Pantheon Report

Generated at 2017-09-18 21:47:37 (UTC).

Data path: GCE Sydney Ethernet (*remote*) →GCE Iowa Ethernet (*local*).

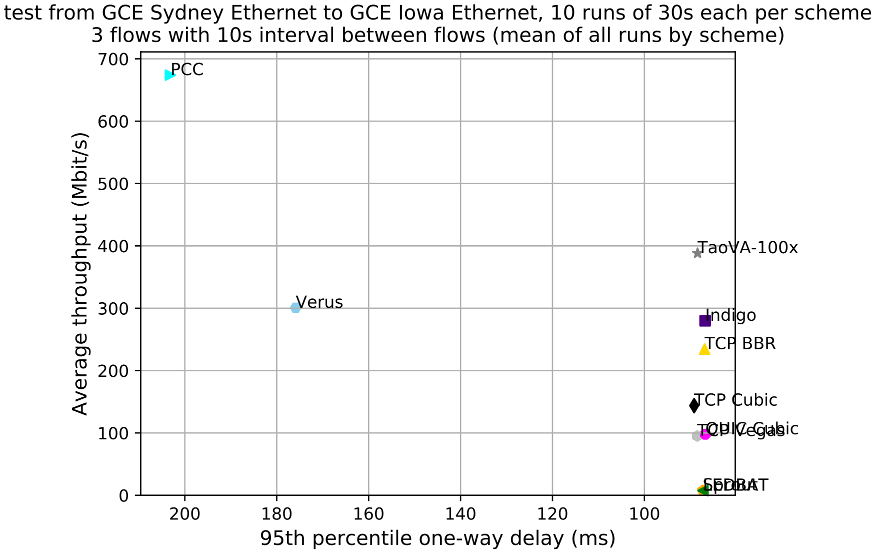
Repeated the test of 10 congestion control schemes 10 times.

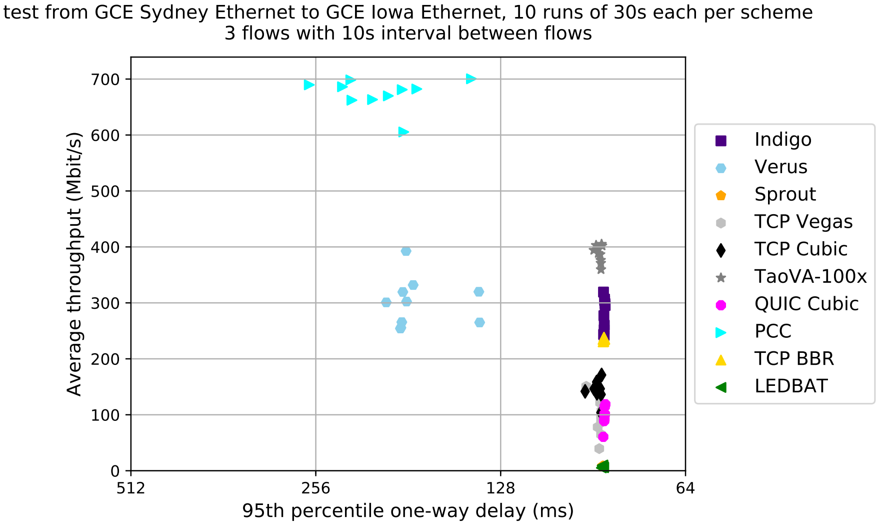
Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

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`).

```
Git summary:
branch: master @ 57453dc11f8da93a2e03eea75289fea01b816298
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/genericCC @ f7ca42f251bf49b432bb71de6d13fa903515c366
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
 M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
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 @ f1a14bffe749737437f61b1eaeeb30b267cde681
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/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

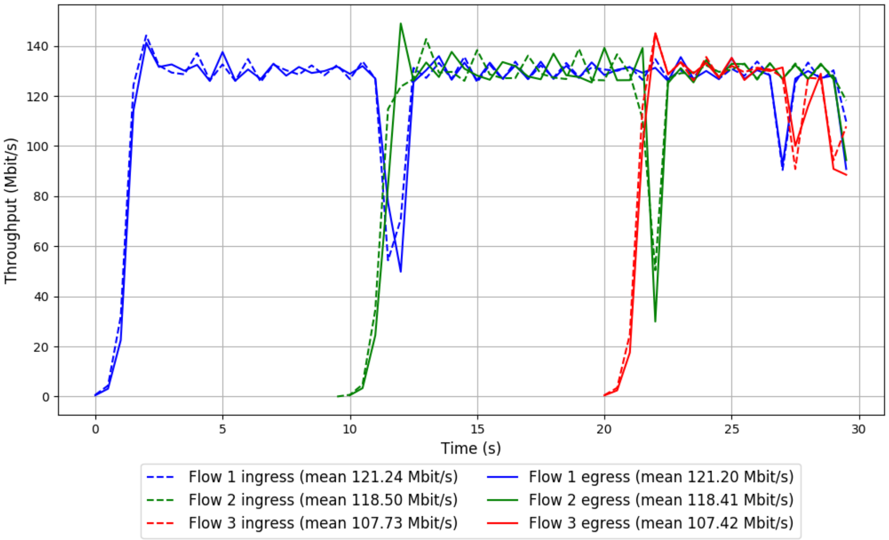

test from GCE Sydney Ethernet to GCE Iowa Ethernet, 10 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)
Average throughput (Mbit/s)
700
600
500
400
300
200
100
0
95th percentile one-way delay (ms)
200
180
160
140
120
100
PCC
Verus
TaoVA-100x
Indigo
TCP BBR
TCP Cubic
QUIC Cubic
TCP Vegas
LEDBAT
Sprout

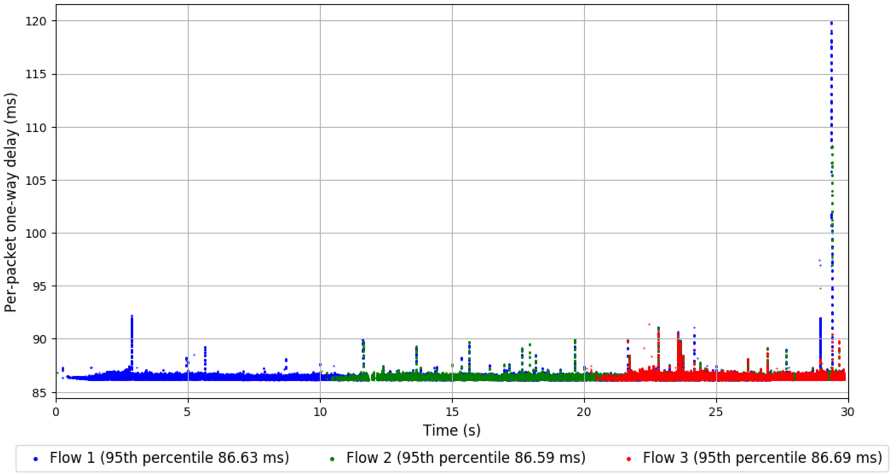

test from GCE Sydney Ethernet to GCE Iowa Ethernet, 10 runs of 30s each per scheme
3 flows with 10s interval between flows
Average throughput (Mbit/s)
700
600
500
400
300
200
100
0
95th percentile one-way delay (ms)
512
256
128
64
Indigo
Verus
Sprout
TCP Vegas
TCP Cubic
TaoVA-100x
QUIC Cubic
PCC
TCP BBR
LEDBAT

scheme	# runs	mean avg tput (Mbit/s) flow 1	flow 2	flow 3	mean 95th-%ile delay (ms) flow 1	flow 2	flow 3	mean loss rate (%) flow 1	flow 2	flow 3
TCP BBR	10	120.74	117.19	110.03	86.89	86.88	86.89	0.64	0.98	2.05
TCP Cubic	10	77.75	75.41	49.23	88.86	89.57	88.70	0.69	0.98	2.70
Indigo	10	153.85	134.97	117.41	86.72	86.89	86.84	0.49	0.88	2.00
LEDBAT	10	4.31	3.55	2.39	87.27	87.21	87.28	1.36	1.69	4.25
PCC	10	532.51	171.94	84.78	209.66	164.27	161.70	4.40	2.80	3.84
QUIC Cubic	10	49.23	55.84	35.92	86.69	86.64	86.56	0.59	0.32	2.27
Sprout	10	4.15	4.03	3.16	87.34	87.31	87.27	0.73	0.94	3.00
TaoVA-100x	10	212.48	202.18	167.59	88.12	89.05	88.94	0.58	0.93	3.02
TCP Vegas	10	56.20	36.27	45.33	88.14	88.42	89.13	0.56	0.96	2.00
Verus	10	194.14	106.47	115.59	161.94	145.80	185.44	1.11	1.48	5.15

```
Run 1: Statistics of TCP BBR

Start at: 2017-09-18 17:26:14
End at: 2017-09-18 17:26:44

# Below is generated by plot.py at 2017-09-18 20:57:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 235.00 Mbit/s
95th percentile per-packet one-way delay: 86.627 ms
Loss rate: 0.96%
-- Flow 1:
Average throughput: 121.20 Mbit/s
95th percentile per-packet one-way delay: 86.630 ms
Loss rate: 0.61%
-- Flow 2:
Average throughput: 118.41 Mbit/s
95th percentile per-packet one-way delay: 86.591 ms
Loss rate: 0.99%
-- Flow 3:
Average throughput: 107.42 Mbit/s
95th percentile per-packet one-way delay: 86.686 ms
Loss rate: 2.03%
```

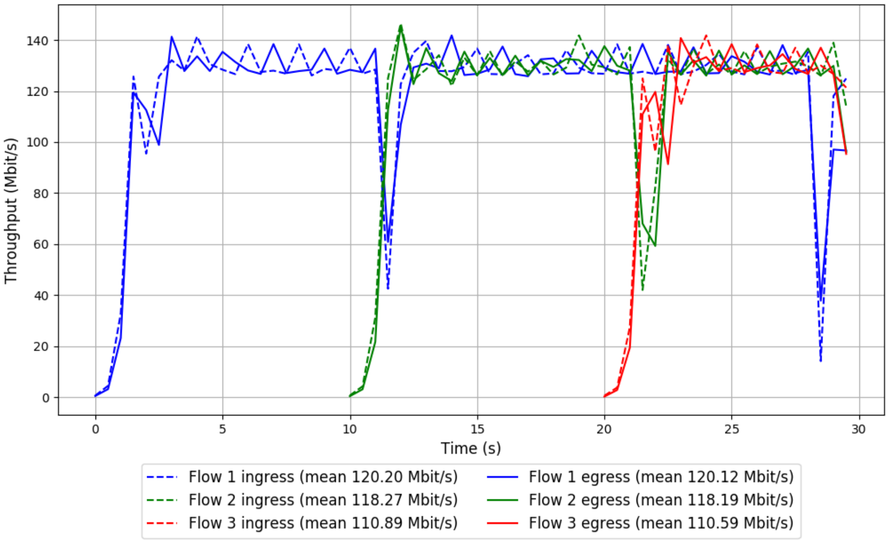
Run 1: Report of TCP BBR — Data Link

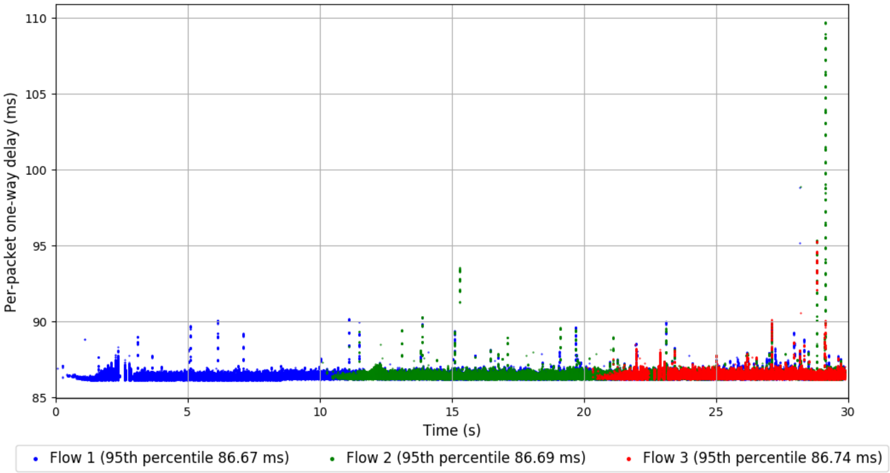




```
Run 2: Statistics of TCP BBR

Start at: 2017-09-18 17:36:03
End at: 2017-09-18 17:36:33

# Below is generated by plot.py at 2017-09-18 20:57:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 234.60 Mbit/s
95th percentile per-packet one-way delay: 86.689 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 120.12 Mbit/s
95th percentile per-packet one-way delay: 86.675 ms
Loss rate: 0.69%
-- Flow 2:
Average throughput: 118.19 Mbit/s
95th percentile per-packet one-way delay: 86.685 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 110.59 Mbit/s
95th percentile per-packet one-way delay: 86.738 ms
Loss rate: 2.03%
```

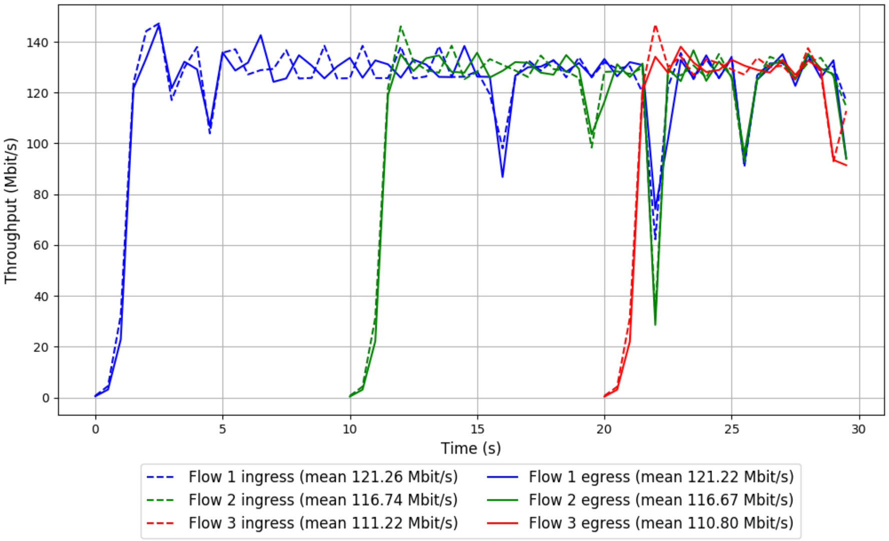
Run 2: Report of TCP BBR — Data Link

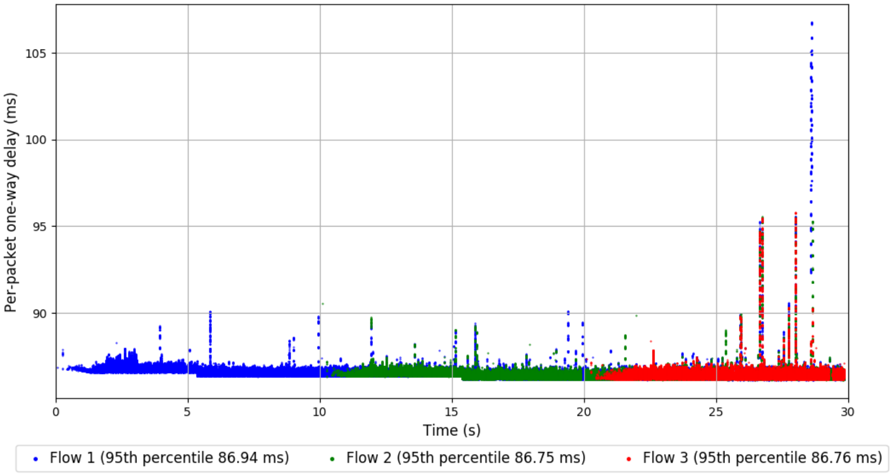




```
Run 3: Statistics of TCP BBR

Start at: 2017-09-18 17:45:46
End at: 2017-09-18 17:46:16

# Below is generated by plot.py at 2017-09-18 20:57:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 234.95 Mbit/s
95th percentile per-packet one-way delay: 86.876 ms
Loss rate: 0.95%
-- Flow 1:
Average throughput: 121.22 Mbit/s
95th percentile per-packet one-way delay: 86.940 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 116.67 Mbit/s
95th percentile per-packet one-way delay: 86.746 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 110.80 Mbit/s
95th percentile per-packet one-way delay: 86.763 ms
Loss rate: 2.05%
```

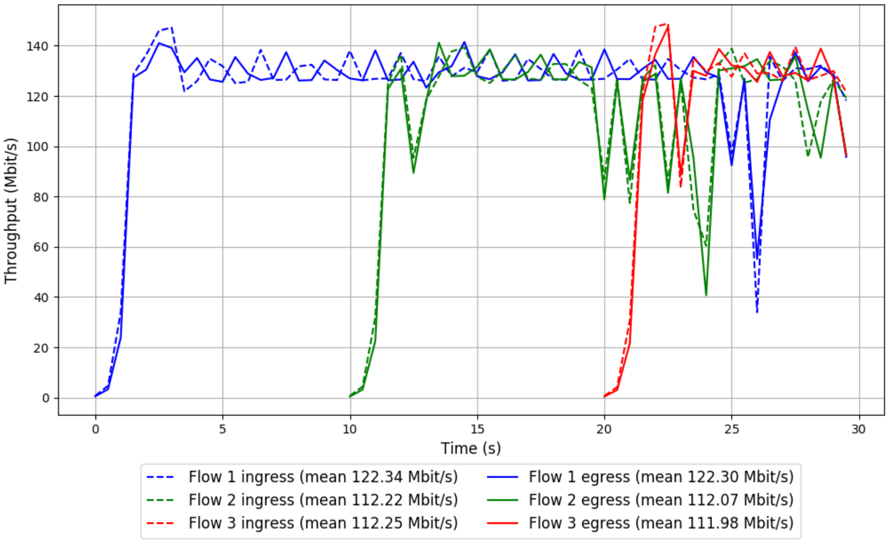
Run 3: Report of TCP BBR — Data Link

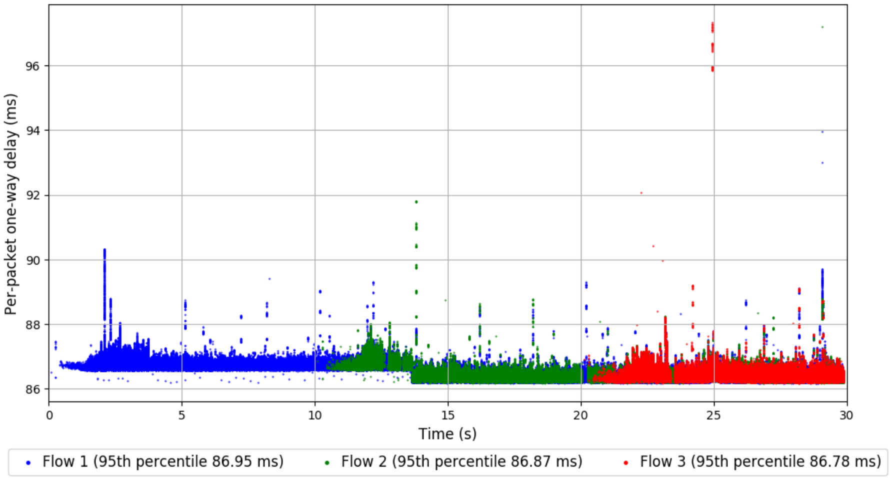




```
Run 4: Statistics of TCP BBR

Start at: 2017-09-18 17:55:38
End at: 2017-09-18 17:56:08

# Below is generated by plot.py at 2017-09-18 20:57:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 233.29 Mbit/s
95th percentile per-packet one-way delay: 86.917 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 122.30 Mbit/s
95th percentile per-packet one-way delay: 86.952 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 112.07 Mbit/s
95th percentile per-packet one-way delay: 86.873 ms
Loss rate: 1.01%
-- Flow 3:
Average throughput: 111.98 Mbit/s
95th percentile per-packet one-way delay: 86.780 ms
Loss rate: 2.00%
```

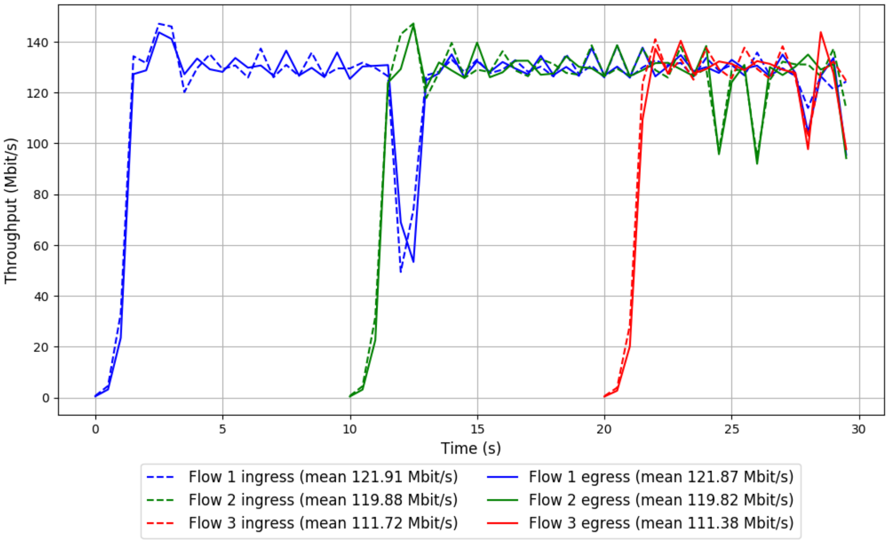
Run 4: Report of TCP BBR — Data Link

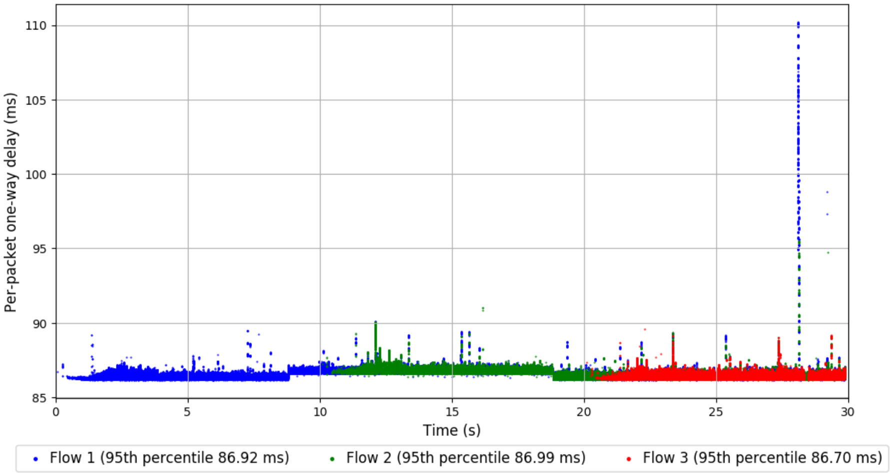




```
Run 5: Statistics of TCP BBR

Start at: 2017-09-18 18:05:22
End at: 2017-09-18 18:05:52

# Below is generated by plot.py at 2017-09-18 20:57:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 237.92 Mbit/s
95th percentile per-packet one-way delay: 86.928 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 121.87 Mbit/s
95th percentile per-packet one-way delay: 86.920 ms
Loss rate: 0.61%
-- Flow 2:
Average throughput: 119.82 Mbit/s
95th percentile per-packet one-way delay: 86.989 ms
Loss rate: 0.93%
-- Flow 3:
Average throughput: 111.38 Mbit/s
95th percentile per-packet one-way delay: 86.704 ms
Loss rate: 2.05%
```

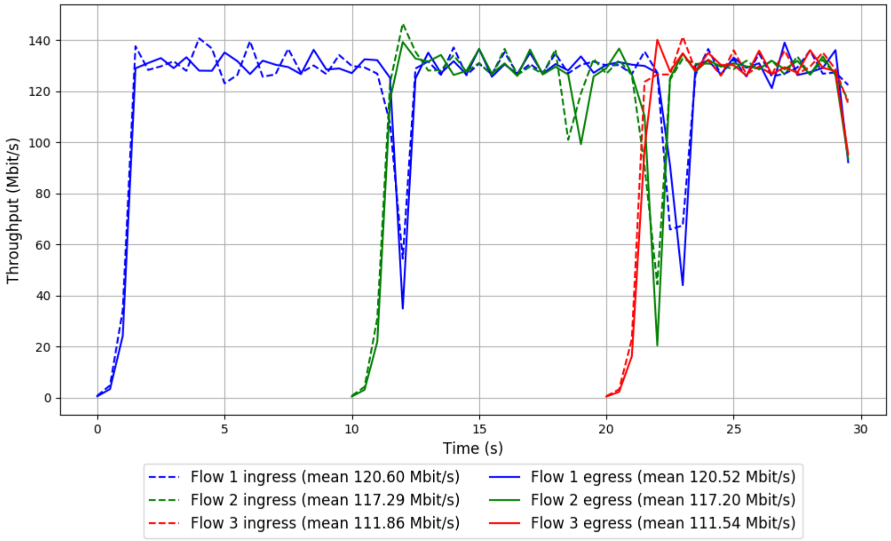
Run 5: Report of TCP BBR — Data Link

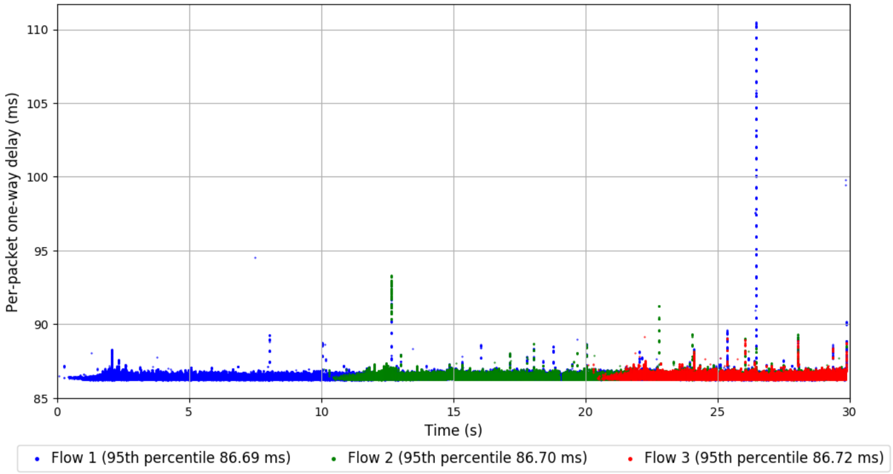




```
Run 6: Statistics of TCP BBR

Start at: 2017-09-18 18:15:18
End at: 2017-09-18 18:15:48

# Below is generated by plot.py at 2017-09-18 20:57:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 234.79 Mbit/s
95th percentile per-packet one-way delay: 86.702 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 120.52 Mbit/s
95th percentile per-packet one-way delay: 86.695 ms
Loss rate: 0.65%
-- Flow 2:
Average throughput: 117.20 Mbit/s
95th percentile per-packet one-way delay: 86.701 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 111.54 Mbit/s
95th percentile per-packet one-way delay: 86.719 ms
Loss rate: 2.03%
```

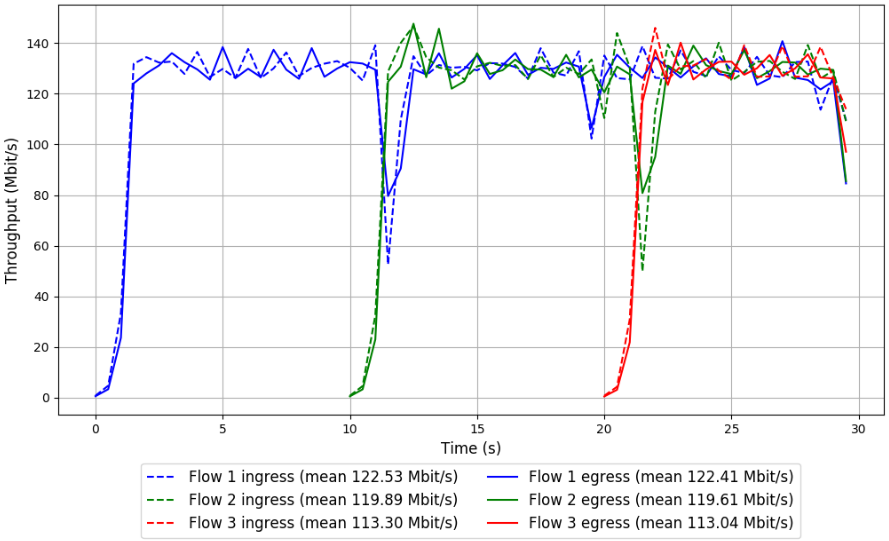
Run 6: Report of TCP BBR — Data Link

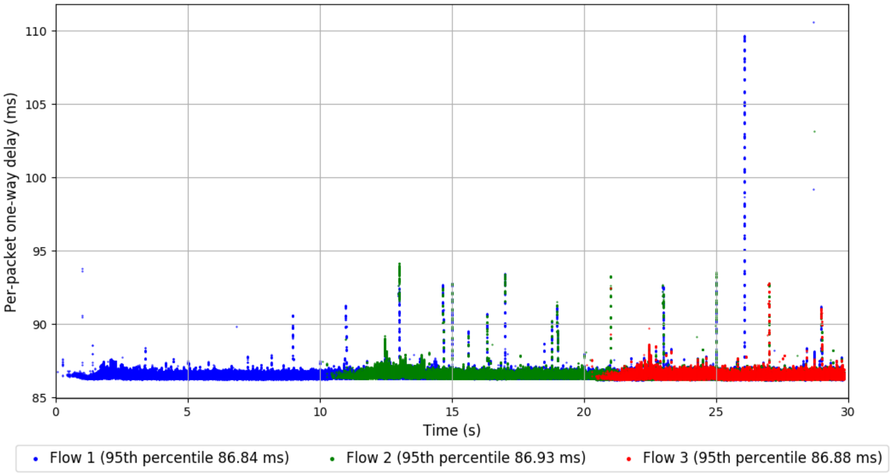




```
Run 7: Statistics of TCP BBR

Start at: 2017-09-18 18:25:01
End at: 2017-09-18 18:25:31

# Below is generated by plot.py at 2017-09-18 20:57:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 238.76 Mbit/s
95th percentile per-packet one-way delay: 86.879 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 122.41 Mbit/s
95th percentile per-packet one-way delay: 86.845 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 119.61 Mbit/s
95th percentile per-packet one-way delay: 86.931 ms
Loss rate: 1.01%
-- Flow 3:
Average throughput: 113.04 Mbit/s
95th percentile per-packet one-way delay: 86.877 ms
Loss rate: 2.01%
```

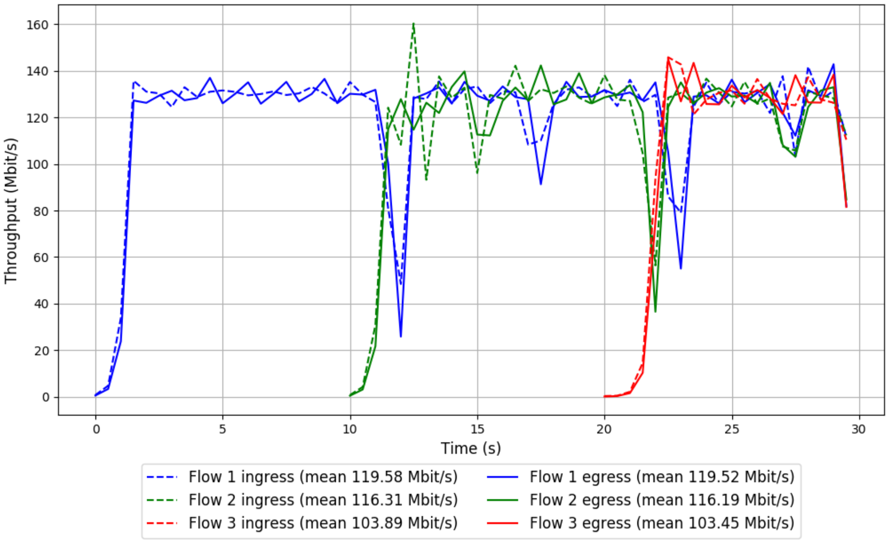
Run 7: Report of TCP BBR — Data Link

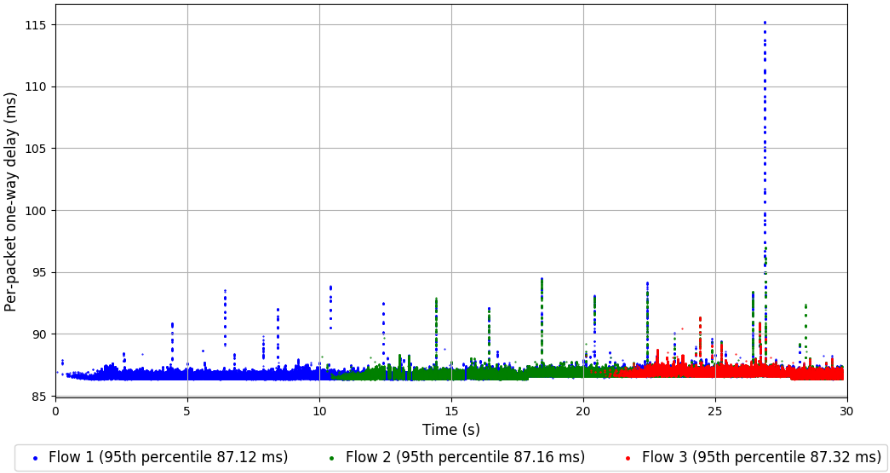




```
Run 8: Statistics of TCP BBR

Start at: 2017-09-18 18:34:53
End at: 2017-09-18 18:35:23

# Below is generated by plot.py at 2017-09-18 20:57:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 230.30 Mbit/s
95th percentile per-packet one-way delay: 87.174 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 119.52 Mbit/s
95th percentile per-packet one-way delay: 87.125 ms
Loss rate: 0.63%
-- Flow 2:
Average throughput: 116.19 Mbit/s
95th percentile per-packet one-way delay: 87.164 ms
Loss rate: 1.03%
-- Flow 3:
Average throughput: 103.45 Mbit/s
95th percentile per-packet one-way delay: 87.316 ms
Loss rate: 2.20%
```

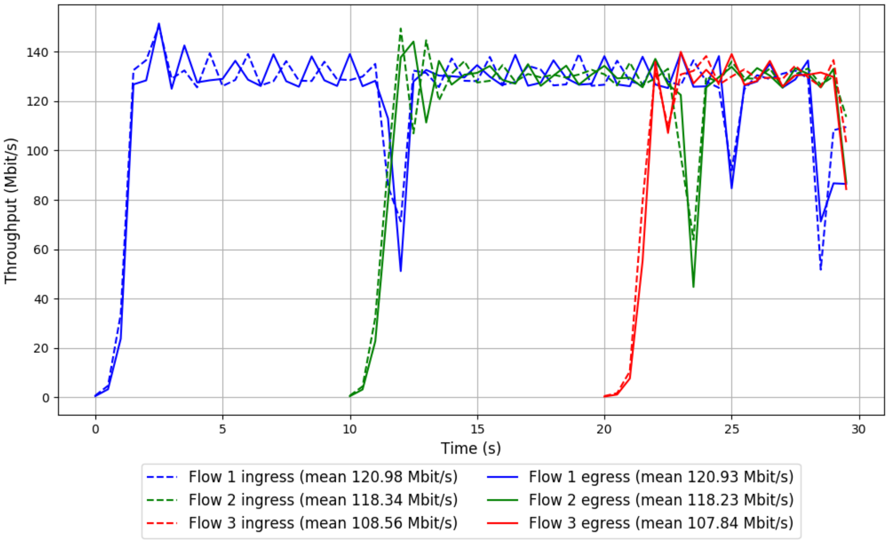
Run 8: Report of TCP BBR — Data Link

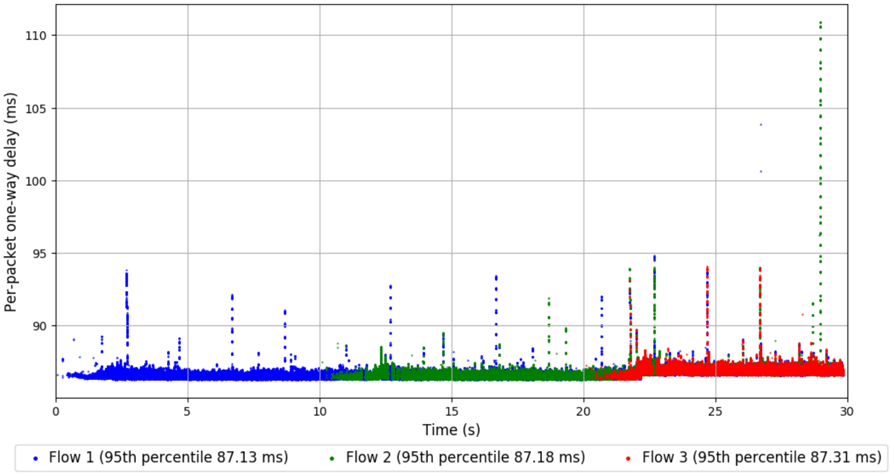




```
Run 9: Statistics of TCP BBR

Start at: 2017-09-18 18:44:39
End at: 2017-09-18 18:45:09

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 234.60 Mbit/s
95th percentile per-packet one-way delay: 87.191 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 120.93 Mbit/s
95th percentile per-packet one-way delay: 87.129 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 118.23 Mbit/s
95th percentile per-packet one-way delay: 87.183 ms
Loss rate: 1.01%
-- Flow 3:
Average throughput: 107.84 Mbit/s
95th percentile per-packet one-way delay: 87.311 ms
Loss rate: 2.08%
```

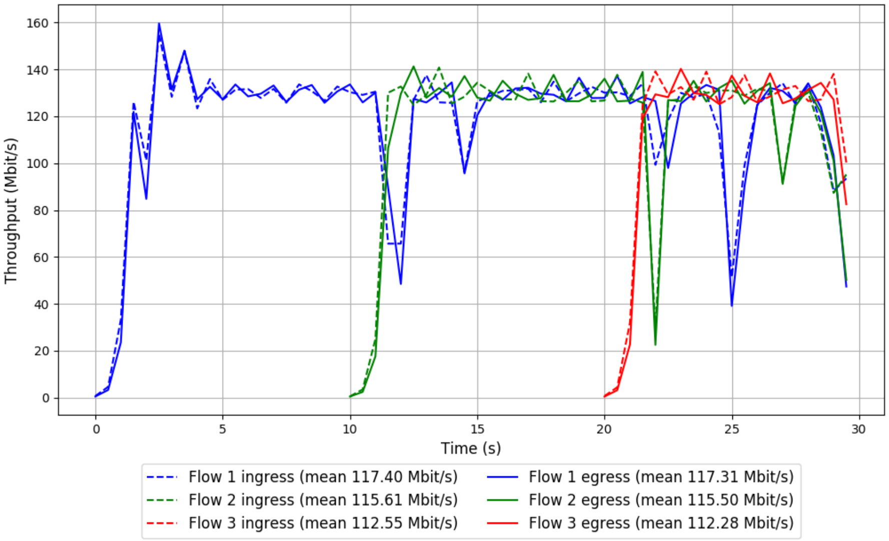
Run 9: Report of TCP BBR — Data Link

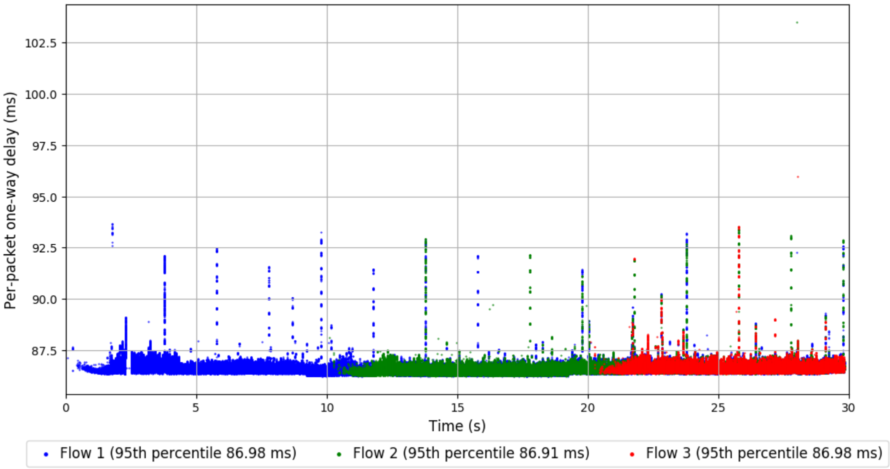




```
Run 10: Statistics of TCP BBR

Start at: 2017-09-18 18:54:22
End at: 2017-09-18 18:54:52

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 230.70 Mbit/s
95th percentile per-packet one-way delay: 86.954 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 117.31 Mbit/s
95th percentile per-packet one-way delay: 86.977 ms
Loss rate: 0.66%
-- Flow 2:
Average throughput: 115.50 Mbit/s
95th percentile per-packet one-way delay: 86.905 ms
Loss rate: 0.98%
-- Flow 3:
Average throughput: 112.28 Mbit/s
95th percentile per-packet one-way delay: 86.977 ms
Loss rate: 2.01%
```

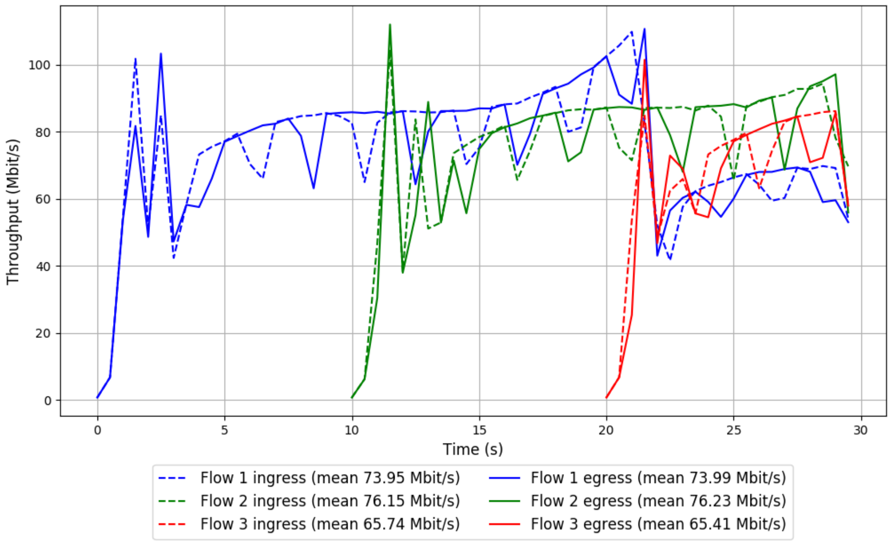
Run 10: Report of TCP BBR — Data Link

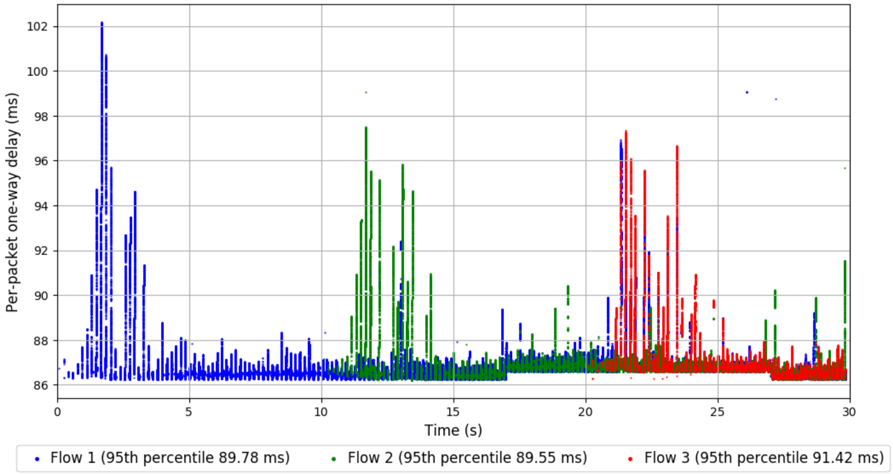




```
Run 1: Statistics of TCP Cubic

Start at: 2017-09-18 17:22:04
End at: 2017-09-18 17:22:34

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 145.99 Mbit/s
95th percentile per-packet one-way delay: 89.904 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 73.99 Mbit/s
95th percentile per-packet one-way delay: 89.783 ms
Loss rate: 0.52%
-- Flow 2:
Average throughput: 76.23 Mbit/s
95th percentile per-packet one-way delay: 89.547 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 65.41 Mbit/s
95th percentile per-packet one-way delay: 91.417 ms
Loss rate: 2.21%
```

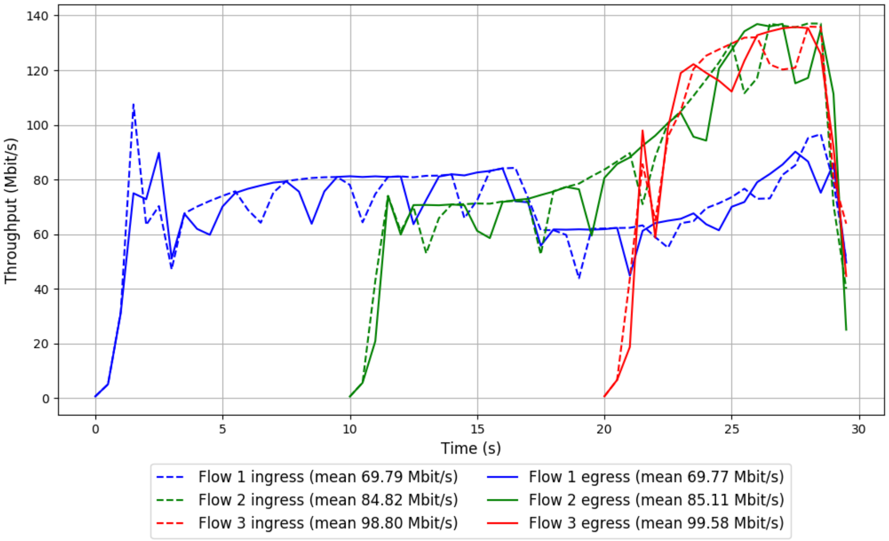
Run 1: Report of TCP Cubic — Data Link

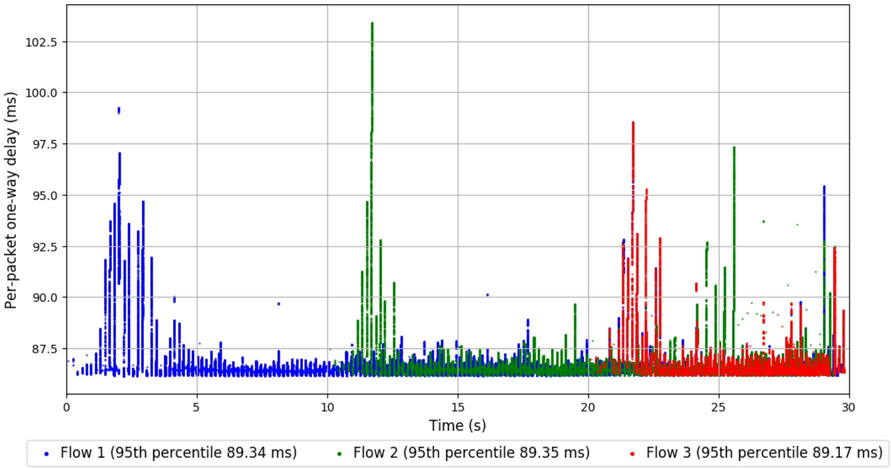




```
Run 2: Statistics of TCP Cubic

Start at: 2017-09-18 17:31:52
End at: 2017-09-18 17:32:22

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 158.55 Mbit/s
95th percentile per-packet one-way delay: 89.317 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 69.77 Mbit/s
95th percentile per-packet one-way delay: 89.345 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 85.11 Mbit/s
95th percentile per-packet one-way delay: 89.353 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 99.58 Mbit/s
95th percentile per-packet one-way delay: 89.169 ms
Loss rate: 0.98%
```

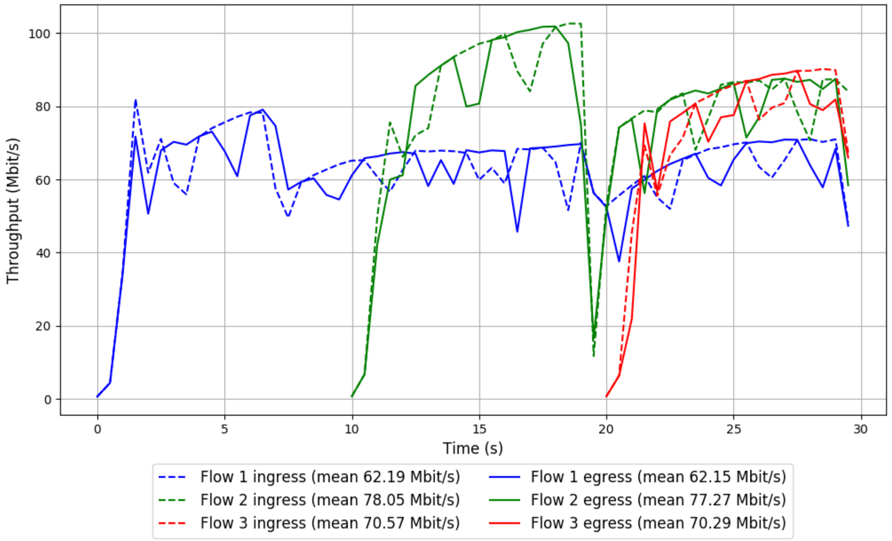
Run 2: Report of TCP Cubic — Data Link

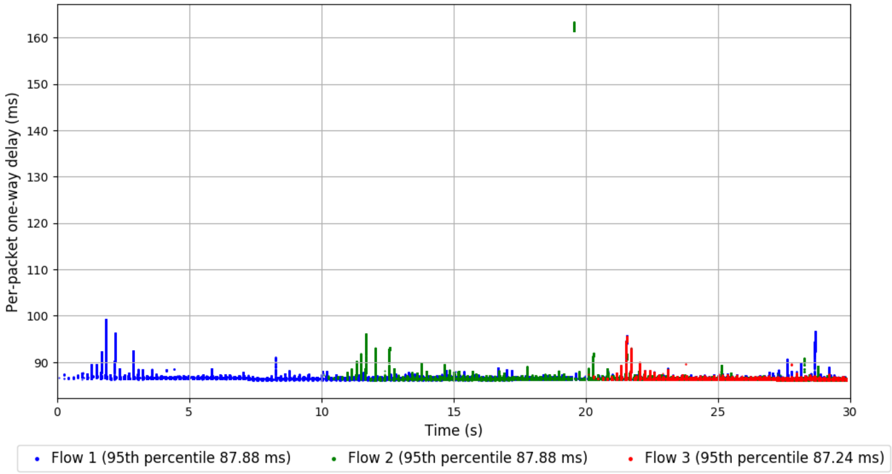




```
Run 3: Statistics of TCP Cubic

Start at: 2017-09-18 17:41:34
End at: 2017-09-18 17:42:04

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 136.33 Mbit/s
95th percentile per-packet one-way delay: 87.812 ms
Loss rate: 1.37%
-- Flow 1:
Average throughput: 62.15 Mbit/s
95th percentile per-packet one-way delay: 87.880 ms
Loss rate: 0.66%
-- Flow 2:
Average throughput: 77.27 Mbit/s
95th percentile per-packet one-way delay: 87.882 ms
Loss rate: 1.86%
-- Flow 3:
Average throughput: 70.29 Mbit/s
95th percentile per-packet one-way delay: 87.241 ms
Loss rate: 2.15%
```

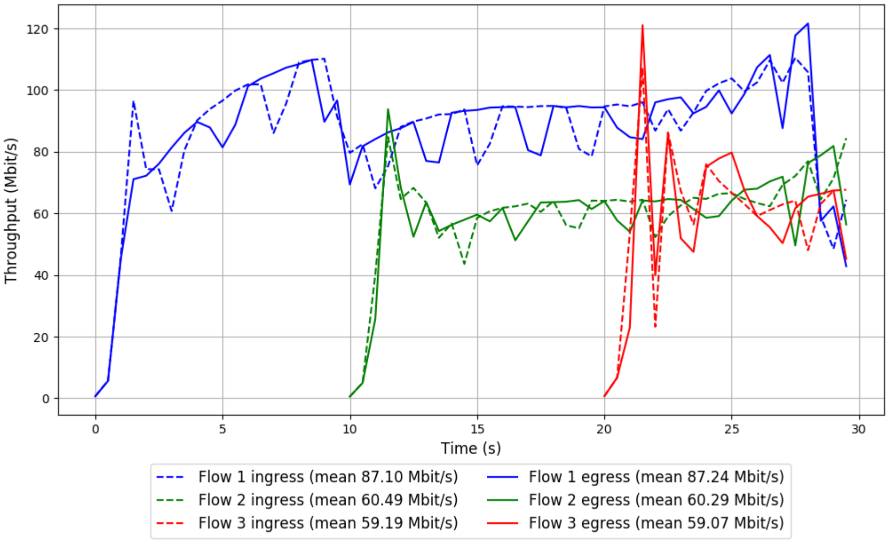
Run 3: Report of TCP Cubic — Data Link

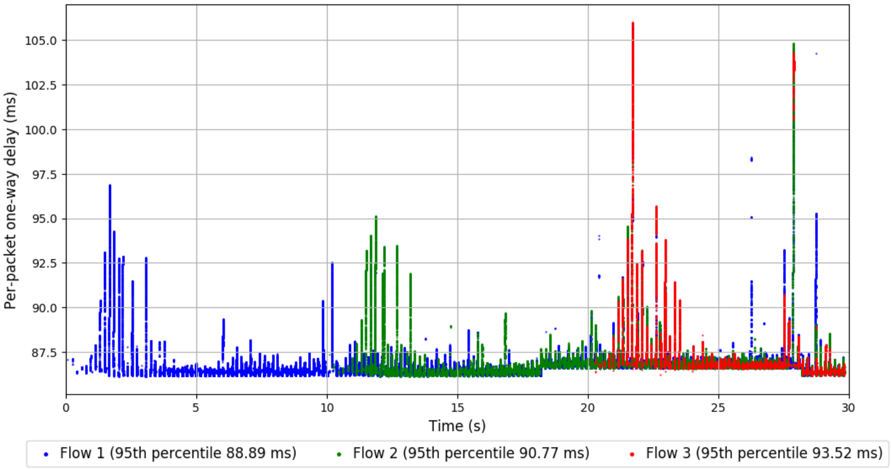




```
Run 4: Statistics of TCP Cubic

Start at: 2017-09-18 17:51:23
End at: 2017-09-18 17:51:53

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 146.50 Mbit/s
95th percentile per-packet one-way delay: 90.190 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 87.24 Mbit/s
95th percentile per-packet one-way delay: 88.885 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 60.29 Mbit/s
95th percentile per-packet one-way delay: 90.769 ms
Loss rate: 1.20%
-- Flow 3:
Average throughput: 59.07 Mbit/s
95th percentile per-packet one-way delay: 93.524 ms
Loss rate: 1.96%
```

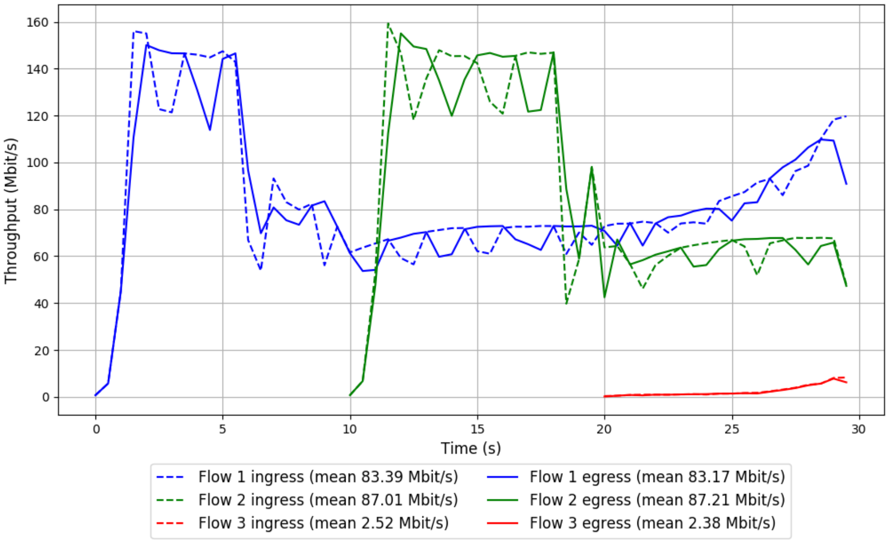
Run 4: Report of TCP Cubic — Data Link

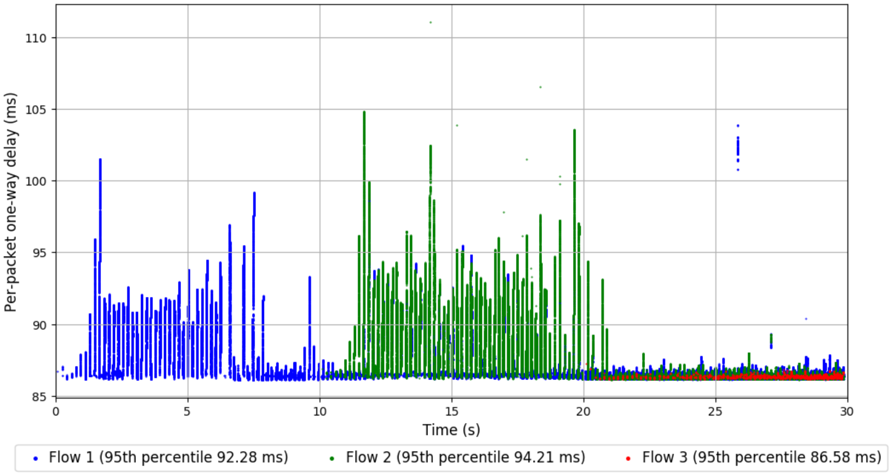




```
Run 5: Statistics of TCP Cubic

Start at: 2017-09-18 18:01:11
End at: 2017-09-18 18:01:41

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 141.86 Mbit/s
95th percentile per-packet one-way delay: 93.249 ms
Loss rate: 0.80%
-- Flow 1:
Average throughput: 83.17 Mbit/s
95th percentile per-packet one-way delay: 92.275 ms
Loss rate: 0.84%
-- Flow 2:
Average throughput: 87.21 Mbit/s
95th percentile per-packet one-way delay: 94.212 ms
Loss rate: 0.65%
-- Flow 3:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 86.575 ms
Loss rate: 7.29%
```

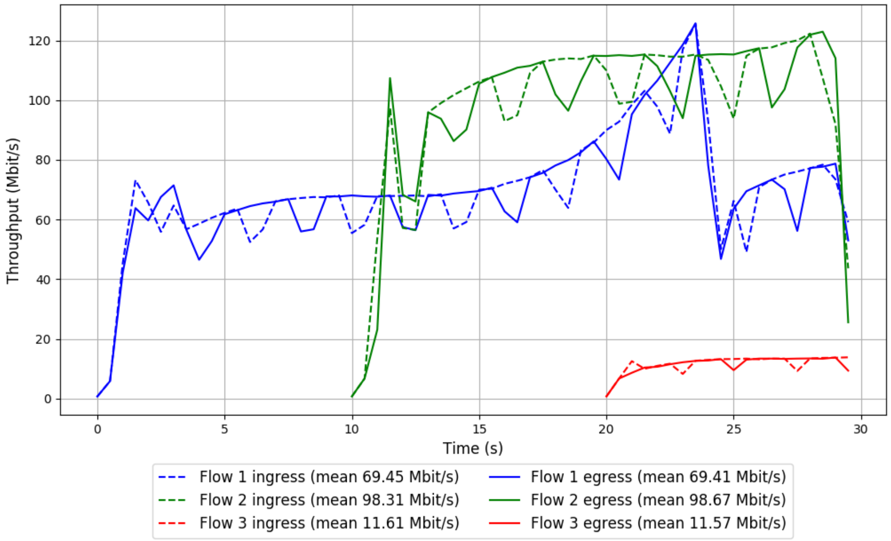
Run 5: Report of TCP Cubic — Data Link

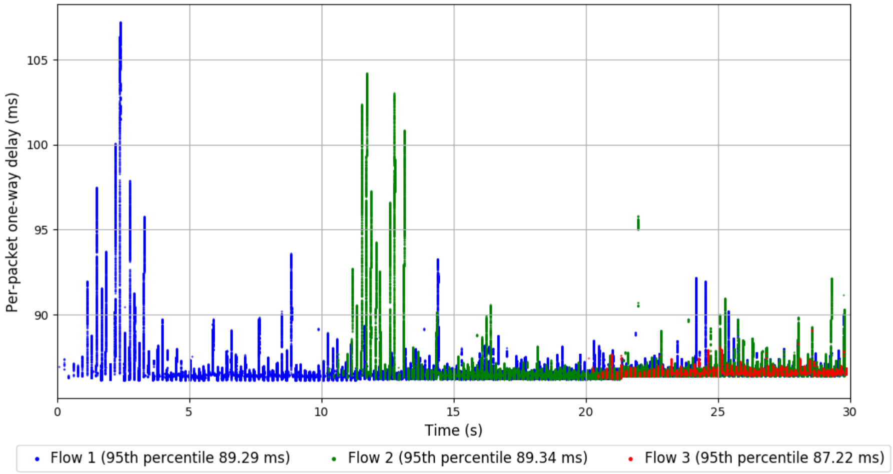




```
Run 6: Statistics of TCP Cubic

Start at: 2017-09-18 18:11:00
End at: 2017-09-18 18:11:30

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 138.43 Mbit/s
95th percentile per-packet one-way delay: 89.211 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 69.41 Mbit/s
95th percentile per-packet one-way delay: 89.292 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 98.67 Mbit/s
95th percentile per-packet one-way delay: 89.337 ms
Loss rate: 0.52%
-- Flow 3:
Average throughput: 11.57 Mbit/s
95th percentile per-packet one-way delay: 87.225 ms
Loss rate: 2.08%
```

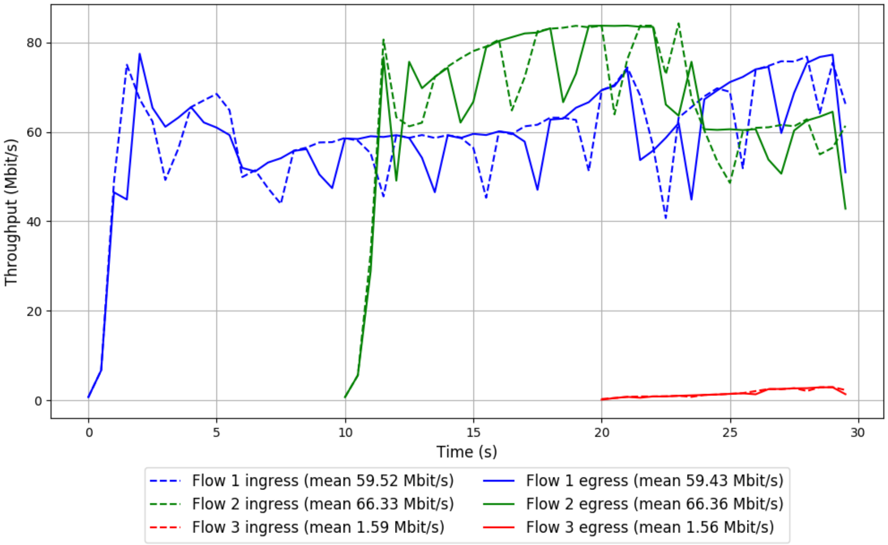
Run 6: Report of TCP Cubic — Data Link

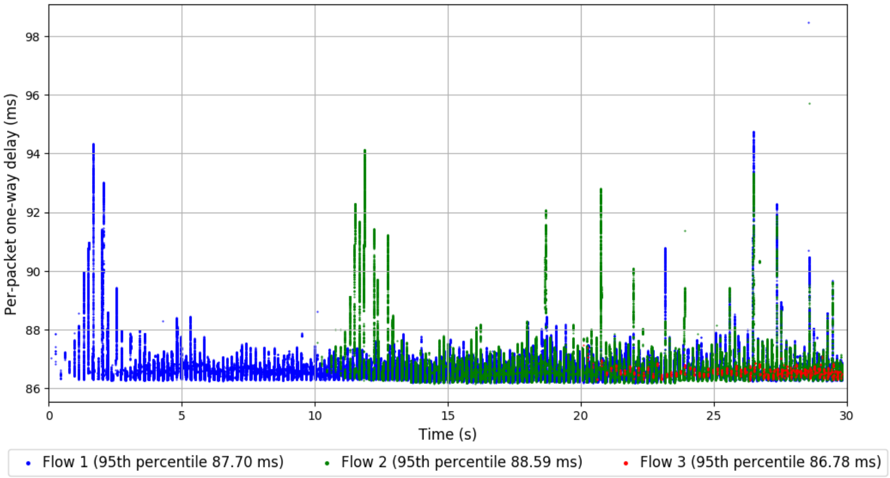




```
Run 7: Statistics of TCP Cubic

Start at: 2017-09-18 18:20:58
End at: 2017-09-18 18:21:28

# Below is generated by plot.py at 2017-09-18 21:01:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 103.93 Mbit/s
95th percentile per-packet one-way delay: 87.913 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 59.43 Mbit/s
95th percentile per-packet one-way delay: 87.699 ms
Loss rate: 0.73%
-- Flow 2:
Average throughput: 66.36 Mbit/s
95th percentile per-packet one-way delay: 88.593 ms
Loss rate: 0.84%
-- Flow 3:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 86.783 ms
Loss rate: 4.03%
```

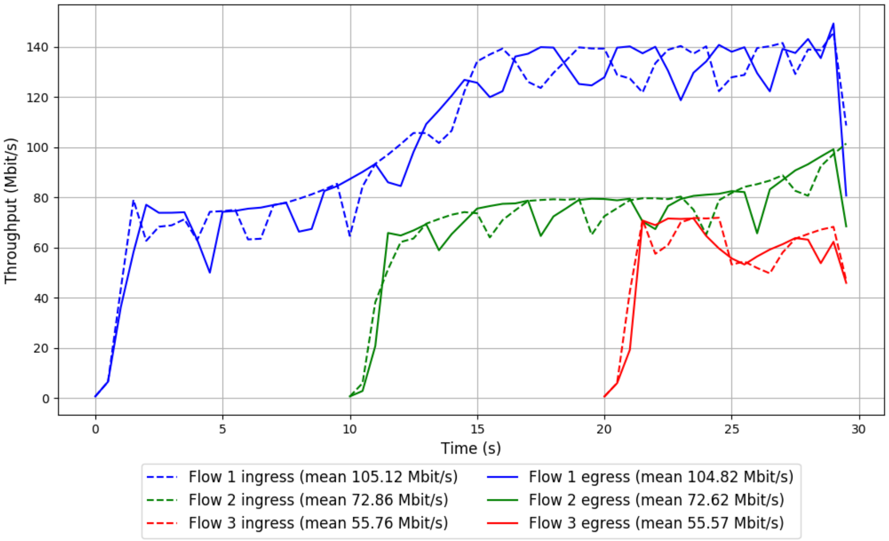
Run 7: Report of TCP Cubic — Data Link

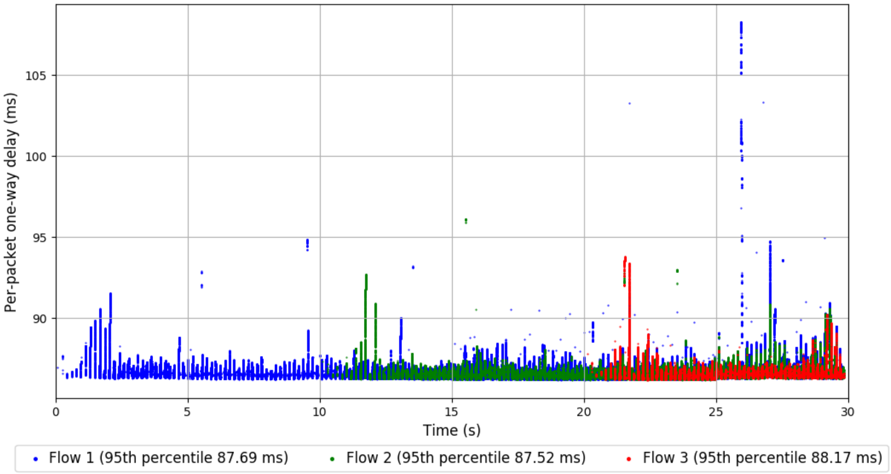




```
Run 8: Statistics of TCP Cubic

Start at: 2017-09-18 18:30:46
End at: 2017-09-18 18:31:16

# Below is generated by plot.py at 2017-09-18 21:02:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 171.12 Mbit/s
95th percentile per-packet one-way delay: 87.662 ms
Loss rate: 1.05%
-- Flow 1:
Average throughput: 104.82 Mbit/s
95th percentile per-packet one-way delay: 87.686 ms
Loss rate: 0.79%
-- Flow 2:
Average throughput: 72.62 Mbit/s
95th percentile per-packet one-way delay: 87.518 ms
Loss rate: 1.20%
-- Flow 3:
Average throughput: 55.57 Mbit/s
95th percentile per-packet one-way delay: 88.172 ms
Loss rate: 2.10%
```

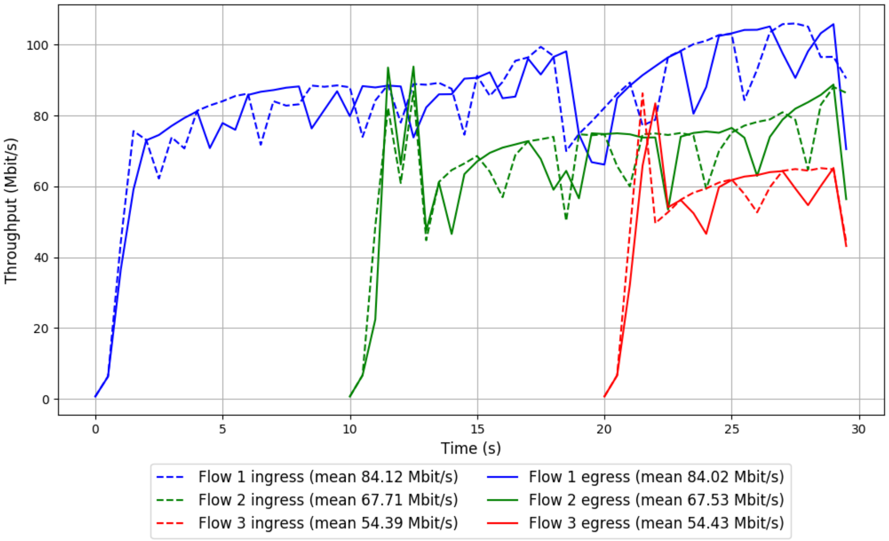
Run 8: Report of TCP Cubic — Data Link

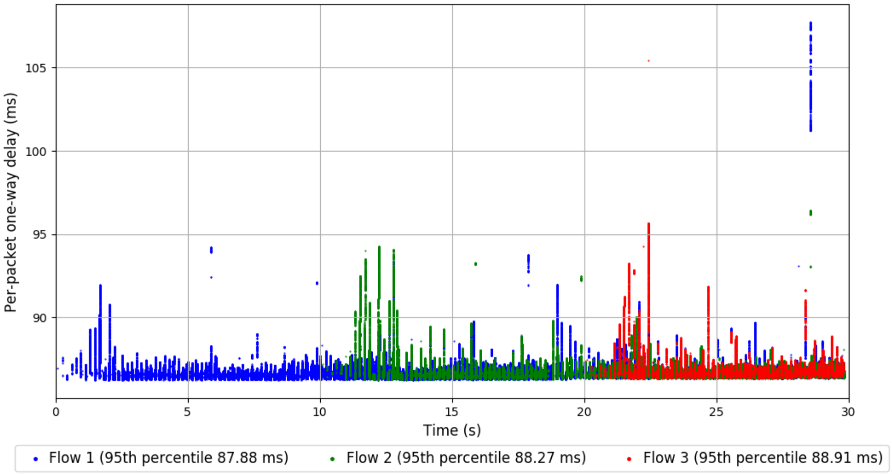




```
Run 9: Statistics of TCP Cubic

Start at: 2017-09-18 18:40:32
End at: 2017-09-18 18:41:02

# Below is generated by plot.py at 2017-09-18 21:02:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 146.50 Mbit/s
95th percentile per-packet one-way delay: 88.101 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 84.02 Mbit/s
95th percentile per-packet one-way delay: 87.876 ms
Loss rate: 0.70%
-- Flow 2:
Average throughput: 67.53 Mbit/s
95th percentile per-packet one-way delay: 88.273 ms
Loss rate: 1.15%
-- Flow 3:
Average throughput: 54.43 Mbit/s
95th percentile per-packet one-way delay: 88.910 ms
Loss rate: 2.01%
```

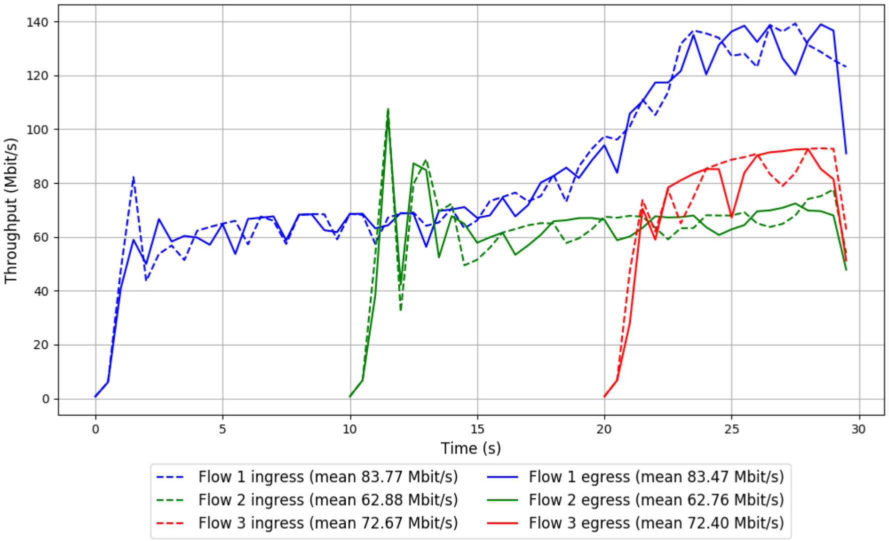
Run 9: Report of TCP Cubic — Data Link

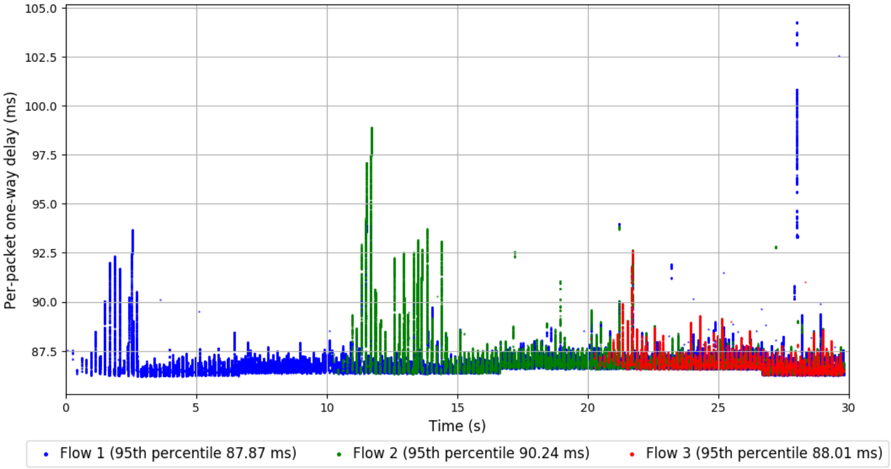




```
Run 10: Statistics of TCP Cubic

Start at: 2017-09-18 18:50:15
End at: 2017-09-18 18:50:45

# Below is generated by plot.py at 2017-09-18 21:02:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 148.70 Mbit/s
95th percentile per-packet one-way delay: 88.412 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 83.47 Mbit/s
95th percentile per-packet one-way delay: 87.873 ms
Loss rate: 0.94%
-- Flow 2:
Average throughput: 62.76 Mbit/s
95th percentile per-packet one-way delay: 90.241 ms
Loss rate: 1.07%
-- Flow 3:
Average throughput: 72.40 Mbit/s
95th percentile per-packet one-way delay: 88.011 ms
Loss rate: 2.16%
```

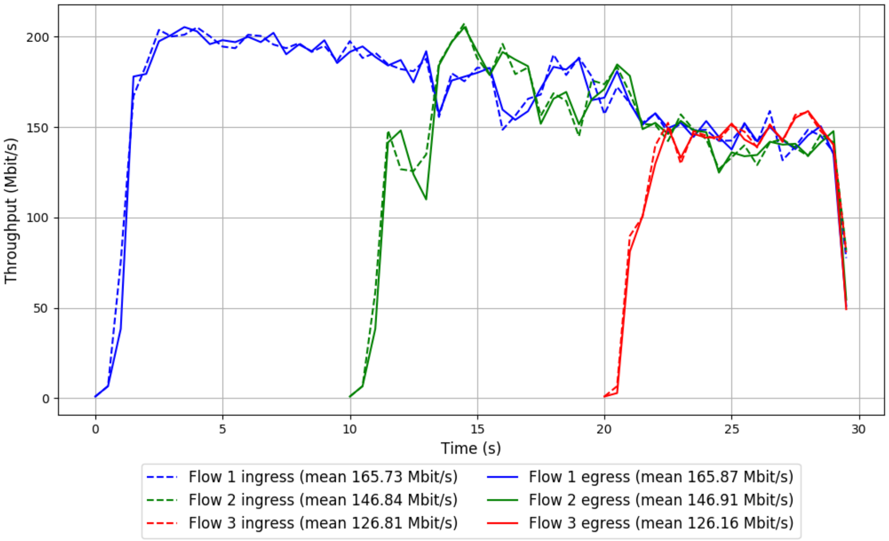
Run 10: Report of TCP Cubic — Data Link

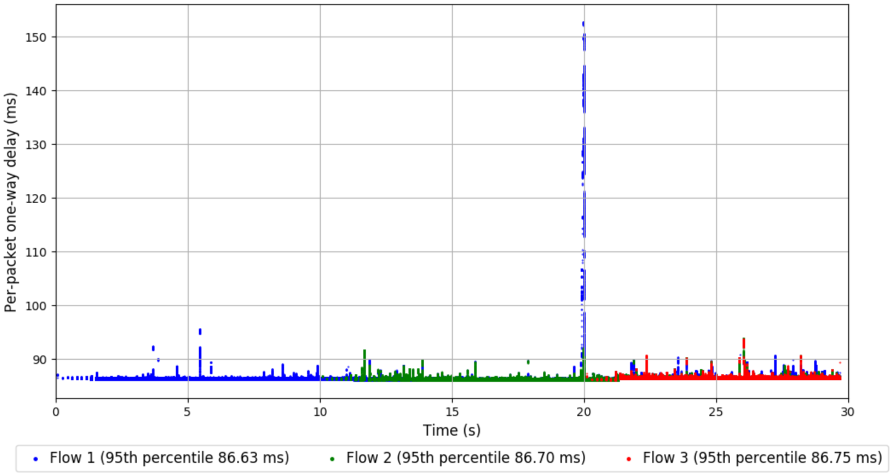




```
Run 1: Statistics of Indigo

Start at: 2017-09-18 17:24:20
End at: 2017-09-18 17:24:50

# Below is generated by plot.py at 2017-09-18 21:05:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 303.82 Mbit/s
95th percentile per-packet one-way delay: 86.674 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 165.87 Mbit/s
95th percentile per-packet one-way delay: 86.628 ms
Loss rate: 0.50%
-- Flow 2:
Average throughput: 146.91 Mbit/s
95th percentile per-packet one-way delay: 86.699 ms
Loss rate: 0.85%
-- Flow 3:
Average throughput: 126.16 Mbit/s
95th percentile per-packet one-way delay: 86.752 ms
Loss rate: 2.27%
```

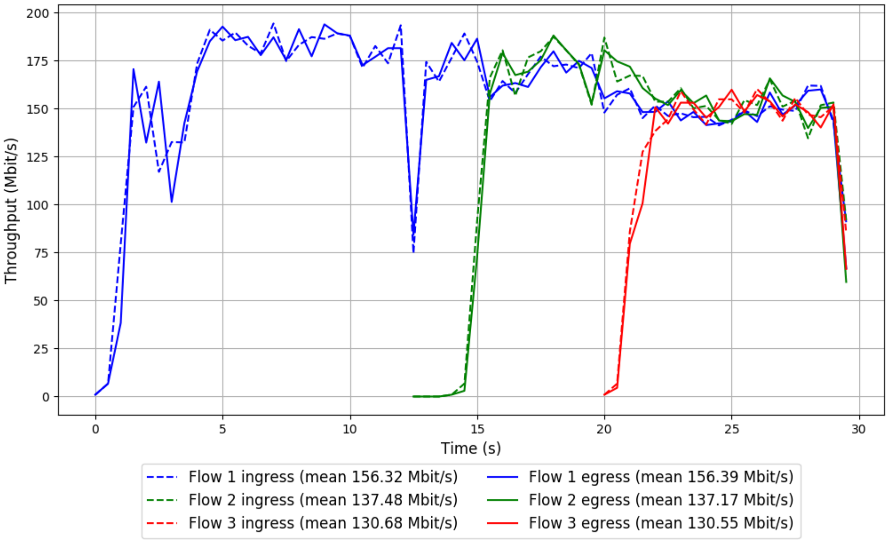
Run 1: Report of Indigo — Data Link

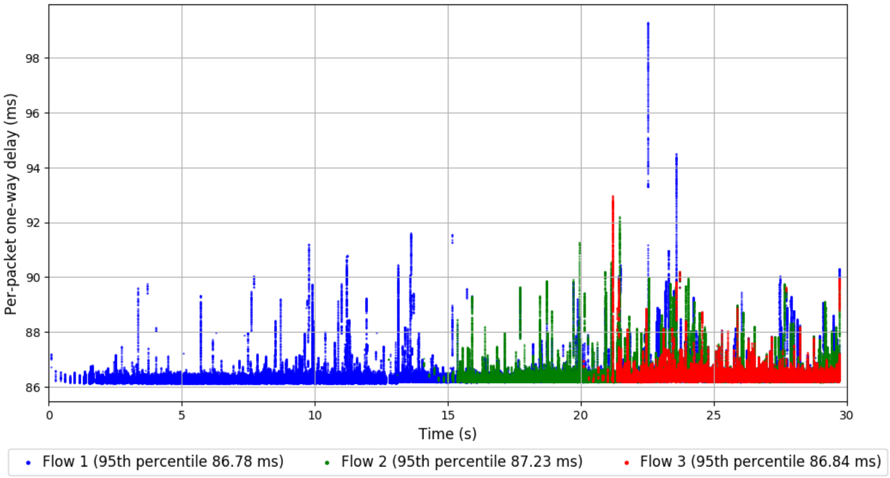




```
Run 2: Statistics of Indigo

Start at: 2017-09-18 17:34:08
End at: 2017-09-18 17:34:38

# Below is generated by plot.py at 2017-09-18 21:05:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 277.09 Mbit/s
95th percentile per-packet one-way delay: 86.922 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 156.39 Mbit/s
95th percentile per-packet one-way delay: 86.775 ms
Loss rate: 0.54%
-- Flow 2:
Average throughput: 137.17 Mbit/s
95th percentile per-packet one-way delay: 87.228 ms
Loss rate: 1.24%
-- Flow 3:
Average throughput: 130.55 Mbit/s
95th percentile per-packet one-way delay: 86.845 ms
Loss rate: 1.88%
```

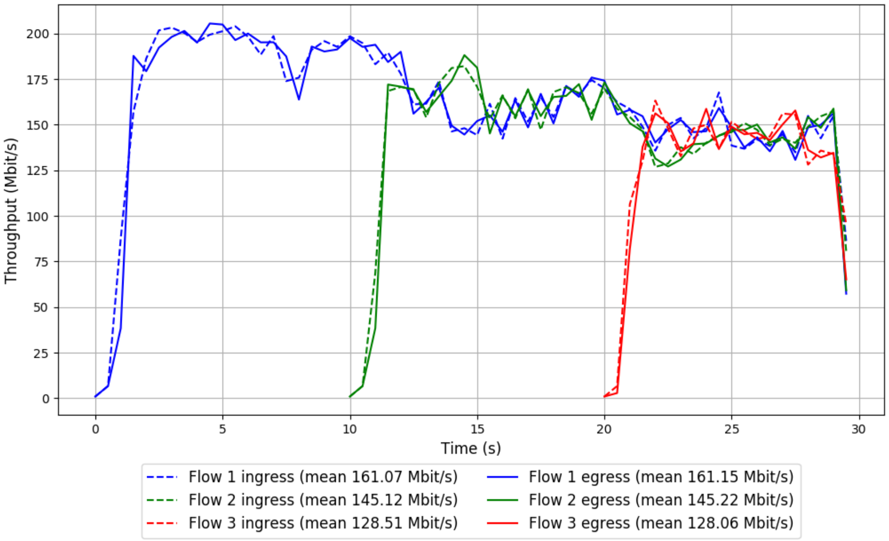
Run 2: Report of Indigo — Data Link

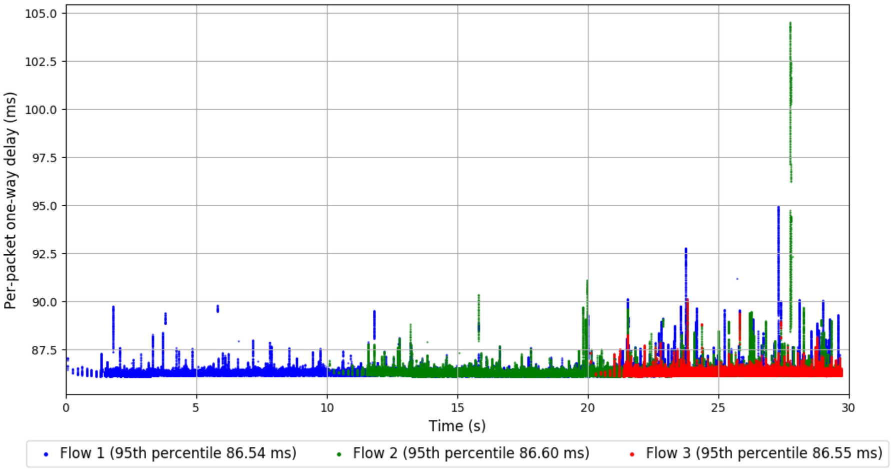




```
Run 3: Statistics of Indigo

Start at: 2017-09-18 17:43:48
End at: 2017-09-18 17:44:18

# Below is generated by plot.py at 2017-09-18 21:06:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 298.75 Mbit/s
95th percentile per-packet one-way delay: 86.559 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 161.15 Mbit/s
95th percentile per-packet one-way delay: 86.536 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 145.22 Mbit/s
95th percentile per-packet one-way delay: 86.597 ms
Loss rate: 0.82%
-- Flow 3:
Average throughput: 128.06 Mbit/s
95th percentile per-packet one-way delay: 86.551 ms
Loss rate: 2.13%
```

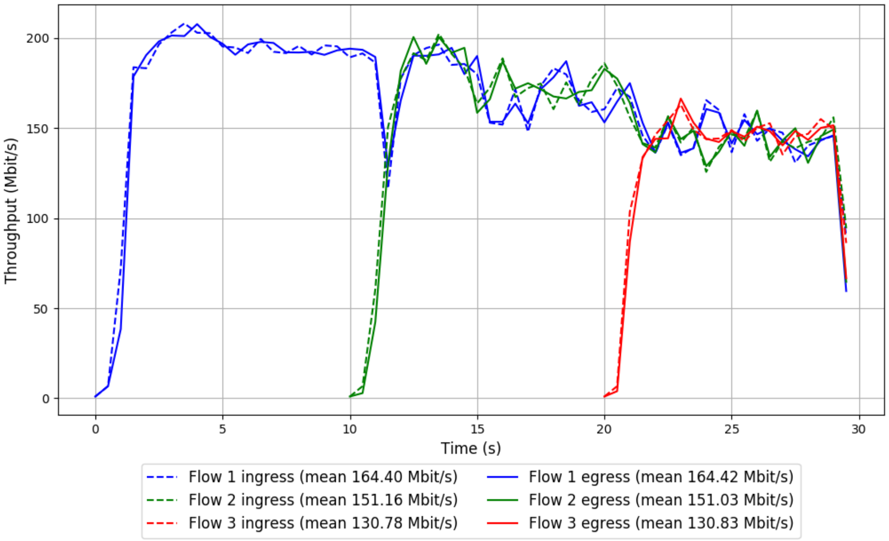
Run 3: Report of Indigo — Data Link

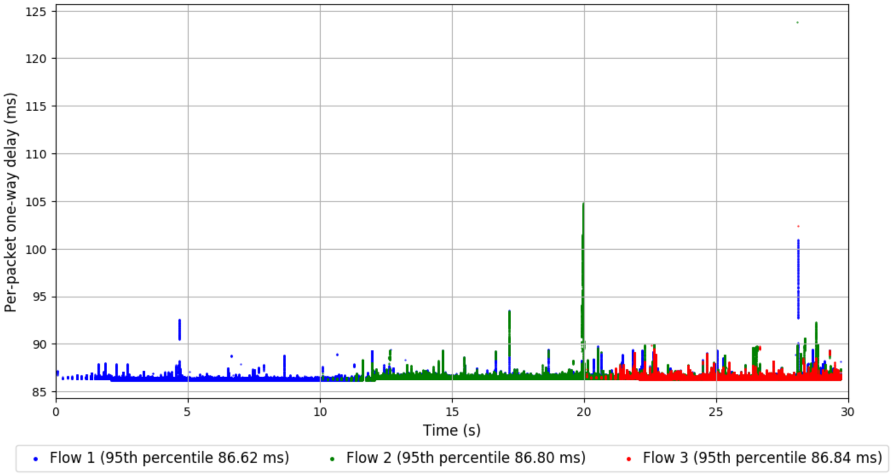




```
Run 4: Statistics of Indigo

Start at: 2017-09-18 17:53:39
End at: 2017-09-18 17:54:09

# Below is generated by plot.py at 2017-09-18 21:06:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 306.69 Mbit/s
95th percentile per-packet one-way delay: 86.697 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 164.42 Mbit/s
95th percentile per-packet one-way delay: 86.618 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 151.03 Mbit/s
95th percentile per-packet one-way delay: 86.803 ms
Loss rate: 0.98%
-- Flow 3:
Average throughput: 130.83 Mbit/s
95th percentile per-packet one-way delay: 86.840 ms
Loss rate: 1.74%
```

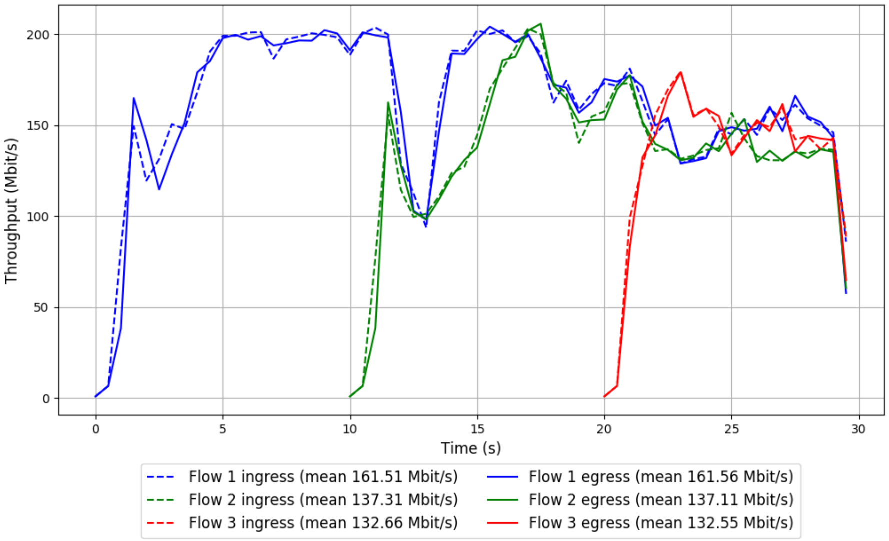
Run 4: Report of Indigo — Data Link

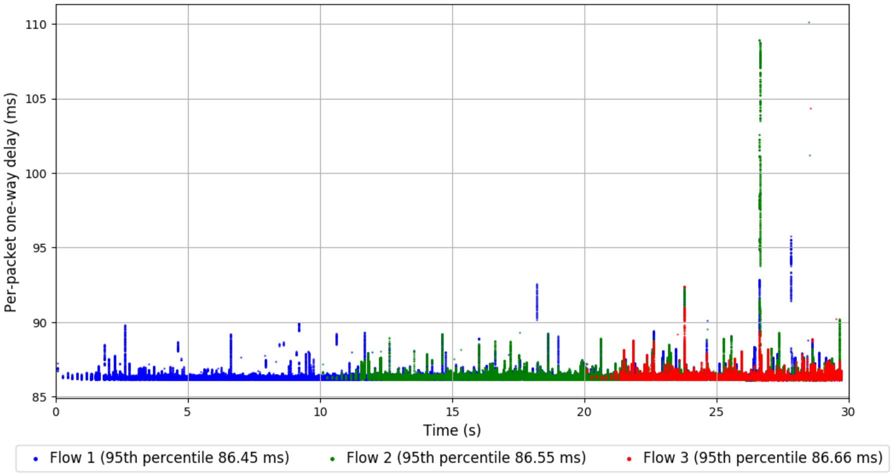




```
Run 5: Statistics of Indigo

Start at: 2017-09-18 18:03:25
End at: 2017-09-18 18:03:55

# Below is generated by plot.py at 2017-09-18 21:06:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 295.32 Mbit/s
95th percentile per-packet one-way delay: 86.505 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 161.56 Mbit/s
95th percentile per-packet one-way delay: 86.451 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 137.11 Mbit/s
95th percentile per-packet one-way delay: 86.551 ms
Loss rate: 1.03%
-- Flow 3:
Average throughput: 132.55 Mbit/s
95th percentile per-packet one-way delay: 86.655 ms
Loss rate: 1.85%
```

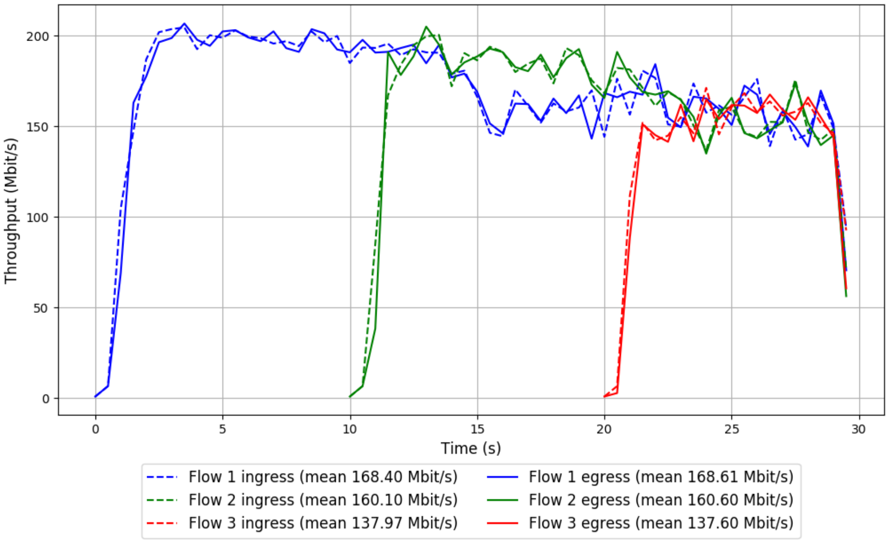
Run 5: Report of Indigo — Data Link

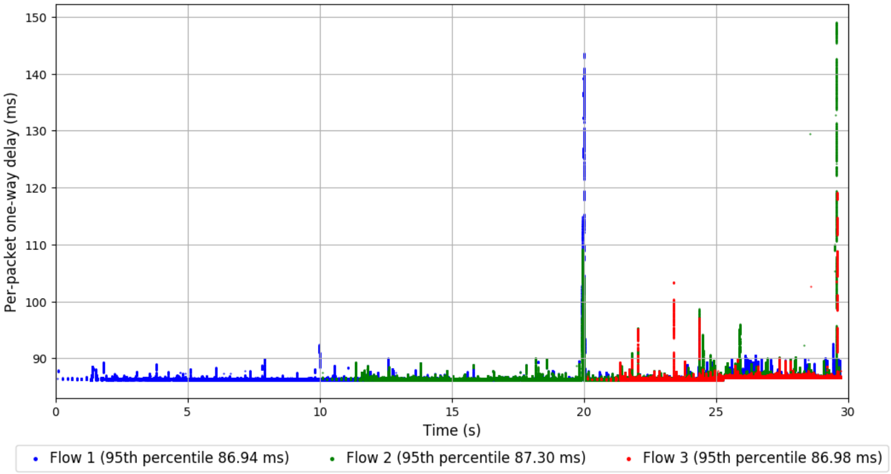




```
Run 6: Statistics of Indigo

Start at: 2017-09-18 18:13:16
End at: 2017-09-18 18:13:46

# Below is generated by plot.py at 2017-09-18 21:08:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 319.33 Mbit/s
95th percentile per-packet one-way delay: 87.045 ms
Loss rate: 0.77%
-- Flow 1:
Average throughput: 168.61 Mbit/s
95th percentile per-packet one-way delay: 86.935 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 160.60 Mbit/s
95th percentile per-packet one-way delay: 87.303 ms
Loss rate: 0.72%
-- Flow 3:
Average throughput: 137.60 Mbit/s
95th percentile per-packet one-way delay: 86.983 ms
Loss rate: 2.06%
```

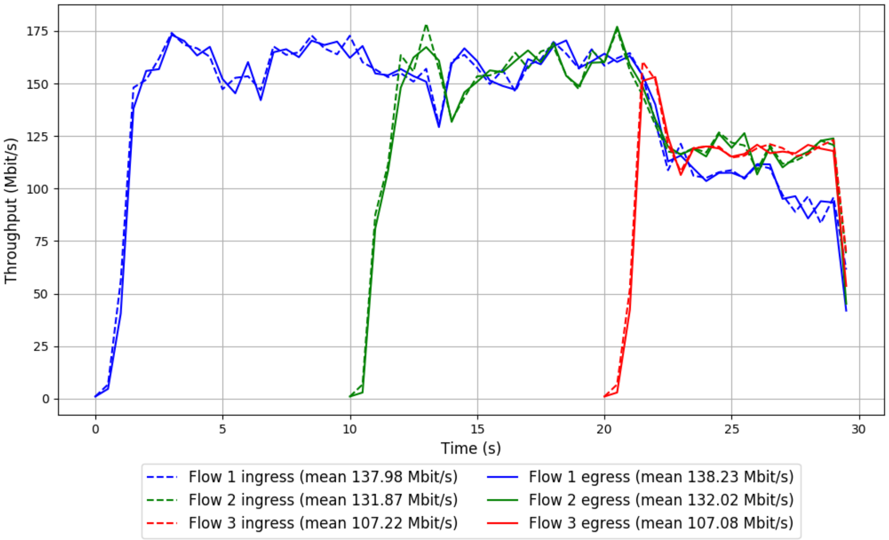
Run 6: Report of Indigo — Data Link

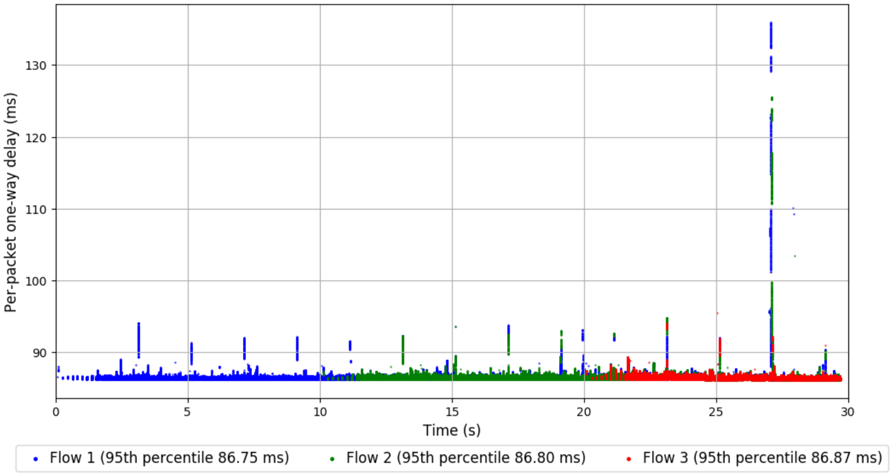




```
Run 7: Statistics of Indigo

Start at: 2017-09-18 18:23:07
End at: 2017-09-18 18:23:37

# Below is generated by plot.py at 2017-09-18 21:08:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 260.17 Mbit/s
95th percentile per-packet one-way delay: 86.785 ms
Loss rate: 0.74%
-- Flow 1:
Average throughput: 138.23 Mbit/s
95th percentile per-packet one-way delay: 86.754 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 132.02 Mbit/s
95th percentile per-packet one-way delay: 86.799 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 107.08 Mbit/s
95th percentile per-packet one-way delay: 86.867 ms
Loss rate: 1.93%
```

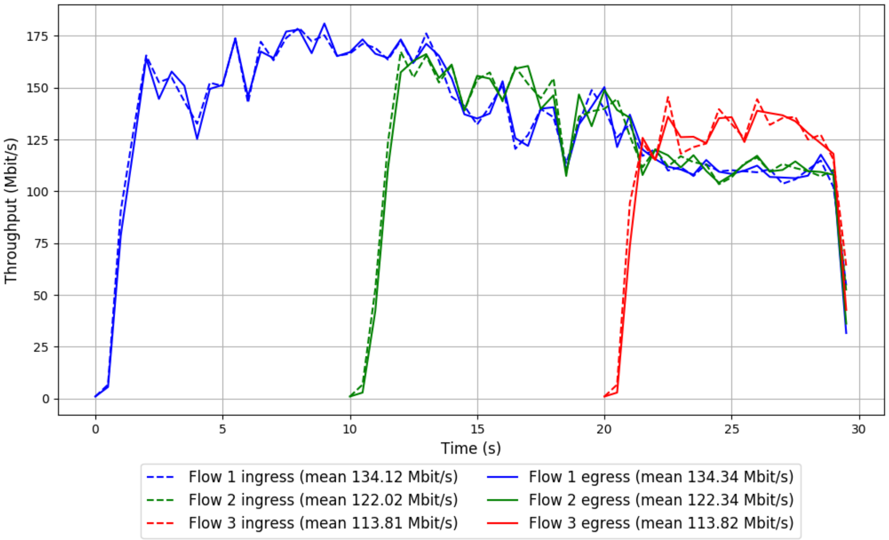
Run 7: Report of Indigo — Data Link

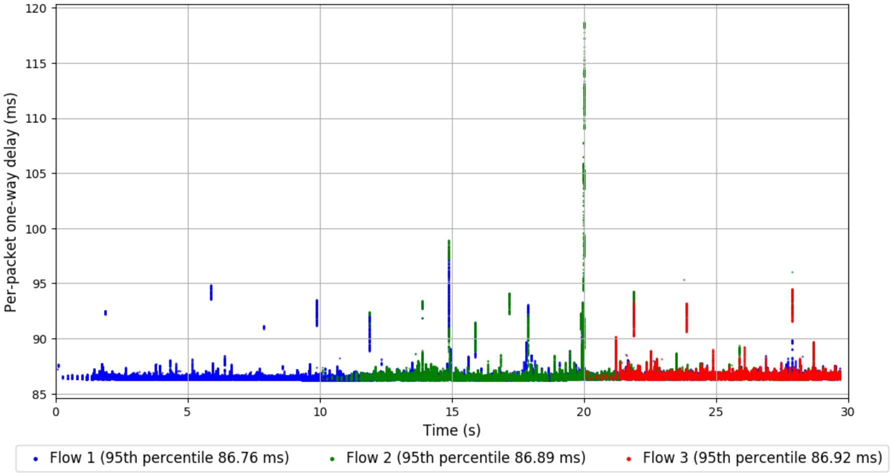




```
Run 8: Statistics of Indigo

Start at: 2017-09-18 18:33:02
End at: 2017-09-18 18:33:32

# Below is generated by plot.py at 2017-09-18 21:08:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 252.14 Mbit/s
95th percentile per-packet one-way delay: 86.832 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 134.34 Mbit/s
95th percentile per-packet one-way delay: 86.763 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 122.34 Mbit/s
95th percentile per-packet one-way delay: 86.890 ms
Loss rate: 0.71%
-- Flow 3:
Average throughput: 113.82 Mbit/s
95th percentile per-packet one-way delay: 86.925 ms
Loss rate: 1.83%
```

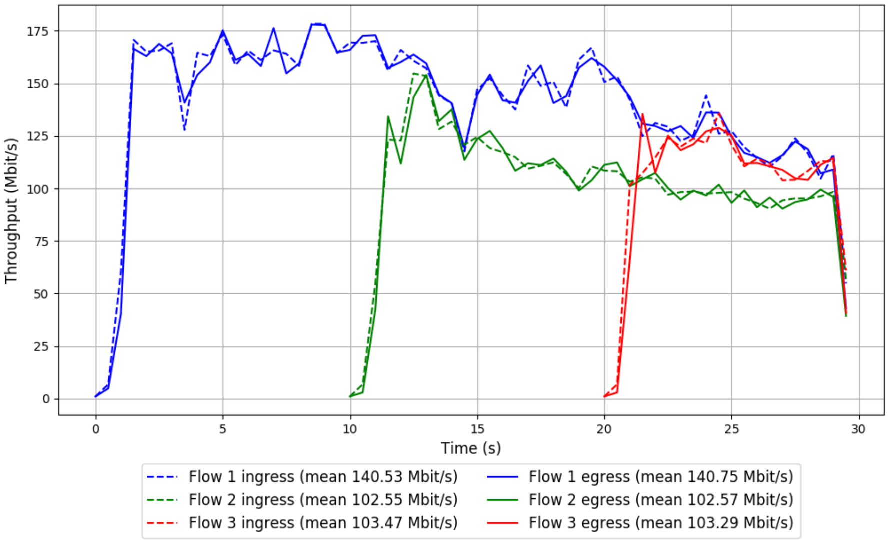
Run 8: Report of Indigo — Data Link

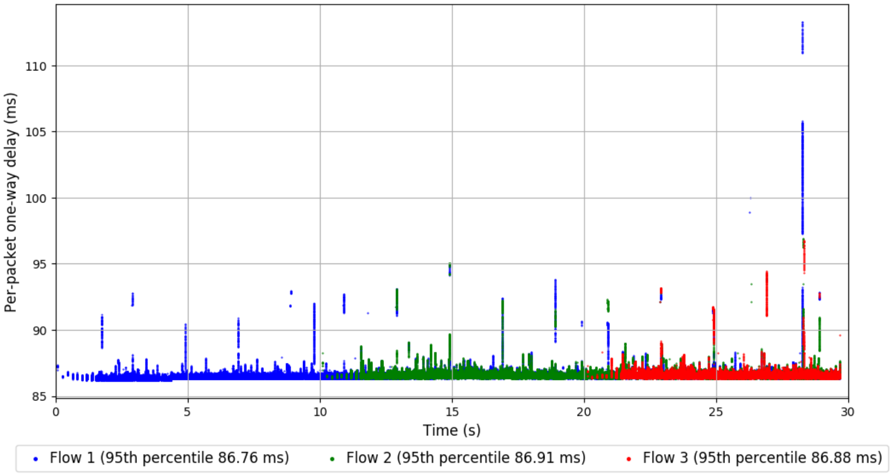




```
Run 9: Statistics of Indigo

Start at: 2017-09-18 18:42:47
End at: 2017-09-18 18:43:17

# Below is generated by plot.py at 2017-09-18 21:09:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 241.99 Mbit/s
95th percentile per-packet one-way delay: 86.822 ms
Loss rate: 0.77%
-- Flow 1:
Average throughput: 140.75 Mbit/s
95th percentile per-packet one-way delay: 86.758 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 102.57 Mbit/s
95th percentile per-packet one-way delay: 86.906 ms
Loss rate: 0.87%
-- Flow 3:
Average throughput: 103.29 Mbit/s
95th percentile per-packet one-way delay: 86.875 ms
Loss rate: 1.95%
```

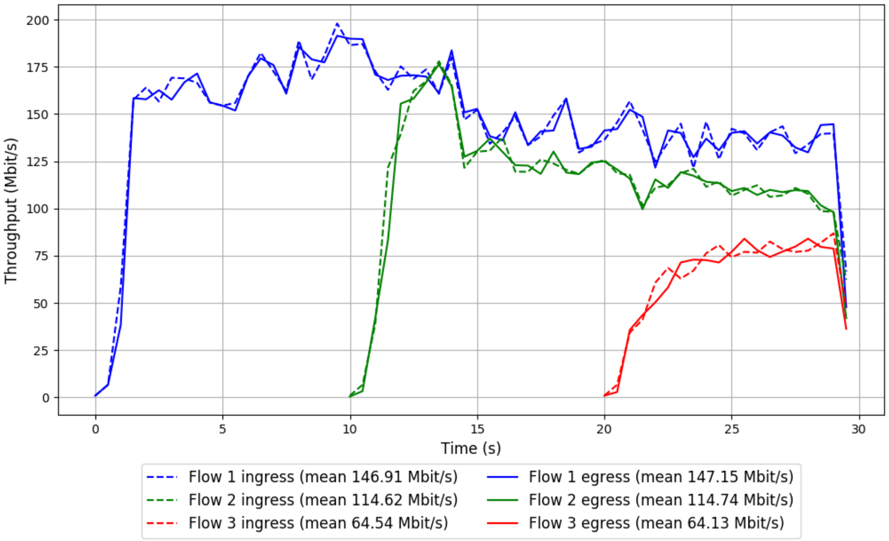
Run 9: Report of Indigo — Data Link

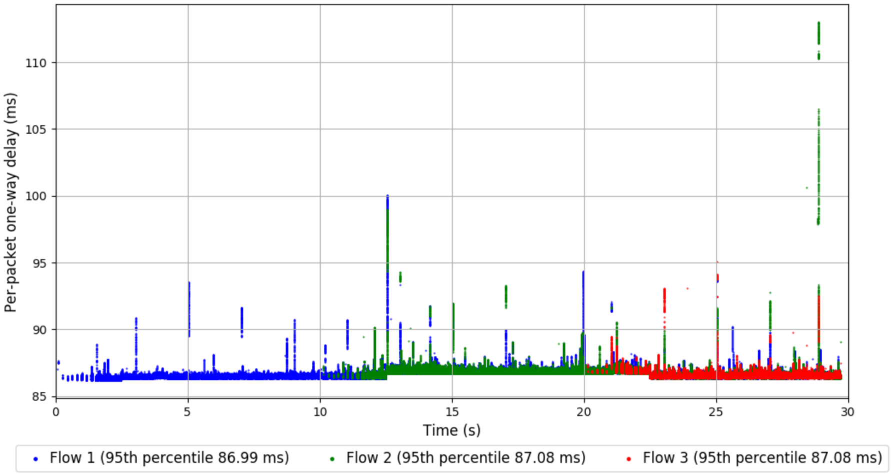




```
Run 10: Statistics of Indigo

Start at: 2017-09-18 18:52:29
End at: 2017-09-18 18:52:59

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 243.66 Mbit/s
95th percentile per-packet one-way delay: 87.021 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 147.15 Mbit/s
95th percentile per-packet one-way delay: 86.988 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 114.74 Mbit/s
95th percentile per-packet one-way delay: 87.075 ms
Loss rate: 0.76%
-- Flow 3:
Average throughput: 64.13 Mbit/s
95th percentile per-packet one-way delay: 87.077 ms
Loss rate: 2.40%
```

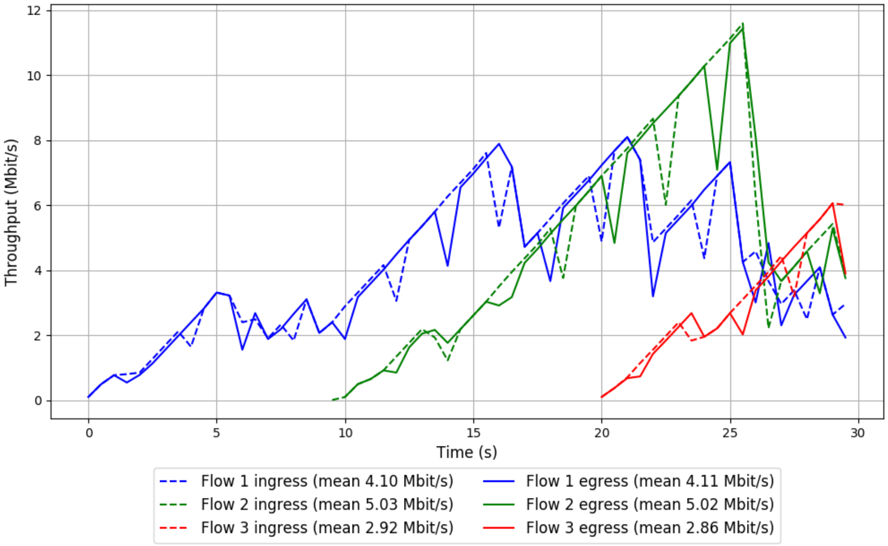
Run 10: Report of Indigo — Data Link

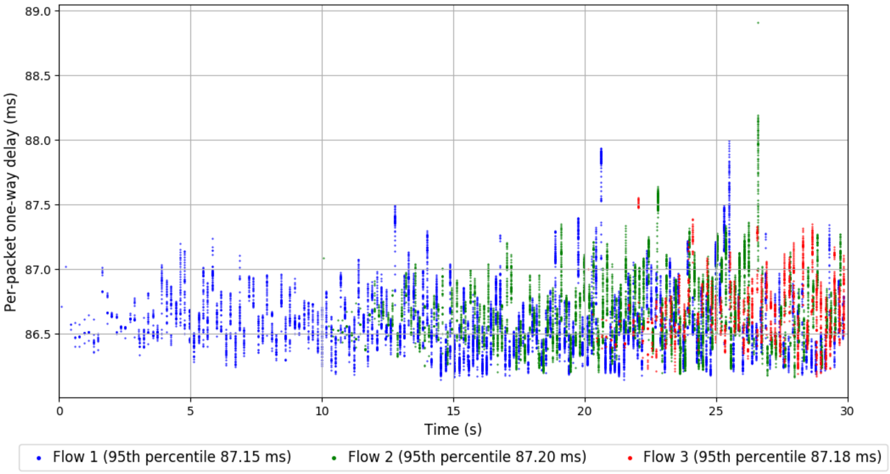




```
Run 1: Statistics of LEDBAT

Start at: 2017-09-18 17:27:12
End at: 2017-09-18 17:27:42

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.35 Mbit/s
95th percentile per-packet one-way delay: 87.182 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 4.11 Mbit/s
95th percentile per-packet one-way delay: 87.149 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 5.02 Mbit/s
95th percentile per-packet one-way delay: 87.201 ms
Loss rate: 1.00%
-- Flow 3:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 87.182 ms
Loss rate: 3.65%
```

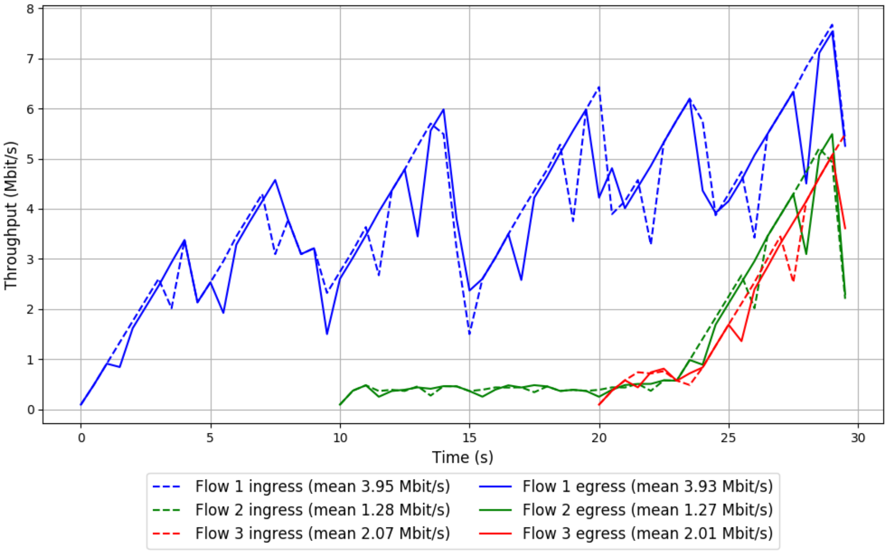
Run 1: Report of LEDBAT — Data Link

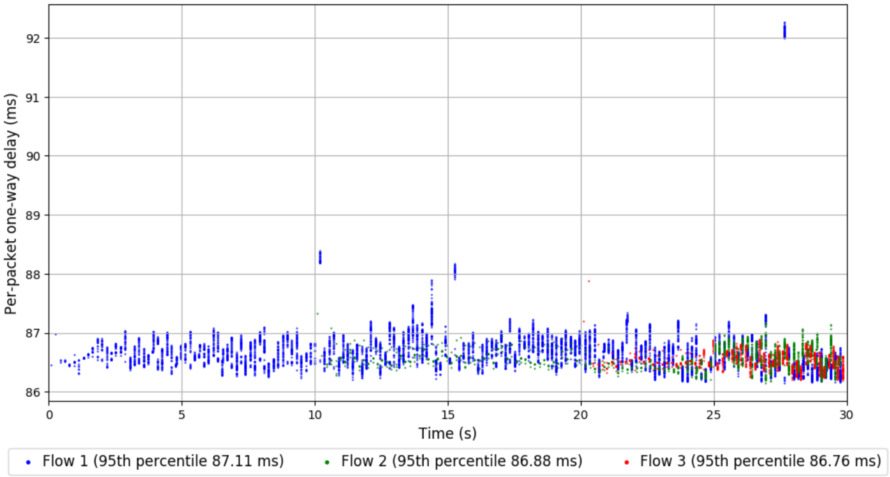




```
Run 2: Statistics of LEDBAT

Start at: 2017-09-18 17:37:01
End at: 2017-09-18 17:37:31

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.41 Mbit/s
95th percentile per-packet one-way delay: 87.043 ms
Loss rate: 1.75%
-- Flow 1:
Average throughput: 3.93 Mbit/s
95th percentile per-packet one-way delay: 87.111 ms
Loss rate: 1.15%
-- Flow 2:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 86.880 ms
Loss rate: 2.21%
-- Flow 3:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 86.764 ms
Loss rate: 4.57%
```

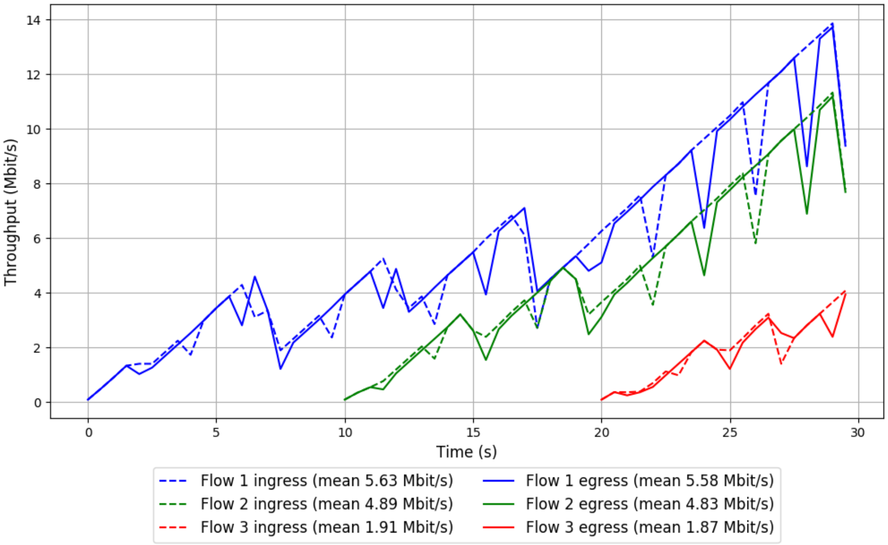
Run 2: Report of LEDBAT — Data Link

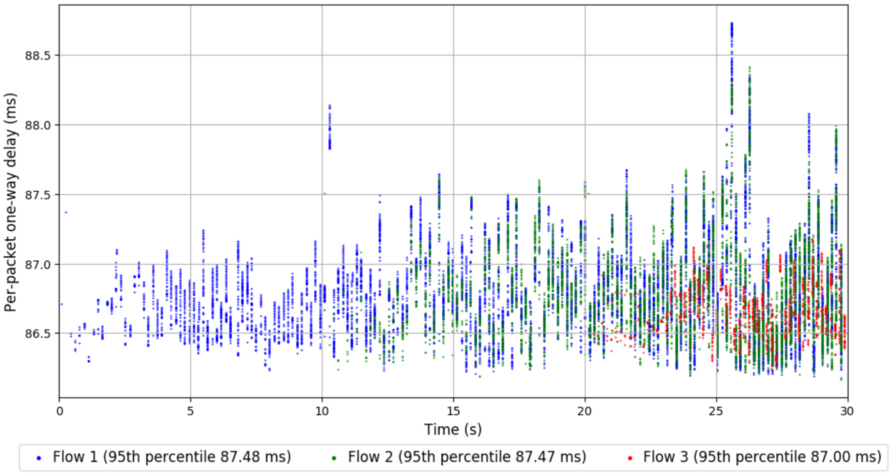




```
Run 3: Statistics of LEDBAT

Start at: 2017-09-18 17:46:44
End at: 2017-09-18 17:47:14

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.36 Mbit/s
95th percentile per-packet one-way delay: 87.464 ms
Loss rate: 1.78%
-- Flow 1:
Average throughput: 5.58 Mbit/s
95th percentile per-packet one-way delay: 87.480 ms
Loss rate: 1.43%
-- Flow 2:
Average throughput: 4.83 Mbit/s
95th percentile per-packet one-way delay: 87.470 ms
Loss rate: 2.02%
-- Flow 3:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 86.998 ms
Loss rate: 3.71%
```

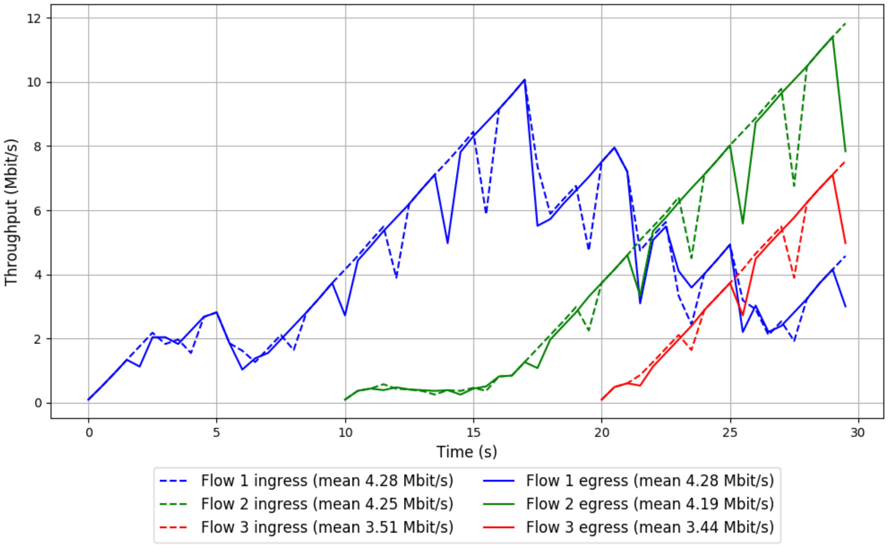
Run 3: Report of LEDBAT — Data Link

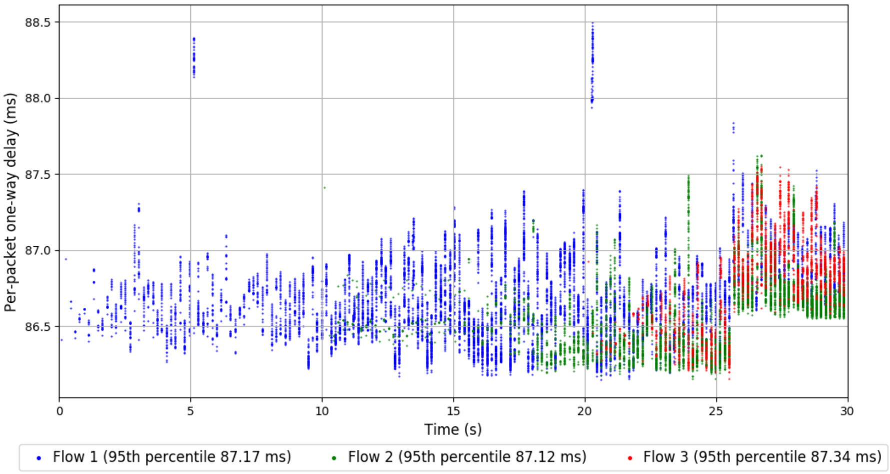




```
Run 4: Statistics of LEDBAT

Start at: 2017-09-18 17:56:36
End at: 2017-09-18 17:57:06

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.18 Mbit/s
95th percentile per-packet one-way delay: 87.197 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 4.28 Mbit/s
95th percentile per-packet one-way delay: 87.166 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 4.19 Mbit/s
95th percentile per-packet one-way delay: 87.117 ms
Loss rate: 2.35%
-- Flow 3:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 87.336 ms
Loss rate: 3.68%
```

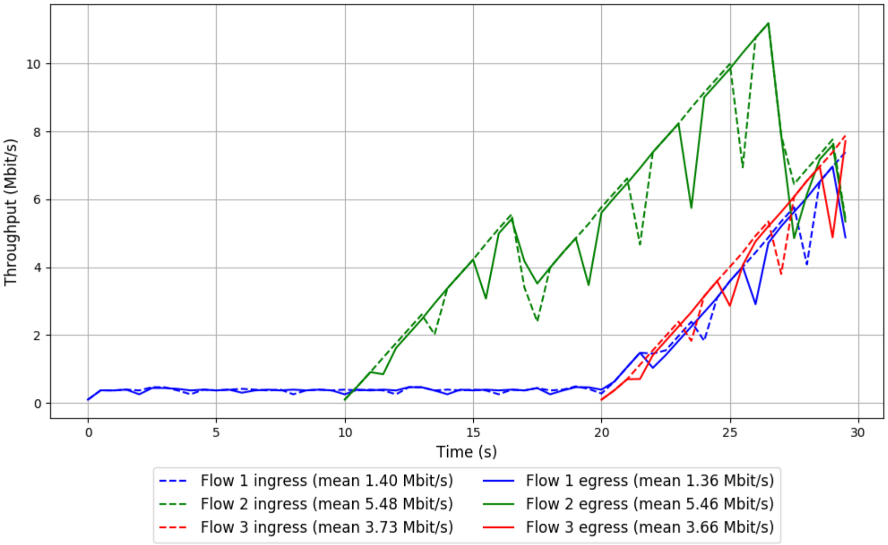
Run 4: Report of LEDBAT — Data Link

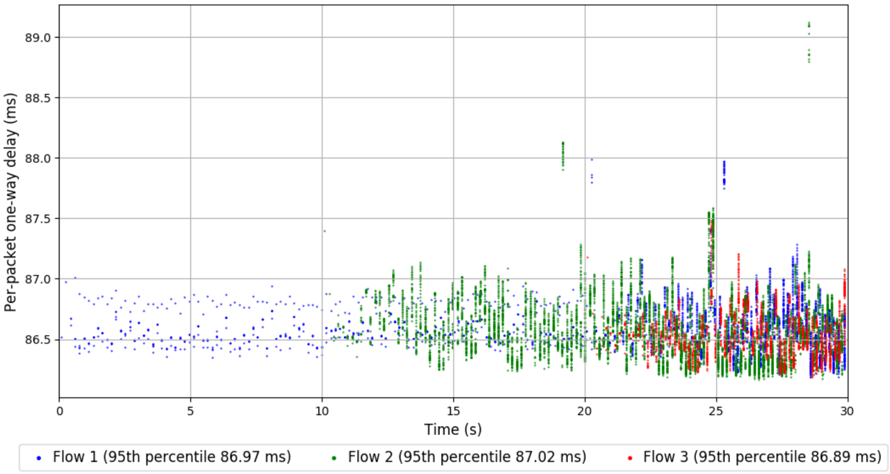




```
Run 5: Statistics of LEDBAT

Start at: 2017-09-18 18:06:21
End at: 2017-09-18 18:06:51

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.16 Mbit/s
95th percentile per-packet one-way delay: 86.971 ms
Loss rate: 2.11%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 86.966 ms
Loss rate: 3.00%
-- Flow 2:
Average throughput: 5.46 Mbit/s
95th percentile per-packet one-way delay: 87.020 ms
Loss rate: 1.26%
-- Flow 3:
Average throughput: 3.66 Mbit/s
95th percentile per-packet one-way delay: 86.886 ms
Loss rate: 3.61%
```

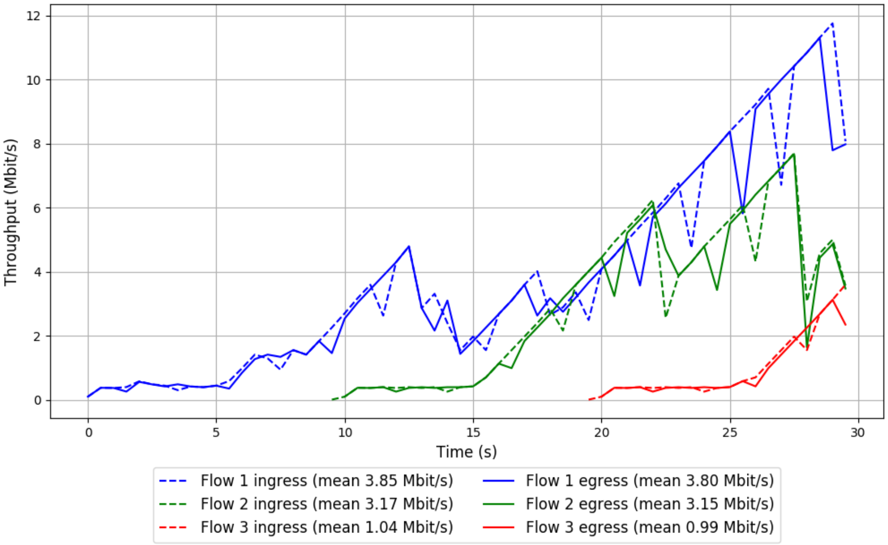
Run 5: Report of LEDBAT — Data Link

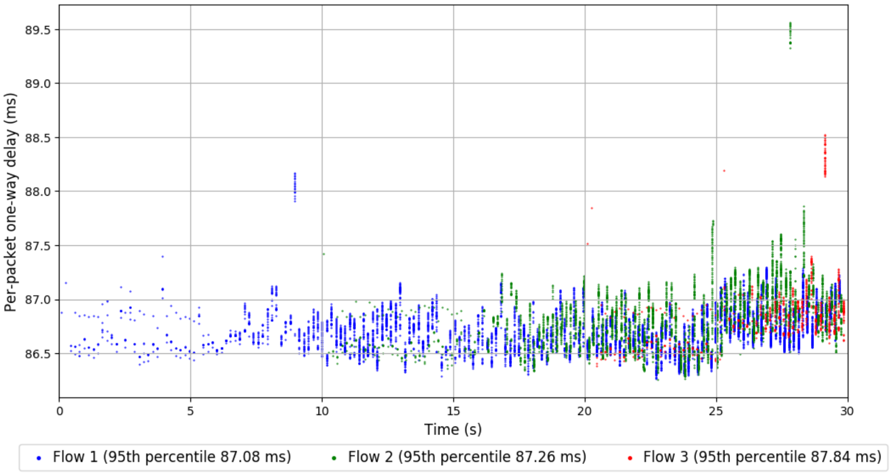




```
Run 6: Statistics of LEDBAT

Start at: 2017-09-18 18:16:16
End at: 2017-09-18 18:16:46

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.19 Mbit/s
95th percentile per-packet one-way delay: 87.155 ms
Loss rate: 1.90%
-- Flow 1:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 87.075 ms
Loss rate: 1.77%
-- Flow 2:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 87.258 ms
Loss rate: 1.46%
-- Flow 3:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 87.845 ms
Loss rate: 6.03%
```

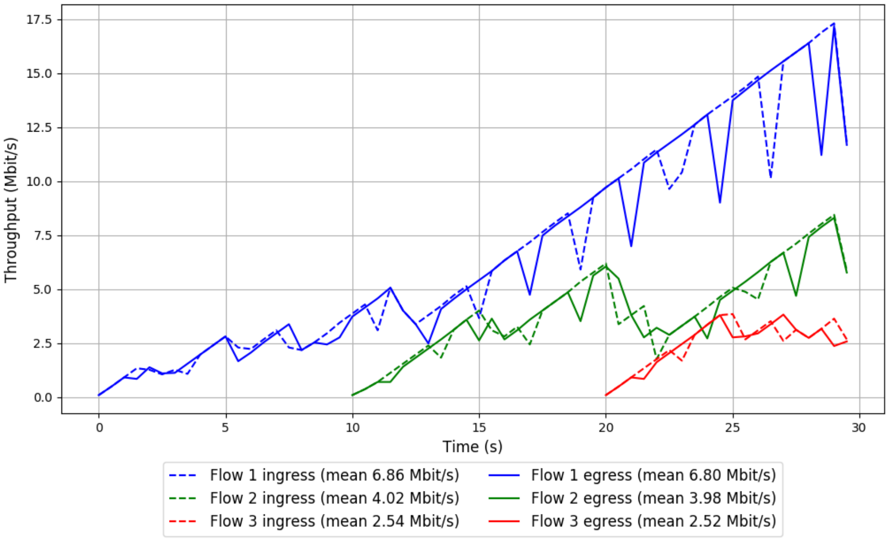
Run 6: Report of LEDBAT — Data Link

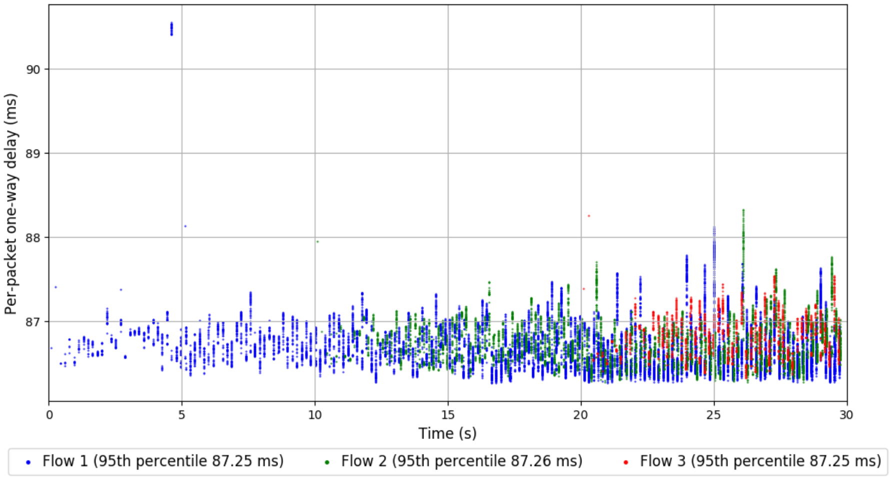




```
Run 7: Statistics of LEDBAT

Start at: 2017-09-18 18:25:59
End at: 2017-09-18 18:26:29

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.23 Mbit/s
95th percentile per-packet one-way delay: 87.250 ms
Loss rate: 1.66%
-- Flow 1:
Average throughput: 6.80 Mbit/s
95th percentile per-packet one-way delay: 87.245 ms
Loss rate: 1.45%
-- Flow 2:
Average throughput: 3.98 Mbit/s
95th percentile per-packet one-way delay: 87.259 ms
Loss rate: 1.86%
-- Flow 3:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 87.250 ms
Loss rate: 2.74%
```

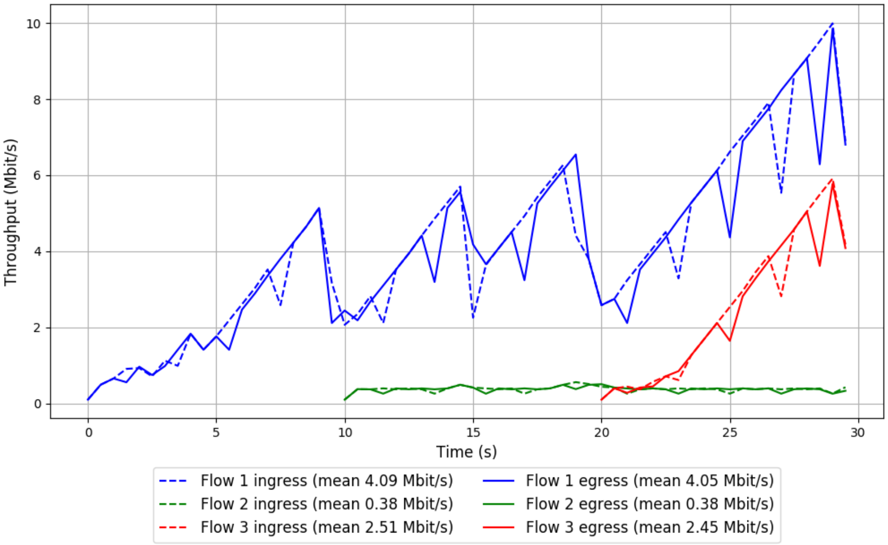
Run 7: Report of LEDBAT — Data Link

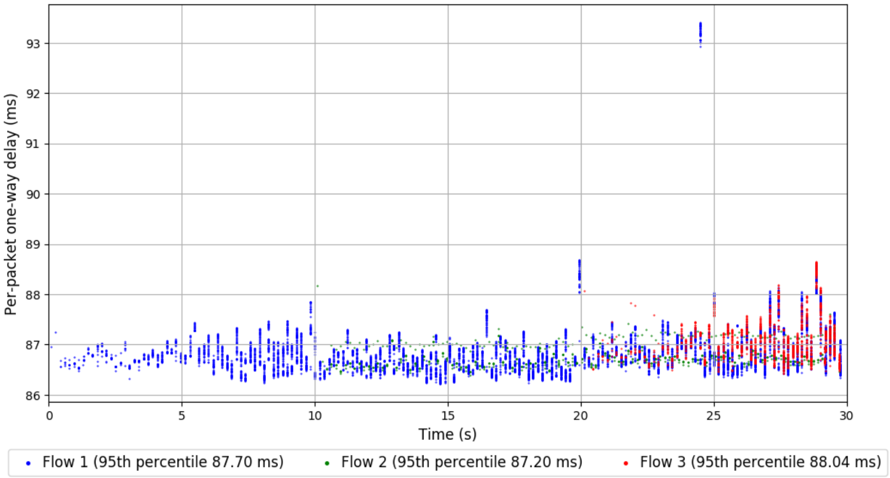




```
Run 8: Statistics of LEDBAT

Start at: 2017-09-18 18:35:51
End at: 2017-09-18 18:36:21

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.09 Mbit/s
95th percentile per-packet one-way delay: 87.759 ms
Loss rate: 1.89%
-- Flow 1:
Average throughput: 4.05 Mbit/s
95th percentile per-packet one-way delay: 87.702 ms
Loss rate: 1.42%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 87.196 ms
Loss rate: 1.57%
-- Flow 3:
Average throughput: 2.45 Mbit/s
95th percentile per-packet one-way delay: 88.038 ms
Loss rate: 4.30%
```

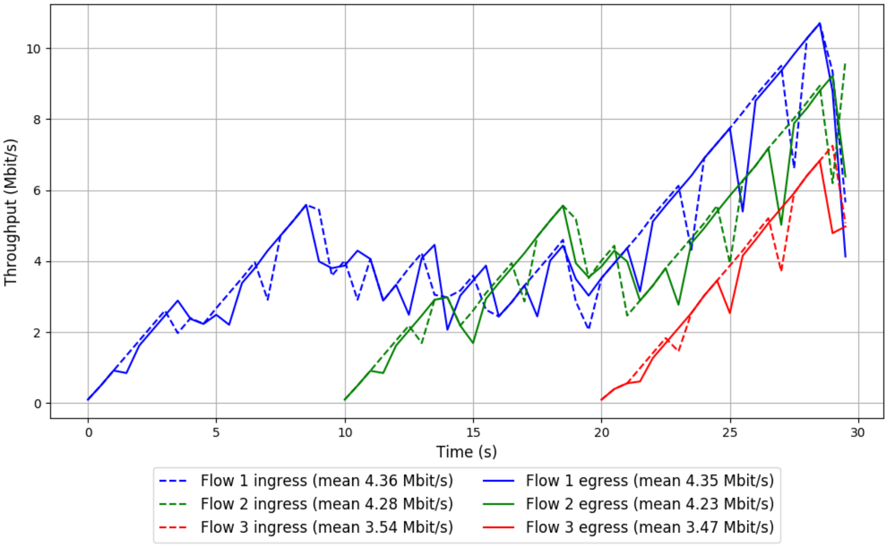
Run 8: Report of LEDBAT — Data Link

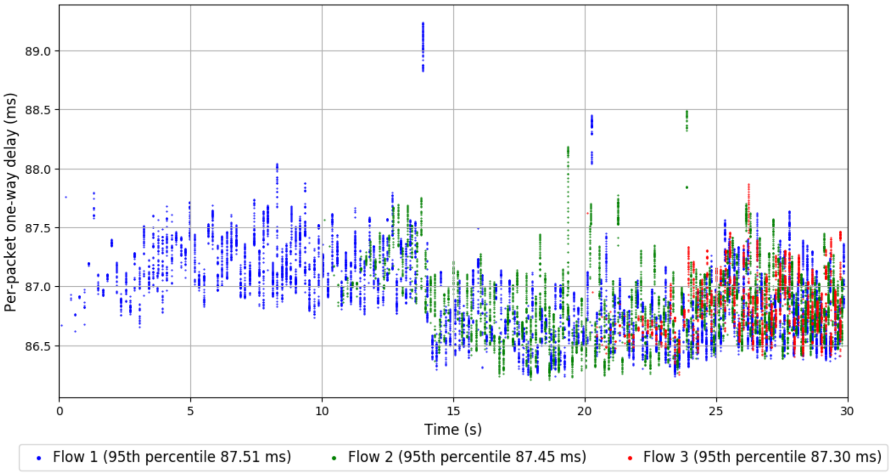




```
Run 9: Statistics of LEDBAT

Start at: 2017-09-18 18:45:37
End at: 2017-09-18 18:46:07

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.27 Mbit/s
95th percentile per-packet one-way delay: 87.467 ms
Loss rate: 1.59%
-- Flow 1:
Average throughput: 4.35 Mbit/s
95th percentile per-packet one-way delay: 87.509 ms
Loss rate: 0.81%
-- Flow 2:
Average throughput: 4.23 Mbit/s
95th percentile per-packet one-way delay: 87.453 ms
Loss rate: 1.92%
-- Flow 3:
Average throughput: 3.47 Mbit/s
95th percentile per-packet one-way delay: 87.295 ms
Loss rate: 3.70%
```

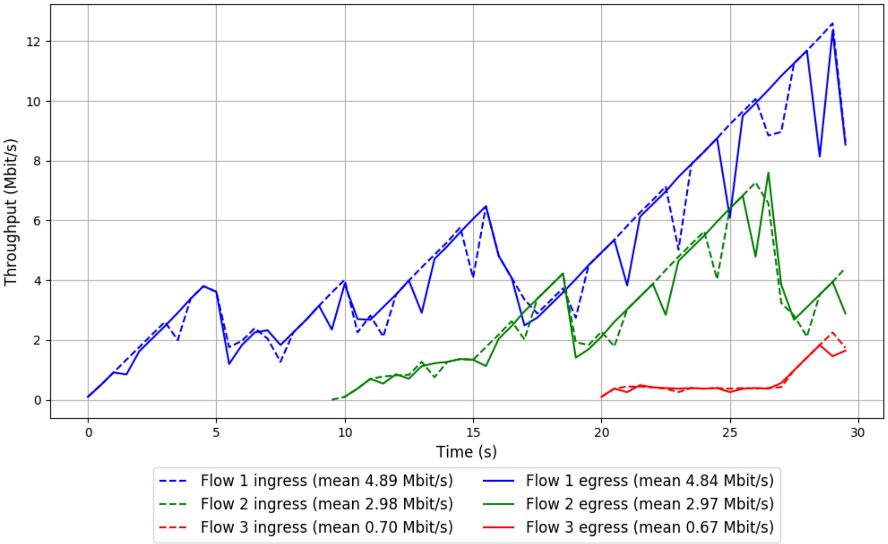
Run 9: Report of LEDBAT — Data Link

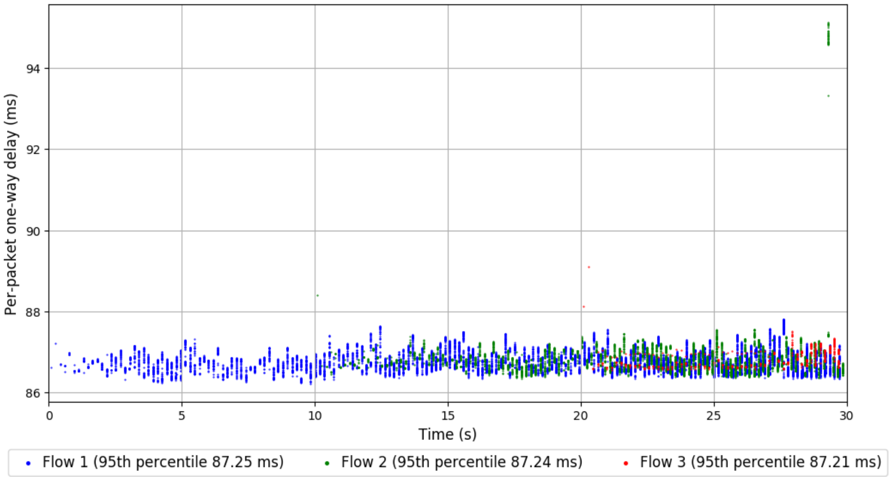




```
Run 10: Statistics of LEDBAT

Start at: 2017-09-18 18:55:20
End at: 2017-09-18 18:55:50

# Below is generated by plot.py at 2017-09-18 21:09:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.01 Mbit/s
95th percentile per-packet one-way delay: 87.248 ms
Loss rate: 1.62%
-- Flow 1:
Average throughput: 4.84 Mbit/s
95th percentile per-packet one-way delay: 87.250 ms
Loss rate: 1.52%
-- Flow 2:
Average throughput: 2.97 Mbit/s
95th percentile per-packet one-way delay: 87.244 ms
Loss rate: 1.28%
-- Flow 3:
Average throughput: 0.67 Mbit/s
95th percentile per-packet one-way delay: 87.212 ms
Loss rate: 6.52%
```

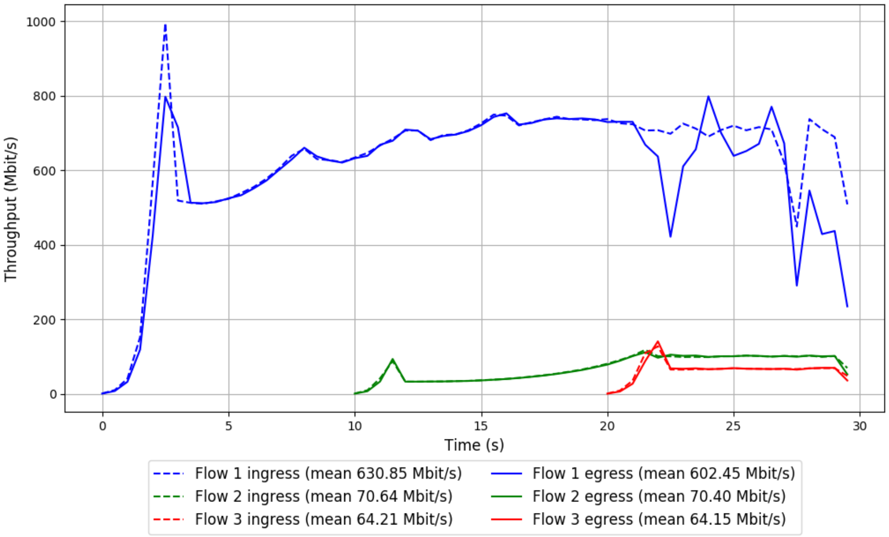
Run 10: Report of LEDBAT — Data Link

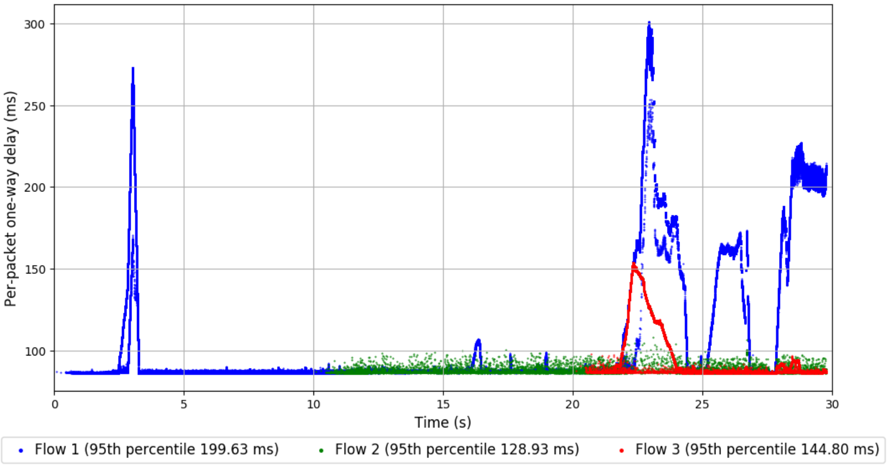




```
Run 1: Statistics of PCC

Start at: 2017-09-18 17:30:39
End at: 2017-09-18 17:31:09

# Below is generated by plot.py at 2017-09-18 21:18:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 669.93 Mbit/s
95th percentile per-packet one-way delay: 195.033 ms
Loss rate: 4.71%
-- Flow 1:
Average throughput: 602.45 Mbit/s
95th percentile per-packet one-way delay: 199.634 ms
Loss rate: 5.06%
-- Flow 2:
Average throughput: 70.40 Mbit/s
95th percentile per-packet one-way delay: 128.926 ms
Loss rate: 1.22%
-- Flow 3:
Average throughput: 64.15 Mbit/s
95th percentile per-packet one-way delay: 144.804 ms
Loss rate: 1.88%
```

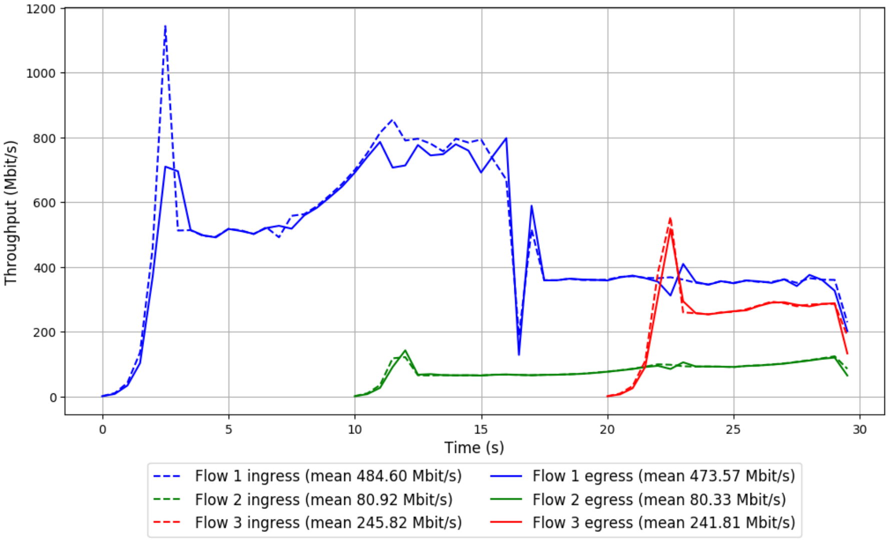
Run 1: Report of PCC — Data Link

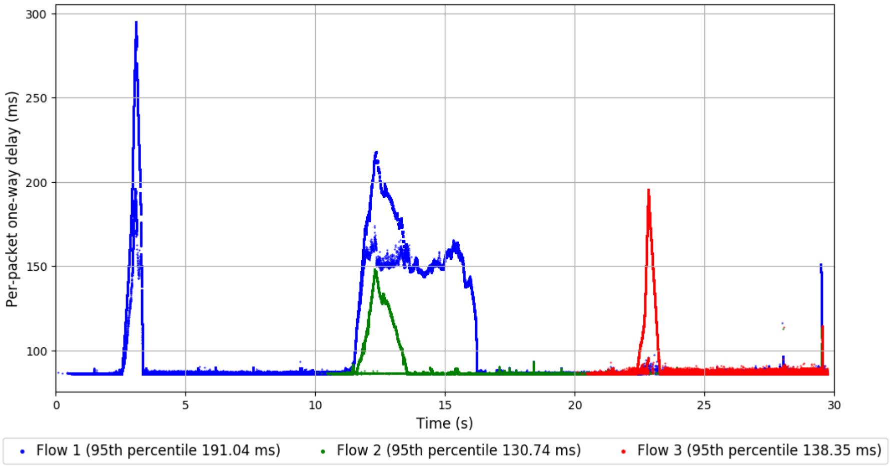




```
Run 2: Statistics of PCC

Start at: 2017-09-18 17:40:24
End at: 2017-09-18 17:40:54

# Below is generated by plot.py at 2017-09-18 21:18:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 605.41 Mbit/s
95th percentile per-packet one-way delay: 184.054 ms
Loss rate: 2.80%
-- Flow 1:
Average throughput: 473.57 Mbit/s
95th percentile per-packet one-way delay: 191.043 ms
Loss rate: 2.84%
-- Flow 2:
Average throughput: 80.33 Mbit/s
95th percentile per-packet one-way delay: 130.740 ms
Loss rate: 1.60%
-- Flow 3:
Average throughput: 241.81 Mbit/s
95th percentile per-packet one-way delay: 138.347 ms
Loss rate: 3.39%
```

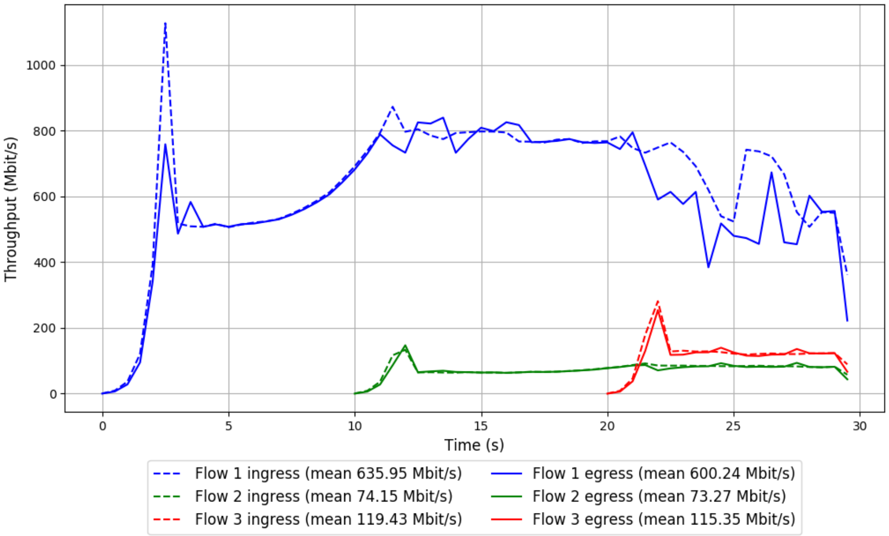
Run 2: Report of PCC — Data Link

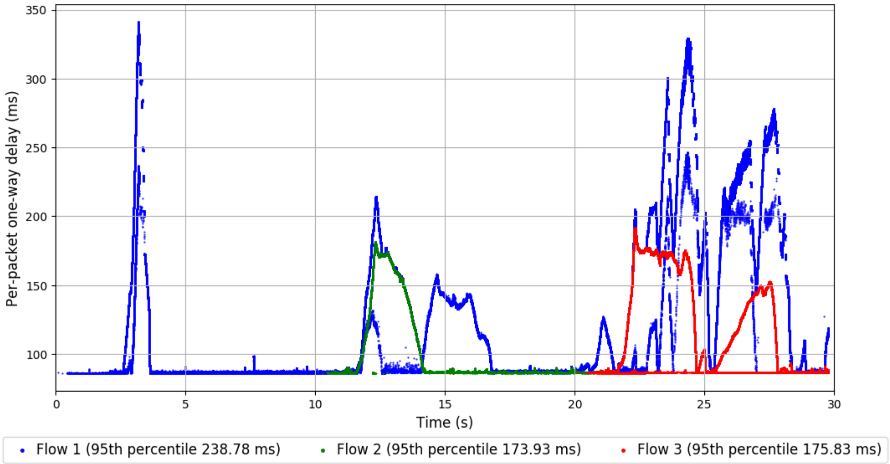




```
Run 3: Statistics of PCC

Start at: 2017-09-18 17:50:08
End at: 2017-09-18 17:50:38

# Below is generated by plot.py at 2017-09-18 21:19:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 686.21 Mbit/s
95th percentile per-packet one-way delay: 231.606 ms
Loss rate: 5.83%
-- Flow 1:
Average throughput: 600.24 Mbit/s
95th percentile per-packet one-way delay: 238.781 ms
Loss rate: 6.16%
-- Flow 2:
Average throughput: 73.27 Mbit/s
95th percentile per-packet one-way delay: 173.929 ms
Loss rate: 2.05%
-- Flow 3:
Average throughput: 115.35 Mbit/s
95th percentile per-packet one-way delay: 175.834 ms
Loss rate: 5.13%
```

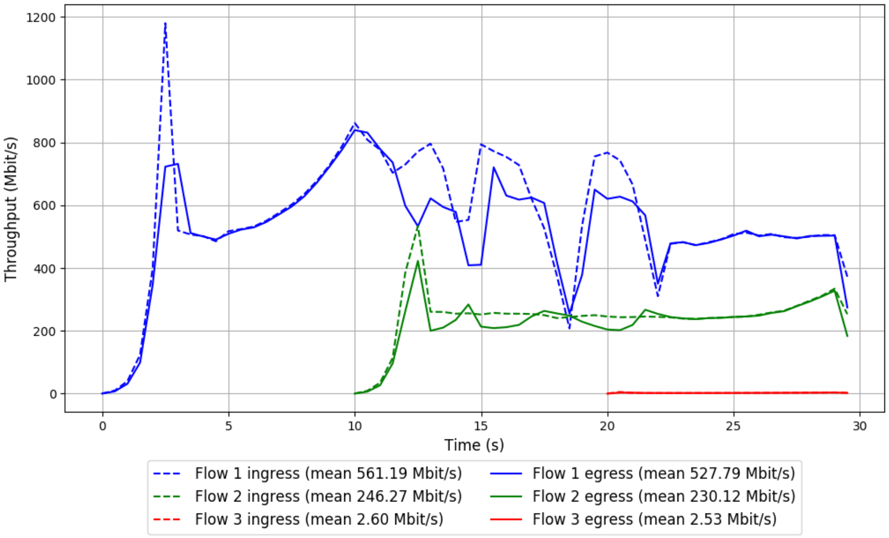
Run 3: Report of PCC — Data Link

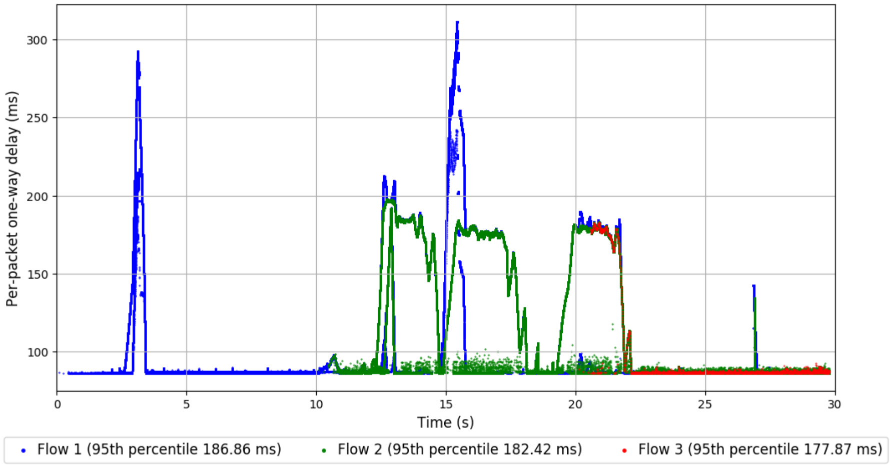




```
Run 4: Statistics of PCC

Start at: 2017-09-18 17:59:58
End at: 2017-09-18 18:00:28

# Below is generated by plot.py at 2017-09-18 21:19:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 681.05 Mbit/s
95th percentile per-packet one-way delay: 185.133 ms
Loss rate: 6.69%
-- Flow 1:
Average throughput: 527.79 Mbit/s
95th percentile per-packet one-way delay: 186.859 ms
Loss rate: 6.50%
-- Flow 2:
Average throughput: 230.12 Mbit/s
95th percentile per-packet one-way delay: 182.422 ms
Loss rate: 7.38%
-- Flow 3:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 177.865 ms
Loss rate: 4.34%
```

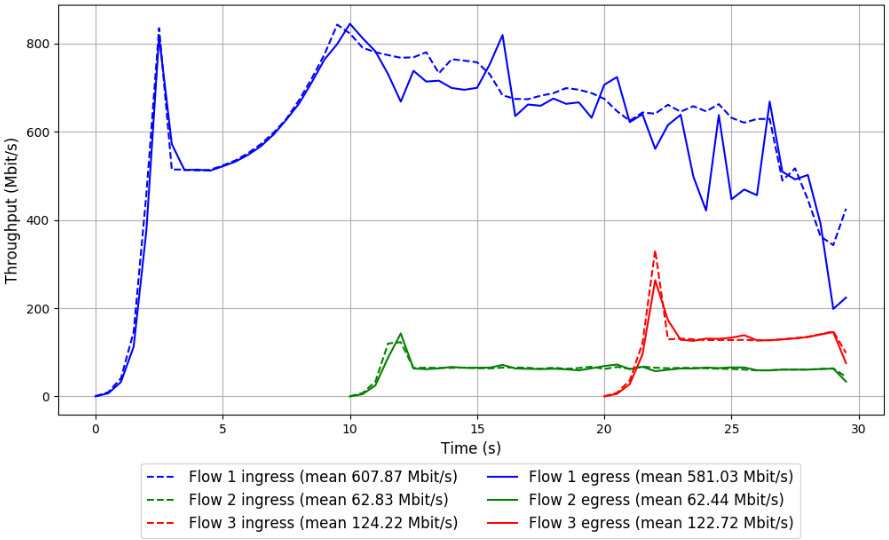
Run 4: Report of PCC — Data Link

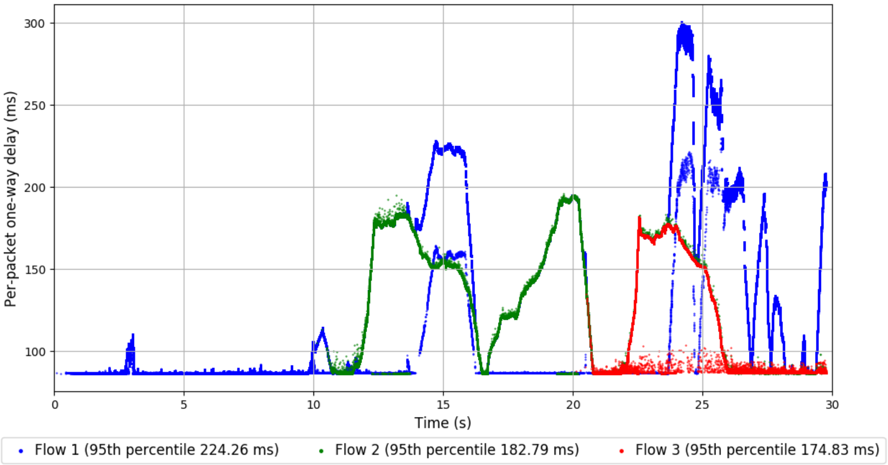




```
Run 5: Statistics of PCC

Start at: 2017-09-18 18:09:48
End at: 2017-09-18 18:10:18

# Below is generated by plot.py at 2017-09-18 21:19:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 662.24 Mbit/s
95th percentile per-packet one-way delay: 223.554 ms
Loss rate: 4.65%
-- Flow 1:
Average throughput: 581.03 Mbit/s
95th percentile per-packet one-way delay: 224.263 ms
Loss rate: 4.97%
-- Flow 2:
Average throughput: 62.44 Mbit/s
95th percentile per-packet one-way delay: 182.789 ms
Loss rate: 1.59%
-- Flow 3:
Average throughput: 122.72 Mbit/s
95th percentile per-packet one-way delay: 174.828 ms
Loss rate: 2.96%
```

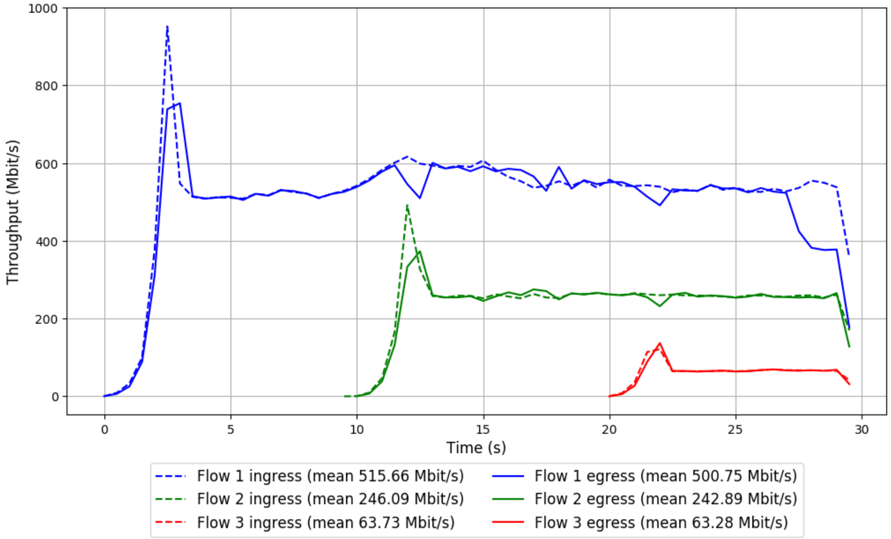
Run 5: Report of PCC — Data Link

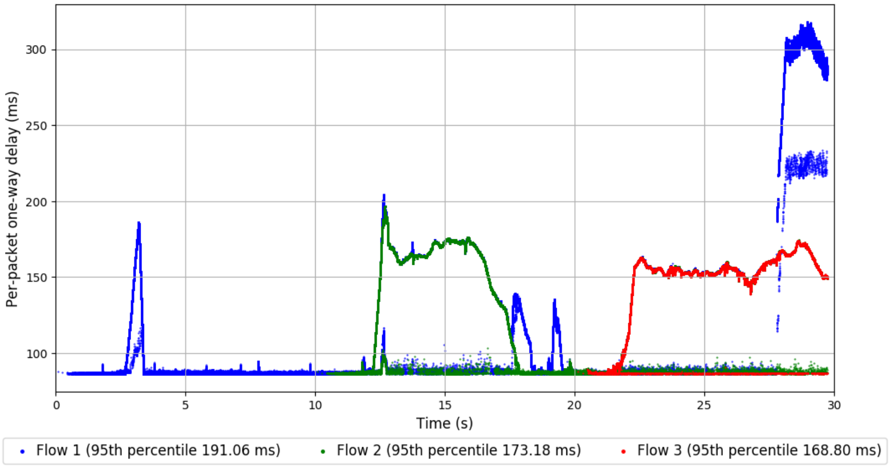




```
Run 6: Statistics of PCC

Start at: 2017-09-18 18:19:44
End at: 2017-09-18 18:20:14

# Below is generated by plot.py at 2017-09-18 21:19:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 682.23 Mbit/s
95th percentile per-packet one-way delay: 175.277 ms
Loss rate: 3.13%
-- Flow 1:
Average throughput: 500.75 Mbit/s
95th percentile per-packet one-way delay: 191.064 ms
Loss rate: 3.46%
-- Flow 2:
Average throughput: 242.89 Mbit/s
95th percentile per-packet one-way delay: 173.176 ms
Loss rate: 2.17%
-- Flow 3:
Average throughput: 63.28 Mbit/s
95th percentile per-packet one-way delay: 168.800 ms
Loss rate: 2.47%
```

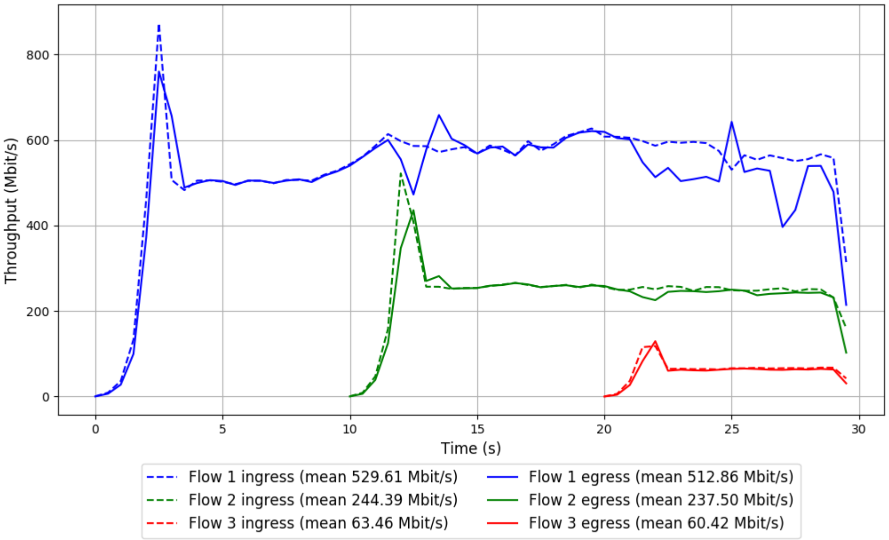
Run 6: Report of PCC — Data Link

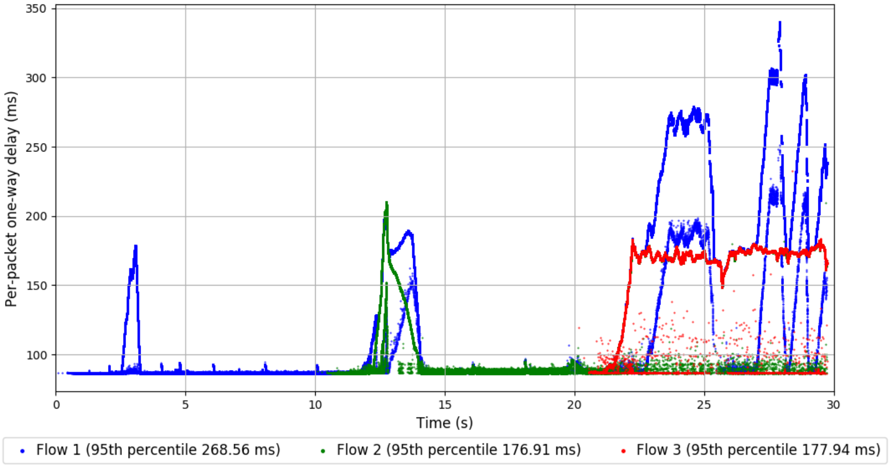




```
Run 7: Statistics of PCC

Start at: 2017-09-18 18:29:32
End at: 2017-09-18 18:30:02

# Below is generated by plot.py at 2017-09-18 21:21:24
# Datalink statistics
-- Total of 3 flows:
Average throughput: 689.65 Mbit/s
95th percentile per-packet one-way delay: 262.306 ms
Loss rate: 3.81%
-- Flow 1:
Average throughput: 512.86 Mbit/s
95th percentile per-packet one-way delay: 268.561 ms
Loss rate: 3.73%
-- Flow 2:
Average throughput: 237.50 Mbit/s
95th percentile per-packet one-way delay: 176.915 ms
Loss rate: 3.68%
-- Flow 3:
Average throughput: 60.42 Mbit/s
95th percentile per-packet one-way delay: 177.944 ms
Loss rate: 6.79%
```

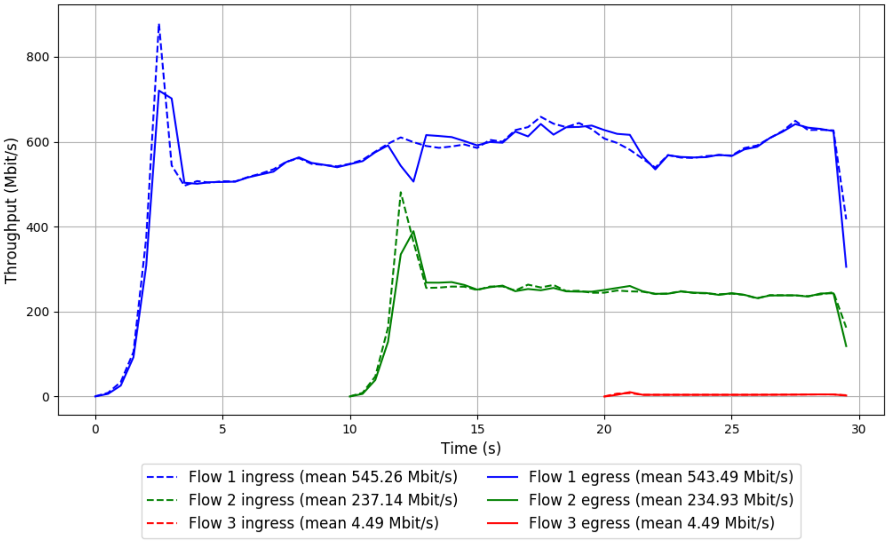
Run 7: Report of PCC — Data Link

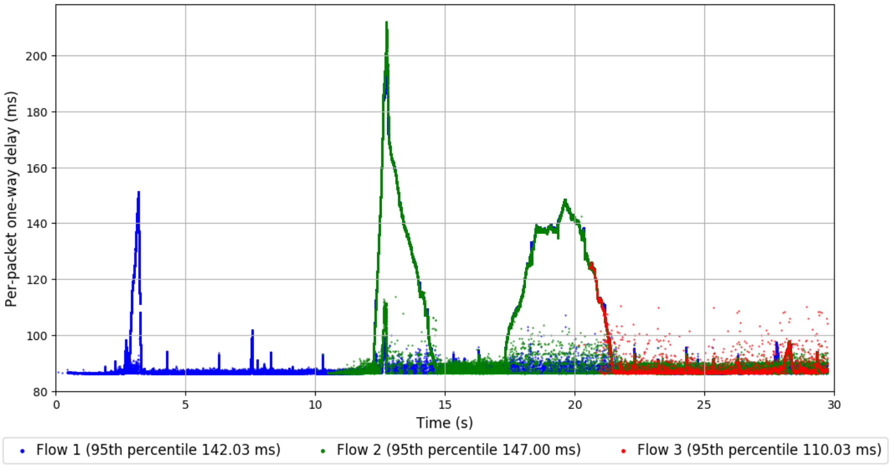




```
Run 8: Statistics of PCC

Start at: 2017-09-18 18:39:17
End at: 2017-09-18 18:39:47

# Below is generated by plot.py at 2017-09-18 21:21:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 700.45 Mbit/s
95th percentile per-packet one-way delay: 142.810 ms
Loss rate: 1.11%
-- Flow 1:
Average throughput: 543.49 Mbit/s
95th percentile per-packet one-way delay: 142.031 ms
Loss rate: 0.91%
-- Flow 2:
Average throughput: 234.93 Mbit/s
95th percentile per-packet one-way delay: 146.999 ms
Loss rate: 1.81%
-- Flow 3:
Average throughput: 4.49 Mbit/s
95th percentile per-packet one-way delay: 110.034 ms
Loss rate: 1.92%
```

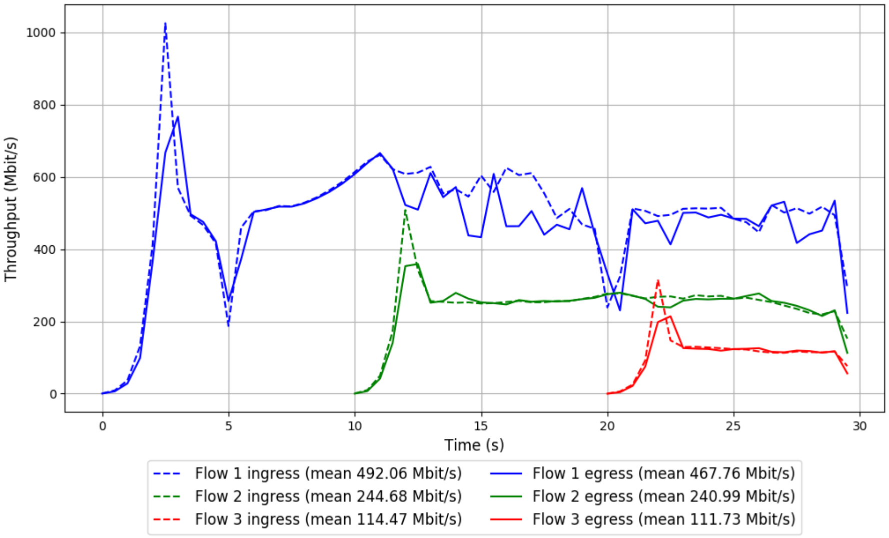
Run 8: Report of PCC — Data Link

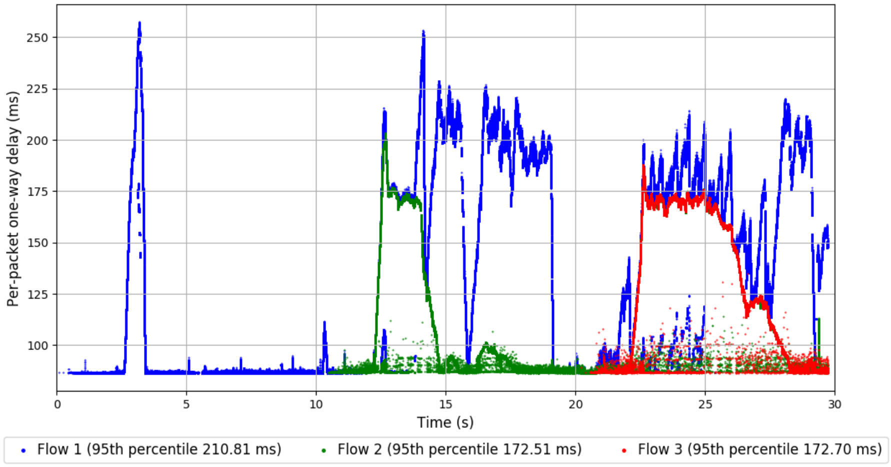




```
Run 9: Statistics of PCC

Start at: 2017-09-18 18:49:01
End at: 2017-09-18 18:49:31

# Below is generated by plot.py at 2017-09-18 21:28:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 663.31 Mbit/s
95th percentile per-packet one-way delay: 206.937 ms
Loss rate: 4.69%
-- Flow 1:
Average throughput: 467.76 Mbit/s
95th percentile per-packet one-way delay: 210.810 ms
Loss rate: 5.49%
-- Flow 2:
Average throughput: 240.99 Mbit/s
95th percentile per-packet one-way delay: 172.514 ms
Loss rate: 2.38%
-- Flow 3:
Average throughput: 111.73 Mbit/s
95th percentile per-packet one-way delay: 172.700 ms
Loss rate: 4.16%
```

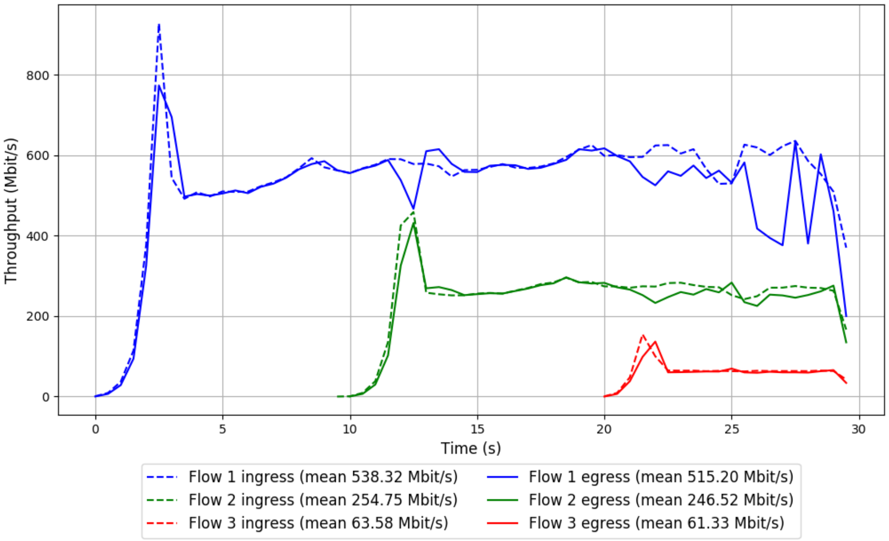
Run 9: Report of PCC — Data Link

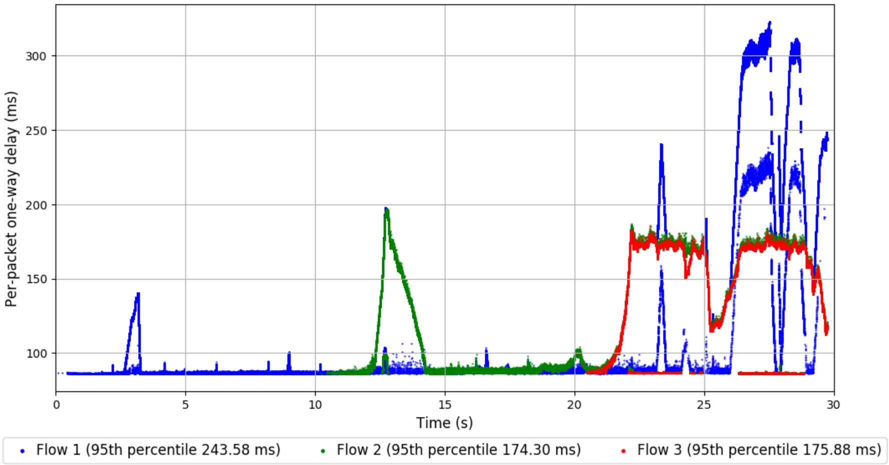




```
Run 10: Statistics of PCC

Start at: 2017-09-18 18:58:45
End at: 2017-09-18 18:59:16

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 698.47 Mbit/s
95th percentile per-packet one-way delay: 224.480 ms
Loss rate: 4.69%
-- Flow 1:
Average throughput: 515.20 Mbit/s
95th percentile per-packet one-way delay: 243.577 ms
Loss rate: 4.85%
-- Flow 2:
Average throughput: 246.52 Mbit/s
95th percentile per-packet one-way delay: 174.296 ms
Loss rate: 4.08%
-- Flow 3:
Average throughput: 61.33 Mbit/s
95th percentile per-packet one-way delay: 175.885 ms
Loss rate: 5.36%
```

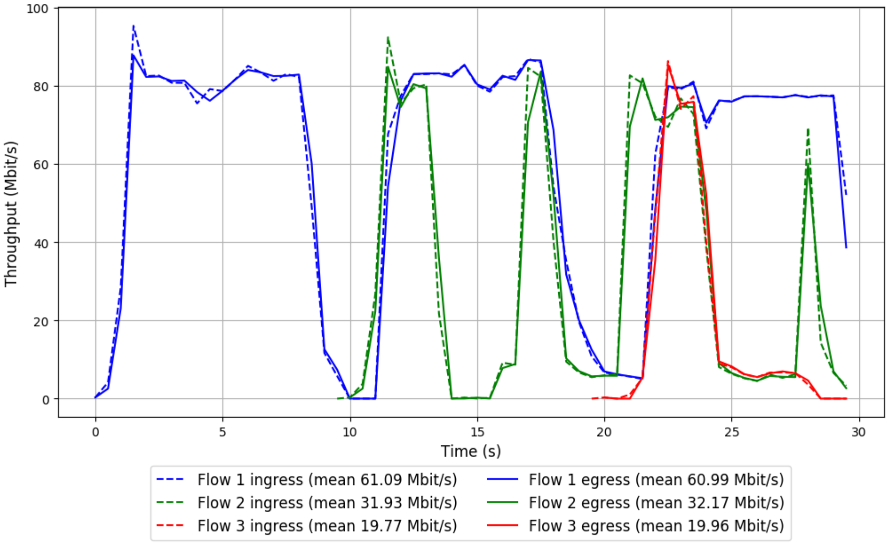
Run 10: Report of PCC — Data Link

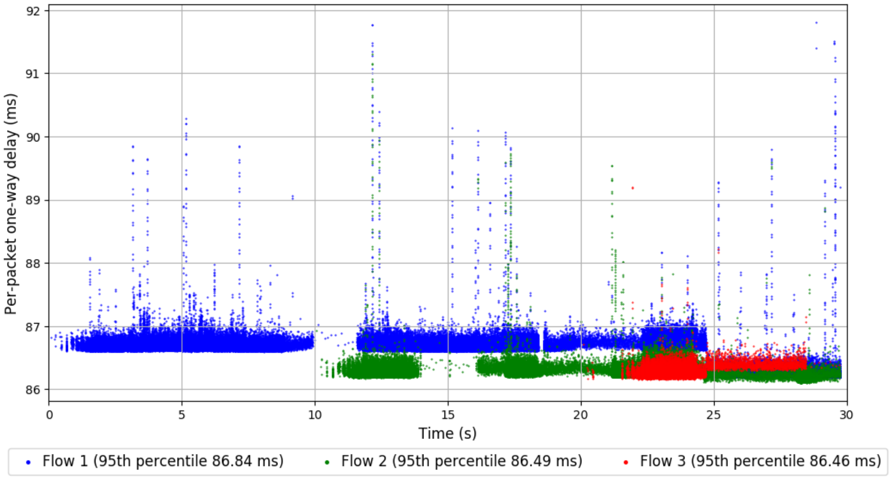




```
Run 1: Statistics of QUIC Cubic

Start at: 2017-09-18 17:27:57
End at: 2017-09-18 17:28:27

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 88.79 Mbit/s
95th percentile per-packet one-way delay: 86.815 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 60.99 Mbit/s
95th percentile per-packet one-way delay: 86.841 ms
Loss rate: 0.74%
-- Flow 2:
Average throughput: 32.17 Mbit/s
95th percentile per-packet one-way delay: 86.486 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 19.96 Mbit/s
95th percentile per-packet one-way delay: 86.461 ms
Loss rate: 0.00%
```

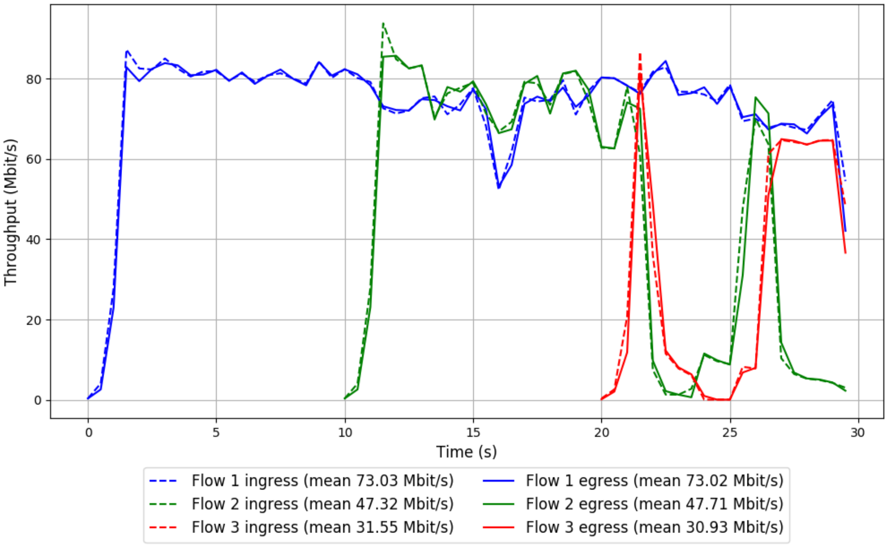
Run 1: Report of QUIC Cubic — Data Link

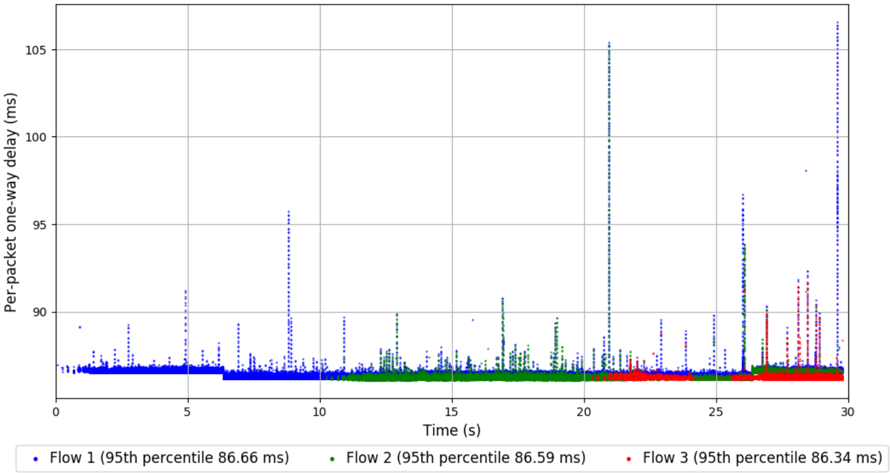




```
Run 2: Statistics of QUIC Cubic

Start at: 2017-09-18 17:37:45
End at: 2017-09-18 17:38:15

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 114.68 Mbit/s
95th percentile per-packet one-way delay: 86.643 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 73.02 Mbit/s
95th percentile per-packet one-way delay: 86.664 ms
Loss rate: 0.59%
-- Flow 2:
Average throughput: 47.71 Mbit/s
95th percentile per-packet one-way delay: 86.591 ms
Loss rate: 0.08%
-- Flow 3:
Average throughput: 30.93 Mbit/s
95th percentile per-packet one-way delay: 86.345 ms
Loss rate: 3.71%
```

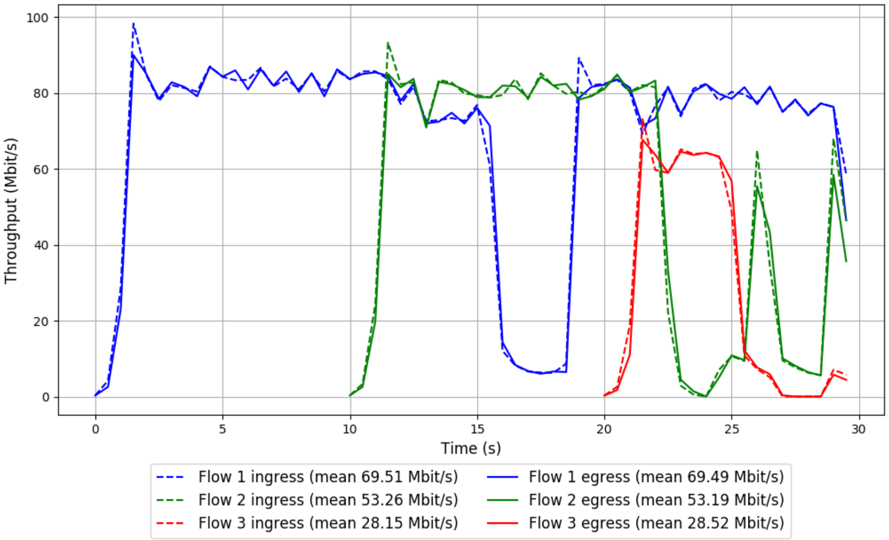
Run 2: Report of QUIC Cubic — Data Link

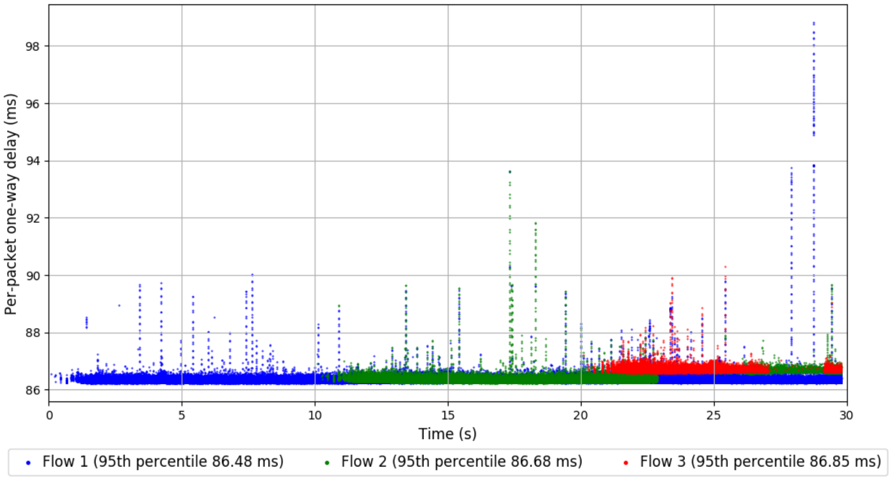




```
Run 3: Statistics of QUIC Cubic

Start at: 2017-09-18 17:47:28
End at: 2017-09-18 17:47:58

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 114.04 Mbit/s
95th percentile per-packet one-way delay: 86.689 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 69.49 Mbit/s
95th percentile per-packet one-way delay: 86.478 ms
Loss rate: 0.60%
-- Flow 2:
Average throughput: 53.19 Mbit/s
95th percentile per-packet one-way delay: 86.676 ms
Loss rate: 1.01%
-- Flow 3:
Average throughput: 28.52 Mbit/s
95th percentile per-packet one-way delay: 86.852 ms
Loss rate: 0.48%
```

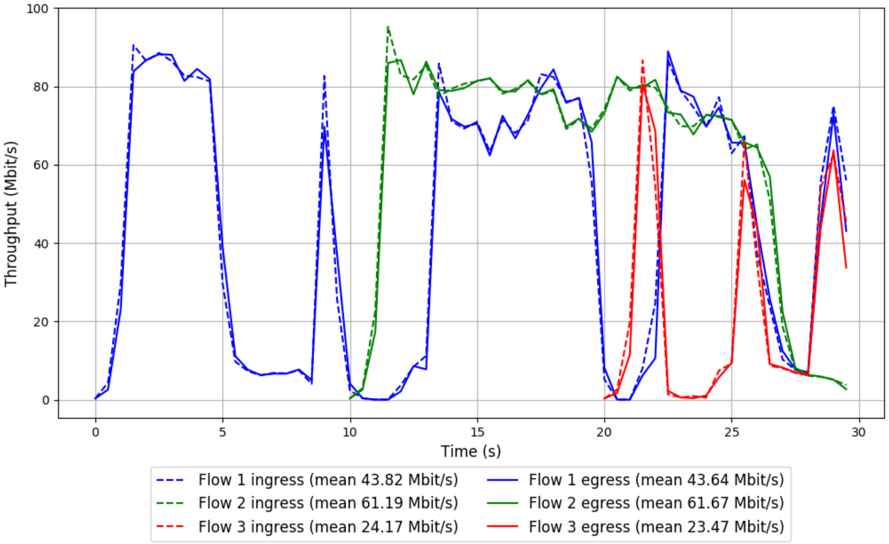
Run 3: Report of QUIC Cubic — Data Link

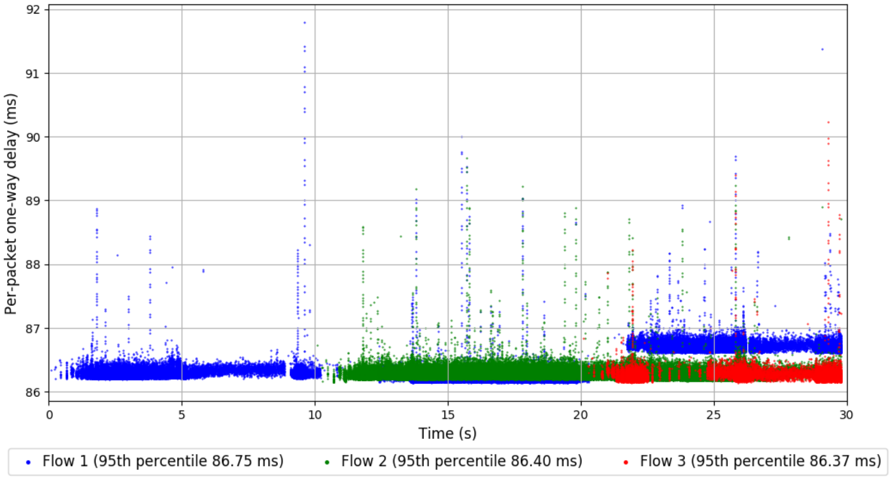




```
Run 4: Statistics of QUIC Cubic

Start at: 2017-09-18 17:57:20
End at: 2017-09-18 17:57:50

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 92.17 Mbit/s
95th percentile per-packet one-way delay: 86.713 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 43.64 Mbit/s
95th percentile per-packet one-way delay: 86.754 ms
Loss rate: 1.00%
-- Flow 2:
Average throughput: 61.67 Mbit/s
95th percentile per-packet one-way delay: 86.403 ms
Loss rate: 0.08%
-- Flow 3:
Average throughput: 23.47 Mbit/s
95th percentile per-packet one-way delay: 86.374 ms
Loss rate: 4.62%
```

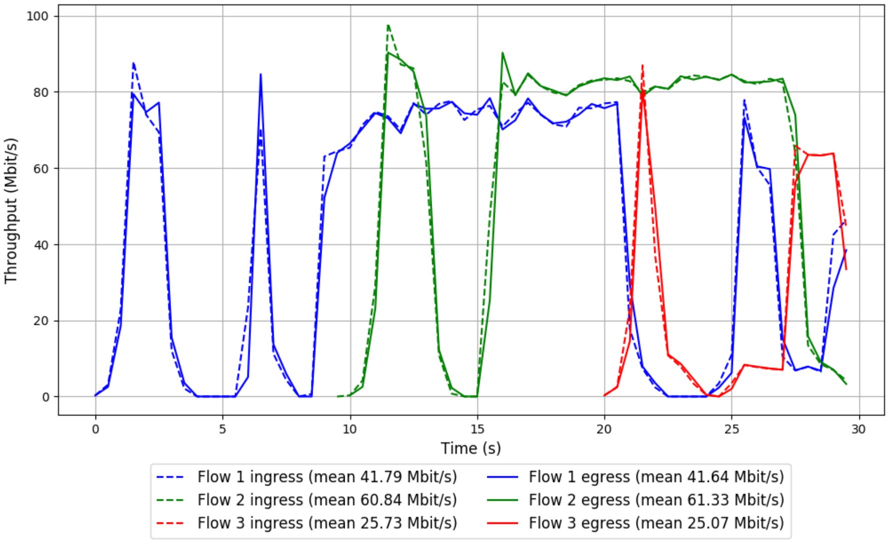
Run 4: Report of QUIC Cubic — Data Link

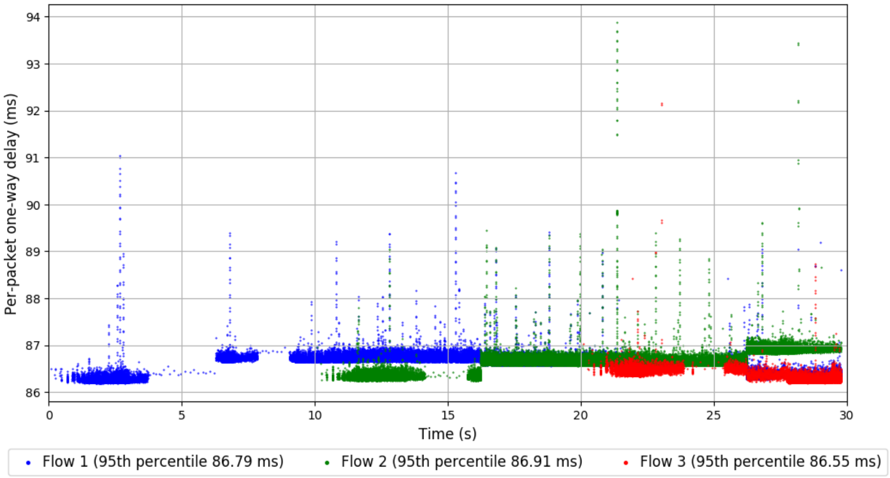




```
Run 5: Statistics of QUIC Cubic

Start at: 2017-09-18 18:07:05
End at: 2017-09-18 18:07:35

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 90.48 Mbit/s
95th percentile per-packet one-way delay: 86.862 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 41.64 Mbit/s
95th percentile per-packet one-way delay: 86.790 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 61.33 Mbit/s
95th percentile per-packet one-way delay: 86.905 ms
Loss rate: 0.08%
-- Flow 3:
Average throughput: 25.07 Mbit/s
95th percentile per-packet one-way delay: 86.549 ms
Loss rate: 4.31%
```

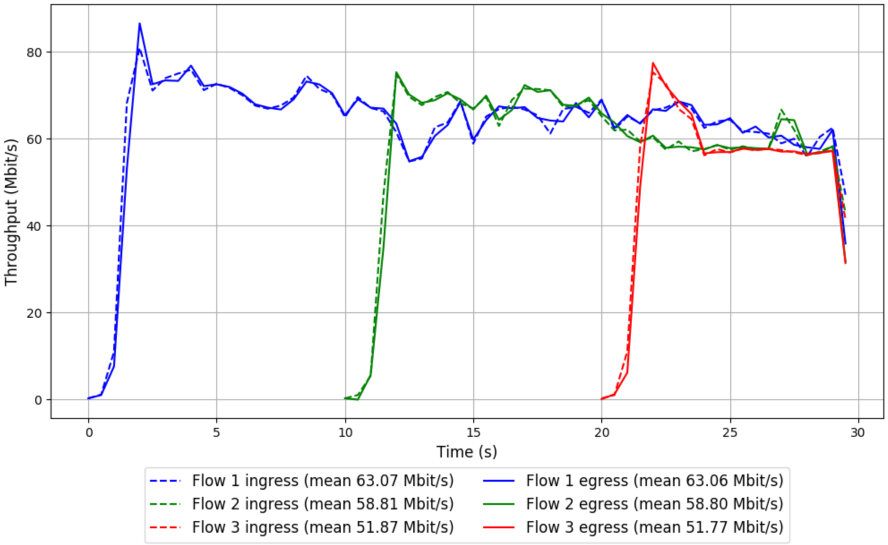
Run 5: Report of QUIC Cubic — Data Link

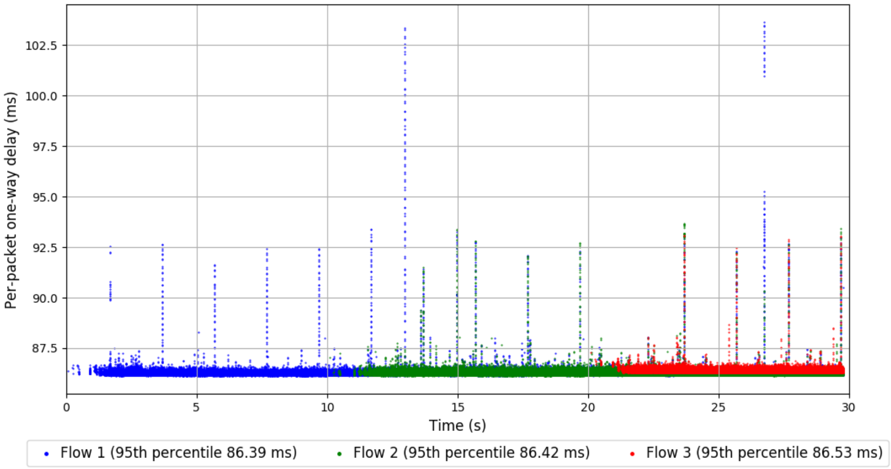




```
Run 6: Statistics of QUIC Cubic

Start at: 2017-09-18 18:17:00
End at: 2017-09-18 18:17:30

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 118.86 Mbit/s
95th percentile per-packet one-way delay: 86.443 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 63.06 Mbit/s
95th percentile per-packet one-way delay: 86.389 ms
Loss rate: 0.60%
-- Flow 2:
Average throughput: 58.80 Mbit/s
95th percentile per-packet one-way delay: 86.421 ms
Loss rate: 0.90%
-- Flow 3:
Average throughput: 51.77 Mbit/s
95th percentile per-packet one-way delay: 86.535 ms
Loss rate: 1.97%
```

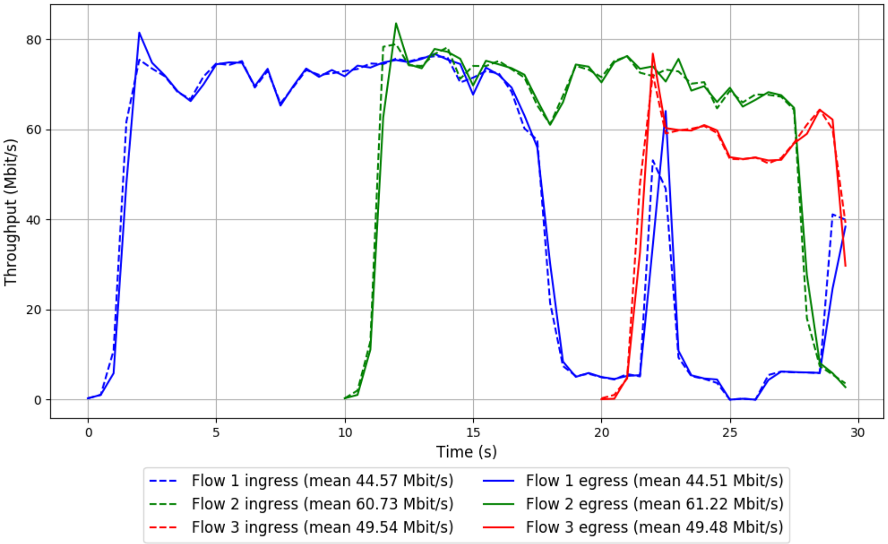
Run 6: Report of QUIC Cubic — Data Link

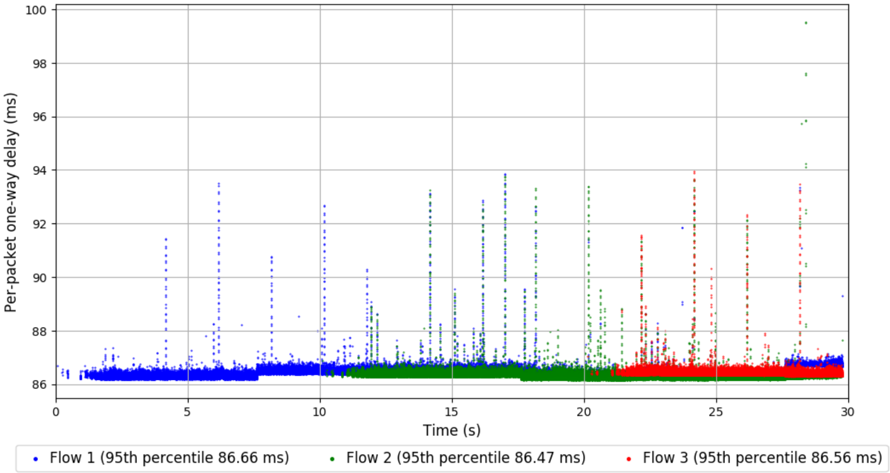




```
Run 7: Statistics of QUIC Cubic

Start at: 2017-09-18 18:26:44
End at: 2017-09-18 18:27:14

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 101.16 Mbit/s
95th percentile per-packet one-way delay: 86.573 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 44.51 Mbit/s
95th percentile per-packet one-way delay: 86.655 ms
Loss rate: 0.71%
-- Flow 2:
Average throughput: 61.22 Mbit/s
95th percentile per-packet one-way delay: 86.473 ms
Loss rate: 0.07%
-- Flow 3:
Average throughput: 49.48 Mbit/s
95th percentile per-packet one-way delay: 86.562 ms
Loss rate: 1.92%
```

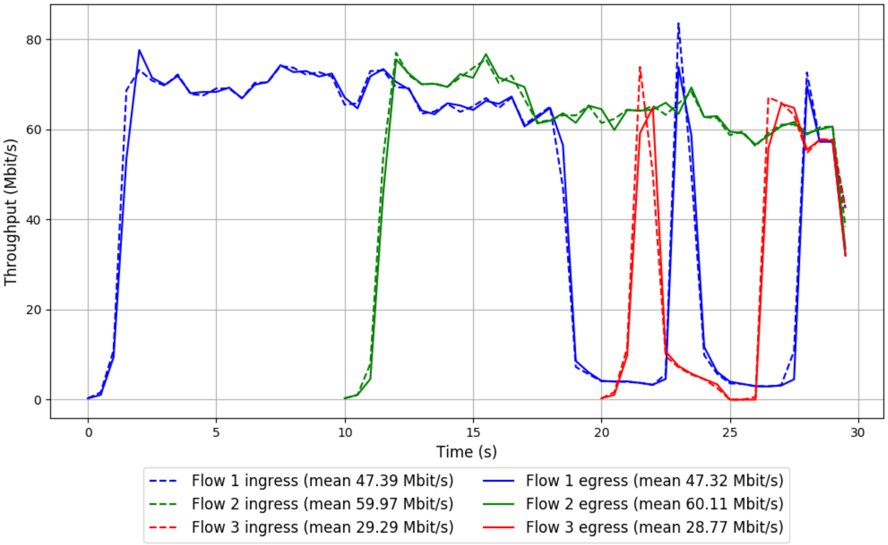
Run 7: Report of QUIC Cubic — Data Link

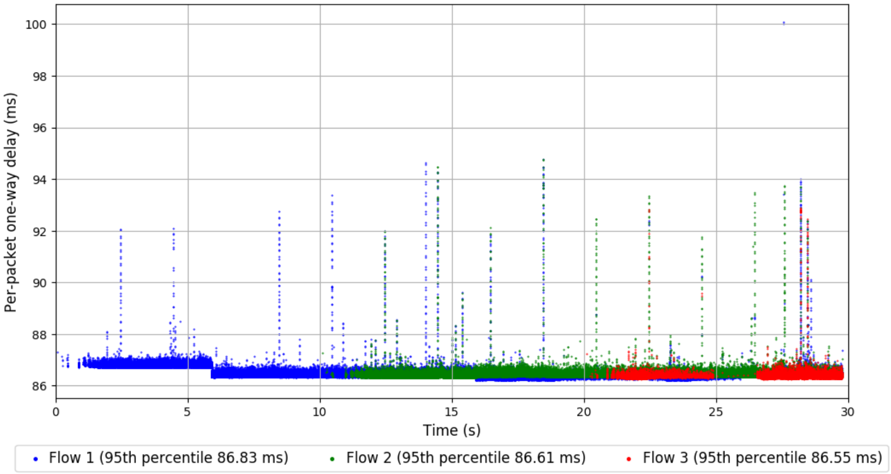




```
Run 8: Statistics of QUIC Cubic

Start at: 2017-09-18 18:36:35
End at: 2017-09-18 18:37:05

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 96.53 Mbit/s
95th percentile per-packet one-way delay: 86.783 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 47.32 Mbit/s
95th percentile per-packet one-way delay: 86.826 ms
Loss rate: 0.73%
-- Flow 2:
Average throughput: 60.11 Mbit/s
95th percentile per-packet one-way delay: 86.608 ms
Loss rate: 0.65%
-- Flow 3:
Average throughput: 28.77 Mbit/s
95th percentile per-packet one-way delay: 86.546 ms
Loss rate: 3.54%
```

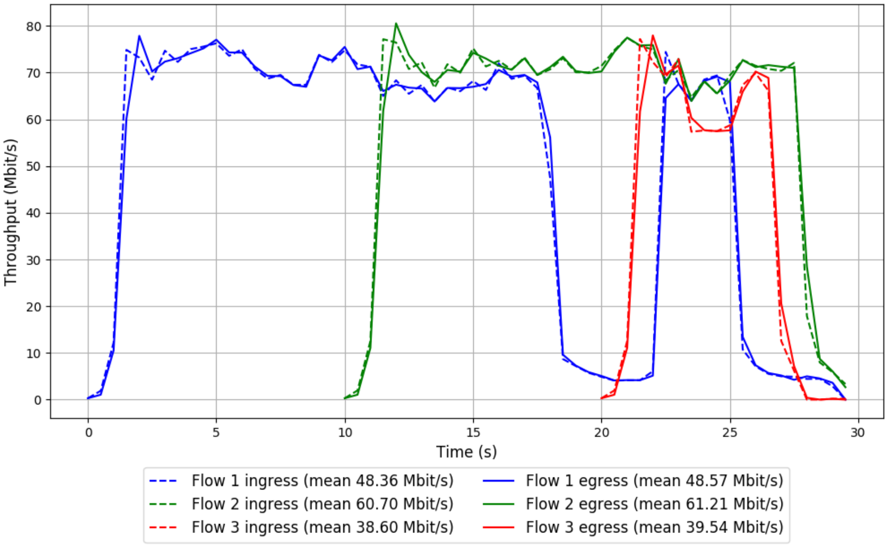
Run 8: Report of QUIC Cubic — Data Link

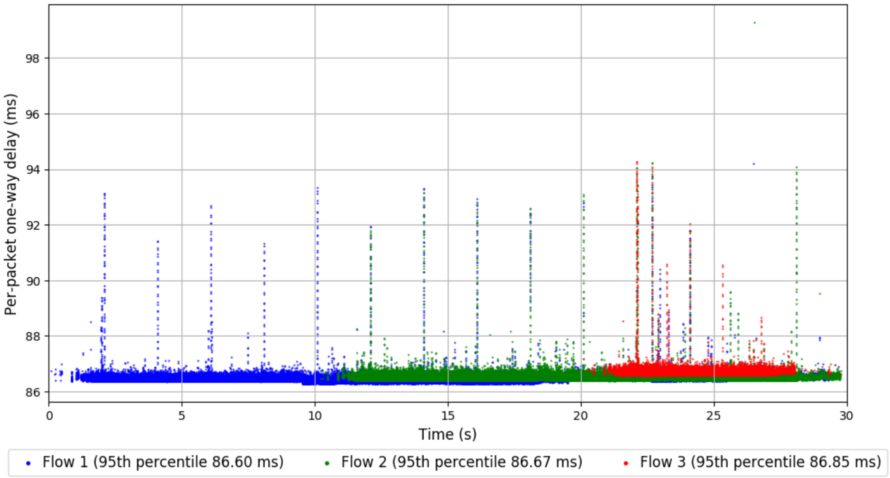




```
Run 9: Statistics of QUIC Cubic

Start at: 2017-09-18 18:46:22
End at: 2017-09-18 18:46:52

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 101.82 Mbit/s
95th percentile per-packet one-way delay: 86.724 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 48.57 Mbit/s
95th percentile per-packet one-way delay: 86.598 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 61.21 Mbit/s
95th percentile per-packet one-way delay: 86.667 ms
Loss rate: 0.07%
-- Flow 3:
Average throughput: 39.54 Mbit/s
95th percentile per-packet one-way delay: 86.852 ms
Loss rate: 0.03%
```

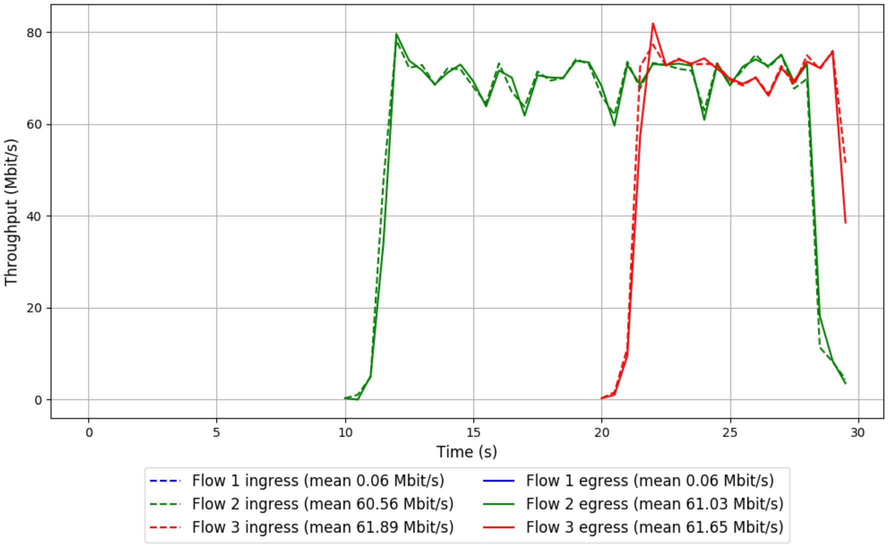
Run 9: Report of QUIC Cubic — Data Link

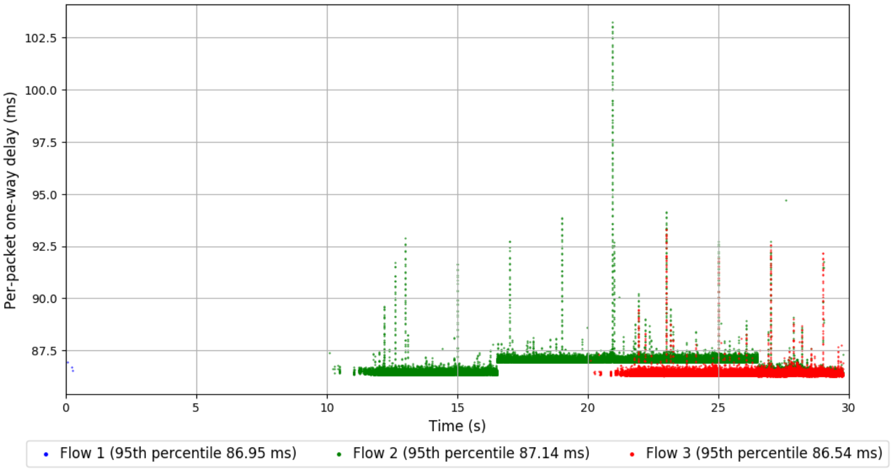




```
Run 10: Statistics of QUIC Cubic

Start at: 2017-09-18 18:56:05
End at: 2017-09-18 18:56:35

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 60.53 Mbit/s
95th percentile per-packet one-way delay: 87.113 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 86.951 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 61.03 Mbit/s
95th percentile per-packet one-way delay: 87.142 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 61.65 Mbit/s
95th percentile per-packet one-way delay: 86.541 ms
Loss rate: 2.15%
```

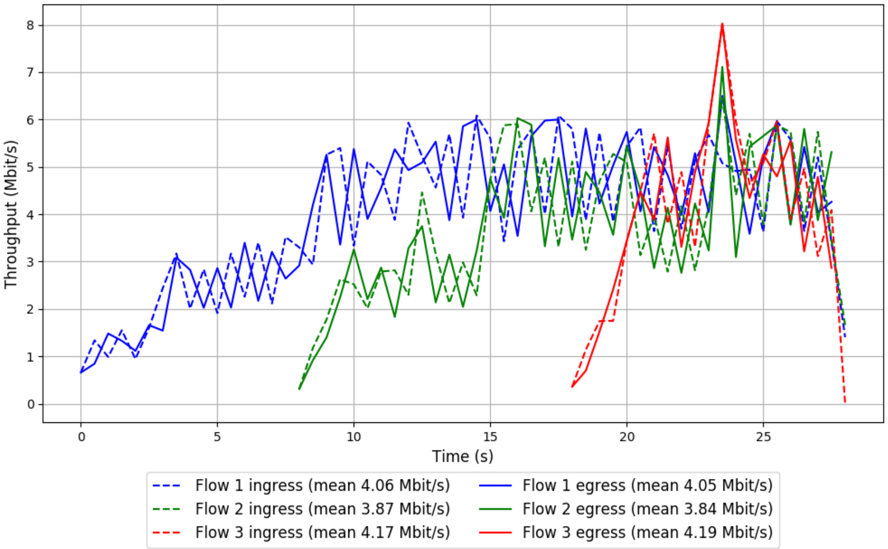
Run 10: Report of QUIC Cubic — Data Link

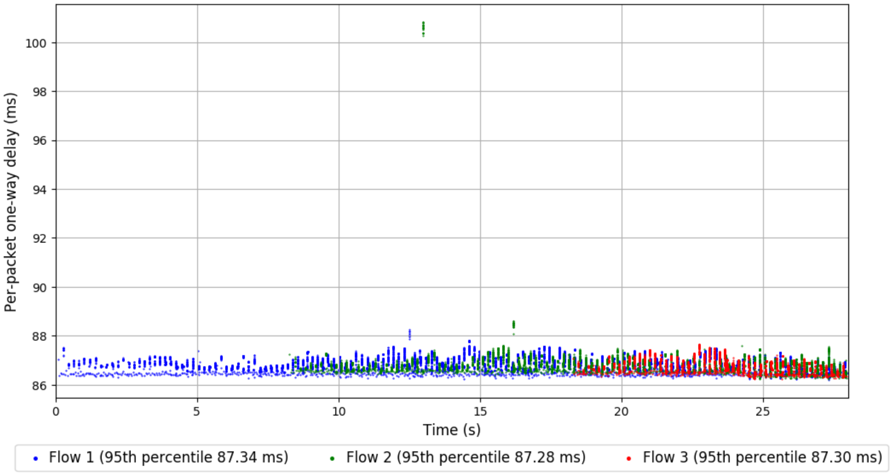




```
Run 1: Statistics of Sprout

Start at: 2017-09-18 17:29:55
End at: 2017-09-18 17:30:25

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.21 Mbit/s
95th percentile per-packet one-way delay: 87.315 ms
Loss rate: 1.21%
-- Flow 1:
Average throughput: 4.05 Mbit/s
95th percentile per-packet one-way delay: 87.340 ms
Loss rate: 0.85%
-- Flow 2:
Average throughput: 3.84 Mbit/s
95th percentile per-packet one-way delay: 87.277 ms
Loss rate: 1.55%
-- Flow 3:
Average throughput: 4.19 Mbit/s
95th percentile per-packet one-way delay: 87.298 ms
Loss rate: 1.58%
```

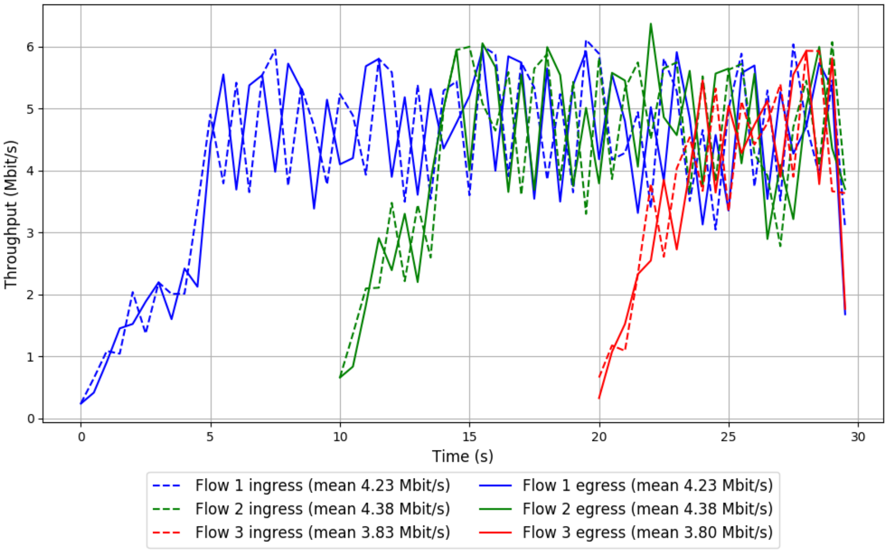
Run 1: Report of Sprout — Data Link

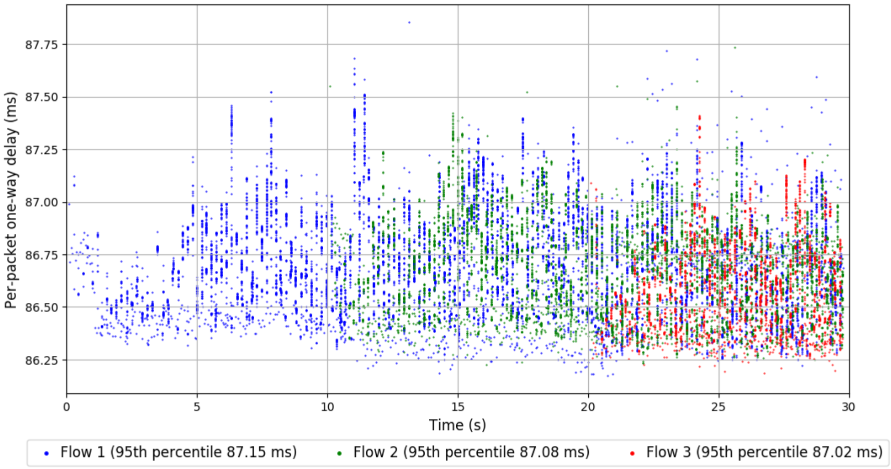




```
Run 2: Statistics of Sprout

Start at: 2017-09-18 17:39:40
End at: 2017-09-18 17:40:10

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.36 Mbit/s
95th percentile per-packet one-way delay: 87.113 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 4.23 Mbit/s
95th percentile per-packet one-way delay: 87.152 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 4.38 Mbit/s
95th percentile per-packet one-way delay: 87.078 ms
Loss rate: 1.13%
-- Flow 3:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 87.015 ms
Loss rate: 2.55%
```

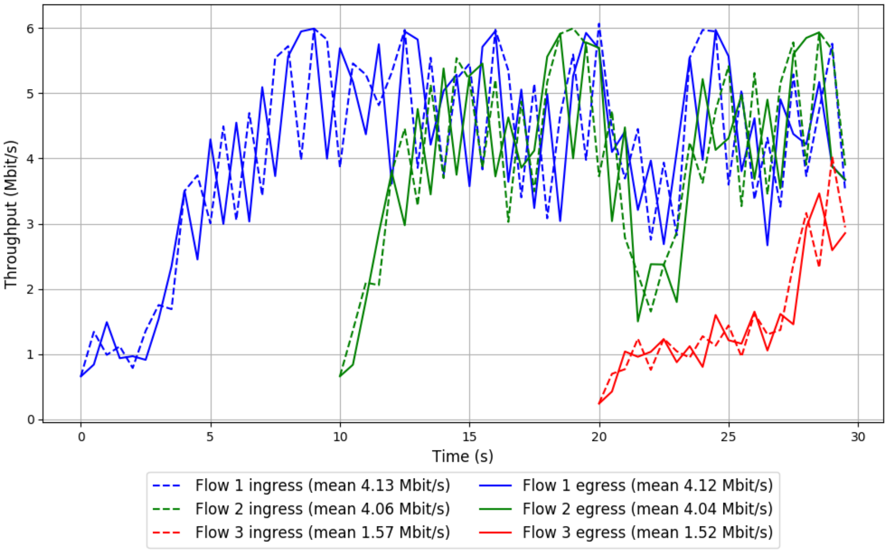
Run 2: Report of Sprout — Data Link

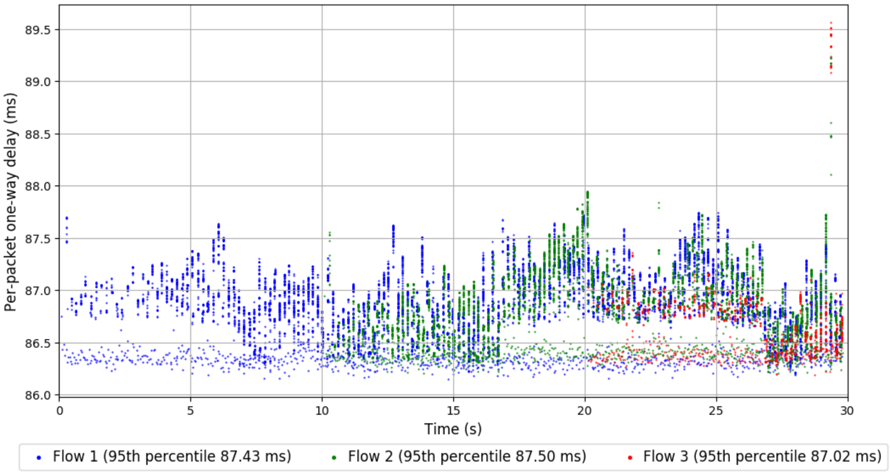




```
Run 3: Statistics of Sprout

Start at: 2017-09-18 17:49:24
End at: 2017-09-18 17:49:54

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.29 Mbit/s
95th percentile per-packet one-way delay: 87.458 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 4.12 Mbit/s
95th percentile per-packet one-way delay: 87.433 ms
Loss rate: 0.73%
-- Flow 2:
Average throughput: 4.04 Mbit/s
95th percentile per-packet one-way delay: 87.497 ms
Loss rate: 1.26%
-- Flow 3:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 87.023 ms
Loss rate: 4.95%
```

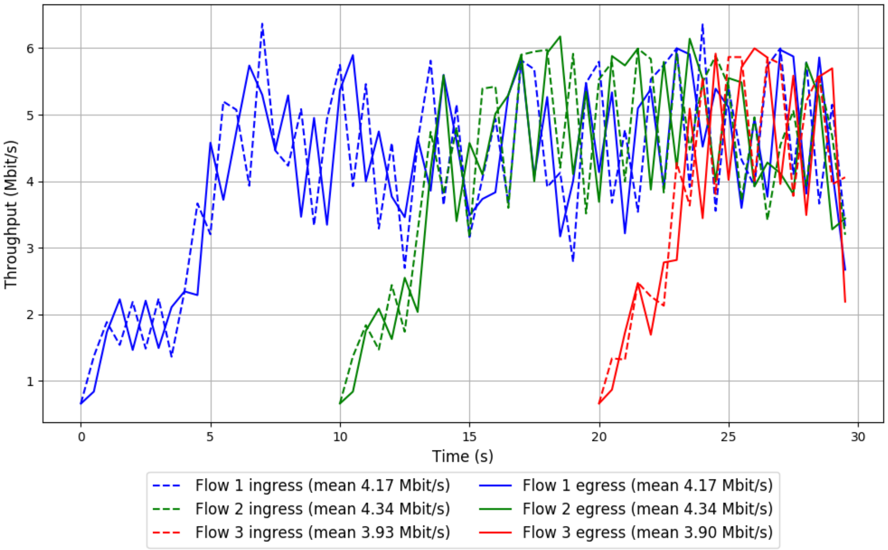
Run 3: Report of Sprout — Data Link

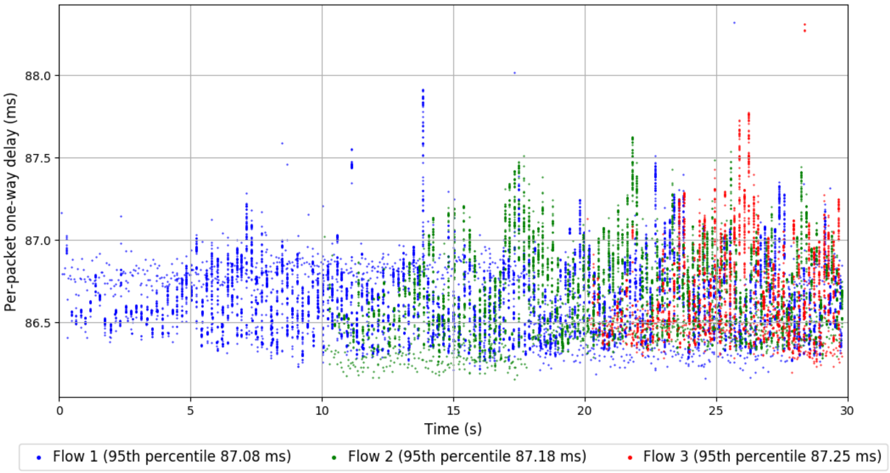




```
Run 4: Statistics of Sprout

Start at: 2017-09-18 17:59:13
End at: 2017-09-18 17:59:43

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.32 Mbit/s
95th percentile per-packet one-way delay: 87.158 ms
Loss rate: 0.99%
-- Flow 1:
Average throughput: 4.17 Mbit/s
95th percentile per-packet one-way delay: 87.083 ms
Loss rate: 0.66%
-- Flow 2:
Average throughput: 4.34 Mbit/s
95th percentile per-packet one-way delay: 87.179 ms
Loss rate: 0.84%
-- Flow 3:
Average throughput: 3.90 Mbit/s
95th percentile per-packet one-way delay: 87.255 ms
Loss rate: 2.42%
```

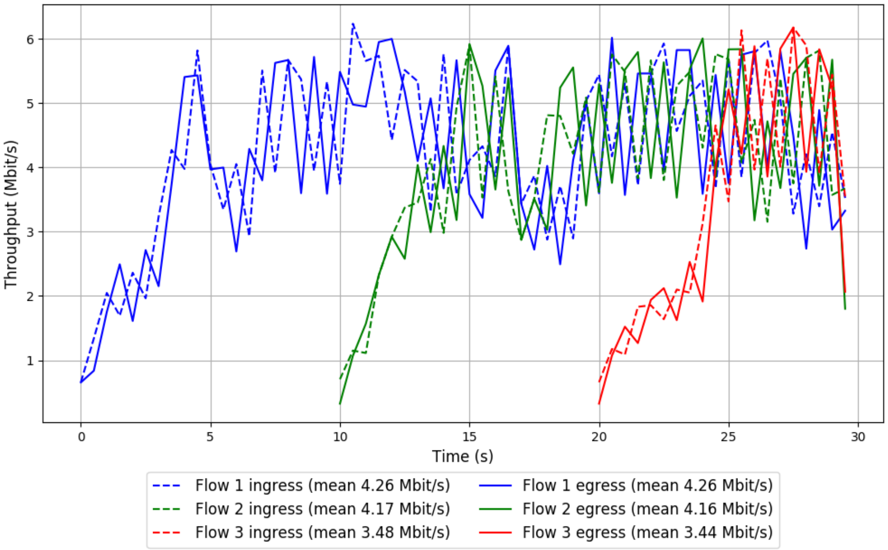
Run 4: Report of Sprout — Data Link

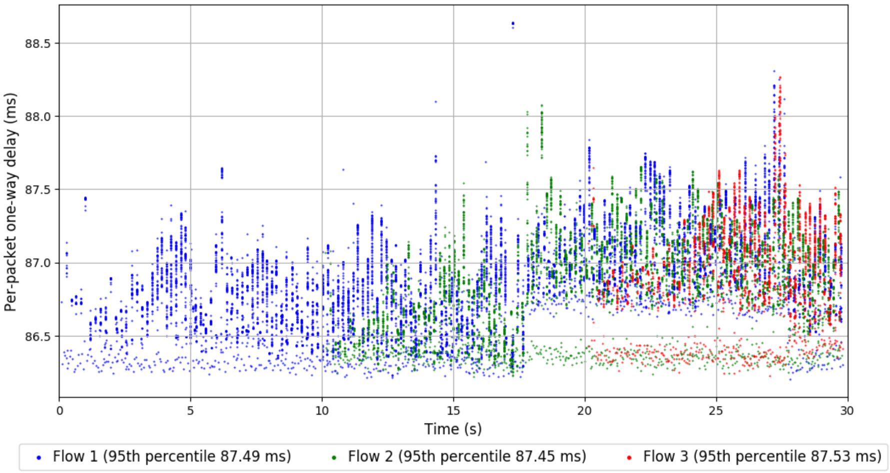




```
Run 5: Statistics of Sprout

Start at: 2017-09-18 18:09:04
End at: 2017-09-18 18:09:34

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.13 Mbit/s
95th percentile per-packet one-way delay: 87.475 ms
Loss rate: 1.11%
-- Flow 1:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 87.488 ms
Loss rate: 0.67%
-- Flow 2:
Average throughput: 4.16 Mbit/s
95th percentile per-packet one-way delay: 87.446 ms
Loss rate: 1.13%
-- Flow 3:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 87.530 ms
Loss rate: 2.66%
```

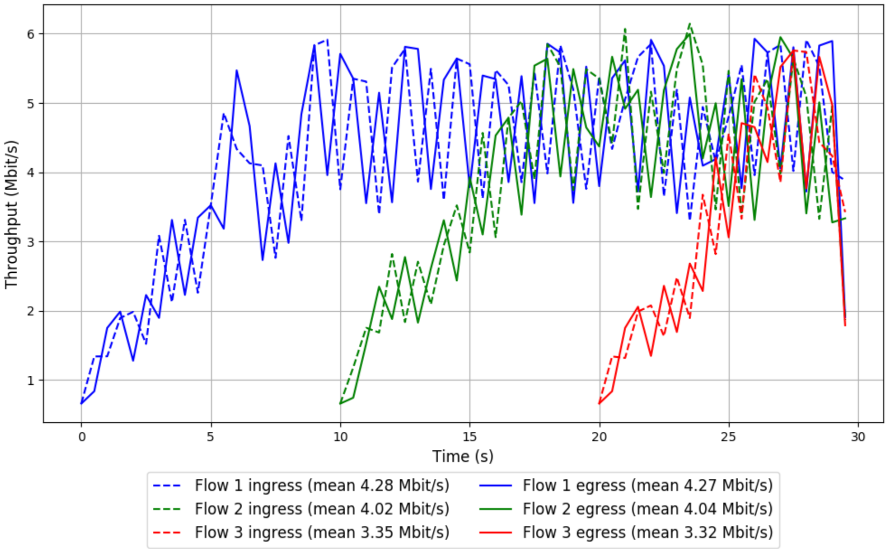
Run 5: Report of Sprout — Data Link

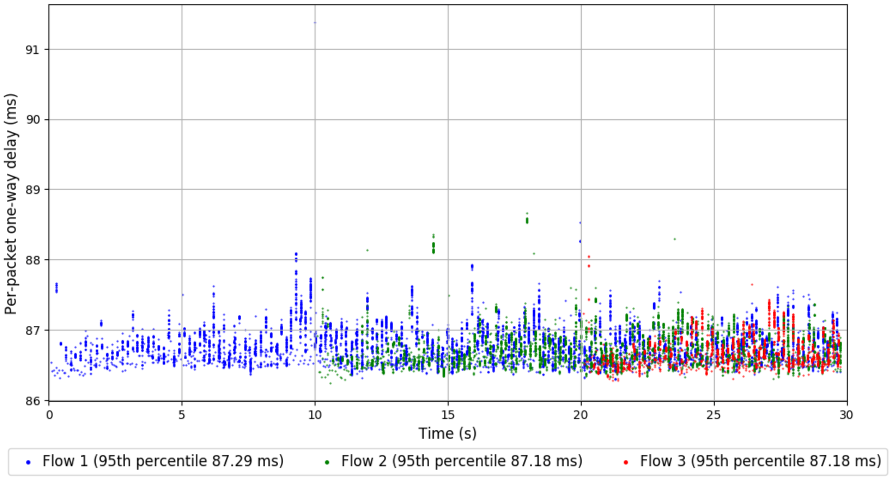




```
Run 6: Statistics of Sprout

Start at: 2017-09-18 18:19:00
End at: 2017-09-18 18:19:30

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.02 Mbit/s
95th percentile per-packet one-way delay: 87.242 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 4.27 Mbit/s
95th percentile per-packet one-way delay: 87.292 ms
Loss rate: 0.77%
-- Flow 2:
Average throughput: 4.04 Mbit/s
95th percentile per-packet one-way delay: 87.180 ms
Loss rate: 0.16%
-- Flow 3:
Average throughput: 3.32 Mbit/s
95th percentile per-packet one-way delay: 87.180 ms
Loss rate: 2.50%
```

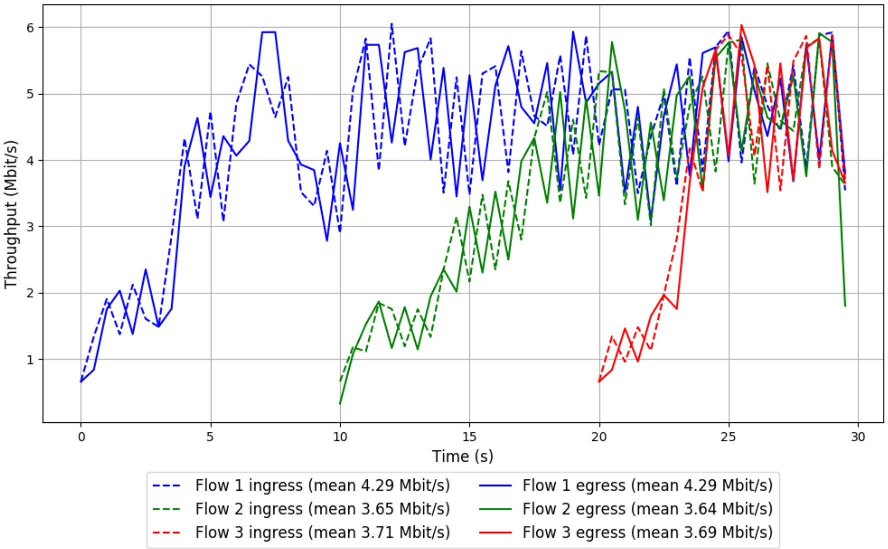
Run 6: Report of Sprout — Data Link

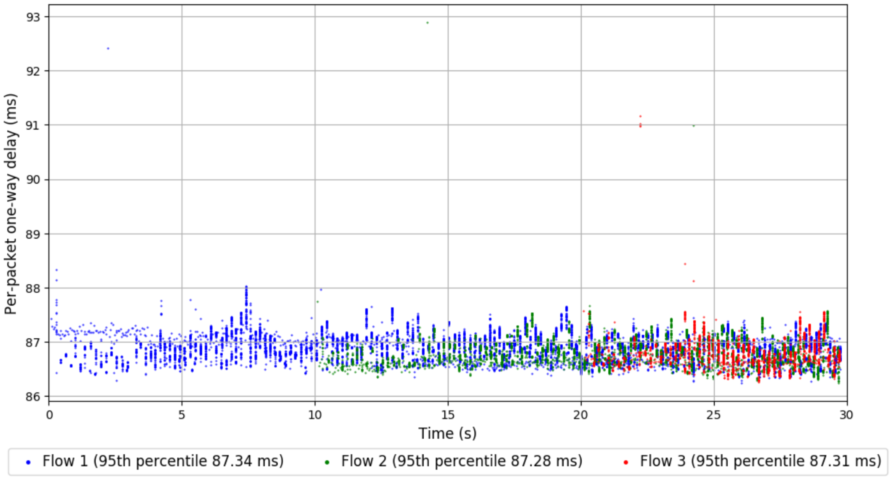




```
Run 7: Statistics of Sprout

Start at: 2017-09-18 18:28:47
End at: 2017-09-18 18:29:17

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.90 Mbit/s
95th percentile per-packet one-way delay: 87.313 ms
Loss rate: 1.13%
-- Flow 1:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 87.337 ms
Loss rate: 0.65%
-- Flow 2:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 87.283 ms
Loss rate: 1.33%
-- Flow 3:
Average throughput: 3.69 Mbit/s
95th percentile per-packet one-way delay: 87.312 ms
Loss rate: 2.42%
```

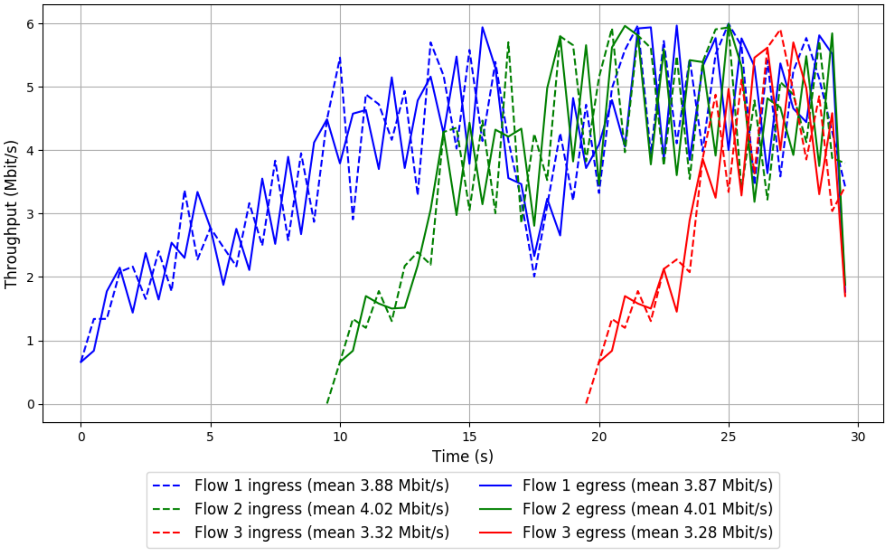
Run 7: Report of Sprout — Data Link

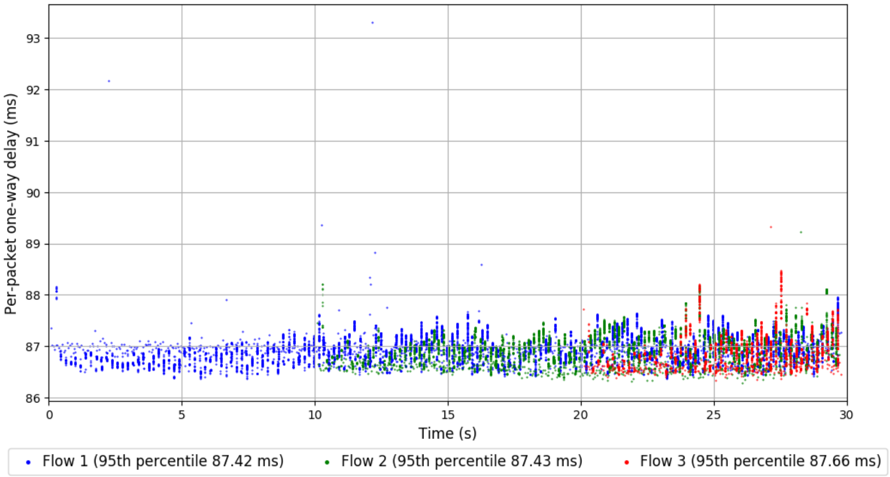




```
Run 8: Statistics of Sprout

Start at: 2017-09-18 18:38:33
End at: 2017-09-18 18:39:03

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.59 Mbit/s
95th percentile per-packet one-way delay: 87.445 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 3.87 Mbit/s
95th percentile per-packet one-way delay: 87.424 ms
Loss rate: 0.73%
-- Flow 2:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 87.432 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 3.28 Mbit/s
95th percentile per-packet one-way delay: 87.662 ms
Loss rate: 2.65%
```

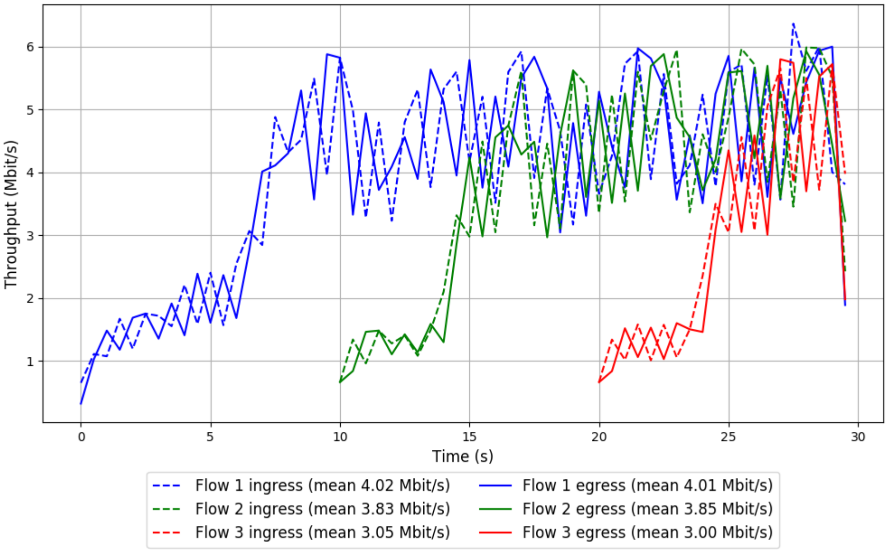
Run 8: Report of Sprout — Data Link

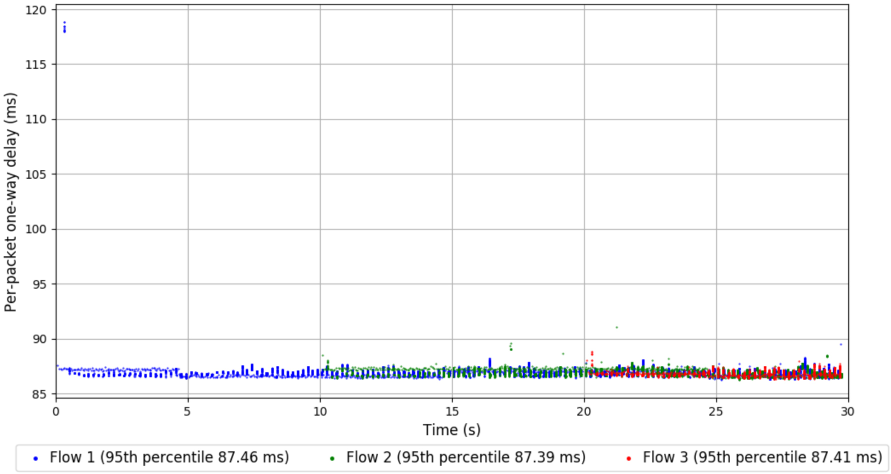




```
Run 9: Statistics of Sprout

Start at: 2017-09-18 18:48:16
End at: 2017-09-18 18:48:47

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.53 Mbit/s
95th percentile per-packet one-way delay: 87.415 ms
Loss rate: 1.04%
-- Flow 1:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 87.462 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 3.85 Mbit/s
95th percentile per-packet one-way delay: 87.392 ms
Loss rate: 0.50%
-- Flow 3:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 87.409 ms
Loss rate: 3.35%
```

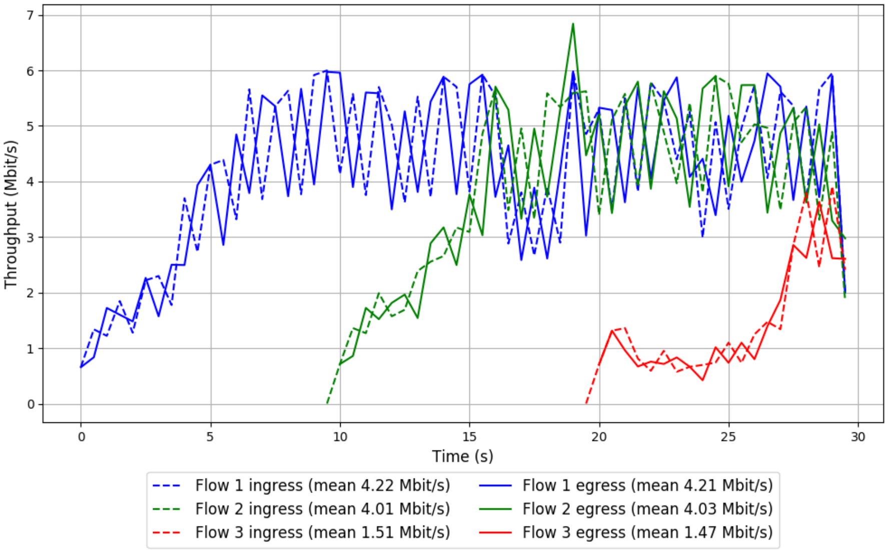
Run 9: Report of Sprout — Data Link

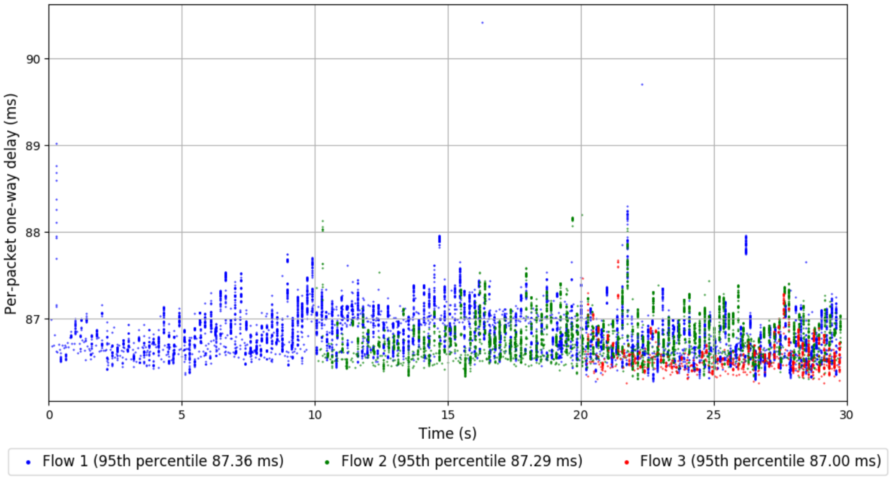




```
Run 10: Statistics of Sprout

Start at: 2017-09-18 18:58:01
End at: 2017-09-18 18:58:31

# Below is generated by plot.py at 2017-09-18 21:31:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.36 Mbit/s
95th percentile per-packet one-way delay: 87.320 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 4.21 Mbit/s
95th percentile per-packet one-way delay: 87.358 ms
Loss rate: 0.81%
-- Flow 2:
Average throughput: 4.03 Mbit/s
95th percentile per-packet one-way delay: 87.289 ms
Loss rate: 0.30%
-- Flow 3:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 87.004 ms
Loss rate: 4.88%
```

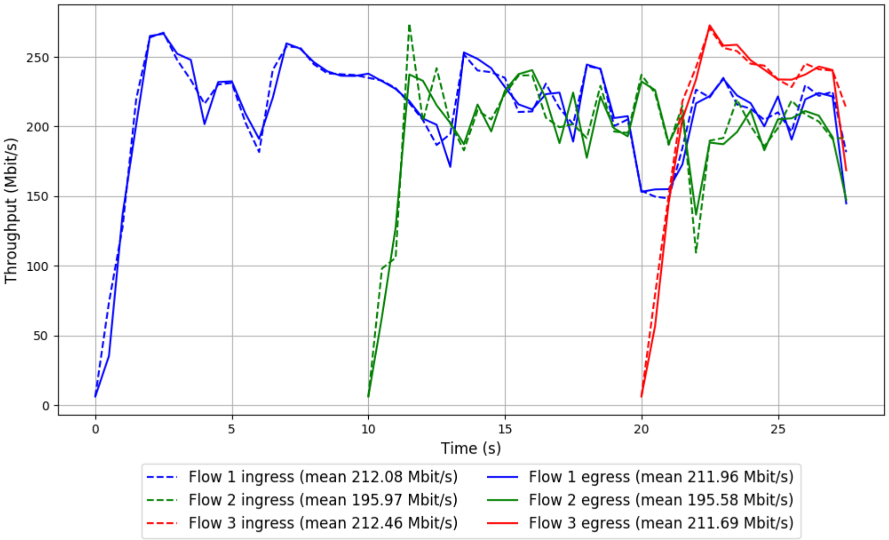
Run 10: Report of Sprout — Data Link

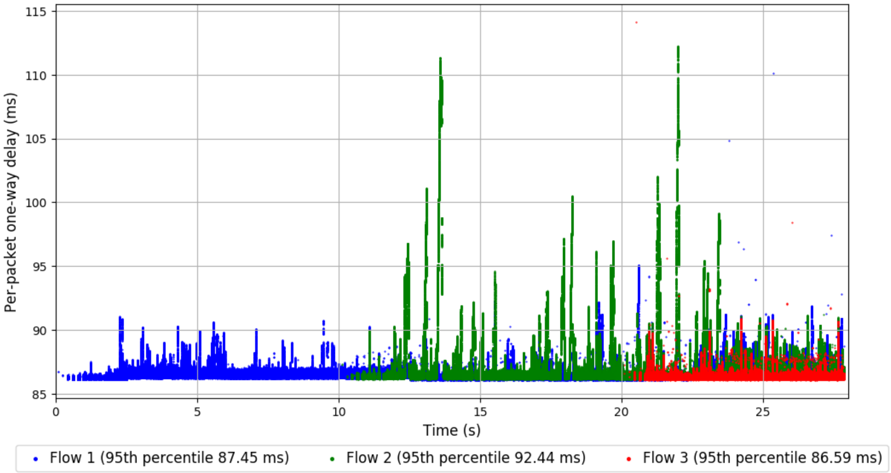




```
Run 1: Statistics of TaoVA-100x

Start at: 2017-09-18 17:22:57
End at: 2017-09-18 17:23:27

# Below is generated by plot.py at 2017-09-18 21:34:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 395.98 Mbit/s
95th percentile per-packet one-way delay: 88.715 ms
Loss rate: 1.12%
-- Flow 1:
Average throughput: 211.96 Mbit/s
95th percentile per-packet one-way delay: 87.453 ms
Loss rate: 0.68%
-- Flow 2:
Average throughput: 195.58 Mbit/s
95th percentile per-packet one-way delay: 92.444 ms
Loss rate: 1.16%
-- Flow 3:
Average throughput: 211.69 Mbit/s
95th percentile per-packet one-way delay: 86.594 ms
Loss rate: 2.58%
```

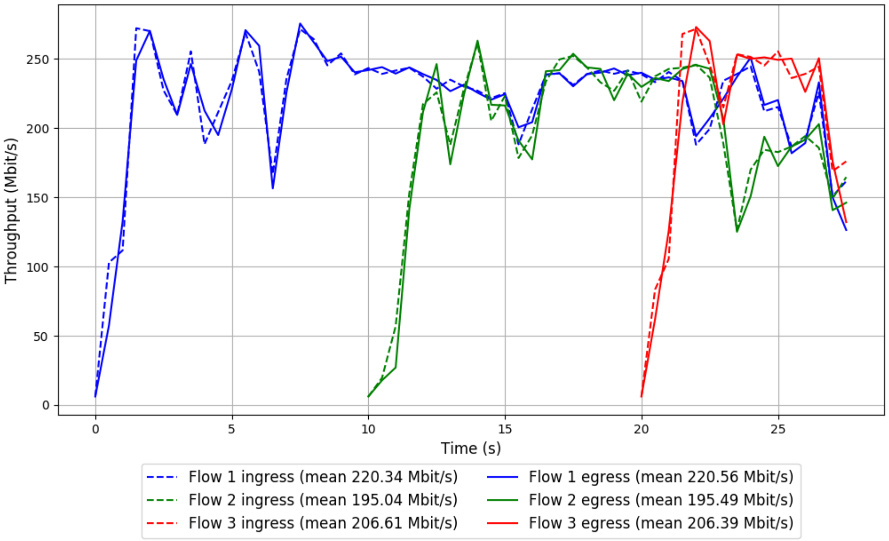
Run 1: Report of TaoVA-100x — Data Link

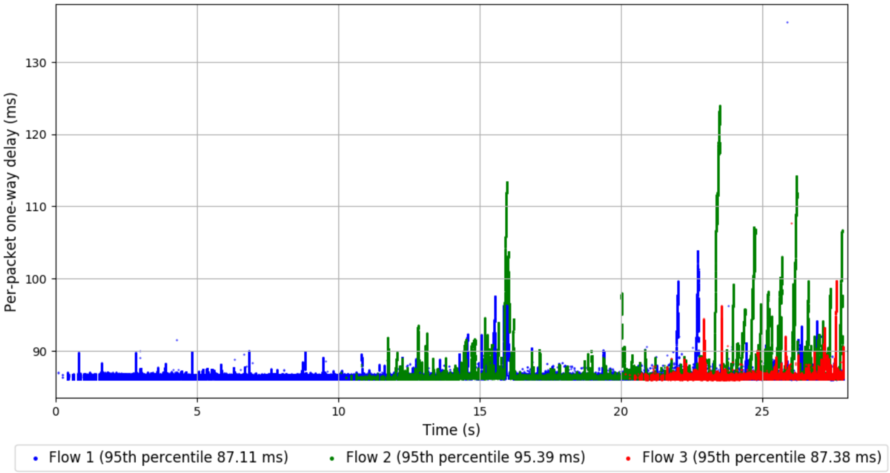




```
Run 2: Statistics of TaoVA-100x

Start at: 2017-09-18 17:32:45
End at: 2017-09-18 17:33:15

# Below is generated by plot.py at 2017-09-18 21:34:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 403.00 Mbit/s
95th percentile per-packet one-way delay: 89.498 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 220.56 Mbit/s
95th percentile per-packet one-way delay: 87.108 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 195.49 Mbit/s
95th percentile per-packet one-way delay: 95.389 ms
Loss rate: 0.75%
-- Flow 3:
Average throughput: 206.39 Mbit/s
95th percentile per-packet one-way delay: 87.375 ms
Loss rate: 2.31%
```

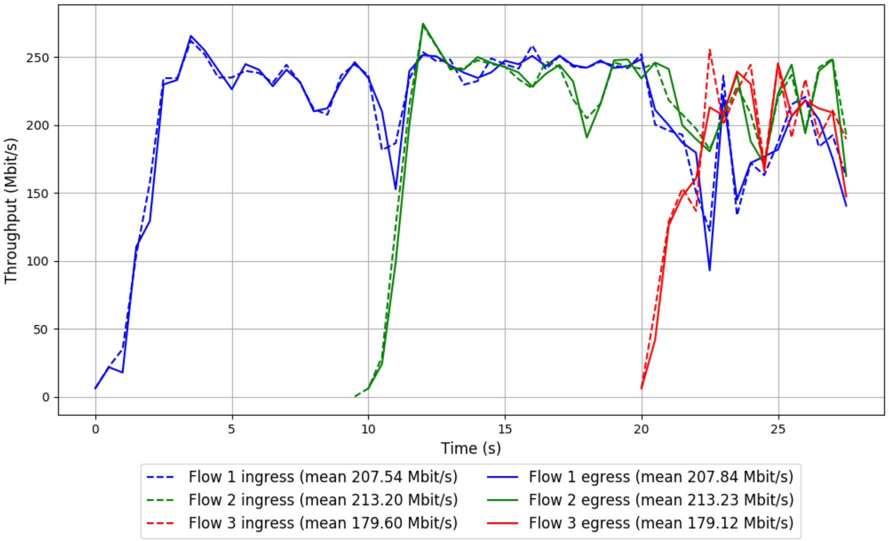
Run 2: Report of TaoVA-100x — Data Link

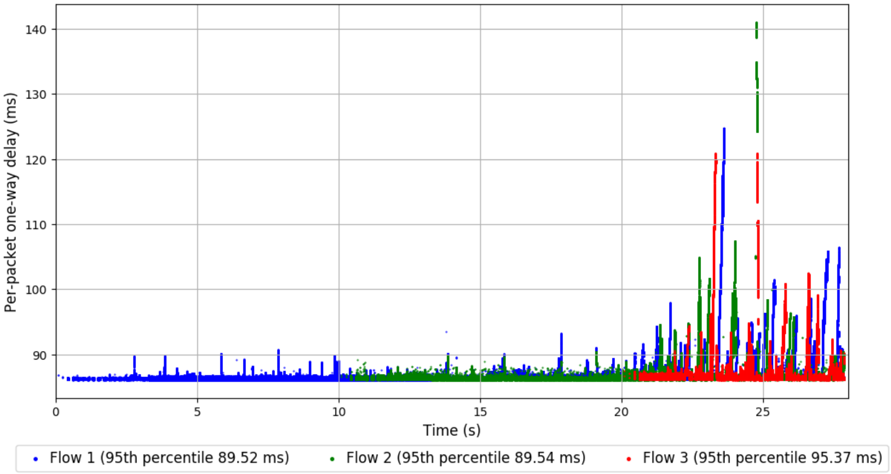




```
Run 3: Statistics of TaoVA-100x

Start at: 2017-09-18 17:42:26
End at: 2017-09-18 17:42:56

# Below is generated by plot.py at 2017-09-18 21:34:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 394.25 Mbit/s
95th percentile per-packet one-way delay: 90.264 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 207.84 Mbit/s
95th percentile per-packet one-way delay: 89.516 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 213.23 Mbit/s
95th percentile per-packet one-way delay: 89.542 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 179.12 Mbit/s
95th percentile per-packet one-way delay: 95.368 ms
Loss rate: 2.41%
```

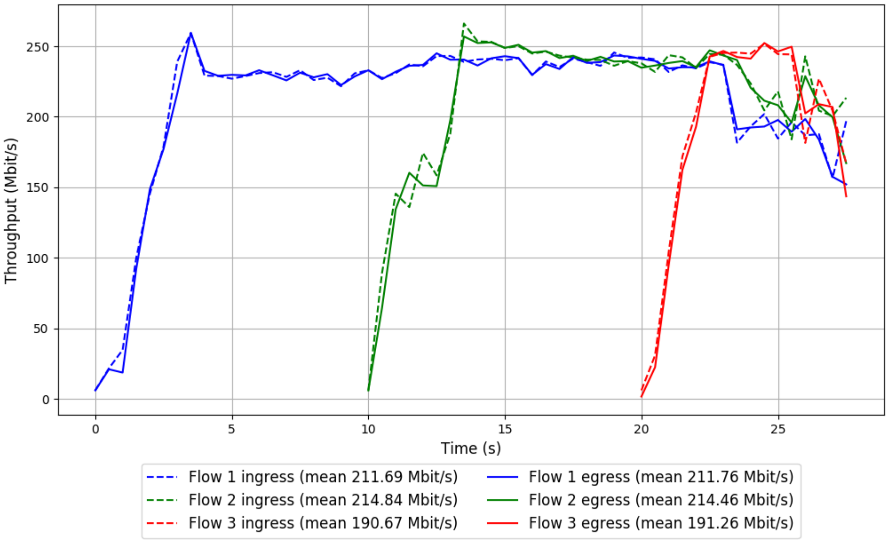
Run 3: Report of TaoVA-100x — Data Link

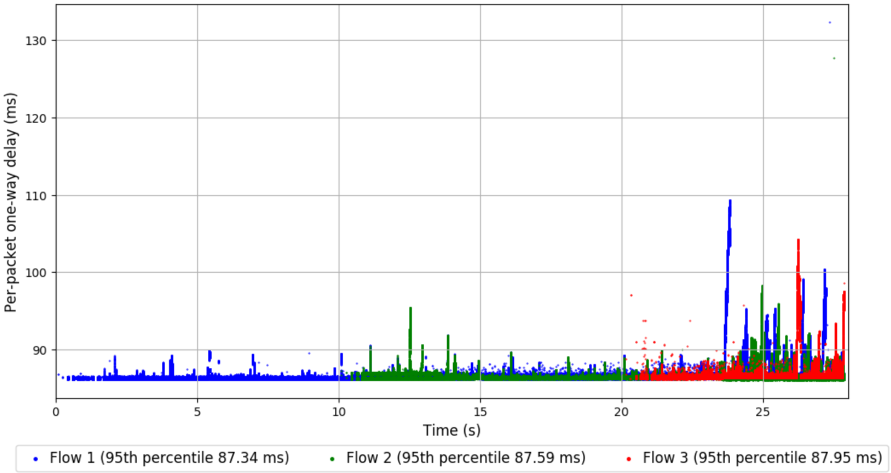




```
Run 4: Statistics of TaoVA-100x

Start at: 2017-09-18 17:52:16
End at: 2017-09-18 17:52:46

# Below is generated by plot.py at 2017-09-18 21:34:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 402.06 Mbit/s
95th percentile per-packet one-way delay: 87.521 ms
Loss rate: 0.96%
-- Flow 1:
Average throughput: 211.76 Mbit/s
95th percentile per-packet one-way delay: 87.343 ms
Loss rate: 0.60%
-- Flow 2:
Average throughput: 214.46 Mbit/s
95th percentile per-packet one-way delay: 87.592 ms
Loss rate: 1.16%
-- Flow 3:
Average throughput: 191.26 Mbit/s
95th percentile per-packet one-way delay: 87.954 ms
Loss rate: 1.88%
```

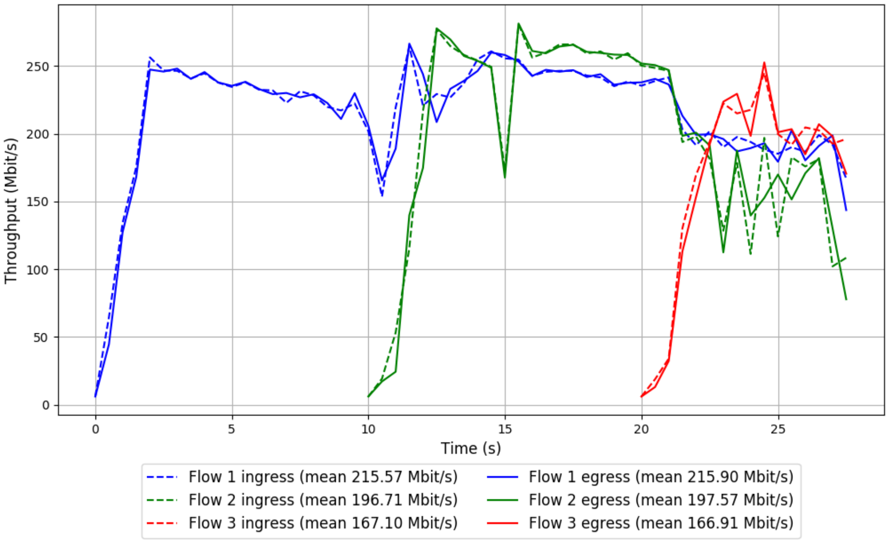
Run 4: Report of TaoVA-100x — Data Link

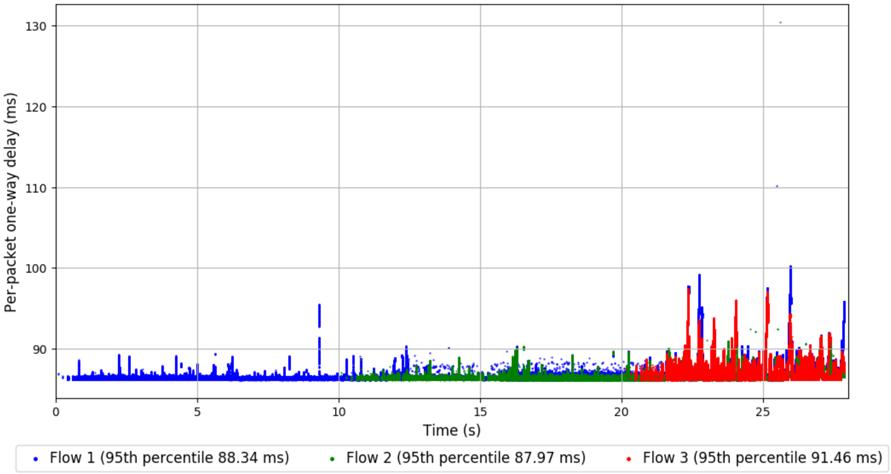




```
Run 5: Statistics of TaoVA-100x

Start at: 2017-09-18 18:02:04
End at: 2017-09-18 18:02:34

# Below is generated by plot.py at 2017-09-18 21:34:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 388.67 Mbit/s
95th percentile per-packet one-way delay: 88.763 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 215.90 Mbit/s
95th percentile per-packet one-way delay: 88.344 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 197.57 Mbit/s
95th percentile per-packet one-way delay: 87.975 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 166.91 Mbit/s
95th percentile per-packet one-way delay: 91.457 ms
Loss rate: 2.32%
```

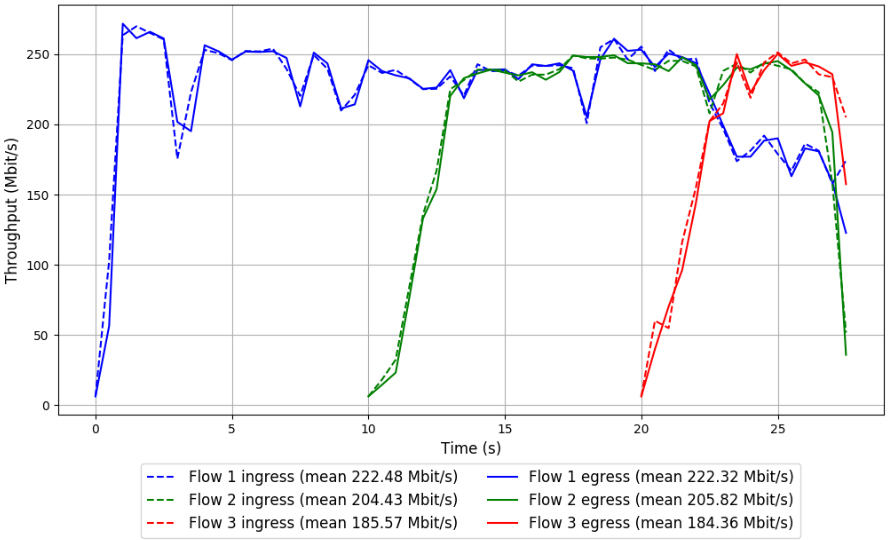
Run 5: Report of TaoVA-100x — Data Link

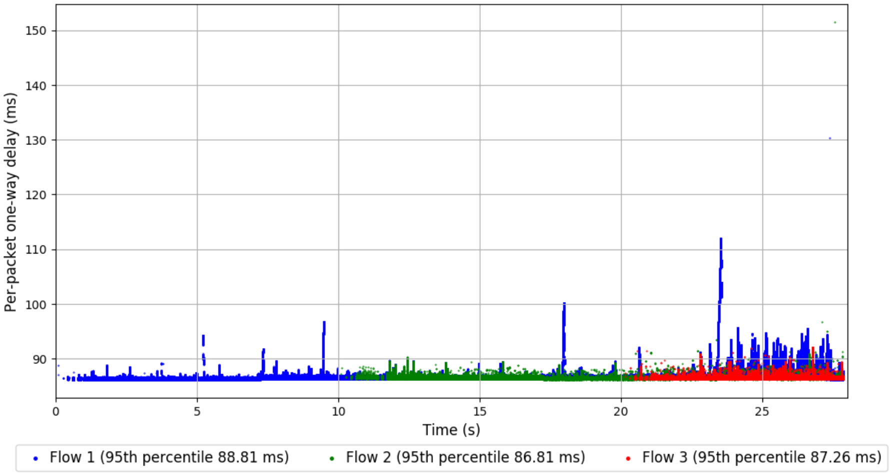




```
Run 6: Statistics of TaoVA-100x

Start at: 2017-09-18 18:11:52
End at: 2017-09-18 18:12:22

# Below is generated by plot.py at 2017-09-18 21:34:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 404.99 Mbit/s
95th percentile per-packet one-way delay: 87.671 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 222.32 Mbit/s
95th percentile per-packet one-way delay: 88.815 ms
Loss rate: 0.70%
-- Flow 2:
Average throughput: 205.82 Mbit/s
95th percentile per-packet one-way delay: 86.811 ms
Loss rate: 0.31%
-- Flow 3:
Average throughput: 184.36 Mbit/s
95th percentile per-packet one-way delay: 87.261 ms
Loss rate: 2.85%
```

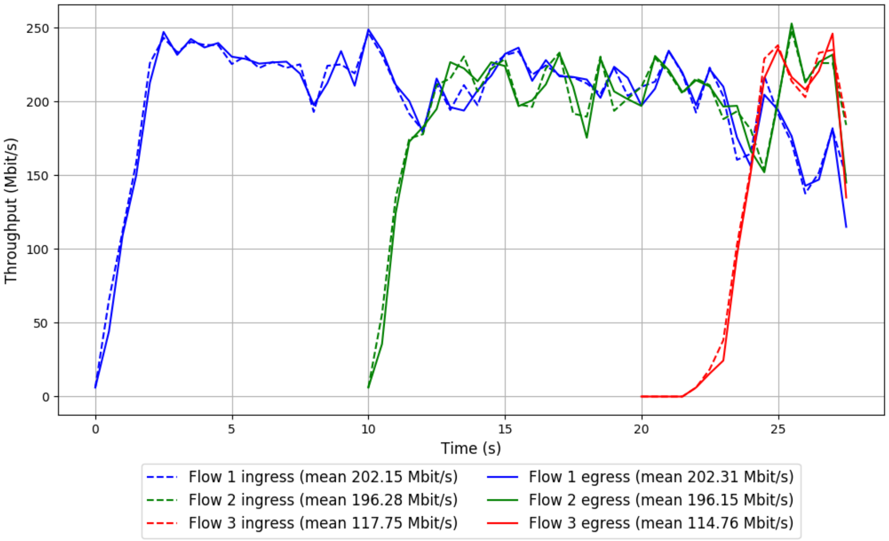
Run 6: Report of TaoVA-100x — Data Link

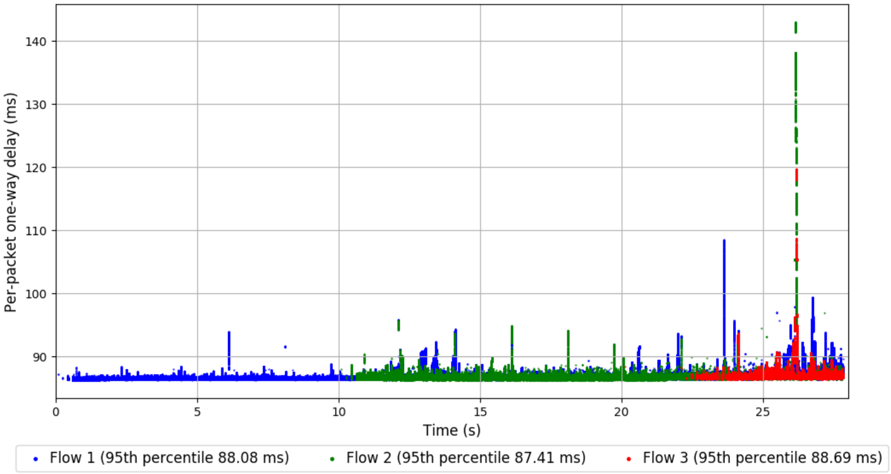




```
Run 7: Statistics of TaoVA-100x

Start at: 2017-09-18 18:21:48
End at: 2017-09-18 18:22:18

# Below is generated by plot.py at 2017-09-18 21:40:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 359.65 Mbit/s
95th percentile per-packet one-way delay: 87.867 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 202.31 Mbit/s
95th percentile per-packet one-way delay: 88.082 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 196.15 Mbit/s
95th percentile per-packet one-way delay: 87.410 ms
Loss rate: 1.04%
-- Flow 3:
Average throughput: 114.76 Mbit/s
95th percentile per-packet one-way delay: 88.688 ms
Loss rate: 4.72%
```

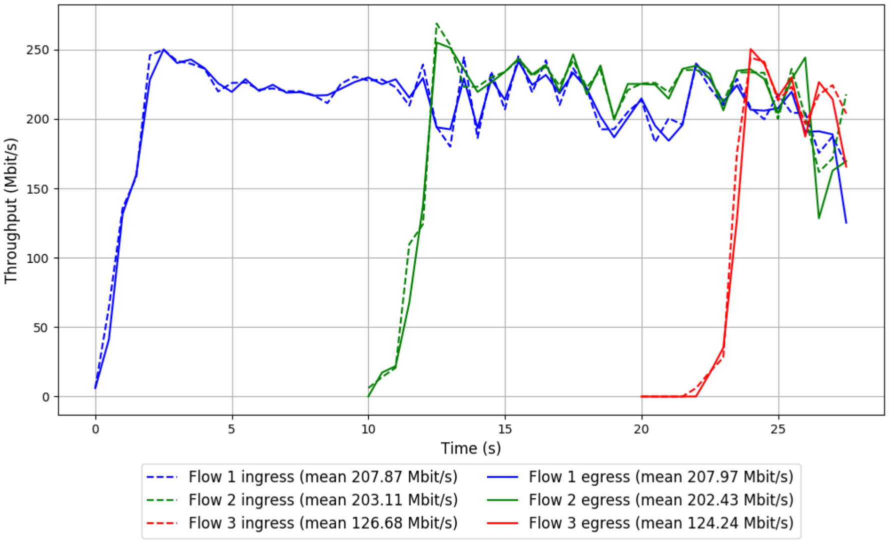
Run 7: Report of TaoVA-100x — Data Link

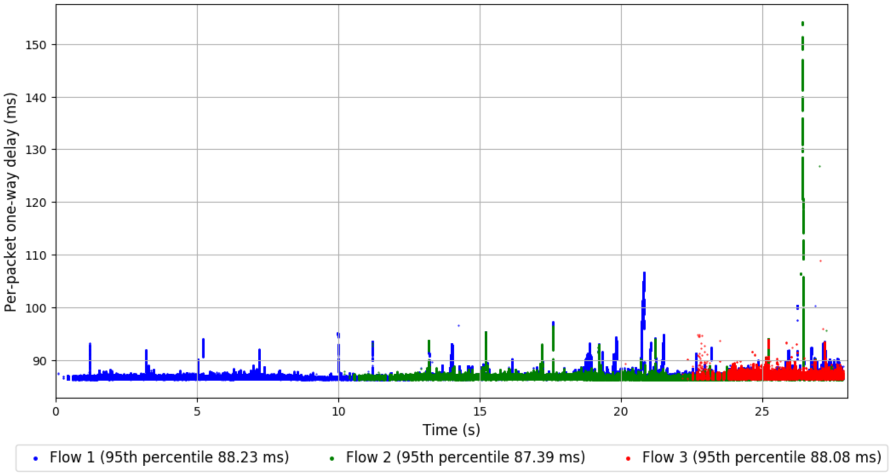




```
Run 8: Statistics of TaoVA-100x

Start at: 2017-09-18 18:31:41
End at: 2017-09-18 18:32:11

# Below is generated by plot.py at 2017-09-18 21:42:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 371.01 Mbit/s
95th percentile per-packet one-way delay: 87.911 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 207.97 Mbit/s
95th percentile per-packet one-way delay: 88.226 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 202.43 Mbit/s
95th percentile per-packet one-way delay: 87.393 ms
Loss rate: 1.30%
-- Flow 3:
Average throughput: 124.24 Mbit/s
95th percentile per-packet one-way delay: 88.082 ms
Loss rate: 4.16%
```

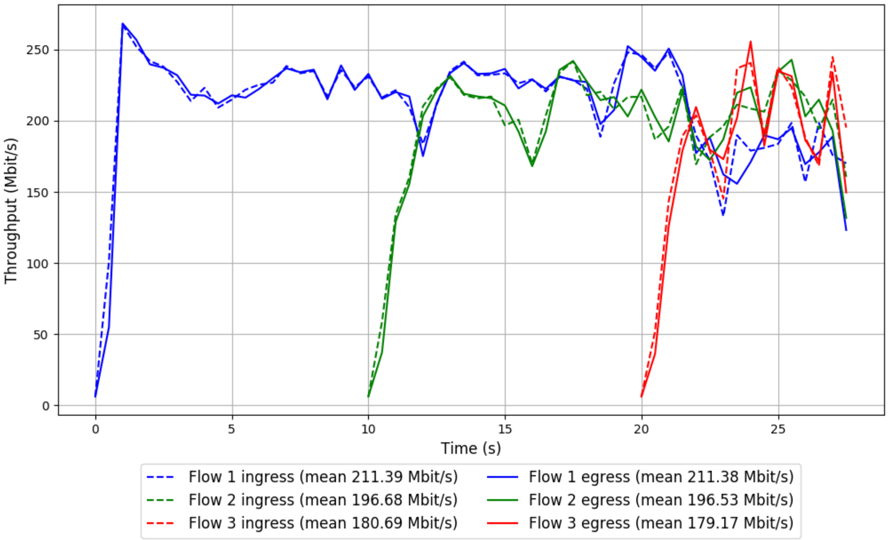
Run 8: Report of TaoVA-100x — Data Link

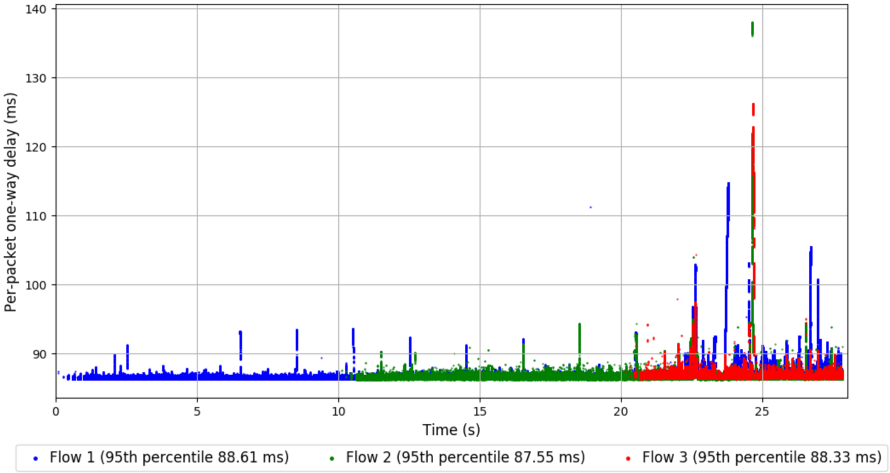




```
Run 9: Statistics of TaoVA-100x

Start at: 2017-09-18 18:41:25
End at: 2017-09-18 18:41:55

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 386.55 Mbit/s
95th percentile per-packet one-way delay: 88.132 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 211.38 Mbit/s
95th percentile per-packet one-way delay: 88.608 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 196.53 Mbit/s
95th percentile per-packet one-way delay: 87.549 ms
Loss rate: 1.05%
-- Flow 3:
Average throughput: 179.17 Mbit/s
95th percentile per-packet one-way delay: 88.329 ms
Loss rate: 3.04%
```

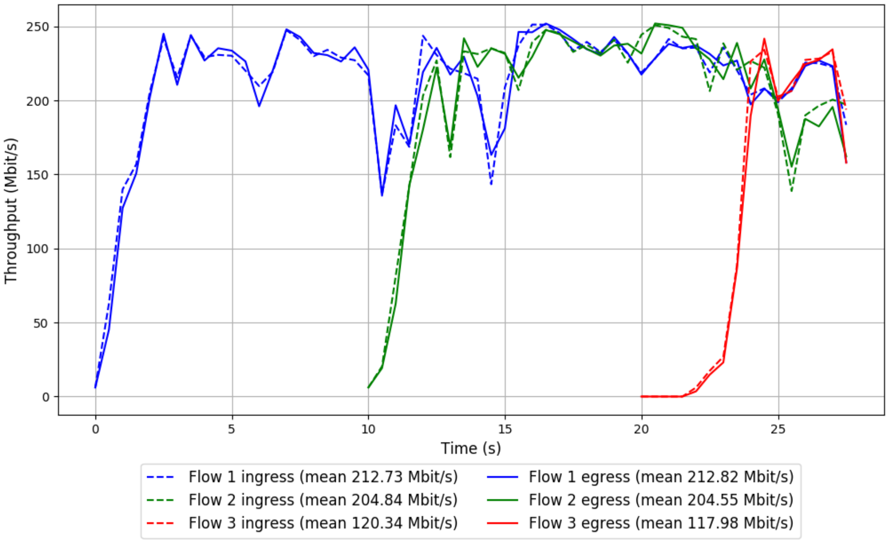
Run 9: Report of TaoVA-100x — Data Link

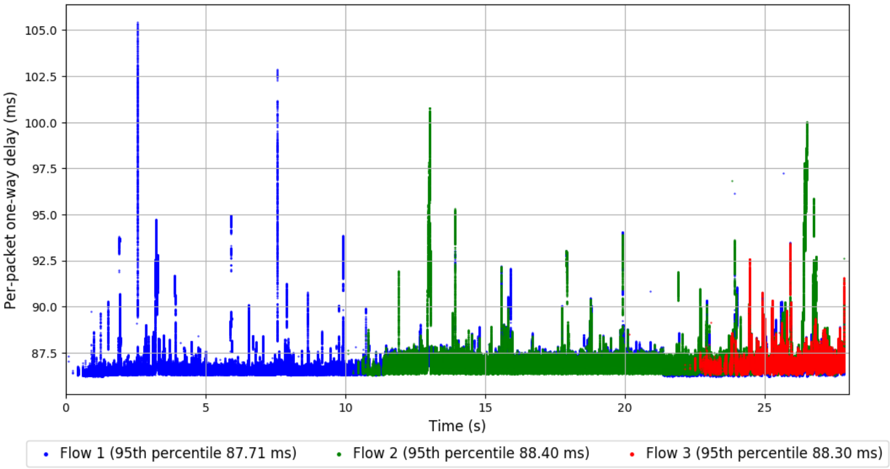




```
Run 10: Statistics of TaoVA-100x

Start at: 2017-09-18 18:51:08
End at: 2017-09-18 18:51:38

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 376.33 Mbit/s
95th percentile per-packet one-way delay: 87.964 ms
Loss rate: 1.02%
-- Flow 1:
Average throughput: 212.82 Mbit/s
95th percentile per-packet one-way delay: 87.708 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 204.55 Mbit/s
95th percentile per-packet one-way delay: 88.399 ms
Loss rate: 1.04%
-- Flow 3:
Average throughput: 117.98 Mbit/s
95th percentile per-packet one-way delay: 88.297 ms
Loss rate: 3.98%
```

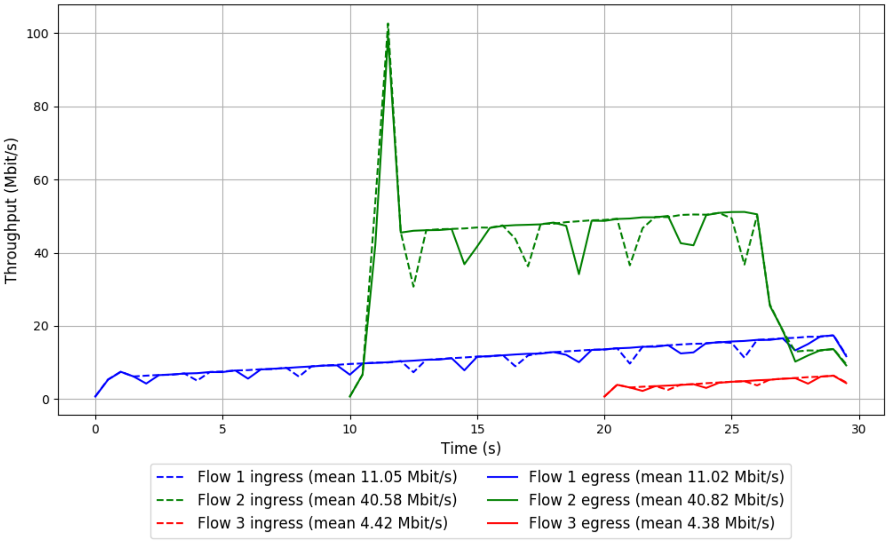
Run 10: Report of TaoVA-100x — Data Link

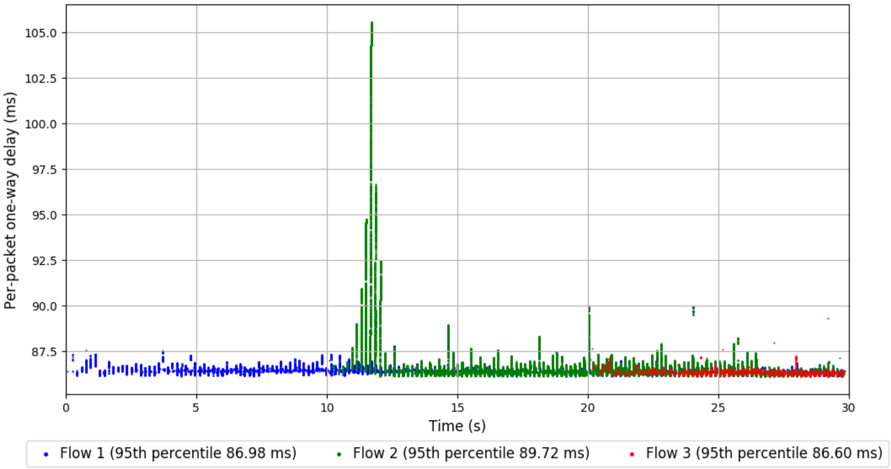




```
Run 1: Statistics of TCP Vegas

Start at: 2017-09-18 17:25:28
End at: 2017-09-18 17:25:58

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 39.52 Mbit/s
95th percentile per-packet one-way delay: 88.440 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 11.02 Mbit/s
95th percentile per-packet one-way delay: 86.981 ms
Loss rate: 0.90%
-- Flow 2:
Average throughput: 40.82 Mbit/s
95th percentile per-packet one-way delay: 89.724 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 4.38 Mbit/s
95th percentile per-packet one-way delay: 86.603 ms
Loss rate: 2.55%
```

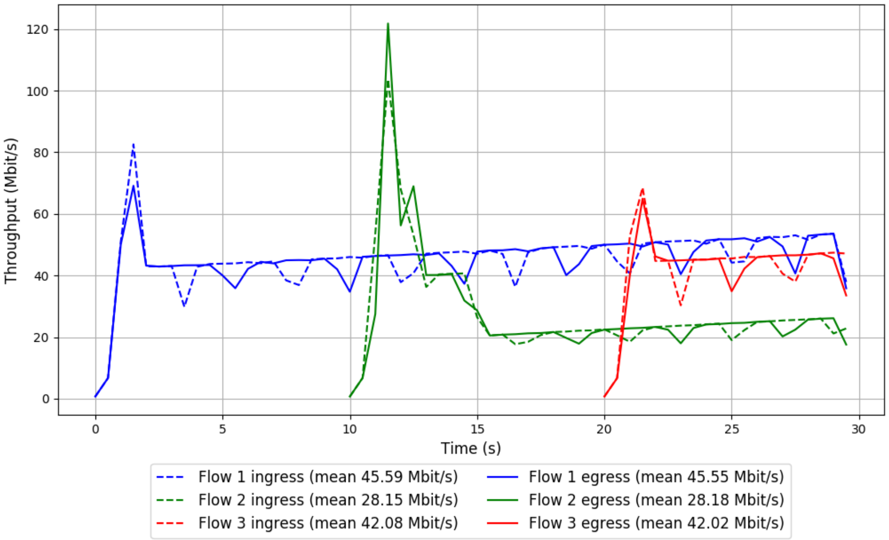
Run 1: Report of TCP Vegas — Data Link

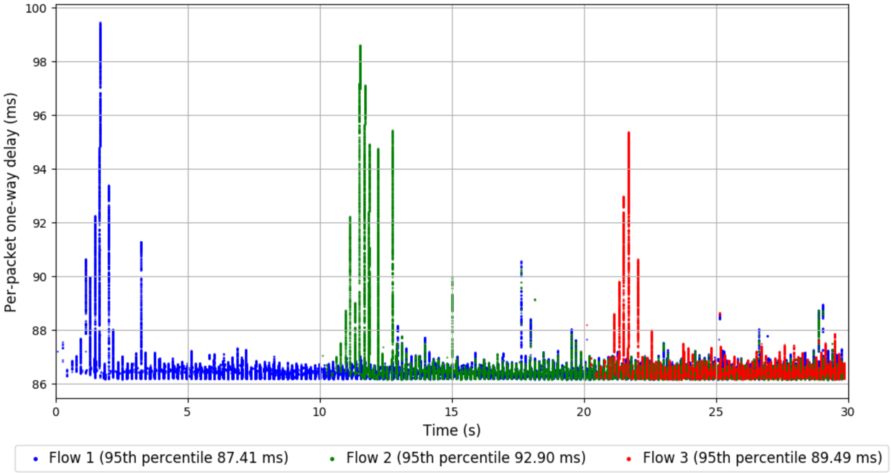




```
Run 2: Statistics of TCP Vegas

Start at: 2017-09-18 17:35:14
End at: 2017-09-18 17:35:44

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 77.99 Mbit/s
95th percentile per-packet one-way delay: 88.980 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 45.55 Mbit/s
95th percentile per-packet one-way delay: 87.412 ms
Loss rate: 0.66%
-- Flow 2:
Average throughput: 28.18 Mbit/s
95th percentile per-packet one-way delay: 92.898 ms
Loss rate: 0.80%
-- Flow 3:
Average throughput: 42.02 Mbit/s
95th percentile per-packet one-way delay: 89.489 ms
Loss rate: 1.90%
```

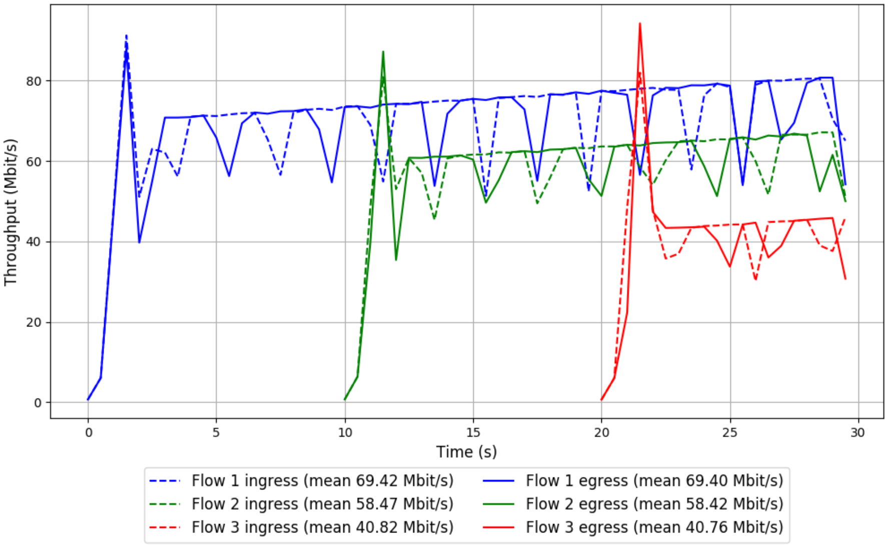
Run 2: Report of TCP Vegas — Data Link

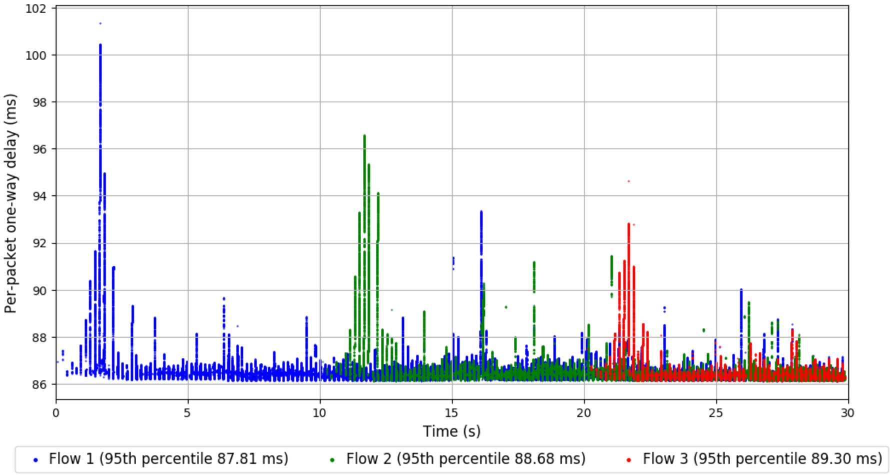




```
Run 3: Statistics of TCP Vegas

Start at: 2017-09-18 17:44:55
End at: 2017-09-18 17:45:25

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 121.51 Mbit/s
95th percentile per-packet one-way delay: 88.164 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 69.40 Mbit/s
95th percentile per-packet one-way delay: 87.806 ms
Loss rate: 0.65%
-- Flow 2:
Average throughput: 58.42 Mbit/s
95th percentile per-packet one-way delay: 88.684 ms
Loss rate: 0.97%
-- Flow 3:
Average throughput: 40.76 Mbit/s
95th percentile per-packet one-way delay: 89.302 ms
Loss rate: 1.89%
```

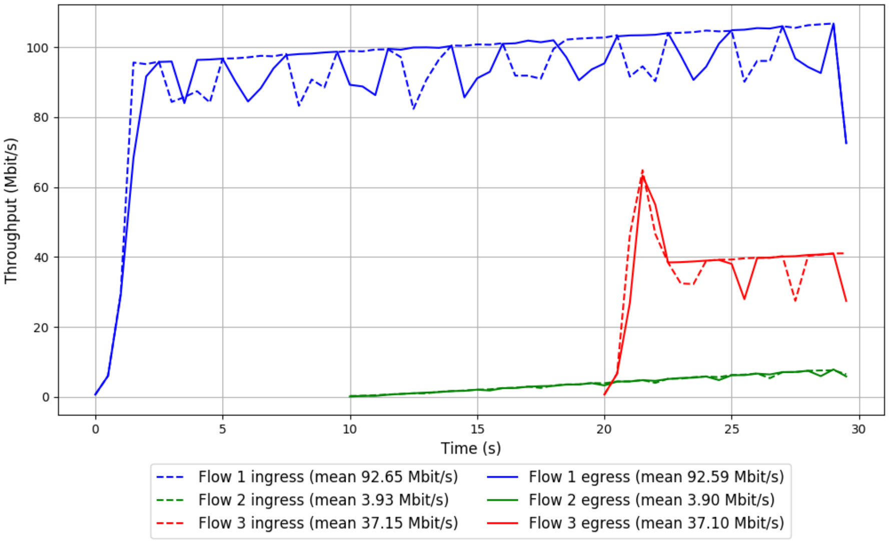
Run 3: Report of TCP Vegas — Data Link

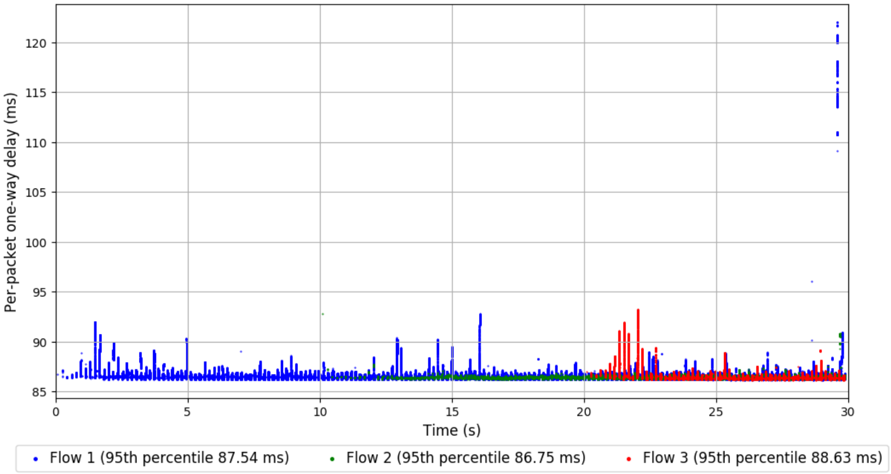




```
Run 4: Statistics of TCP Vegas

Start at: 2017-09-18 17:54:47
End at: 2017-09-18 17:55:17

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 107.30 Mbit/s
95th percentile per-packet one-way delay: 87.667 ms
Loss rate: 0.80%
-- Flow 1:
Average throughput: 92.59 Mbit/s
95th percentile per-packet one-way delay: 87.541 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 3.90 Mbit/s
95th percentile per-packet one-way delay: 86.748 ms
Loss rate: 1.76%
-- Flow 3:
Average throughput: 37.10 Mbit/s
95th percentile per-packet one-way delay: 88.630 ms
Loss rate: 1.87%
```

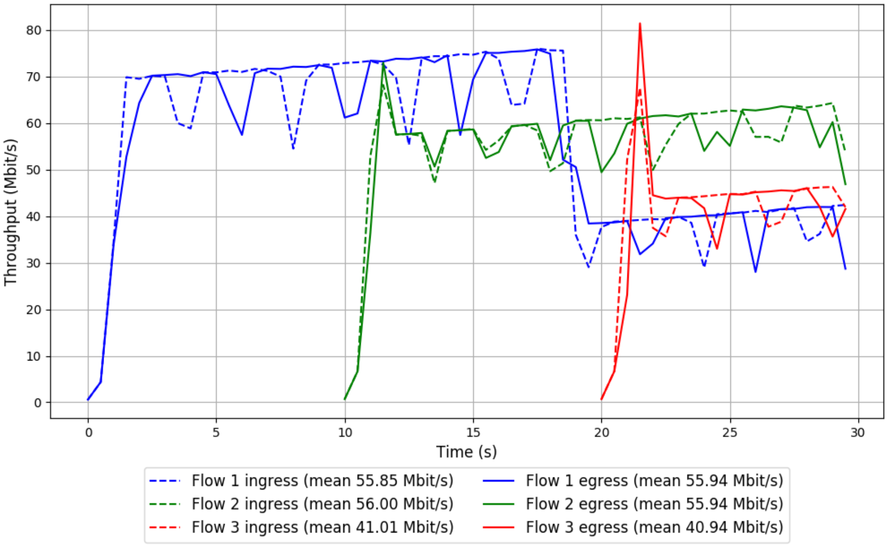
Run 4: Report of TCP Vegas — Data Link

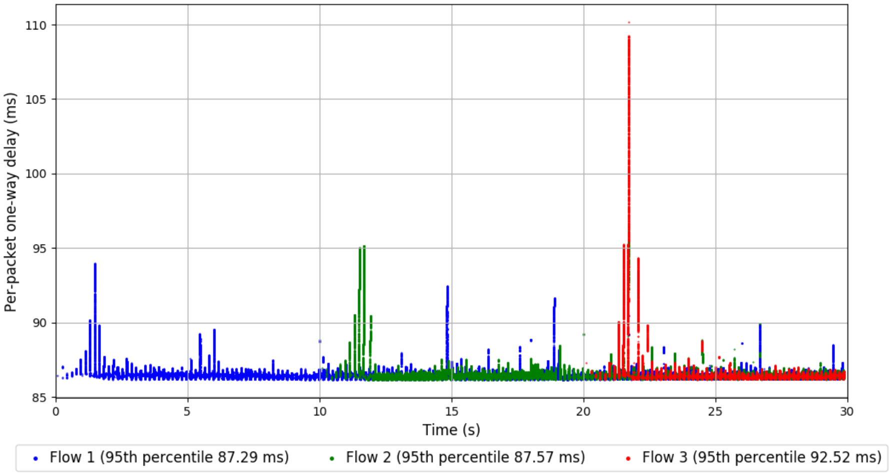




```
Run 5: Statistics of TCP Vegas

Start at: 2017-09-18 18:04:32
End at: 2017-09-18 18:05:02

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 106.47 Mbit/s
95th percentile per-packet one-way delay: 87.721 ms
Loss rate: 0.80%
-- Flow 1:
Average throughput: 55.94 Mbit/s
95th percentile per-packet one-way delay: 87.292 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 55.94 Mbit/s
95th percentile per-packet one-way delay: 87.571 ms
Loss rate: 0.97%
-- Flow 3:
Average throughput: 40.94 Mbit/s
95th percentile per-packet one-way delay: 92.517 ms
Loss rate: 1.91%
```

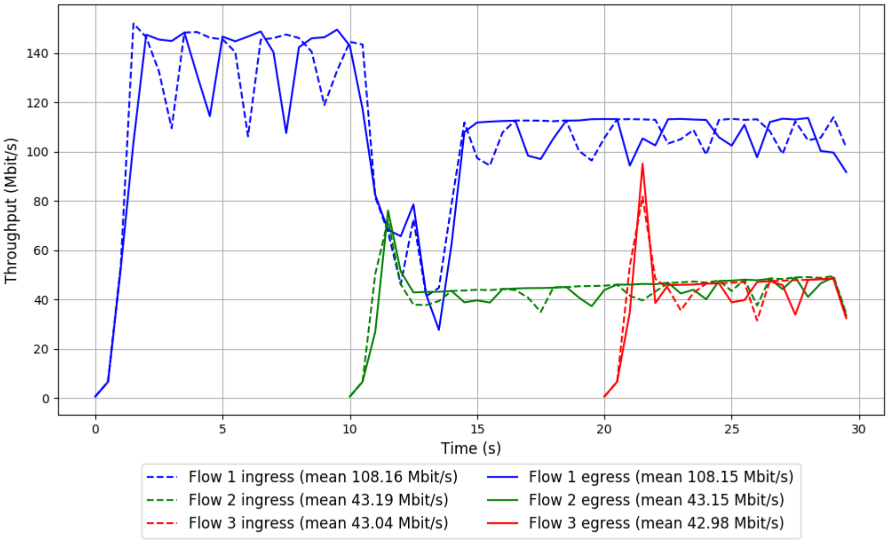
Run 5: Report of TCP Vegas — Data Link

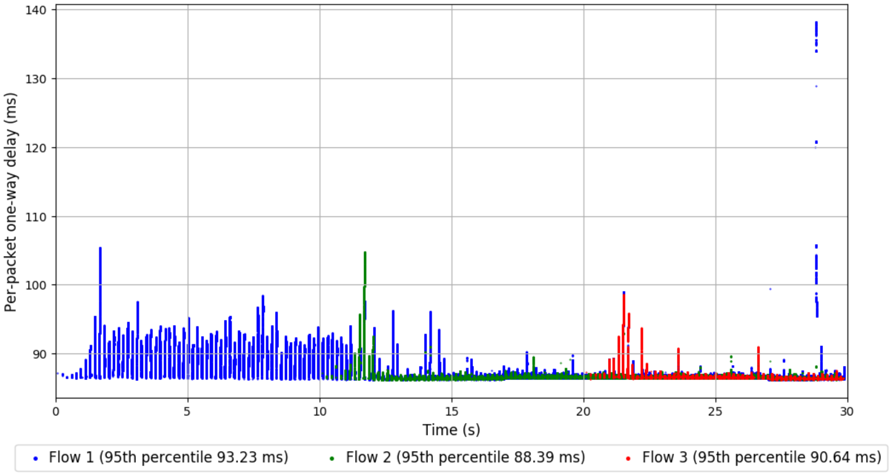




```
Run 6: Statistics of TCP Vegas

Start at: 2017-09-18 18:14:24
End at: 2017-09-18 18:14:54

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 150.83 Mbit/s
95th percentile per-packet one-way delay: 92.876 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 108.15 Mbit/s
95th percentile per-packet one-way delay: 93.227 ms
Loss rate: 0.59%
-- Flow 2:
Average throughput: 43.15 Mbit/s
95th percentile per-packet one-way delay: 88.385 ms
Loss rate: 0.97%
-- Flow 3:
Average throughput: 42.98 Mbit/s
95th percentile per-packet one-way delay: 90.635 ms
Loss rate: 1.89%
```

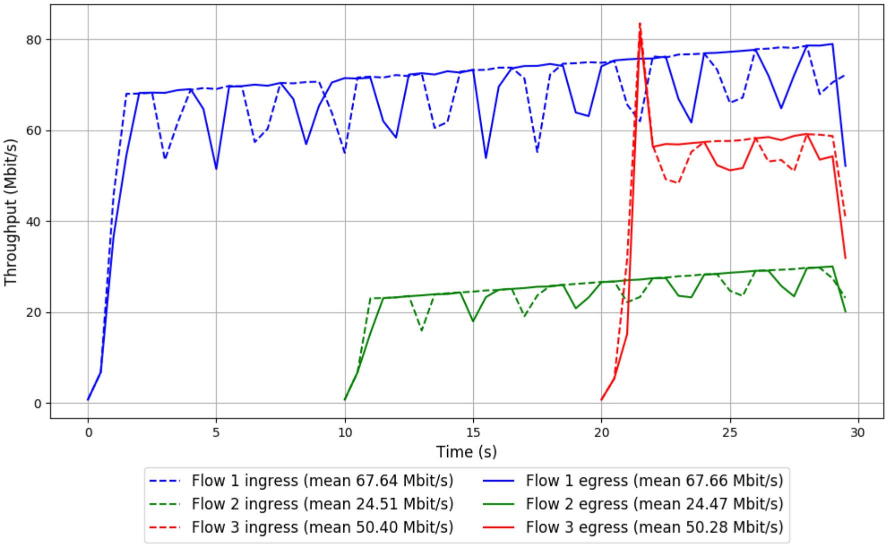
Run 6: Report of TCP Vegas — Data Link

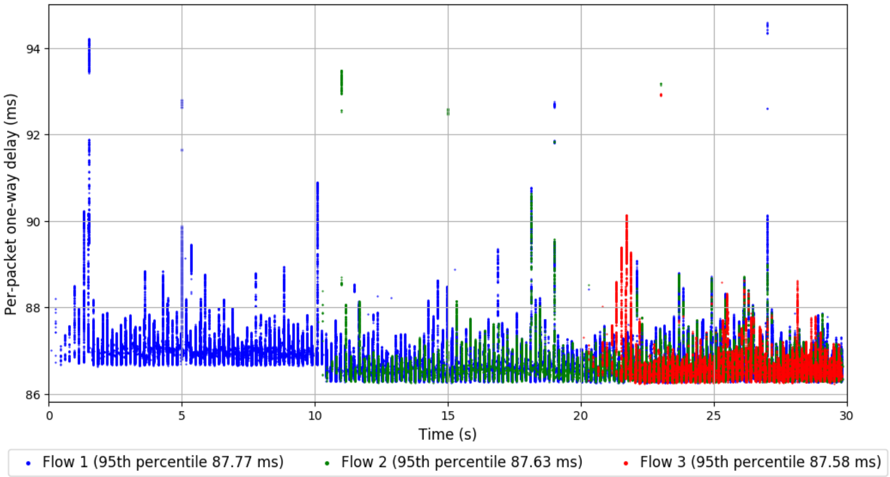




```
Run 7: Statistics of TCP Vegas

Start at: 2017-09-18 18:24:11
End at: 2017-09-18 18:24:41

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 100.19 Mbit/s
95th percentile per-packet one-way delay: 87.722 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 67.66 Mbit/s
95th percentile per-packet one-way delay: 87.774 ms
Loss rate: 0.65%
-- Flow 2:
Average throughput: 24.47 Mbit/s
95th percentile per-packet one-way delay: 87.634 ms
Loss rate: 1.03%
-- Flow 3:
Average throughput: 50.28 Mbit/s
95th percentile per-packet one-way delay: 87.585 ms
Loss rate: 2.00%
```

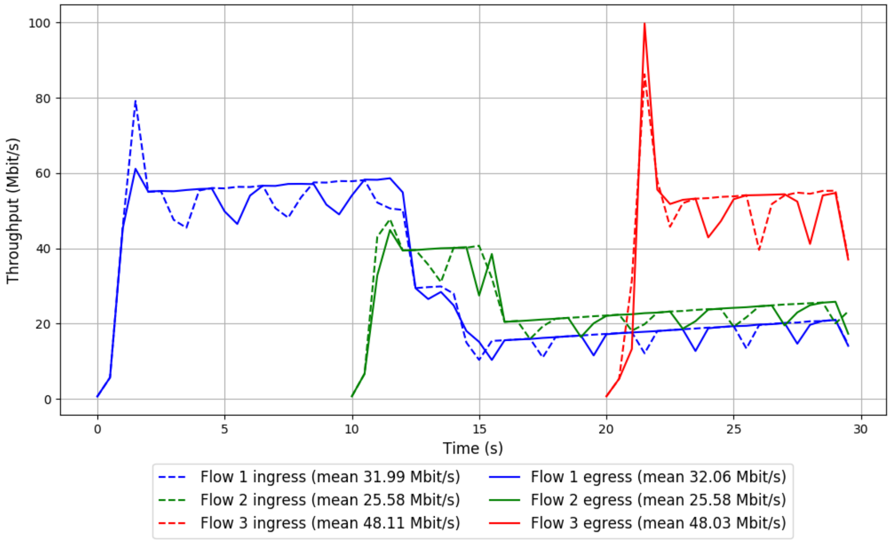
Run 7: Report of TCP Vegas — Data Link

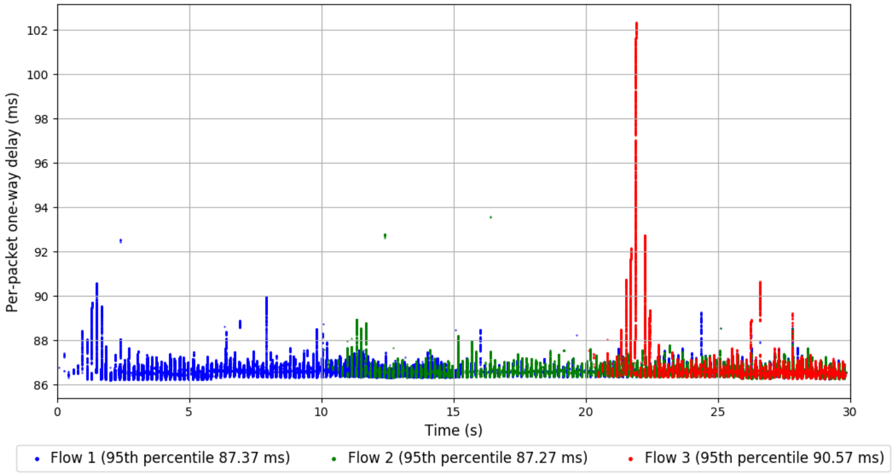




```
Run 8: Statistics of TCP Vegas

Start at: 2017-09-18 18:34:05
End at: 2017-09-18 18:34:35

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 64.70 Mbit/s
95th percentile per-packet one-way delay: 87.861 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 32.06 Mbit/s
95th percentile per-packet one-way delay: 87.372 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 25.58 Mbit/s
95th percentile per-packet one-way delay: 87.266 ms
Loss rate: 0.85%
-- Flow 3:
Average throughput: 48.03 Mbit/s
95th percentile per-packet one-way delay: 90.572 ms
Loss rate: 1.94%
```

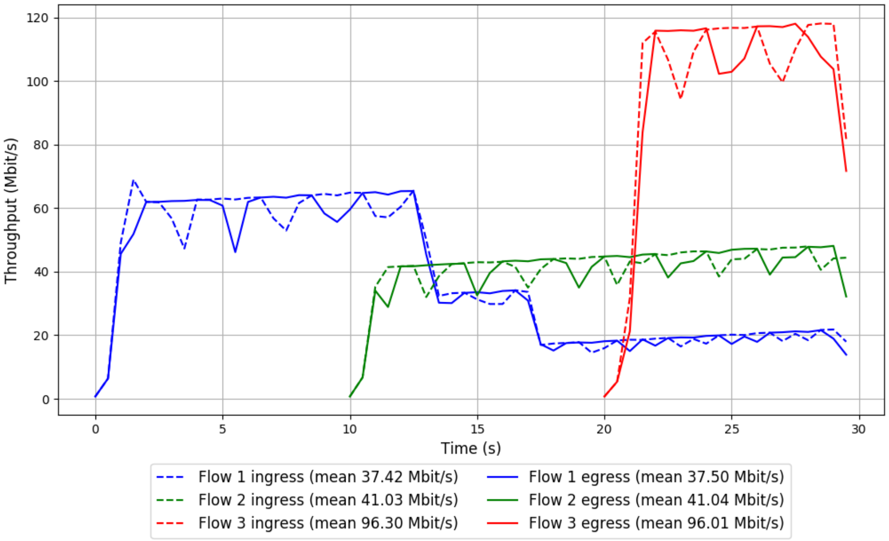
Run 8: Report of TCP Vegas — Data Link

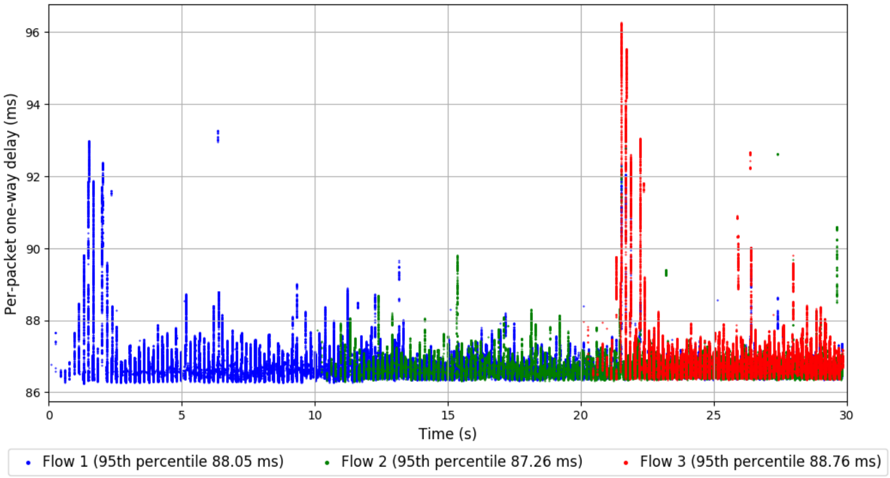




```
Run 9: Statistics of TCP Vegas

Start at: 2017-09-18 18:43:49
End at: 2017-09-18 18:44:19

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 96.11 Mbit/s
95th percentile per-packet one-way delay: 87.854 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 37.50 Mbit/s
95th percentile per-packet one-way delay: 88.053 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 41.04 Mbit/s
95th percentile per-packet one-way delay: 87.256 ms
Loss rate: 0.99%
-- Flow 3:
Average throughput: 96.01 Mbit/s
95th percentile per-packet one-way delay: 88.757 ms
Loss rate: 2.05%
```

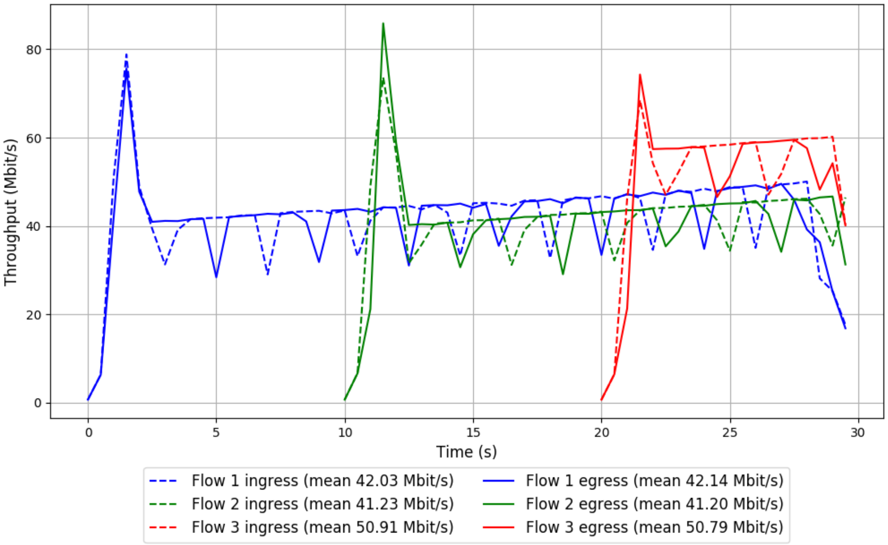
Run 9: Report of TCP Vegas — Data Link

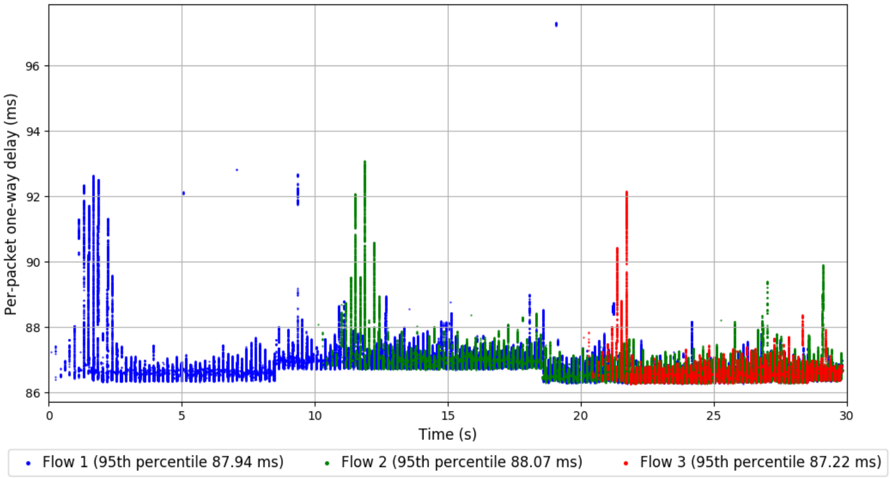




```
Run 10: Statistics of TCP Vegas

Start at: 2017-09-18 18:53:33
End at: 2017-09-18 18:54:03

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 85.96 Mbit/s
95th percentile per-packet one-way delay: 87.858 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 42.14 Mbit/s
95th percentile per-packet one-way delay: 87.938 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 41.20 Mbit/s
95th percentile per-packet one-way delay: 88.073 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 50.79 Mbit/s
95th percentile per-packet one-way delay: 87.224 ms
Loss rate: 2.01%
```

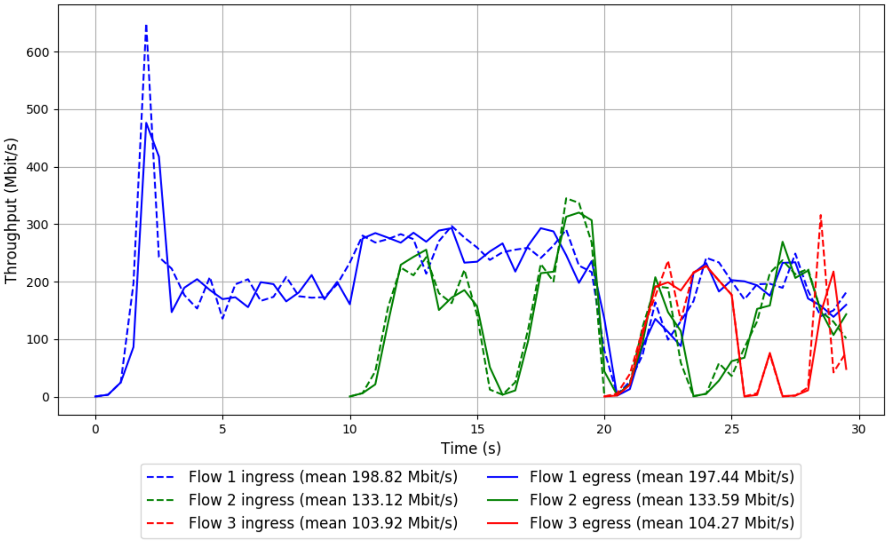
Run 10: Report of TCP Vegas — Data Link

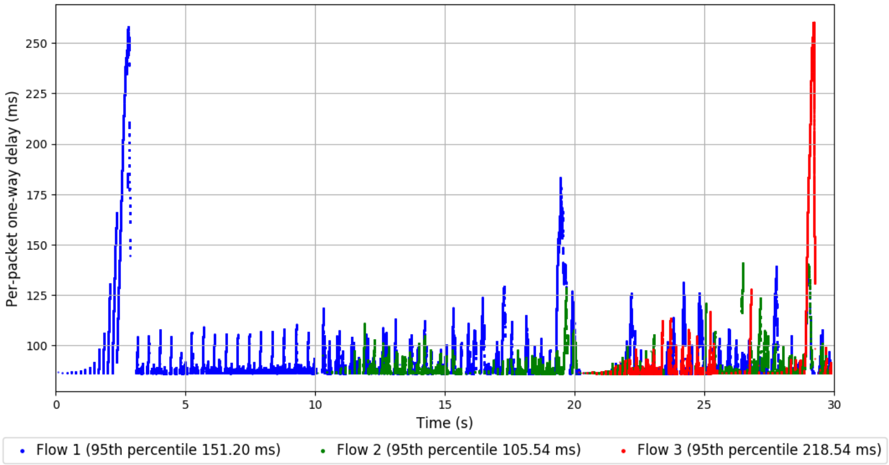




```
Run 1: Statistics of Verus

Start at: 2017-09-18 17:28:46
End at: 2017-09-18 17:29:16

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 319.88 Mbit/s
95th percentile per-packet one-way delay: 138.909 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 197.44 Mbit/s
95th percentile per-packet one-way delay: 151.198 ms
Loss rate: 1.41%
-- Flow 2:
Average throughput: 133.59 Mbit/s
95th percentile per-packet one-way delay: 105.541 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 104.27 Mbit/s
95th percentile per-packet one-way delay: 218.542 ms
Loss rate: 1.43%
```

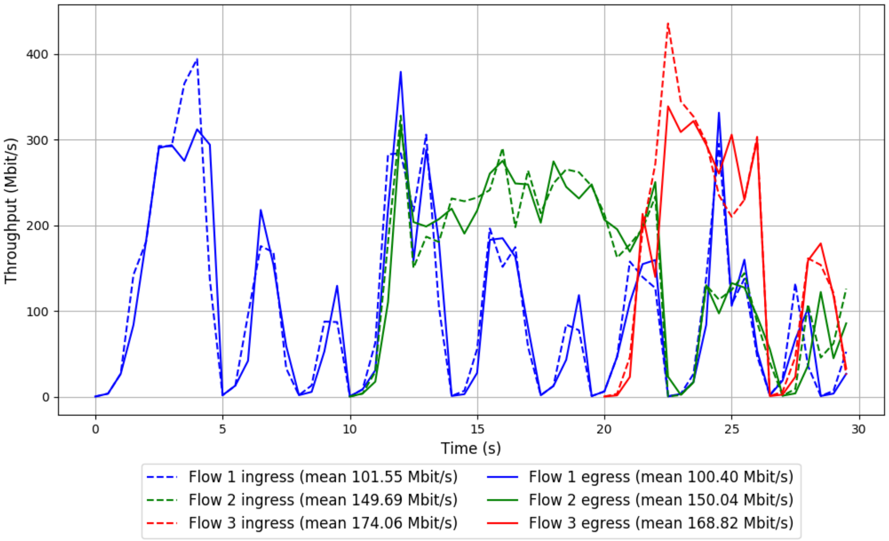
Run 1: Report of Verus — Data Link

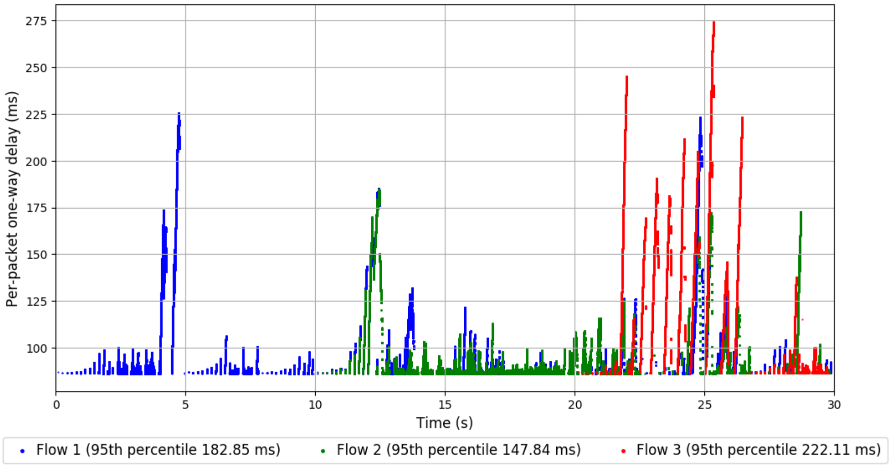




```
Run 2: Statistics of Verus

Start at: 2017-09-18 17:38:36
End at: 2017-09-18 17:39:06

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 254.24 Mbit/s
95th percentile per-packet one-way delay: 186.389 ms
Loss rate: 2.11%
-- Flow 1:
Average throughput: 100.40 Mbit/s
95th percentile per-packet one-way delay: 182.848 ms
Loss rate: 1.72%
-- Flow 2:
Average throughput: 150.04 Mbit/s
95th percentile per-packet one-way delay: 147.843 ms
Loss rate: 1.02%
-- Flow 3:
Average throughput: 168.82 Mbit/s
95th percentile per-packet one-way delay: 222.109 ms
Loss rate: 4.73%
```

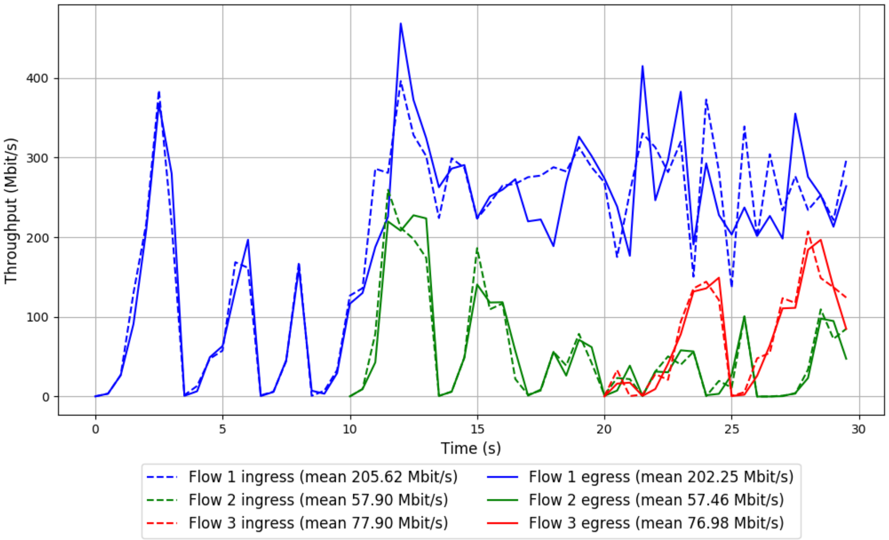
Run 2: Report of Verus — Data Link

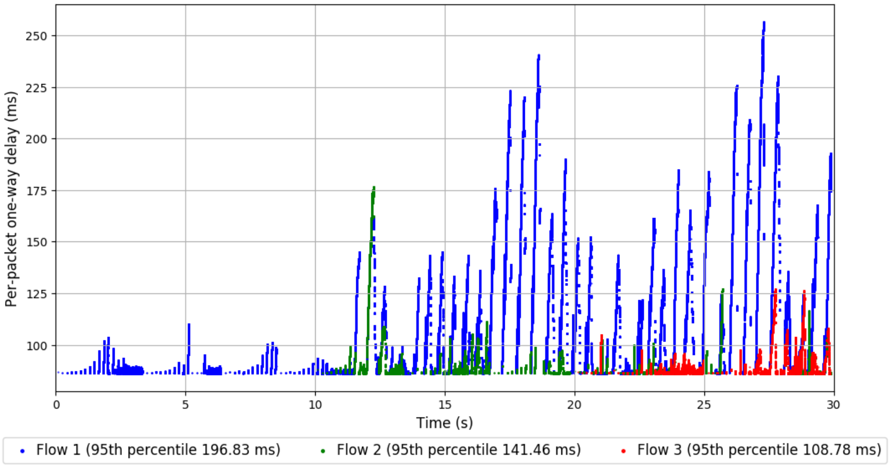




```
Run 3: Statistics of Verus

Start at: 2017-09-18 17:48:19
End at: 2017-09-18 17:48:49

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 265.54 Mbit/s
95th percentile per-packet one-way delay: 185.422 ms
Loss rate: 2.22%
-- Flow 1:
Average throughput: 202.25 Mbit/s
95th percentile per-packet one-way delay: 196.828 ms
Loss rate: 2.21%
-- Flow 2:
Average throughput: 57.46 Mbit/s
95th percentile per-packet one-way delay: 141.459 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 76.98 Mbit/s
95th percentile per-packet one-way delay: 108.775 ms
Loss rate: 3.17%
```

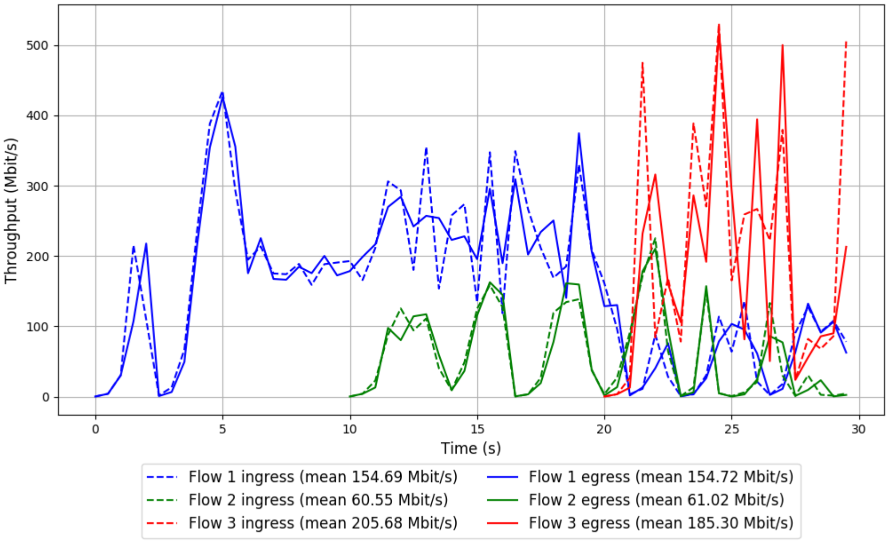
Run 3: Report of Verus — Data Link

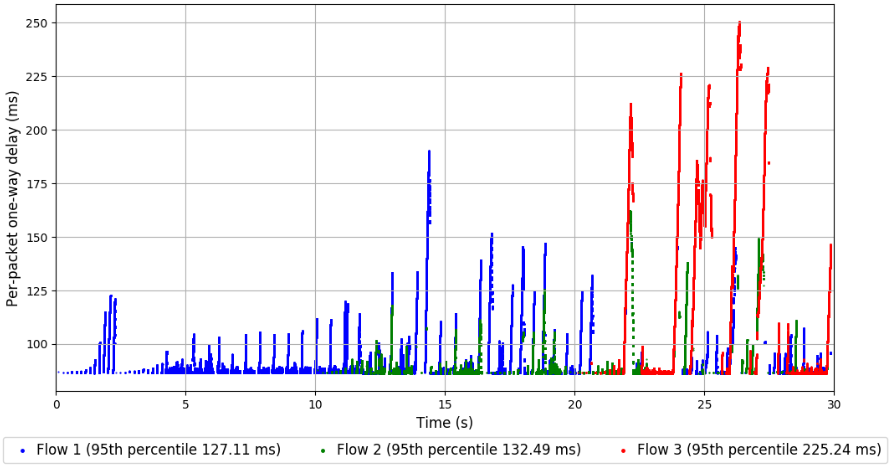




```
Run 4: Statistics of Verus

Start at: 2017-09-18 17:58:09
End at: 2017-09-18 17:58:39

# Below is generated by plot.py at 2017-09-18 21:45:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 255.67 Mbit/s
95th percentile per-packet one-way delay: 186.064 ms
Loss rate: 3.31%
-- Flow 1:
Average throughput: 154.72 Mbit/s
95th percentile per-packet one-way delay: 127.108 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 61.02 Mbit/s
95th percentile per-packet one-way delay: 132.491 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 185.30 Mbit/s
95th percentile per-packet one-way delay: 225.236 ms
Loss rate: 11.48%
```

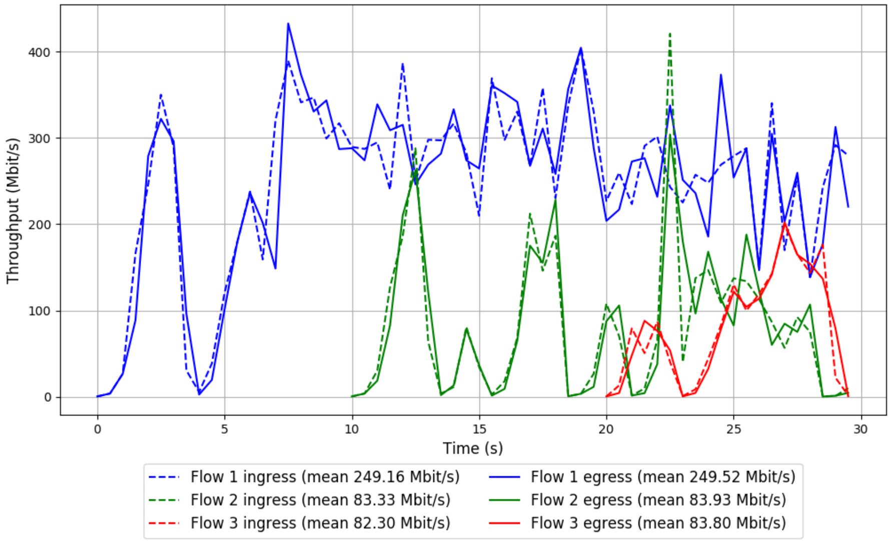
Run 4: Report of Verus — Data Link

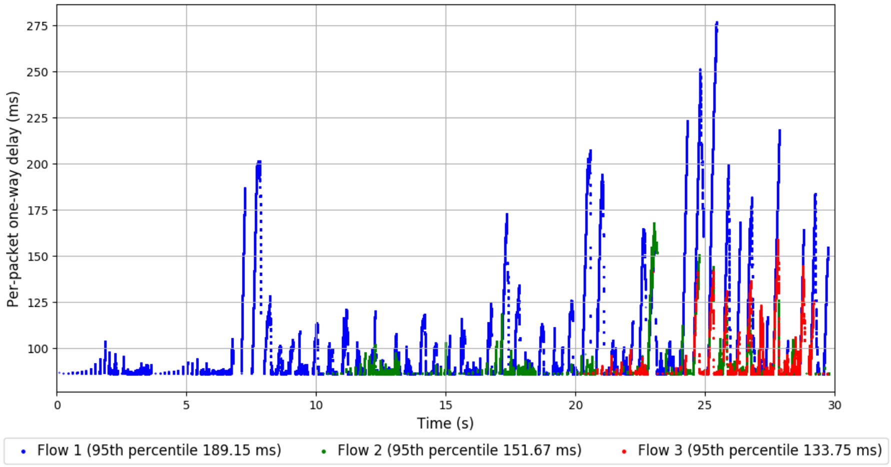




```
Run 5: Statistics of Verus

Start at: 2017-09-18 18:07:54
End at: 2017-09-18 18:08:24

# Below is generated by plot.py at 2017-09-18 21:46:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 331.89 Mbit/s
95th percentile per-packet one-way delay: 177.681 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 249.52 Mbit/s
95th percentile per-packet one-way delay: 189.145 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 83.93 Mbit/s
95th percentile per-packet one-way delay: 151.673 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 83.80 Mbit/s
95th percentile per-packet one-way delay: 133.755 ms
Loss rate: 0.08%
```

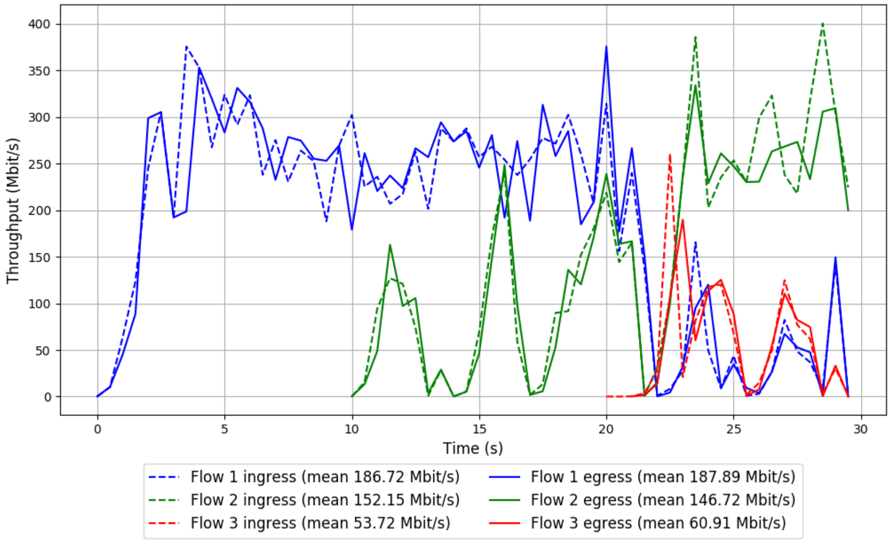
Run 5: Report of Verus — Data Link

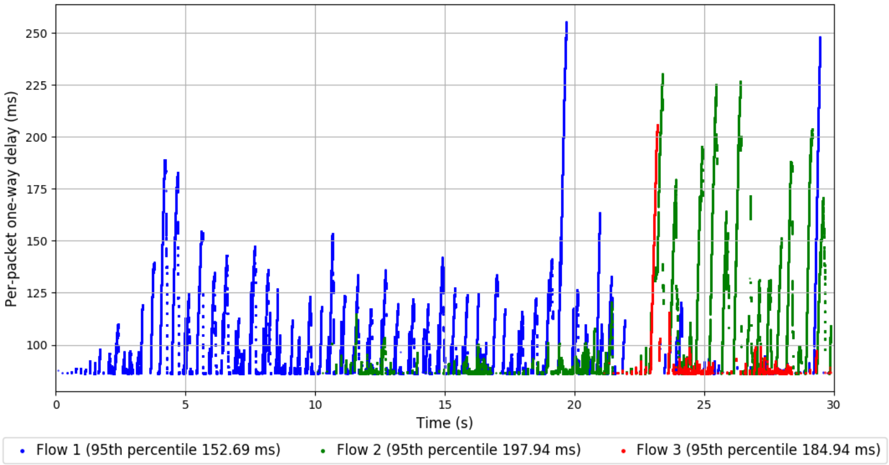




```
Run 6: Statistics of Verus

Start at: 2017-09-18 18:17:51
End at: 2017-09-18 18:18:21

# Below is generated by plot.py at 2017-09-18 21:47:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 302.35 Mbit/s
95th percentile per-packet one-way delay: 182.144 ms
Loss rate: 1.70%
-- Flow 1:
Average throughput: 187.89 Mbit/s
95th percentile per-packet one-way delay: 152.688 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 146.72 Mbit/s
95th percentile per-packet one-way delay: 197.938 ms
Loss rate: 4.41%
-- Flow 3:
Average throughput: 60.91 Mbit/s
95th percentile per-packet one-way delay: 184.940 ms
Loss rate: 0.07%
```

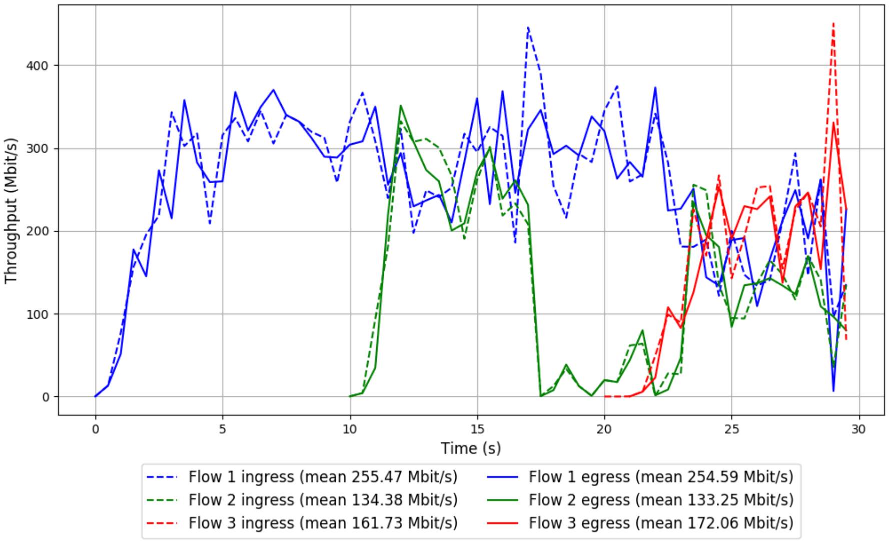
Run 6: Report of Verus — Data Link

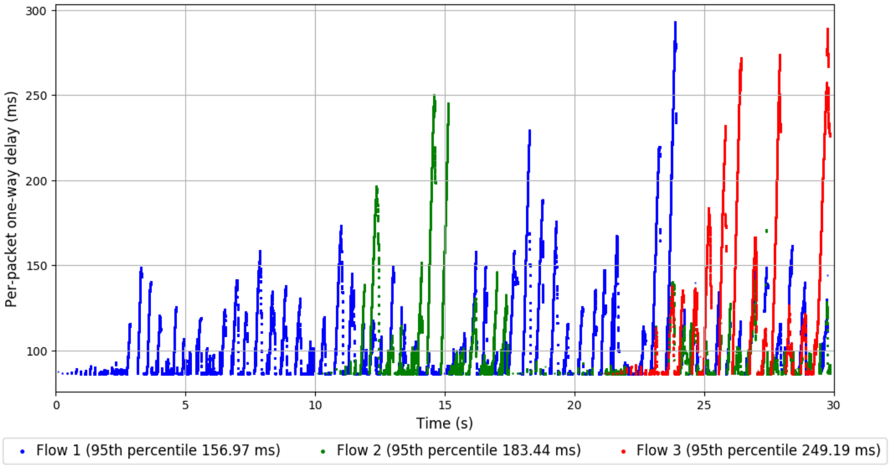




```
Run 7: Statistics of Verus

Start at: 2017-09-18 18:27:34
End at: 2017-09-18 18:28:04

# Below is generated by plot.py at 2017-09-18 21:47:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 392.67 Mbit/s
95th percentile per-packet one-way delay: 182.479 ms
Loss rate: 1.02%
-- Flow 1:
Average throughput: 254.59 Mbit/s
95th percentile per-packet one-way delay: 156.971 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 133.25 Mbit/s
95th percentile per-packet one-way delay: 183.441 ms
Loss rate: 1.90%
-- Flow 3:
Average throughput: 172.06 Mbit/s
95th percentile per-packet one-way delay: 249.189 ms
Loss rate: 3.18%
```

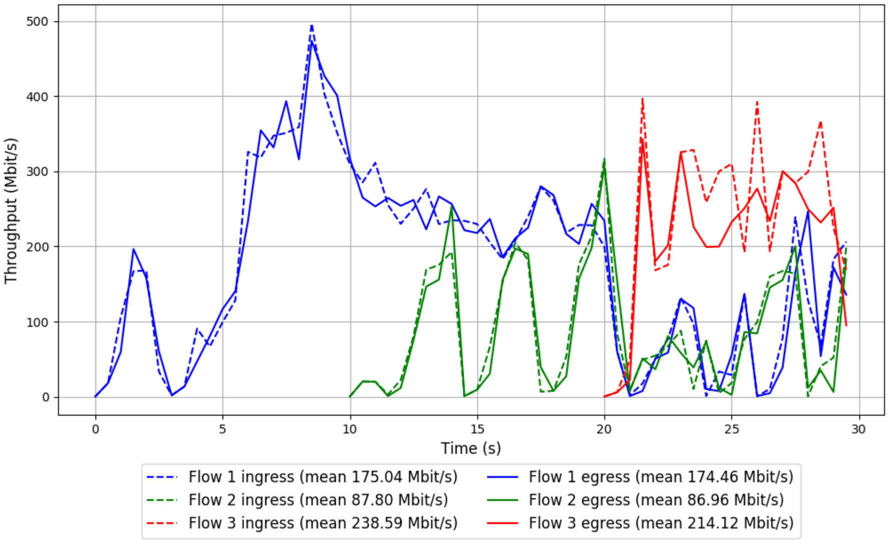
Run 7: Report of Verus — Data Link

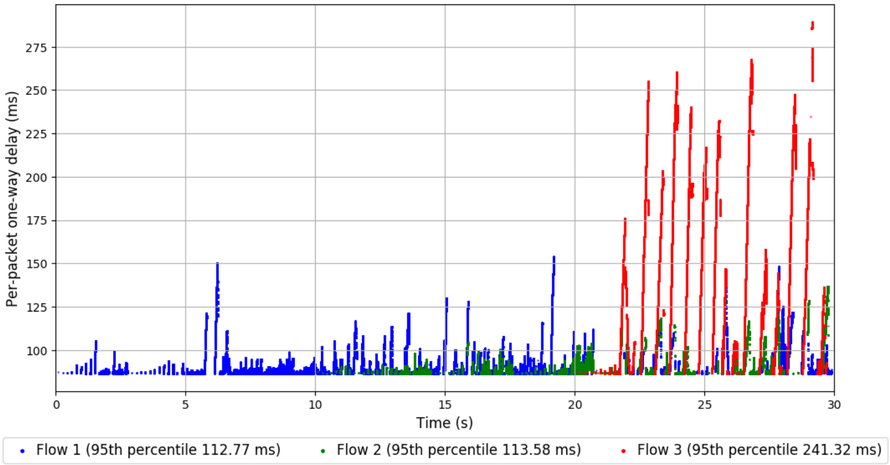




```
Run 8: Statistics of Verus

Start at: 2017-09-18 18:37:25
End at: 2017-09-18 18:37:55

# Below is generated by plot.py at 2017-09-18 21:47:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 300.89 Mbit/s
95th percentile per-packet one-way delay: 196.546 ms
Loss rate: 4.24%
-- Flow 1:
Average throughput: 174.46 Mbit/s
95th percentile per-packet one-way delay: 112.765 ms
Loss rate: 0.91%
-- Flow 2:
Average throughput: 86.96 Mbit/s
95th percentile per-packet one-way delay: 113.583 ms
Loss rate: 1.94%
-- Flow 3:
Average throughput: 214.12 Mbit/s
95th percentile per-packet one-way delay: 241.323 ms
Loss rate: 13.29%
```

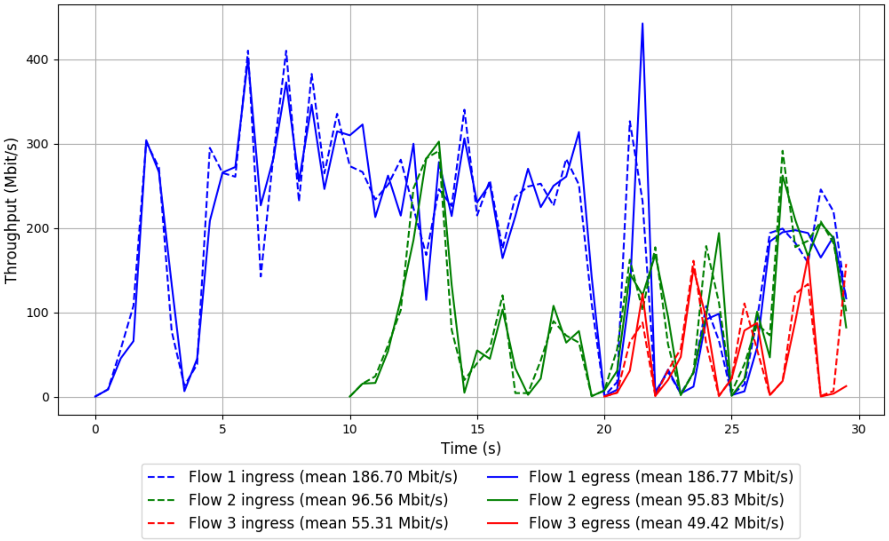
Run 8: Report of Verus — Data Link

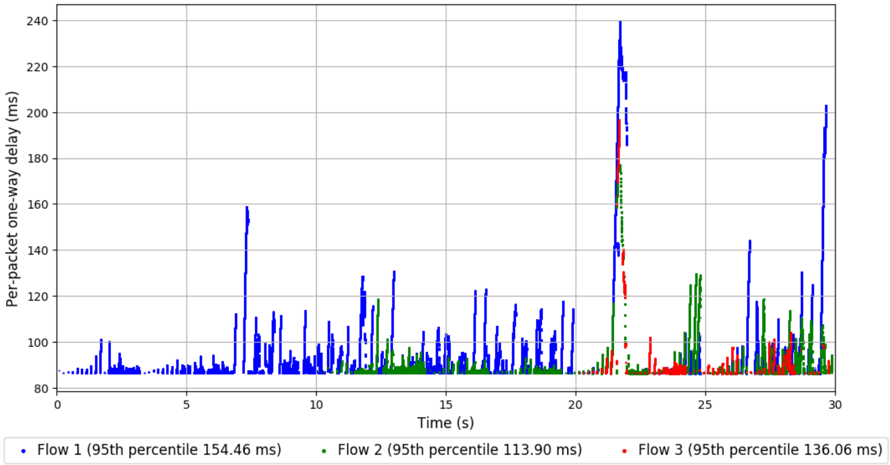




```
Run 9: Statistics of Verus

Start at: 2017-09-18 18:47:12
End at: 2017-09-18 18:47:42

# Below is generated by plot.py at 2017-09-18 21:47:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 264.99 Mbit/s
95th percentile per-packet one-way delay: 138.484 ms
Loss rate: 2.05%
-- Flow 1:
Average throughput: 186.77 Mbit/s
95th percentile per-packet one-way delay: 154.464 ms
Loss rate: 1.05%
-- Flow 2:
Average throughput: 95.83 Mbit/s
95th percentile per-packet one-way delay: 113.896 ms
Loss rate: 1.66%
-- Flow 3:
Average throughput: 49.42 Mbit/s
95th percentile per-packet one-way delay: 136.056 ms
Loss rate: 13.52%
```

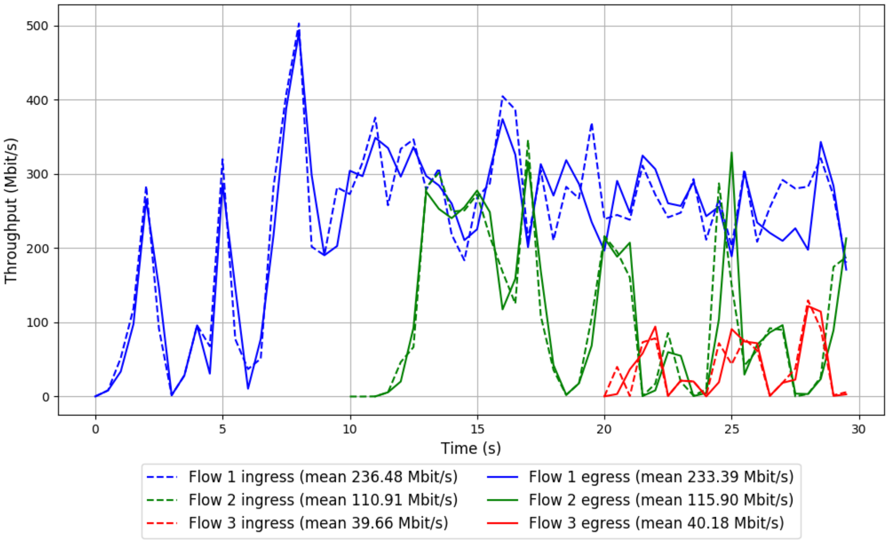
Run 9: Report of Verus — Data Link



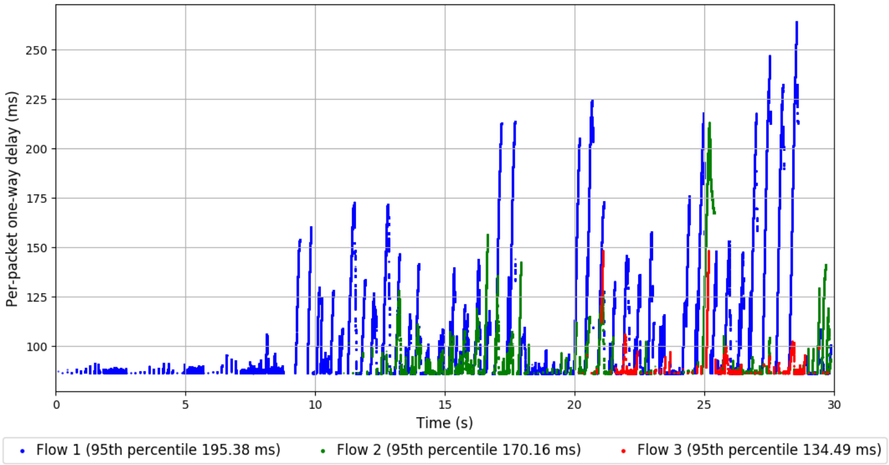


```
Run 10: Statistics of Verus

Start at: 2017-09-18 18:56:52
End at: 2017-09-18 18:57:22

# Below is generated by plot.py at 2017-09-18 21:47:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 319.46 Mbit/s
95th percentile per-packet one-way delay: 184.717 ms
Loss rate: 1.70%
-- Flow 1:
Average throughput: 233.39 Mbit/s
95th percentile per-packet one-way delay: 195.379 ms
Loss rate: 1.79%
-- Flow 2:
Average throughput: 115.90 Mbit/s
95th percentile per-packet one-way delay: 170.159 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 40.18 Mbit/s
95th percentile per-packet one-way delay: 134.492 ms
Loss rate: 0.50%
```

Run 10: Report of Verus — Data Link



Throughput (Mbit/s)
500
400
300
200
100
0
0
5
10
15
20
25
30
Time (s)
Flow 1 ingress (mean 236.48 Mbit/s)
Flow 1 egress (mean 233.39 Mbit/s)
Flow 2 ingress (mean 110.91 Mbit/s)
Flow 2 egress (mean 115.90 Mbit/s)
Flow 3 ingress (mean 39.66 Mbit/s)
Flow 3 egress (mean 40.18 Mbit/s)



Per-packet one-way delay (ms)
250
225
200
175
150
125
100
0
5
10
15
20
25
30
Time (s)
Flow 1 (95th percentile 195.38 ms)
Flow 2 (95th percentile 170.16 ms)
Flow 3 (95th percentile 134.49 ms)