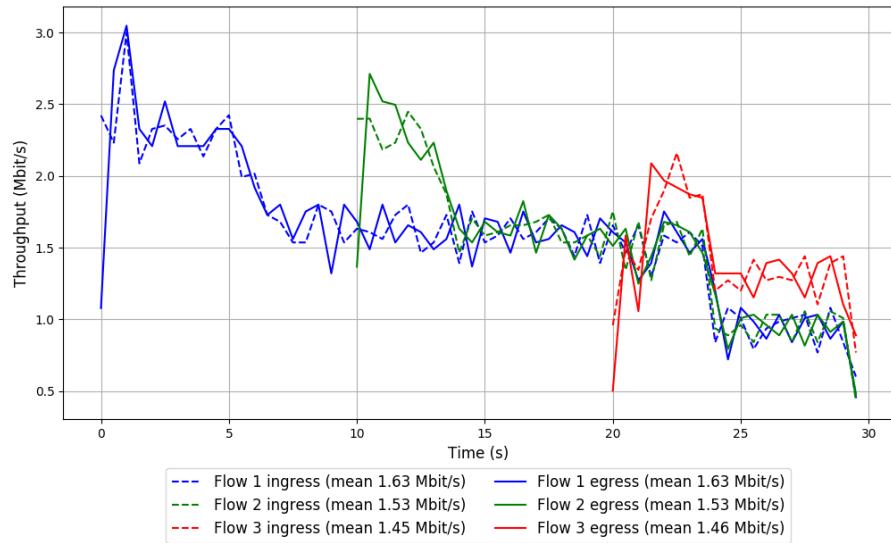


Run 1: Statistics of Indigo-1-32

```
Start at: 2018-01-26 00:21:21
End at: 2018-01-26 00:21:52
Local clock offset: -1.259 ms
Remote clock offset: -8.996 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.11 Mbit/s
95th percentile per-packet one-way delay: 139.824 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 139.809 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 136.233 ms
Loss rate: 0.40%
-- Flow 3:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 148.966 ms
Loss rate: 1.02%
```

Run 1: Report of Indigo-1-32 — Data Link

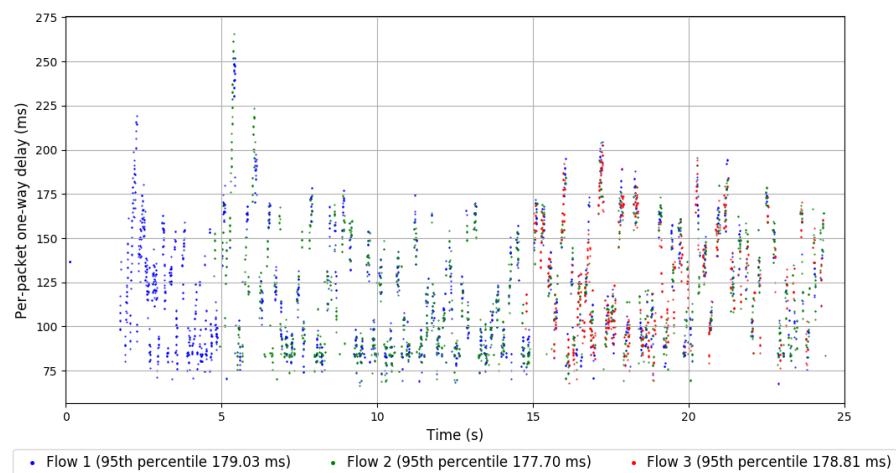
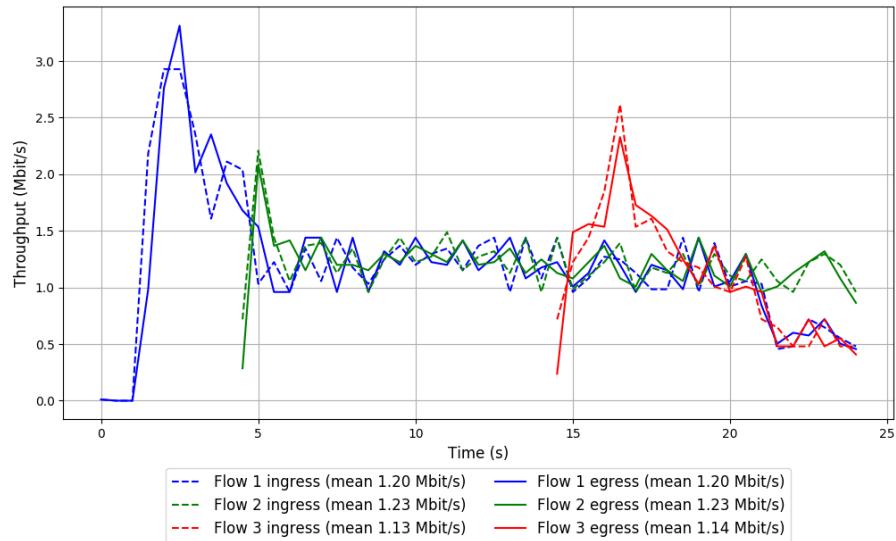


Run 2: Statistics of Indigo-1-32

```
Start at: 2018-01-26 00:40:20
End at: 2018-01-26 00:40:50
Local clock offset: -0.685 ms
Remote clock offset: -9.672 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.63 Mbit/s
95th percentile per-packet one-way delay: 178.682 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 179.025 ms
Loss rate: 1.23%
-- Flow 2:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 177.701 ms
Loss rate: 1.18%
-- Flow 3:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 178.809 ms
Loss rate: 1.09%
```

Run 2: Report of Indigo-1-32 — Data Link

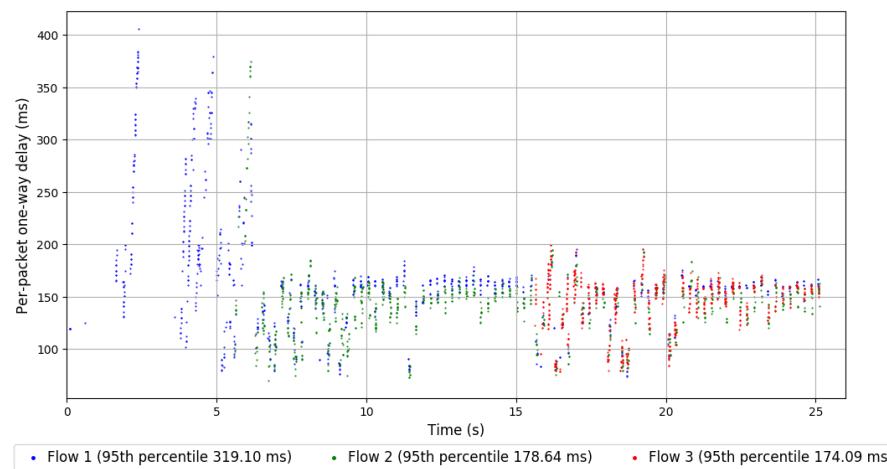
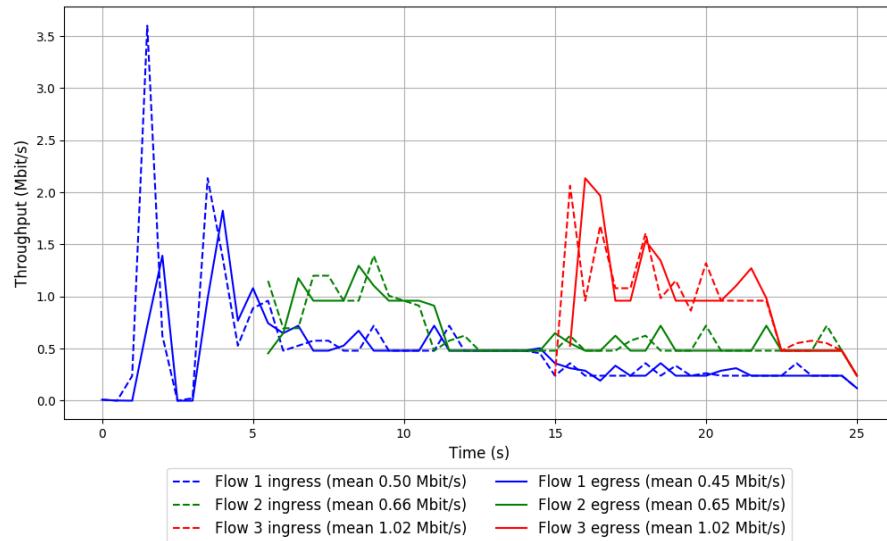


Run 3: Statistics of Indigo-1-32

```
Start at: 2018-01-26 00:59:17
End at: 2018-01-26 00:59:47
Local clock offset: -0.077 ms
Remote clock offset: -10.459 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 241.874 ms
Loss rate: 5.05%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 319.103 ms
Loss rate: 10.32%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 178.643 ms
Loss rate: 1.94%
-- Flow 3:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 174.092 ms
Loss rate: 2.43%
```

Run 3: Report of Indigo-1-32 — Data Link

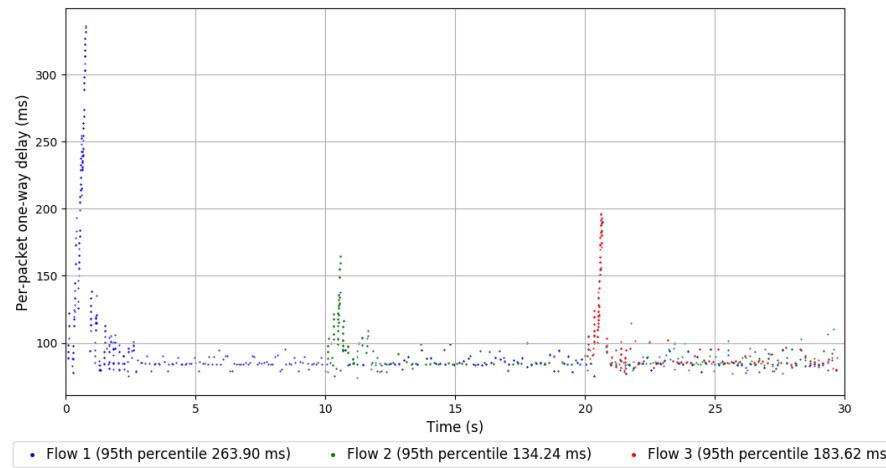
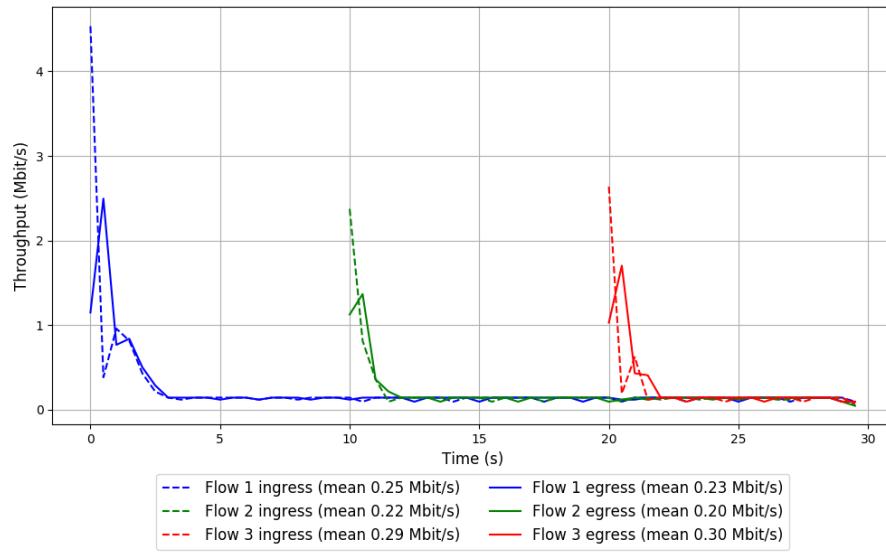


```
Run 1: Statistics of Indigo-1-128

Start at: 2018-01-26 00:26:06
End at: 2018-01-26 00:26:36
Local clock offset: -0.552 ms
Remote clock offset: -9.279 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 232.736 ms
Loss rate: 6.81%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 263.905 ms
Loss rate: 8.97%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 134.239 ms
Loss rate: 7.35%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 183.615 ms
Loss rate: 0.42%
```

Run 1: Report of Indigo-1-128 — Data Link

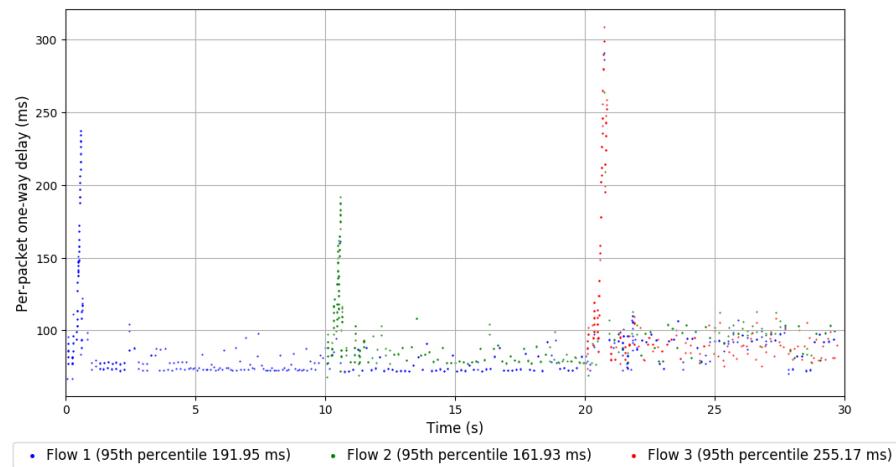
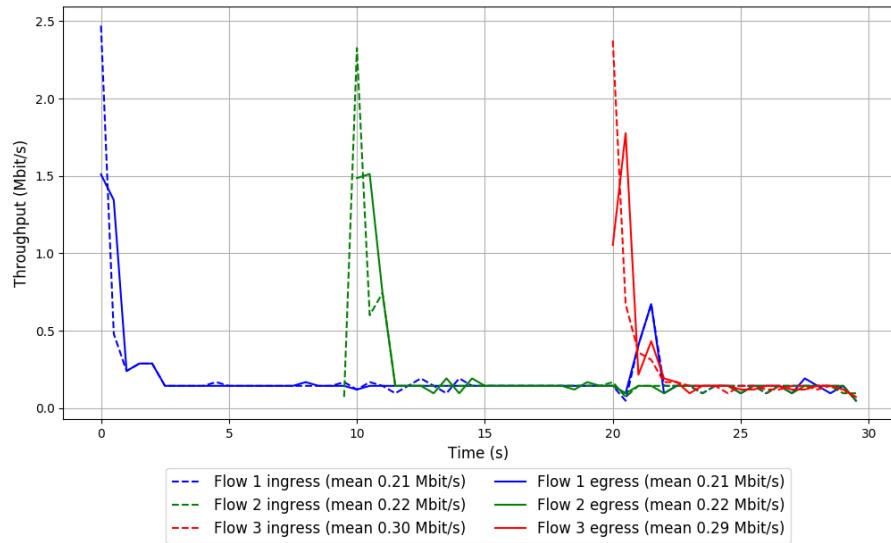


Run 2: Statistics of Indigo-1-128

```
Start at: 2018-01-26 00:45:04
End at: 2018-01-26 00:45:34
Local clock offset: -0.706 ms
Remote clock offset: -9.841 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 212.042 ms
Loss rate: 1.60%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 191.952 ms
Loss rate: 1.18%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 161.931 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 255.173 ms
Loss rate: 4.10%
```

Run 2: Report of Indigo-1-128 — Data Link



Run 3: Statistics of Indigo-1-128

```
Start at: 2018-01-26 01:04:01
End at: 2018-01-26 01:04:31
Local clock offset: -2.705 ms
Remote clock offset: -10.693 ms

# Below is generated by plot.py at 2018-01-26 02:15:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 190.357 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 146.443 ms
Loss rate: 0.45%
-- Flow 2:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 205.586 ms
Loss rate: 0.53%
-- Flow 3:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 198.717 ms
Loss rate: 0.25%
```

Run 3: Report of Indigo-1-128 — Data Link

