

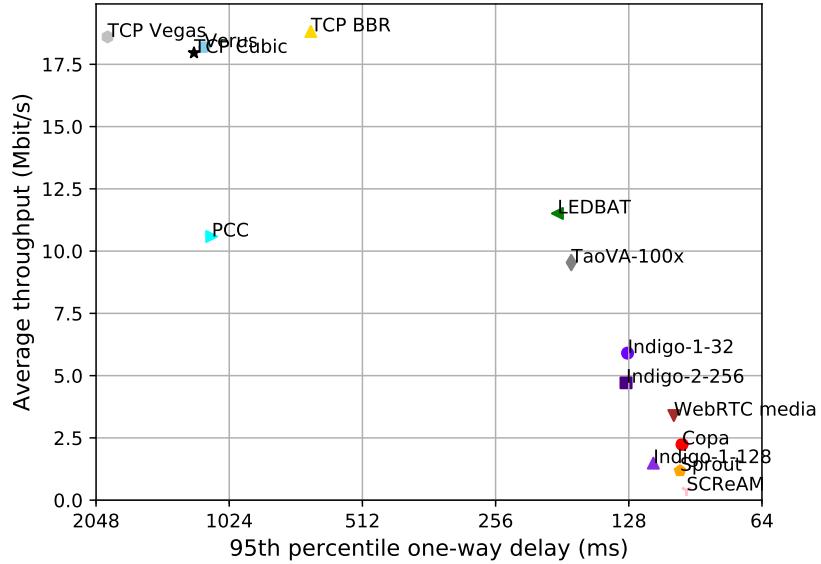
Pantheon Report

Generated at 2018-01-26 02:17:10 (UTC).
Data path: AWS Korea Ethernet (*local*) → China ppp0 (*remote*).
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.

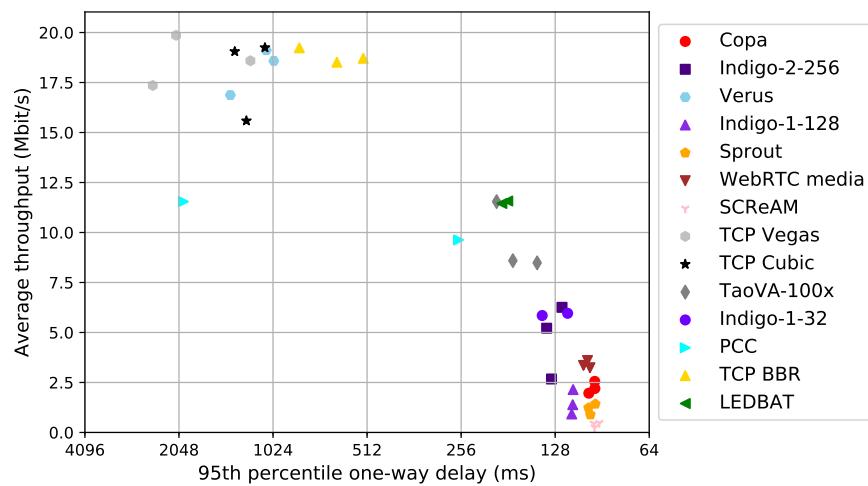
Git summary:

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



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



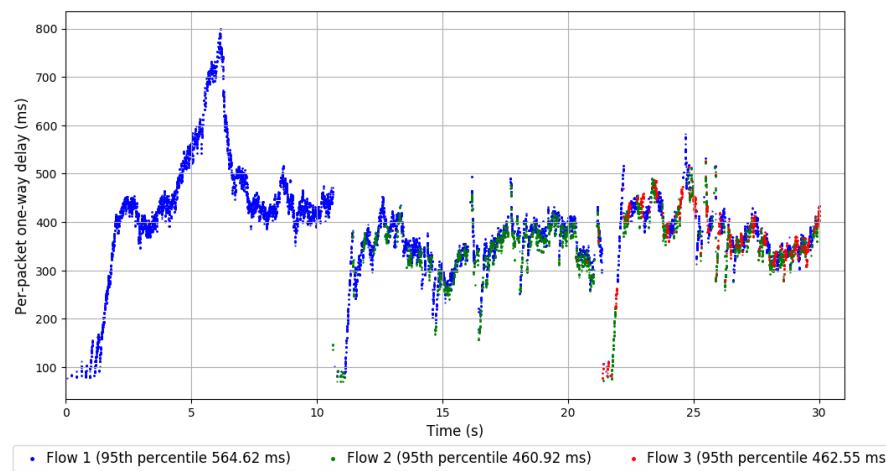
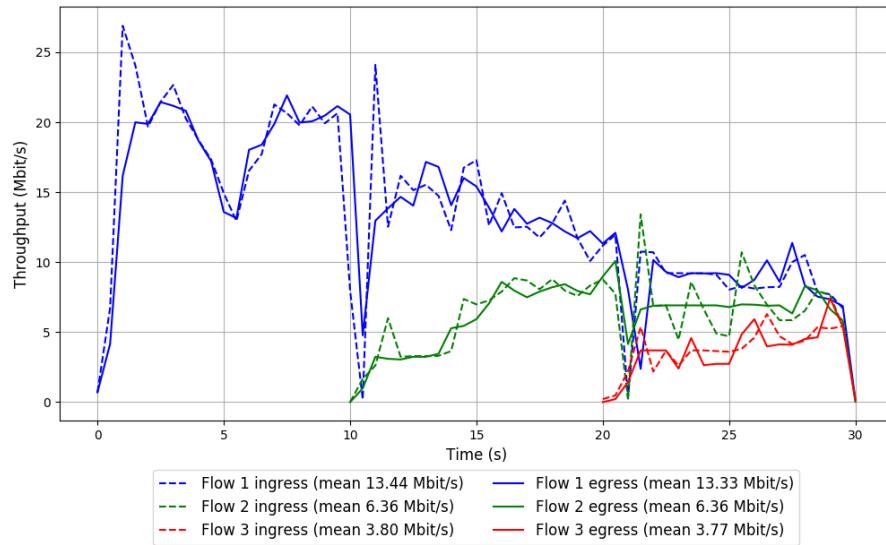
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	12.88	6.33	5.68	655.72	656.33	677.19	0.59	2.32	7.14
TCP Cubic		16.01	2.78	0.49	1220.98	1244.01	1211.51	2.72	16.33	26.95
LEDBAT		8.11	4.33	1.60	177.90	211.35	253.23	0.68	0.74	1.89
PCC		4.01	5.87	8.14	1013.10	1100.10	1178.98	3.50	5.42	9.26
QUIC Cubic		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCReAM		0.32	0.22	0.22	1402.85	90.80	101.02	0.10	0.13	0.23
WebRTC media		2.09	1.04	0.28	101.08	102.26	122.27	0.19	0.34	1.02
Sprout		0.63	0.55	0.56	96.68	99.06	97.74	0.17	0.05	0.02
TaoVA-100x		4.99	4.49	5.93	159.22	179.97	202.43	0.10	0.13	0.24
TCP Vegas		16.79	3.02	0.42	1876.79	1882.36	1804.17	3.92	11.21	20.87
Verus		14.16	5.90	0.65	969.47	1108.16	1032.95	0.47	9.65	10.55
Copa		1.11	1.18	1.33	97.76	96.10	95.08	0.28	0.26	0.81
Indigo-2-256		2.59	1.68	3.14	126.33	133.90	124.94	0.08	0.28	0.00
Indigo-1-32		1.75	4.14	4.35	126.14	125.95	132.50	0.01	0.30	0.07
Indigo-1-128		0.53	0.99	0.95	106.73	108.06	106.11	0.00	0.03	0.00

Run 1: Statistics of TCP BBR

```
Start at: 2018-01-26 01:34:55
End at: 2018-01-26 01:35:25
Local clock offset: 0.374 ms
Remote clock offset: -10.516 ms

# Below is generated by plot.py at 2018-01-26 02:16:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.71 Mbit/s
95th percentile per-packet one-way delay: 526.624 ms
Loss rate: 1.15%
-- Flow 1:
Average throughput: 13.33 Mbit/s
95th percentile per-packet one-way delay: 564.622 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 6.36 Mbit/s
95th percentile per-packet one-way delay: 460.915 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 3.77 Mbit/s
95th percentile per-packet one-way delay: 462.550 ms
Loss rate: 3.25%
```

Run 1: Report of TCP BBR — Data Link

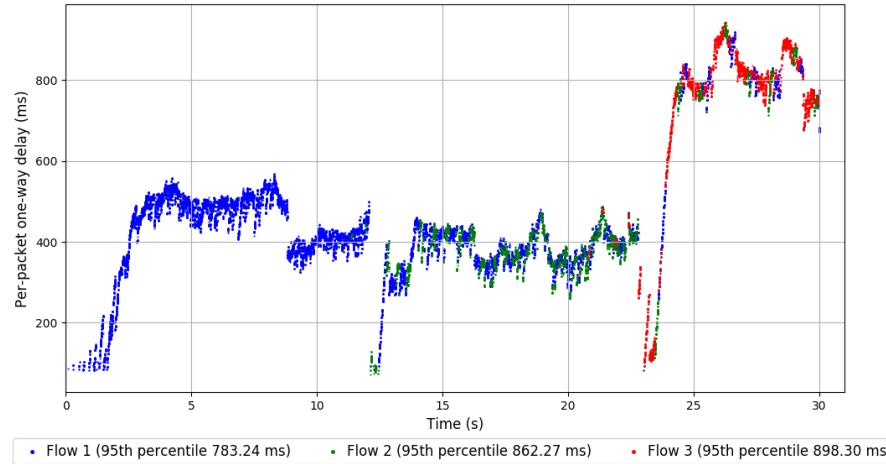
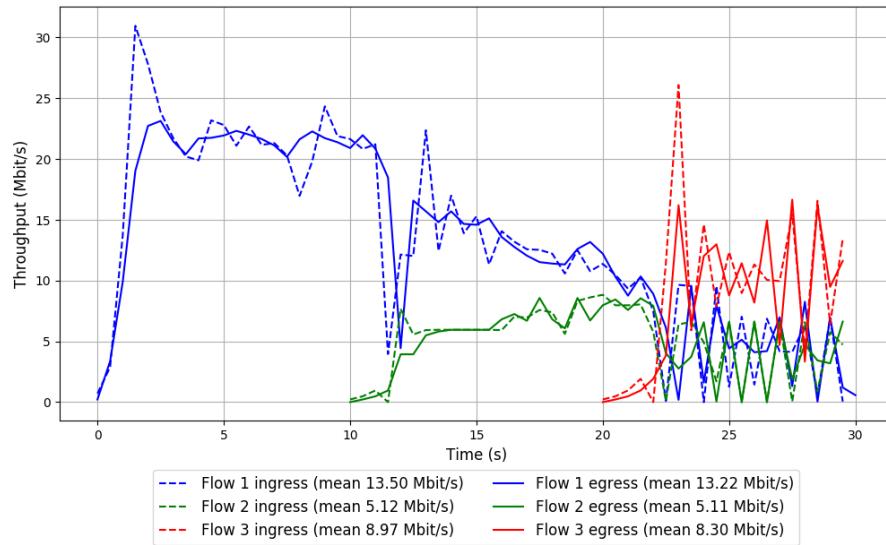


Run 2: Statistics of TCP BBR

```
Start at: 2018-01-26 01:53:58
End at: 2018-01-26 01:54:28
Local clock offset: 0.573 ms
Remote clock offset: -9.705 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.24 Mbit/s
95th percentile per-packet one-way delay: 843.318 ms
Loss rate: 2.38%
-- Flow 1:
Average throughput: 13.22 Mbit/s
95th percentile per-packet one-way delay: 783.237 ms
Loss rate: 0.65%
-- Flow 2:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 862.271 ms
Loss rate: 2.32%
-- Flow 3:
Average throughput: 8.30 Mbit/s
95th percentile per-packet one-way delay: 898.298 ms
Loss rate: 10.14%
```

Run 2: Report of TCP BBR — Data Link

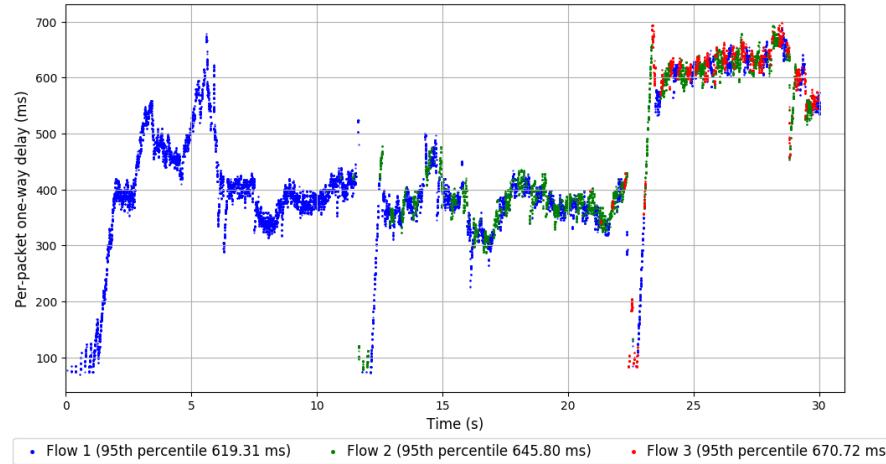
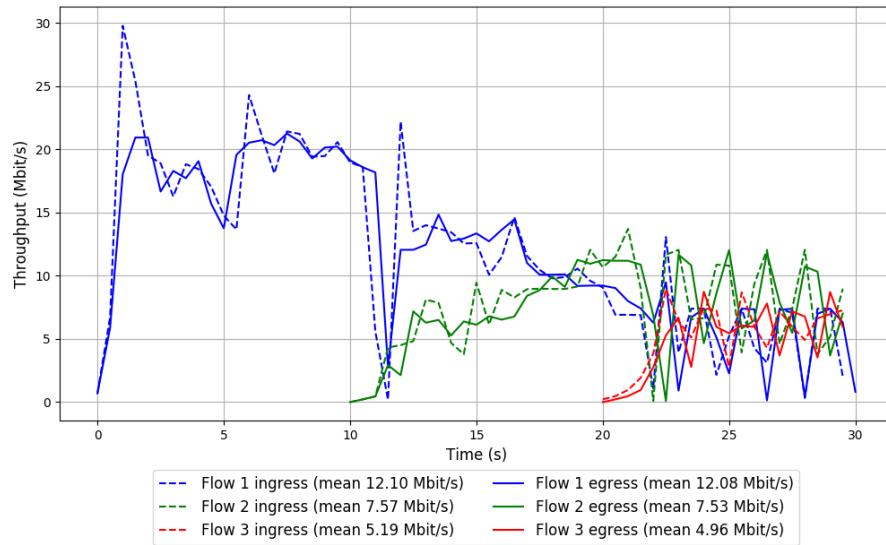


Run 3: Statistics of TCP BBR

```
Start at: 2018-01-26 02:13:03
End at: 2018-01-26 02:13:33
Local clock offset: 0.978 ms
Remote clock offset: -8.937 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.52 Mbit/s
95th percentile per-packet one-way delay: 639.554 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 12.08 Mbit/s
95th percentile per-packet one-way delay: 619.309 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 7.53 Mbit/s
95th percentile per-packet one-way delay: 645.799 ms
Loss rate: 3.00%
-- Flow 3:
Average throughput: 4.96 Mbit/s
95th percentile per-packet one-way delay: 670.723 ms
Loss rate: 8.04%
```

Run 3: Report of TCP BBR — Data Link

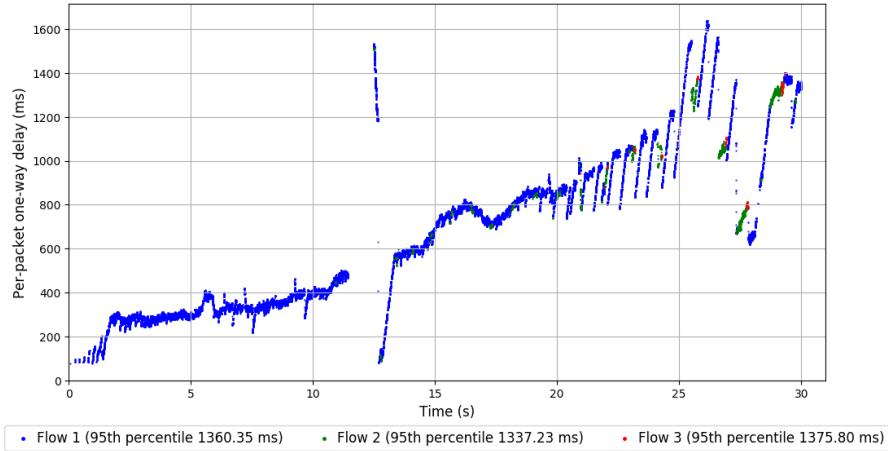
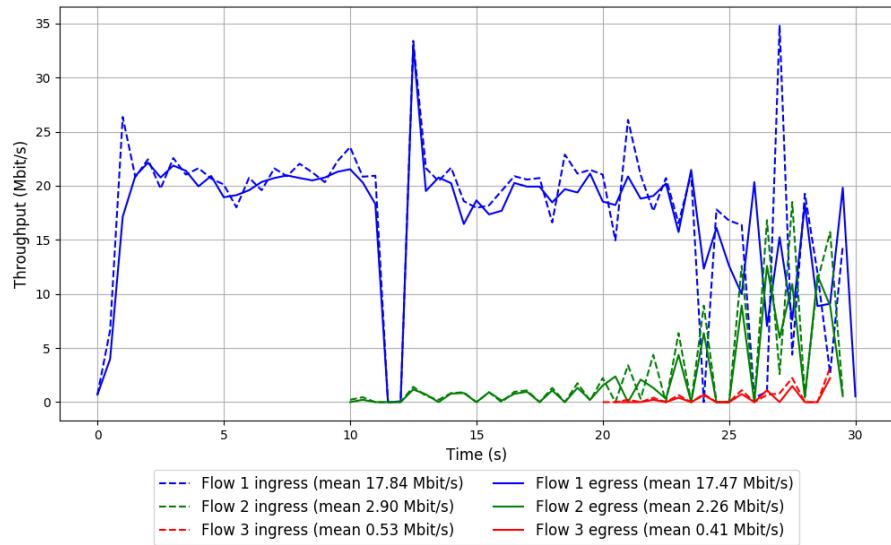


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2018-01-26 01:23:01
End at: 2018-01-26 01:23:31
Local clock offset: 0.026 ms
Remote clock offset: -10.585 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.05 Mbit/s
95th percentile per-packet one-way delay: 1357.778 ms
Loss rate: 4.53%
-- Flow 1:
Average throughput: 17.47 Mbit/s
95th percentile per-packet one-way delay: 1360.345 ms
Loss rate: 2.18%
-- Flow 2:
Average throughput: 2.26 Mbit/s
95th percentile per-packet one-way delay: 1337.230 ms
Loss rate: 24.04%
-- Flow 3:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 1375.801 ms
Loss rate: 31.95%
```

Run 1: Report of TCP Cubic — Data Link

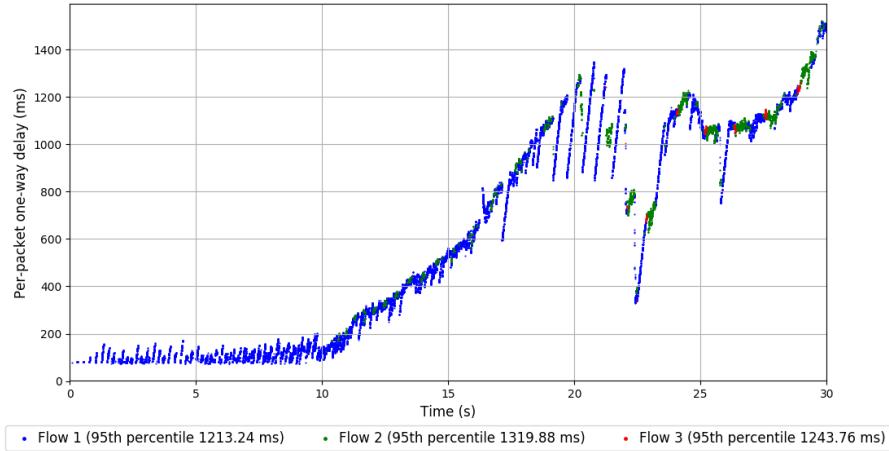
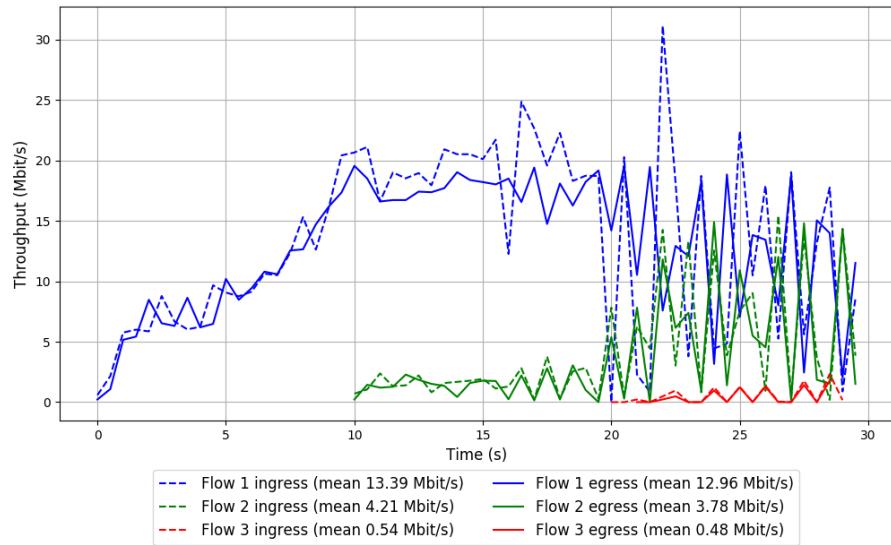


Run 2: Statistics of TCP Cubic

```
Start at: 2018-01-26 01:42:04
End at: 2018-01-26 01:42:34
Local clock offset: 0.286 ms
Remote clock offset: -10.31 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.59 Mbit/s
95th percentile per-packet one-way delay: 1245.899 ms
Loss rate: 4.87%
-- Flow 1:
Average throughput: 12.96 Mbit/s
95th percentile per-packet one-way delay: 1213.237 ms
Loss rate: 3.35%
-- Flow 2:
Average throughput: 3.78 Mbit/s
95th percentile per-packet one-way delay: 1319.880 ms
Loss rate: 10.95%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 1243.762 ms
Loss rate: 25.34%
```

Run 2: Report of TCP Cubic — Data Link

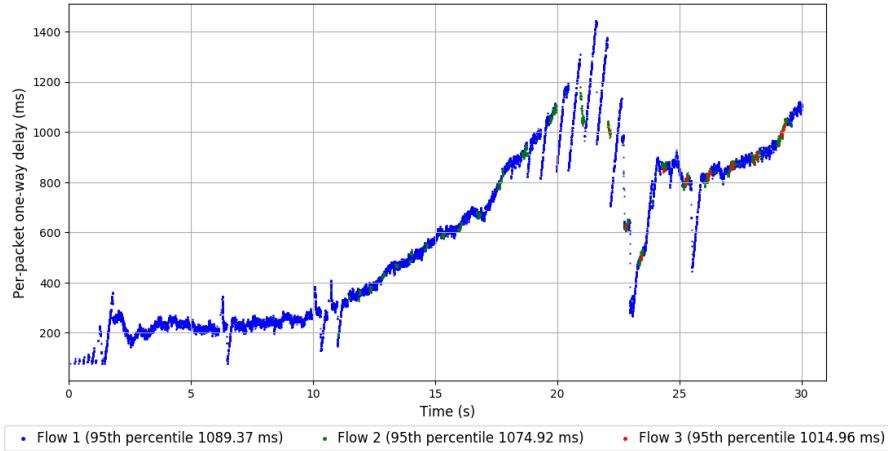
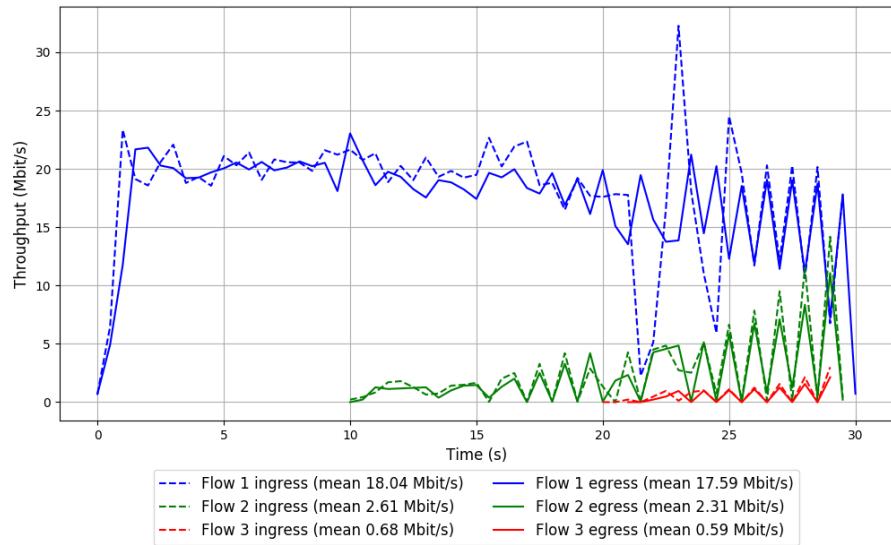


Run 3: Statistics of TCP Cubic

```
Start at: 2018-01-26 02:01:07
End at: 2018-01-26 02:01:37
Local clock offset: 0.148 ms
Remote clock offset: -9.423 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.24 Mbit/s
95th percentile per-packet one-way delay: 1086.680 ms
Loss rate: 3.83%
-- Flow 1:
Average throughput: 17.59 Mbit/s
95th percentile per-packet one-way delay: 1089.367 ms
Loss rate: 2.62%
-- Flow 2:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 1074.920 ms
Loss rate: 14.00%
-- Flow 3:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1014.963 ms
Loss rate: 23.57%
```

Run 3: Report of TCP Cubic — Data Link

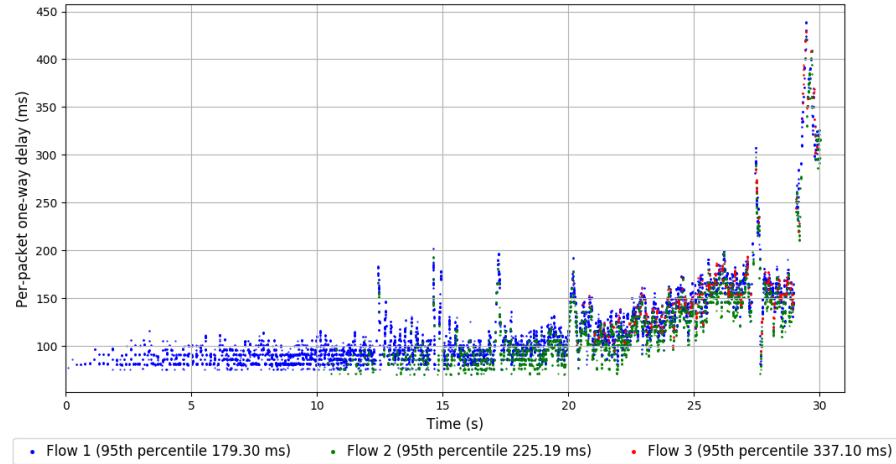
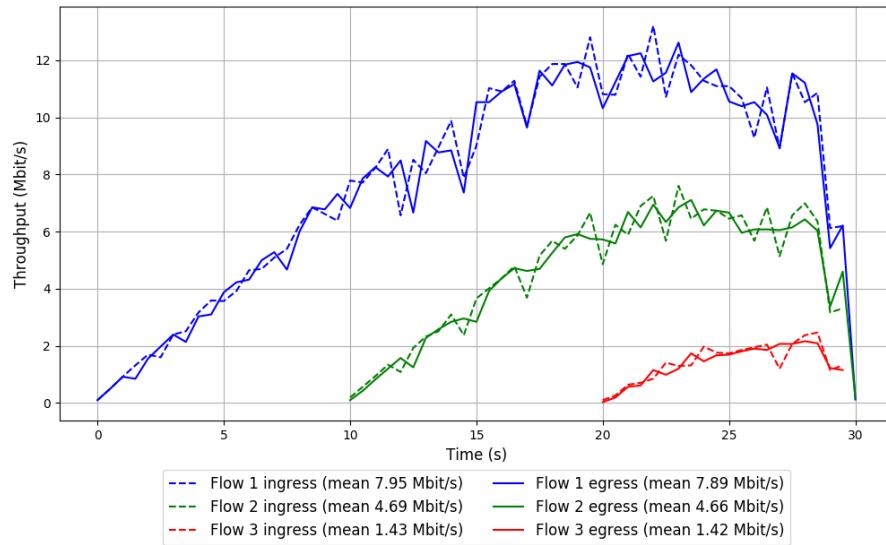


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2018-01-26 01:26:35
End at: 2018-01-26 01:27:06
Local clock offset: -0.171 ms
Remote clock offset: -10.45 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.45 Mbit/s
95th percentile per-packet one-way delay: 189.633 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 7.89 Mbit/s
95th percentile per-packet one-way delay: 179.304 ms
Loss rate: 0.89%
-- Flow 2:
Average throughput: 4.66 Mbit/s
95th percentile per-packet one-way delay: 225.190 ms
Loss rate: 0.69%
-- Flow 3:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 337.103 ms
Loss rate: 2.97%
```

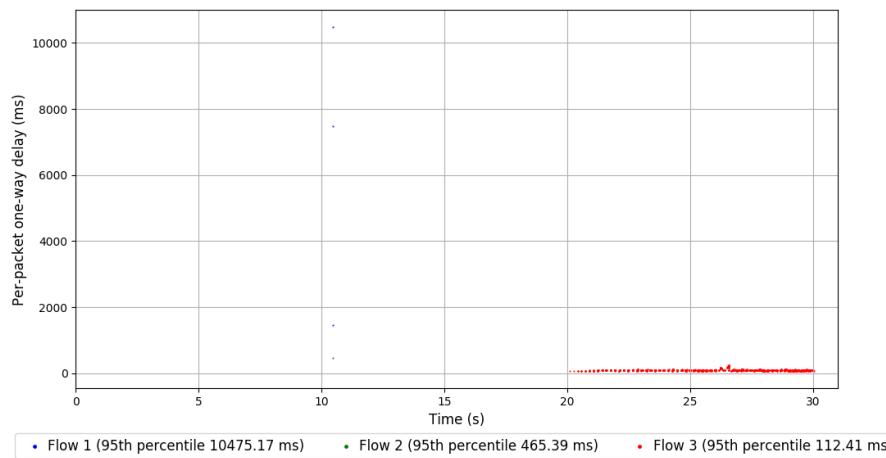
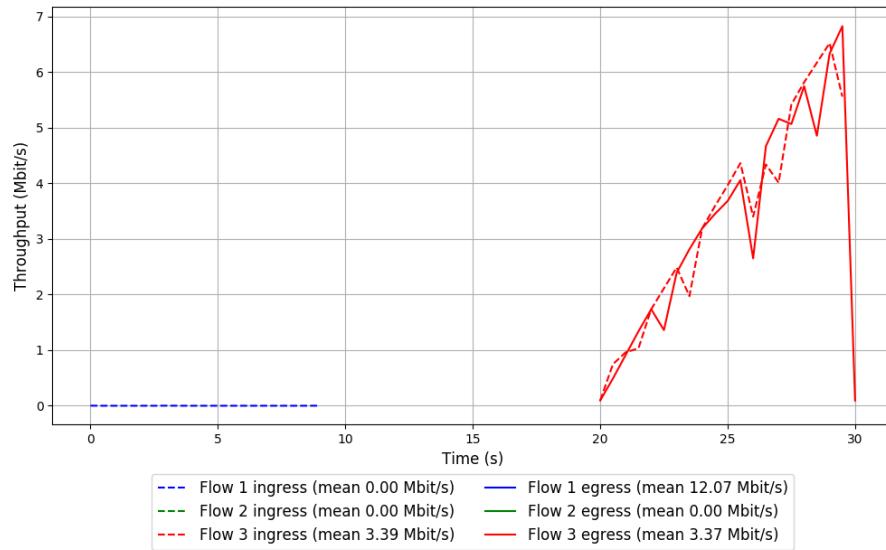
Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-01-26 01:45:39
End at: 2018-01-26 01:46:09
Local clock offset: 0.462 ms
Remote clock offset: -10.183 ms

Run 2: Report of LEDBAT — Data Link

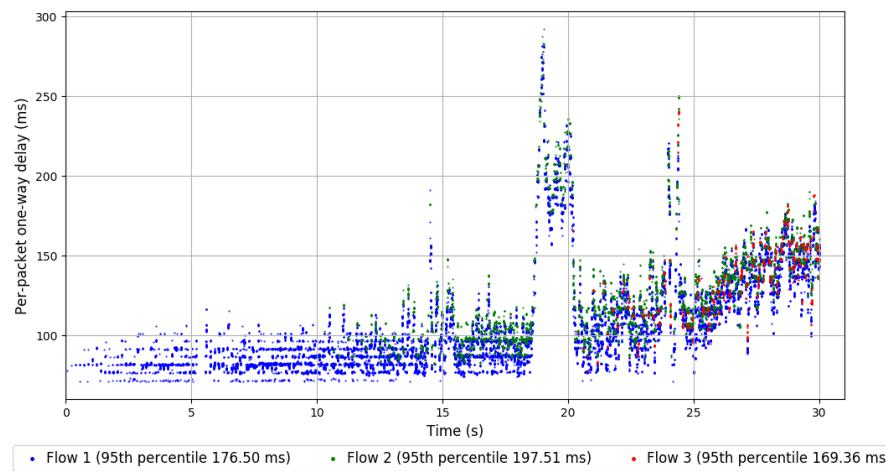
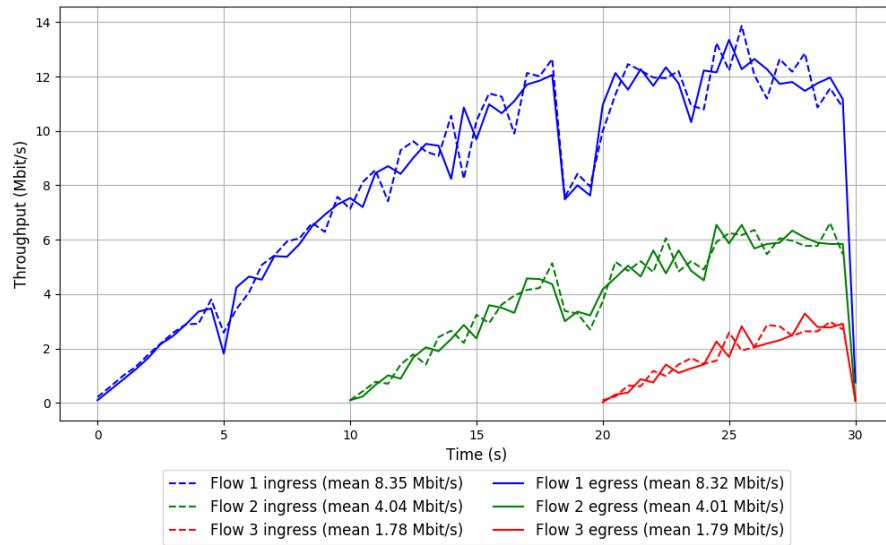


Run 3: Statistics of LEDBAT

```
Start at: 2018-01-26 02:04:42
End at: 2018-01-26 02:05:12
Local clock offset: 0.124 ms
Remote clock offset: -9.282 ms

# Below is generated by plot.py at 2018-01-26 02:16:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.57 Mbit/s
95th percentile per-packet one-way delay: 181.585 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 8.32 Mbit/s
95th percentile per-packet one-way delay: 176.500 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 197.513 ms
Loss rate: 0.80%
-- Flow 3:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 169.356 ms
Loss rate: 0.80%
```

Run 3: Report of LEDBAT — Data Link

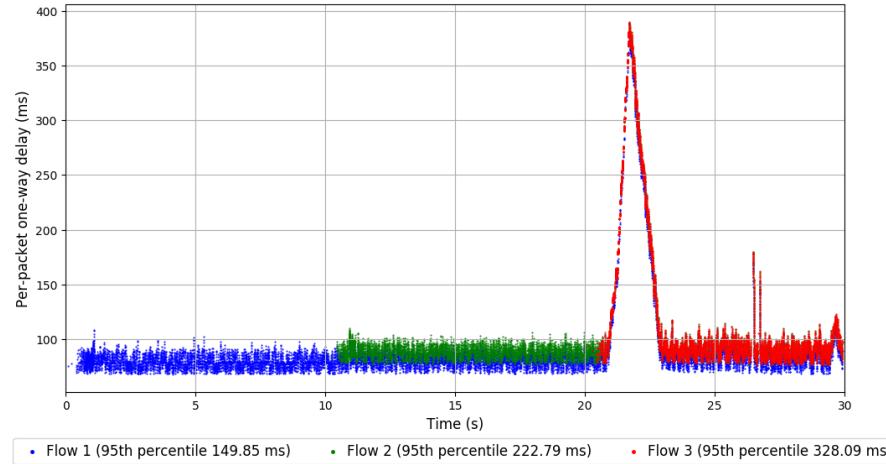
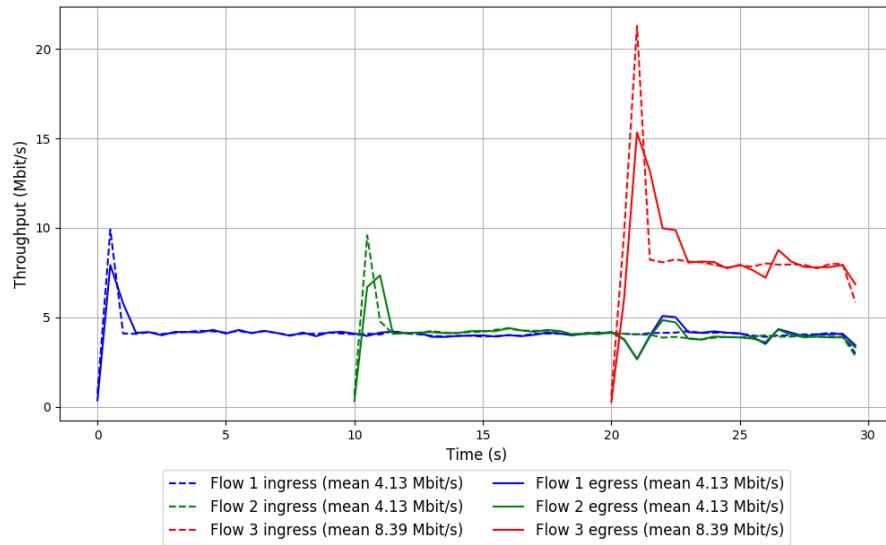


Run 1: Statistics of PCC

```
Start at: 2018-01-26 01:25:24
End at: 2018-01-26 01:25:54
Local clock offset: -0.156 ms
Remote clock offset: -10.493 ms

# Below is generated by plot.py at 2018-01-26 02:16:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.63 Mbit/s
95th percentile per-packet one-way delay: 260.905 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 4.13 Mbit/s
95th percentile per-packet one-way delay: 149.852 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 4.13 Mbit/s
95th percentile per-packet one-way delay: 222.788 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 8.39 Mbit/s
95th percentile per-packet one-way delay: 328.092 ms
Loss rate: 0.39%
```

Run 1: Report of PCC — Data Link

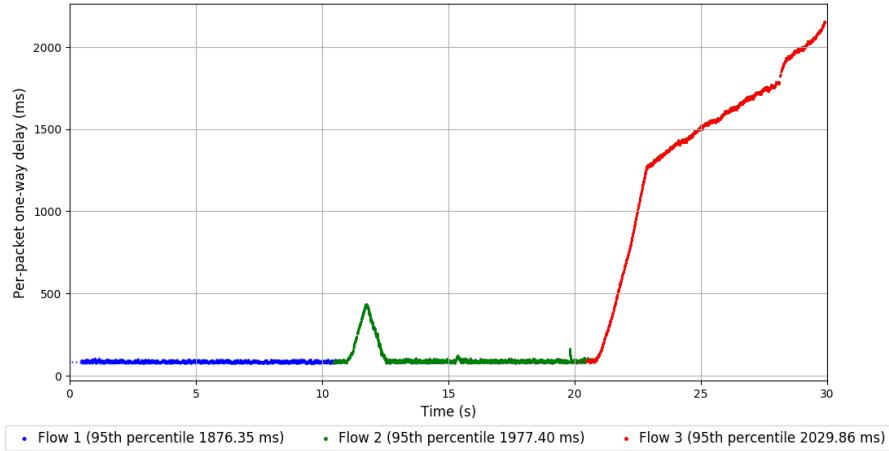
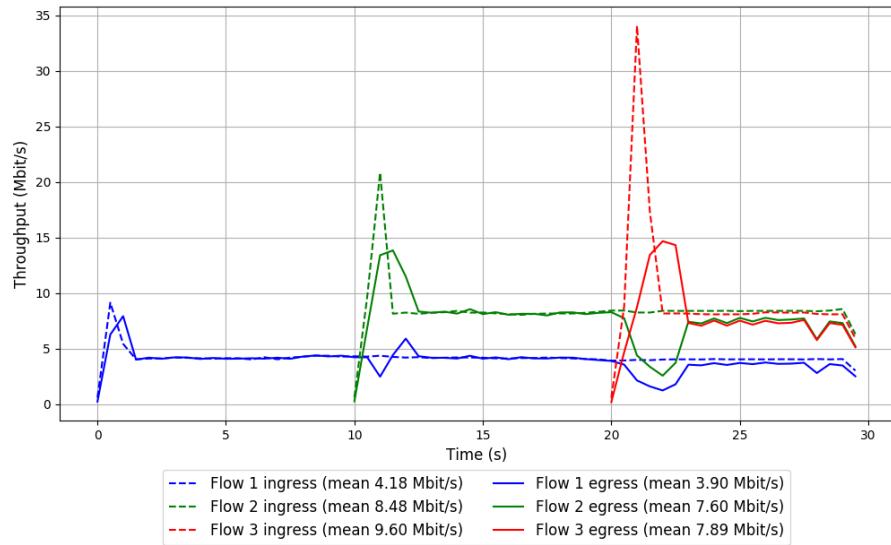


Run 2: Statistics of PCC

```
Start at: 2018-01-26 01:44:27
End at: 2018-01-26 01:44:57
Local clock offset: 0.784 ms
Remote clock offset: -10.175 ms

# Below is generated by plot.py at 2018-01-26 02:16:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.55 Mbit/s
95th percentile per-packet one-way delay: 1982.260 ms
Loss rate: 11.25%
-- Flow 1:
Average throughput: 3.90 Mbit/s
95th percentile per-packet one-way delay: 1876.349 ms
Loss rate: 6.88%
-- Flow 2:
Average throughput: 7.60 Mbit/s
95th percentile per-packet one-way delay: 1977.402 ms
Loss rate: 10.63%
-- Flow 3:
Average throughput: 7.89 Mbit/s
95th percentile per-packet one-way delay: 2029.861 ms
Loss rate: 18.12%
```

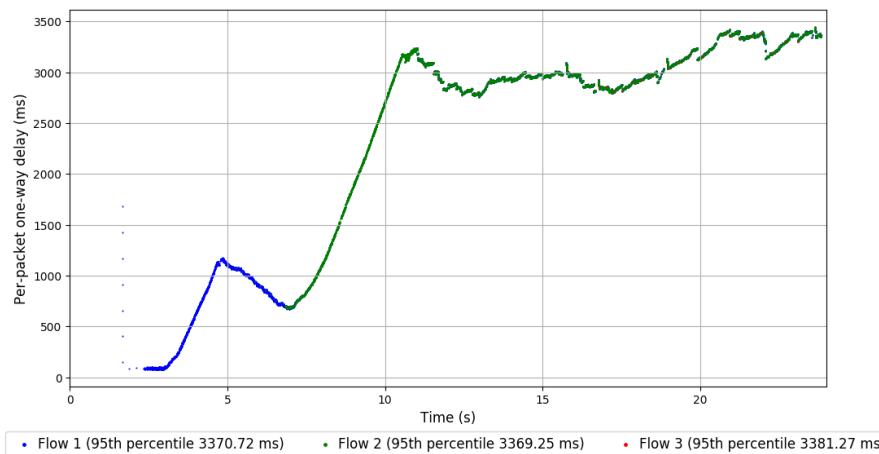
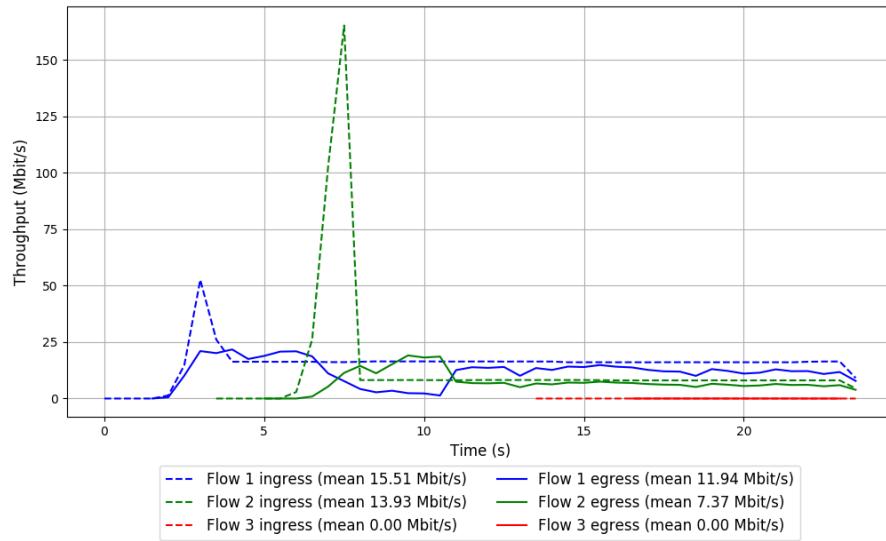
Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2018-01-26 02:03:31
End at: 2018-01-26 02:04:01
Local clock offset: 0.99 ms
Remote clock offset: -9.31 ms

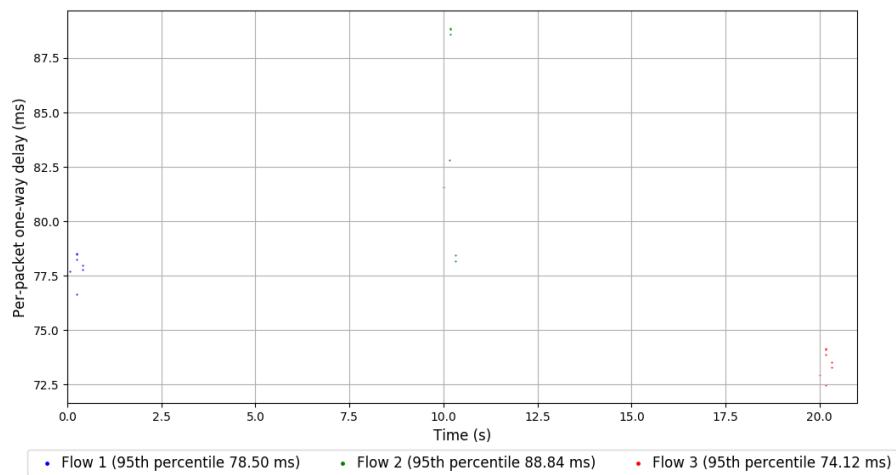
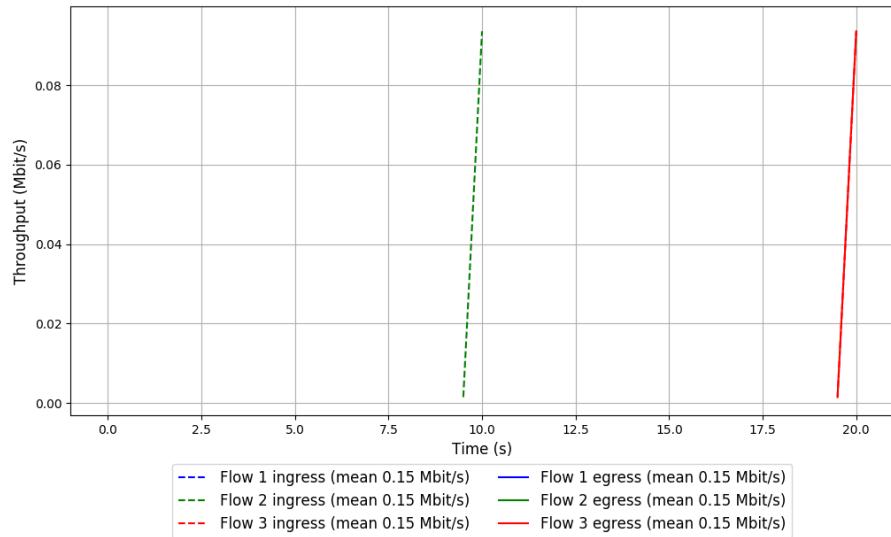
Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-01-26 01:21:50
End at: 2018-01-26 01:22:20
Local clock offset: 0.22 ms
Remote clock offset: -10.457 ms

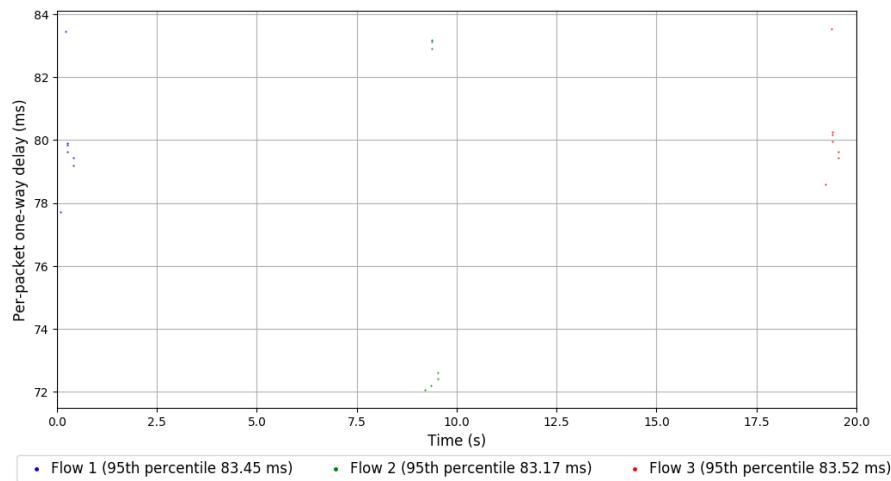
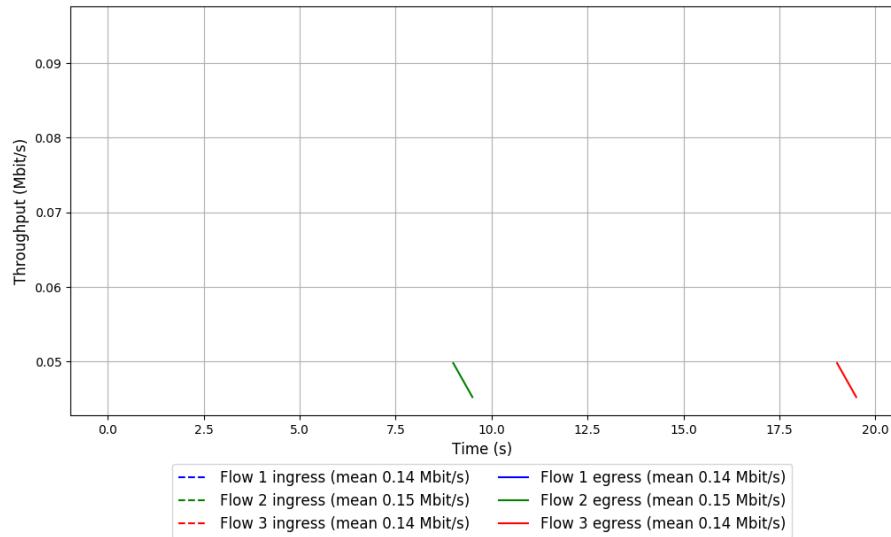
Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-01-26 01:40:54
End at: 2018-01-26 01:41:24
Local clock offset: 0.181 ms
Remote clock offset: -10.364 ms

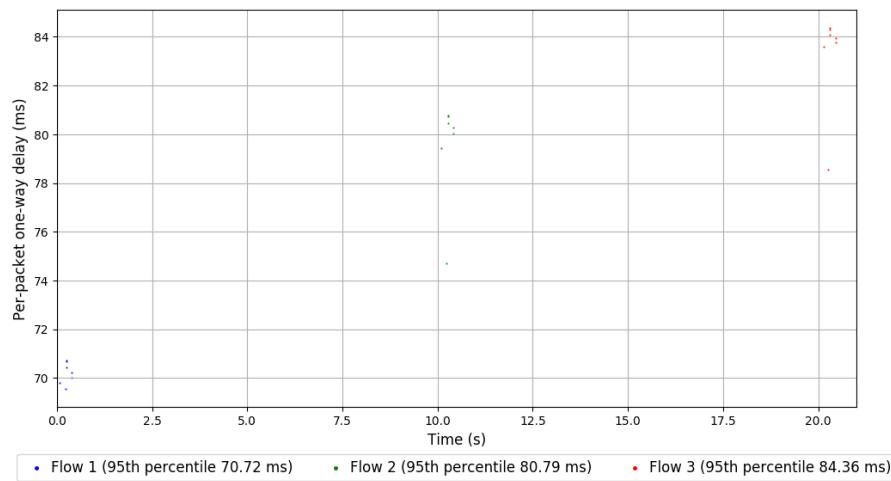
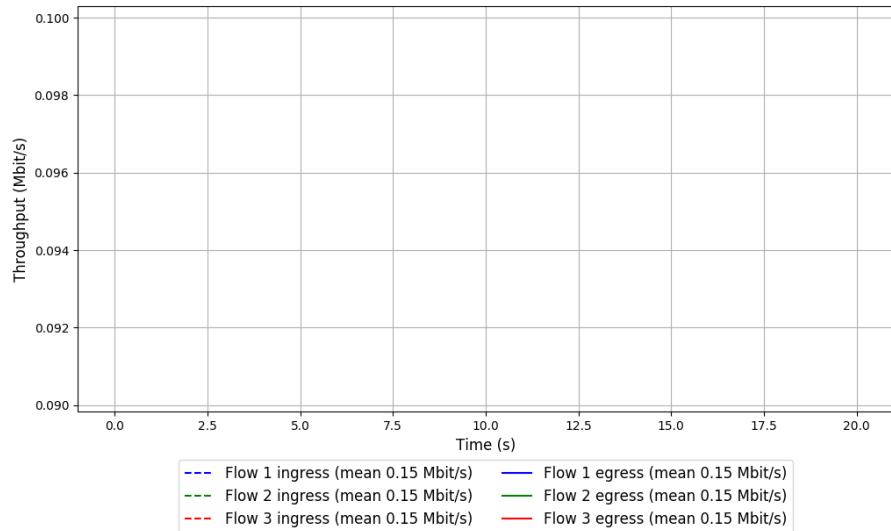
Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-01-26 01:59:57
End at: 2018-01-26 02:00:27
Local clock offset: 0.288 ms
Remote clock offset: -9.477 ms

Run 3: Report of QUIC Cubic — Data Link

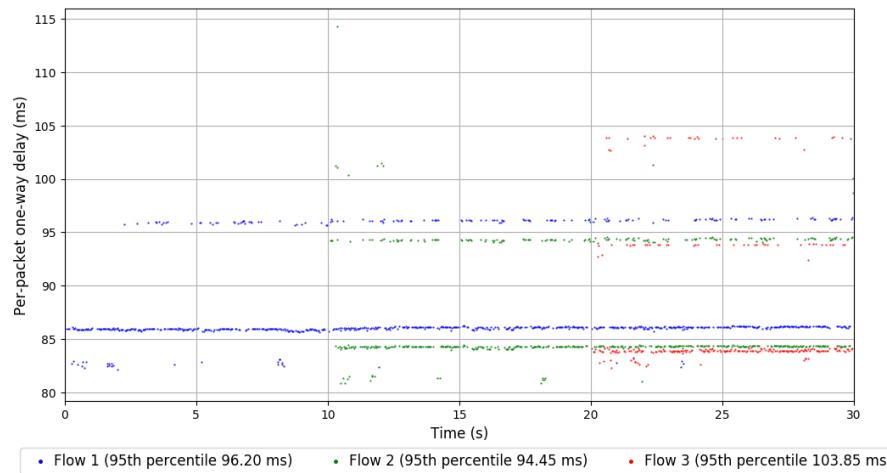
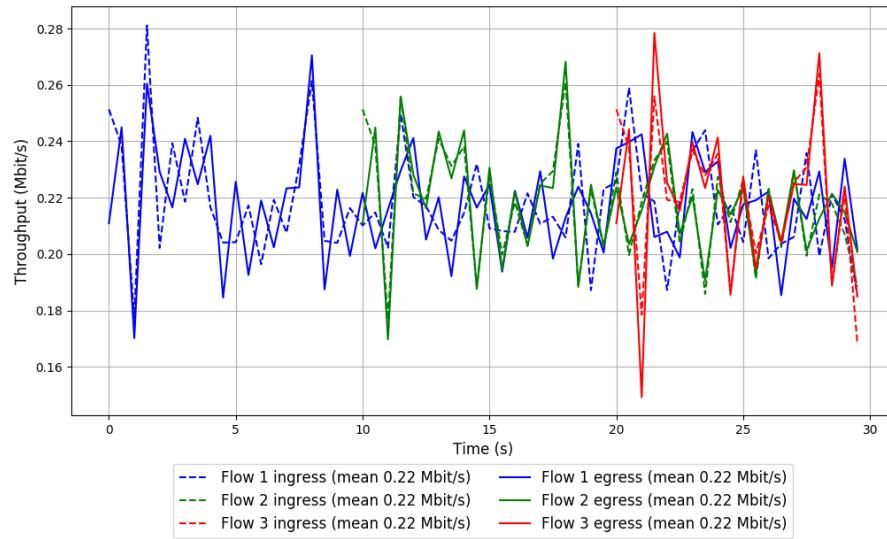


```
Run 1: Statistics of SCReAM

Start at: 2018-01-26 01:19:28
End at: 2018-01-26 01:19:58
Local clock offset: 0.233 ms
Remote clock offset: -10.419 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 96.197 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 96.197 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 94.451 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 103.846 ms
Loss rate: 0.35%
```

Run 1: Report of SCReAM — Data Link

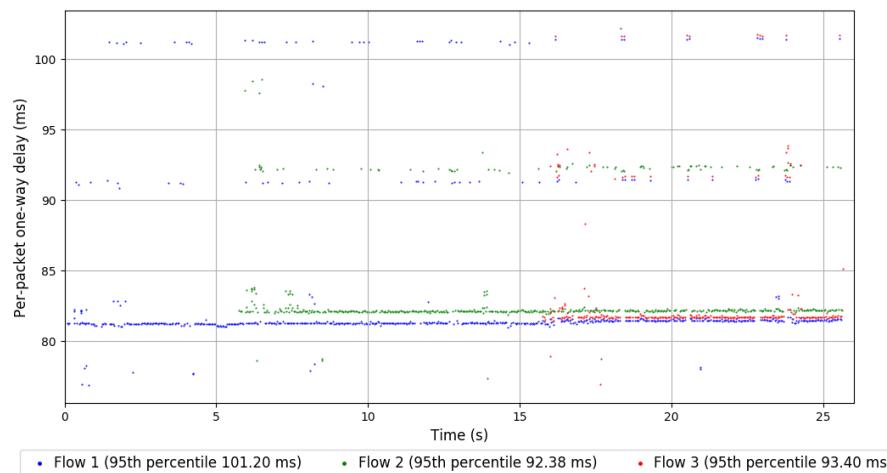
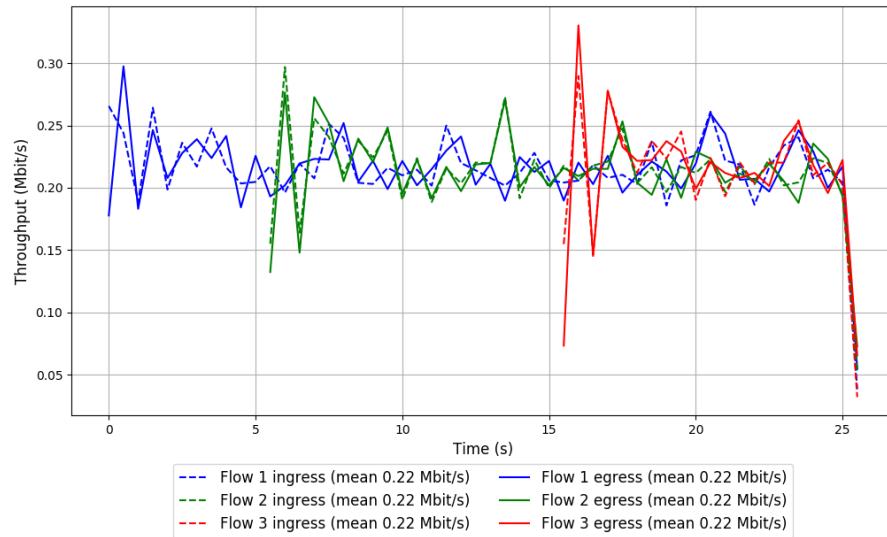


Run 2: Statistics of SCReAM

```
Start at: 2018-01-26 01:38:31
End at: 2018-01-26 01:39:01
Local clock offset: 0.7 ms
Remote clock offset: -10.486 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 92.479 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 101.205 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 92.376 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 93.402 ms
Loss rate: 0.00%
```

Run 2: Report of SCReAM — Data Link

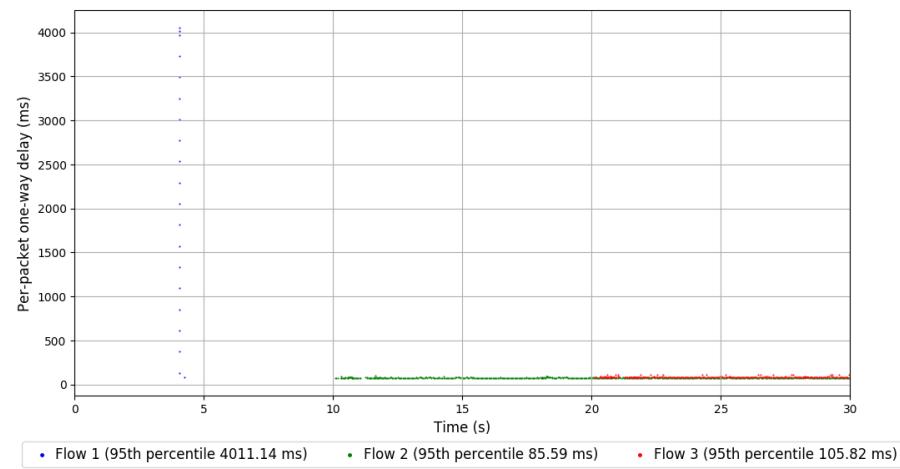
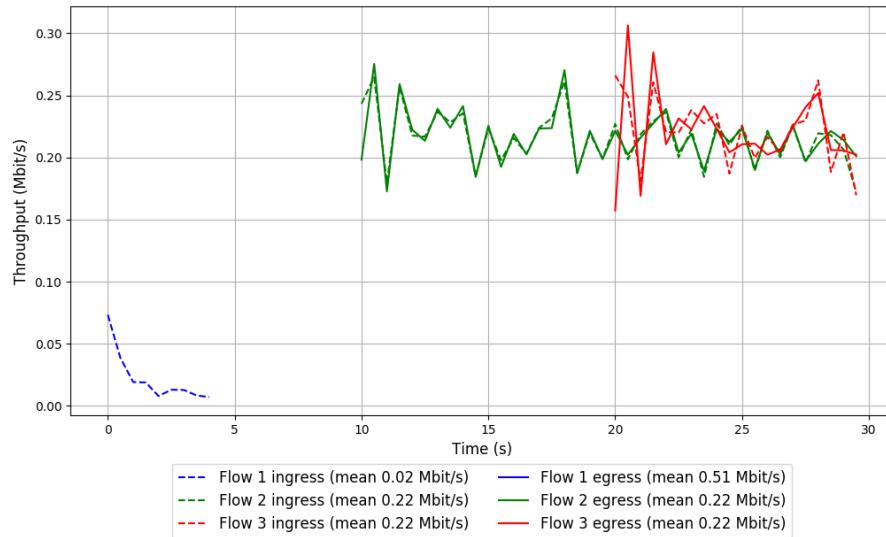


Run 3: Statistics of SCReAM

```
Start at: 2018-01-26 01:57:34
End at: 2018-01-26 01:58:04
Local clock offset: 0.593 ms
Remote clock offset: -9.521 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 95.727 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 4011.139 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 85.587 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 105.818 ms
Loss rate: 0.35%
```

Run 3: Report of SCReAM — Data Link

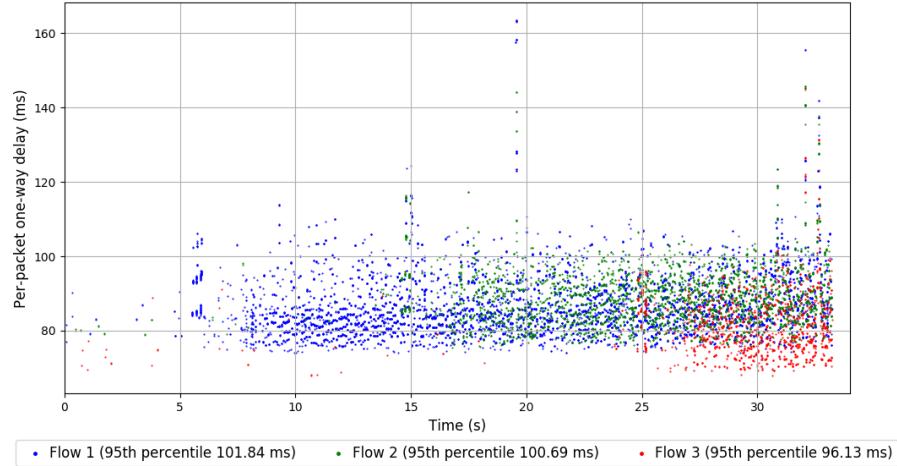
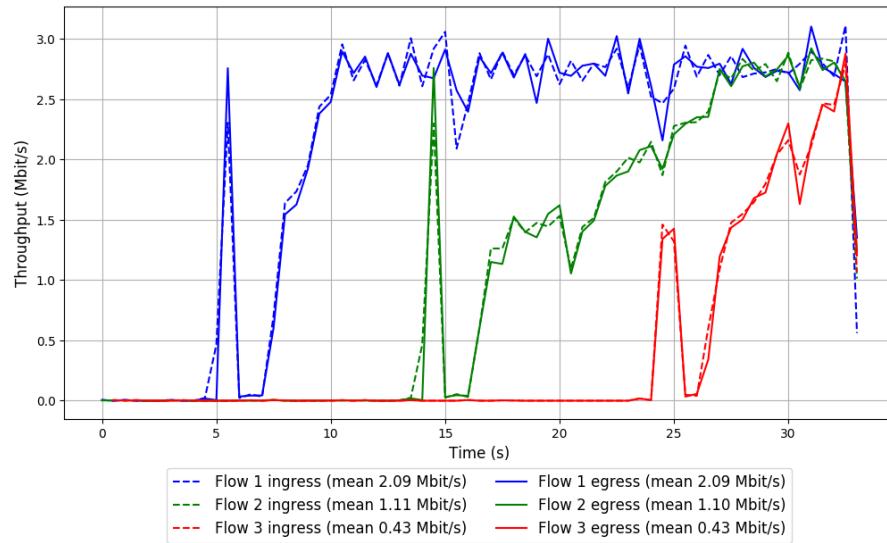


```
Run 1: Statistics of WebRTC media

Start at: 2018-01-26 01:28:58
End at: 2018-01-26 01:29:28
Local clock offset: 0.655 ms
Remote clock offset: -10.483 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.60 Mbit/s
95th percentile per-packet one-way delay: 100.863 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 101.837 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 100.695 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 96.129 ms
Loss rate: 0.72%
```

Run 1: Report of WebRTC media — Data Link

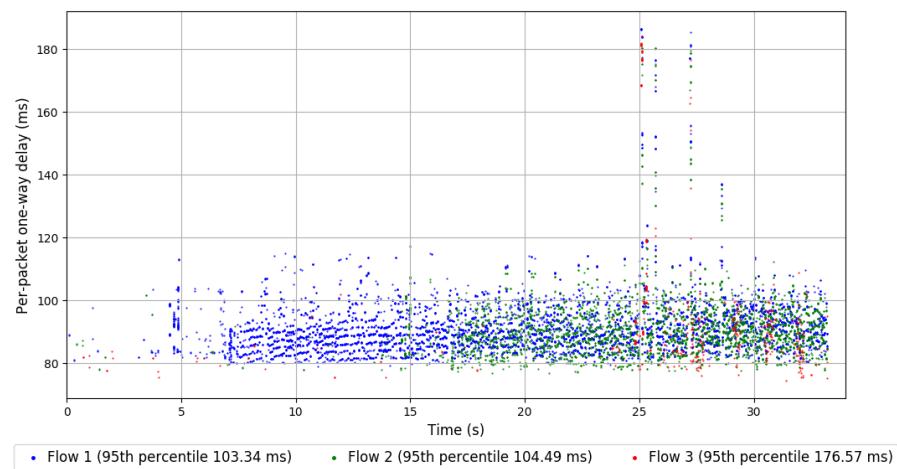
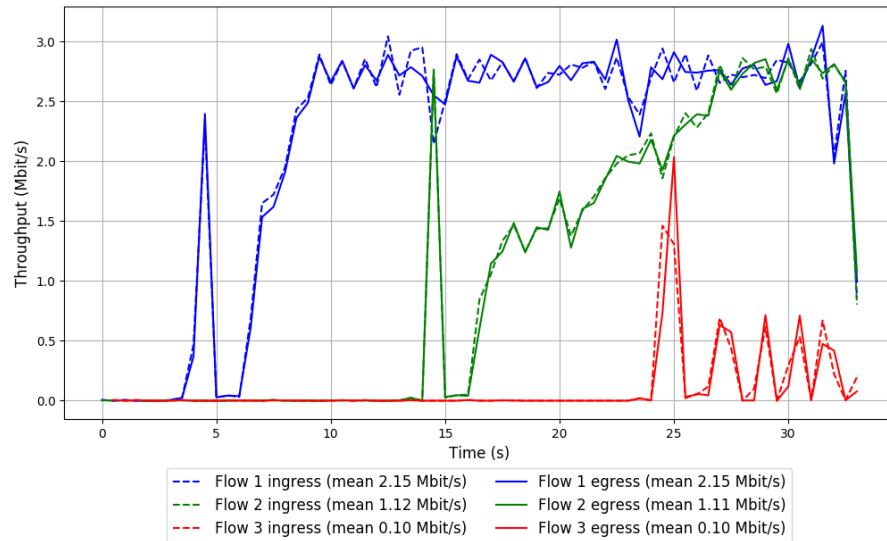


Run 2: Statistics of WebRTC media

```
Start at: 2018-01-26 01:48:01
End at: 2018-01-26 01:48:31
Local clock offset: -2.116 ms
Remote clock offset: -10.017 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.35 Mbit/s
95th percentile per-packet one-way delay: 103.877 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 103.337 ms
Loss rate: 0.31%
-- Flow 2:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 104.492 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 176.566 ms
Loss rate: 1.73%
```

Run 2: Report of WebRTC media — Data Link

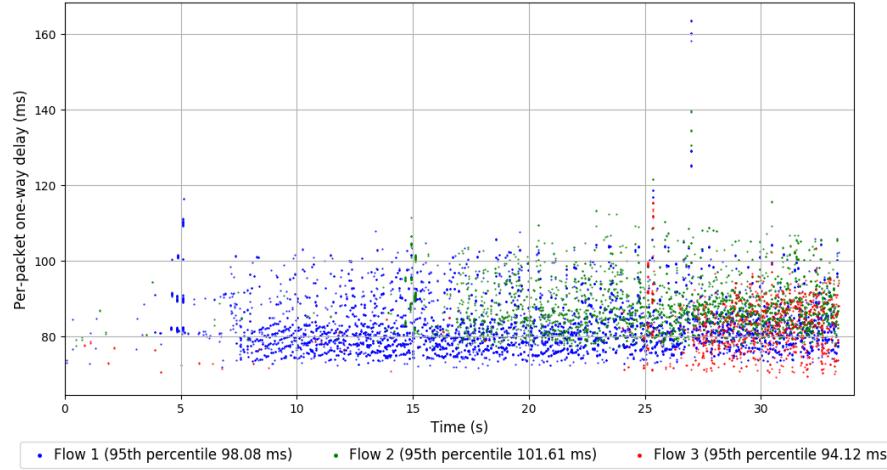
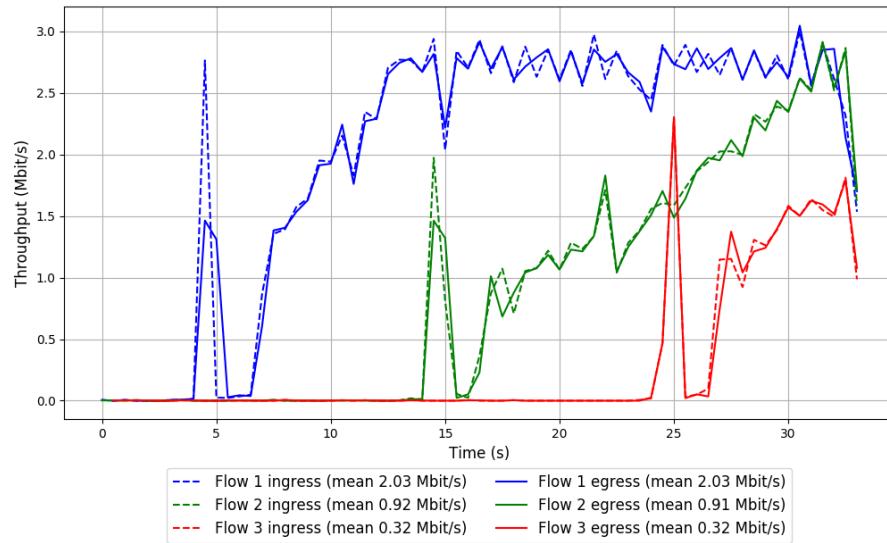


```
Run 3: Statistics of WebRTC media

Start at: 2018-01-26 02:07:06
End at: 2018-01-26 02:07:36
Local clock offset: 0.78 ms
Remote clock offset: -9.219 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 99.039 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 98.078 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 101.605 ms
Loss rate: 0.51%
-- Flow 3:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 94.122 ms
Loss rate: 0.62%
```

Run 3: Report of WebRTC media — Data Link

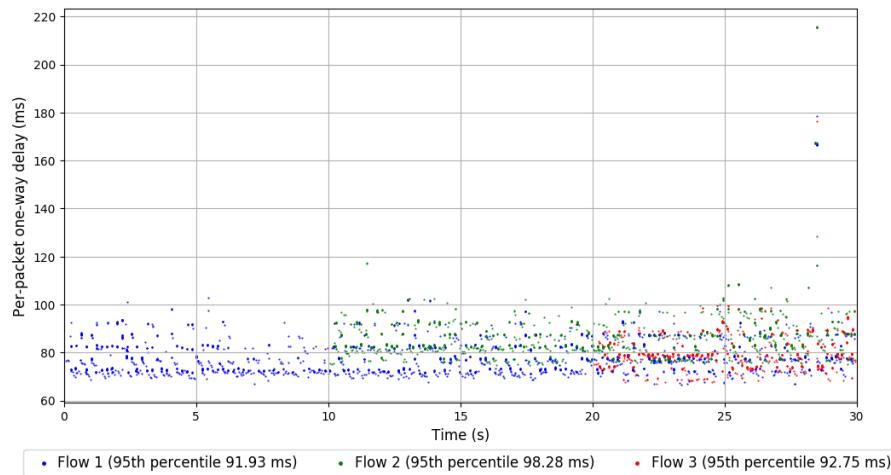
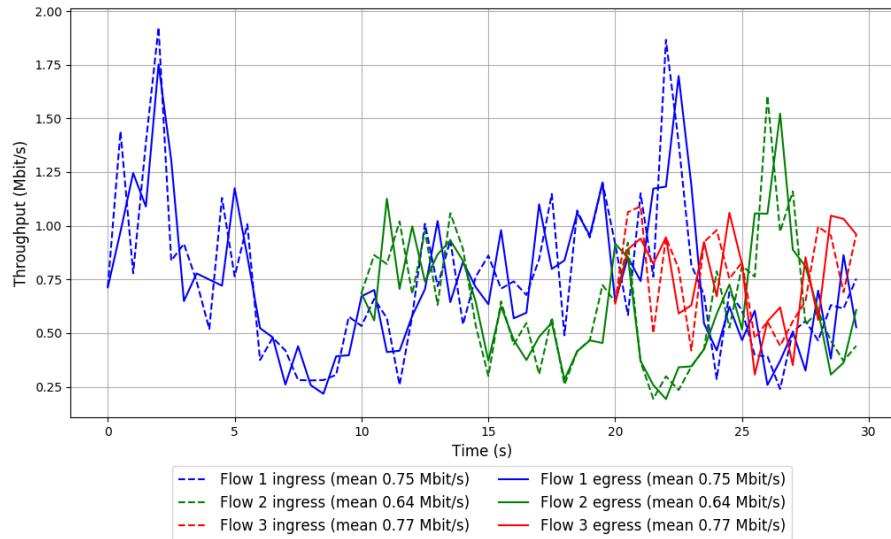


Run 1: Statistics of Sprout

```
Start at: 2018-01-26 01:24:13
End at: 2018-01-26 01:24:43
Local clock offset: 0.416 ms
Remote clock offset: -10.486 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 95.201 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 91.934 ms
Loss rate: 0.51%
-- Flow 2:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 98.281 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 92.753 ms
Loss rate: 0.01%
```

Run 1: Report of Sprout — Data Link

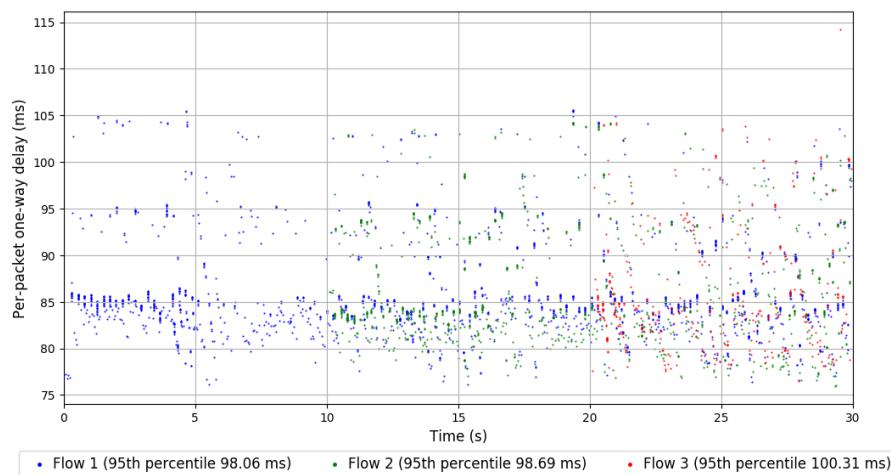
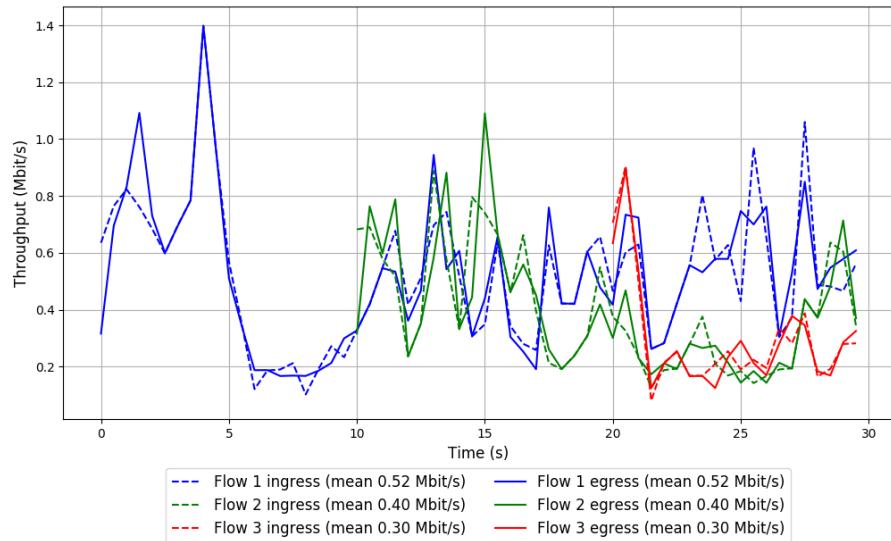


Run 2: Statistics of Sprout

```
Start at: 2018-01-26 01:43:16
End at: 2018-01-26 01:43:46
Local clock offset: 0.299 ms
Remote clock offset: -10.252 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 98.737 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 98.058 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 98.689 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 100.306 ms
Loss rate: 0.03%
```

Run 2: Report of Sprout — Data Link

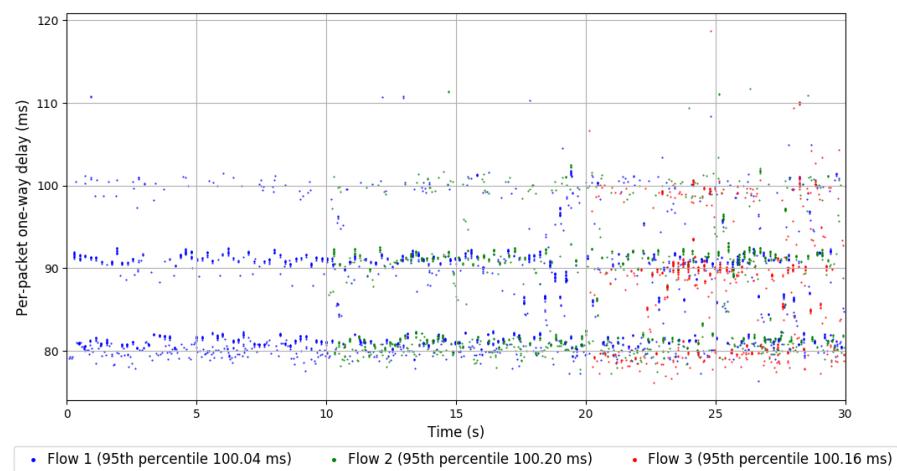
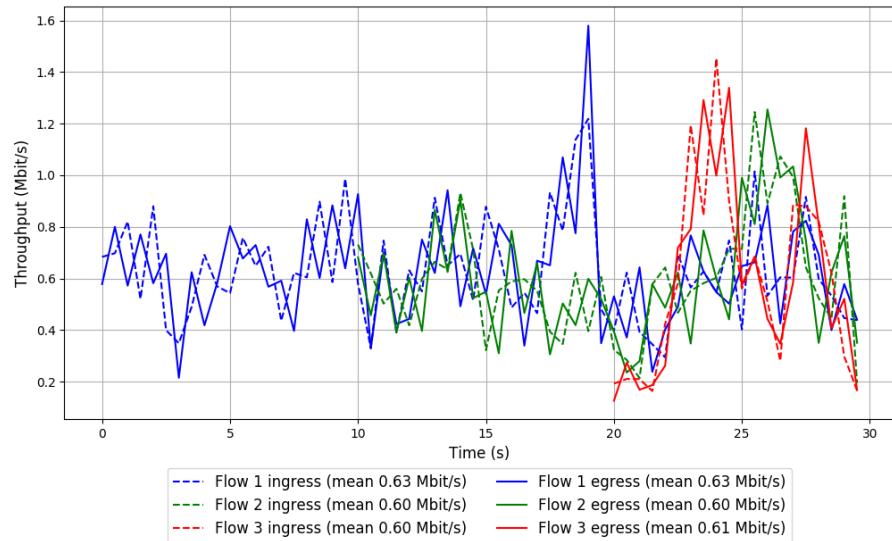


Run 3: Statistics of Sprout

```
Start at: 2018-01-26 02:02:20
End at: 2018-01-26 02:02:50
Local clock offset: 0.236 ms
Remote clock offset: -9.376 ms

# Below is generated by plot.py at 2018-01-26 02:16:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 100.118 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 100.039 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 100.200 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 100.160 ms
Loss rate: 0.01%
```

Run 3: Report of Sprout — Data Link

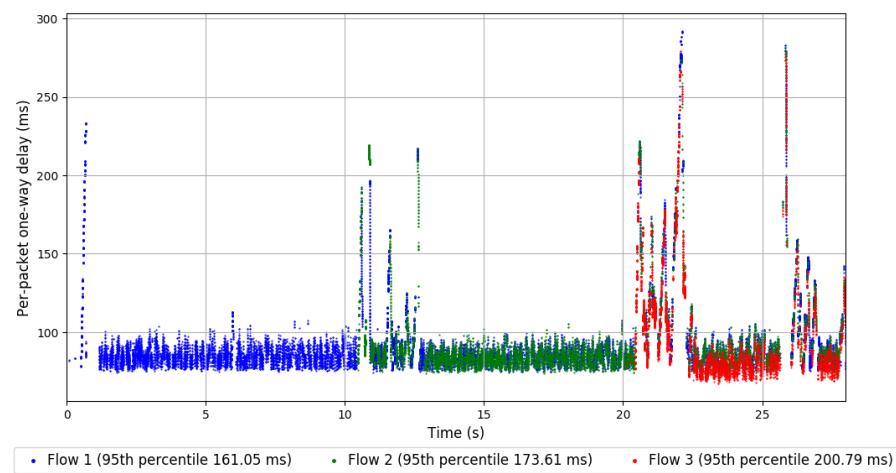
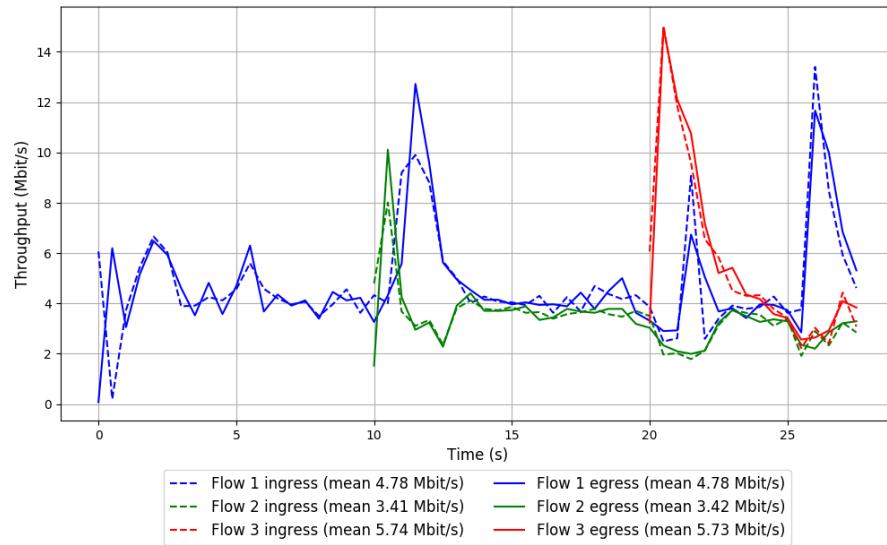


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-01-26 01:20:39
End at: 2018-01-26 01:21:09
Local clock offset: 0.546 ms
Remote clock offset: -10.45 ms

# Below is generated by plot.py at 2018-01-26 02:16:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.59 Mbit/s
95th percentile per-packet one-way delay: 174.827 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 4.78 Mbit/s
95th percentile per-packet one-way delay: 161.050 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 3.42 Mbit/s
95th percentile per-packet one-way delay: 173.606 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 5.73 Mbit/s
95th percentile per-packet one-way delay: 200.789 ms
Loss rate: 0.00%
```

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

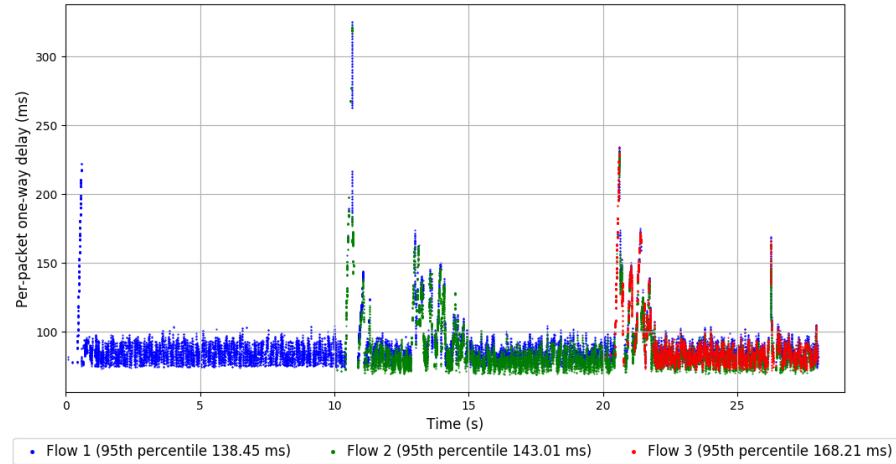
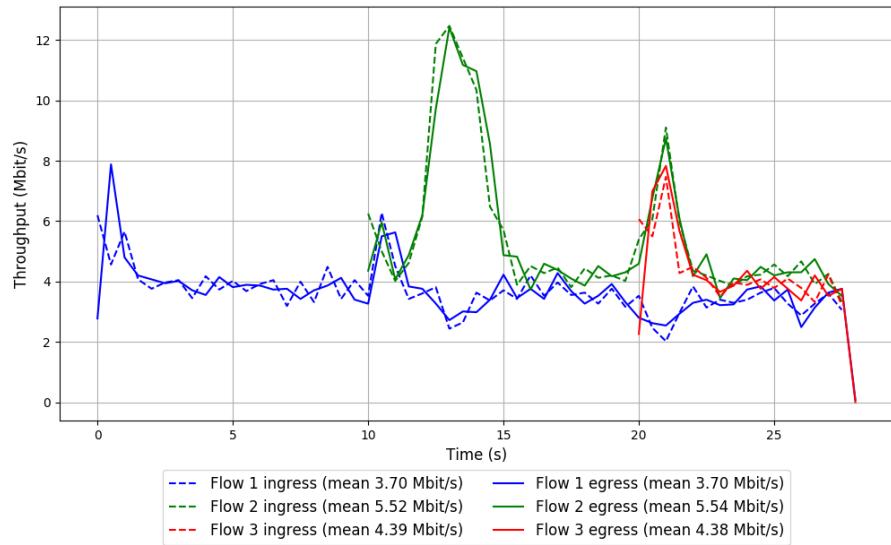


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-01-26 01:39:42
End at: 2018-01-26 01:40:12
Local clock offset: 0.684 ms
Remote clock offset: -10.379 ms

# Below is generated by plot.py at 2018-01-26 02:16:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.48 Mbit/s
95th percentile per-packet one-way delay: 146.162 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 138.446 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 5.54 Mbit/s
95th percentile per-packet one-way delay: 143.009 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 4.38 Mbit/s
95th percentile per-packet one-way delay: 168.214 ms
Loss rate: 0.48%
```

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

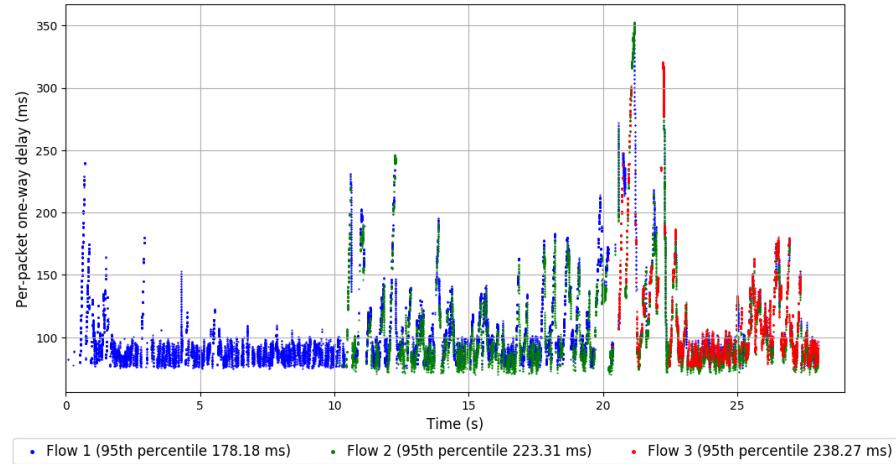
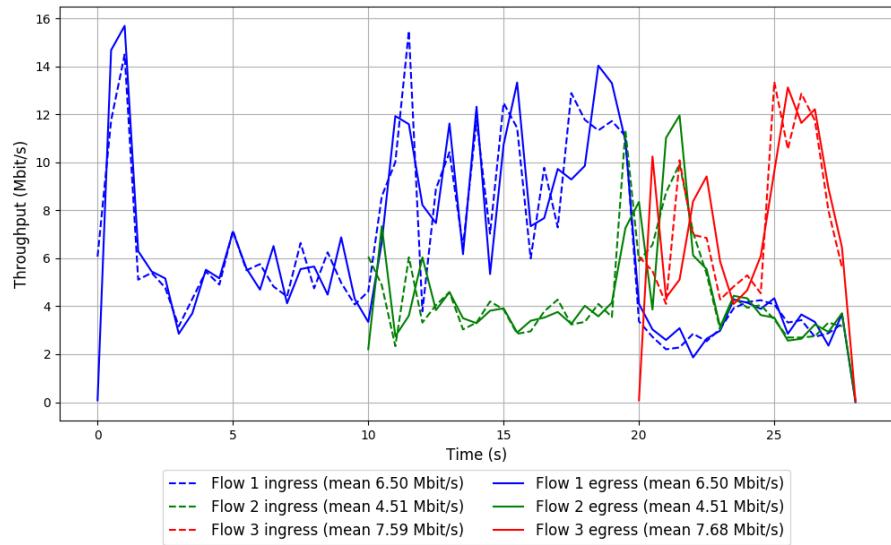


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-01-26 01:58:45
End at: 2018-01-26 01:59:15
Local clock offset: 0.851 ms
Remote clock offset: -9.504 ms

# Below is generated by plot.py at 2018-01-26 02:16:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.54 Mbit/s
95th percentile per-packet one-way delay: 197.094 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 6.50 Mbit/s
95th percentile per-packet one-way delay: 178.175 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 4.51 Mbit/s
95th percentile per-packet one-way delay: 223.310 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 7.68 Mbit/s
95th percentile per-packet one-way delay: 238.274 ms
Loss rate: 0.24%
```

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

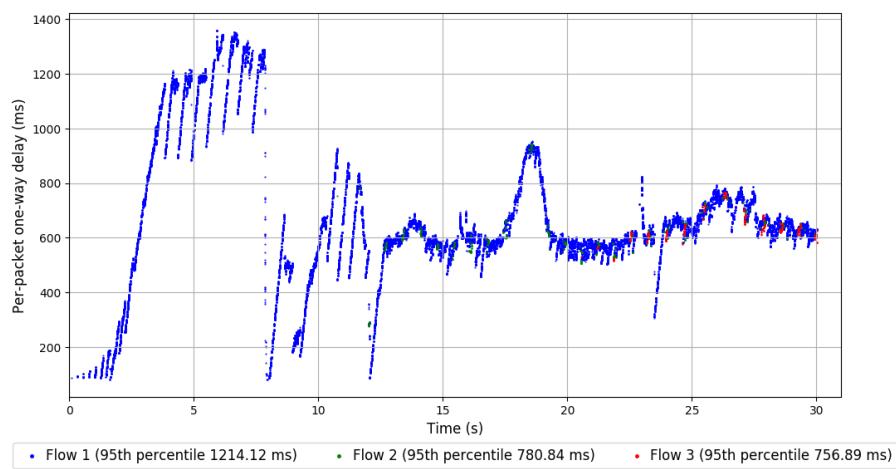
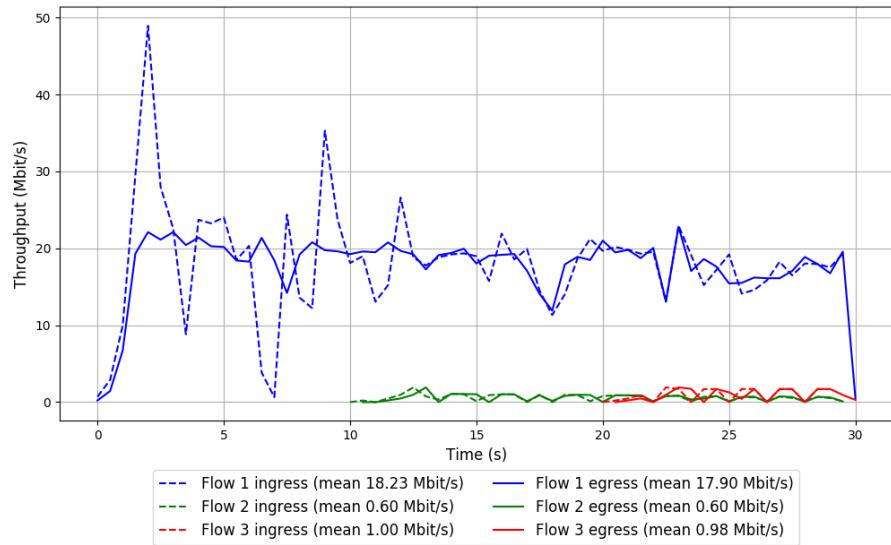


Run 1: Statistics of TCP Vegas

```
Start at: 2018-01-26 01:36:07
End at: 2018-01-26 01:36:37
Local clock offset: 0.331 ms
Remote clock offset: -10.516 ms

# Below is generated by plot.py at 2018-01-26 02:16:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.59 Mbit/s
95th percentile per-packet one-way delay: 1209.876 ms
Loss rate: 2.01%
-- Flow 1:
Average throughput: 17.90 Mbit/s
95th percentile per-packet one-way delay: 1214.121 ms
Loss rate: 1.99%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 780.837 ms
Loss rate: 2.54%
-- Flow 3:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 756.886 ms
Loss rate: 2.41%
```

Run 1: Report of TCP Vegas — Data Link

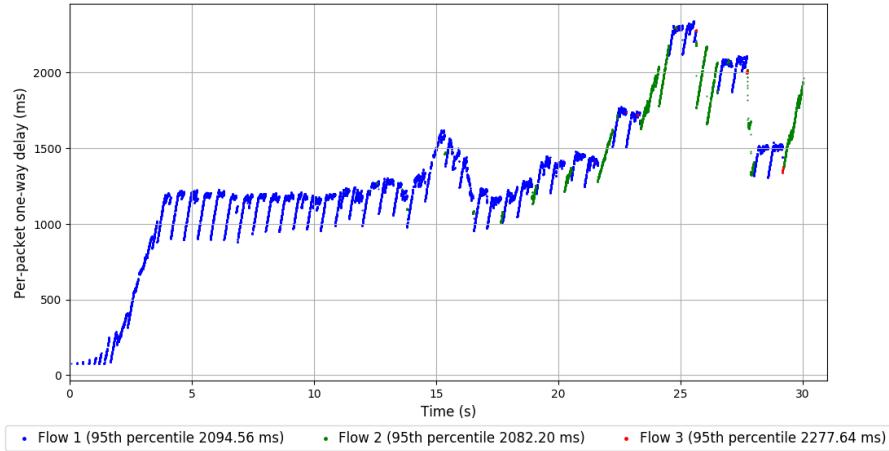
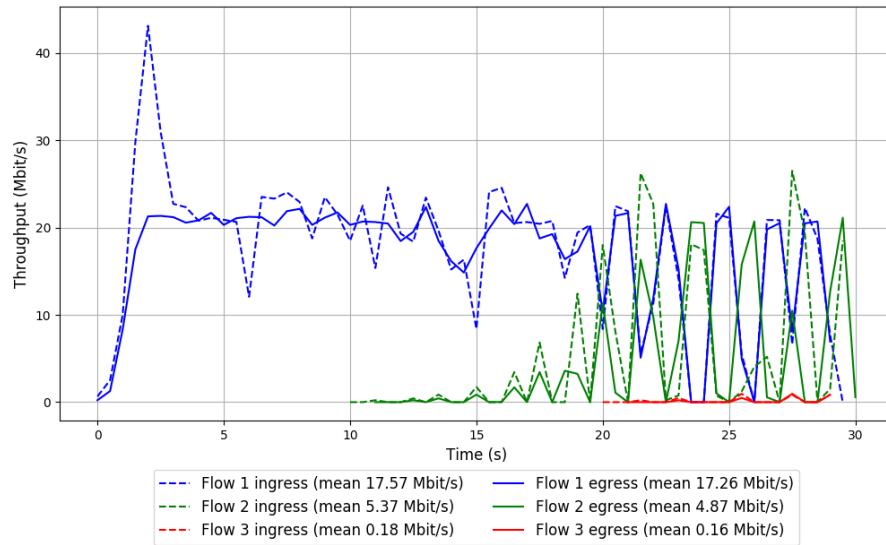


Run 2: Statistics of TCP Vegas

```
Start at: 2018-01-26 01:55:10
End at: 2018-01-26 01:55:40
Local clock offset: 0.644 ms
Remote clock offset: -9.729 ms

# Below is generated by plot.py at 2018-01-26 02:16:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.86 Mbit/s
95th percentile per-packet one-way delay: 2092.916 ms
Loss rate: 6.37%
-- Flow 1:
Average throughput: 17.26 Mbit/s
95th percentile per-packet one-way delay: 2094.563 ms
Loss rate: 4.62%
-- Flow 2:
Average throughput: 4.87 Mbit/s
95th percentile per-packet one-way delay: 2082.198 ms
Loss rate: 14.66%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 2277.636 ms
Loss rate: 25.69%
```

Run 2: Report of TCP Vegas — Data Link

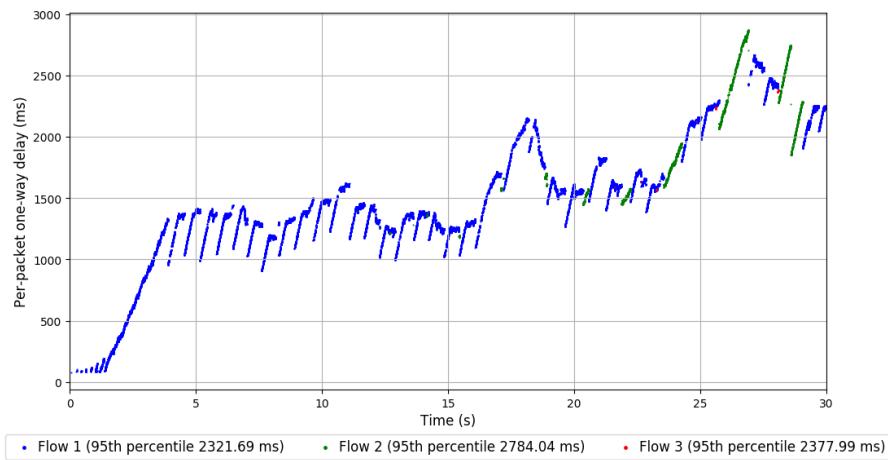
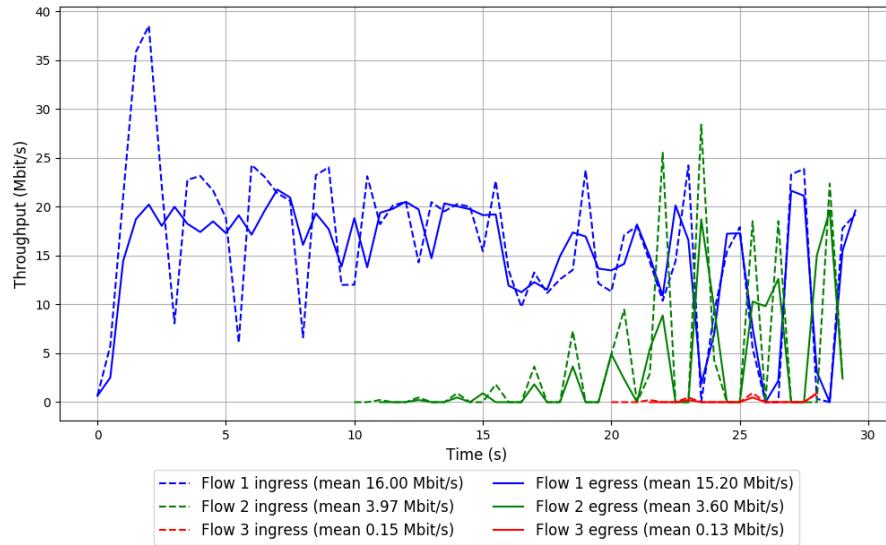


Run 3: Statistics of TCP Vegas

```
Start at: 2018-01-26 02:14:15
End at: 2018-01-26 02:14:45
Local clock offset: 0.993 ms
Remote clock offset: -8.871 ms

# Below is generated by plot.py at 2018-01-26 02:16:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 17.35 Mbit/s
95th percentile per-packet one-way delay: 2484.187 ms
Loss rate: 6.76%
-- Flow 1:
Average throughput: 15.20 Mbit/s
95th percentile per-packet one-way delay: 2321.689 ms
Loss rate: 5.15%
-- Flow 2:
Average throughput: 3.60 Mbit/s
95th percentile per-packet one-way delay: 2784.038 ms
Loss rate: 16.43%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 2377.990 ms
Loss rate: 34.51%
```

Run 3: Report of TCP Vegas — Data Link

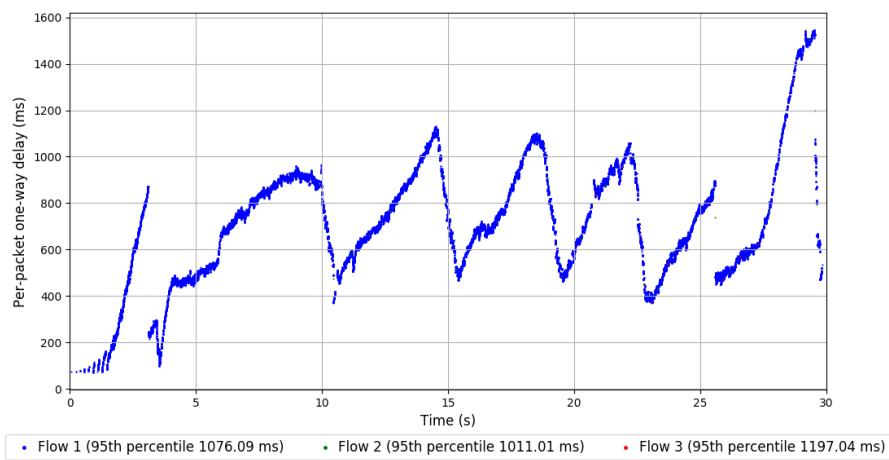
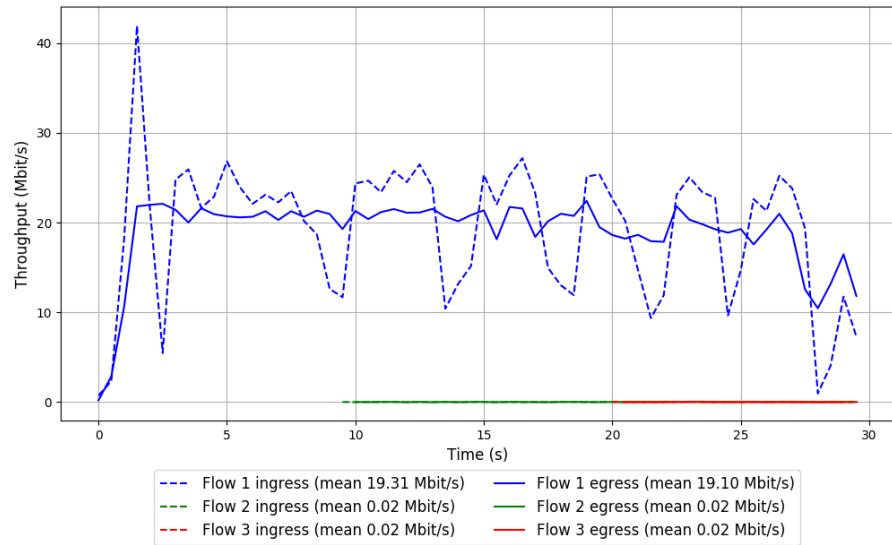


Run 1: Statistics of Verus

```
Start at: 2018-01-26 01:33:43
End at: 2018-01-26 01:34:13
Local clock offset: 0.525 ms
Remote clock offset: -10.486 ms

# Below is generated by plot.py at 2018-01-26 02:16:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.12 Mbit/s
95th percentile per-packet one-way delay: 1076.089 ms
Loss rate: 1.11%
-- Flow 1:
Average throughput: 19.10 Mbit/s
95th percentile per-packet one-way delay: 1076.088 ms
Loss rate: 1.10%
-- Flow 2:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1011.007 ms
Loss rate: 3.85%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1197.042 ms
Loss rate: 7.14%
```

Run 1: Report of Verus — Data Link

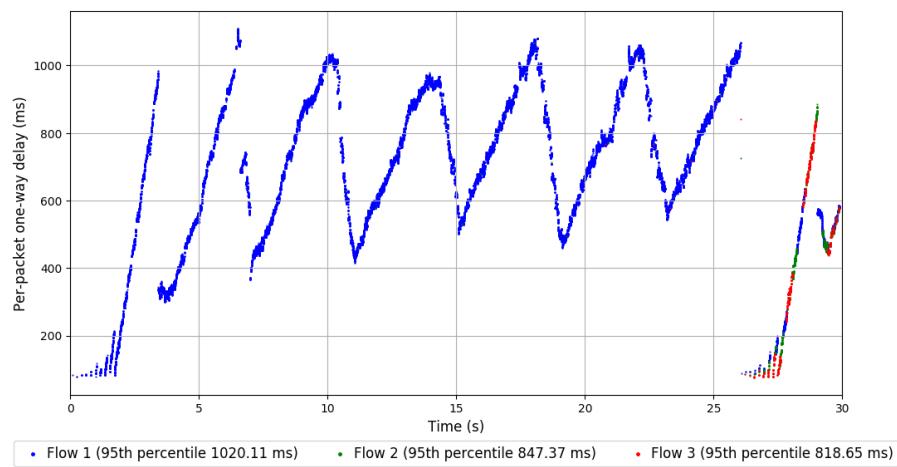
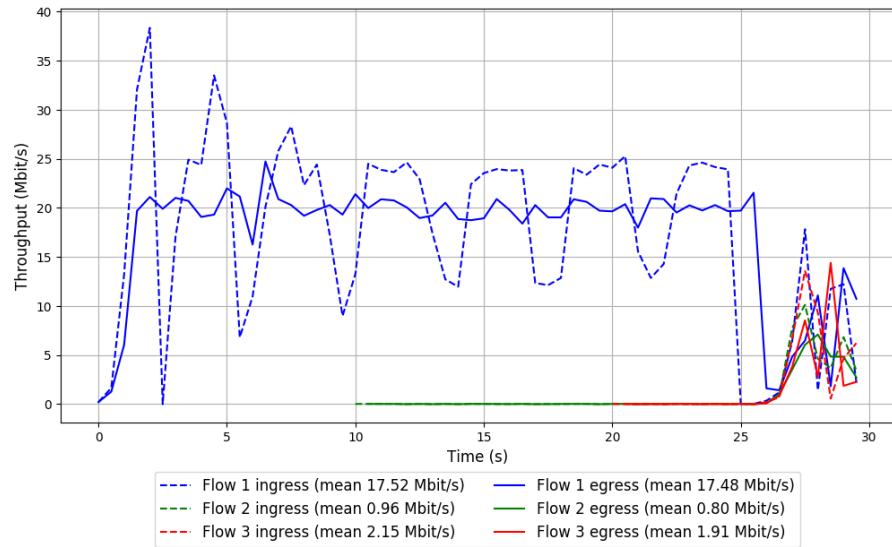


Run 2: Statistics of Verus

```
Start at: 2018-01-26 01:52:45
End at: 2018-01-26 01:53:16
Local clock offset: 0.212 ms
Remote clock offset: -9.79 ms

# Below is generated by plot.py at 2018-01-26 02:17:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.58 Mbit/s
95th percentile per-packet one-way delay: 1018.208 ms
Loss rate: 1.57%
-- Flow 1:
Average throughput: 17.48 Mbit/s
95th percentile per-packet one-way delay: 1020.114 ms
Loss rate: 0.29%
-- Flow 2:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 847.366 ms
Loss rate: 19.47%
-- Flow 3:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 818.650 ms
Loss rate: 17.37%
```

Run 2: Report of Verus — Data Link

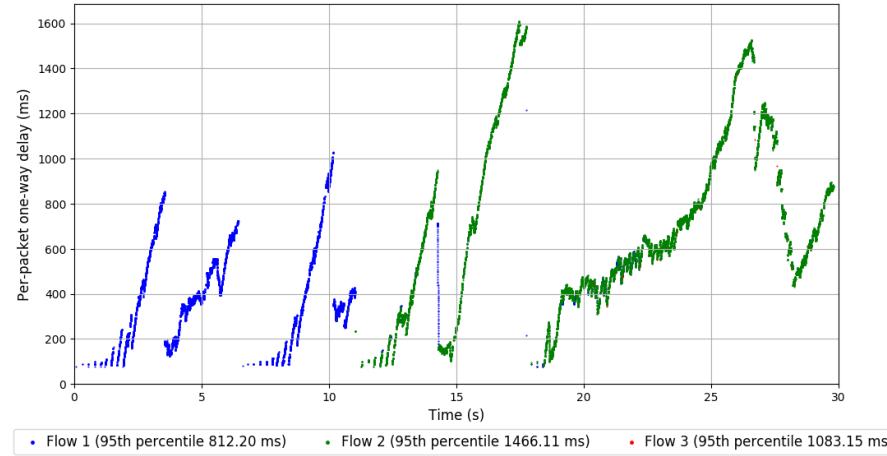
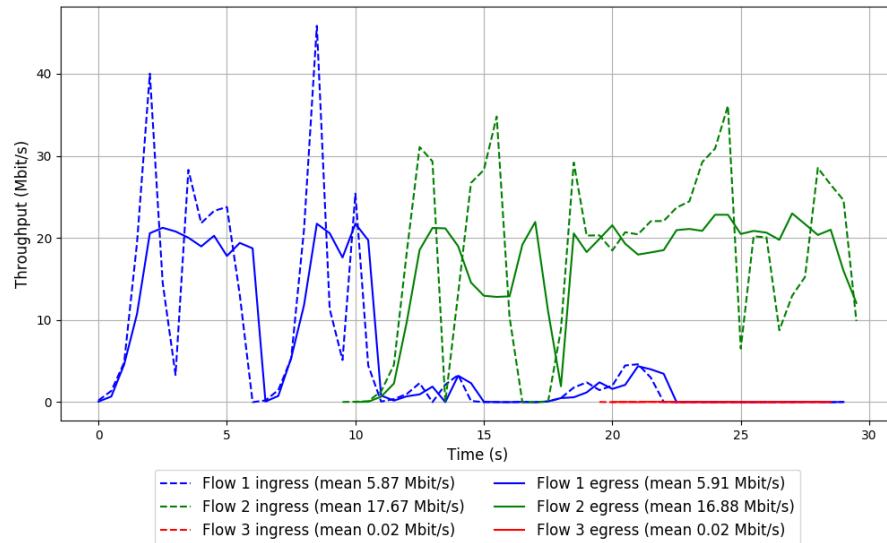


Run 3: Statistics of Verus

```
Start at: 2018-01-26 02:11:51
End at: 2018-01-26 02:12:21
Local clock offset: 0.317 ms
Remote clock offset: -8.979 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 16.87 Mbit/s
95th percentile per-packet one-way delay: 1402.291 ms
Loss rate: 3.78%
-- Flow 1:
Average throughput: 5.91 Mbit/s
95th percentile per-packet one-way delay: 812.201 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 16.88 Mbit/s
95th percentile per-packet one-way delay: 1466.107 ms
Loss rate: 5.63%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1083.151 ms
Loss rate: 7.14%
```

Run 3: Report of Verus — Data Link

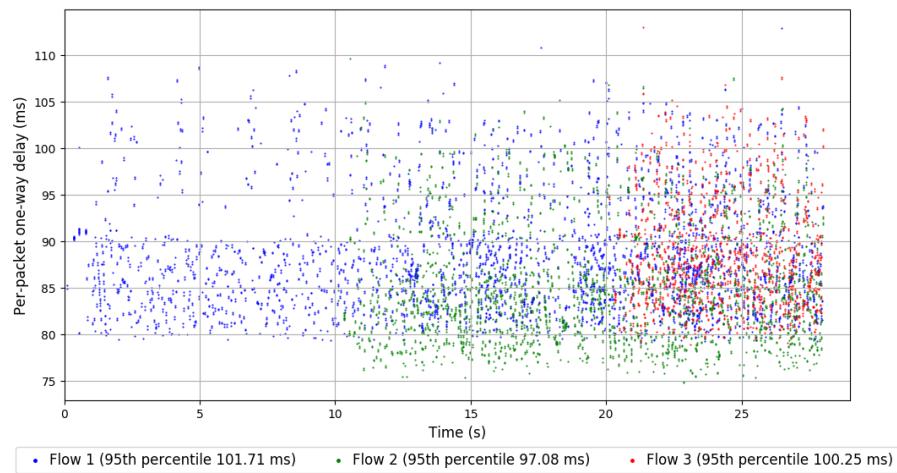
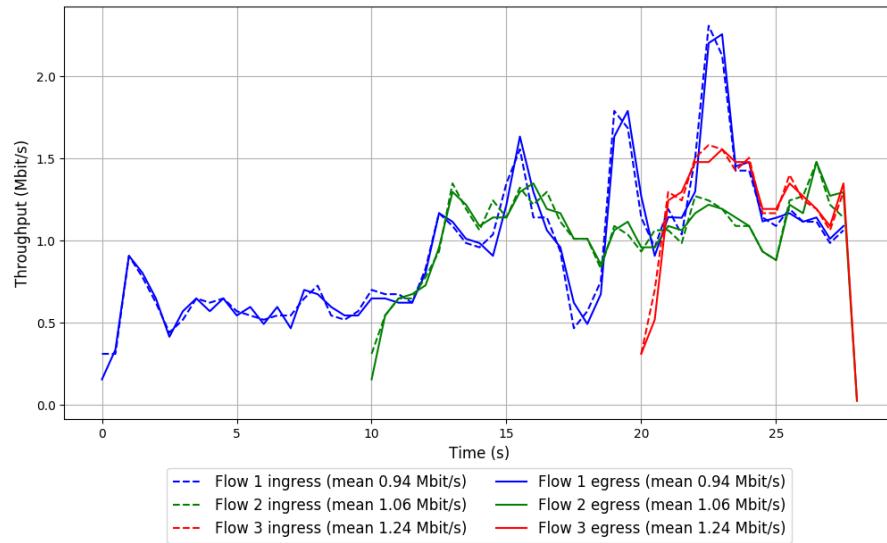


Run 1: Statistics of Copa

```
Start at: 2018-01-26 01:18:17
End at: 2018-01-26 01:18:47
Local clock offset: -2.648 ms
Remote clock offset: -10.413 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 99.884 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 101.709 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 97.078 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 100.245 ms
Loss rate: 0.79%
```

Run 1: Report of Copa — Data Link

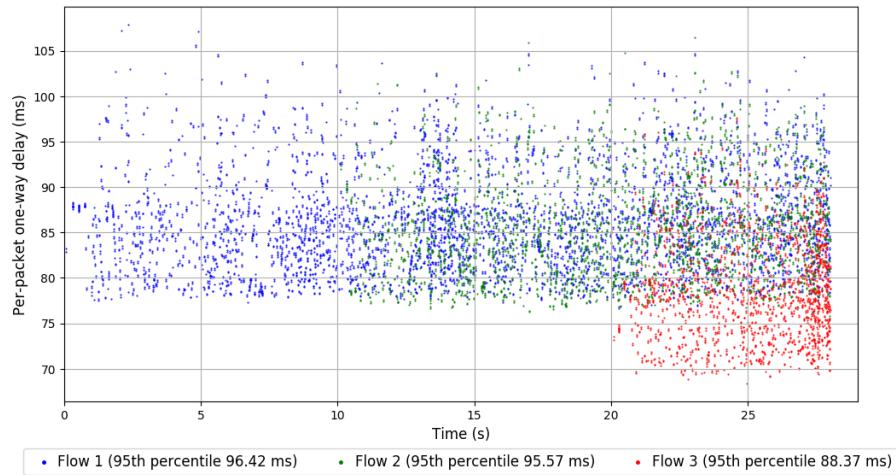
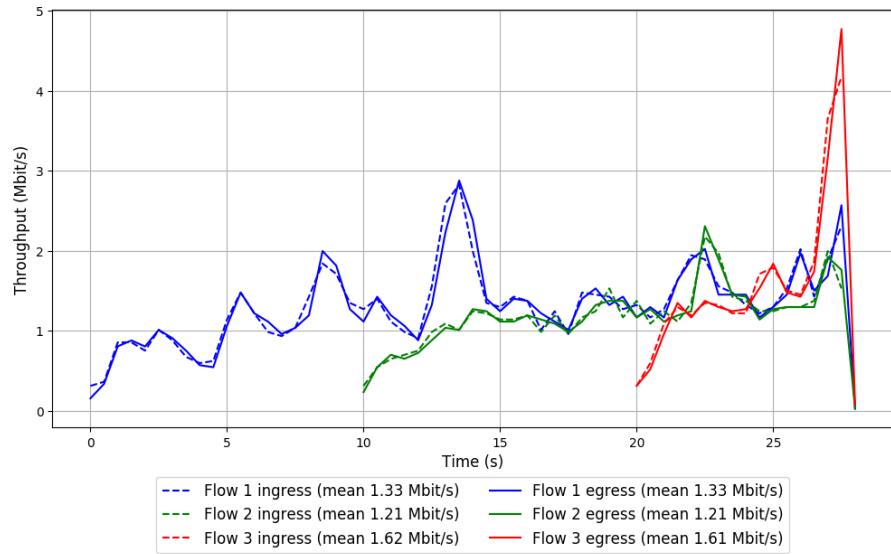


Run 2: Statistics of Copa

```
Start at: 2018-01-26 01:37:20
End at: 2018-01-26 01:37:50
Local clock offset: 0.403 ms
Remote clock offset: -10.518 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.56 Mbit/s
95th percentile per-packet one-way delay: 95.631 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 96.424 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 95.568 ms
Loss rate: 0.30%
-- Flow 3:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 88.370 ms
Loss rate: 0.91%
```

Run 2: Report of Copa — Data Link

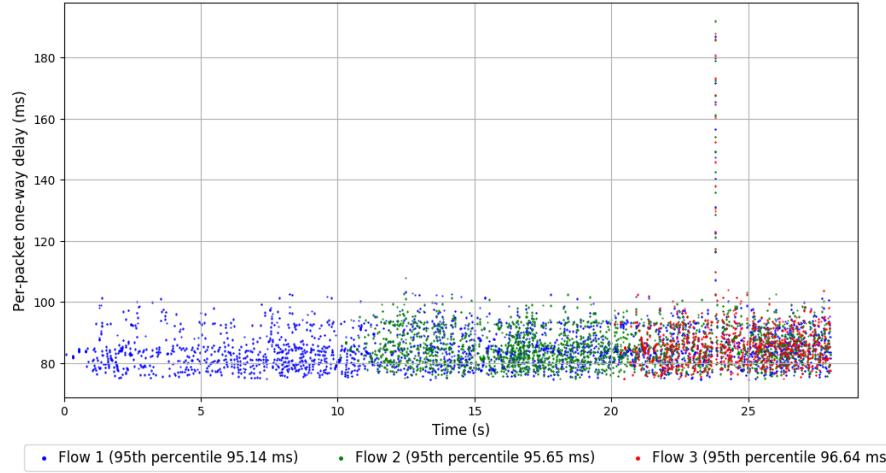
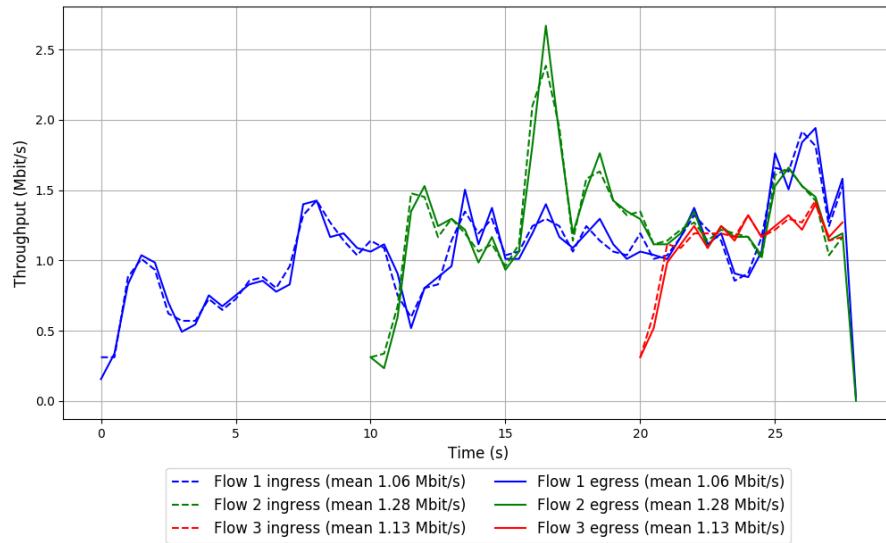


Run 3: Statistics of Copa

```
Start at: 2018-01-26 01:56:23
End at: 2018-01-26 01:56:53
Local clock offset: 0.13 ms
Remote clock offset: -9.6 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 95.526 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 95.136 ms
Loss rate: 0.22%
-- Flow 2:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 95.648 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 96.636 ms
Loss rate: 0.72%
```

Run 3: Report of Copa — Data Link

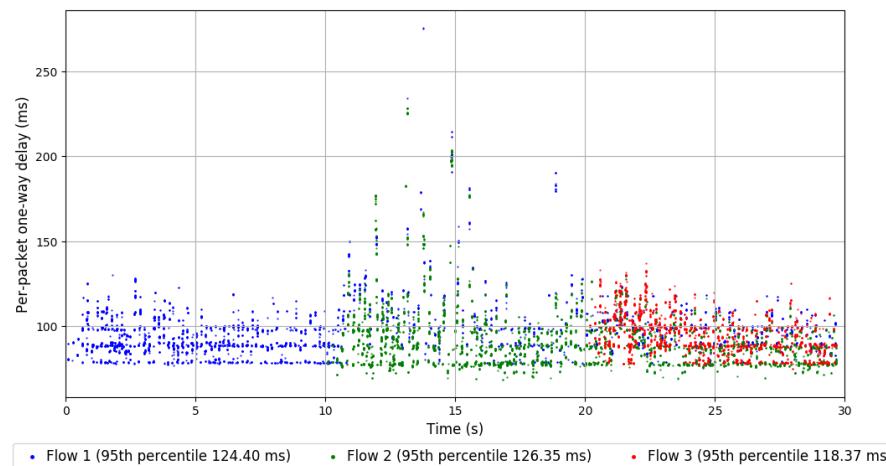
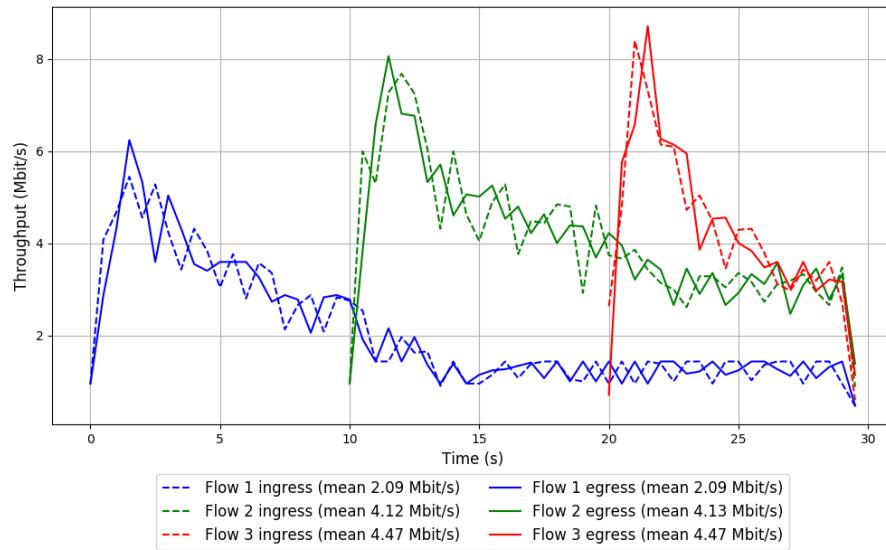


```
Run 1: Statistics of Indigo-2-256

Start at: 2018-01-26 01:27:47
End at: 2018-01-26 01:28:17
Local clock offset: 0.352 ms
Remote clock offset: -10.481 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.26 Mbit/s
95th percentile per-packet one-way delay: 121.717 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 124.400 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 4.13 Mbit/s
95th percentile per-packet one-way delay: 126.348 ms
Loss rate: 0.06%
-- Flow 3:
Average throughput: 4.47 Mbit/s
95th percentile per-packet one-way delay: 118.370 ms
Loss rate: 0.00%
```

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

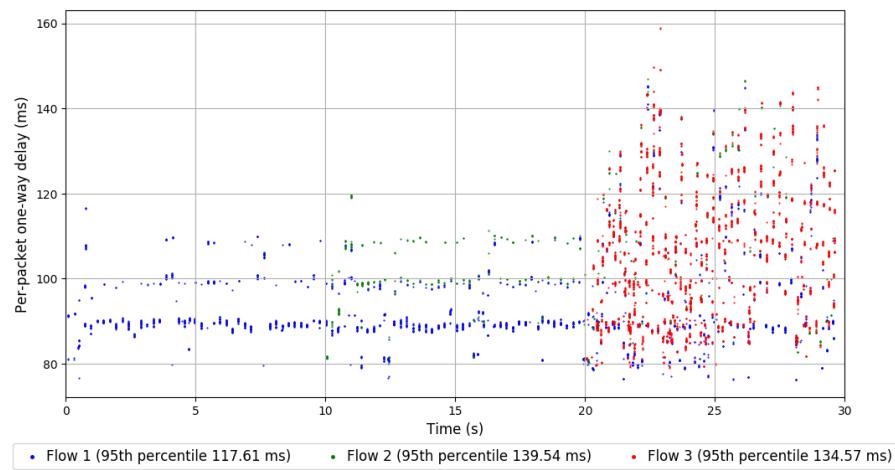
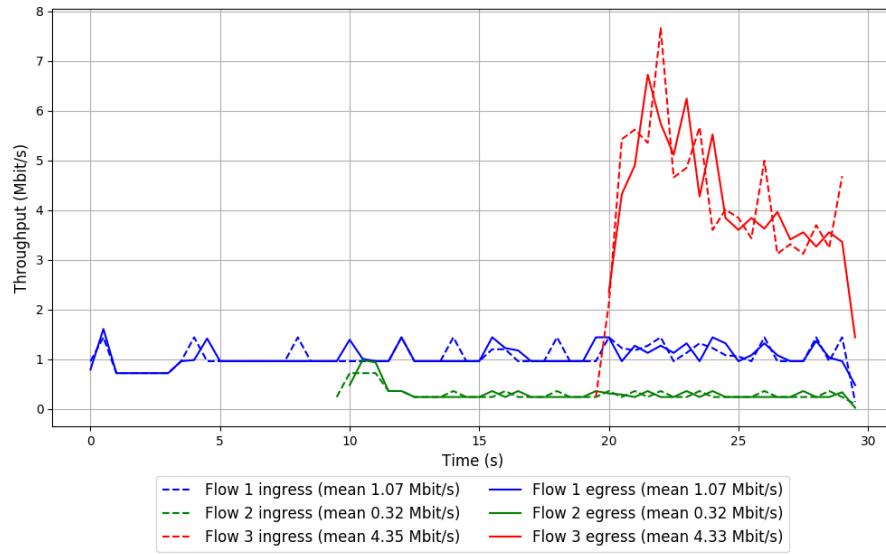


Run 2: Statistics of Indigo-2-256

```
Start at: 2018-01-26 01:46:50
End at: 2018-01-26 01:47:20
Local clock offset: 0.318 ms
Remote clock offset: -10.115 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.67 Mbit/s
95th percentile per-packet one-way delay: 131.518 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 117.605 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 139.544 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 4.33 Mbit/s
95th percentile per-packet one-way delay: 134.572 ms
Loss rate: 0.00%
```

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

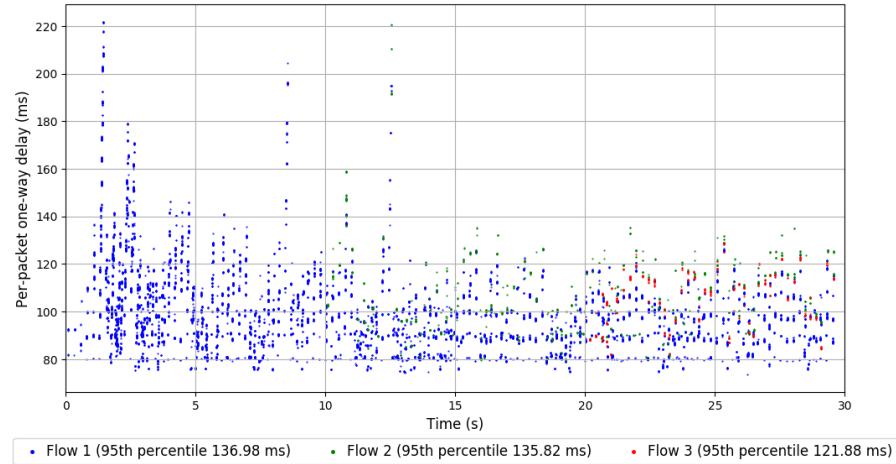
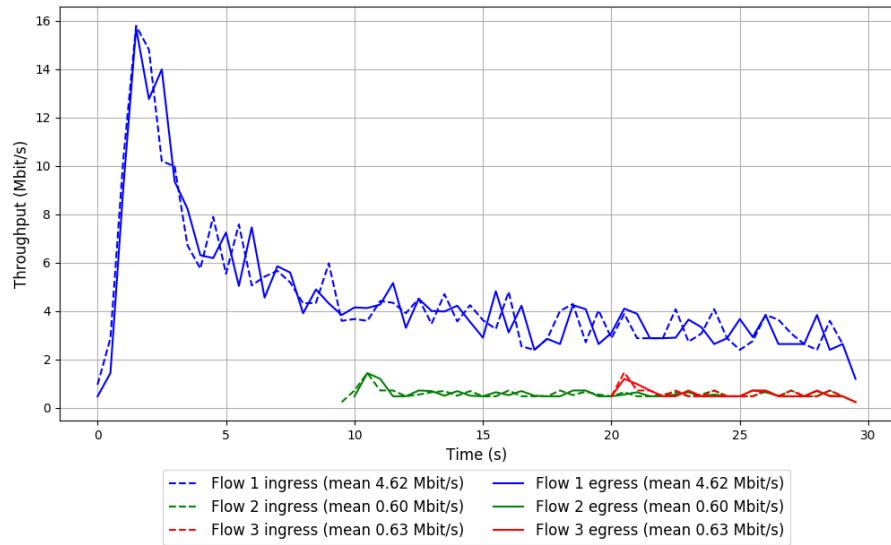


Run 3: Statistics of Indigo-2-256

```
Start at: 2018-01-26 02:05:54
End at: 2018-01-26 02:06:24
Local clock offset: 0.644 ms
Remote clock offset: -9.264 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.21 Mbit/s
95th percentile per-packet one-way delay: 136.292 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 4.62 Mbit/s
95th percentile per-packet one-way delay: 136.984 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 135.818 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 121.879 ms
Loss rate: 0.00%
```

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

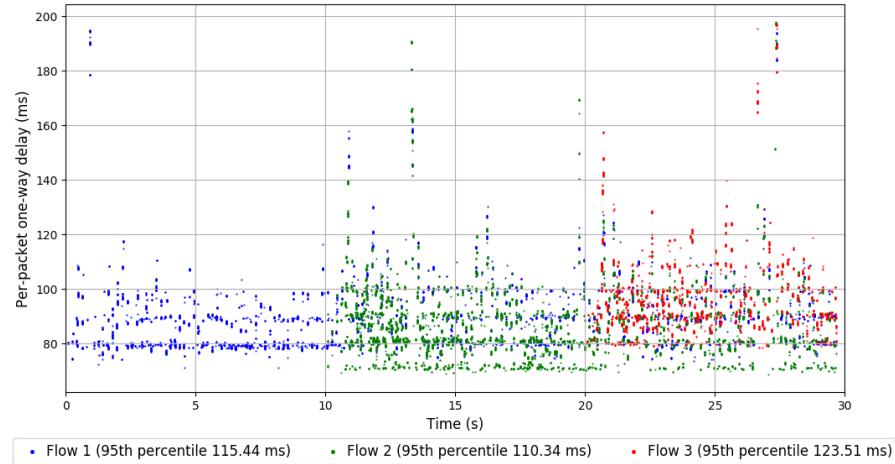
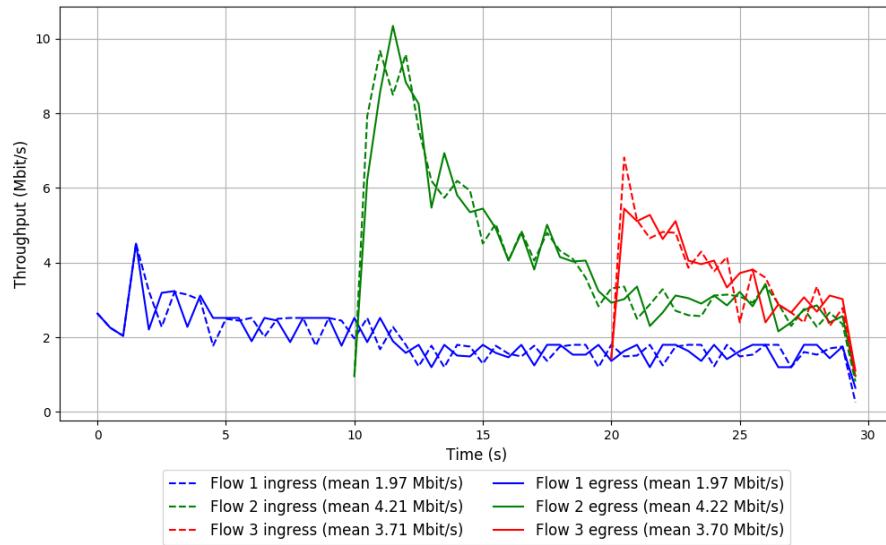


```
Run 1: Statistics of Indigo-1-32
```

```
Start at: 2018-01-26 01:32:31
End at: 2018-01-26 01:33:01
Local clock offset: 0.279 ms
Remote clock offset: -10.511 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.96 Mbit/s
95th percentile per-packet one-way delay: 116.761 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 115.442 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 4.22 Mbit/s
95th percentile per-packet one-way delay: 110.345 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 123.509 ms
Loss rate: 0.00%
```

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

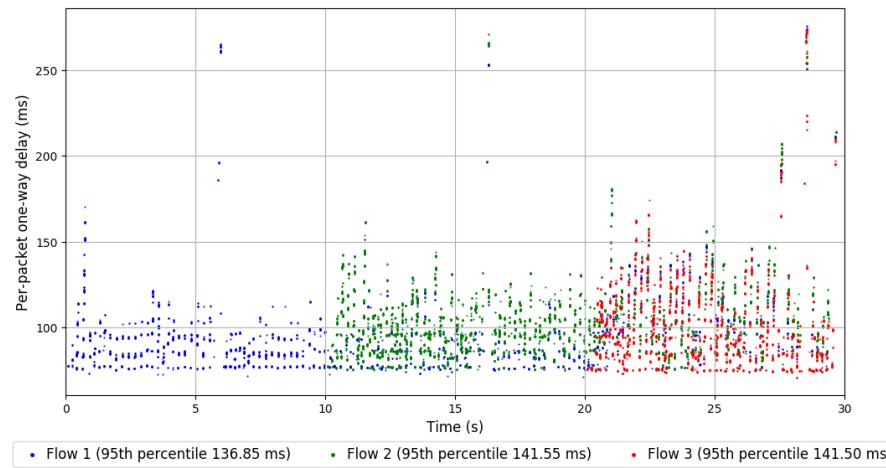
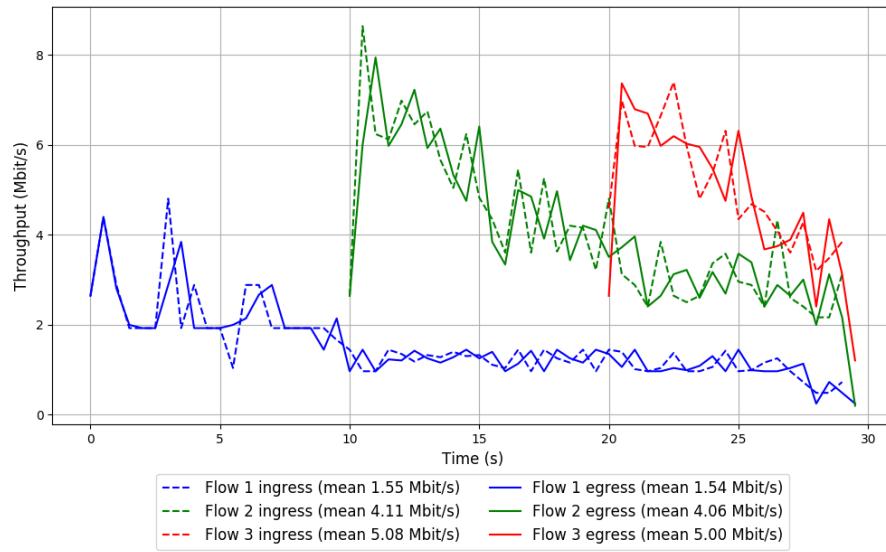


Run 2: Statistics of Indigo-1-32

```
Start at: 2018-01-26 01:51:34
End at: 2018-01-26 01:52:04
Local clock offset: 0.669 ms
Remote clock offset: -9.803 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.85 Mbit/s
95th percentile per-packet one-way delay: 140.855 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 136.847 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 4.06 Mbit/s
95th percentile per-packet one-way delay: 141.549 ms
Loss rate: 0.48%
-- Flow 3:
Average throughput: 5.00 Mbit/s
95th percentile per-packet one-way delay: 141.496 ms
Loss rate: 0.13%
```

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



Run 3: Statistics of Indigo-1-32

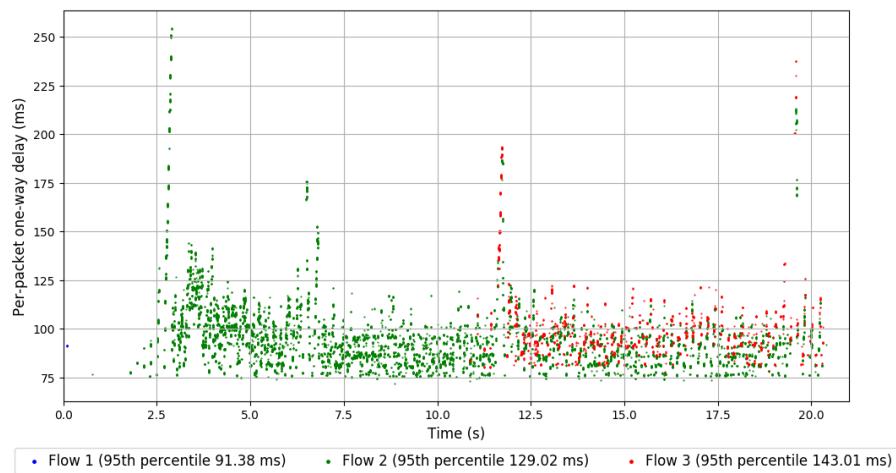
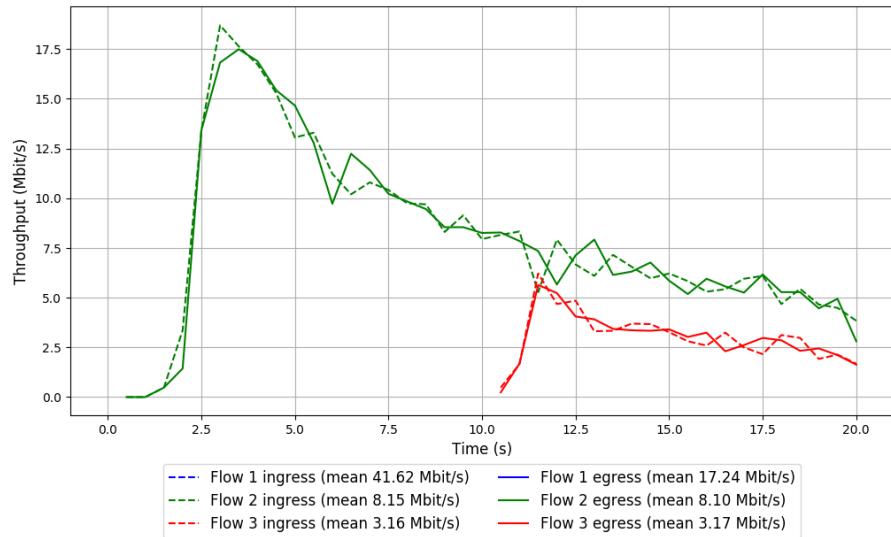
Start at: 2018-01-26 02:10:39

End at: 2018-01-26 02:11:09

Local clock offset: 0.544 ms

Remote clock offset: -9.026 ms

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

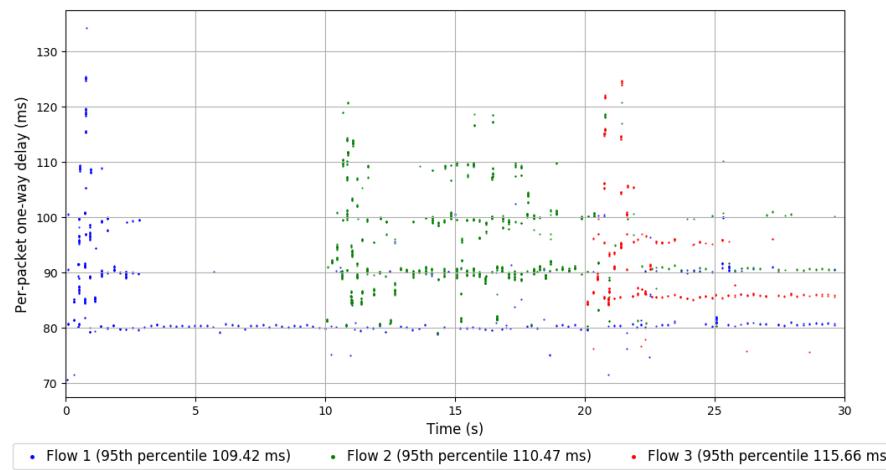
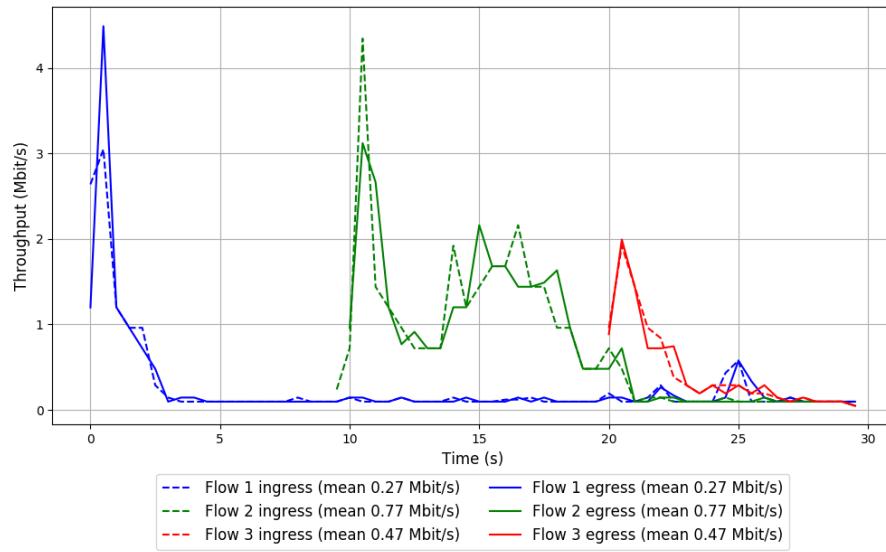


```
Run 1: Statistics of Indigo-1-128

Start at: 2018-01-26 01:31:21
End at: 2018-01-26 01:31:51
Local clock offset: 0.048 ms
Remote clock offset: -10.477 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 113.307 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 109.419 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 110.471 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 115.662 ms
Loss rate: 0.00%
```

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

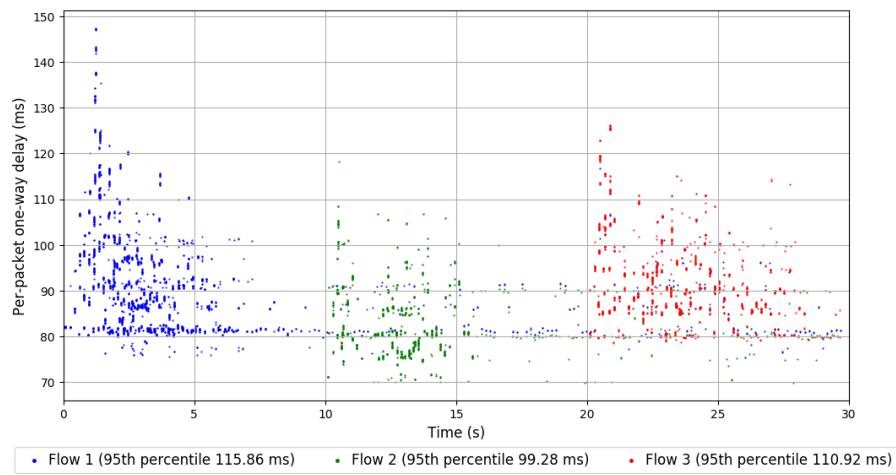
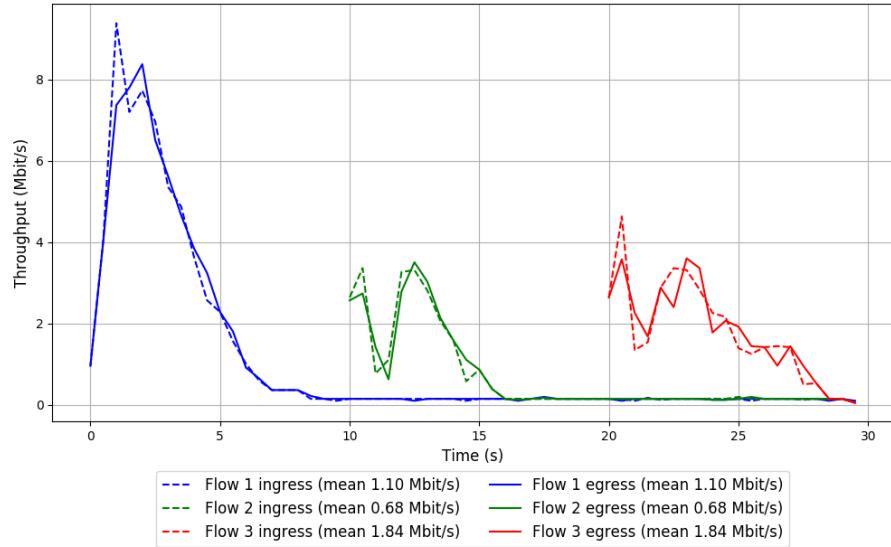


Run 2: Statistics of Indigo-1-128

```
Start at: 2018-01-26 01:50:23
End at: 2018-01-26 01:50:53
Local clock offset: 0.725 ms
Remote clock offset: -9.945 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 112.165 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 115.865 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 99.284 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 1.84 Mbit/s
95th percentile per-packet one-way delay: 110.922 ms
Loss rate: 0.00%
```

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



```
Run 3: Statistics of Indigo-1-128

Start at: 2018-01-26 02:09:28
End at: 2018-01-26 02:09:58
Local clock offset: 0.319 ms
Remote clock offset: -9.089 ms

# Below is generated by plot.py at 2018-01-26 02:17:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 112.469 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 94.898 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 114.416 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 91.753 ms
Loss rate: 0.00%
```

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

