Pantheon Report

Generated at 2017-09-19 08:15:08 (UTC).

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

Repeated the test of 10 congestion control schemes 10 times.

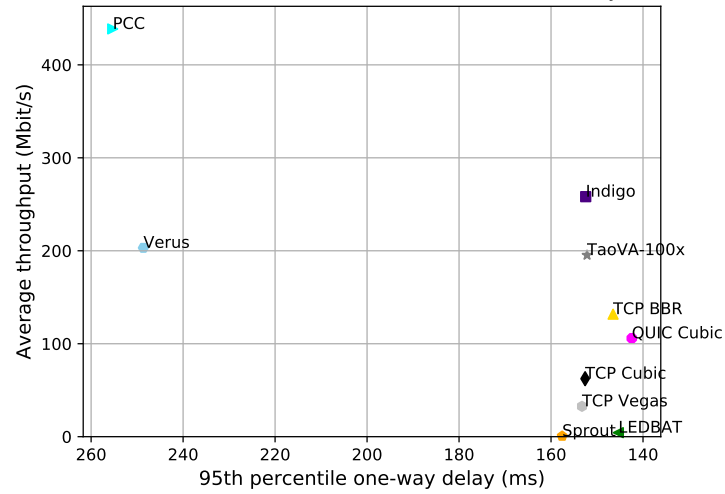Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

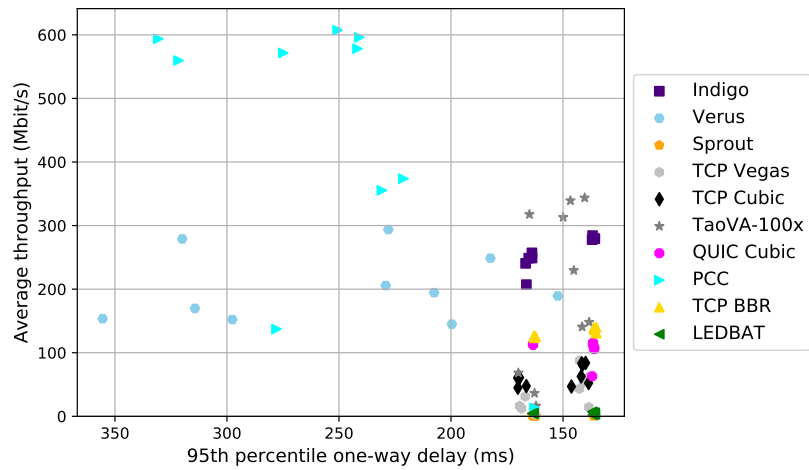Tested BBR with qdisc of Fair Queuing (`fq`), and other schemes with the default Linux qdisc (`pfifo_fast`).

```
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 London Ethernet to GCE Sydney Ethernet, 10 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)

test from GCE London Ethernet to GCE Sydney Ethernet, 10 runs of 30s each per scheme
3 flows with 10s interval between flows

scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	10	67.90	66.83	60.39	146.49	146.51	146.55	1.05	1.68	3.64
TCP Cubic	10	28.49	37.02	29.08	150.17	151.79	153.26	2.05	2.19	4.61
Indigo	9	137.28	131.91	105.46	152.43	152.87	154.04	1.01	1.55	3.89
LEDBAT	9	2.88	1.76	0.96	145.39	145.29	145.21	1.73	2.81	5.58
PCC	10	304.34	165.85	76.31	247.03	214.81	226.20	4.16	4.24	5.66
QUIC Cubic	9	85.80	56.00	47.59	139.25	139.44	139.29	0.98	0.99	3.49
Sprout	10	0.32	0.32	0.43	152.26	152.03	152.18	0.69	1.02	1.78
TaoVA-100x	10	103.14	115.44	72.07	154.59	151.52	151.65	0.64	1.61	3.40
TCP Vegas	10	12.04	18.53	24.46	434.13	152.19	153.98	0.97	1.43	3.13
Verus	10	116.16	97.65	70.57	226.00	215.93	219.94	3.51	3.04	6.27

```
Run 1: Statistics of TCP BBR

Start at: 2017-09-19 04:01:50
End at: 2017-09-19 04:02:20

# Below is generated by plot.py at 2017-09-19 07:41:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 138.94 Mbit/s
95th percentile per-packet one-way delay: 136.244 ms
Loss rate: 1.60%
-- Flow 1:
Average throughput: 72.08 Mbit/s
95th percentile per-packet one-way delay: 136.236 ms
Loss rate: 0.99%
-- Flow 2:
Average throughput: 69.49 Mbit/s
95th percentile per-packet one-way delay: 136.234 ms
Loss rate: 1.73%
-- Flow 3:
Average throughput: 63.75 Mbit/s
95th percentile per-packet one-way delay: 136.300 ms
Loss rate: 3.35%
```
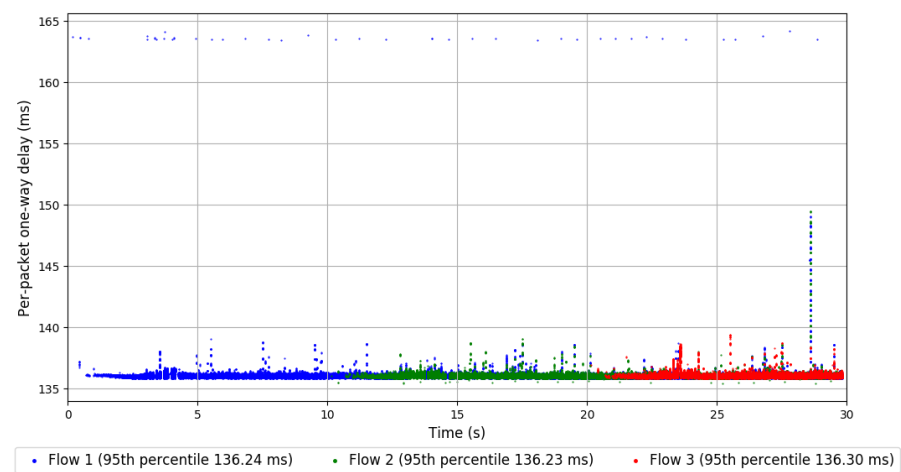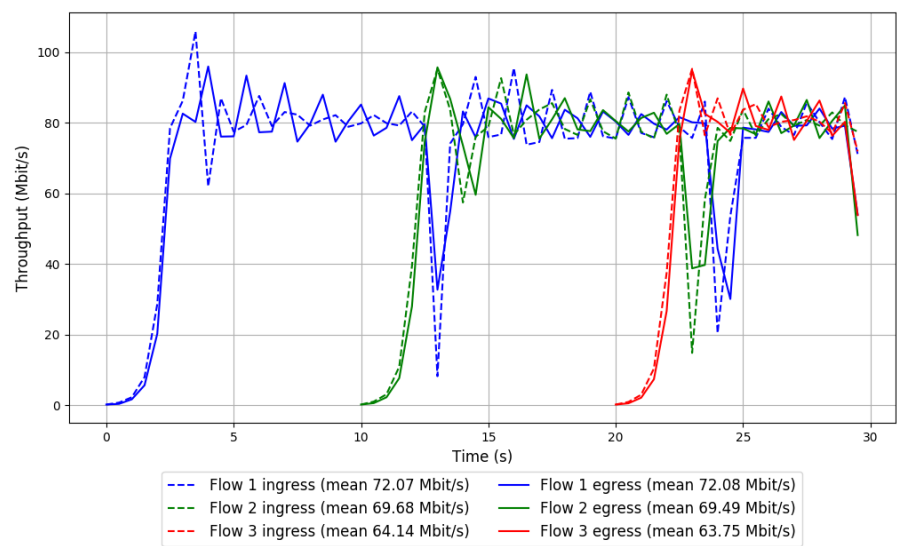
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2017-09-19 04:12:23
End at: 2017-09-19 04:12:53


# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 139.24 Mbit/s
95th percentile per-packet one-way delay: 136.207 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 72.27 Mbit/s
95th percentile per-packet one-way delay: 136.171 ms
Loss rate: 1.10%
-- Flow 2:
Average throughput: 70.04 Mbit/s
95th percentile per-packet one-way delay: 136.231 ms
Loss rate: 1.70%
-- Flow 3:
Average throughput: 63.50 Mbit/s
95th percentile per-packet one-way delay: 136.263 ms
Loss rate: 3.35%
```
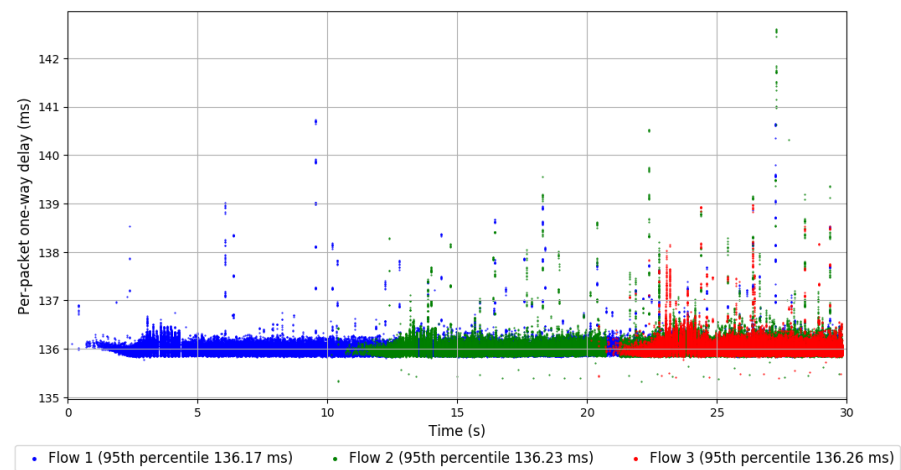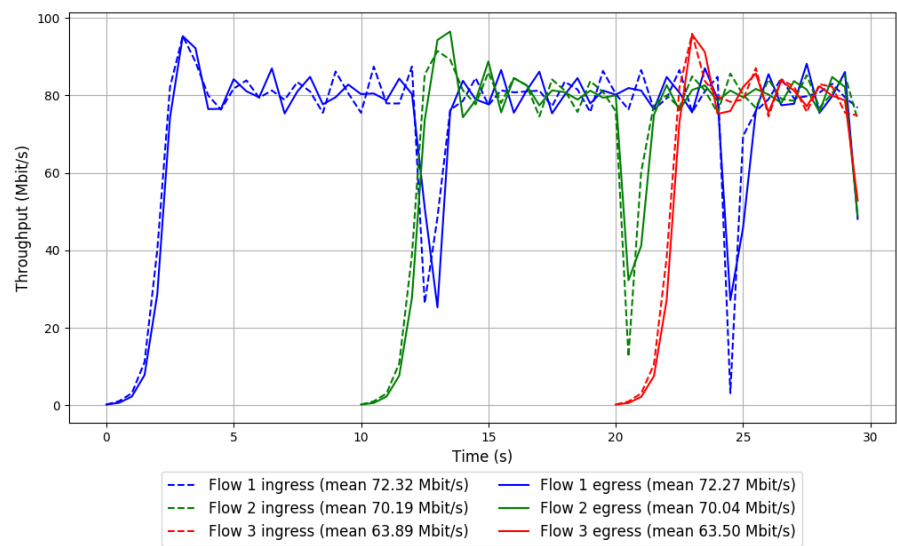
Run 2: Report of TCP BBR — Data Link

Flow 1 ingress (mean 72.32 Mbit/s)   Flow 1 egress (mean 72.27 Mbit/s)
Flow 2 ingress (mean 70.19 Mbit/s)   Flow 2 egress (mean 70.04 Mbit/s)
Flow 3 ingress (mean 63.89 Mbit/s)   Flow 3 egress (mean 63.50 Mbit/s)

Flow 1 (95th percentile 136.17 ms)   Flow 2 (95th percentile 136.23 ms)   Flow 3 (95th percentile 136.26 ms)

```
Run 3: Statistics of TCP BBR

Start at: 2017-09-19 04:22:58
End at: 2017-09-19 04:23:28

# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 135.89 Mbit/s
95th percentile per-packet one-way delay: 136.193 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 70.41 Mbit/s
95th percentile per-packet one-way delay: 136.190 ms
Loss rate: 1.04%
-- Flow 2:
Average throughput: 68.49 Mbit/s
95th percentile per-packet one-way delay: 136.180 ms
Loss rate: 1.51%
-- Flow 3:
Average throughput: 61.76 Mbit/s
95th percentile per-packet one-way delay: 136.232 ms
Loss rate: 3.35%
```
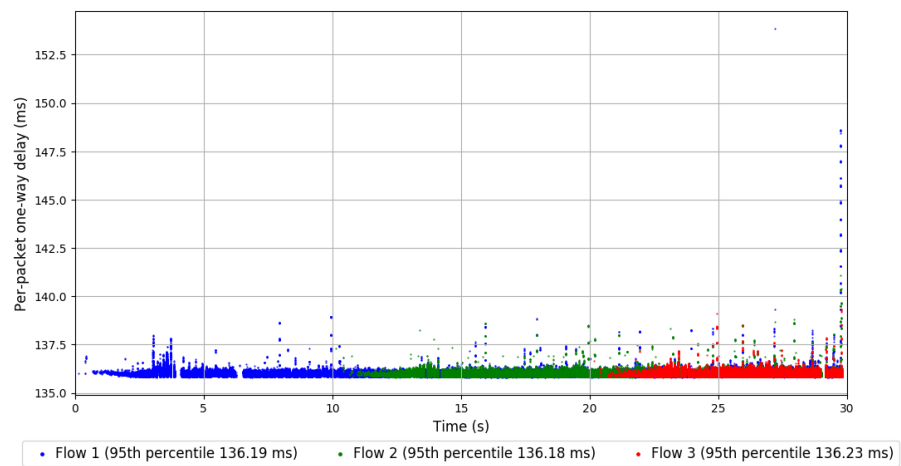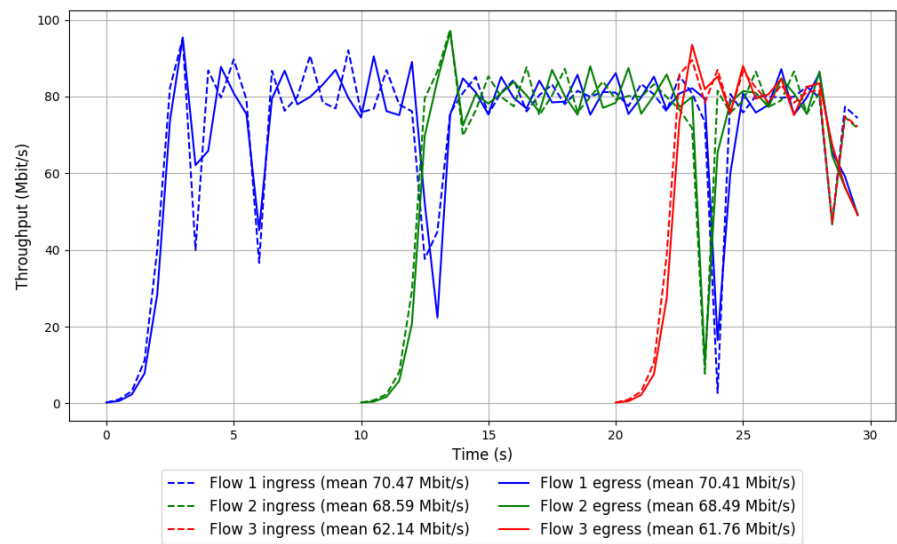
Run 3: Report of TCP BBR — Data Link

```
Run 4: Statistics of TCP BBR

Start at: 2017-09-19 04:33:04
End at: 2017-09-19 04:33:34

# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 126.42 Mbit/s
95th percentile per-packet one-way delay: 162.873 ms
Loss rate: 1.72%
-- Flow 1:
Average throughput: 66.13 Mbit/s
95th percentile per-packet one-way delay: 162.849 ms
Loss rate: 1.06%
-- Flow 2:
Average throughput: 63.12 Mbit/s
95th percentile per-packet one-way delay: 162.889 ms
Loss rate: 1.84%
-- Flow 3:
Average throughput: 56.65 Mbit/s
95th percentile per-packet one-way delay: 162.910 ms
Loss rate: 3.77%
```
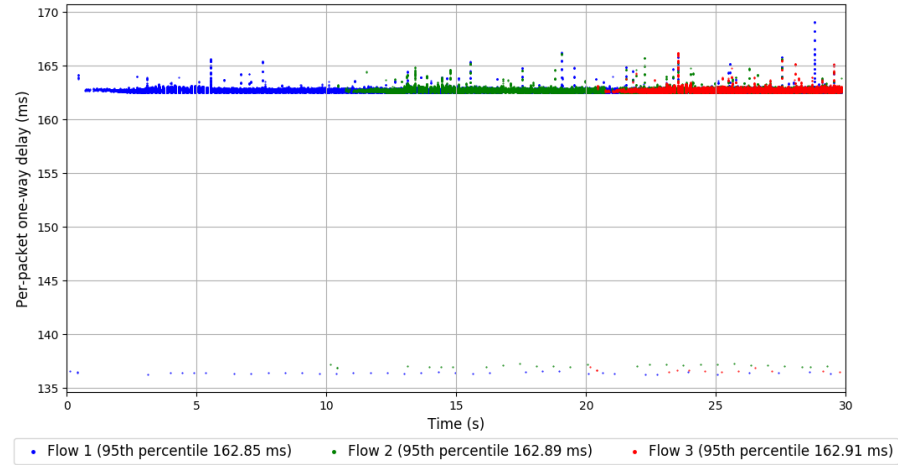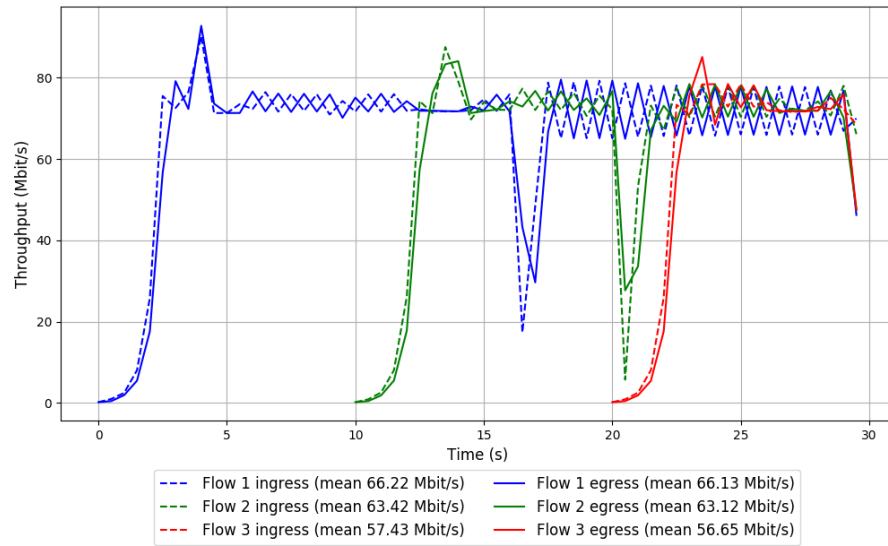
Run 4: Report of TCP BBR — Data Link

- Flow 1 ingress (mean 66.22 Mbit/s) — Flow 1 egress (mean 66.13 Mbit/s)
- Flow 2 ingress (mean 63.42 Mbit/s) — Flow 2 egress (mean 63.12 Mbit/s)
- Flow 3 ingress (mean 57.43 Mbit/s) — Flow 3 egress (mean 56.65 Mbit/s)

- Flow 1 (95th percentile 162.85 ms)   - Flow 2 (95th percentile 162.89 ms)   - Flow 3 (95th percentile 162.91 ms)

```
Run 5: Statistics of TCP BBR

Start at: 2017-09-19 04:42:58
End at: 2017-09-19 04:43:28


# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 123.40 Mbit/s
95th percentile per-packet one-way delay: 162.885 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 63.90 Mbit/s
95th percentile per-packet one-way delay: 162.905 ms
Loss rate: 1.09%
-- Flow 2:
Average throughput: 62.44 Mbit/s
95th percentile per-packet one-way delay: 162.860 ms
Loss rate: 1.71%
-- Flow 3:
Average throughput: 56.05 Mbit/s
95th percentile per-packet one-way delay: 162.877 ms
Loss rate: 4.03%
```
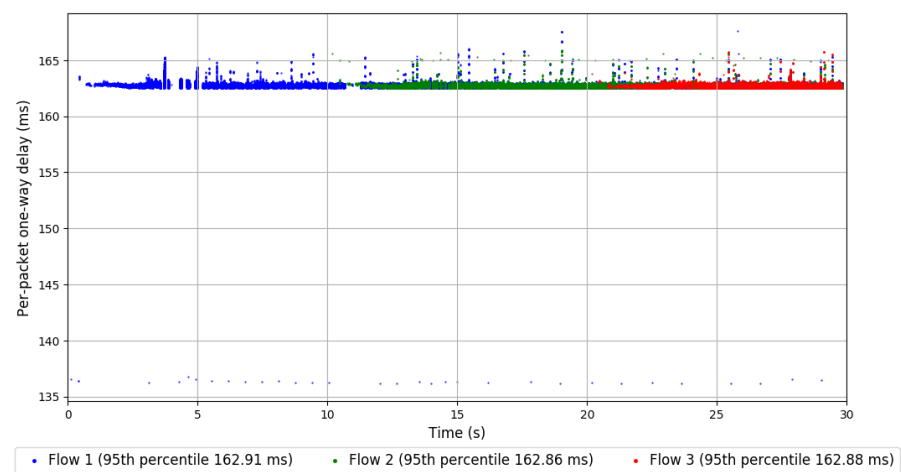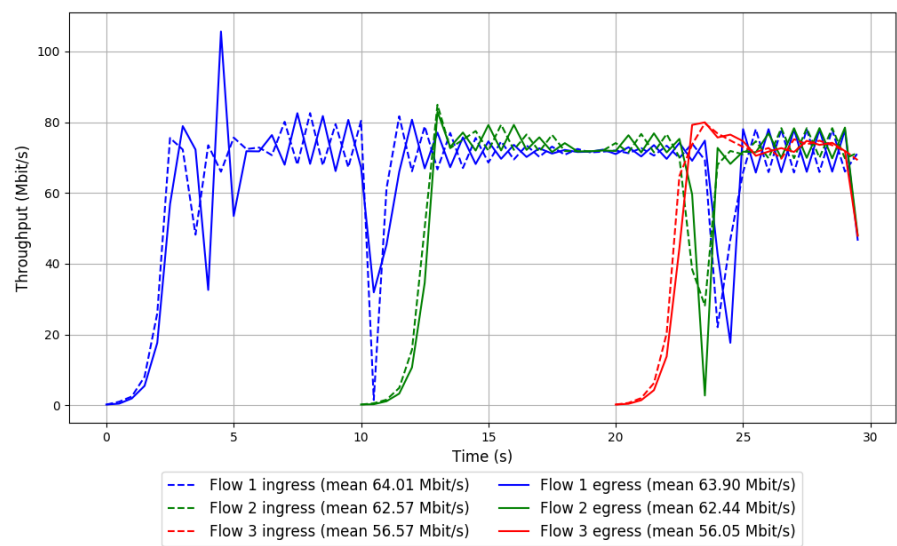
Run 5: Report of TCP BBR — Data Link

```
Run 6: Statistics of TCP BBR

Start at: 2017-09-19 04:53:11
End at: 2017-09-19 04:53:41

# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 126.71 Mbit/s
95th percentile per-packet one-way delay: 162.835 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 66.37 Mbit/s
95th percentile per-packet one-way delay: 162.816 ms
Loss rate: 1.07%
-- Flow 2:
Average throughput: 63.23 Mbit/s
95th percentile per-packet one-way delay: 162.834 ms
Loss rate: 1.89%
-- Flow 3:
Average throughput: 56.70 Mbit/s
95th percentile per-packet one-way delay: 162.905 ms
Loss rate: 3.73%
```
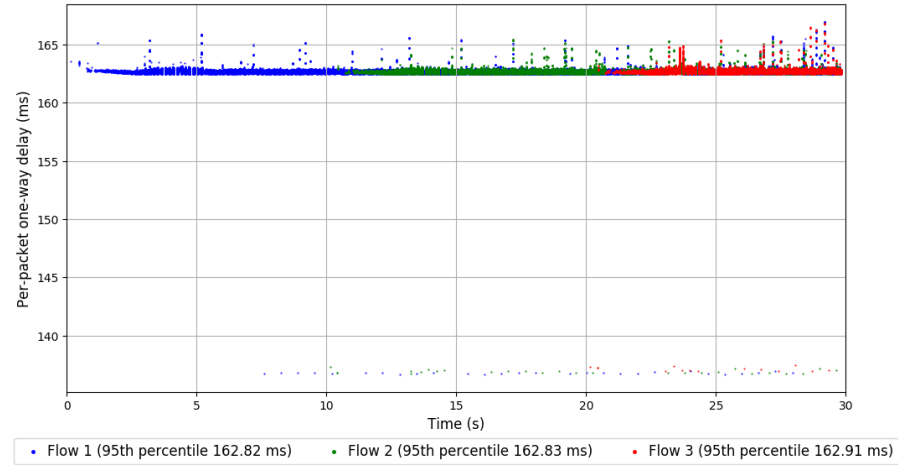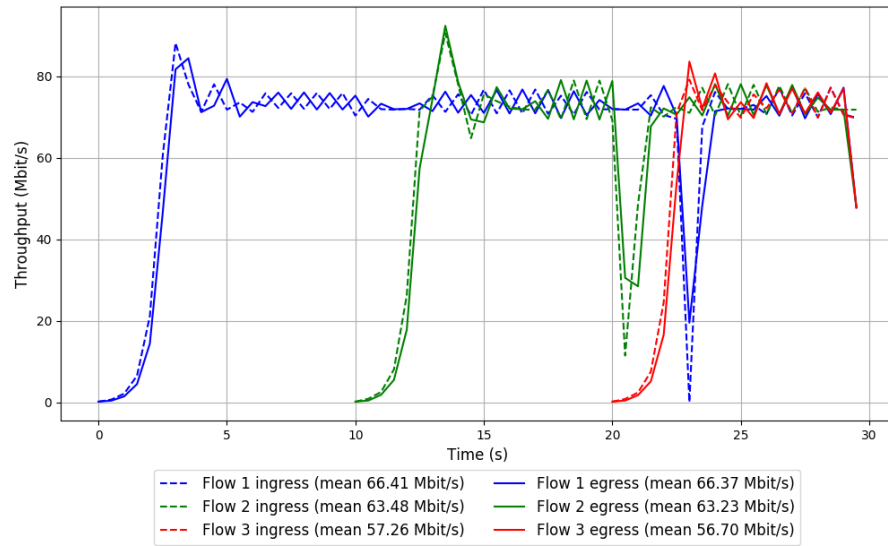
Run 6: Report of TCP BBR — Data Link

Flow 1 ingress (mean 66.41 Mbit/s)   Flow 1 egress (mean 66.37 Mbit/s)
Flow 2 ingress (mean 63.48 Mbit/s)   Flow 2 egress (mean 63.23 Mbit/s)
Flow 3 ingress (mean 57.26 Mbit/s)   Flow 3 egress (mean 56.70 Mbit/s)

Flow 1 (95th percentile 162.82 ms)   Flow 2 (95th percentile 162.83 ms)   Flow 3 (95th percentile 162.91 ms)

```
Run 7: Statistics of TCP BBR

Start at: 2017-09-19 05:03:02
End at: 2017-09-19 05:03:32


# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 130.91 Mbit/s
95th percentile per-packet one-way delay: 135.215 ms
Loss rate: 1.59%
-- Flow 1:
Average throughput: 64.32 Mbit/s
95th percentile per-packet one-way delay: 135.199 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 69.60 Mbit/s
95th percentile per-packet one-way delay: 135.217 ms
Loss rate: 1.54%
-- Flow 3:
Average throughput: 62.84 Mbit/s
95th percentile per-packet one-way delay: 135.262 ms
Loss rate: 3.64%
```
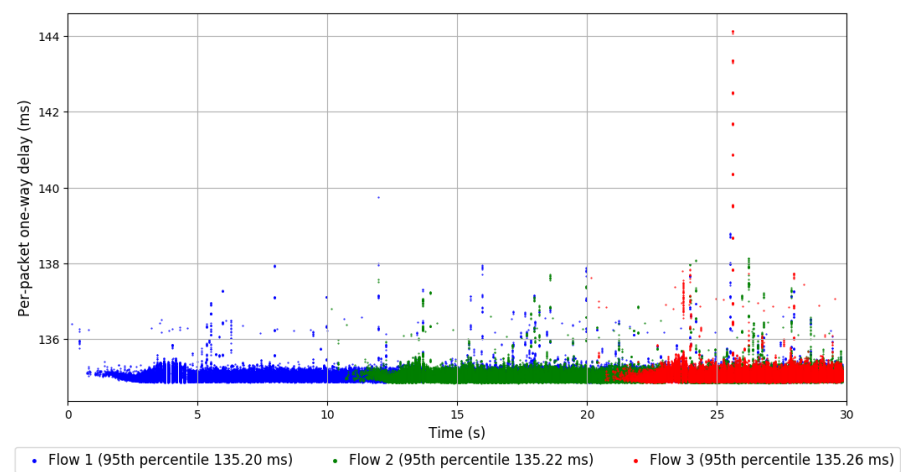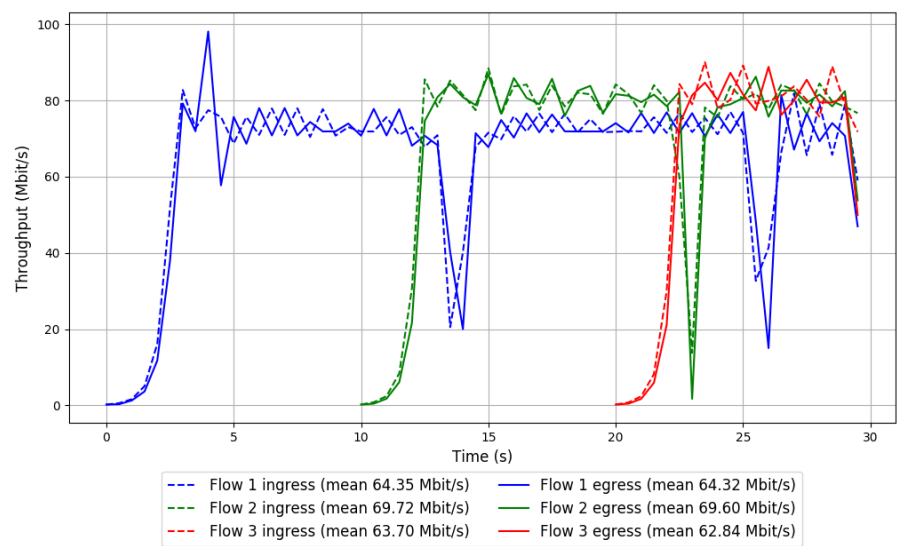
Run 7: Report of TCP BBR — Data Link

```
Run 8: Statistics of TCP BBR

Start at: 2017-09-19 05:13:10
End at: 2017-09-19 05:13:40


# Below is generated by plot.py at 2017-09-19 07:41:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 140.08 Mbit/s
95th percentile per-packet one-way delay: 135.190 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 73.35 Mbit/s
95th percentile per-packet one-way delay: 135.177 ms
Loss rate: 1.00%
-- Flow 2:
Average throughput: 69.89 Mbit/s
95th percentile per-packet one-way delay: 135.187 ms
Loss rate: 1.64%
-- Flow 3:
Average throughput: 62.85 Mbit/s
95th percentile per-packet one-way delay: 135.237 ms
Loss rate: 3.63%
```
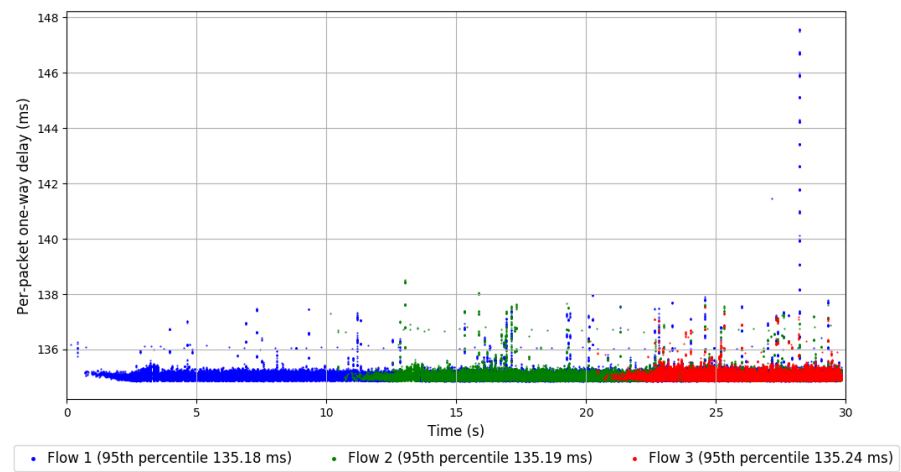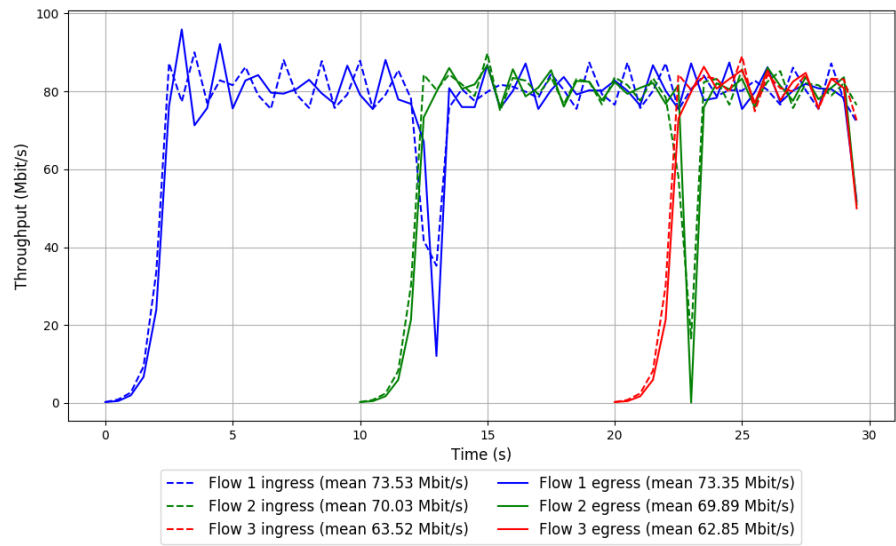
Run 8: Report of TCP BBR — Data Link

Flow 1 ingress (mean 73.53 Mbit/s)   Flow 1 egress (mean 73.35 Mbit/s)
Flow 2 ingress (mean 70.03 Mbit/s)   Flow 2 egress (mean 69.89 Mbit/s)
Flow 3 ingress (mean 63.52 Mbit/s)   Flow 3 egress (mean 62.85 Mbit/s)

Flow 1 (95th percentile 135.18 ms)   Flow 2 (95th percentile 135.19 ms)   Flow 3 (95th percentile 135.24 ms)

```
Run 9: Statistics of TCP BBR

Start at: 2017-09-19 05:23:39
End at: 2017-09-19 05:24:09

# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 131.21 Mbit/s
95th percentile per-packet one-way delay: 135.212 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 64.67 Mbit/s
95th percentile per-packet one-way delay: 135.173 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 69.50 Mbit/s
95th percentile per-packet one-way delay: 135.230 ms
Loss rate: 1.53%
-- Flow 3:
Average throughput: 63.24 Mbit/s
95th percentile per-packet one-way delay: 135.269 ms
Loss rate: 3.77%
```
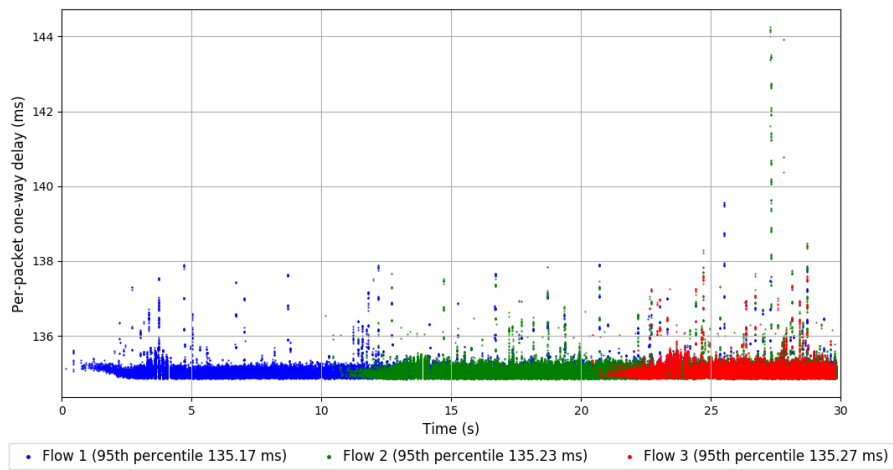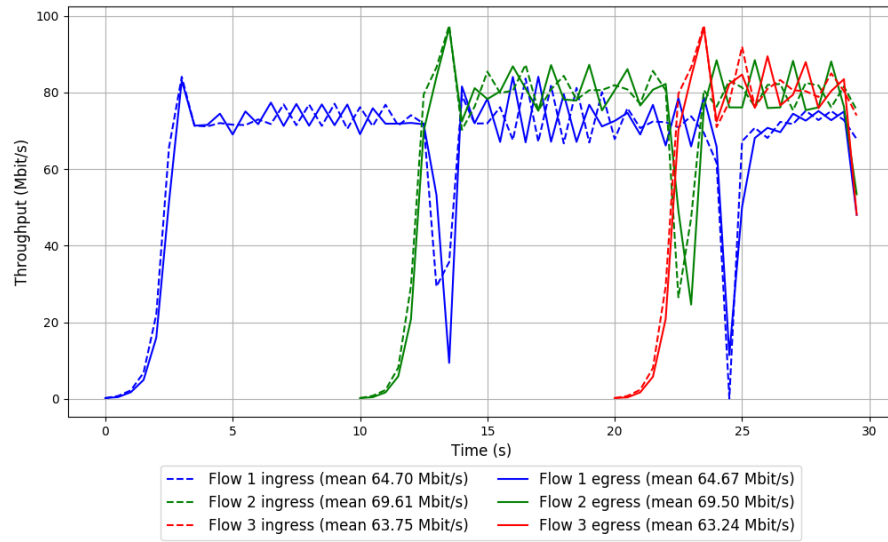
Run 9: Report of TCP BBR — Data Link

```
Run 10: Statistics of TCP BBR

Start at: 2017-09-19 05:33:59
End at: 2017-09-19 05:34:29

# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 125.29 Mbit/s
95th percentile per-packet one-way delay: 162.223 ms
Loss rate: 1.75%
-- Flow 1:
Average throughput: 65.54 Mbit/s
95th percentile per-packet one-way delay: 162.218 ms
Loss rate: 1.21%
-- Flow 2:
Average throughput: 62.45 Mbit/s
95th percentile per-packet one-way delay: 162.218 ms
Loss rate: 1.70%
-- Flow 3:
Average throughput: 56.53 Mbit/s
95th percentile per-packet one-way delay: 162.254 ms
Loss rate: 3.75%
```
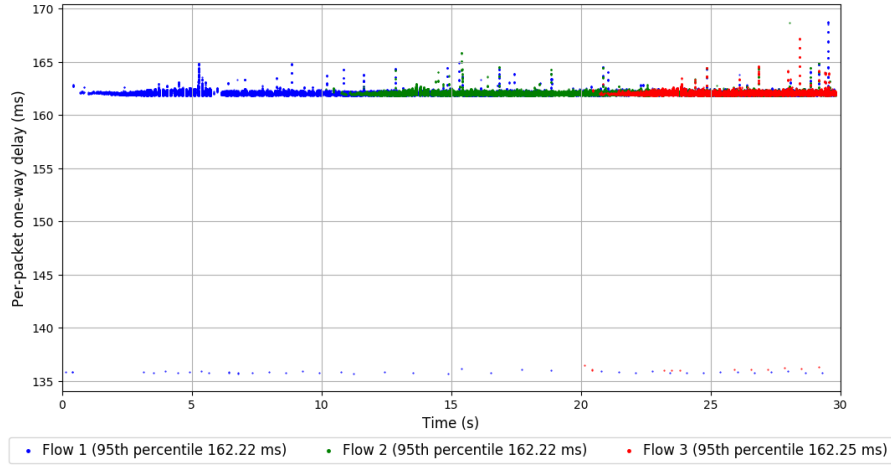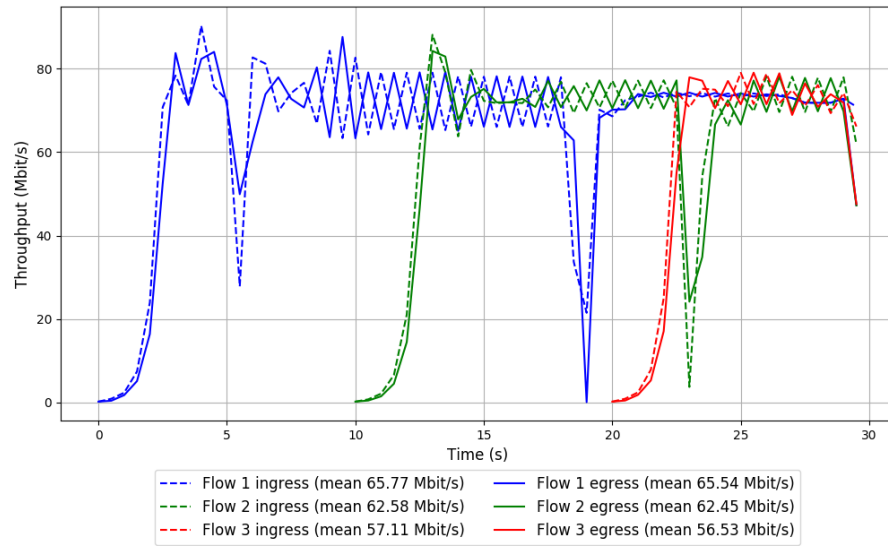
Run 10: Report of TCP BBR — Data Link

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```
Run 1: Statistics of TCP Cubic

Start at: 2017-09-19 04:00:54
End at: 2017-09-19 04:01:24


# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 62.73 Mbit/s
95th percentile per-packet one-way delay: 141.912 ms
Loss rate: 1.68%
-- Flow 1:
Average throughput: 15.70 Mbit/s
95th percentile per-packet one-way delay: 138.193 ms
Loss rate: 1.50%
-- Flow 2:
Average throughput: 53.69 Mbit/s
95th percentile per-packet one-way delay: 142.673 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 35.29 Mbit/s
95th percentile per-packet one-way delay: 141.875 ms
Loss rate: 3.32%
```
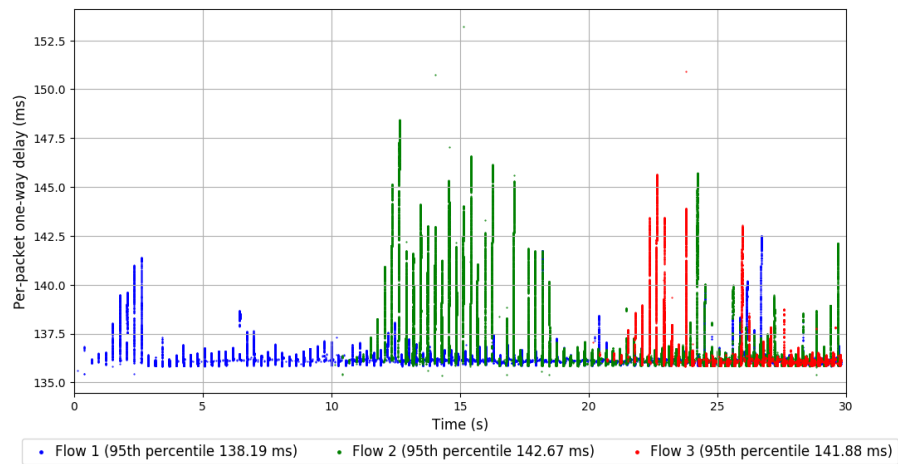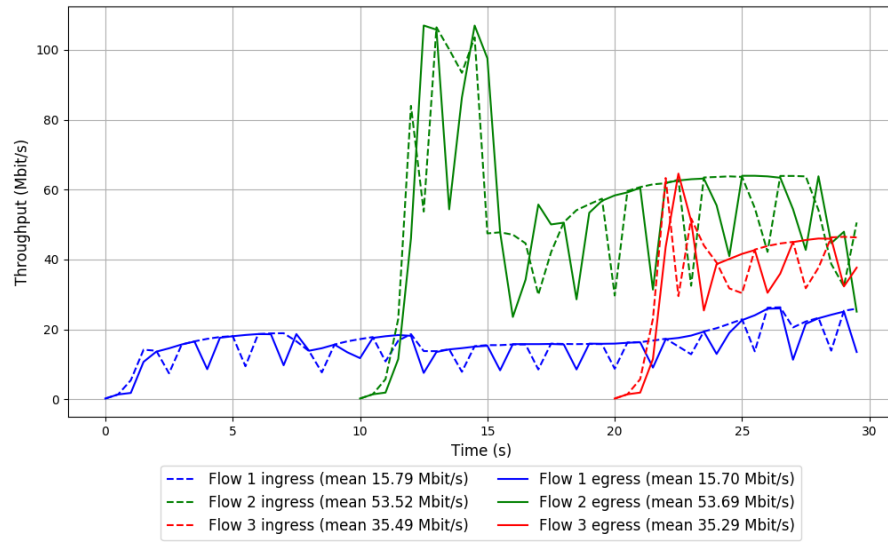
Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2017-09-19 04:11:28
End at: 2017-09-19 04:11:58

# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 52.28 Mbit/s
95th percentile per-packet one-way delay: 138.602 ms
Loss rate: 2.10%
-- Flow 1:
Average throughput: 6.95 Mbit/s
95th percentile per-packet one-way delay: 136.707 ms
Loss rate: 2.48%
-- Flow 2:
Average throughput: 46.95 Mbit/s
95th percentile per-packet one-way delay: 137.849 ms
Loss rate: 1.55%
-- Flow 3:
Average throughput: 43.79 Mbit/s
95th percentile per-packet one-way delay: 140.205 ms
Loss rate: 3.10%
```
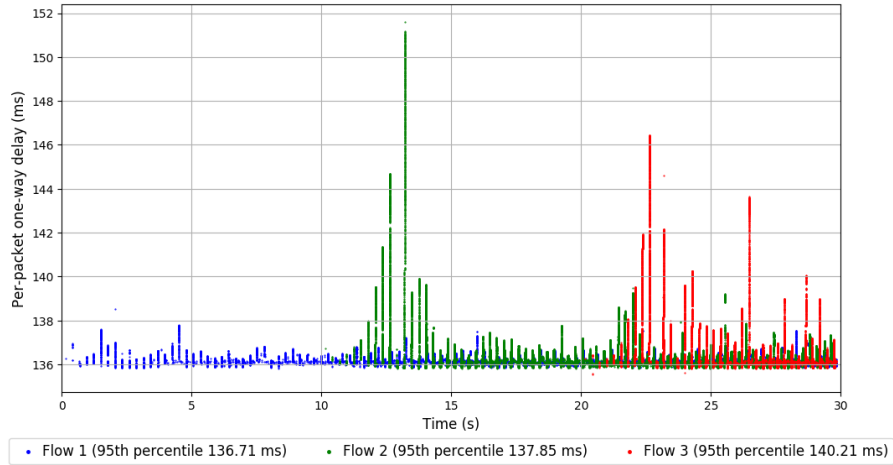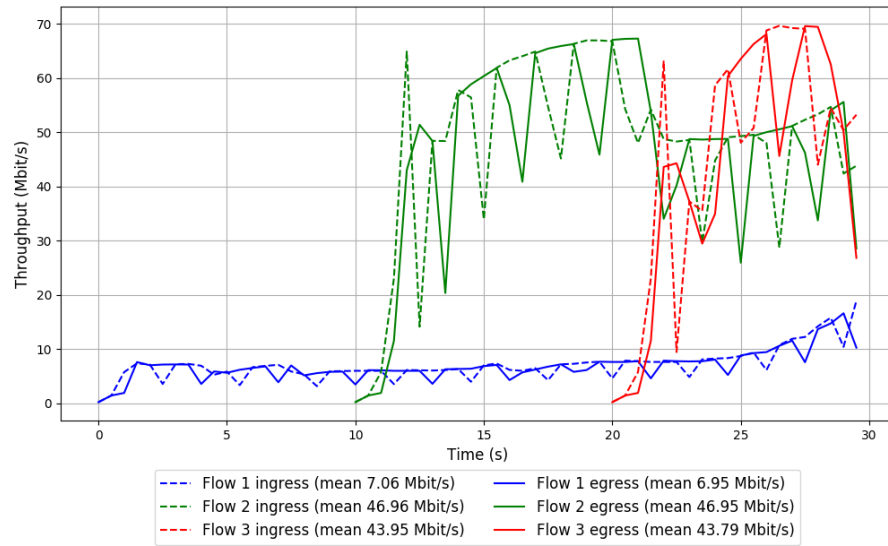
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2017-09-19 04:22:01
End at: 2017-09-19 04:22:31

# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 80.93 Mbit/s
95th percentile per-packet one-way delay: 141.346 ms
Loss rate: 1.52%
-- Flow 1:
Average throughput: 38.66 Mbit/s
95th percentile per-packet one-way delay: 141.514 ms
Loss rate: 0.84%
-- Flow 2:
Average throughput: 45.15 Mbit/s
95th percentile per-packet one-way delay: 139.579 ms
Loss rate: 1.55%
-- Flow 3:
Average throughput: 38.02 Mbit/s
95th percentile per-packet one-way delay: 143.227 ms
Loss rate: 3.47%
```
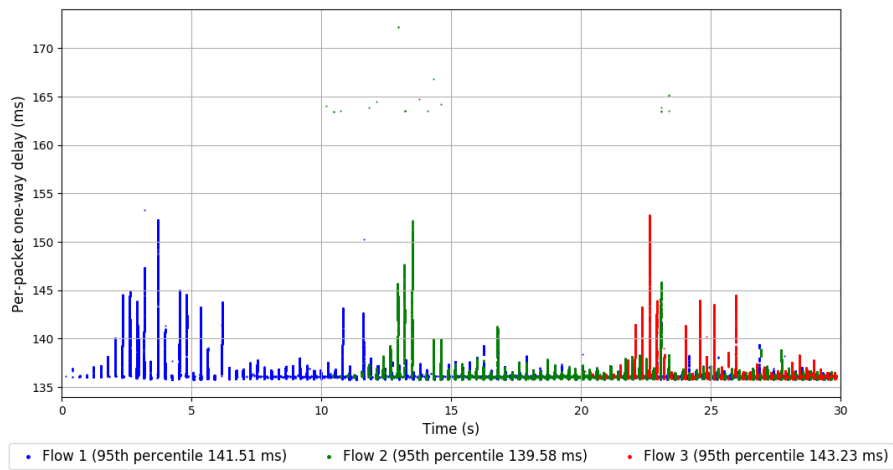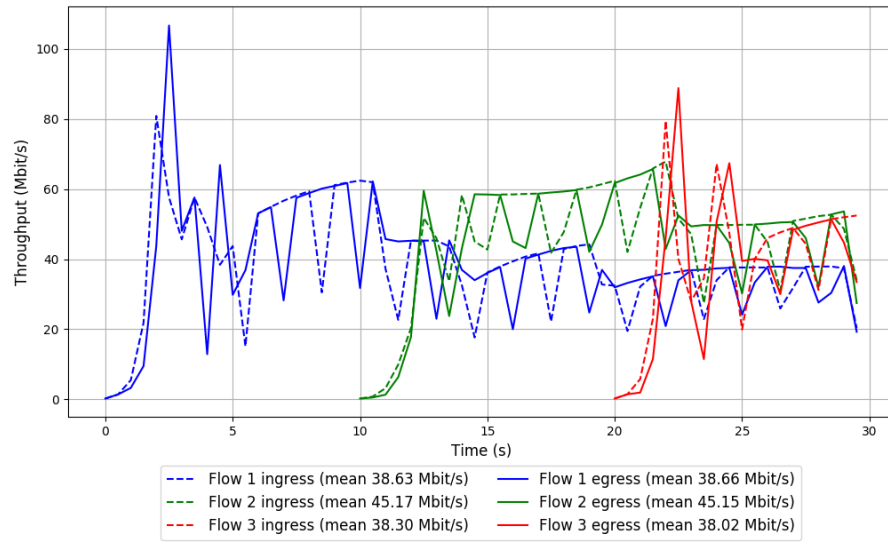
Run 3: Report of TCP Cubic — Data Link

```
Run 4: Statistics of TCP Cubic

Start at: 2017-09-19 04:32:08
End at: 2017-09-19 04:32:38

# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 60.77 Mbit/s
95th percentile per-packet one-way delay: 169.385 ms
Loss rate: 2.69%
-- Flow 1:
Average throughput: 42.82 Mbit/s
95th percentile per-packet one-way delay: 168.969 ms
Loss rate: 1.84%
-- Flow 2:
Average throughput: 25.36 Mbit/s
95th percentile per-packet one-way delay: 170.302 ms
Loss rate: 4.23%
-- Flow 3:
Average throughput: 3.96 Mbit/s
95th percentile per-packet one-way delay: 163.987 ms
Loss rate: 9.64%
```
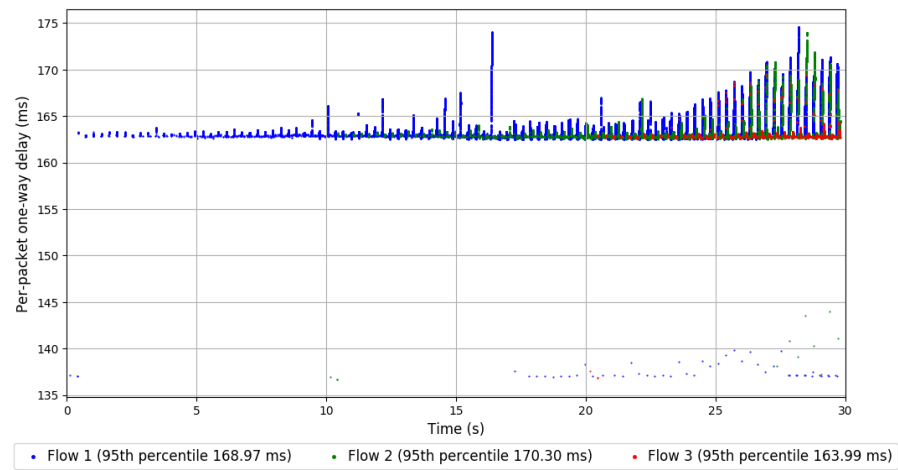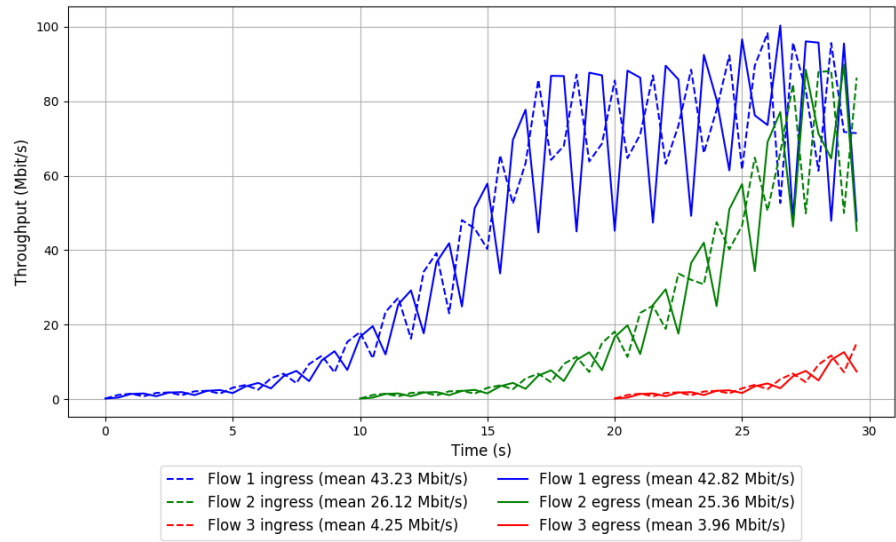
Run 4: Report of TCP Cubic — Data Link

```
Run 5: Statistics of TCP Cubic

Start at: 2017-09-19 04:42:03
End at: 2017-09-19 04:42:33


# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 47.59 Mbit/s
95th percentile per-packet one-way delay: 166.394 ms
Loss rate: 2.69%
-- Flow 1:
Average throughput: 24.09 Mbit/s
95th percentile per-packet one-way delay: 165.679 ms
Loss rate: 1.88%
-- Flow 2:
Average throughput: 19.83 Mbit/s
95th percentile per-packet one-way delay: 165.121 ms
Loss rate: 3.07%
-- Flow 3:
Average throughput: 31.93 Mbit/s
95th percentile per-packet one-way delay: 171.289 ms
Loss rate: 4.07%
```

Run 5: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 24.33 Mbit/s) --- Flow 1 egress (mean 24.09 Mbit/s)
Flow 2 ingress (mean 20.17 Mbit/s) --- Flow 2 egress (mean 19.83 Mbit/s)
Flow 3 ingress (mean 32.28 Mbit/s) --- Flow 3 egress (mean 31.93 Mbit/s)

Flow 1 (95th percentile 165.68 ms)   Flow 2 (95th percentile 165.12 ms)   Flow 3 (95th percentile 171.29 ms)

```
Run 6: Statistics of TCP Cubic

Start at: 2017-09-19 04:52:16
End at: 2017-09-19 04:52:46

# Below is generated by plot.py at 2017-09-19 07:43:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 44.94 Mbit/s
95th percentile per-packet one-way delay: 170.153 ms
Loss rate: 2.00%
-- Flow 1:
Average throughput: 14.59 Mbit/s
95th percentile per-packet one-way delay: 163.596 ms
Loss rate: 3.02%
-- Flow 2:
Average throughput: 44.26 Mbit/s
95th percentile per-packet one-way delay: 171.487 ms
Loss rate: 1.32%
-- Flow 3:
Average throughput: 3.28 Mbit/s
95th percentile per-packet one-way delay: 163.247 ms
Loss rate: 6.10%
```
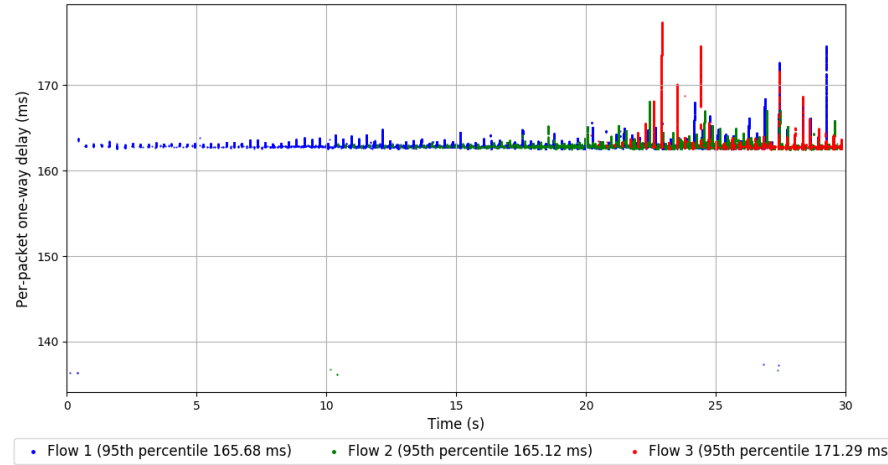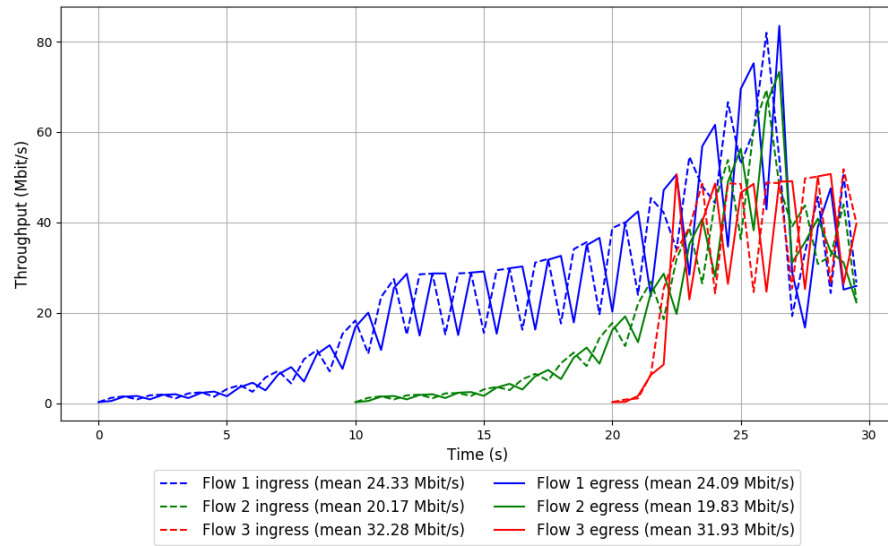
Run 6: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 14.91 Mbit/s) --- Flow 1 egress (mean 14.59 Mbit/s)
Flow 2 ingress (mean 44.19 Mbit/s) --- Flow 2 egress (mean 44.26 Mbit/s)
Flow 3 ingress (mean 3.39 Mbit/s) --- Flow 3 egress (mean 3.28 Mbit/s)

Flow 1 (95th percentile 163.60 ms) • Flow 2 (95th percentile 171.49 ms) • Flow 3 (95th percentile 163.25 ms)

```
Run 7: Statistics of TCP Cubic

Start at: 2017-09-19 05:02:06
End at: 2017-09-19 05:02:36


# Below is generated by plot.py at 2017-09-19 07:43:24
# Datalink statistics
-- Total of 3 flows:
Average throughput: 83.31 Mbit/s
95th percentile per-packet one-way delay: 141.659 ms
Loss rate: 1.29%
-- Flow 1:
Average throughput: 41.73 Mbit/s
95th percentile per-packet one-way delay: 138.321 ms
Loss rate: 1.01%
-- Flow 2:
Average throughput: 37.07 Mbit/s
95th percentile per-packet one-way delay: 141.194 ms
Loss rate: 1.40%
-- Flow 3:
Average throughput: 52.66 Mbit/s
95th percentile per-packet one-way delay: 144.341 ms
Loss rate: 1.82%
```
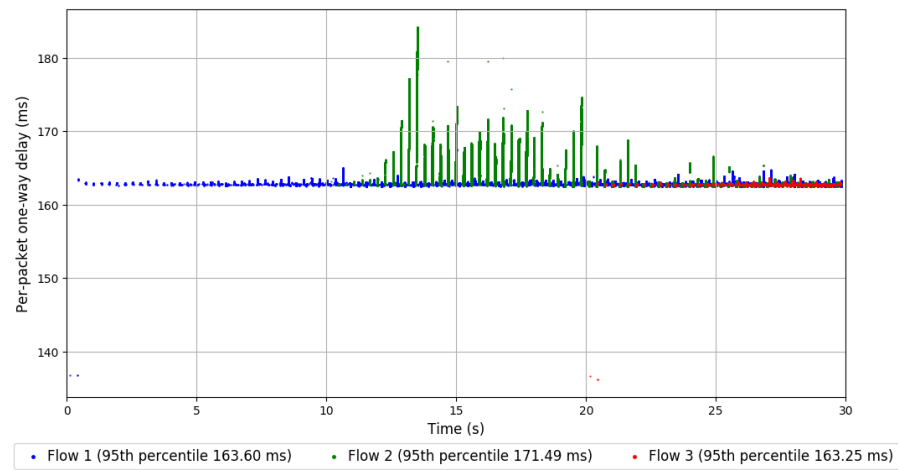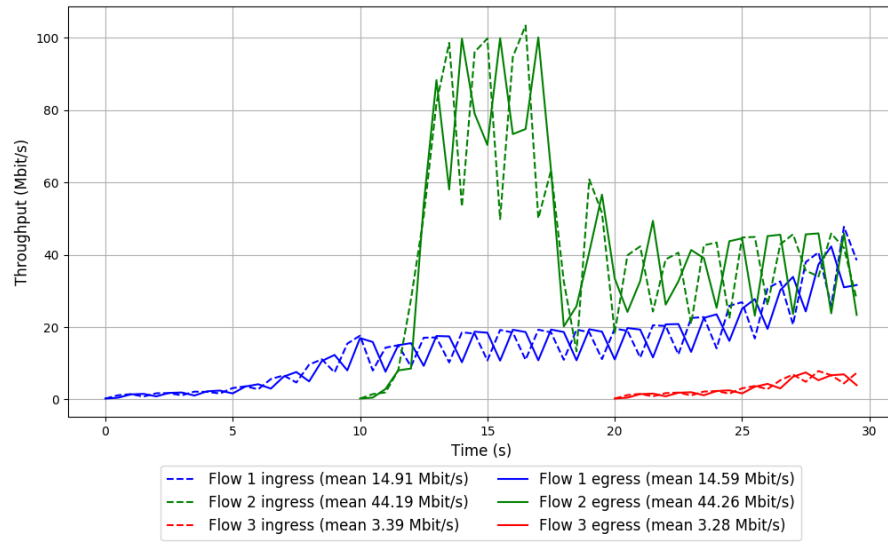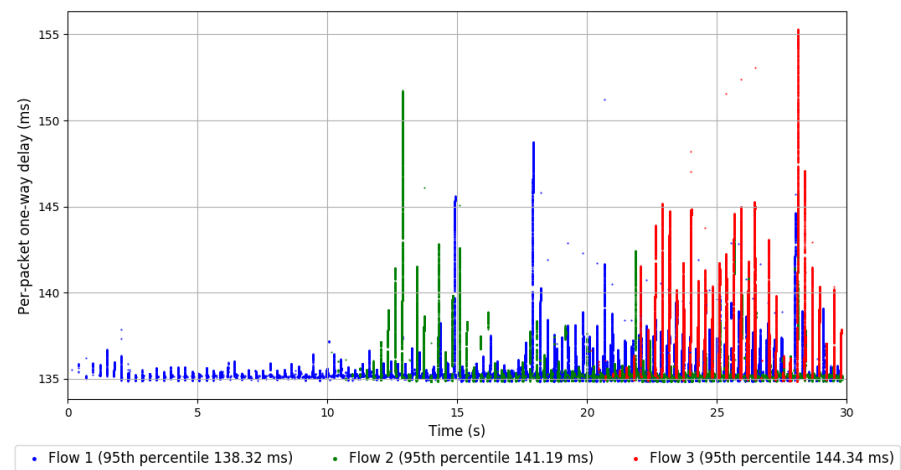
Run 7: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 41.77 Mbit/s) --- Flow 1 egress (mean 41.73 Mbit/s)
Flow 2 ingress (mean 37.08 Mbit/s) --- Flow 2 egress (mean 37.07 Mbit/s)
Flow 3 ingress (mean 52.16 Mbit/s) --- Flow 3 egress (mean 52.66 Mbit/s)

Flow 1 (95th percentile 138.32 ms)   Flow 2 (95th percentile 141.19 ms)   Flow 3 (95th percentile 144.34 ms)

37

```
Run 8: Statistics of TCP Cubic

Start at: 2017-09-19 05:12:14
End at: 2017-09-19 05:12:44


# Below is generated by plot.py at 2017-09-19 07:43:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 83.97 Mbit/s
95th percentile per-packet one-way delay: 139.929 ms
Loss rate: 1.53%
-- Flow 1:
Average throughput: 46.10 Mbit/s
95th percentile per-packet one-way delay: 139.119 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 42.29 Mbit/s
95th percentile per-packet one-way delay: 138.471 ms
Loss rate: 1.87%
-- Flow 3:
Average throughput: 30.38 Mbit/s
95th percentile per-packet one-way delay: 146.410 ms
Loss rate: 3.52%
```
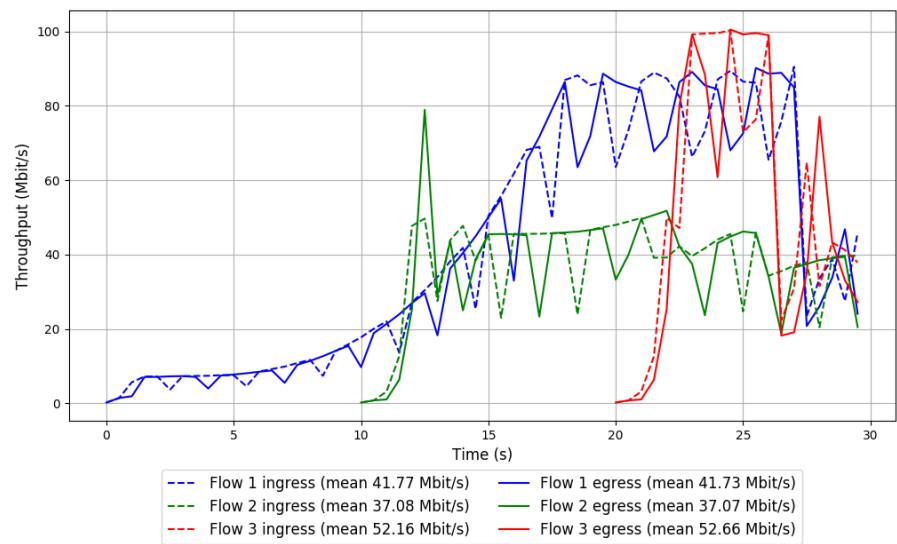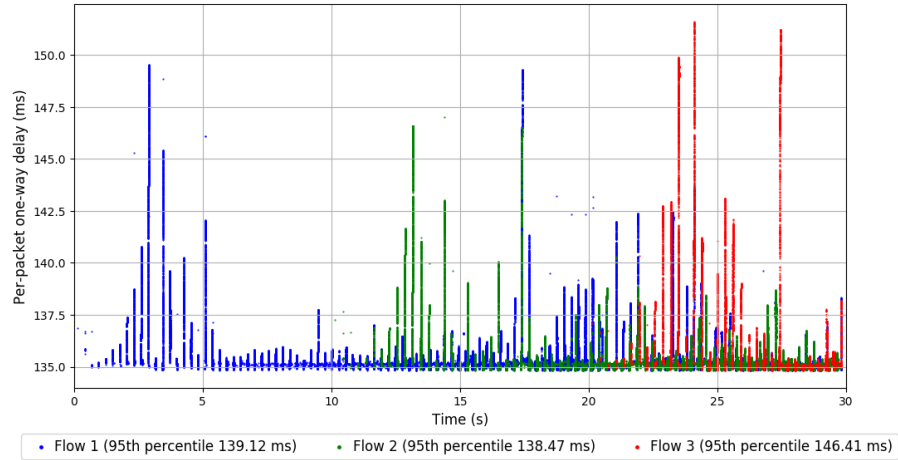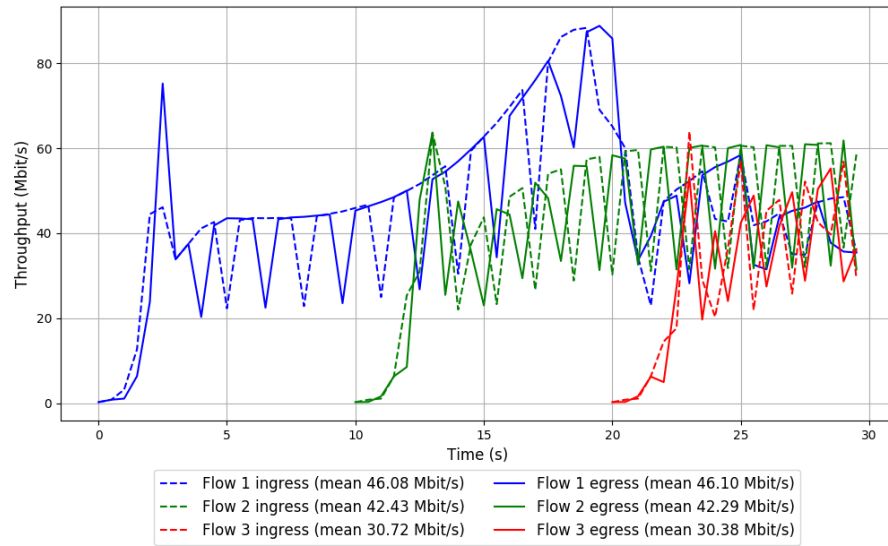
Run 8: Report of TCP Cubic — Data Link

- - - - Flow 1 ingress (mean 46.08 Mbit/s)   —— Flow 1 egress (mean 46.10 Mbit/s)
- - - - Flow 2 ingress (mean 42.43 Mbit/s)   —— Flow 2 egress (mean 42.29 Mbit/s)
- - - - Flow 3 ingress (mean 30.72 Mbit/s)   —— Flow 3 egress (mean 30.38 Mbit/s)

- Flow 1 (95th percentile 139.12 ms)   • Flow 2 (95th percentile 138.47 ms)   • Flow 3 (95th percentile 146.41 ms)

```
Run 9: Statistics of TCP Cubic

Start at: 2017-09-19 05:22:45
End at: 2017-09-19 05:23:15


# Below is generated by plot.py at 2017-09-19 07:43:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 46.86 Mbit/s
95th percentile per-packet one-way delay: 146.239 ms
Loss rate: 2.42%
-- Flow 1:
Average throughput: 11.23 Mbit/s
95th percentile per-packet one-way delay: 139.372 ms
Loss rate: 5.20%
-- Flow 2:
Average throughput: 31.04 Mbit/s
95th percentile per-packet one-way delay: 140.574 ms
Loss rate: 1.52%
-- Flow 3:
Average throughput: 47.56 Mbit/s
95th percentile per-packet one-way delay: 149.061 ms
Loss rate: 1.49%
```
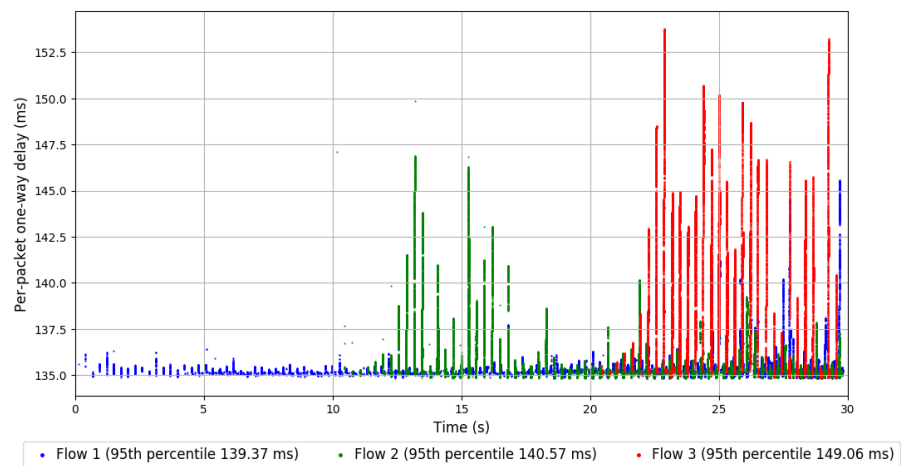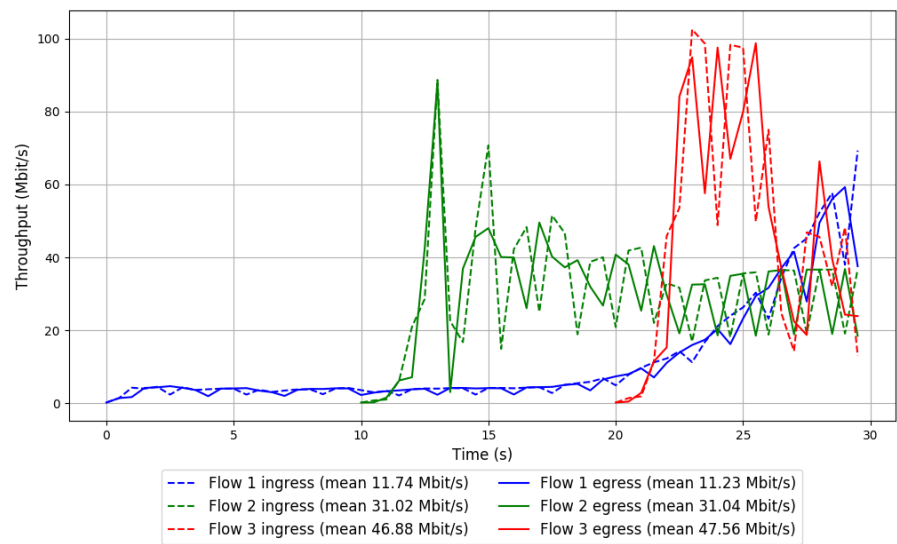
Run 9: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 11.74 Mbit/s) Flow 1 egress (mean 11.23 Mbit/s)
Flow 2 ingress (mean 31.02 Mbit/s) Flow 2 egress (mean 31.04 Mbit/s)
Flow 3 ingress (mean 46.88 Mbit/s) Flow 3 egress (mean 47.56 Mbit/s)

Flow 1 (95th percentile 139.37 ms) Flow 2 (95th percentile 140.57 ms) Flow 3 (95th percentile 149.06 ms)

```
Run 10: Statistics of TCP Cubic

Start at: 2017-09-19 05:33:05
End at: 2017-09-19 05:33:35


# Below is generated by plot.py at 2017-09-19 07:43:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 60.50 Mbit/s
95th percentile per-packet one-way delay: 170.267 ms
Loss rate: 2.65%
-- Flow 1:
Average throughput: 43.03 Mbit/s
95th percentile per-packet one-way delay: 170.219 ms
Loss rate: 1.83%
-- Flow 2:
Average throughput: 24.59 Mbit/s
95th percentile per-packet one-way delay: 170.658 ms
Loss rate: 4.18%
-- Flow 3:
Average throughput: 3.90 Mbit/s
95th percentile per-packet one-way delay: 168.965 ms
Loss rate: 9.58%
```
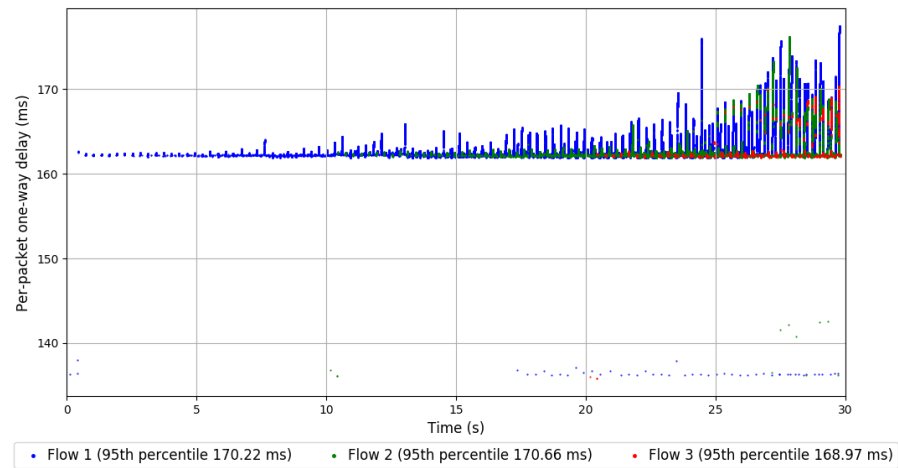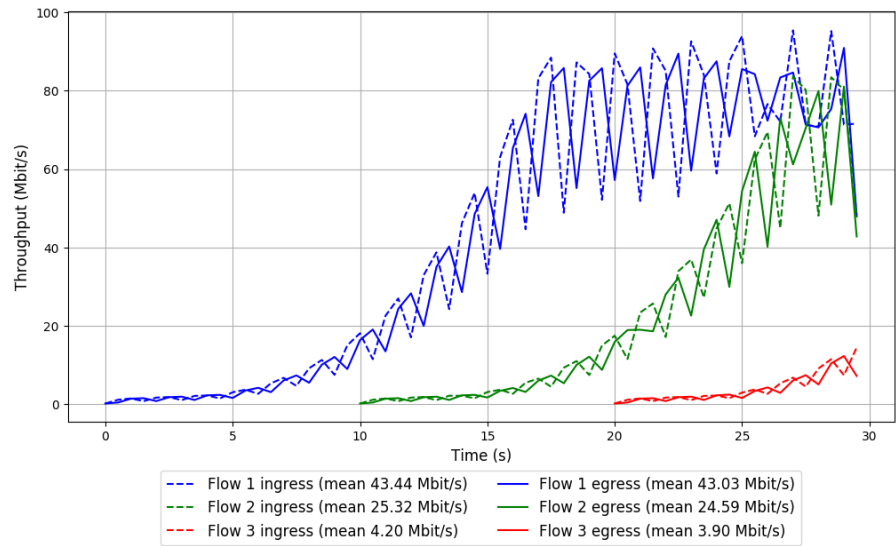
Run 10: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 43.44 Mbit/s) --- Flow 1 egress (mean 43.03 Mbit/s)
Flow 2 ingress (mean 25.32 Mbit/s) --- Flow 2 egress (mean 24.59 Mbit/s)
Flow 3 ingress (mean 4.20 Mbit/s) --- Flow 3 egress (mean 3.90 Mbit/s)

Flow 1 (95th percentile 170.22 ms)   Flow 2 (95th percentile 170.66 ms)   Flow 3 (95th percentile 168.97 ms)
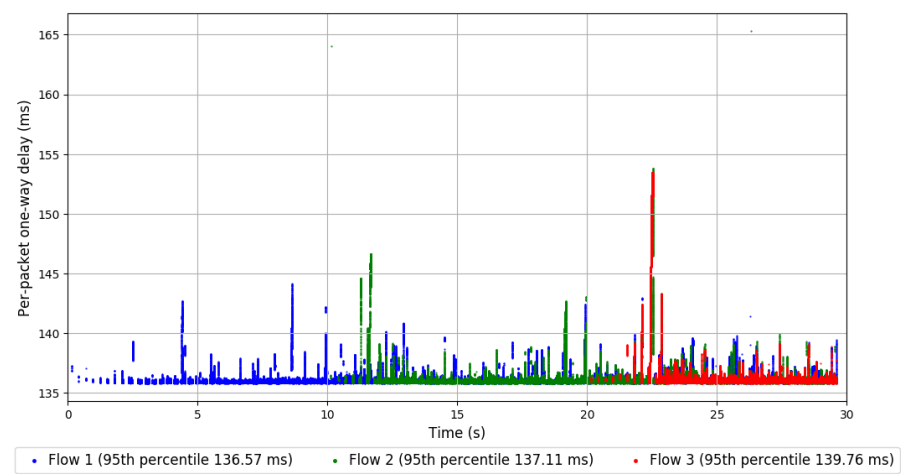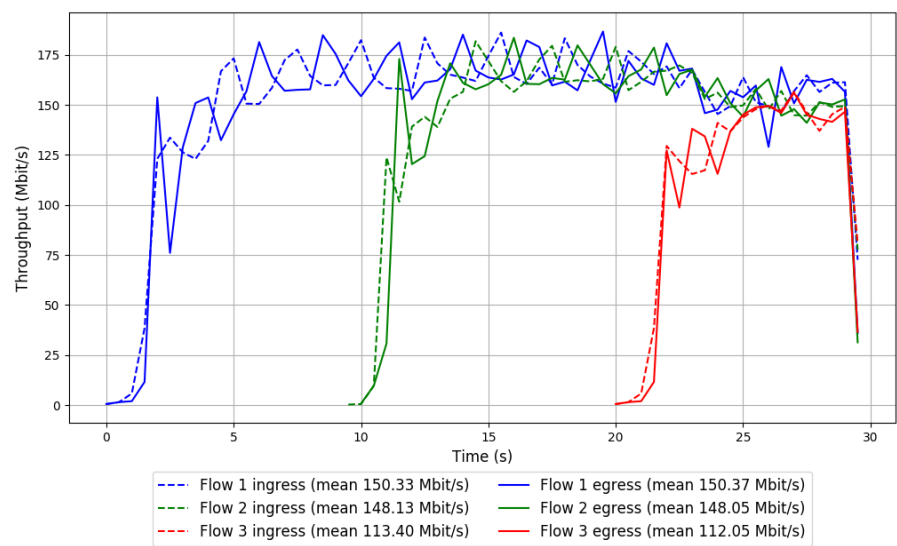
43

```
Run 1: Statistics of Indigo

Start at: 2017-09-19 04:07:53
End at: 2017-09-19 04:08:23

# Below is generated by plot.py at 2017-09-19 07:47:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 284.25 Mbit/s
95th percentile per-packet one-way delay: 136.825 ms
Loss rate: 1.48%
-- Flow 1:
Average throughput: 150.37 Mbit/s
95th percentile per-packet one-way delay: 136.574 ms
Loss rate: 0.89%
-- Flow 2:
Average throughput: 148.05 Mbit/s
95th percentile per-packet one-way delay: 137.106 ms
Loss rate: 1.44%
-- Flow 3:
Average throughput: 112.05 Mbit/s
95th percentile per-packet one-way delay: 139.763 ms
Loss rate: 3.95%
```

Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2017-09-19 04:18:28
End at: 2017-09-19 04:18:58

# Below is generated by plot.py at 2017-09-19 07:47:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 277.93 Mbit/s
95th percentile per-packet one-way delay: 137.024 ms
Loss rate: 1.44%
-- Flow 1:
Average throughput: 152.26 Mbit/s
95th percentile per-packet one-way delay: 136.773 ms
Loss rate: 0.82%
-- Flow 2:
Average throughput: 137.29 Mbit/s
95th percentile per-packet one-way delay: 137.712 ms
Loss rate: 1.51%
-- Flow 3:
Average throughput: 110.43 Mbit/s
95th percentile per-packet one-way delay: 136.601 ms
Loss rate: 3.87%
```
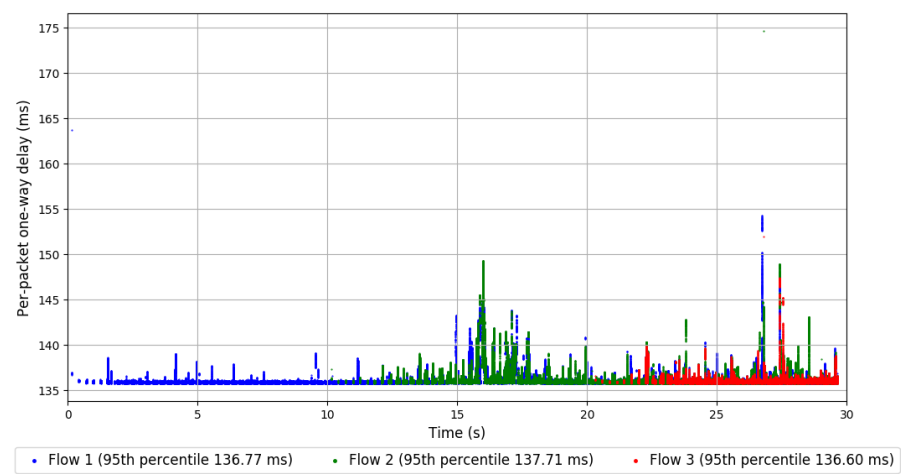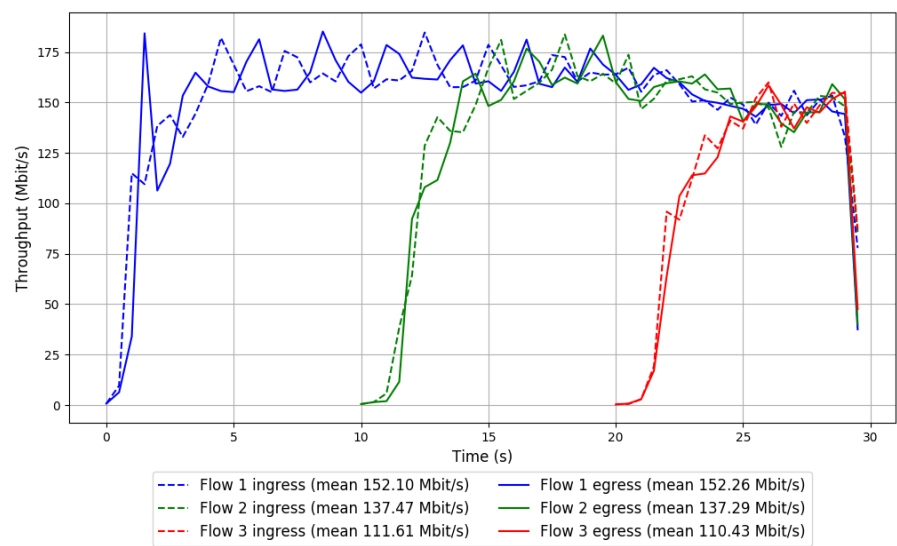
Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2017-09-19 04:29:13
End at: 2017-09-19 04:29:43

# Below is generated by plot.py at 2017-09-19 07:47:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 207.12 Mbit/s
95th percentile per-packet one-way delay: 166.362 ms
Loss rate: 1.73%
-- Flow 1:
Average throughput: 87.82 Mbit/s
95th percentile per-packet one-way delay: 170.520 ms
Loss rate: 1.15%
-- Flow 2:
Average throughput: 130.24 Mbit/s
95th percentile per-packet one-way delay: 165.918 ms
Loss rate: 1.72%
-- Flow 3:
Average throughput: 103.34 Mbit/s
95th percentile per-packet one-way delay: 164.370 ms
Loss rate: 3.28%
```
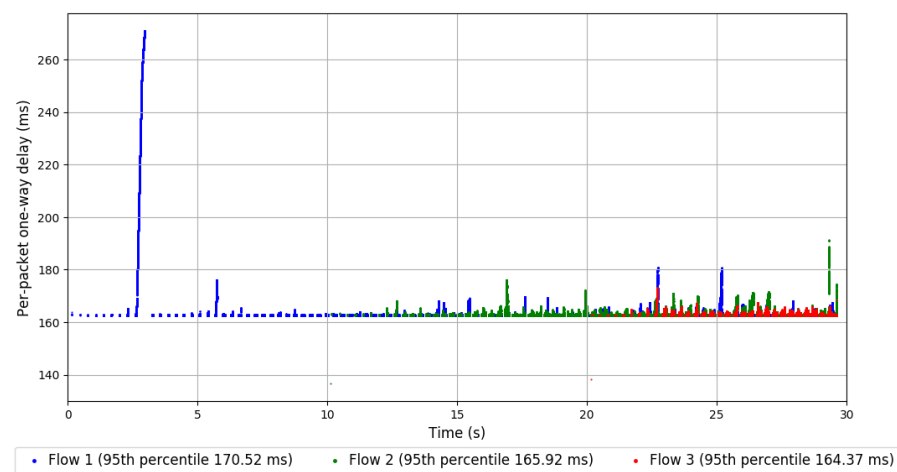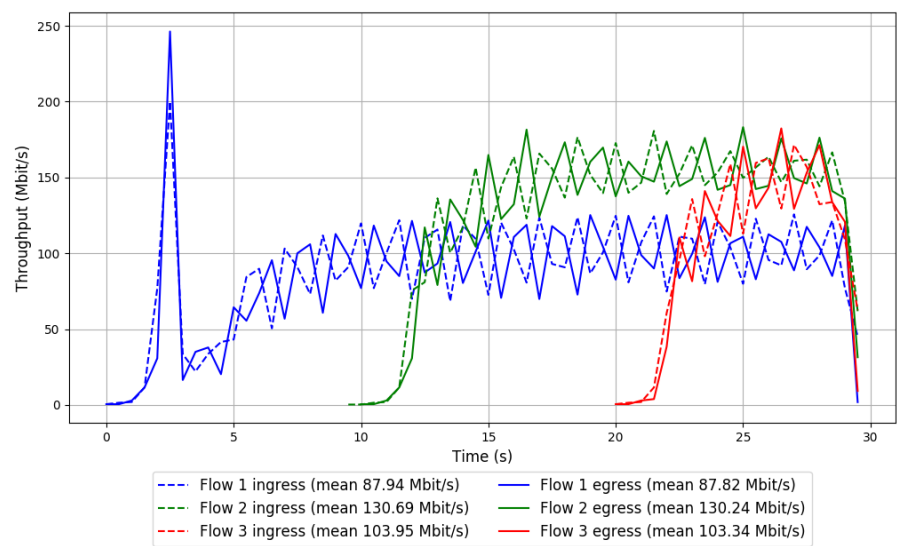
Run 3: Report of Indigo — Data Link

Flow 1 ingress (mean 87.94 Mbit/s) --- Flow 1 egress (mean 87.82 Mbit/s)
Flow 2 ingress (mean 130.69 Mbit/s) --- Flow 2 egress (mean 130.24 Mbit/s)
Flow 3 ingress (mean 103.95 Mbit/s) --- Flow 3 egress (mean 103.34 Mbit/s)

Flow 1 (95th percentile 170.52 ms)   Flow 2 (95th percentile 165.92 ms)   Flow 3 (95th percentile 164.37 ms)

49

```
Run 4: Statistics of Indigo

Start at: 2017-09-19 04:38:46
End at: 2017-09-19 04:39:16


# Below is generated by plot.py at 2017-09-19 07:47:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 240.60 Mbit/s
95th percentile per-packet one-way delay: 166.706 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 136.97 Mbit/s
95th percentile per-packet one-way delay: 164.749 ms
Loss rate: 1.13%
-- Flow 2:
Average throughput: 115.71 Mbit/s
95th percentile per-packet one-way delay: 168.312 ms
Loss rate: 1.62%
-- Flow 3:
Average throughput: 88.76 Mbit/s
95th percentile per-packet one-way delay: 172.182 ms
Loss rate: 3.89%
```
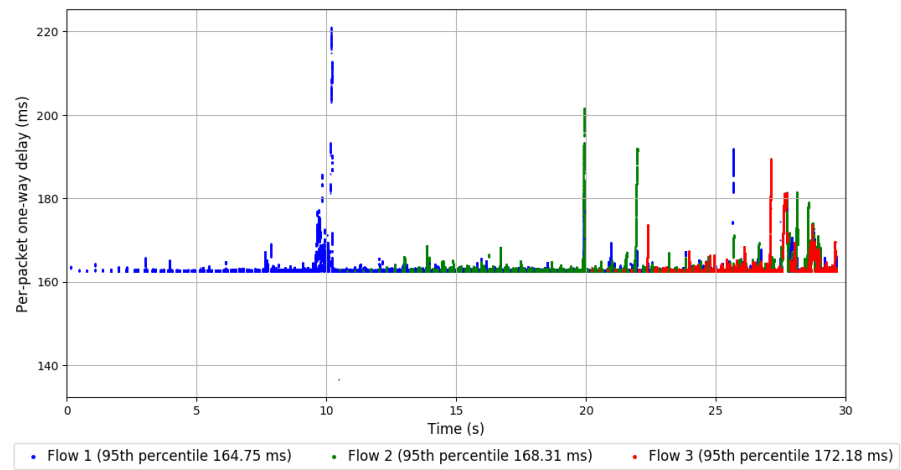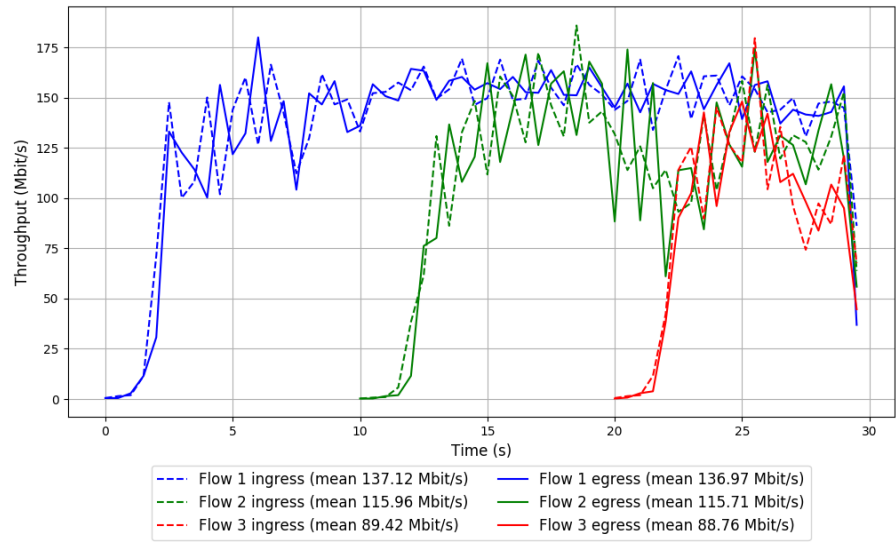
Run 4: Report of Indigo — Data Link

```
Run 5: Statistics of Indigo

Start at: 2017-09-19 04:49:10
End at: 2017-09-19 04:49:40


# Below is generated by plot.py at 2017-09-19 07:47:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 257.08 Mbit/s
95th percentile per-packet one-way delay: 163.876 ms
Loss rate: 1.69%
-- Flow 1:
Average throughput: 138.24 Mbit/s
95th percentile per-packet one-way delay: 163.364 ms
Loss rate: 0.99%
-- Flow 2:
Average throughput: 129.17 Mbit/s
95th percentile per-packet one-way delay: 164.113 ms
Loss rate: 1.79%
-- Flow 3:
Average throughput: 104.70 Mbit/s
95th percentile per-packet one-way delay: 165.953 ms
Loss rate: 4.22%
```
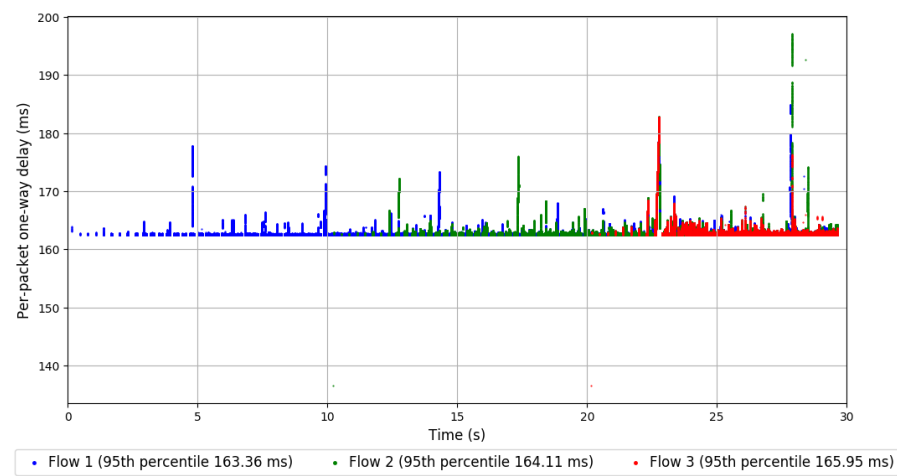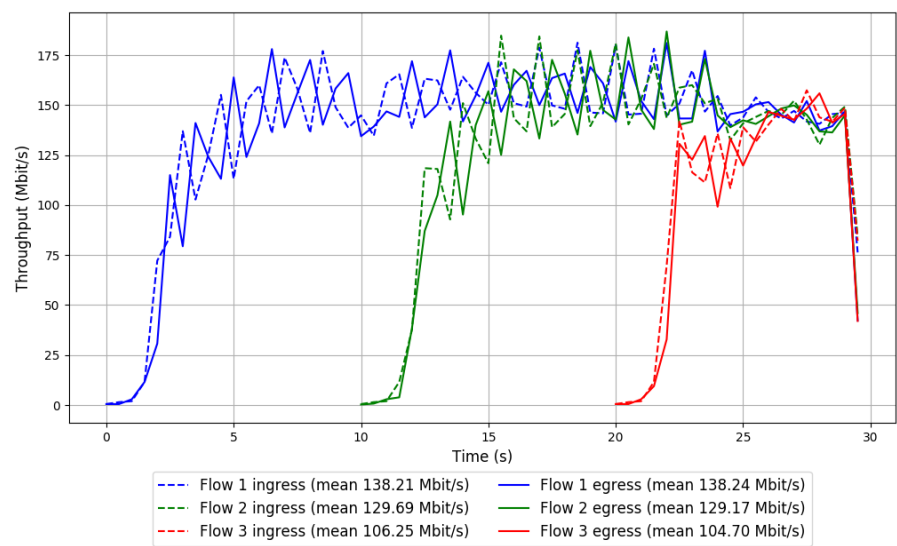
Run 5: Report of Indigo — Data Link

Flow 1 ingress (mean 138.21 Mbit/s)   Flow 1 egress (mean 138.24 Mbit/s)
Flow 2 ingress (mean 129.69 Mbit/s)   Flow 2 egress (mean 129.17 Mbit/s)
Flow 3 ingress (mean 106.25 Mbit/s)   Flow 3 egress (mean 104.70 Mbit/s)

Flow 1 (95th percentile 163.36 ms)   Flow 2 (95th percentile 164.11 ms)   Flow 3 (95th percentile 165.95 ms)

```
Run 6: Statistics of Indigo

Start at: 2017-09-19 04:58:41
End at: 2017-09-19 04:59:11


# Below is generated by plot.py at 2017-09-19 07:48:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 279.72 Mbit/s
95th percentile per-packet one-way delay: 136.383 ms
Loss rate: 1.48%
-- Flow 1:
Average throughput: 149.18 Mbit/s
95th percentile per-packet one-way delay: 136.075 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 141.34 Mbit/s
95th percentile per-packet one-way delay: 136.249 ms
Loss rate: 1.42%
-- Flow 3:
Average throughput: 116.87 Mbit/s
95th percentile per-packet one-way delay: 139.805 ms
Loss rate: 3.79%
```
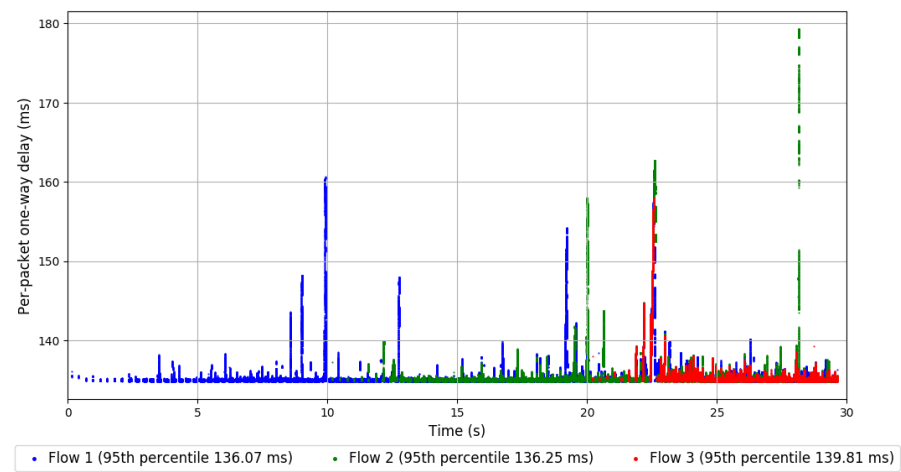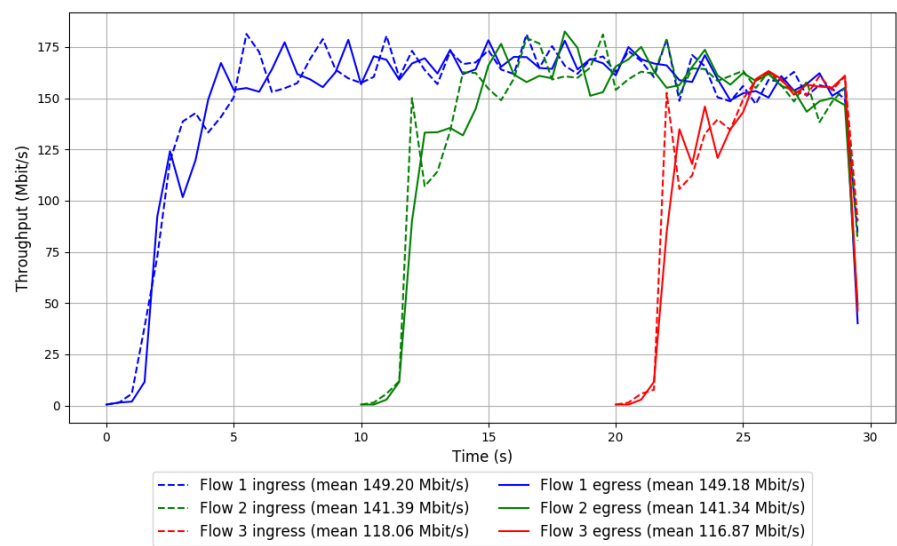
Run 6: Report of Indigo — Data Link

- - - Flow 1 ingress (mean 149.20 Mbit/s) ——— Flow 1 egress (mean 149.18 Mbit/s)
- - - Flow 2 ingress (mean 141.39 Mbit/s) ——— Flow 2 egress (mean 141.34 Mbit/s)
- - - Flow 3 ingress (mean 118.06 Mbit/s) ——— Flow 3 egress (mean 116.87 Mbit/s)

- Flow 1 (95th percentile 136.07 ms)   - Flow 2 (95th percentile 136.25 ms)   - Flow 3 (95th percentile 139.81 ms)

```
Run 7: Statistics of Indigo

Start at: 2017-09-19 05:08:49
End at: 2017-09-19 05:09:19


# Below is generated by plot.py at 2017-09-19 07:48:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 279.35 Mbit/s
95th percentile per-packet one-way delay: 135.811 ms
Loss rate: 1.49%
-- Flow 1:
Average throughput: 150.34 Mbit/s
95th percentile per-packet one-way delay: 135.580 ms
Loss rate: 0.97%
-- Flow 2:
Average throughput: 140.08 Mbit/s
95th percentile per-packet one-way delay: 135.929 ms
Loss rate: 1.52%
-- Flow 3:
Average throughput: 106.91 Mbit/s
95th percentile per-packet one-way delay: 136.247 ms
Loss rate: 3.59%
```
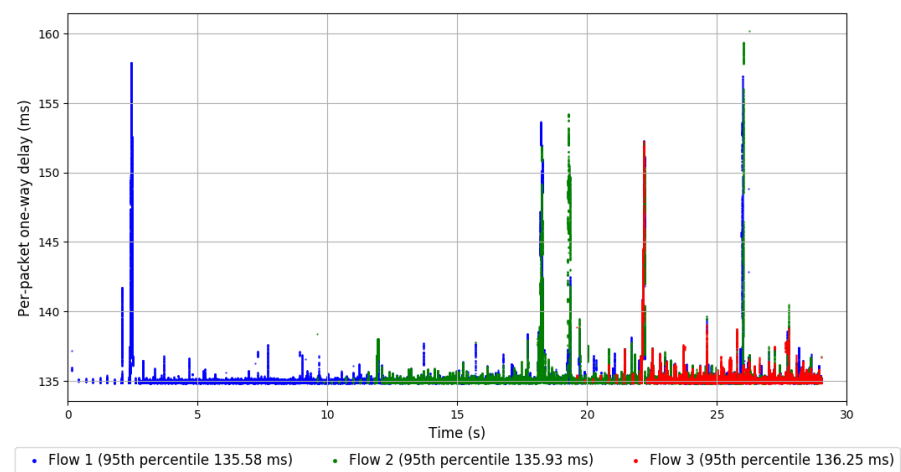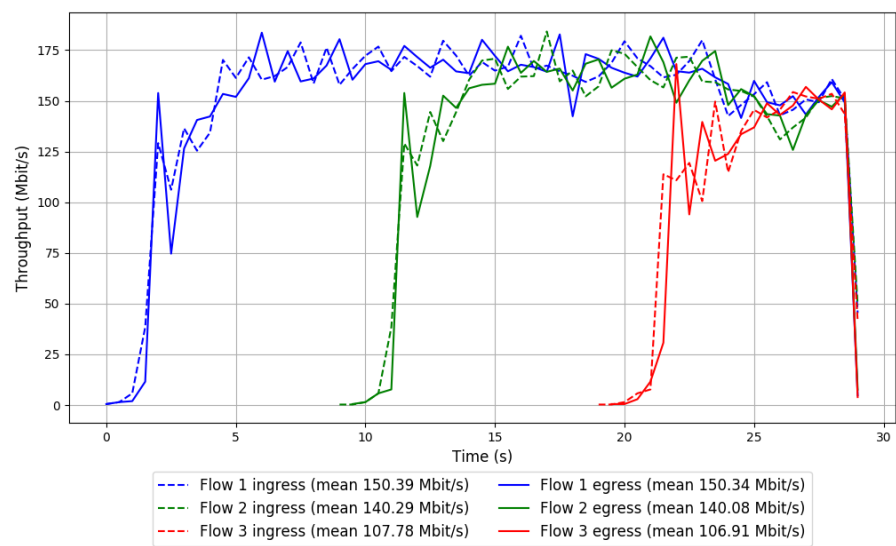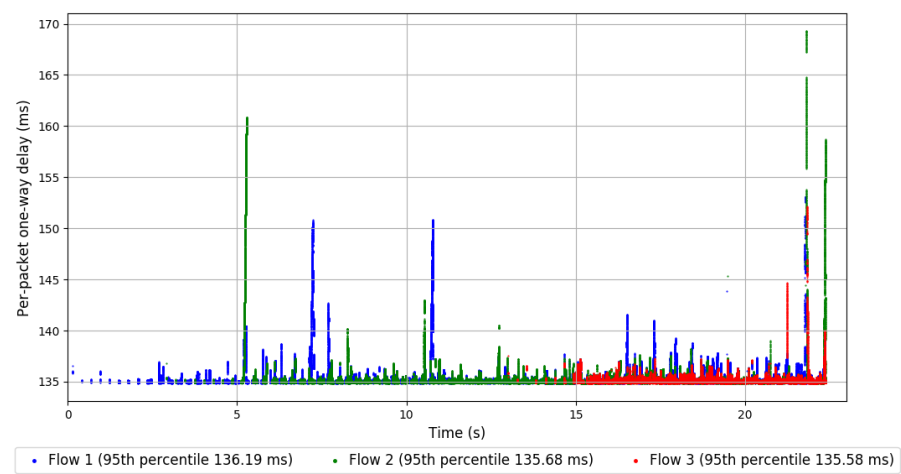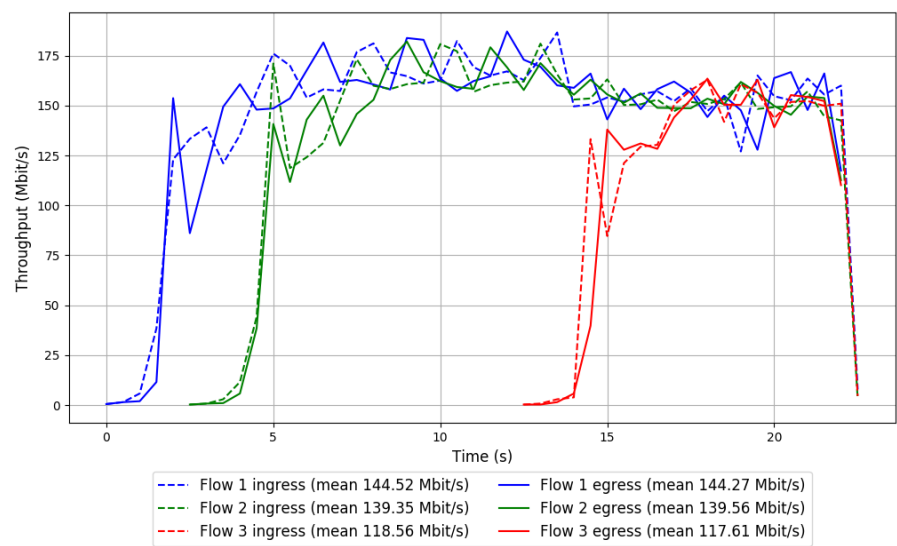
Run 7: Report of Indigo — Data Link

- - - - Flow 1 ingress (mean 150.39 Mbit/s)   —— Flow 1 egress (mean 150.34 Mbit/s)
- - - - Flow 2 ingress (mean 140.29 Mbit/s)   —— Flow 2 egress (mean 140.08 Mbit/s)
- - - - Flow 3 ingress (mean 107.78 Mbit/s)   —— Flow 3 egress (mean 106.91 Mbit/s)

• Flow 1 (95th percentile 135.58 ms)　　• Flow 2 (95th percentile 135.93 ms)　　• Flow 3 (95th percentile 136.25 ms)

Run 8: Statistics of Indigo

Start at: 2017-09-19 05:19:20
End at: 2017-09-19 05:19:50

Run 8: Report of Indigo — Data Link

```
Run 9: Statistics of Indigo

Start at: 2017-09-19 05:29:56
End at: 2017-09-19 05:30:26


# Below is generated by plot.py at 2017-09-19 07:51:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 248.96 Mbit/s
95th percentile per-packet one-way delay: 163.850 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 139.13 Mbit/s
95th percentile per-packet one-way delay: 162.982 ms
Loss rate: 1.12%
-- Flow 2:
Average throughput: 117.78 Mbit/s
95th percentile per-packet one-way delay: 165.453 ms
Loss rate: 1.83%
-- Flow 3:
Average throughput: 102.00 Mbit/s
95th percentile per-packet one-way delay: 164.699 ms
Loss rate: 4.12%
```
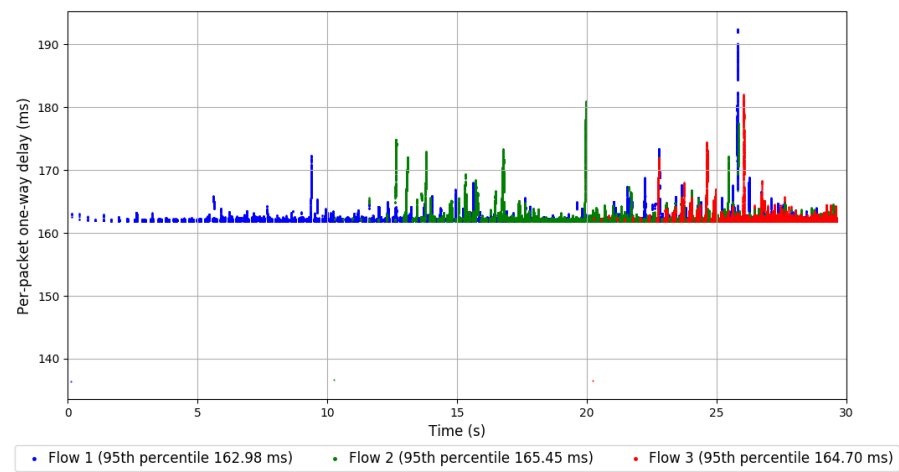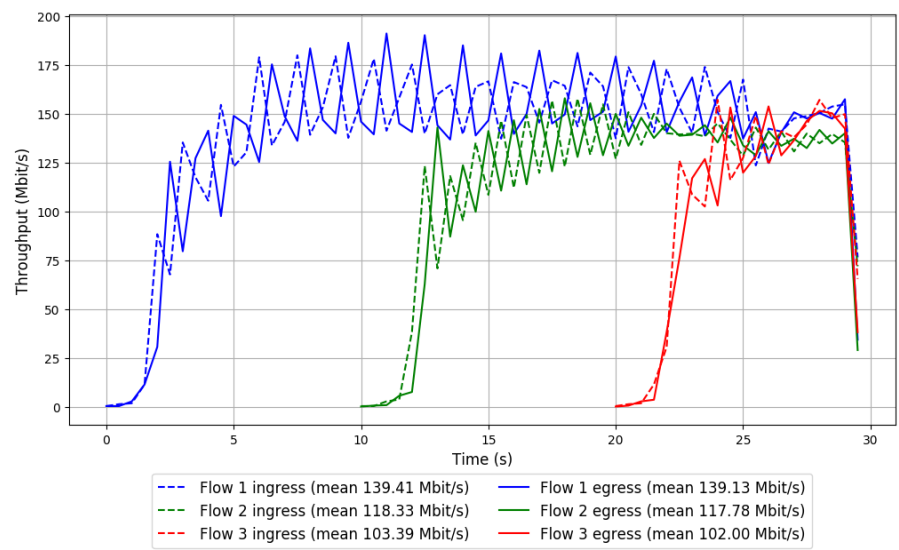
Run 9: Report of Indigo — Data Link

```
Run 10: Statistics of Indigo

Start at: 2017-09-19 05:39:38
End at: 2017-09-19 05:40:08

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 248.72 Mbit/s
95th percentile per-packet one-way delay: 165.318 ms
Loss rate: 1.53%
-- Flow 1:
Average throughput: 131.24 Mbit/s
95th percentile per-packet one-way delay: 165.296 ms
Loss rate: 1.09%
-- Flow 2:
Average throughput: 127.52 Mbit/s
95th percentile per-packet one-way delay: 165.079 ms
Loss rate: 1.07%
-- Flow 3:
Average throughput: 104.05 Mbit/s
95th percentile per-packet one-way delay: 166.755 ms
Loss rate: 4.30%
```
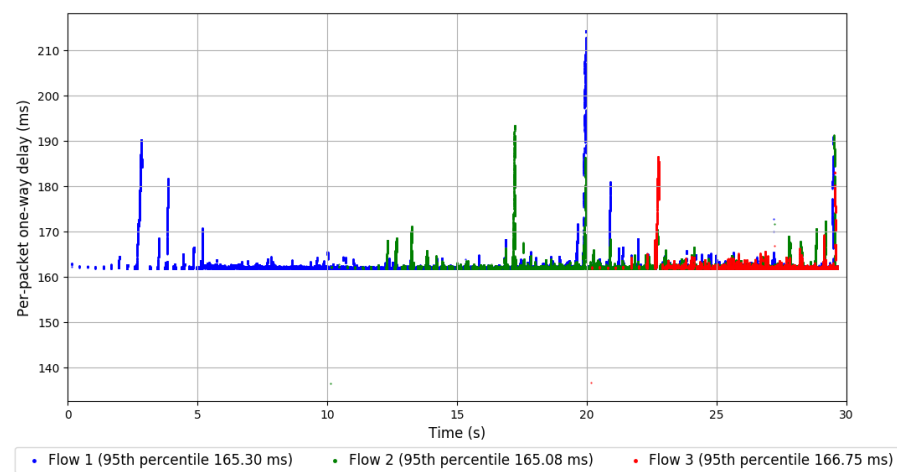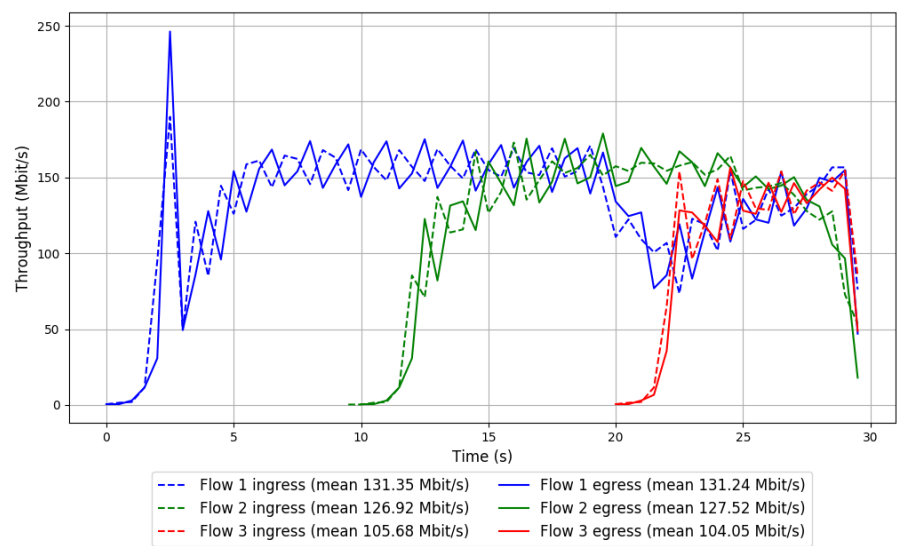
Run 10: Report of Indigo — Data Link

Flow 1 ingress (mean 131.35 Mbit/s) --- Flow 1 egress (mean 131.24 Mbit/s)
Flow 2 ingress (mean 126.92 Mbit/s) --- Flow 2 egress (mean 127.52 Mbit/s)
Flow 3 ingress (mean 105.68 Mbit/s) --- Flow 3 egress (mean 104.05 Mbit/s)

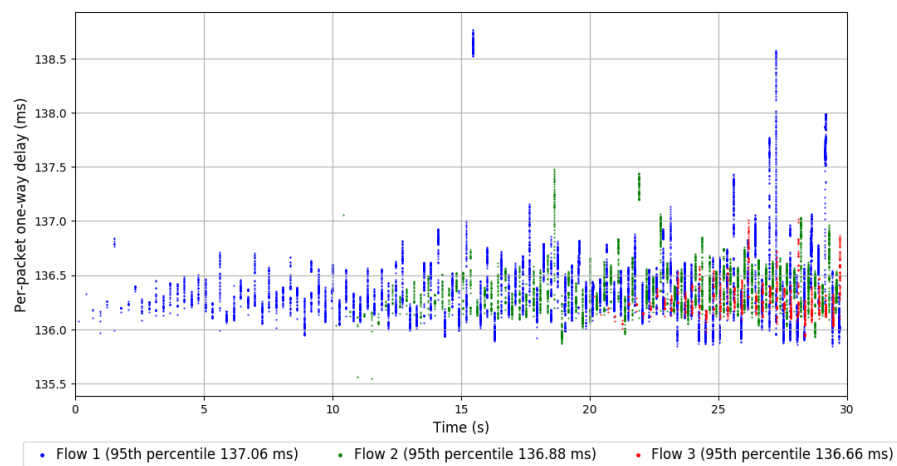Flow 1 (95th percentile 165.30 ms) Flow 2 (95th percentile 165.08 ms) Flow 3 (95th percentile 166.75 ms)
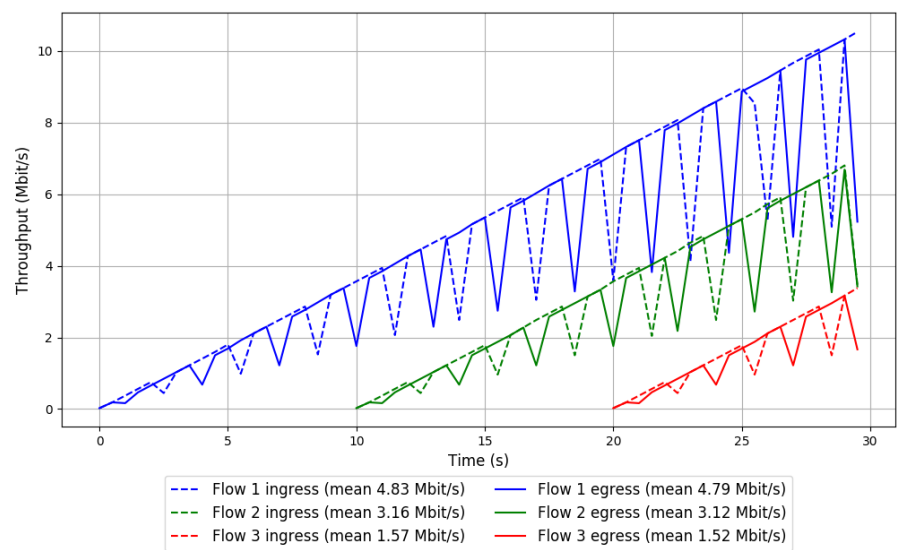
```
Run 1: Statistics of LEDBAT

Start at: 2017-09-19 04:04:56
End at: 2017-09-19 04:05:26

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.32 Mbit/s
95th percentile per-packet one-way delay: 136.954 ms
Loss rate: 2.36%
-- Flow 1:
Average throughput: 4.79 Mbit/s
95th percentile per-packet one-way delay: 137.062 ms
Loss rate: 1.84%
-- Flow 2:
Average throughput: 3.12 Mbit/s
95th percentile per-packet one-way delay: 136.878 ms
Loss rate: 2.79%
-- Flow 3:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 136.661 ms
Loss rate: 5.56%
```

Run 1: Report of LEDBAT — Data Link

- - - Flow 1 ingress (mean 4.83 Mbit/s) ——— Flow 1 egress (mean 4.79 Mbit/s)
- - - Flow 2 ingress (mean 3.16 Mbit/s) ——— Flow 2 egress (mean 3.12 Mbit/s)
- - - Flow 3 ingress (mean 1.57 Mbit/s) ——— Flow 3 egress (mean 1.52 Mbit/s)

• Flow 1 (95th percentile 137.06 ms)   • Flow 2 (95th percentile 136.88 ms)   • Flow 3 (95th percentile 136.66 ms)
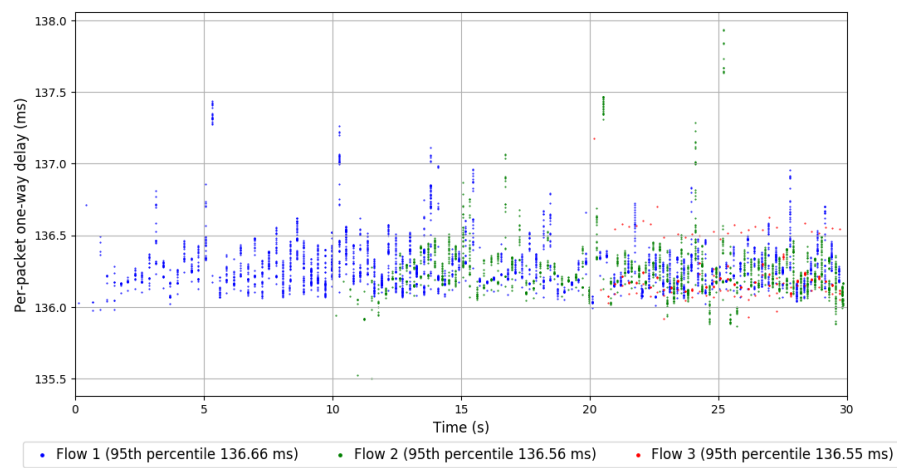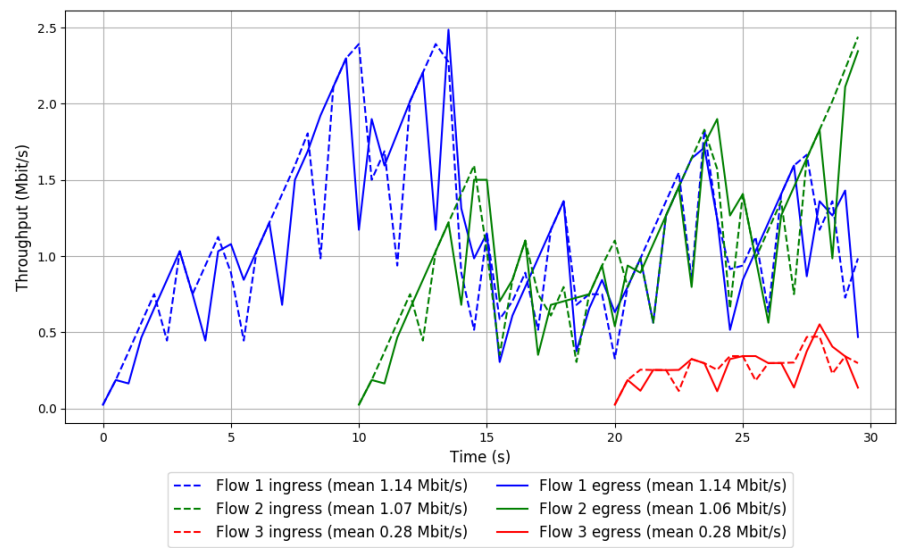
```
Run 2: Statistics of LEDBAT

Start at: 2017-09-19 04:15:40
End at: 2017-09-19 04:16:10

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.92 Mbit/s
95th percentile per-packet one-way delay: 136.623 ms
Loss rate: 1.89%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 136.658 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 136.564 ms
Loss rate: 2.91%
-- Flow 3:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 136.554 ms
Loss rate: 2.91%
```

Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2017-09-19 04:26:25
End at: 2017-09-19 04:26:55

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.67 Mbit/s
95th percentile per-packet one-way delay: 136.689 ms
Loss rate: 2.52%
-- Flow 1:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 136.727 ms
Loss rate: 1.94%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 136.465 ms
Loss rate: 0.86%
-- Flow 3:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 136.653 ms
Loss rate: 5.84%
```
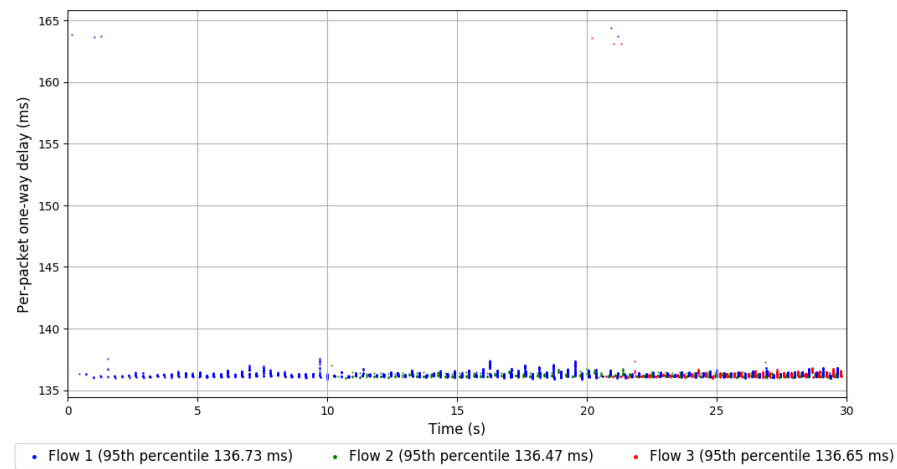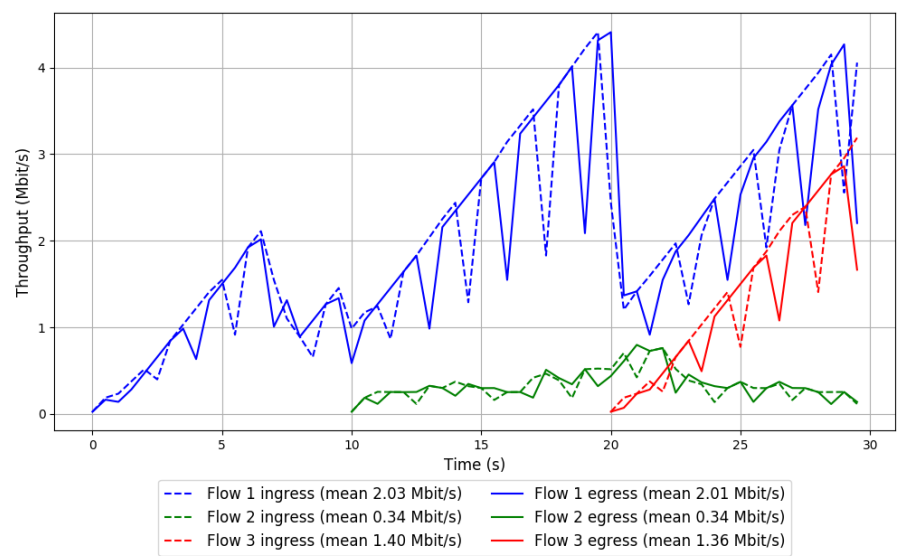
Run 3: Report of LEDBAT — Data Link

```
Run 4: Statistics of LEDBAT

Start at: 2017-09-19 04:35:53
End at: 2017-09-19 04:36:23

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.92 Mbit/s
95th percentile per-packet one-way delay: 163.344 ms
Loss rate: 2.38%
-- Flow 1:
Average throughput: 3.03 Mbit/s
95th percentile per-packet one-way delay: 163.359 ms
Loss rate: 1.98%
-- Flow 2:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 163.277 ms
Loss rate: 3.61%
-- Flow 3:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 163.251 ms
Loss rate: 4.26%
```
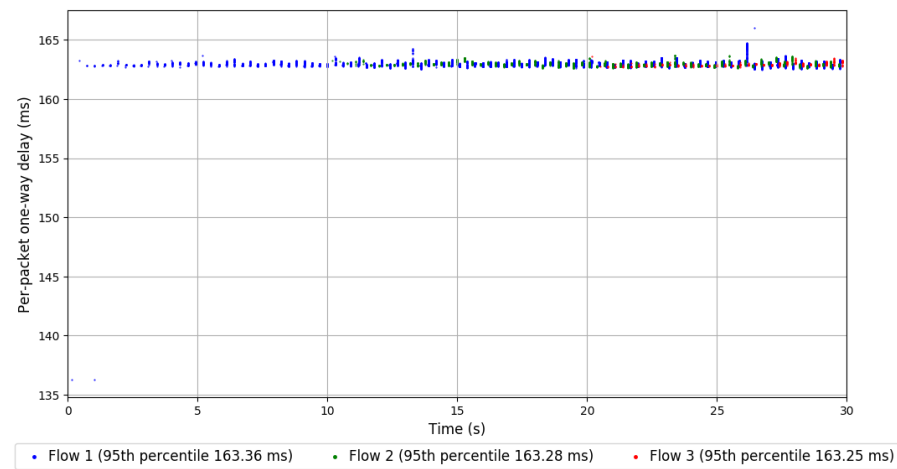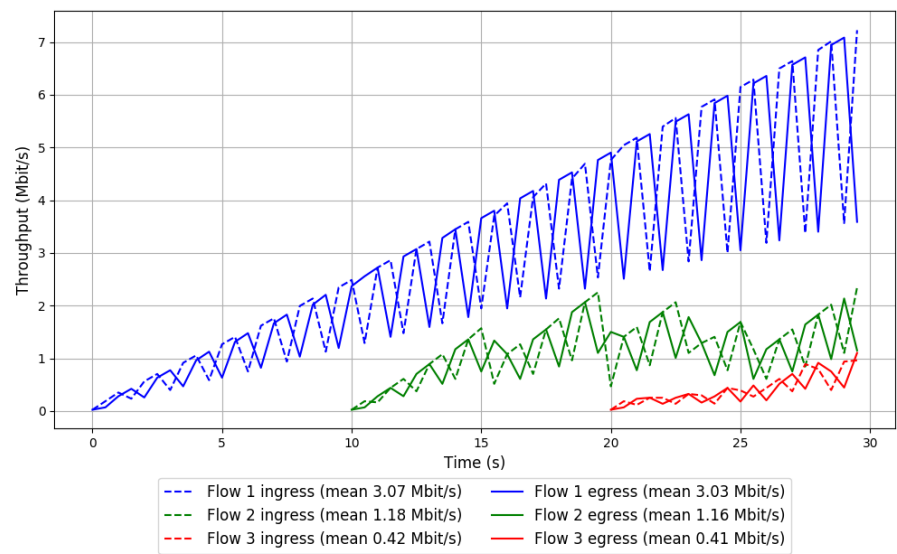
Run 4: Report of LEDBAT — Data Link

```
Run 5: Statistics of LEDBAT

Start at: 2017-09-19 04:46:24
End at: 2017-09-19 04:46:54

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.63 Mbit/s
95th percentile per-packet one-way delay: 163.199 ms
Loss rate: 2.56%
-- Flow 1:
Average throughput: 3.02 Mbit/s
95th percentile per-packet one-way delay: 163.150 ms
Loss rate: 2.00%
-- Flow 2:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 163.301 ms
Loss rate: 2.99%
-- Flow 3:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 163.160 ms
Loss rate: 5.88%
```
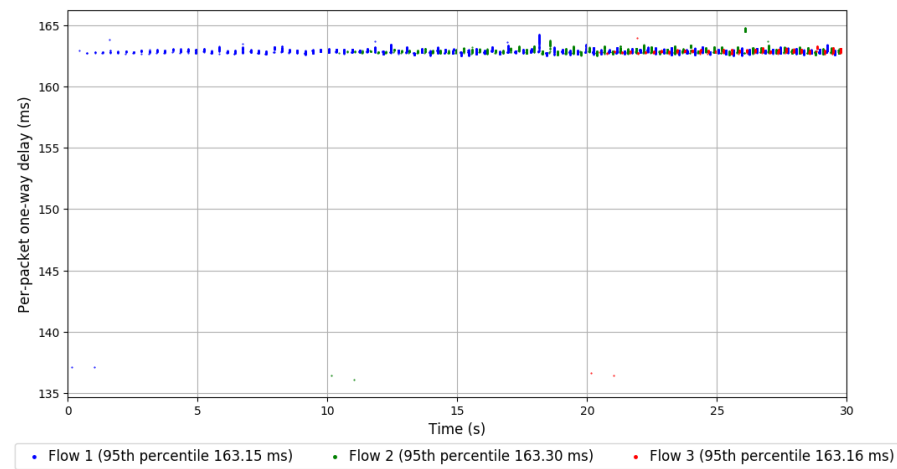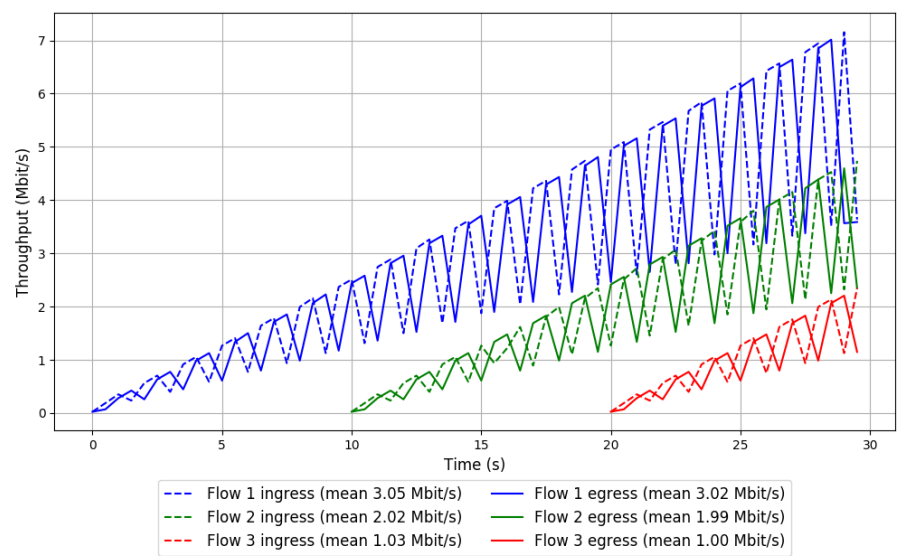
Run 5: Report of LEDBAT — Data Link

```
Run 6: Statistics of LEDBAT

Start at: 2017-09-19 04:55:59
End at: 2017-09-19 04:56:29

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.61 Mbit/s
95th percentile per-packet one-way delay: 163.784 ms
Loss rate: 2.57%
-- Flow 1:
Average throughput: 2.98 Mbit/s
95th percentile per-packet one-way delay: 163.955 ms
Loss rate: 2.00%
-- Flow 2:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 163.642 ms
Loss rate: 2.99%
-- Flow 3:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 163.477 ms
Loss rate: 5.84%
```
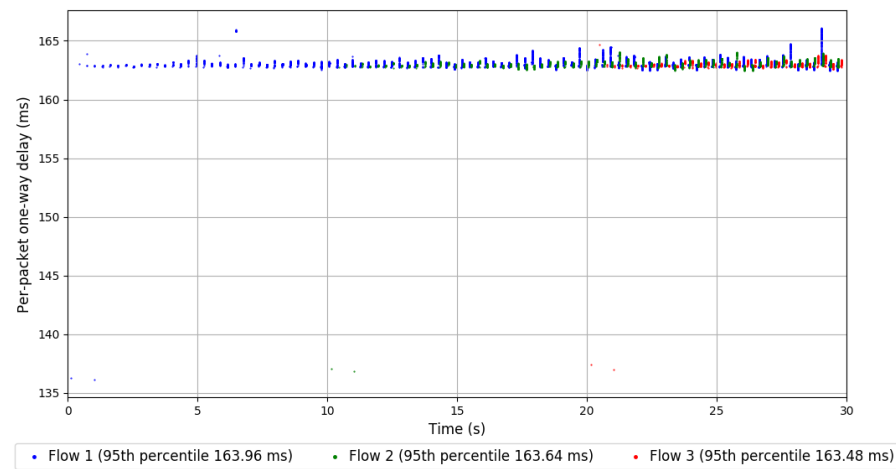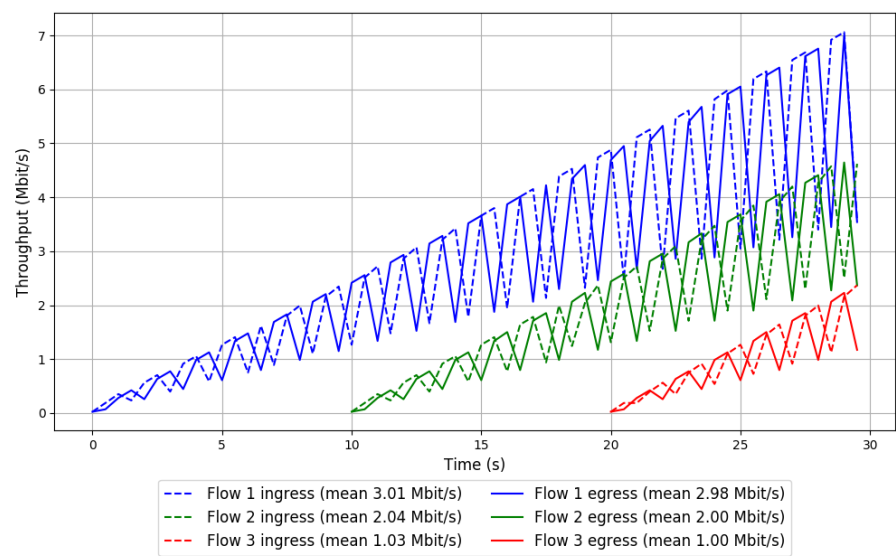
Run 6: Report of LEDBAT — Data Link

```
Run 7: Statistics of LEDBAT

Start at: 2017-09-19 05:06:04
End at: 2017-09-19 05:06:34

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.81 Mbit/s
95th percentile per-packet one-way delay: 136.038 ms
Loss rate: 2.07%
-- Flow 1:
Average throughput: 3.79 Mbit/s
95th percentile per-packet one-way delay: 136.052 ms
Loss rate: 1.31%
-- Flow 2:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 136.038 ms
Loss rate: 2.96%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 135.523 ms
Loss rate: 7.69%
```
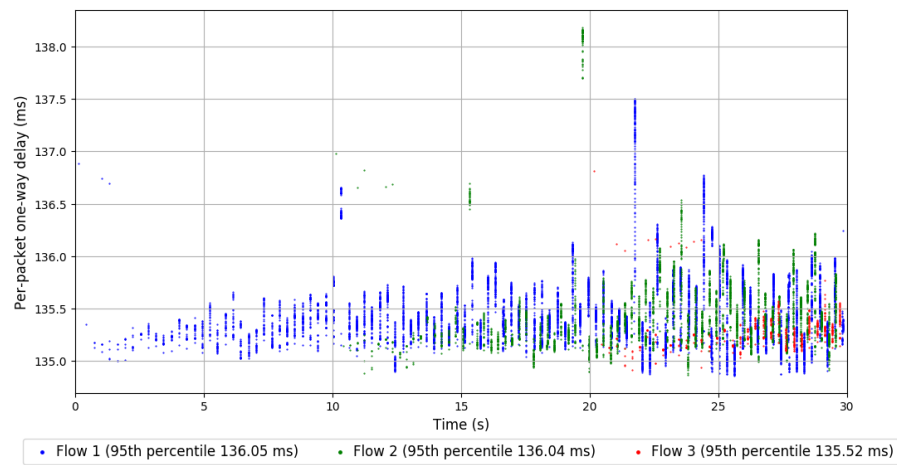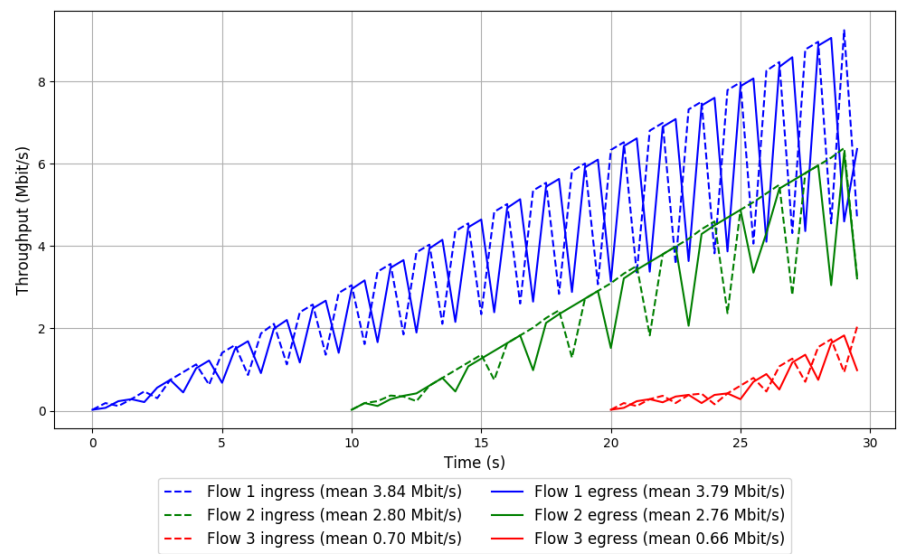
Run 7: Report of LEDBAT — Data Link

```
Run 8: Statistics of LEDBAT

Start at: 2017-09-19 05:16:34
End at: 2017-09-19 05:17:04

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.02 Mbit/s
95th percentile per-packet one-way delay: 135.774 ms
Loss rate: 2.33%
-- Flow 1:
Average throughput: 1.65 Mbit/s
95th percentile per-packet one-way delay: 135.673 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 135.767 ms
Loss rate: 2.69%
-- Flow 3:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 135.930 ms
Loss rate: 6.07%
```

Run 8: Report of LEDBAT — Data Link

```
Run 9: Statistics of LEDBAT

Start at: 2017-09-19 05:27:02
End at: 2017-09-19 05:27:32

# Below is generated by plot.py at 2017-09-19 07:51:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.10 Mbit/s
95th percentile per-packet one-way delay: 135.858 ms
Loss rate: 2.78%
-- Flow 1:
Average throughput: 3.47 Mbit/s
95th percentile per-packet one-way delay: 135.896 ms
Loss rate: 2.14%
-- Flow 2:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 135.704 ms
Loss rate: 3.51%
-- Flow 3:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 135.715 ms
Loss rate: 6.16%
```
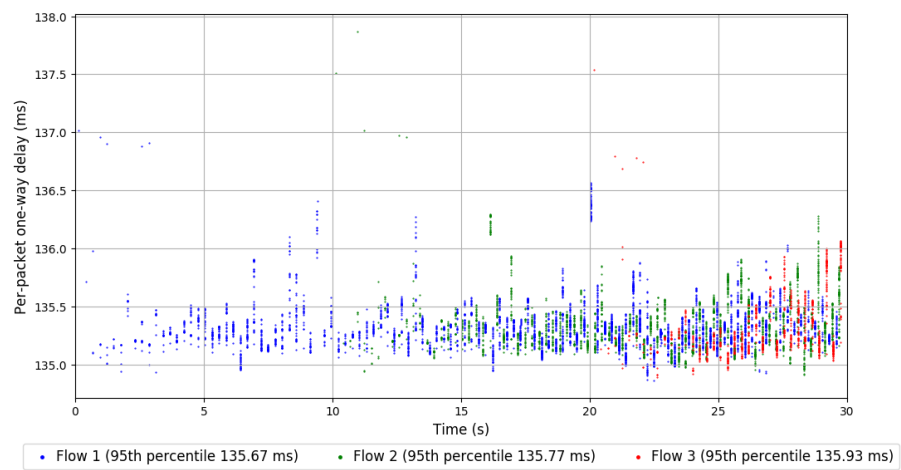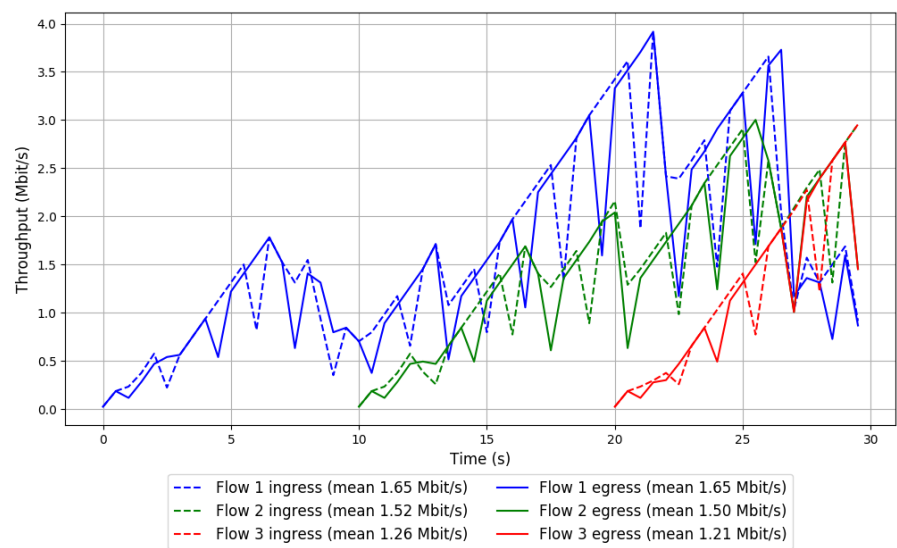
Run 9: Report of LEDBAT — Data Link

Run 10: Statistics of LEDBAT

Start at: 2017-09-19 05:36:45
End at: 2017-09-19 05:37:15

Run 10: Report of LEDBAT — Data Link

Flow 1 ingress (mean 1.23 Mbit/s)   Flow 1 egress (mean 1.20 Mbit/s)
Flow 2 ingress (mean 1.40 Mbit/s)   Flow 2 egress (mean 1.37 Mbit/s)
Flow 3 ingress (mean 0.88 Mbit/s)   Flow 3 egress (mean 0.85 Mbit/s)

Flow 1 (95th percentile 162.53 ms)   Flow 2 (95th percentile 162.53 ms)   Flow 3 (95th percentile 162.43 ms)

83

```
Run 1: Statistics of PCC

Start at: 2017-09-19 03:59:32
End at: 2017-09-19 04:00:02

# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 607.46 Mbit/s
95th percentile per-packet one-way delay: 250.594 ms
Loss rate: 5.99%
-- Flow 1:
Average throughput: 425.95 Mbit/s
95th percentile per-packet one-way delay: 254.340 ms
Loss rate: 5.42%
-- Flow 2:
Average throughput: 244.49 Mbit/s
95th percentile per-packet one-way delay: 241.252 ms
Loss rate: 7.22%
-- Flow 3:
Average throughput: 61.36 Mbit/s
95th percentile per-packet one-way delay: 245.331 ms
Loss rate: 7.97%
```
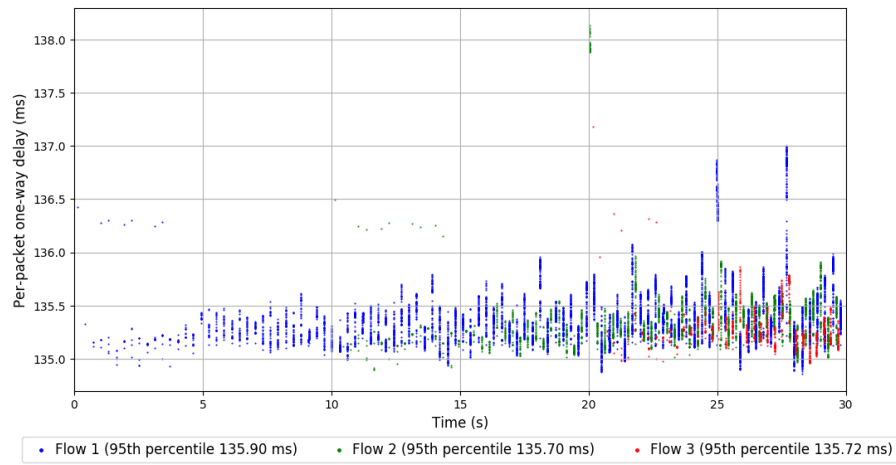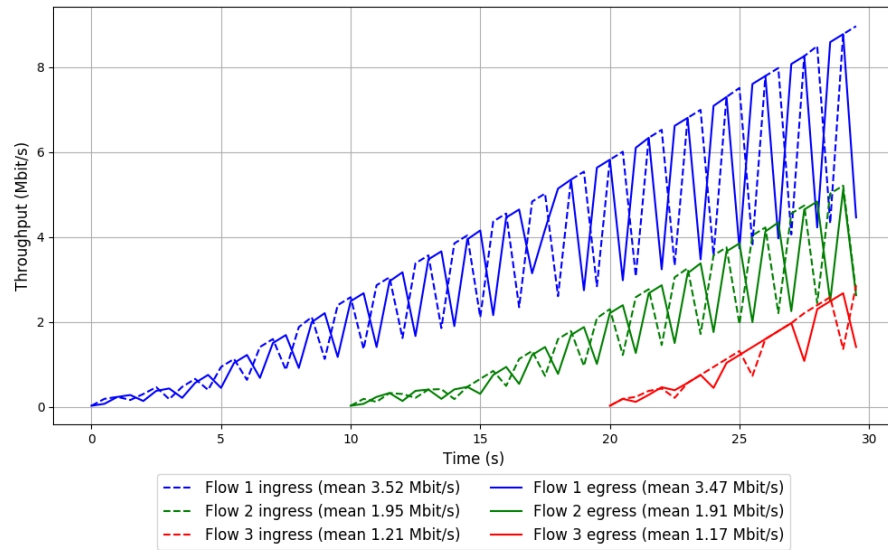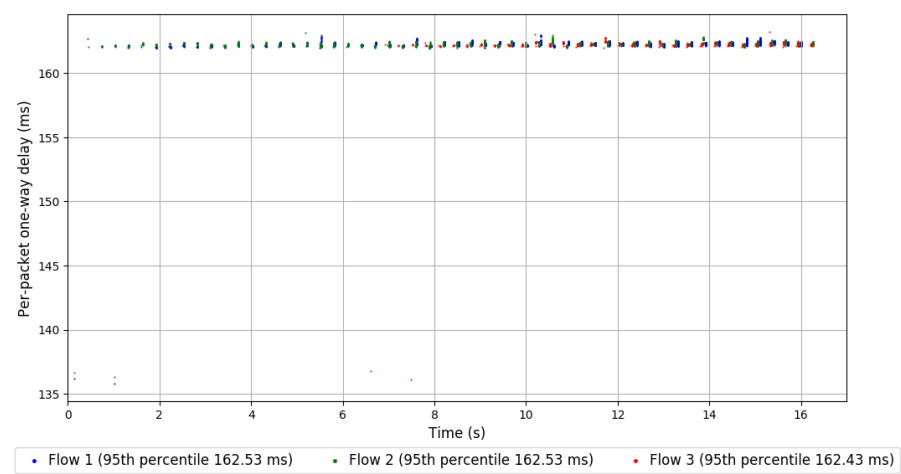
Run 1: Report of PCC — Data Link

```
Run 2: Statistics of PCC

Start at: 2017-09-19 04:10:06
End at: 2017-09-19 04:10:36


# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 578.31 Mbit/s
95th percentile per-packet one-way delay: 241.730 ms
Loss rate: 4.86%
-- Flow 1:
Average throughput: 384.26 Mbit/s
95th percentile per-packet one-way delay: 242.311 ms
Loss rate: 4.36%
-- Flow 2:
Average throughput: 234.35 Mbit/s
95th percentile per-packet one-way delay: 241.239 ms
Loss rate: 5.89%
-- Flow 3:
Average throughput: 120.15 Mbit/s
95th percentile per-packet one-way delay: 233.240 ms
Loss rate: 5.71%
```
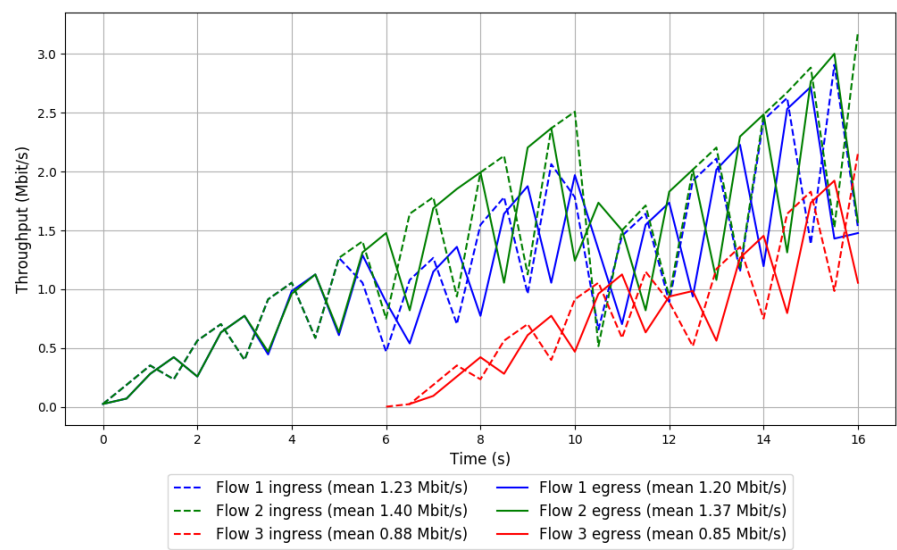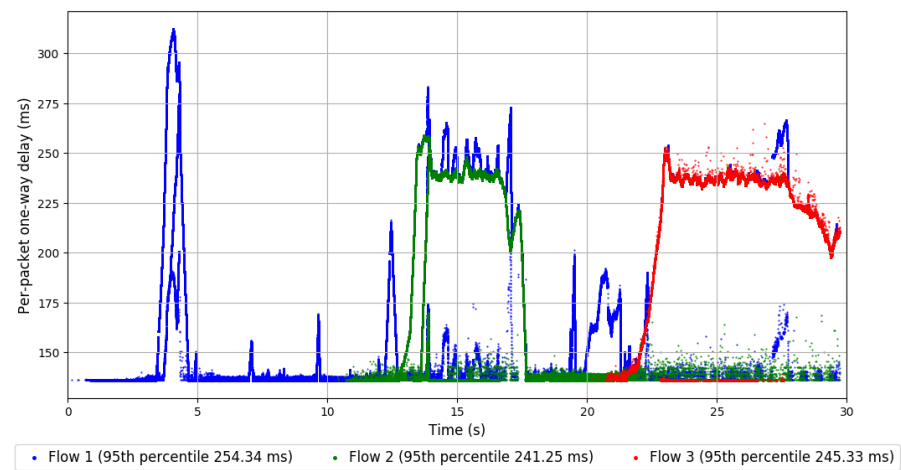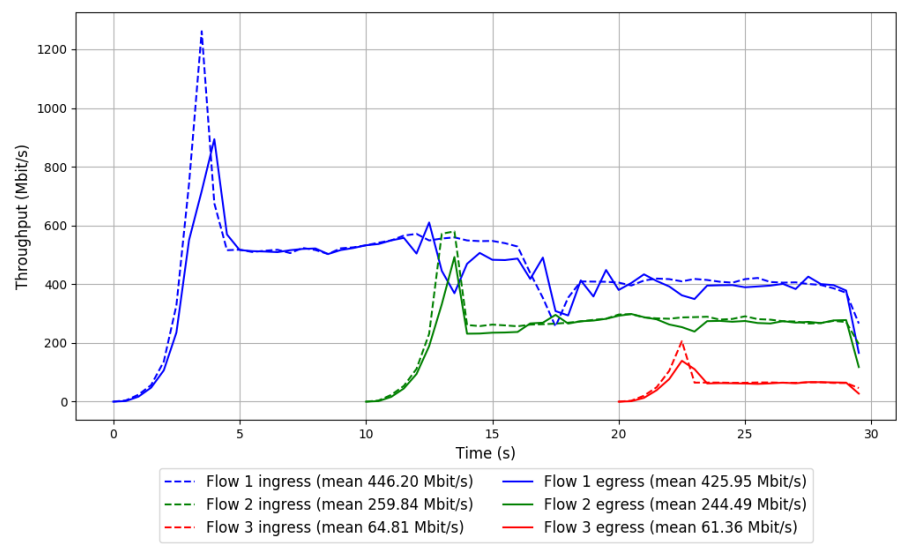
Run 2: Report of PCC — Data Link

```
Run 3: Statistics of PCC

Start at: 2017-09-19 04:20:40
End at: 2017-09-19 04:21:10

# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 571.60 Mbit/s
95th percentile per-packet one-way delay: 274.841 ms
Loss rate: 9.30%
-- Flow 1:
Average throughput: 419.72 Mbit/s
95th percentile per-packet one-way delay: 286.996 ms
Loss rate: 8.79%
-- Flow 2:
Average throughput: 228.68 Mbit/s
95th percentile per-packet one-way delay: 244.796 ms
Loss rate: 10.68%
-- Flow 3:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 247.012 ms
Loss rate: 13.01%
```

Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 455.51 Mbit/s)   Flow 1 egress (mean 419.72 Mbit/s)
Flow 2 ingress (mean 252.16 Mbit/s)   Flow 2 egress (mean 228.68 Mbit/s)
Flow 3 ingress (mean 2.27 Mbit/s)   Flow 3 egress (mean 2.05 Mbit/s)

Flow 1 (95th percentile 287.00 ms)   Flow 2 (95th percentile 244.80 ms)   Flow 3 (95th percentile 247.01 ms)
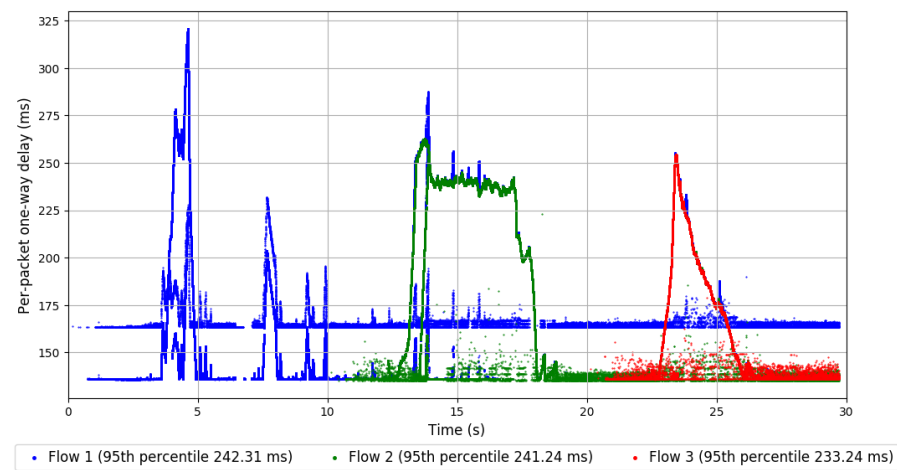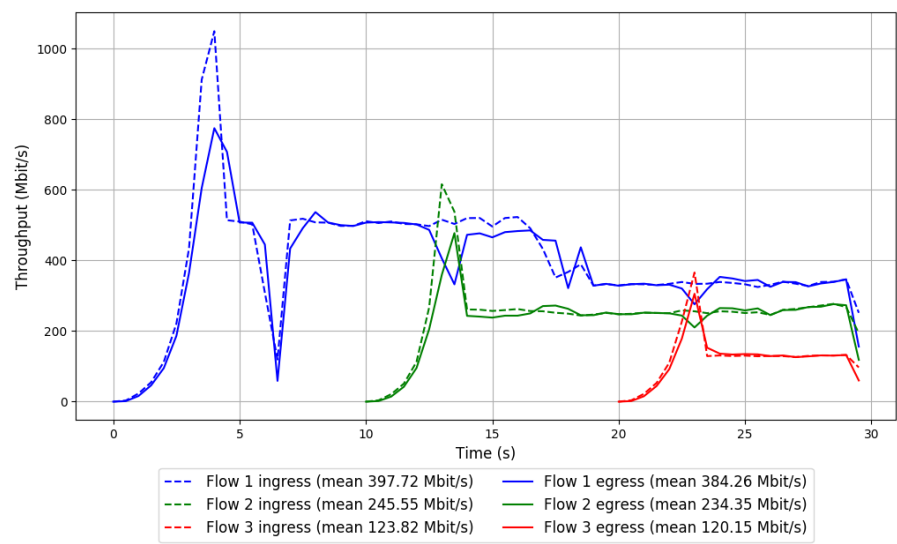
89

```
Run 4: Statistics of PCC

Start at: 2017-09-19 04:31:16
End at: 2017-09-19 04:31:46


# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.17 Mbit/s
95th percentile per-packet one-way delay: 162.729 ms
Loss rate: 1.86%
-- Flow 1:
Average throughput: 5.30 Mbit/s
95th percentile per-packet one-way delay: 162.728 ms
Loss rate: 1.65%
-- Flow 2:
Average throughput: 9.66 Mbit/s
95th percentile per-packet one-way delay: 162.725 ms
Loss rate: 1.73%
-- Flow 3:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 162.745 ms
Loss rate: 3.16%
```

Run 4: Report of PCC — Data Link

```
Run 5: Statistics of PCC

Start at: 2017-09-19 04:40:53
End at: 2017-09-19 04:41:23


# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 373.76 Mbit/s
95th percentile per-packet one-way delay: 221.233 ms
Loss rate: 3.82%
-- Flow 1:
Average throughput: 13.13 Mbit/s
95th percentile per-packet one-way delay: 218.713 ms
Loss rate: 2.23%
-- Flow 2:
Average throughput: 529.45 Mbit/s
95th percentile per-packet one-way delay: 221.453 ms
Loss rate: 3.90%
-- Flow 3:
Average throughput: 33.46 Mbit/s
95th percentile per-packet one-way delay: 219.229 ms
Loss rate: 3.02%
```
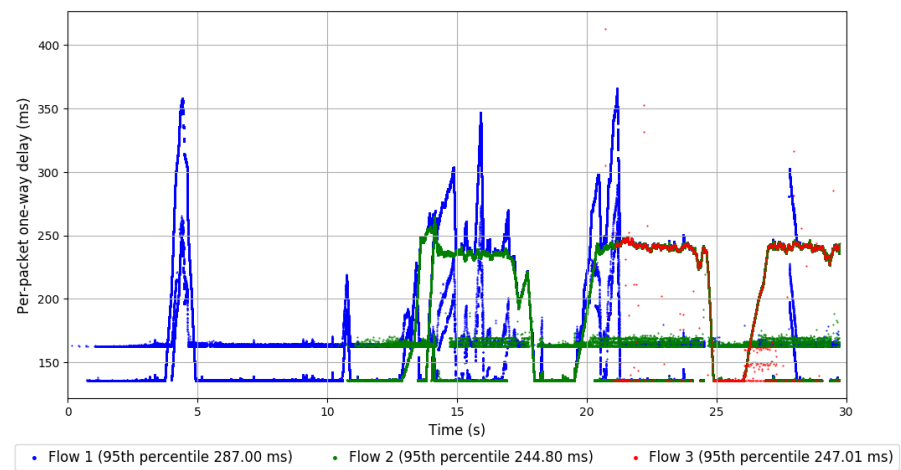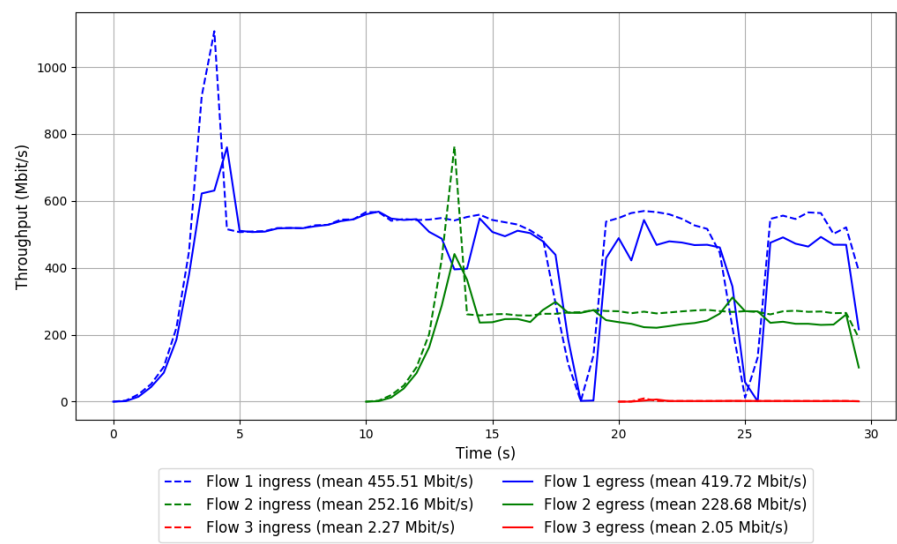
Run 5: Report of PCC — Data Link

- - - Flow 1 ingress (mean 13.31 Mbit/s)   —— Flow 1 egress (mean 13.13 Mbit/s)
- - - Flow 2 ingress (mean 542.58 Mbit/s)   —— Flow 2 egress (mean 529.45 Mbit/s)
- - - Flow 3 ingress (mean 33.54 Mbit/s)   —— Flow 3 egress (mean 33.46 Mbit/s)

- Flow 1 (95th percentile 218.71 ms)   • Flow 2 (95th percentile 221.45 ms)   • Flow 3 (95th percentile 219.23 ms)

```
Run 6: Statistics of PCC

Start at: 2017-09-19 04:51:17
End at: 2017-09-19 04:51:47


# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 137.17 Mbit/s
95th percentile per-packet one-way delay: 277.903 ms
Loss rate: 9.55%
-- Flow 1:
Average throughput: 6.60 Mbit/s
95th percentile per-packet one-way delay: 162.839 ms
Loss rate: 2.20%
-- Flow 2:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 162.891 ms
Loss rate: 2.59%
-- Flow 3:
Average throughput: 395.24 Mbit/s
95th percentile per-packet one-way delay: 279.439 ms
Loss rate: 10.06%
```
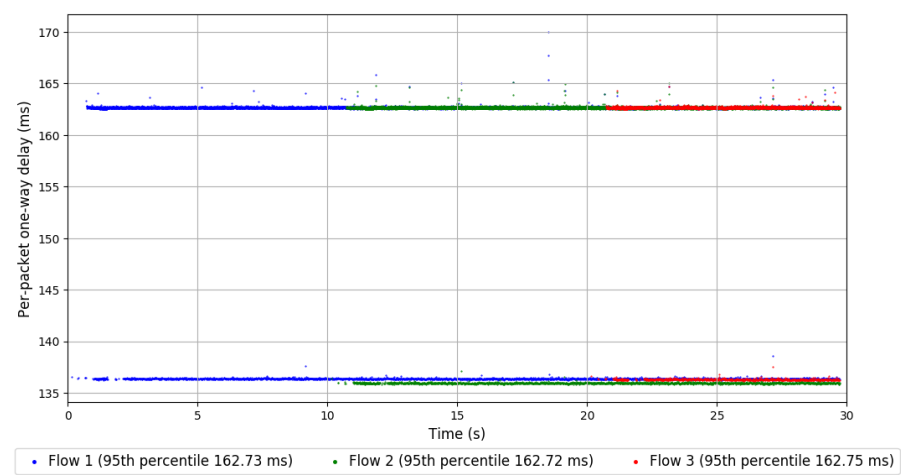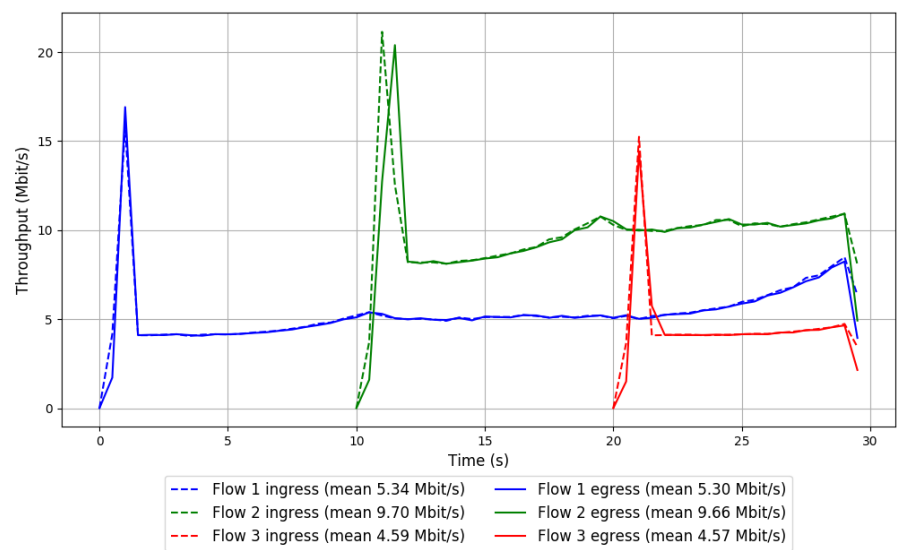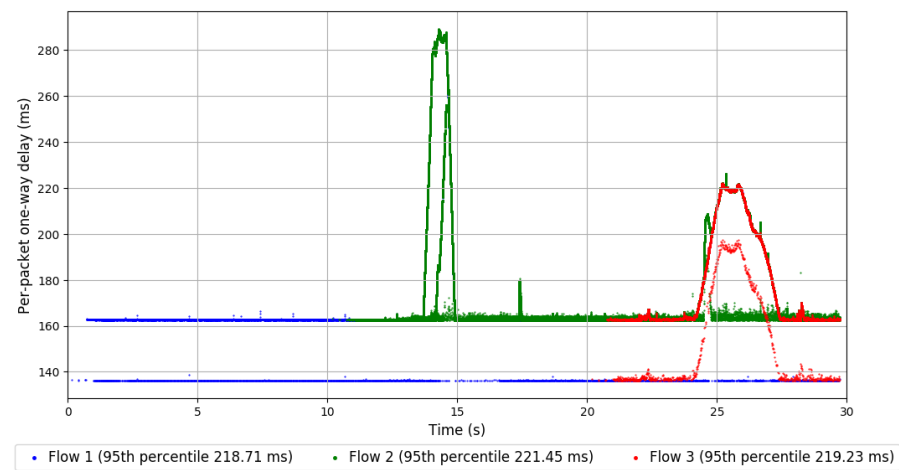
Run 6: Report of PCC — Data Link

- - - - Flow 1 ingress (mean 6.68 Mbit/s) —— Flow 1 egress (mean 6.60 Mbit/s)
- - - - Flow 2 ingress (mean 4.76 Mbit/s) —— Flow 2 egress (mean 4.70 Mbit/s)
- - - - Flow 3 ingress (mean 426.10 Mbit/s) —— Flow 3 egress (mean 395.24 Mbit/s)

- Flow 1 (95th percentile 162.84 ms) • Flow 2 (95th percentile 162.89 ms) • Flow 3 (95th percentile 279.44 ms)

95

```
Run 7: Statistics of PCC

Start at: 2017-09-19 05:00:49
End at: 2017-09-19 05:01:19


# Below is generated by plot.py at 2017-09-19 07:59:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 559.68 Mbit/s
95th percentile per-packet one-way delay: 321.577 ms
Loss rate: 4.00%
-- Flow 1:
Average throughput: 454.81 Mbit/s
95th percentile per-packet one-way delay: 332.351 ms
Loss rate: 4.30%
-- Flow 2:
Average throughput: 127.82 Mbit/s
95th percentile per-packet one-way delay: 238.354 ms
Loss rate: 2.54%
-- Flow 3:
Average throughput: 62.92 Mbit/s
95th percentile per-packet one-way delay: 238.550 ms
Loss rate: 3.30%
```
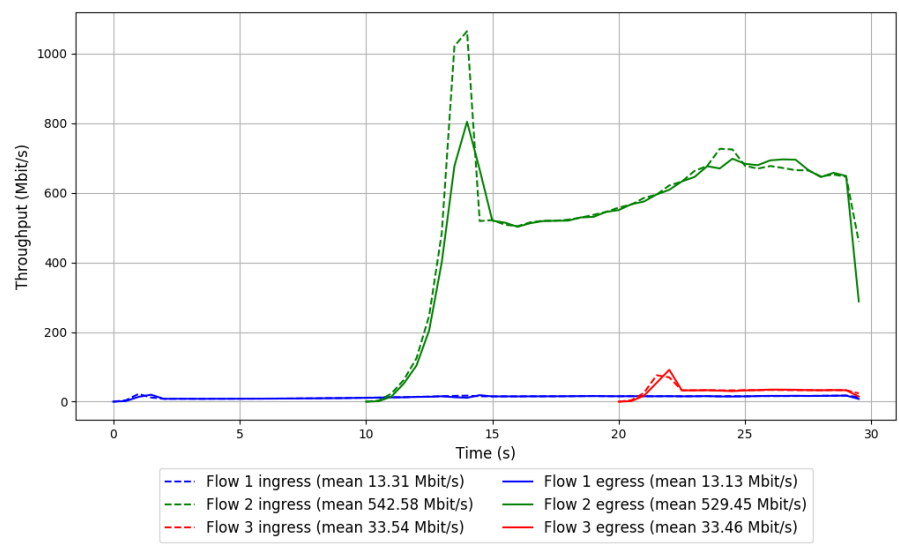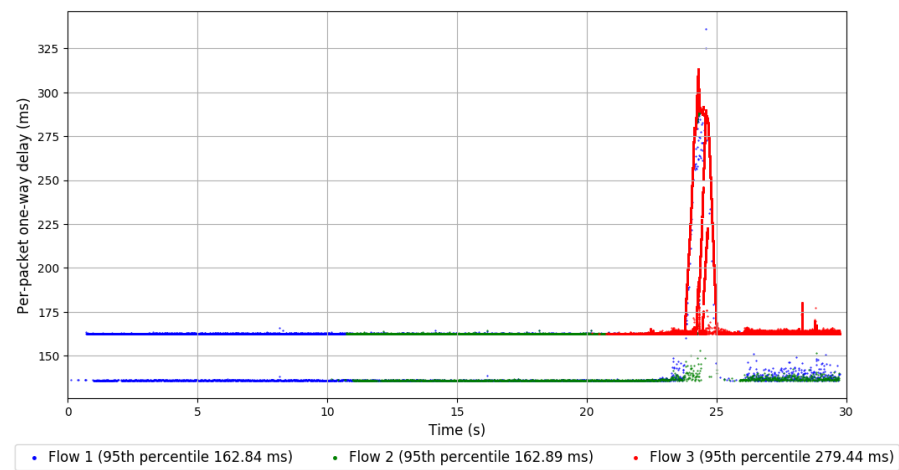
Run 7: Report of PCC — Data Link

```
Run 8: Statistics of PCC

Start at: 2017-09-19 05:10:55
End at: 2017-09-19 05:11:25


# Below is generated by plot.py at 2017-09-19 08:02:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 593.77 Mbit/s
95th percentile per-packet one-way delay: 330.656 ms
Loss rate: 5.87%
-- Flow 1:
Average throughput: 496.96 Mbit/s
95th percentile per-packet one-way delay: 333.382 ms
Loss rate: 6.37%
-- Flow 2:
Average throughput: 130.14 Mbit/s
95th percentile per-packet one-way delay: 237.083 ms
Loss rate: 3.15%
-- Flow 3:
Average throughput: 33.15 Mbit/s
95th percentile per-packet one-way delay: 237.960 ms
Loss rate: 3.89%
```
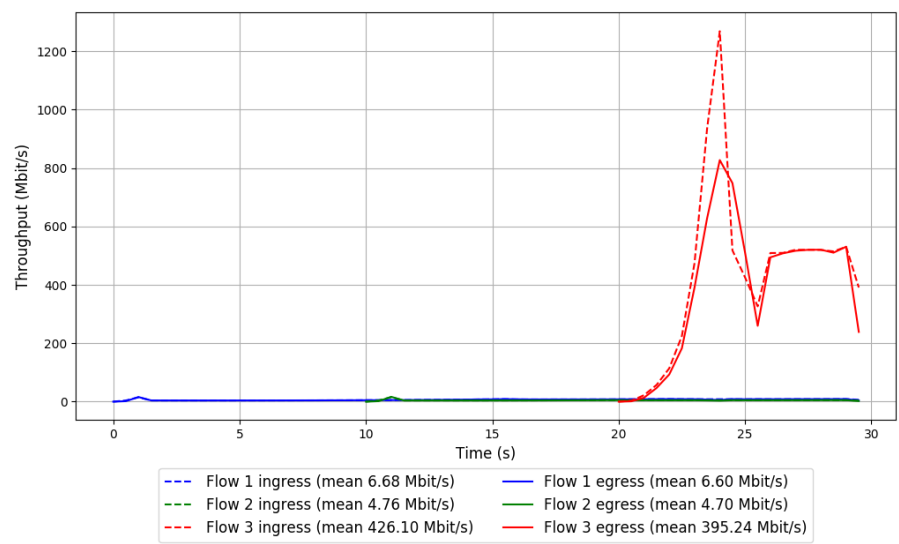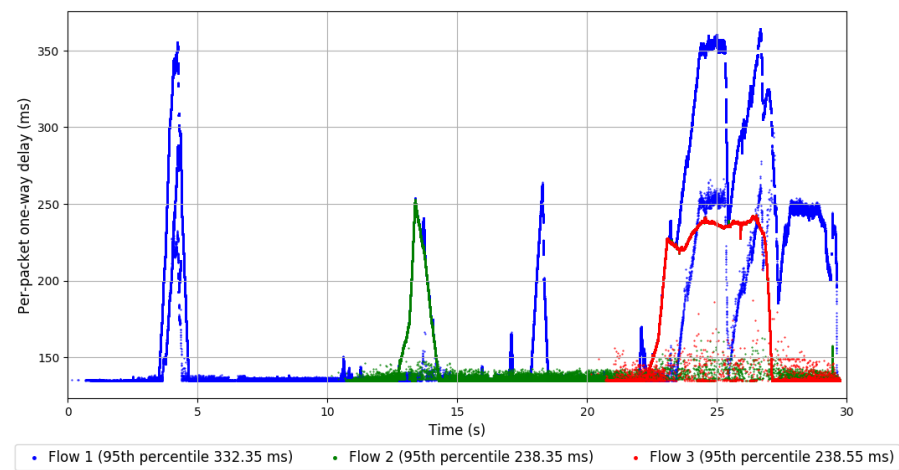
Run 8: Report of PCC — Data Link

Flow 1 ingress (mean 525.92 Mbit/s)   Flow 1 egress (mean 496.96 Mbit/s)
Flow 2 ingress (mean 132.51 Mbit/s)   Flow 2 egress (mean 130.14 Mbit/s)
Flow 3 ingress (mean 33.53 Mbit/s)   Flow 3 egress (mean 33.15 Mbit/s)

Flow 1 (95th percentile 333.38 ms)   Flow 2 (95th percentile 237.08 ms)   Flow 3 (95th percentile 237.96 ms)

```
Run 9: Statistics of PCC

Start at: 2017-09-19 05:21:27
End at: 2017-09-19 05:21:57


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 596.12 Mbit/s
95th percentile per-packet one-way delay: 240.912 ms
Loss rate: 3.57%
-- Flow 1:
Average throughput: 492.85 Mbit/s
95th percentile per-packet one-way delay: 243.452 ms
Loss rate: 3.70%
-- Flow 2:
Average throughput: 140.09 Mbit/s
95th percentile per-packet one-way delay: 236.227 ms
Loss rate: 2.90%
-- Flow 3:
Average throughput: 33.13 Mbit/s
95th percentile per-packet one-way delay: 236.310 ms
Loss rate: 3.46%
```
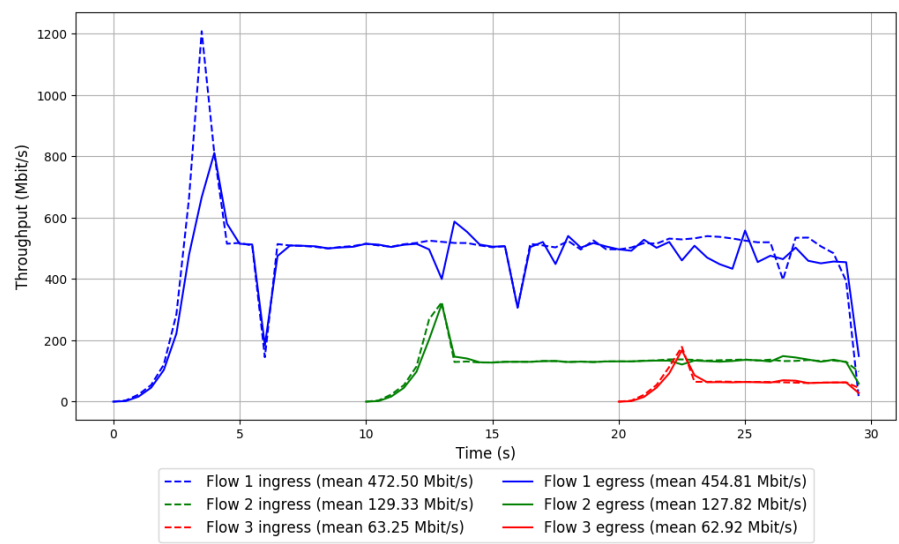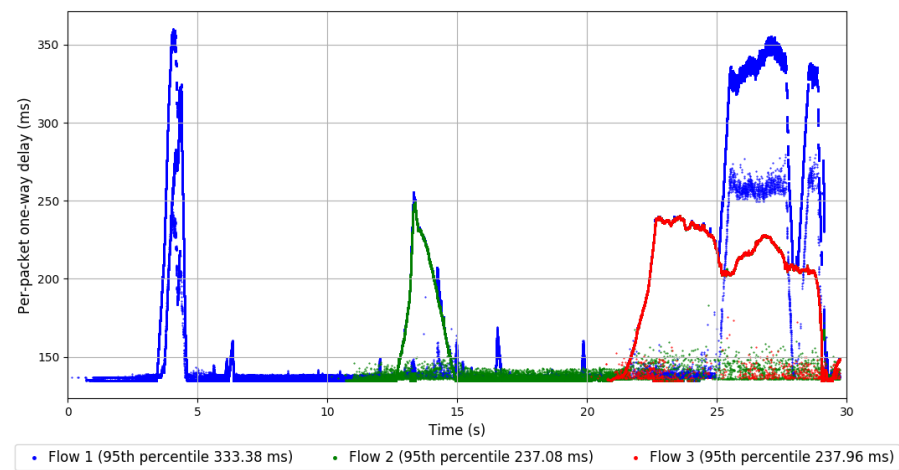
Run 9: Report of PCC — Data Link

```
Run 10: Statistics of PCC

Start at: 2017-09-19 05:31:58
End at: 2017-09-19 05:32:28

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 355.41 Mbit/s
95th percentile per-packet one-way delay: 230.831 ms
Loss rate: 2.59%
-- Flow 1:
Average throughput: 343.83 Mbit/s
95th percentile per-packet one-way delay: 233.232 ms
Loss rate: 2.60%
-- Flow 2:
Average throughput: 9.15 Mbit/s
95th percentile per-packet one-way delay: 162.121 ms
Loss rate: 1.76%
-- Flow 3:
Average throughput: 17.08 Mbit/s
95th percentile per-packet one-way delay: 162.189 ms
Loss rate: 2.99%
```
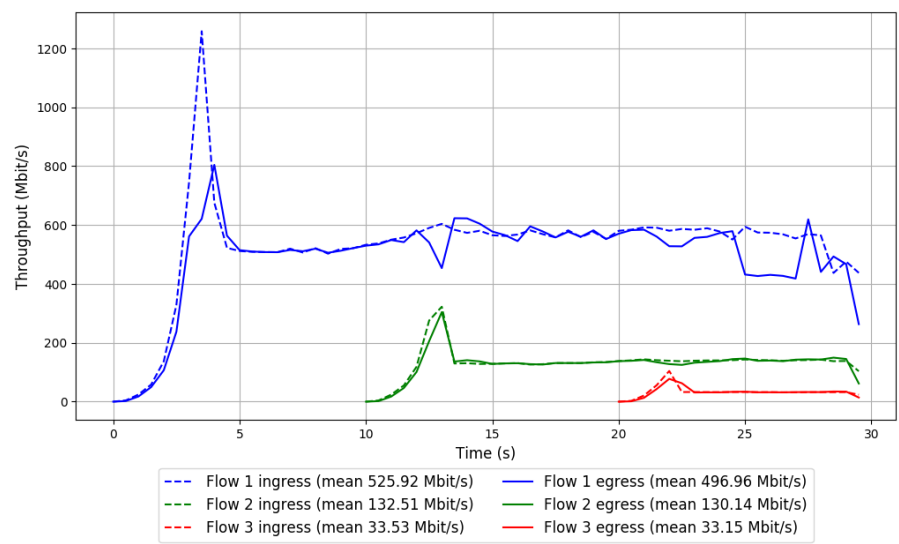
Run 10: Report of PCC — Data Link

Flow 1 ingress (mean 349.48 Mbit/s) ---- Flow 1 egress (mean 343.83 Mbit/s) ——
Flow 2 ingress (mean 9.19 Mbit/s) ---- Flow 2 egress (mean 9.15 Mbit/s) ——
Flow 3 ingress (mean 17.12 Mbit/s) ---- Flow 3 egress (mean 17.08 Mbit/s) ——

Flow 1 (95th percentile 233.23 ms)   • Flow 2 (95th percentile 162.12 ms)   • Flow 3 (95th percentile 162.19 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2017-09-19 04:03:58
End at: 2017-09-19 04:04:28


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 107.82 Mbit/s
95th percentile per-packet one-way delay: 136.245 ms
Loss rate: 1.15%
-- Flow 1:
Average throughput: 58.84 Mbit/s
95th percentile per-packet one-way delay: 136.247 ms
Loss rate: 1.08%
-- Flow 2:
Average throughput: 57.41 Mbit/s
95th percentile per-packet one-way delay: 136.261 ms
Loss rate: 1.56%
-- Flow 3:
Average throughput: 34.45 Mbit/s
95th percentile per-packet one-way delay: 135.584 ms
Loss rate: 0.04%
```
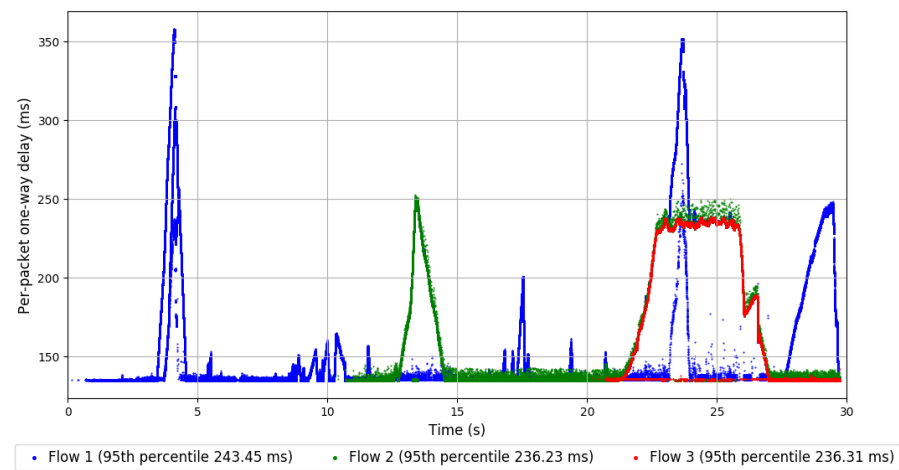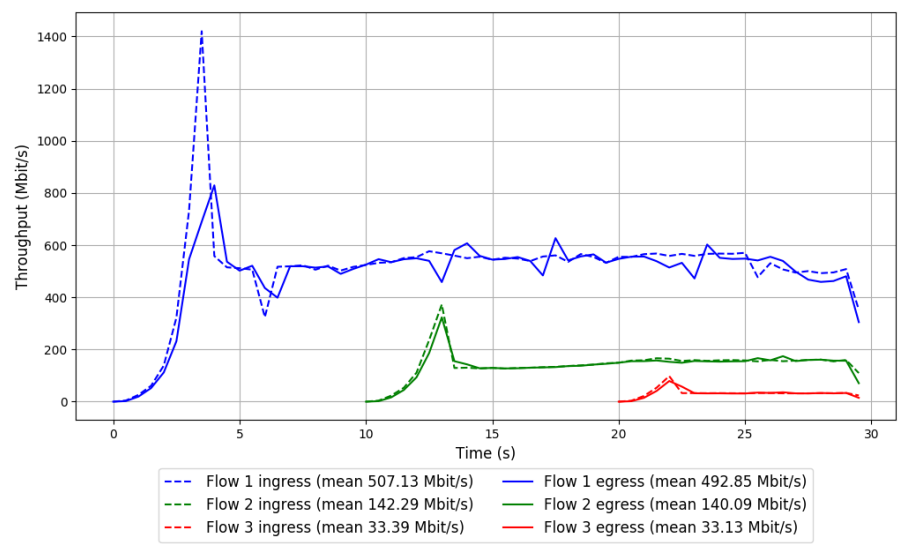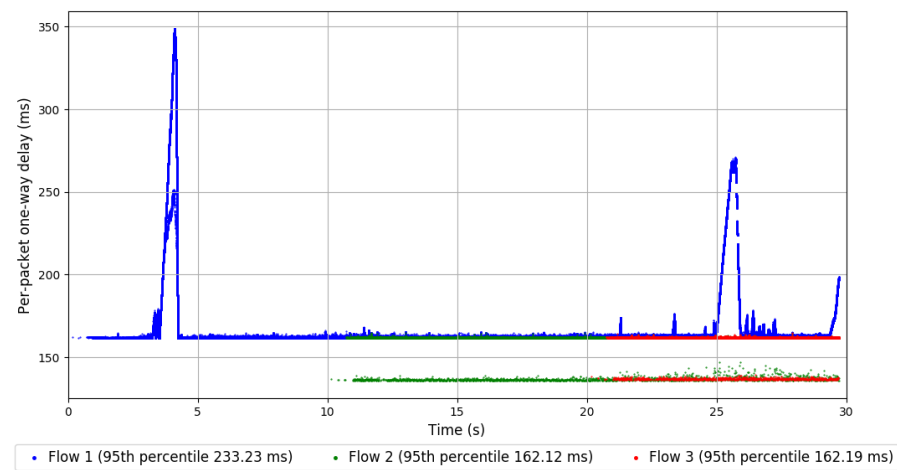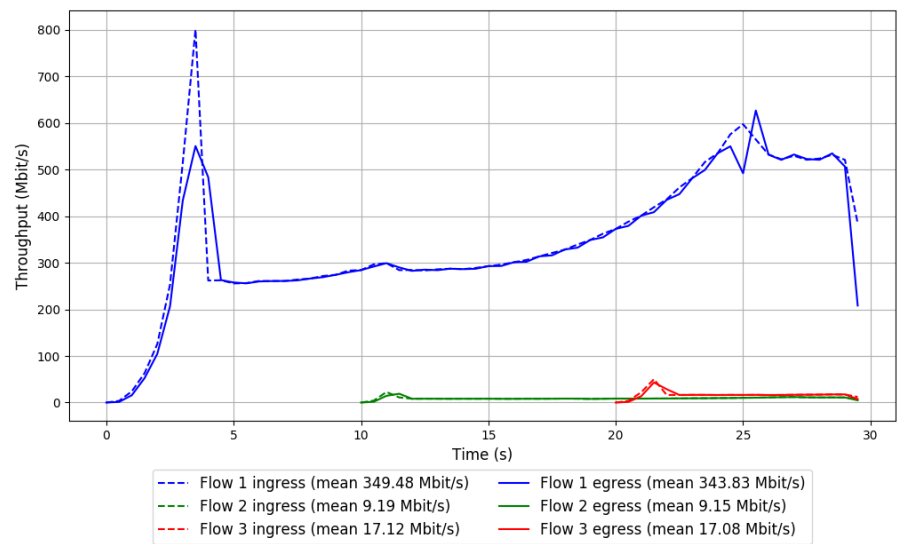
Run 1: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 58.94 Mbit/s) --- Flow 1 egress (mean 58.84 Mbit/s)
Flow 2 ingress (mean 57.51 Mbit/s) --- Flow 2 egress (mean 57.41 Mbit/s)
Flow 3 ingress (mean 33.33 Mbit/s) --- Flow 3 egress (mean 34.45 Mbit/s)

Flow 1 (95th percentile 136.25 ms)   Flow 2 (95th percentile 136.26 ms)   Flow 3 (95th percentile 135.58 ms)
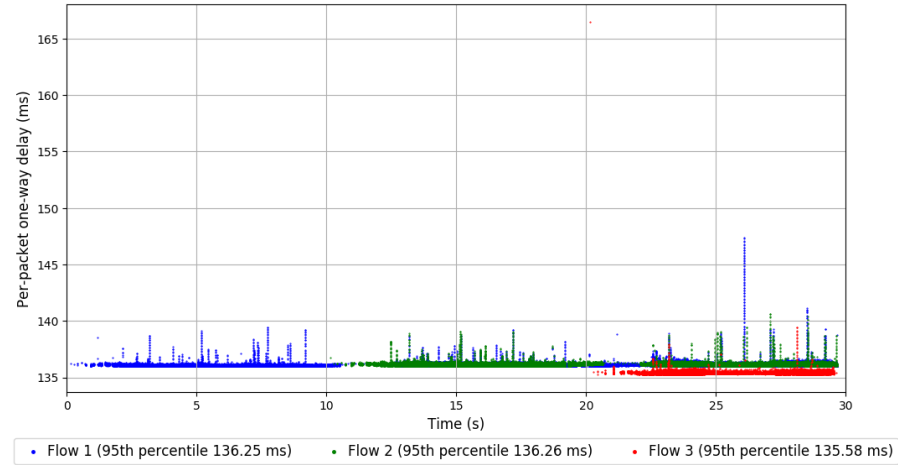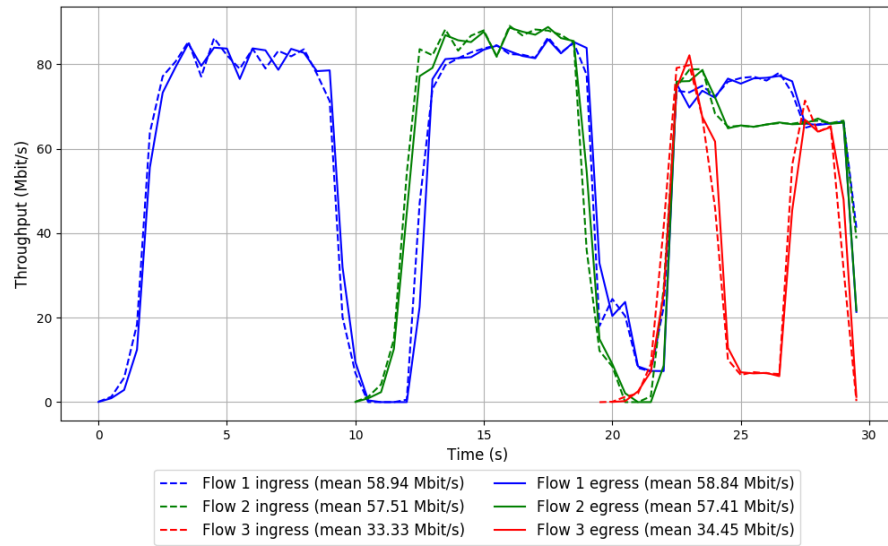
```
Run 2: Statistics of QUIC Cubic

Start at: 2017-09-19 04:14:41
End at: 2017-09-19 04:15:11

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 113.50 Mbit/s
95th percentile per-packet one-way delay: 163.483 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 61.49 Mbit/s
95th percentile per-packet one-way delay: 135.944 ms
Loss rate: 1.18%
-- Flow 2:
Average throughput: 61.58 Mbit/s
95th percentile per-packet one-way delay: 163.586 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 35.24 Mbit/s
95th percentile per-packet one-way delay: 137.109 ms
Loss rate: 1.83%
```

Run 2: Report of QUIC Cubic — Data Link

- - - Flow 1 ingress (mean 61.65 Mbit/s)   Flow 1 egress (mean 61.49 Mbit/s)
- - - Flow 2 ingress (mean 60.74 Mbit/s)   Flow 2 egress (mean 61.58 Mbit/s)
- - - Flow 3 ingress (mean 34.89 Mbit/s)   Flow 3 egress (mean 35.24 Mbit/s)

• Flow 1 (95th percentile 135.94 ms)   • Flow 2 (95th percentile 163.59 ms)   • Flow 3 (95th percentile 137.11 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-09-19 04:25:25
End at: 2017-09-19 04:25:55


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 114.52 Mbit/s
95th percentile per-packet one-way delay: 136.496 ms
Loss rate: 1.58%
-- Flow 1:
Average throughput: 58.72 Mbit/s
95th percentile per-packet one-way delay: 136.580 ms
Loss rate: 1.08%
-- Flow 2:
Average throughput: 56.97 Mbit/s
95th percentile per-packet one-way delay: 136.205 ms
Loss rate: 1.54%
-- Flow 3:
Average throughput: 56.22 Mbit/s
95th percentile per-packet one-way delay: 136.256 ms
Loss rate: 3.26%
```
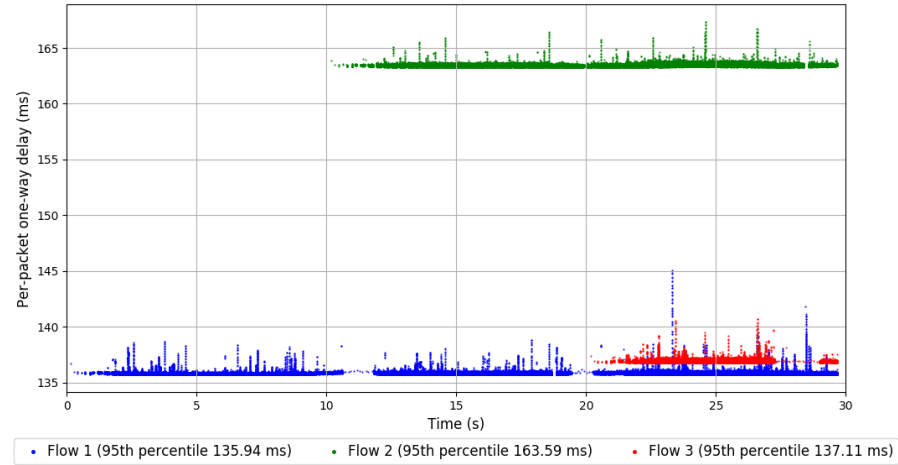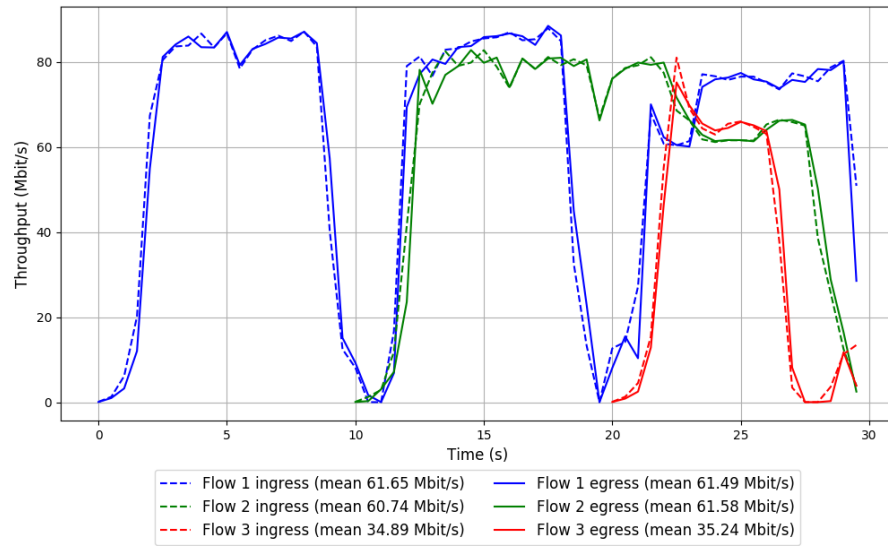
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 58.81 Mbit/s)   Flow 1 egress (mean 58.72 Mbit/s)
Flow 2 ingress (mean 57.06 Mbit/s)   Flow 2 egress (mean 56.97 Mbit/s)
Flow 3 ingress (mean 56.50 Mbit/s)   Flow 3 egress (mean 56.22 Mbit/s)

Flow 1 (95th percentile 136.58 ms)   Flow 2 (95th percentile 136.21 ms)   Flow 3 (95th percentile 136.26 ms)

Run 4: Statistics of QUIC Cubic

Start at: 2017-09-19 04:34:57
End at: 2017-09-19 04:35:27

Run 4: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 260.20 Mbit/s) --- Flow 1 egress (mean 180.14 Mbit/s)
Flow 2 ingress (mean 60.14 Mbit/s) --- Flow 2 egress (mean 60.52 Mbit/s)
Flow 3 ingress (mean 60.87 Mbit/s) --- Flow 3 egress (mean 60.32 Mbit/s)

Flow 1 (95th percentile 136.83 ms) • Flow 2 (95th percentile 136.26 ms) • Flow 3 (95th percentile 163.47 ms)

```
Run 5: Statistics of QUIC Cubic

Start at: 2017-09-19 04:45:24
End at: 2017-09-19 04:45:54

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 112.18 Mbit/s
95th percentile per-packet one-way delay: 163.350 ms
Loss rate: 1.69%
-- Flow 1:
Average throughput: 63.09 Mbit/s
95th percentile per-packet one-way delay: 163.057 ms
Loss rate: 1.08%
-- Flow 2:
Average throughput: 47.85 Mbit/s
95th percentile per-packet one-way delay: 136.269 ms
Loss rate: 1.77%
-- Flow 3:
Average throughput: 53.91 Mbit/s
95th percentile per-packet one-way delay: 163.470 ms
Loss rate: 3.67%
```
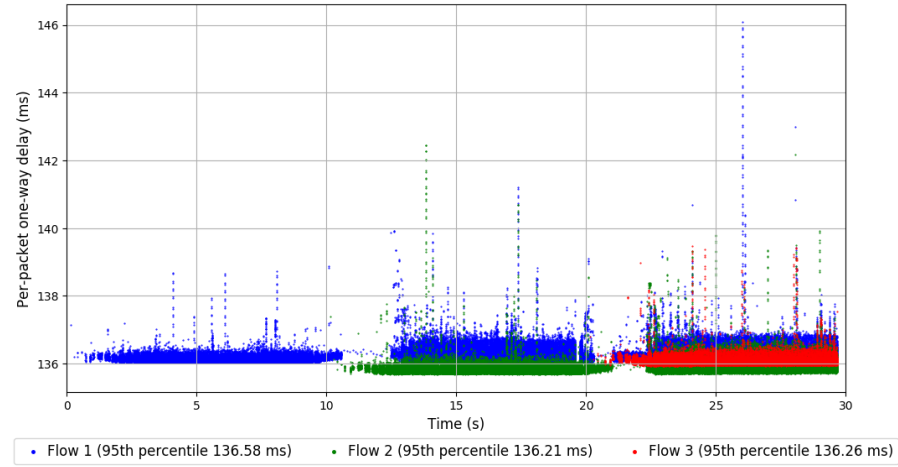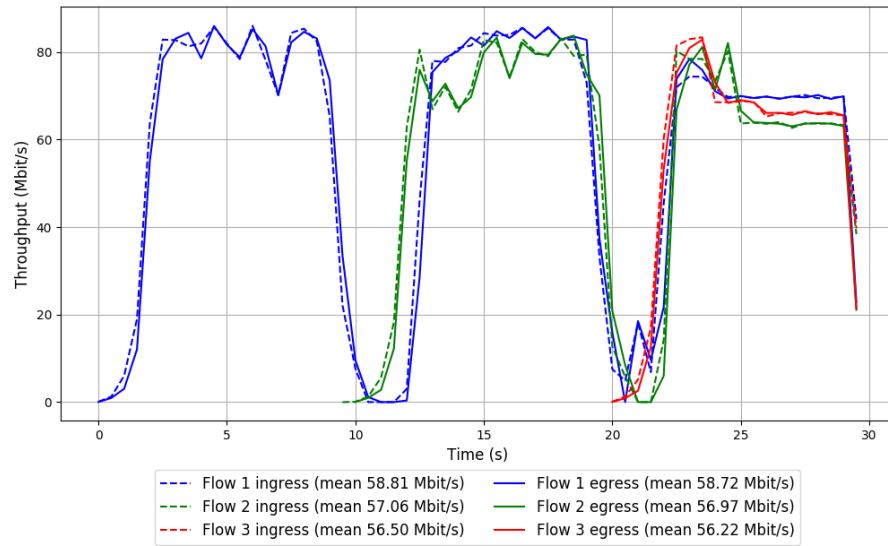
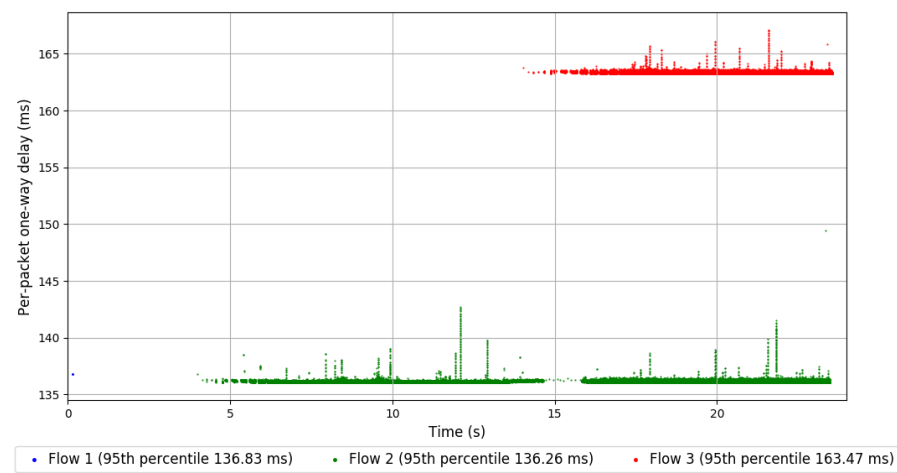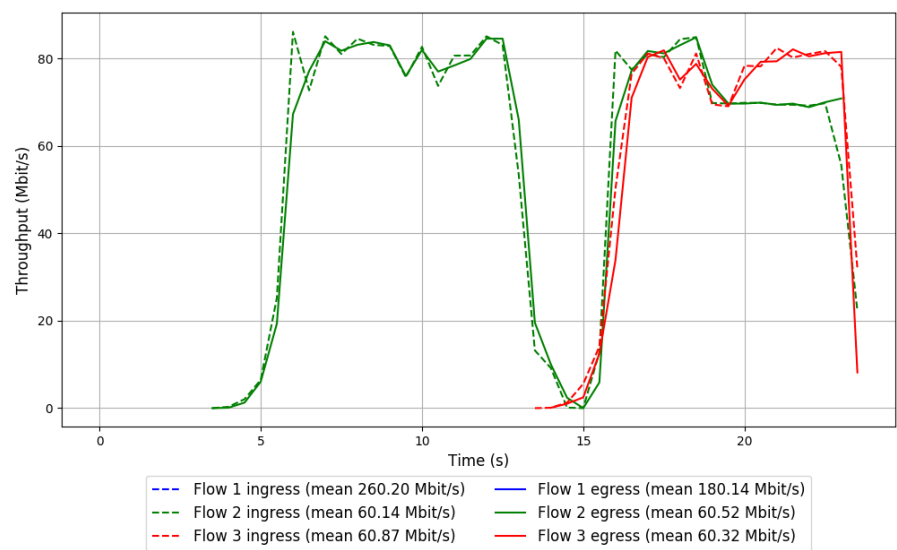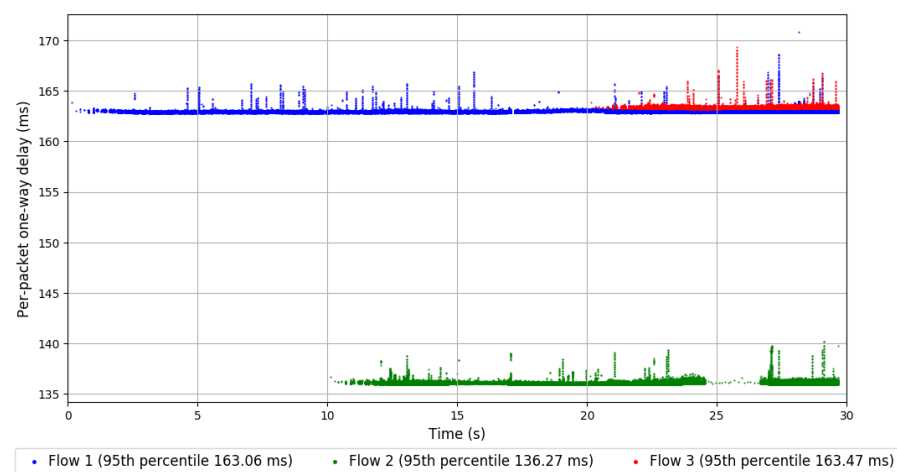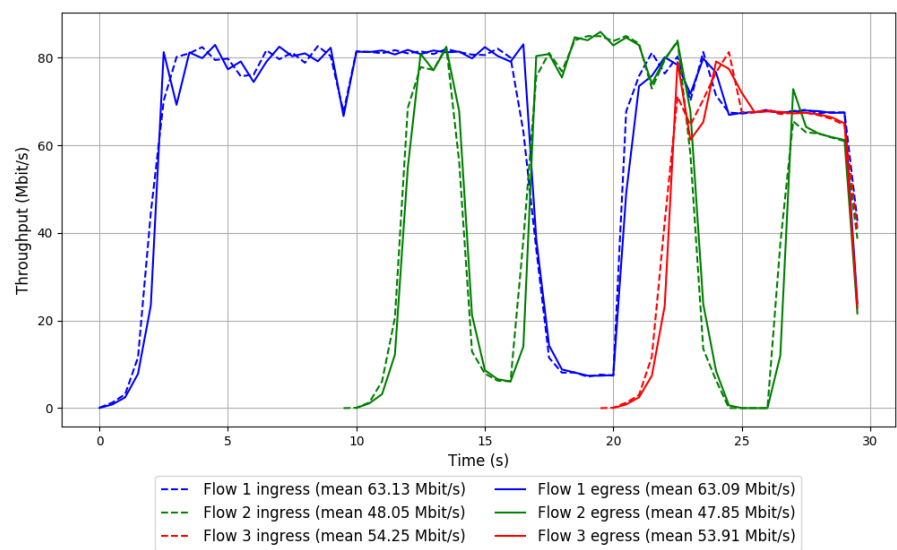Run 5: Report of QUIC Cubic — Data Link

```
Run 6: Statistics of QUIC Cubic

Start at: 2017-09-19 04:55:06
End at: 2017-09-19 04:55:36

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 63.09 Mbit/s
95th percentile per-packet one-way delay: 136.986 ms
Loss rate: 1.44%
-- Flow 1:
Average throughput: 299.53 Mbit/s
95th percentile per-packet one-way delay: 137.642 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 61.28 Mbit/s
95th percentile per-packet one-way delay: 137.004 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 42.19 Mbit/s
95th percentile per-packet one-way delay: 136.634 ms
Loss rate: 5.47%
```

Run 6: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 262.86 Mbit/s) Flow 1 egress (mean 299.53 Mbit/s)
Flow 2 ingress (mean 60.50 Mbit/s)   Flow 2 egress (mean 61.28 Mbit/s)
Flow 3 ingress (mean 43.40 Mbit/s)   Flow 3 egress (mean 42.19 Mbit/s)

Flow 1 (95th percentile 137.64 ms)   Flow 2 (95th percentile 137.00 ms)   Flow 3 (95th percentile 136.63 ms)

```
Run 7: Statistics of QUIC Cubic

Start at: 2017-09-19 05:05:06
End at: 2017-09-19 05:05:36

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 115.78 Mbit/s
95th percentile per-packet one-way delay: 136.640 ms
Loss rate: 1.28%
-- Flow 1:
Average throughput: 57.64 Mbit/s
95th percentile per-packet one-way delay: 136.357 ms
Loss rate: 1.21%
-- Flow 2:
Average throughput: 59.33 Mbit/s
95th percentile per-packet one-way delay: 136.716 ms
Loss rate: 0.16%
-- Flow 3:
Average throughput: 58.97 Mbit/s
95th percentile per-packet one-way delay: 136.618 ms
Loss rate: 3.74%
```
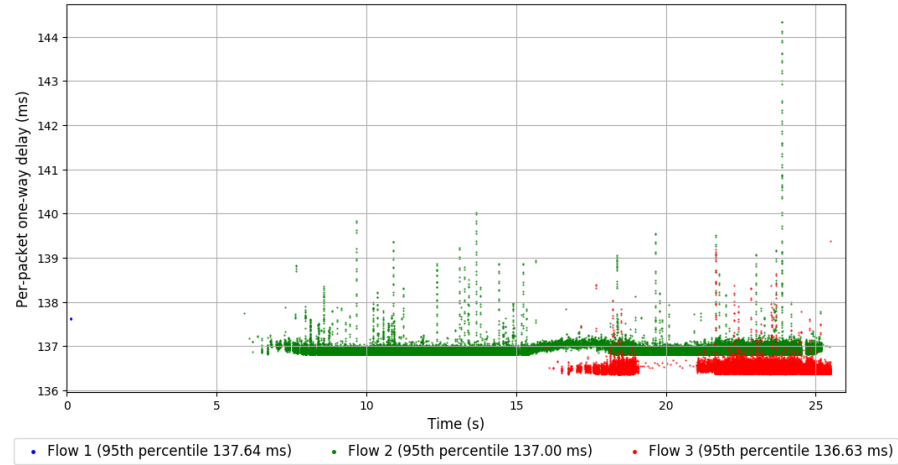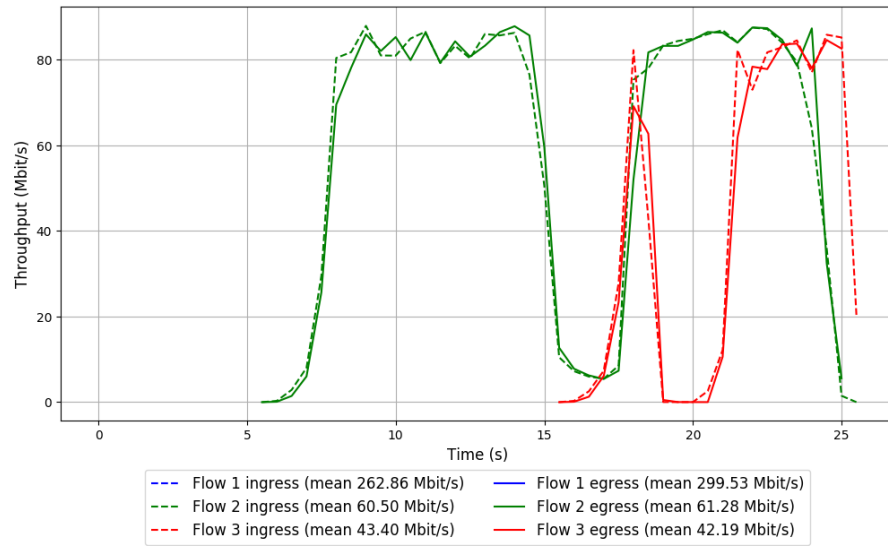
Run 7: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 57.82 Mbit/s) --- Flow 1 egress (mean 57.64 Mbit/s)
Flow 2 ingress (mean 58.60 Mbit/s) --- Flow 2 egress (mean 59.33 Mbit/s)
Flow 3 ingress (mean 59.55 Mbit/s) --- Flow 3 egress (mean 58.97 Mbit/s)

Flow 1 (95th percentile 136.36 ms) • Flow 2 (95th percentile 136.72 ms) • Flow 3 (95th percentile 136.62 ms)

```
Run 8: Statistics of QUIC Cubic

Start at: 2017-09-19 05:15:36
End at: 2017-09-19 05:16:06

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 112.59 Mbit/s
95th percentile per-packet one-way delay: 136.671 ms
Loss rate: 1.65%
-- Flow 1:
Average throughput: 60.00 Mbit/s
95th percentile per-packet one-way delay: 135.941 ms
Loss rate: 1.01%
-- Flow 2:
Average throughput: 52.63 Mbit/s
95th percentile per-packet one-way delay: 136.726 ms
Loss rate: 1.80%
-- Flow 3:
Average throughput: 55.15 Mbit/s
95th percentile per-packet one-way delay: 136.366 ms
Loss rate: 3.43%
```
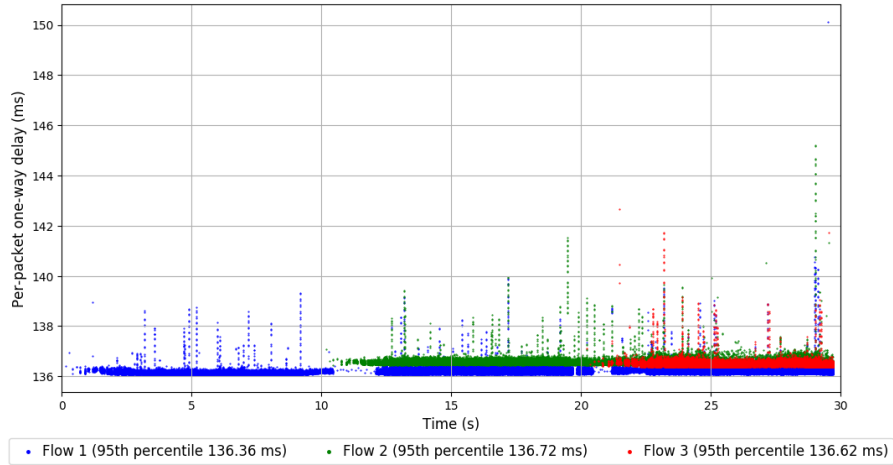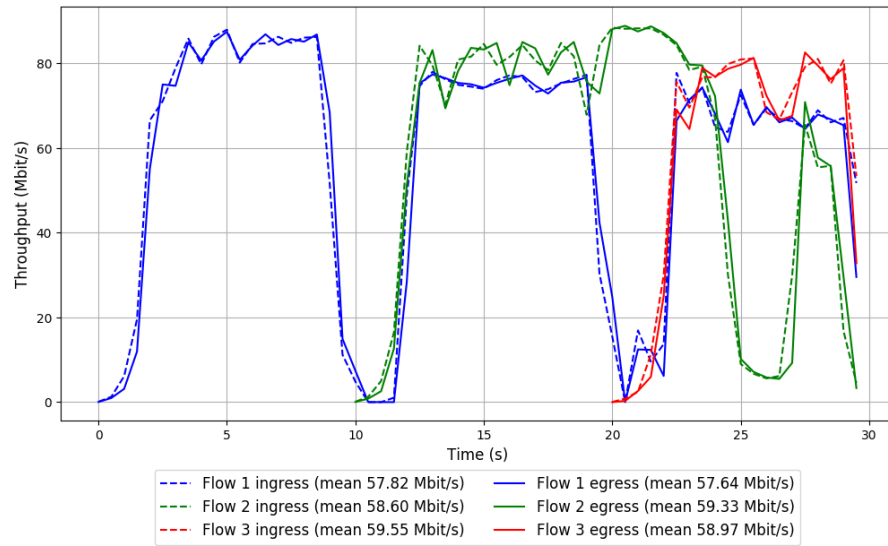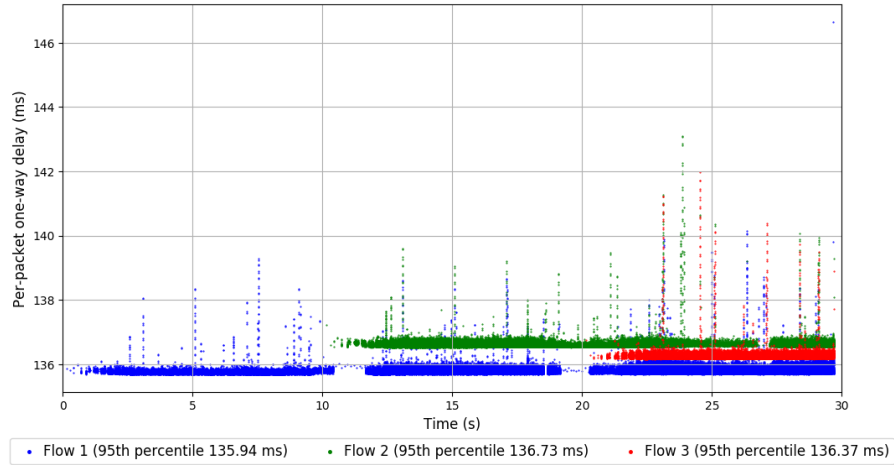
Run 8: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 60.06 Mbit/s)   Flow 1 egress (mean 60.00 Mbit/s)
Flow 2 ingress (mean 52.86 Mbit/s)   Flow 2 egress (mean 52.63 Mbit/s)
Flow 3 ingress (mean 55.52 Mbit/s)   Flow 3 egress (mean 55.15 Mbit/s)

Flow 1 (95th percentile 135.94 ms)   Flow 2 (95th percentile 136.73 ms)   Flow 3 (95th percentile 136.37 ms)

```
Run 9: Statistics of QUIC Cubic

Start at: 2017-09-19 05:26:05
End at: 2017-09-19 05:26:35


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 107.55 Mbit/s
95th percentile per-packet one-way delay: 135.997 ms
Loss rate: 1.31%
-- Flow 1:
Average throughput: 55.05 Mbit/s
95th percentile per-packet one-way delay: 135.364 ms
Loss rate: 1.15%
-- Flow 2:
Average throughput: 61.71 Mbit/s
95th percentile per-packet one-way delay: 136.063 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 36.32 Mbit/s
95th percentile per-packet one-way delay: 135.487 ms
Loss rate: 5.97%
```
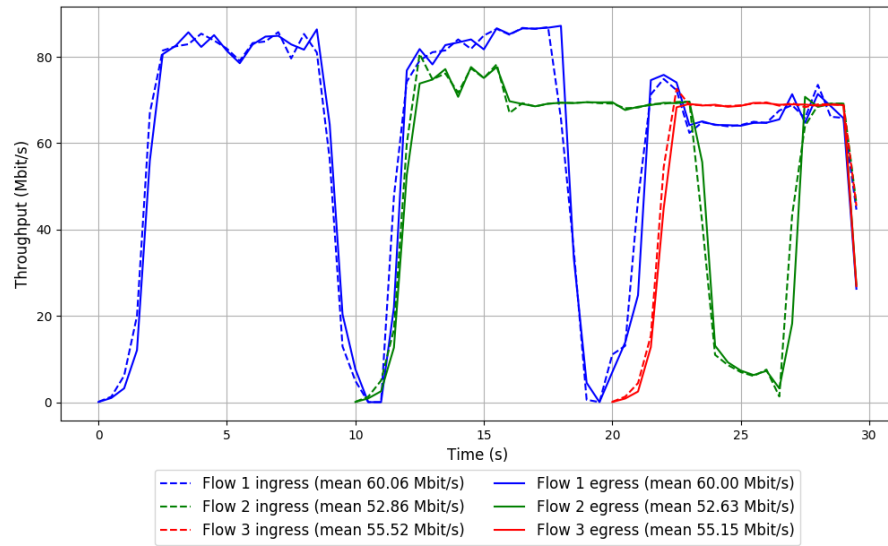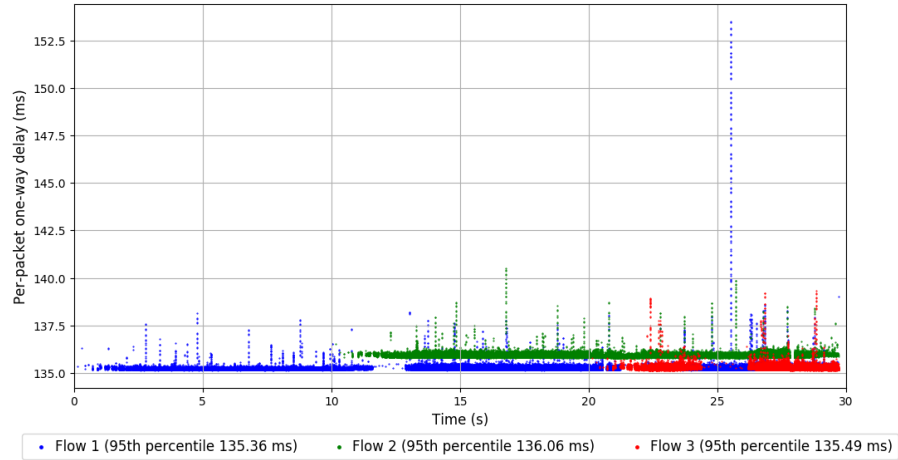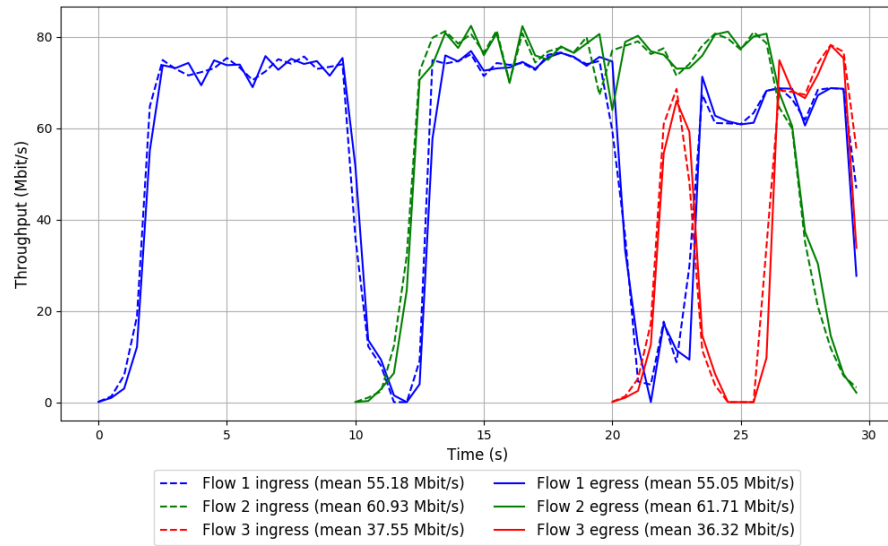
Run 9: Report of QUIC Cubic — Data Link

```
Run 10: Statistics of QUIC Cubic

Start at: 2017-09-19 05:35:48
End at: 2017-09-19 05:36:18


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 105.72 Mbit/s
95th percentile per-packet one-way delay: 136.113 ms
Loss rate: 1.76%
-- Flow 1:
Average throughput: 57.81 Mbit/s
95th percentile per-packet one-way delay: 136.106 ms
Loss rate: 1.01%
-- Flow 2:
Average throughput: 45.27 Mbit/s
95th percentile per-packet one-way delay: 136.146 ms
Loss rate: 1.81%
-- Flow 3:
Average throughput: 55.86 Mbit/s
95th percentile per-packet one-way delay: 136.065 ms
Loss rate: 4.00%
```
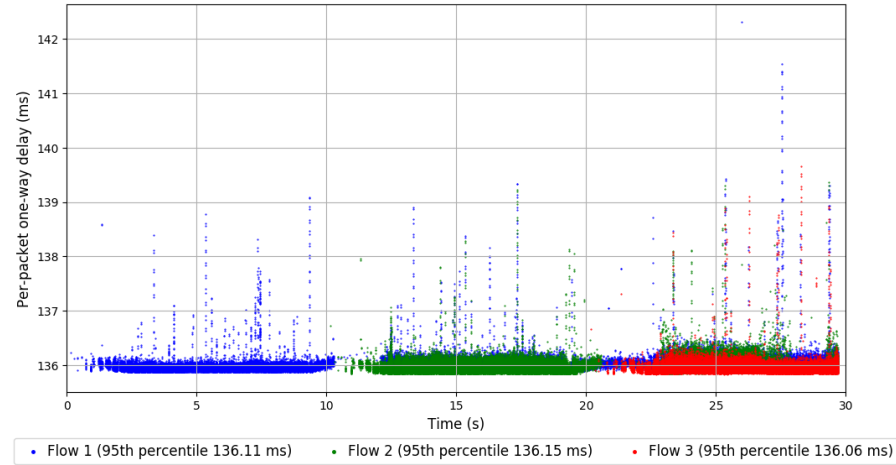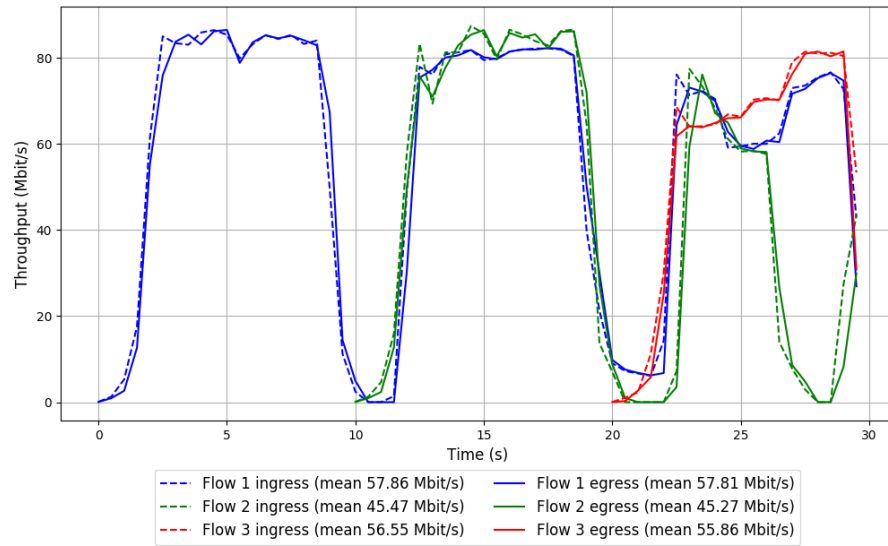
Run 10: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of Sprout

Start at: 2017-09-19 04:05:48
End at: 2017-09-19 04:06:18


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 163.650 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 163.675 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 136.240 ms
Loss rate: 1.15%
-- Flow 3:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 136.307 ms
Loss rate: 2.20%
```
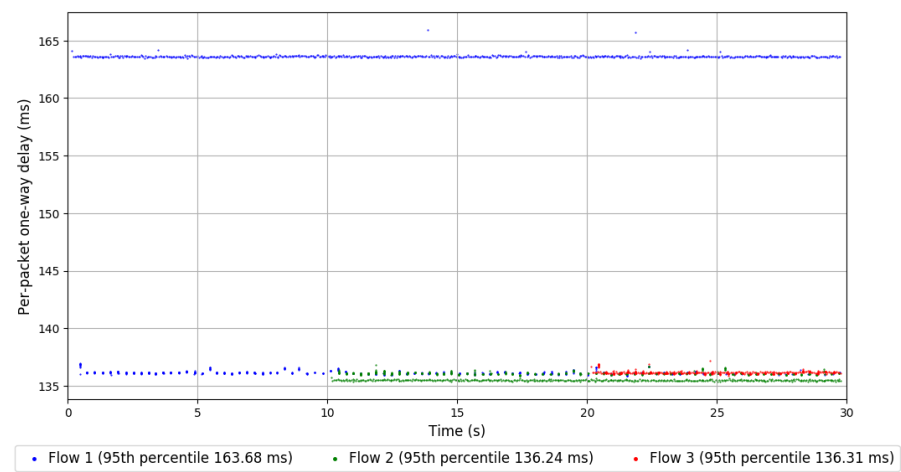
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2017-09-19 04:16:30
End at: 2017-09-19 04:17:00


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 163.434 ms
Loss rate: 1.27%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 136.432 ms
Loss rate: 1.02%
-- Flow 2:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 136.484 ms
Loss rate: 0.86%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 163.545 ms
Loss rate: 2.85%
```

Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2017-09-19 04:27:16
End at: 2017-09-19 04:27:46

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 162.717 ms
Loss rate: 1.46%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 136.416 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 162.783 ms
Loss rate: 1.06%
-- Flow 3:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 136.345 ms
Loss rate: 3.10%
```
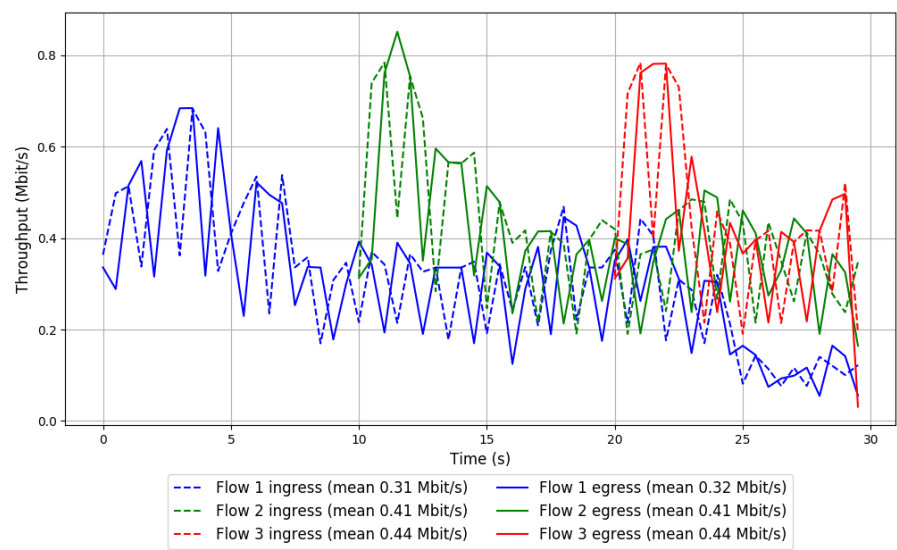
Run 3: Report of Sprout — Data Link

```
Run 4: Statistics of Sprout

Start at: 2017-09-19 04:36:44
End at: 2017-09-19 04:37:14


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 163.046 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 163.089 ms
Loss rate: 0.22%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 162.975 ms
Loss rate: 0.58%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 162.994 ms
Loss rate: 2.37%
```
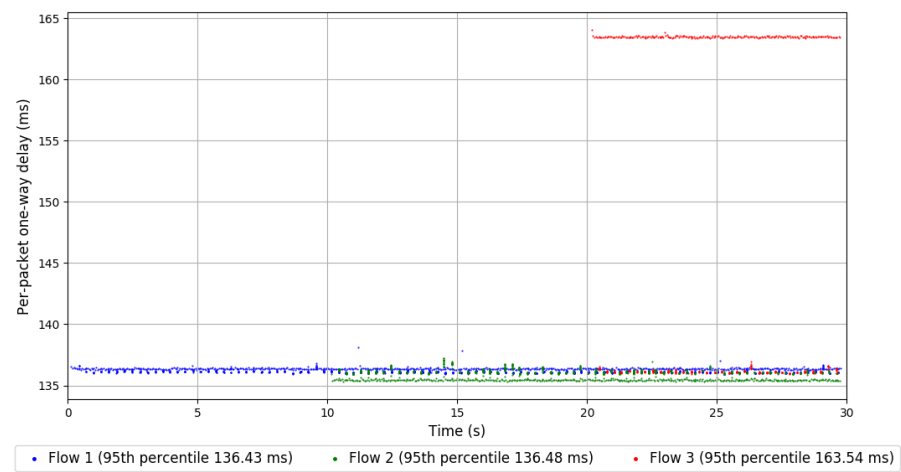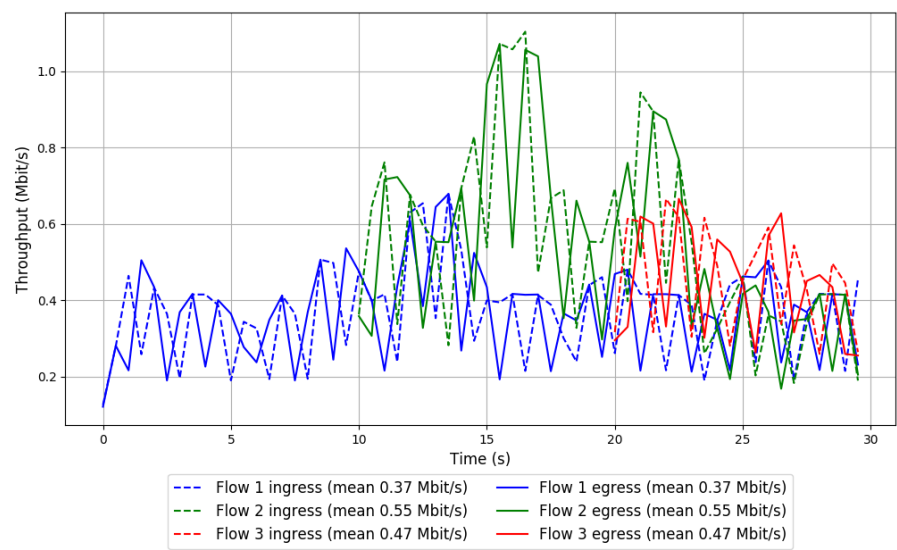
Run 4: Report of Sprout — Data Link

```
Run 5: Statistics of Sprout

Start at: 2017-09-19 04:47:15
End at: 2017-09-19 04:47:45


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 162.879 ms
Loss rate: 1.45%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 162.880 ms
Loss rate: 0.97%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 162.874 ms
Loss rate: 0.80%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 162.868 ms
Loss rate: 3.35%
```
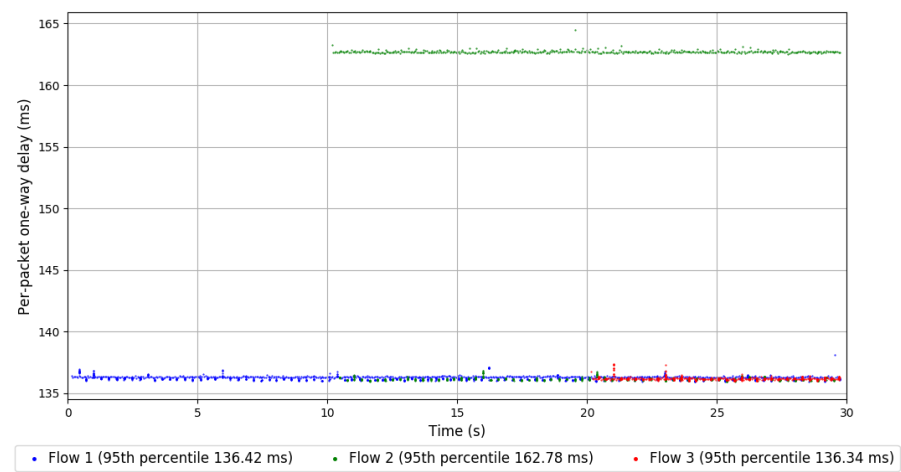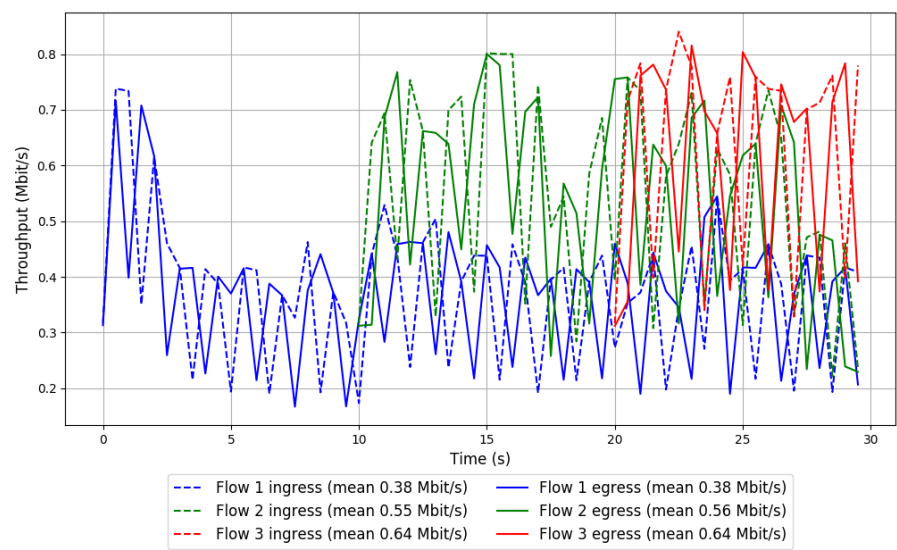
Run 5: Report of Sprout — Data Link

Flow 1 ingress (mean 0.32 Mbit/s)   Flow 1 egress (mean 0.32 Mbit/s)
Flow 2 ingress (mean 0.22 Mbit/s)   Flow 2 egress (mean 0.22 Mbit/s)
Flow 3 ingress (mean 0.40 Mbit/s)   Flow 3 egress (mean 0.40 Mbit/s)

Flow 1 (95th percentile 162.88 ms)   Flow 2 (95th percentile 162.87 ms)   Flow 3 (95th percentile 162.87 ms)

```
Run 6: Statistics of Sprout

Start at: 2017-09-19 04:56:49
End at: 2017-09-19 04:57:19


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 162.870 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 162.859 ms
Loss rate: 0.72%
-- Flow 2:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 162.857 ms
Loss rate: 0.87%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 163.023 ms
Loss rate: 1.15%
```
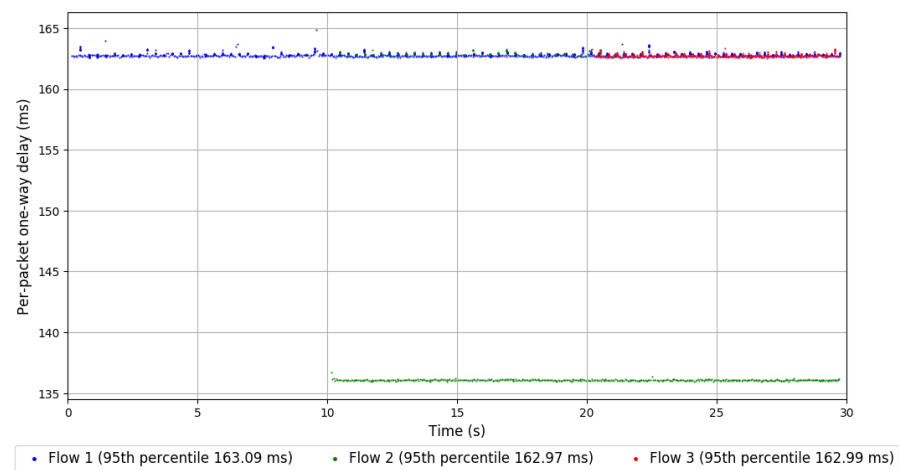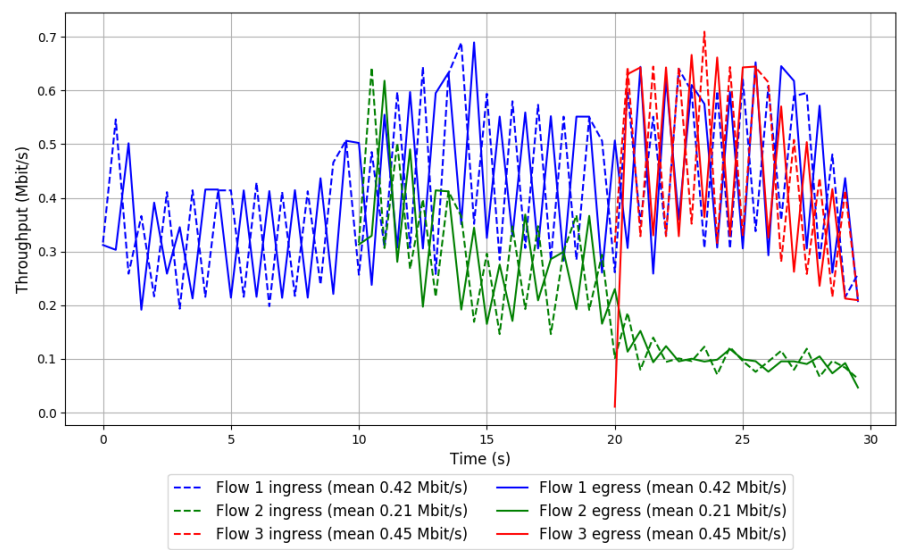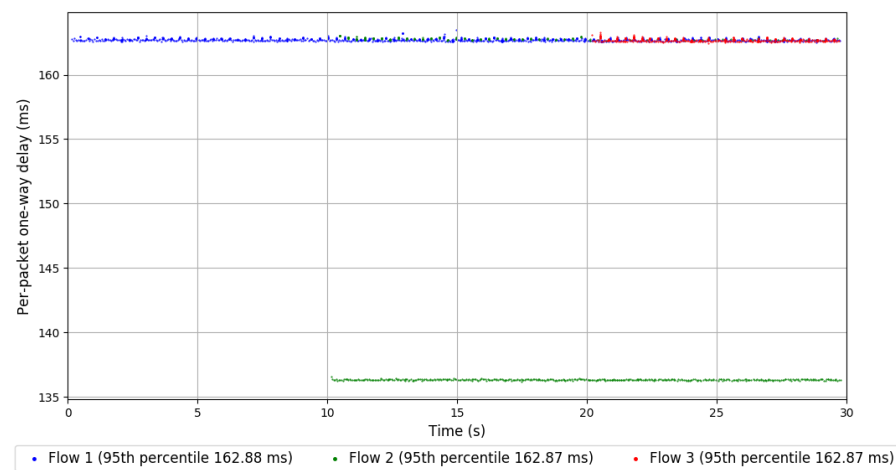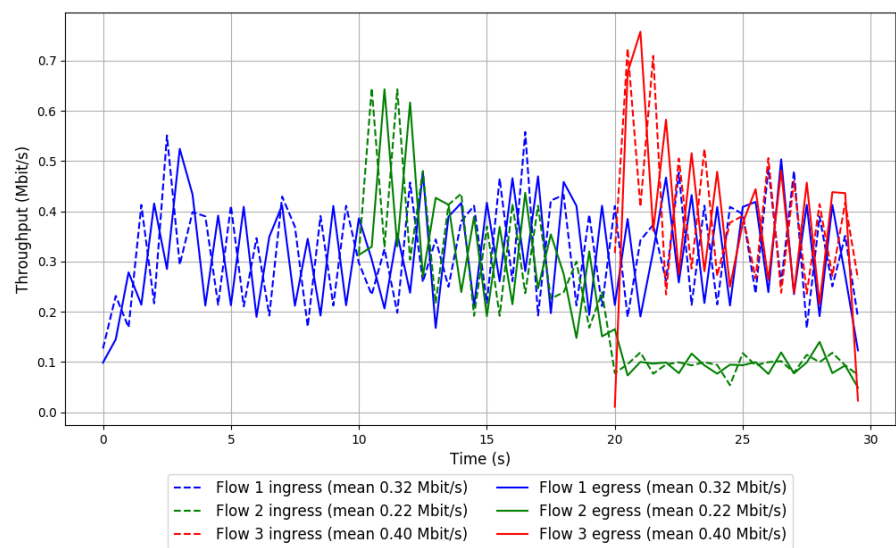
Run 6: Report of Sprout — Data Link

```
Run 7: Statistics of Sprout

Start at: 2017-09-19 05:06:54
End at: 2017-09-19 05:07:24


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 136.413 ms
Loss rate: 1.08%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 136.444 ms
Loss rate: 0.95%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 136.270 ms
Loss rate: 2.24%
-- Flow 3:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 136.060 ms
Loss rate: 0.07%
```

Run 7: Report of Sprout — Data Link

```
Run 8: Statistics of Sprout

Start at: 2017-09-19 05:17:23
End at: 2017-09-19 05:17:53

# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 136.314 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 136.339 ms
Loss rate: 1.03%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 135.422 ms
Loss rate: 1.39%
-- Flow 3:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 136.123 ms
Loss rate: 0.38%
```
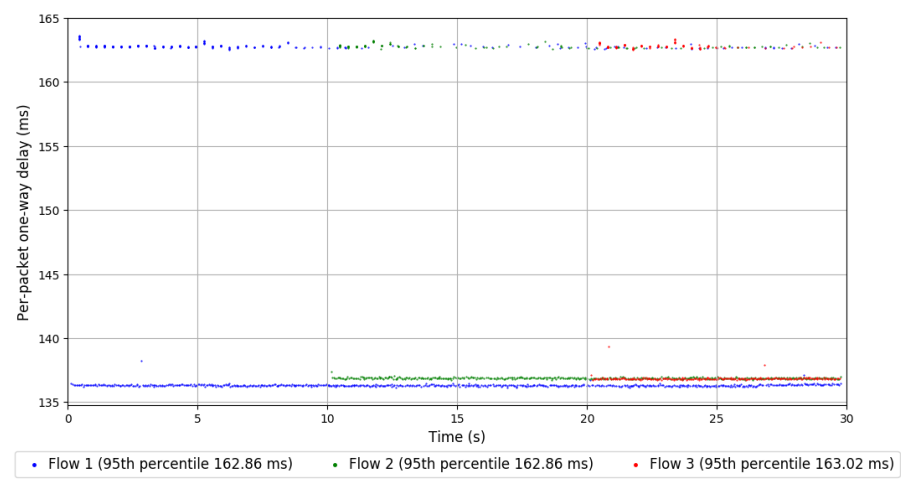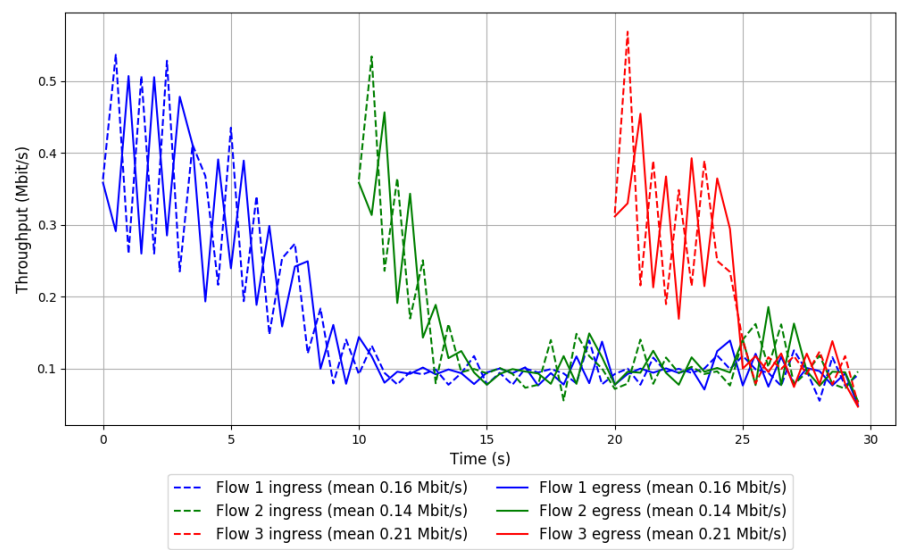
Run 8: Report of Sprout — Data Link

```
Run 9: Statistics of Sprout

Start at: 2017-09-19 05:27:51
End at: 2017-09-19 05:28:21


# Below is generated by plot.py at 2017-09-19 08:02:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 162.216 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 162.199 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 162.201 ms
Loss rate: 0.52%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 162.242 ms
Loss rate: 0.14%
```
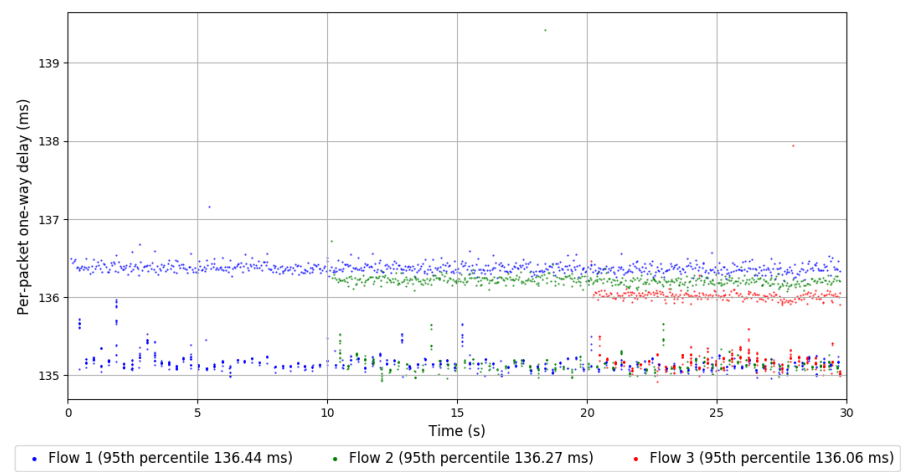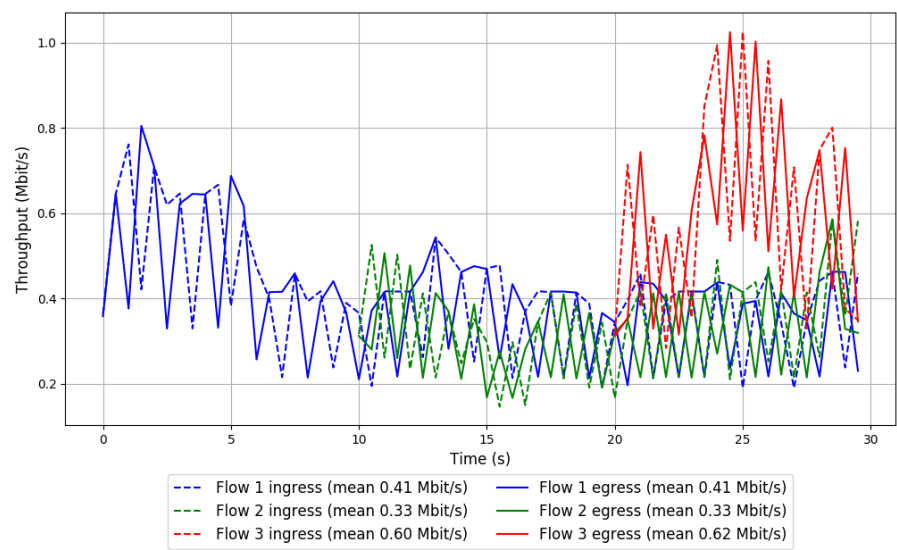
Run 9: Report of Sprout — Data Link

Flow 1 ingress (mean 0.36 Mbit/s) ---- Flow 1 egress (mean 0.36 Mbit/s) ——
Flow 2 ingress (mean 0.26 Mbit/s) ---- Flow 2 egress (mean 0.26 Mbit/s) ——
Flow 3 ingress (mean 0.29 Mbit/s) ---- Flow 3 egress (mean 0.30 Mbit/s) ——

• Flow 1 (95th percentile 162.20 ms)   • Flow 2 (95th percentile 162.20 ms)   • Flow 3 (95th percentile 162.24 ms)

Run 10: Statistics of Sprout

Start at: 2017-09-19 05:37:34
End at: 2017-09-19 05:38:04

Below is generated by plot.py at 2017-09-19 08:02:54
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 162.254 ms
Loss rate: 1.05%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 162.259 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 0.16 Mbit/s
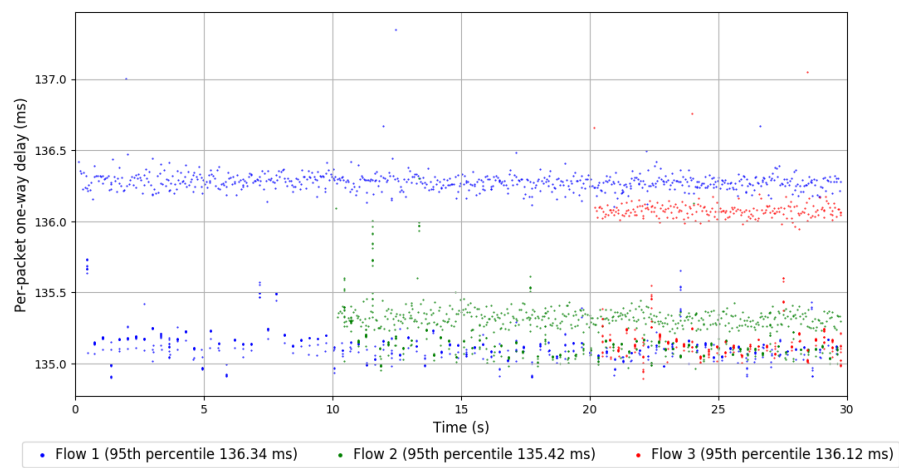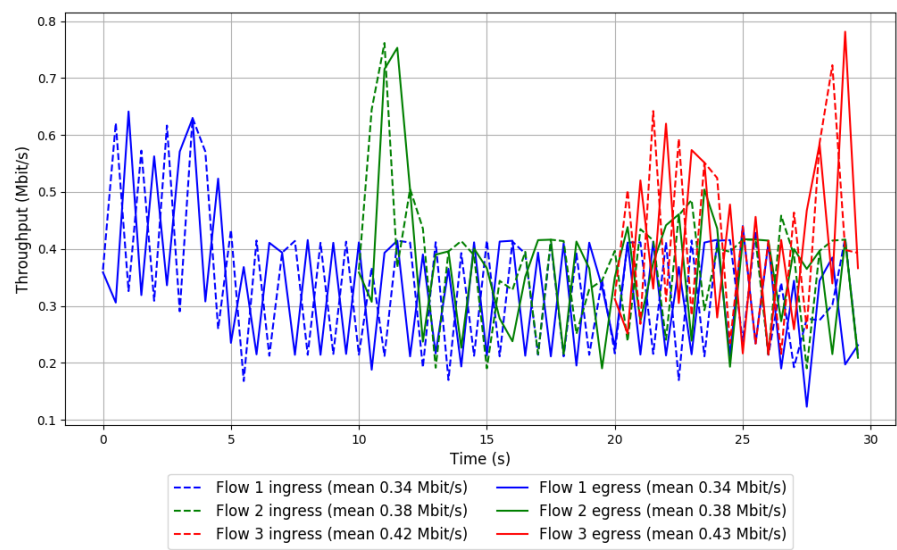95th percentile per-packet one-way delay: 162.186 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 162.271 ms
Loss rate: 2.22%

Run 10: Report of Sprout — Data Link

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

Start at: 2017-09-19 04:02:51
End at: 2017-09-19 04:03:21

# Below is generated by plot.py at 2017-09-19 08:05:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 140.74 Mbit/s
95th percentile per-packet one-way delay: 141.476 ms
Loss rate: 1.71%
-- Flow 1:
Average throughput: 10.45 Mbit/s
95th percentile per-packet one-way delay: 163.480 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 198.21 Mbit/s
95th percentile per-packet one-way delay: 138.186 ms
Loss rate: 1.80%
-- Flow 3:
Average throughput: 13.78 Mbit/s
95th percentile per-packet one-way delay: 136.848 ms
Loss rate: 3.33%
```
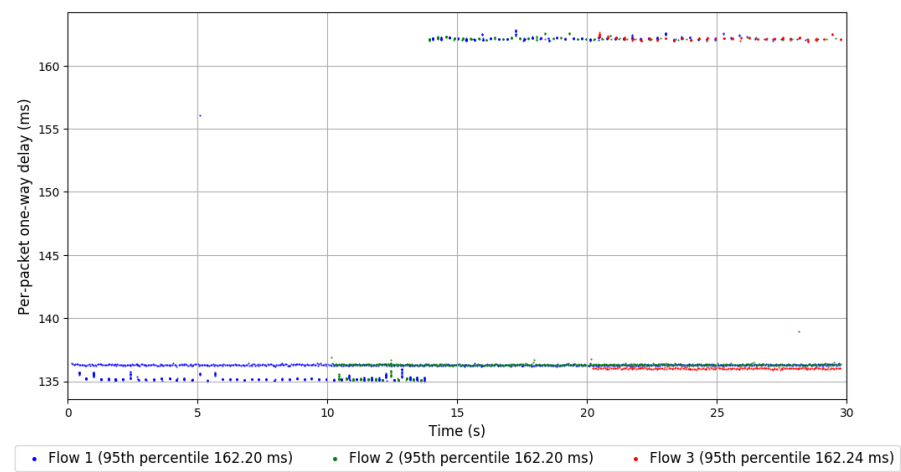
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 10.47 Mbit/s)   Flow 1 egress (mean 10.45 Mbit/s)
Flow 2 ingress (mean 198.77 Mbit/s)   Flow 2 egress (mean 198.21 Mbit/s)
Flow 3 ingress (mean 13.76 Mbit/s)   Flow 3 egress (mean 13.78 Mbit/s)

Flow 1 (95th percentile 163.48 ms)   Flow 2 (95th percentile 138.19 ms)   Flow 3 (95th percentile 136.85 ms)

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

Start at: 2017-09-19 04:13:24
End at: 2017-09-19 04:13:54

# Below is generated by plot.py at 2017-09-19 08:08:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 229.55 Mbit/s
95th percentile per-packet one-way delay: 145.194 ms
Loss rate: 1.43%
-- Flow 1:
Average throughput: 203.91 Mbit/s
95th percentile per-packet one-way delay: 144.826 ms
Loss rate: 1.14%
-- Flow 2:
Average throughput: 4.87 Mbit/s
95th percentile per-packet one-way delay: 163.499 ms
Loss rate: 2.16%
-- Flow 3:
Average throughput: 81.42 Mbit/s
95th percentile per-packet one-way delay: 136.910 ms
Loss rate: 3.92%
```
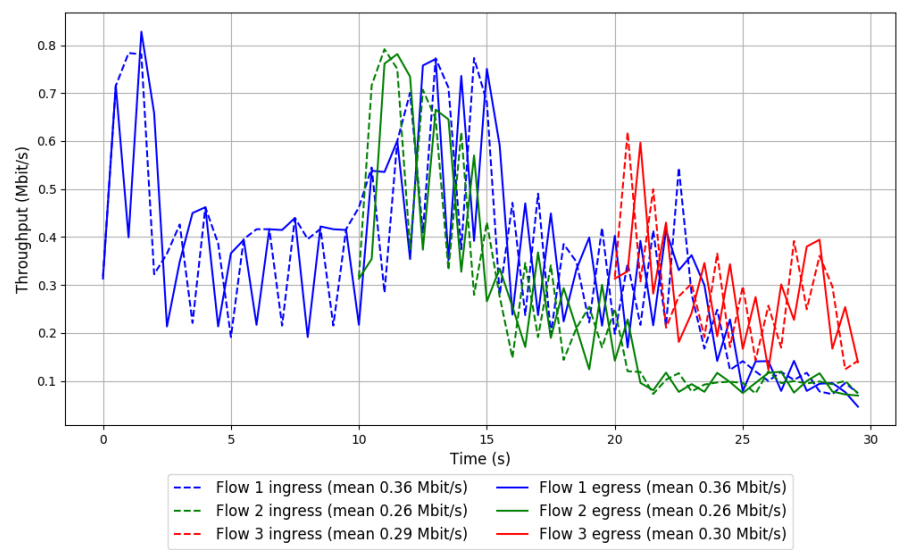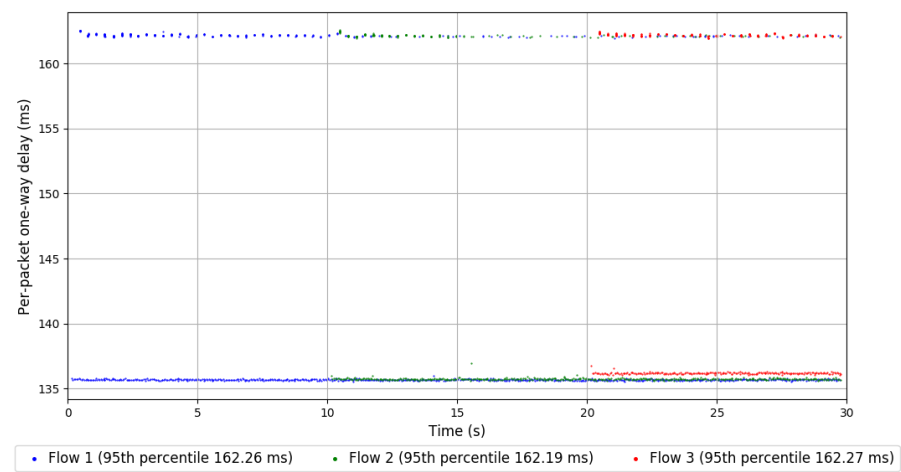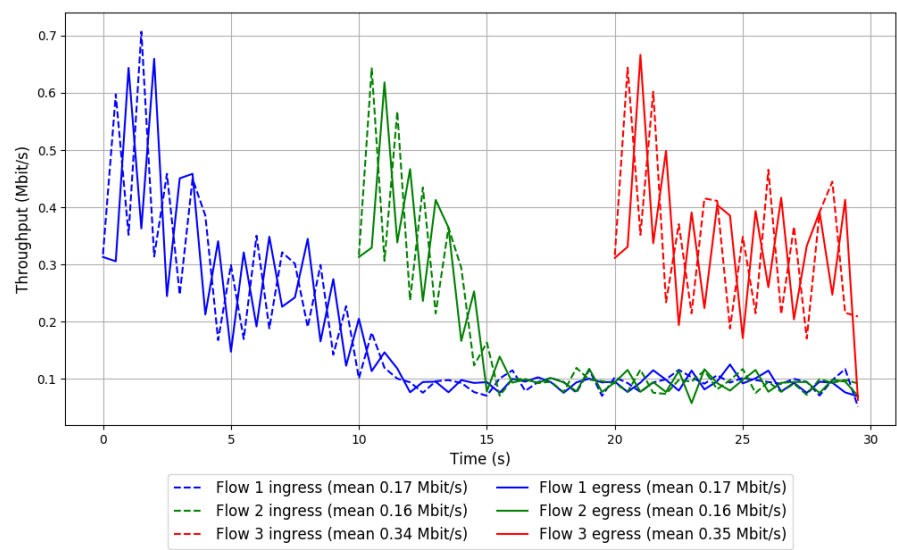
Run 2: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 204.23 Mbit/s) --- Flow 1 egress (mean 203.91 Mbit/s)
Flow 2 ingress (mean 4.91 Mbit/s) --- Flow 2 egress (mean 4.87 Mbit/s)
Flow 3 ingress (mean 81.81 Mbit/s) --- Flow 3 egress (mean 81.42 Mbit/s)

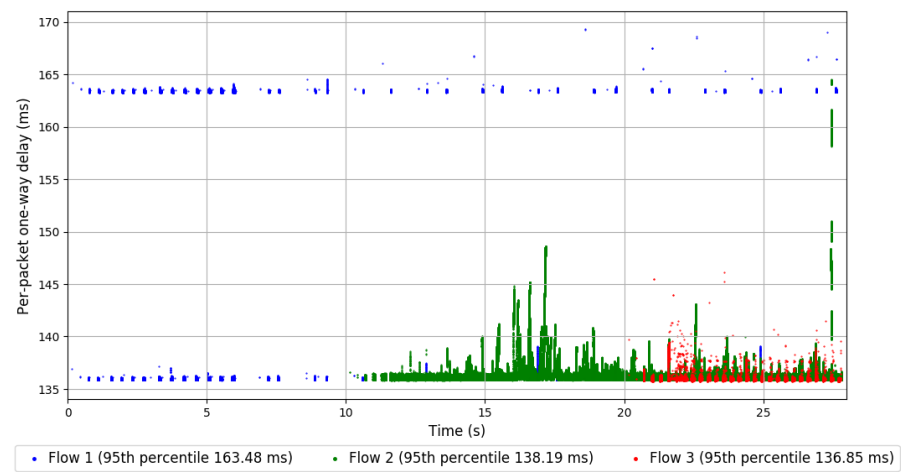Flow 1 (95th percentile 144.83 ms) • Flow 2 (95th percentile 163.50 ms) • Flow 3 (95th percentile 136.91 ms)
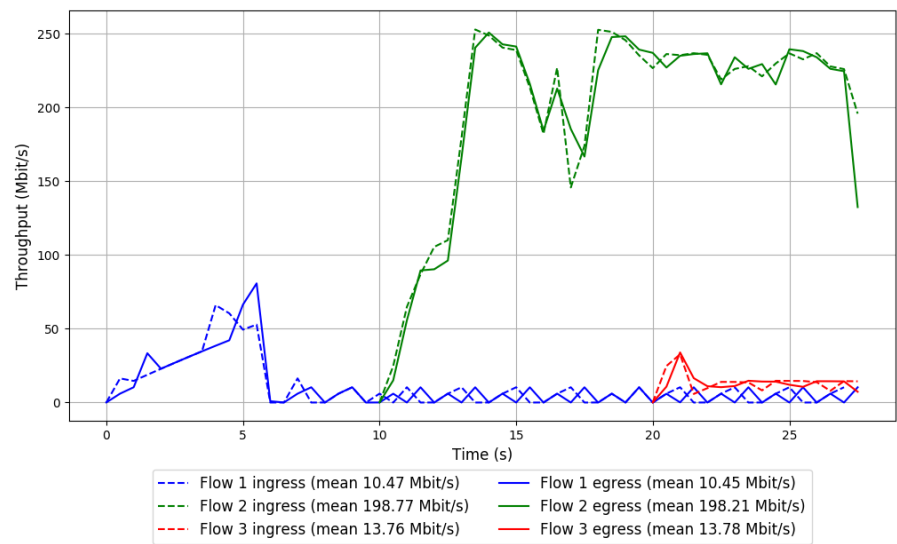
```
Run 3: Statistics of TaoVA-100x

Start at: 2017-09-19 04:23:58
End at: 2017-09-19 04:24:28

# Below is generated by plot.py at 2017-09-19 08:11:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 313.11 Mbit/s
95th percentile per-packet one-way delay: 149.956 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 163.72 Mbit/s
95th percentile per-packet one-way delay: 160.391 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 184.33 Mbit/s
95th percentile per-packet one-way delay: 144.825 ms
Loss rate: 1.24%
-- Flow 3:
Average throughput: 115.66 Mbit/s
95th percentile per-packet one-way delay: 145.946 ms
Loss rate: 4.07%
```

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

Flow 1 ingress (mean 162.14 Mbit/s)   Flow 1 egress (mean 163.72 Mbit/s)
Flow 2 ingress (mean 183.81 Mbit/s)   Flow 2 egress (mean 184.33 Mbit/s)
Flow 3 ingress (mean 115.86 Mbit/s)   Flow 3 egress (mean 115.66 Mbit/s)

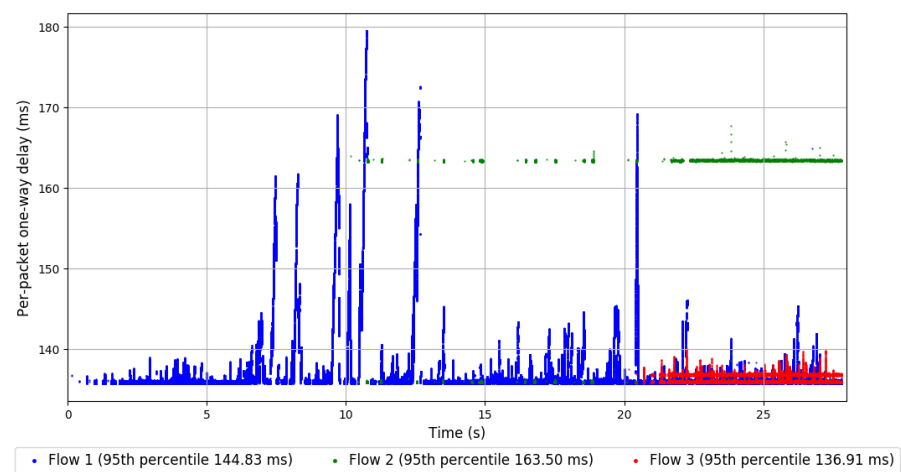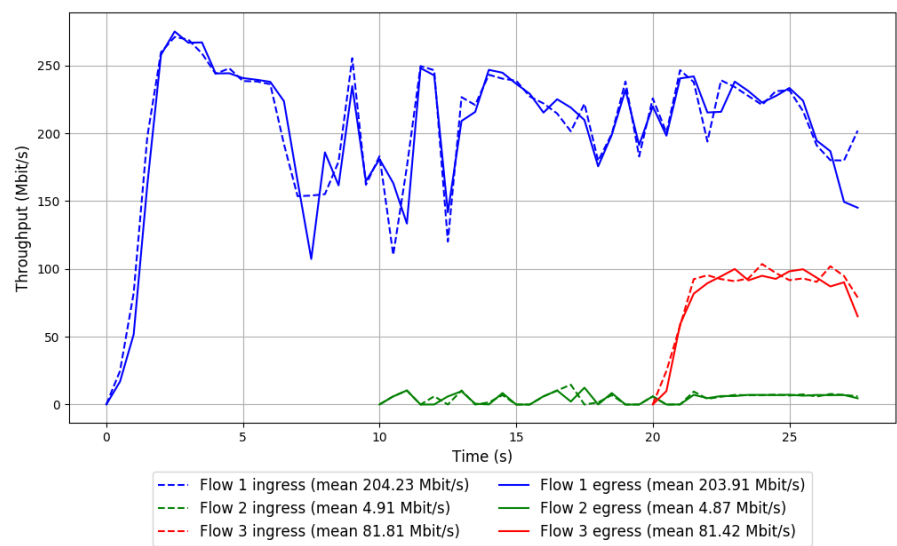Flow 1 (95th percentile 160.39 ms)   Flow 2 (95th percentile 144.82 ms)   Flow 3 (95th percentile 145.95 ms)
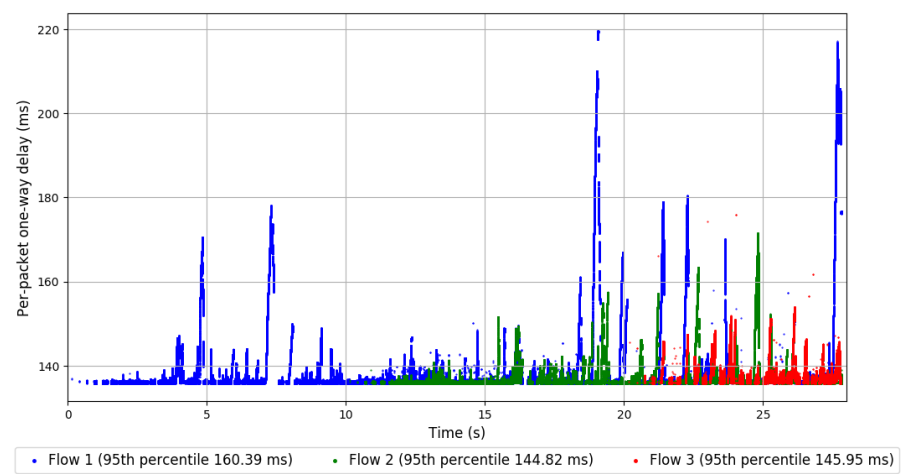
149

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

Start at: 2017-09-19 04:34:03
End at: 2017-09-19 04:34:33


# Below is generated by plot.py at 2017-09-19 08:11:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 36.42 Mbit/s
95th percentile per-packet one-way delay: 162.723 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 41.51 Mbit/s
95th percentile per-packet one-way delay: 162.726 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 8.18 Mbit/s
95th percentile per-packet one-way delay: 162.719 ms
Loss rate: 1.60%
-- Flow 3:
Average throughput: 7.38 Mbit/s
95th percentile per-packet one-way delay: 162.689 ms
Loss rate: 4.69%
```

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

Flow 1 ingress (mean 41.57 Mbit/s) --- Flow 1 egress (mean 41.51 Mbit/s)
Flow 2 ingress (mean 8.29 Mbit/s) --- Flow 2 egress (mean 8.18 Mbit/s)
Flow 3 ingress (mean 7.69 Mbit/s) --- Flow 3 egress (mean 7.38 Mbit/s)

Flow 1 (95th percentile 162.73 ms) • Flow 2 (95th percentile 162.72 ms) • Flow 3 (95th percentile 162.69 ms)
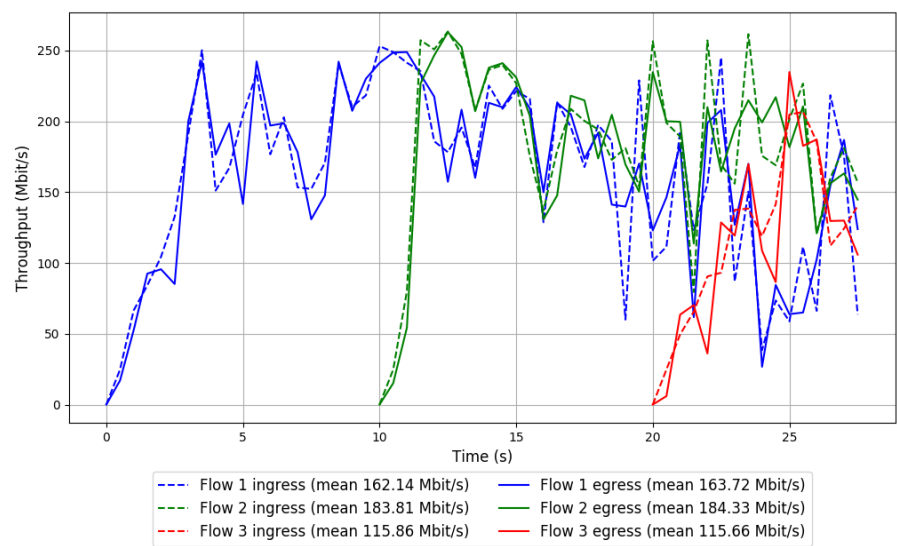
```
Run 5: Statistics of TaoVA-100x

Start at: 2017-09-19 04:43:58
End at: 2017-09-19 04:44:28

# Below is generated by plot.py at 2017-09-19 08:12:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 317.65 Mbit/s
95th percentile per-packet one-way delay: 164.992 ms
Loss rate: 1.49%
-- Flow 1:
Average throughput: 199.46 Mbit/s
95th percentile per-packet one-way delay: 166.272 ms
Loss rate: 1.14%
-- Flow 2:
Average throughput: 185.05 Mbit/s
95th percentile per-packet one-way delay: 163.165 ms
Loss rate: 2.07%
-- Flow 3:
Average throughput: 4.77 Mbit/s
95th percentile per-packet one-way delay: 162.653 ms
Loss rate: 0.00%
```

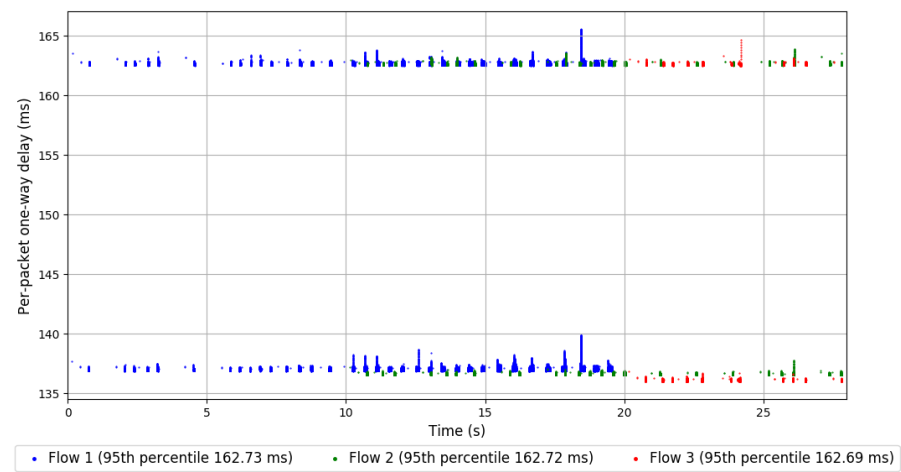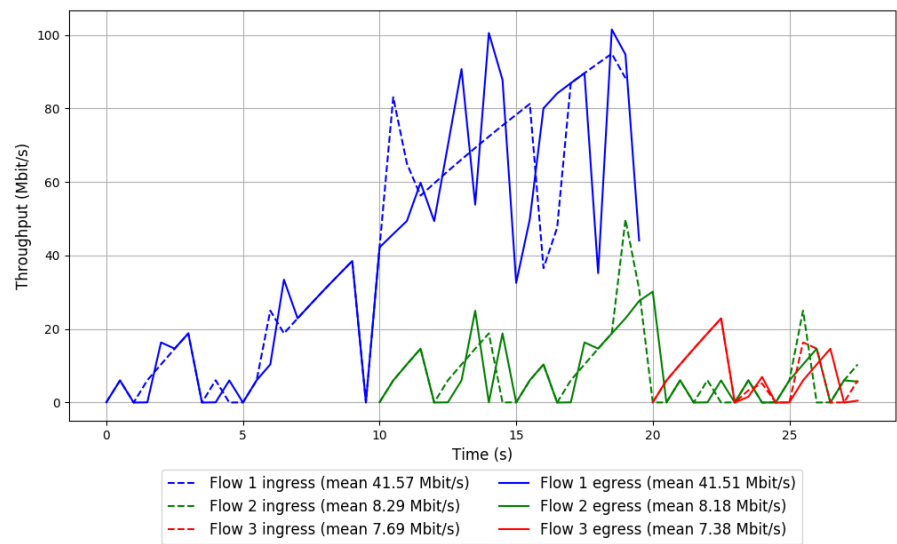Run 5: Report of TaoVA-100x — Data Link

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

Start at: 2017-09-19 04:54:09
End at: 2017-09-19 04:54:39

# Below is generated by plot.py at 2017-09-19 08:12:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 68.40 Mbit/s
95th percentile per-packet one-way delay: 169.922 ms
Loss rate: 3.70%
-- Flow 1:
Average throughput: 15.35 Mbit/s
95th percentile per-packet one-way delay: 162.681 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 6.21 Mbit/s
95th percentile per-packet one-way delay: 162.658 ms
Loss rate: 1.92%
-- Flow 3:
Average throughput: 178.11 Mbit/s
95th percentile per-packet one-way delay: 172.660 ms
Loss rate: 4.93%
```

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

- - - Flow 1 ingress (mean 15.25 Mbit/s)   —— Flow 1 egress (mean 15.35 Mbit/s)
- - - Flow 2 ingress (mean 6.24 Mbit/s)   —— Flow 2 egress (mean 6.21 Mbit/s)
- - - Flow 3 ingress (mean 180.25 Mbit/s)   —— Flow 3 egress (mean 178.11 Mbit/s)

- Flow 1 (95th percentile 162.68 ms)   • Flow 2 (95th percentile 162.66 ms)   • Flow 3 (95th percentile 172.66 ms)

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

Start at: 2017-09-19 05:04:00
End at: 2017-09-19 05:04:30


# Below is generated by plot.py at 2017-09-19 08:12:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 148.15 Mbit/s
95th percentile per-packet one-way delay: 138.350 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 13.28 Mbit/s
95th percentile per-packet one-way delay: 136.722 ms
Loss rate: 0.99%
-- Flow 2:
Average throughput: 205.89 Mbit/s
95th percentile per-packet one-way delay: 138.989 ms
Loss rate: 1.76%
-- Flow 3:
Average throughput: 12.42 Mbit/s
95th percentile per-packet one-way delay: 137.063 ms
Loss rate: 3.64%
```
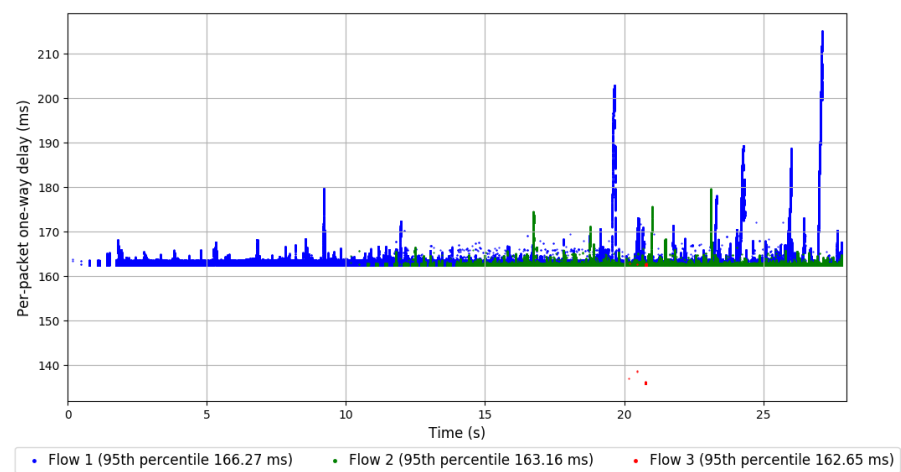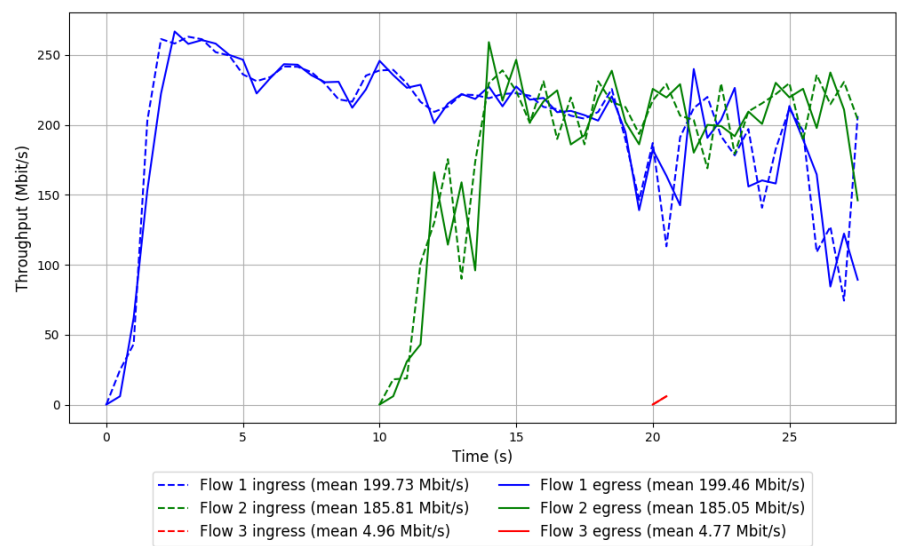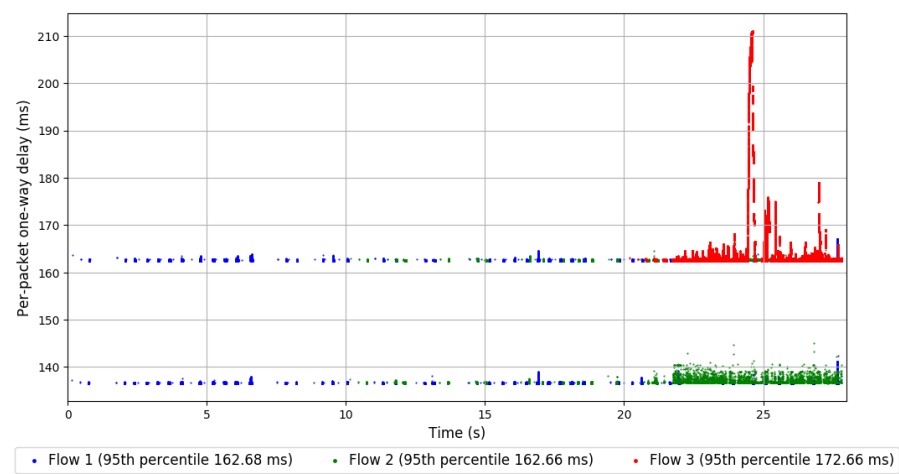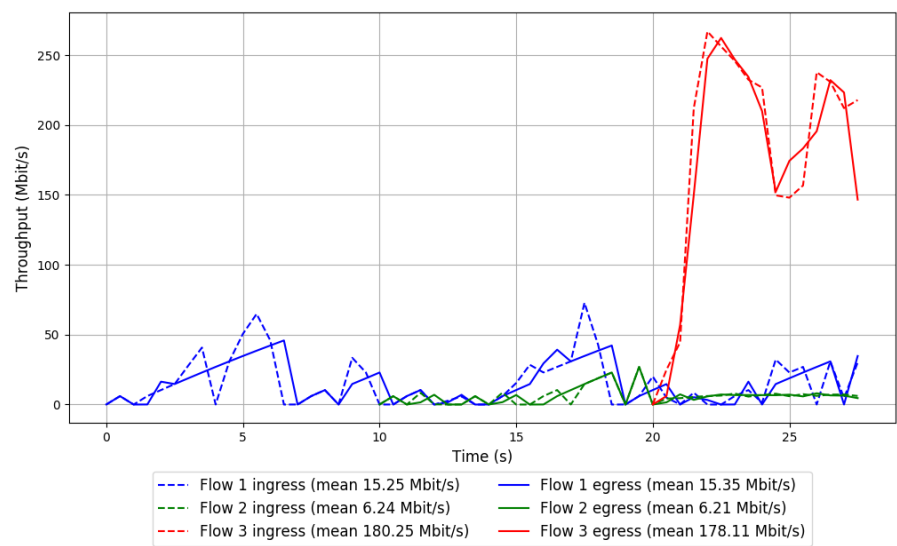
Run 7: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 13.29 Mbit/s) ----   Flow 1 egress (mean 13.28 Mbit/s) ——
Flow 2 ingress (mean 206.45 Mbit/s) ----   Flow 2 egress (mean 205.89 Mbit/s) ——
Flow 3 ingress (mean 12.44 Mbit/s) ----   Flow 3 egress (mean 12.42 Mbit/s) ——

Flow 1 (95th percentile 136.72 ms)   Flow 2 (95th percentile 138.99 ms)   Flow 3 (95th percentile 137.06 ms)
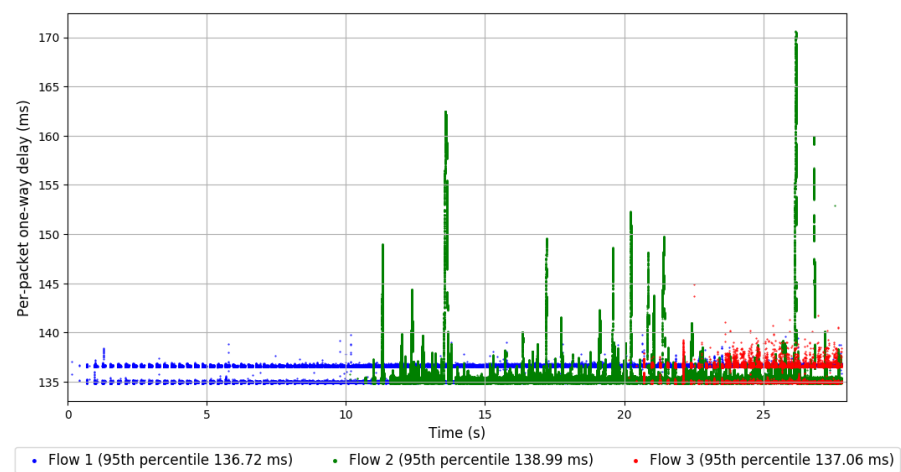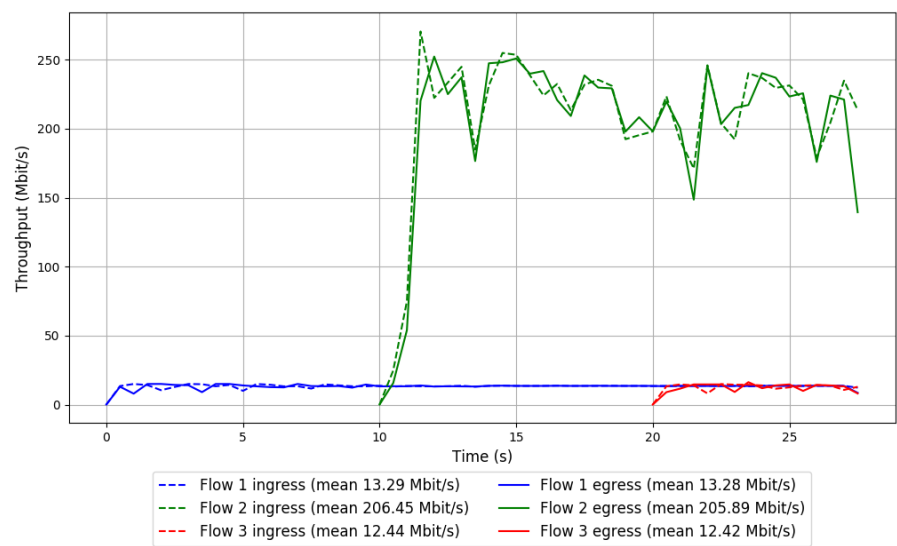
157

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

Start at: 2017-09-19 05:14:09
End at: 2017-09-19 05:14:39


# Below is generated by plot.py at 2017-09-19 08:13:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 339.28 Mbit/s
95th percentile per-packet one-way delay: 146.693 ms
Loss rate: 1.49%
-- Flow 1:
Average throughput: 186.05 Mbit/s
95th percentile per-packet one-way delay: 147.300 ms
Loss rate: 0.58%
-- Flow 2:
Average throughput: 172.90 Mbit/s
95th percentile per-packet one-way delay: 138.443 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 155.54 Mbit/s
95th percentile per-packet one-way delay: 155.096 ms
Loss rate: 4.96%
```

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

Flow 1 ingress (mean 185.32 Mbit/s) — Flow 1 egress (mean 186.05 Mbit/s)
Flow 2 ingress (mean 173.08 Mbit/s) — Flow 2 egress (mean 172.90 Mbit/s)
Flow 3 ingress (mean 158.19 Mbit/s) — Flow 3 egress (mean 155.54 Mbit/s)

Flow 1 (95th percentile 147.30 ms) · Flow 2 (95th percentile 138.44 ms) · Flow 3 (95th percentile 155.10 ms)

159

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

Start at: 2017-09-19 05:24:37
End at: 2017-09-19 05:25:07

# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 343.72 Mbit/s
95th percentile per-packet one-way delay: 140.348 ms
Loss rate: 1.57%
-- Flow 1:
Average throughput: 193.34 Mbit/s
95th percentile per-packet one-way delay: 139.477 ms
Loss rate: 0.76%
-- Flow 2:
Average throughput: 171.48 Mbit/s
95th percentile per-packet one-way delay: 140.609 ms
Loss rate: 1.91%
-- Flow 3:
Average throughput: 147.77 Mbit/s
95th percentile per-packet one-way delay: 144.627 ms
Loss rate: 4.41%
```
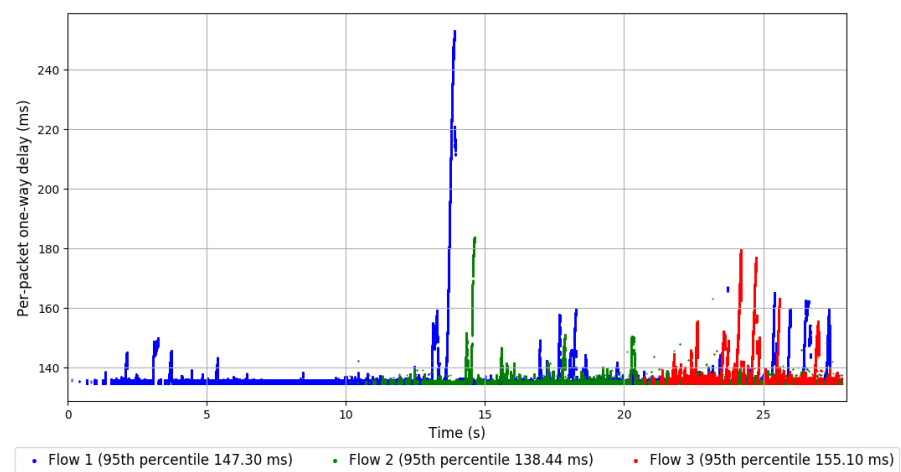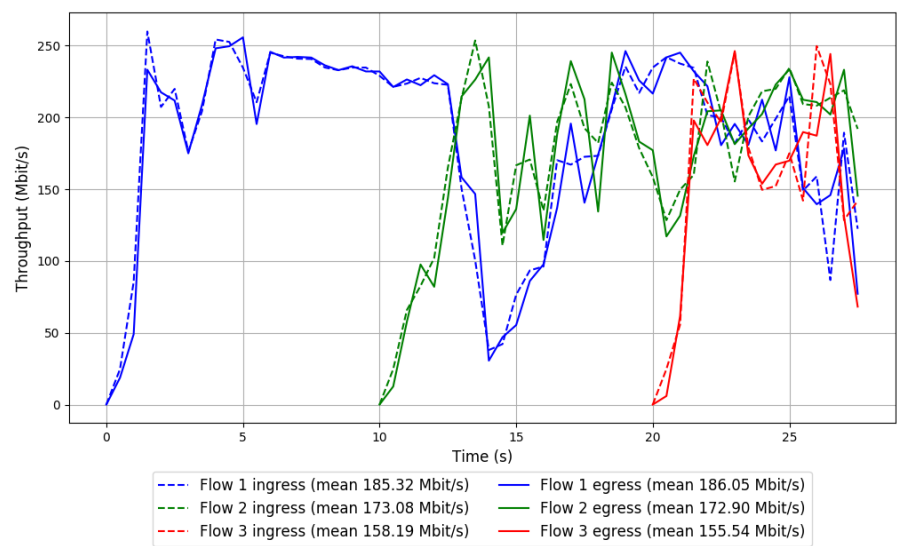
Run 9: Report of TaoVA-100x — Data Link

- --- Flow 1 ingress (mean 193.11 Mbit/s)   —— Flow 1 egress (mean 193.34 Mbit/s)
- --- Flow 2 ingress (mean 172.49 Mbit/s)   —— Flow 2 egress (mean 171.48 Mbit/s)
- --- Flow 3 ingress (mean 149.29 Mbit/s)   —— Flow 3 egress (mean 147.77 Mbit/s)

- Flow 1 (95th percentile 139.48 ms)   • Flow 2 (95th percentile 140.61 ms)   • Flow 3 (95th percentile 144.63 ms)
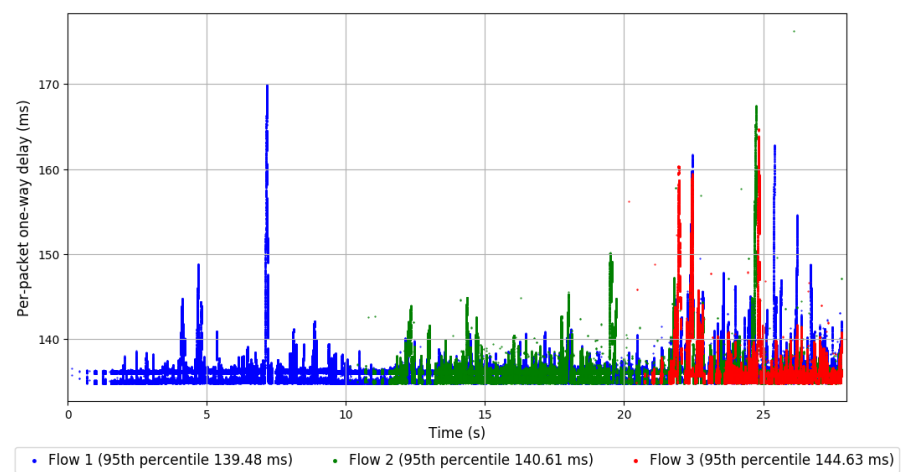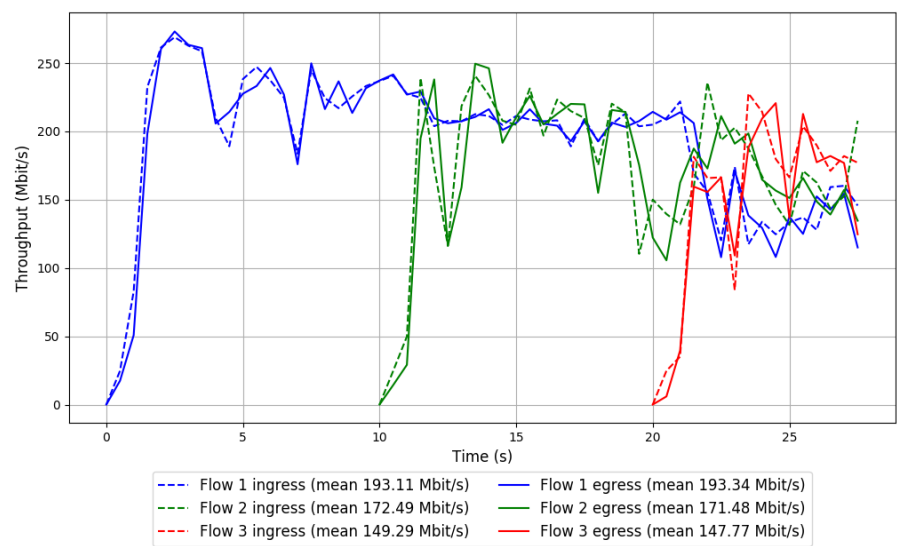
161

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

Start at: 2017-09-19 05:34:57
End at: 2017-09-19 05:35:27

# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 16.41 Mbit/s
95th percentile per-packet one-way delay: 162.069 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 4.36 Mbit/s
95th percentile per-packet one-way delay: 162.072 ms
Loss rate: 1.75%
-- Flow 2:
Average throughput: 17.28 Mbit/s
95th percentile per-packet one-way delay: 162.071 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 3.84 Mbit/s
95th percentile per-packet one-way delay: 162.026 ms
Loss rate: 0.00%
```
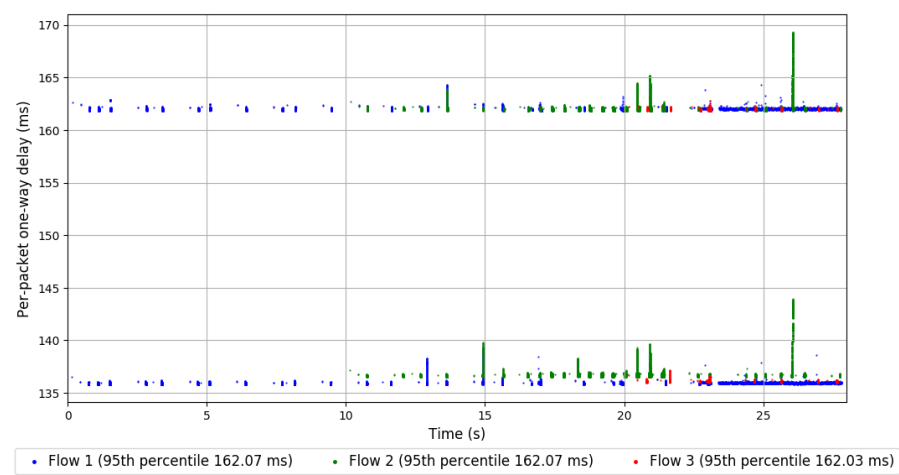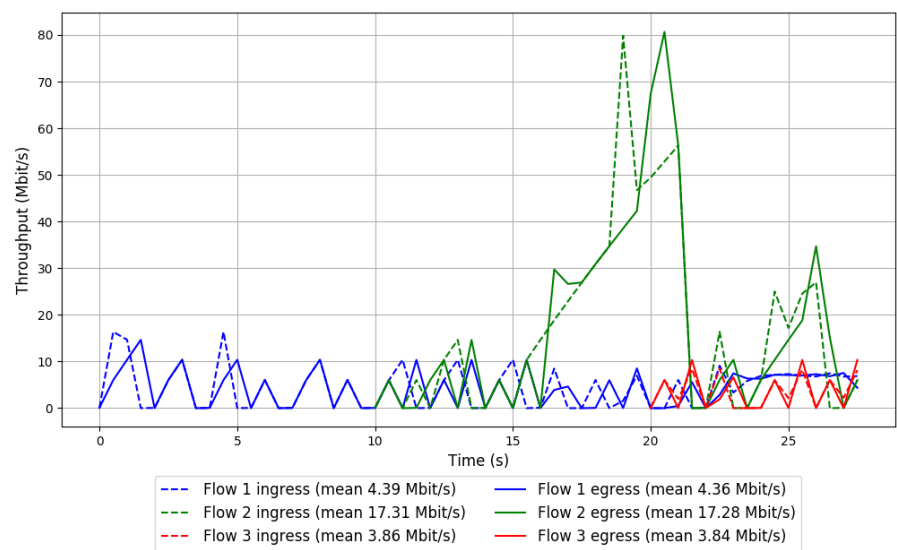
Run 10: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 4.39 Mbit/s) — — —   Flow 1 egress (mean 4.36 Mbit/s)
Flow 2 ingress (mean 17.31 Mbit/s) — — —   Flow 2 egress (mean 17.28 Mbit/s)
Flow 3 ingress (mean 3.86 Mbit/s) — — —   Flow 3 egress (mean 3.84 Mbit/s)

Flow 1 (95th percentile 162.07 ms)   Flow 2 (95th percentile 162.07 ms)   Flow 3 (95th percentile 162.03 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2017-09-19 04:09:11
End at: 2017-09-19 04:09:41

# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 53.87 Mbit/s
95th percentile per-packet one-way delay: 140.843 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 25.59 Mbit/s
95th percentile per-packet one-way delay: 137.842 ms
Loss rate: 1.00%
-- Flow 2:
Average throughput: 29.35 Mbit/s
95th percentile per-packet one-way delay: 142.394 ms
Loss rate: 1.51%
-- Flow 3:
Average throughput: 27.17 Mbit/s
95th percentile per-packet one-way delay: 145.745 ms
Loss rate: 3.14%
```
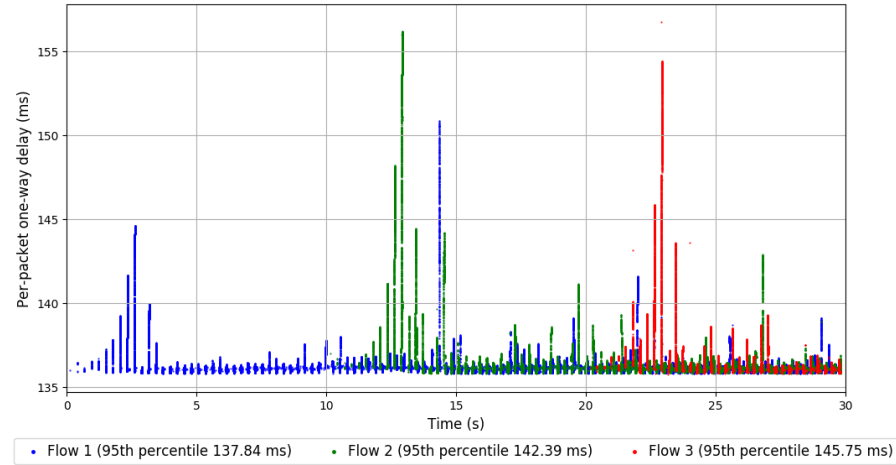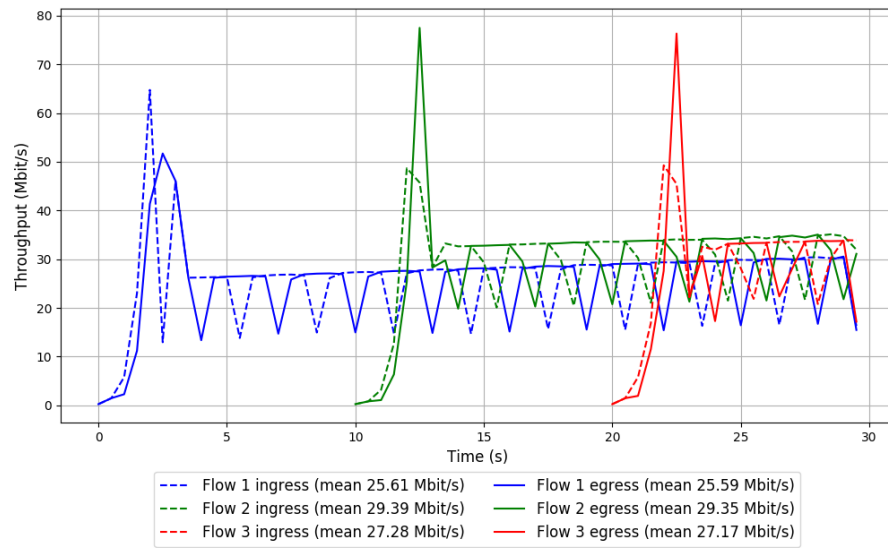
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2017-09-19 04:19:44
End at: 2017-09-19 04:20:14


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 62.05 Mbit/s
95th percentile per-packet one-way delay: 138.494 ms
Loss rate: 1.28%
-- Flow 1:
Average throughput: 31.25 Mbit/s
95th percentile per-packet one-way delay: 140.260 ms
Loss rate: 0.97%
-- Flow 2:
Average throughput: 45.96 Mbit/s
95th percentile per-packet one-way delay: 136.924 ms
Loss rate: 1.55%
-- Flow 3:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 136.392 ms
Loss rate: 5.20%
```
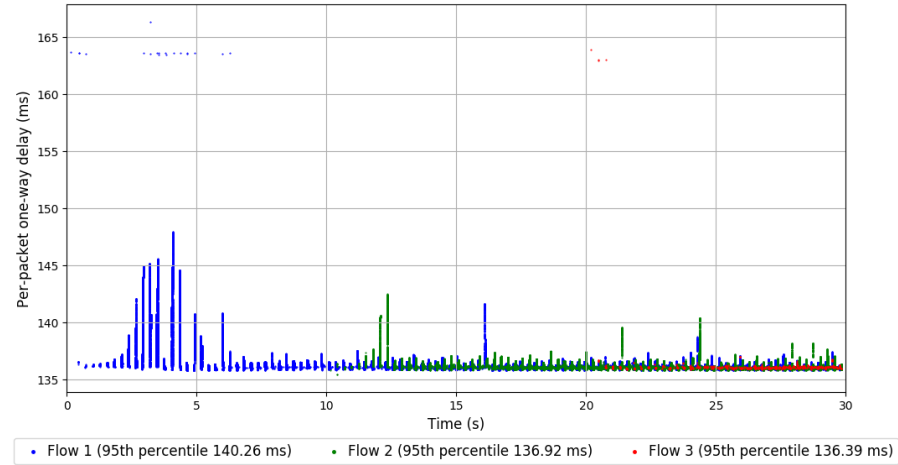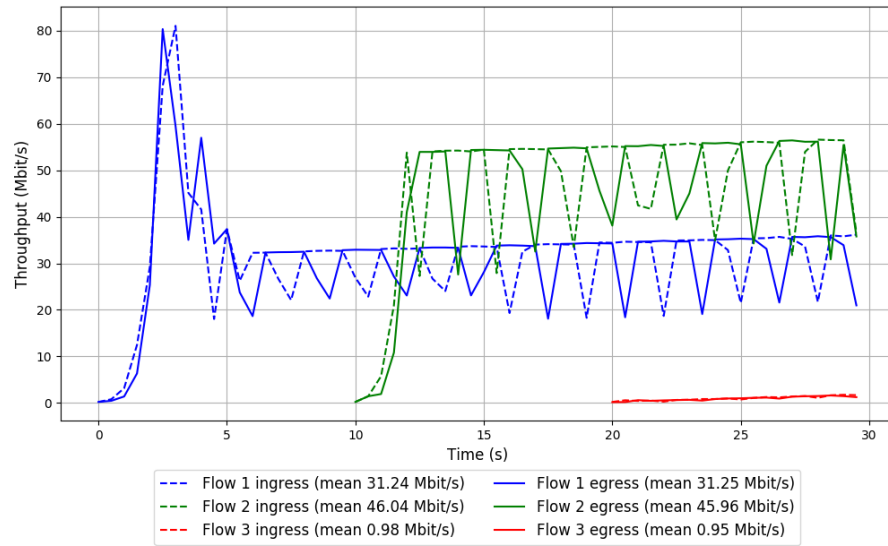
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2017-09-19 04:30:24
End at: 2017-09-19 04:30:54


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 16.23 Mbit/s
95th percentile per-packet one-way delay: 169.376 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 163.085 ms
Loss rate: 1.18%
-- Flow 2:
Average throughput: 22.55 Mbit/s
95th percentile per-packet one-way delay: 169.743 ms
Loss rate: 1.53%
-- Flow 3:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 163.042 ms
Loss rate: 3.18%
```

Run 3: Report of TCP Vegas — Data Link

- - - - Flow 1 ingress (mean 0.85 Mbit/s)   —— Flow 1 egress (mean 0.85 Mbit/s)
- - - - Flow 2 ingress (mean 22.56 Mbit/s) —— Flow 2 egress (mean 22.55 Mbit/s)
- - - - Flow 3 ingress (mean 1.41 Mbit/s)   —— Flow 3 egress (mean 1.41 Mbit/s)

- Flow 1 (95th percentile 163.09 ms)   - Flow 2 (95th percentile 169.74 ms)   - Flow 3 (95th percentile 163.04 ms)

169

```
Run 4: Statistics of TCP Vegas

Start at: 2017-09-19 04:39:59
End at: 2017-09-19 04:40:29


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 31.19 Mbit/s
95th percentile per-packet one-way delay: 166.902 ms
Loss rate: 2.60%
-- Flow 1:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 163.076 ms
Loss rate: 1.03%
-- Flow 2:
Average throughput: 23.77 Mbit/s
95th percentile per-packet one-way delay: 166.458 ms
Loss rate: 1.60%
-- Flow 3:
Average throughput: 43.34 Mbit/s
95th percentile per-packet one-way delay: 167.481 ms
Loss rate: 3.84%
```
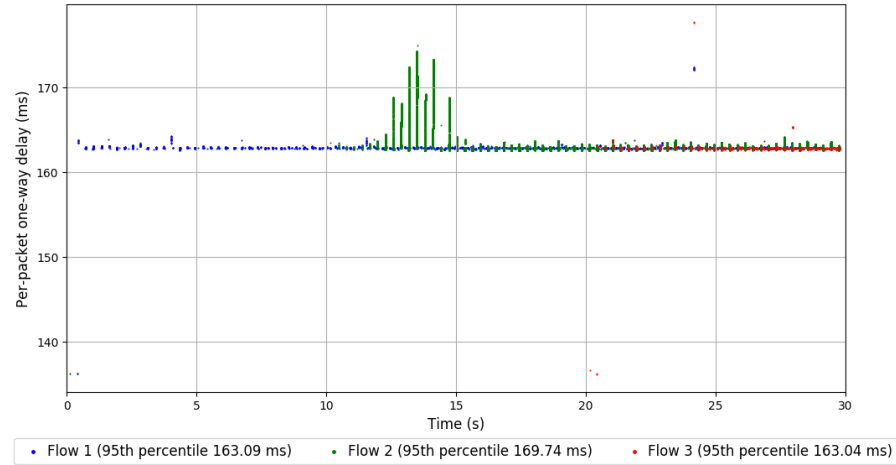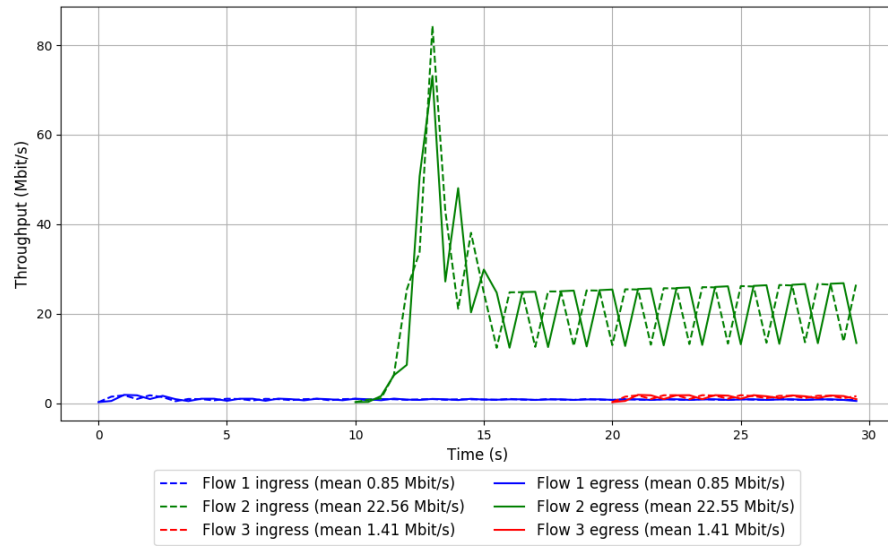
Run 4: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 1.44 Mbit/s) --- Flow 1 egress (mean 1.44 Mbit/s)
Flow 2 ingress (mean 23.79 Mbit/s) --- Flow 2 egress (mean 23.77 Mbit/s)
Flow 3 ingress (mean 43.72 Mbit/s) --- Flow 3 egress (mean 43.34 Mbit/s)

Flow 1 (95th percentile 163.08 ms)   Flow 2 (95th percentile 166.46 ms)   Flow 3 (95th percentile 167.48 ms)

171

```
Run 5: Statistics of TCP Vegas

Start at: 2017-09-19 04:50:25
End at: 2017-09-19 04:50:55

# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.30 Mbit/s
95th percentile per-packet one-way delay: 168.521 ms
Loss rate: 3.11%
-- Flow 1:
Average throughput: 1.92 Mbit/s
95th percentile per-packet one-way delay: 163.035 ms
Loss rate: 1.87%
-- Flow 2:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 162.957 ms
Loss rate: 1.46%
-- Flow 3:
Average throughput: 29.34 Mbit/s
95th percentile per-packet one-way delay: 169.322 ms
Loss rate: 3.50%
```
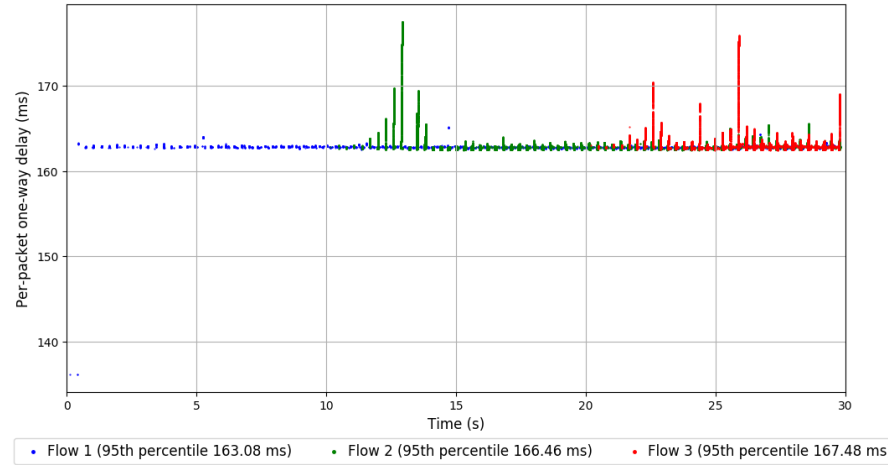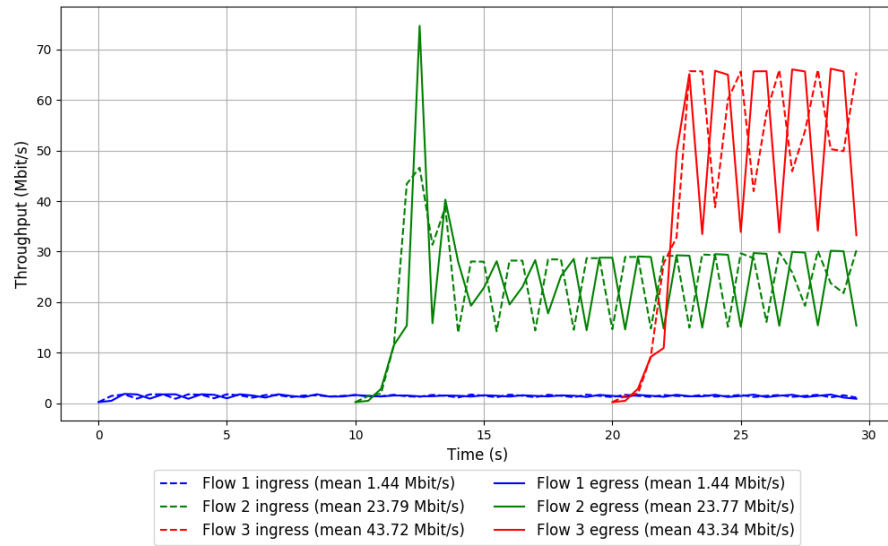
Run 5: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 1.93 Mbit/s) --- Flow 1 egress (mean 1.92 Mbit/s)
Flow 2 ingress (mean 1.28 Mbit/s) --- Flow 2 egress (mean 1.28 Mbit/s)
Flow 3 ingress (mean 29.48 Mbit/s) --- Flow 3 egress (mean 29.34 Mbit/s)

Flow 1 (95th percentile 163.03 ms)   Flow 2 (95th percentile 162.96 ms)   Flow 3 (95th percentile 169.32 ms)

173

```
Run 6: Statistics of TCP Vegas

Start at: 2017-09-19 04:59:56
End at: 2017-09-19 05:00:26


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 43.33 Mbit/s
95th percentile per-packet one-way delay: 142.735 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2974.691 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 31.82 Mbit/s
95th percentile per-packet one-way delay: 139.284 ms
Loss rate: 1.41%
-- Flow 3:
Average throughput: 56.08 Mbit/s
95th percentile per-packet one-way delay: 145.329 ms
Loss rate: 1.54%
```
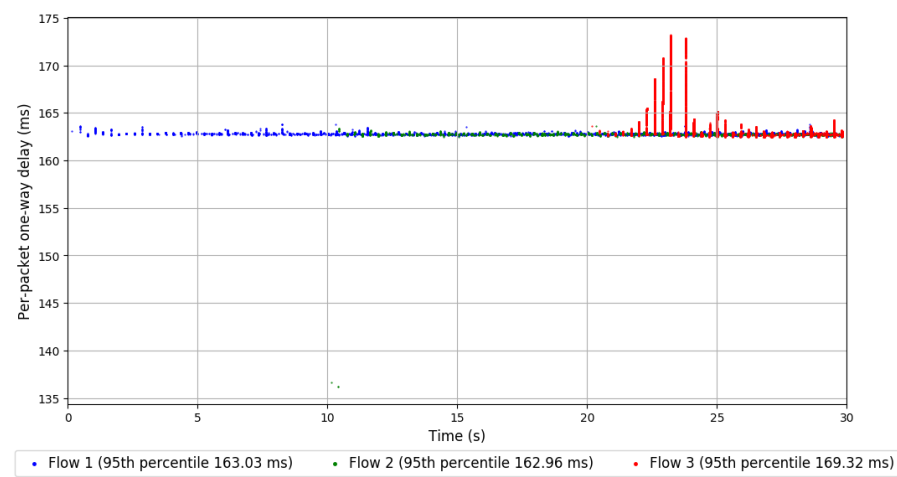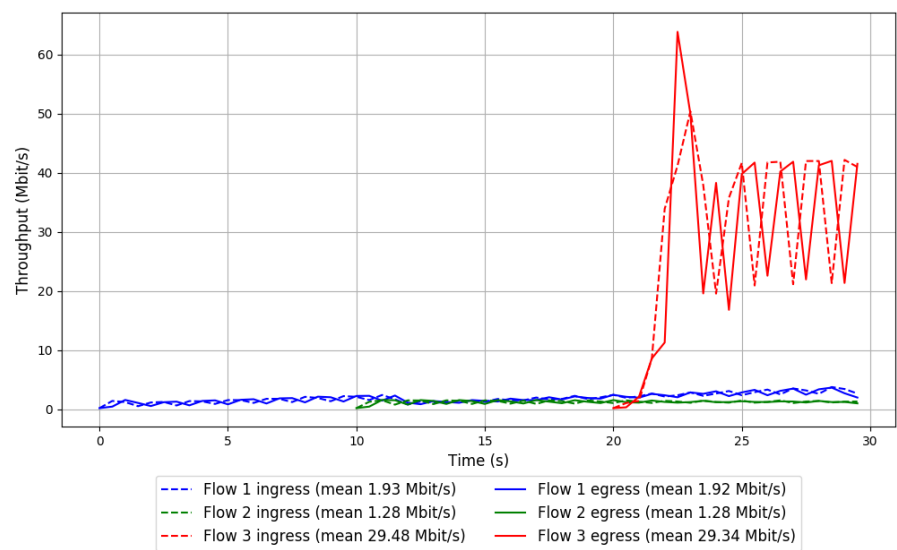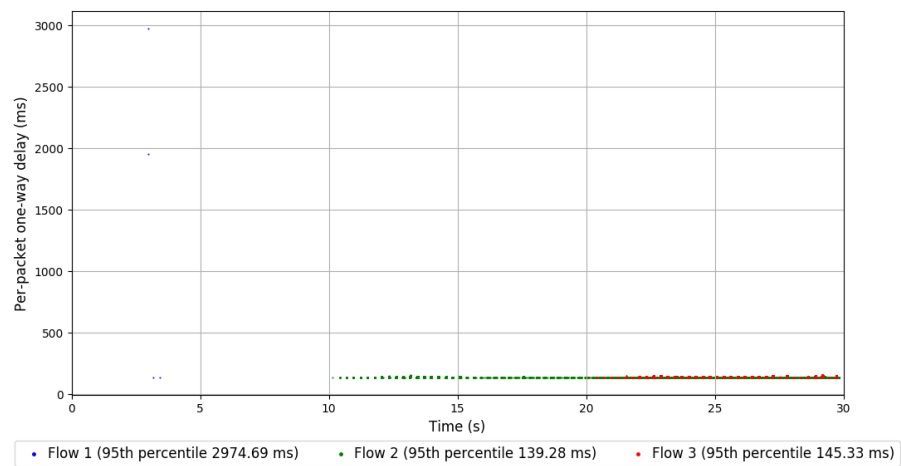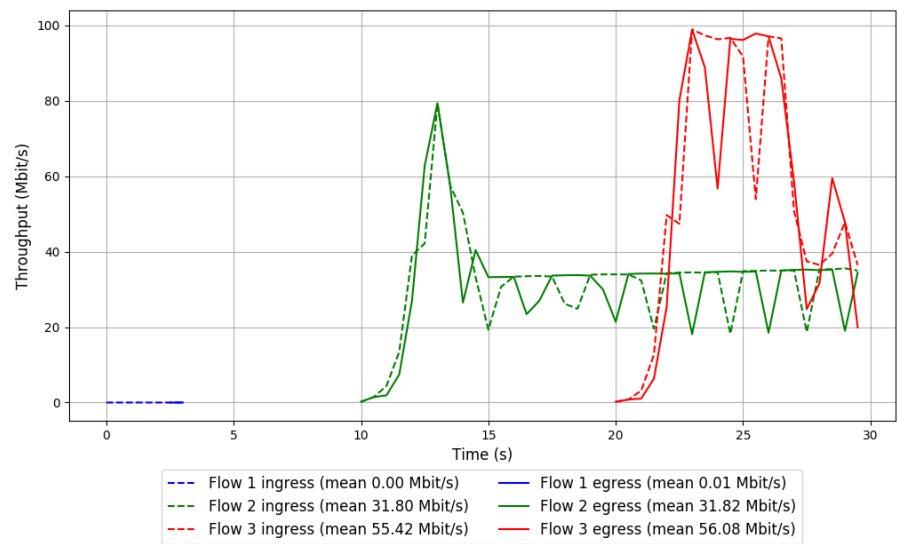
Run 6: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 0.00 Mbit/s)   Flow 1 egress (mean 0.01 Mbit/s)
Flow 2 ingress (mean 31.80 Mbit/s)   Flow 2 egress (mean 31.82 Mbit/s)
Flow 3 ingress (mean 55.42 Mbit/s)   Flow 3 egress (mean 56.08 Mbit/s)

Flow 1 (95th percentile 2974.69 ms)   Flow 2 (95th percentile 139.28 ms)   Flow 3 (95th percentile 145.33 ms)

175

```
Run 7: Statistics of TCP Vegas

Start at: 2017-09-19 05:10:04
End at: 2017-09-19 05:10:34


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.39 Mbit/s
95th percentile per-packet one-way delay: 138.494 ms
Loss rate: 1.82%
-- Flow 1:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 135.914 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 5.71 Mbit/s
95th percentile per-packet one-way delay: 136.172 ms
Loss rate: 0.71%
-- Flow 3:
Average throughput: 23.01 Mbit/s
95th percentile per-packet one-way delay: 141.597 ms
Loss rate: 2.90%
```
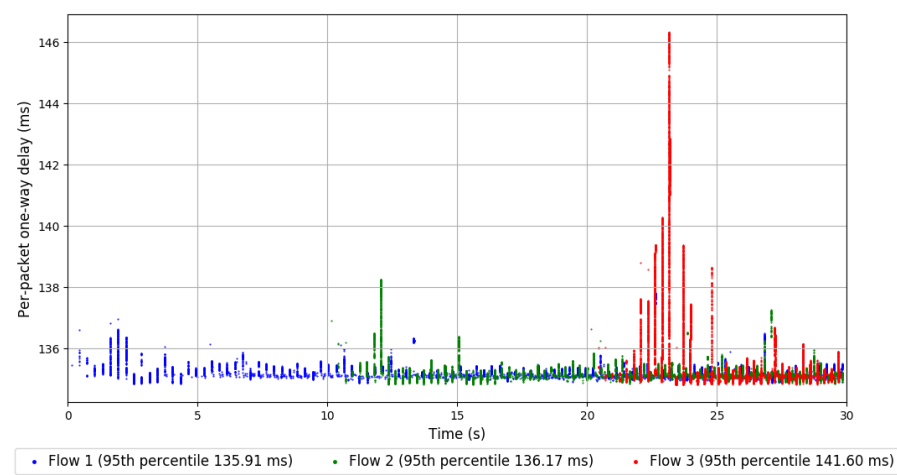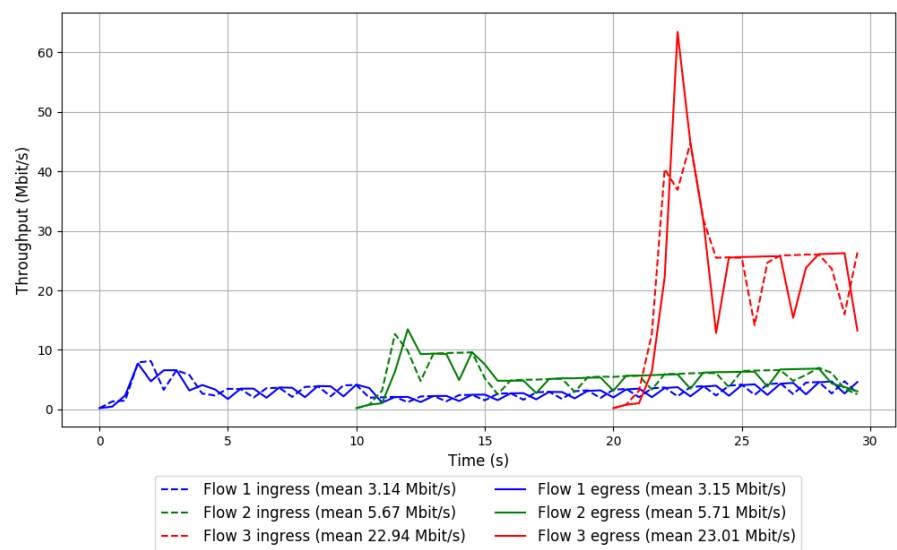
Run 7: Report of TCP Vegas — Data Link

- - - - Flow 1 ingress (mean 3.14 Mbit/s)   —— Flow 1 egress (mean 3.15 Mbit/s)
- - - - Flow 2 ingress (mean 5.67 Mbit/s)   —— Flow 2 egress (mean 5.71 Mbit/s)
- - - - Flow 3 ingress (mean 22.94 Mbit/s)   —— Flow 3 egress (mean 23.01 Mbit/s)

- Flow 1 (95th percentile 135.91 ms)   • Flow 2 (95th percentile 136.17 ms)   • Flow 3 (95th percentile 141.60 ms)

```
Run 8: Statistics of TCP Vegas

Start at: 2017-09-19 05:20:31
End at: 2017-09-19 05:21:01

# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 87.60 Mbit/s
95th percentile per-packet one-way delay: 142.557 ms
Loss rate: 1.26%
-- Flow 1:
Average throughput: 53.31 Mbit/s
95th percentile per-packet one-way delay: 138.558 ms
Loss rate: 1.01%
-- Flow 2:
Average throughput: 22.03 Mbit/s
95th percentile per-packet one-way delay: 143.269 ms
Loss rate: 1.47%
-- Flow 3:
Average throughput: 60.53 Mbit/s
95th percentile per-packet one-way delay: 146.275 ms
Loss rate: 1.77%
```
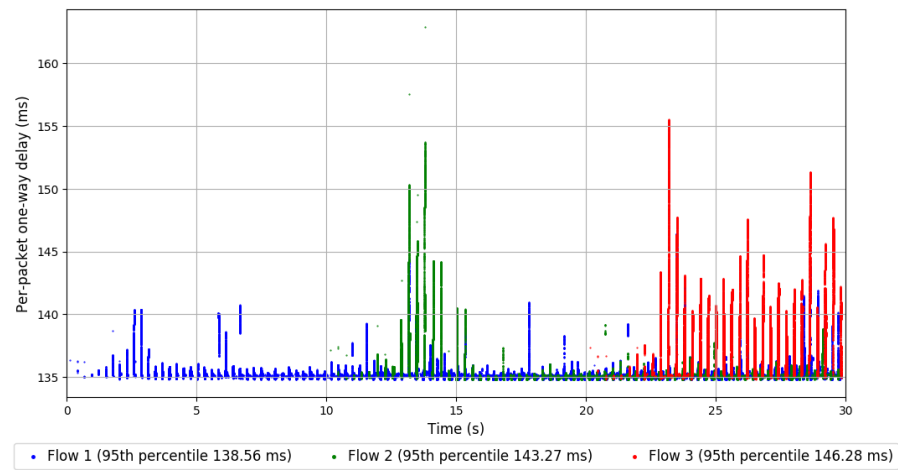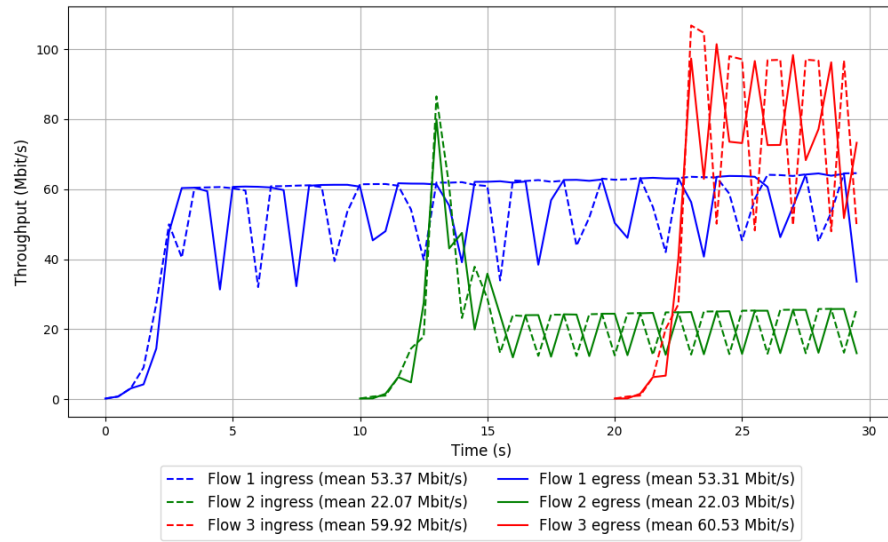
Run 8: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 53.37 Mbit/s) — Flow 1 egress (mean 53.31 Mbit/s)
Flow 2 ingress (mean 22.07 Mbit/s) — Flow 2 egress (mean 22.03 Mbit/s)
Flow 3 ingress (mean 59.92 Mbit/s) — Flow 3 egress (mean 60.53 Mbit/s)

Flow 1 (95th percentile 138.56 ms)   Flow 2 (95th percentile 143.27 ms)   Flow 3 (95th percentile 146.28 ms)

179

```
Run 9: Statistics of TCP Vegas

Start at: 2017-09-19 05:31:08
End at: 2017-09-19 05:31:38


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 162.393 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 162.439 ms
Loss rate: 1.05%
-- Flow 2:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 162.330 ms
Loss rate: 1.54%
-- Flow 3:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 162.380 ms
Loss rate: 3.09%
```
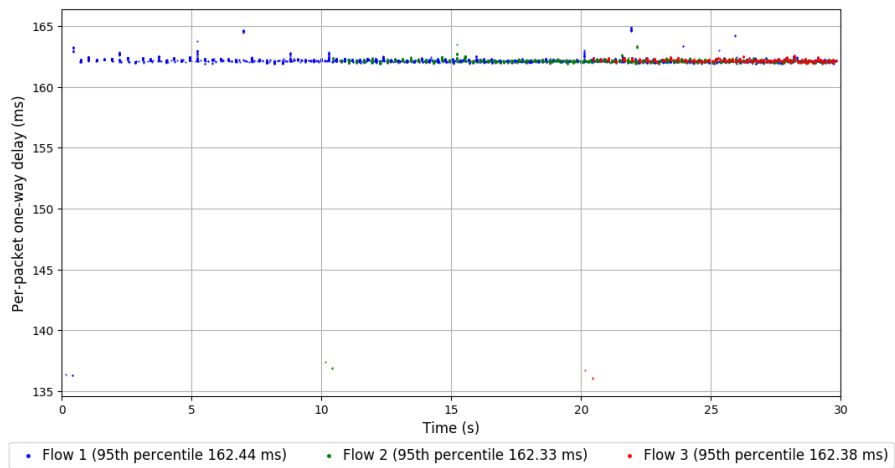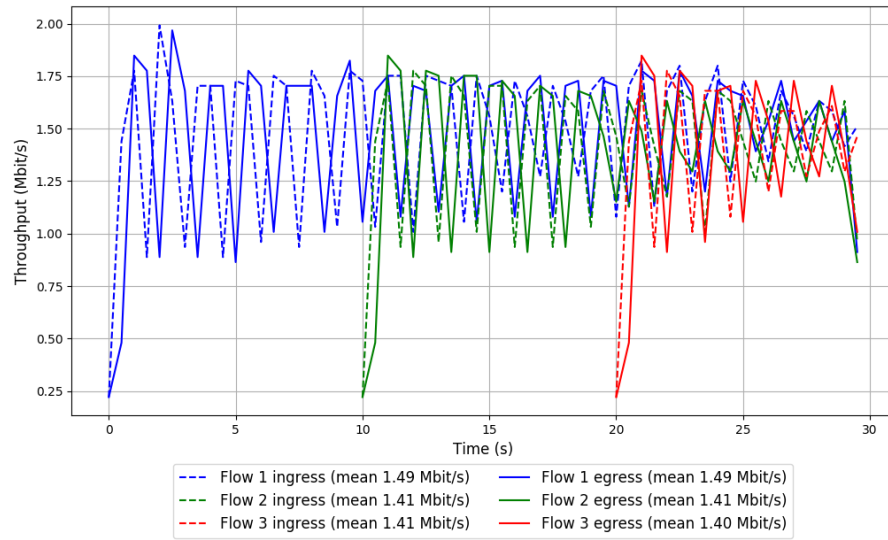
Run 9: Report of TCP Vegas — Data Link

```
Run 10: Statistics of TCP Vegas

Start at: 2017-09-19 05:40:49
End at: 2017-09-19 05:41:19


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.83 Mbit/s
95th percentile per-packet one-way delay: 162.359 ms
Loss rate: 1.52%
-- Flow 1:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 162.368 ms
Loss rate: 1.00%
-- Flow 2:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 162.369 ms
Loss rate: 1.52%
-- Flow 3:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 162.286 ms
Loss rate: 3.10%
```
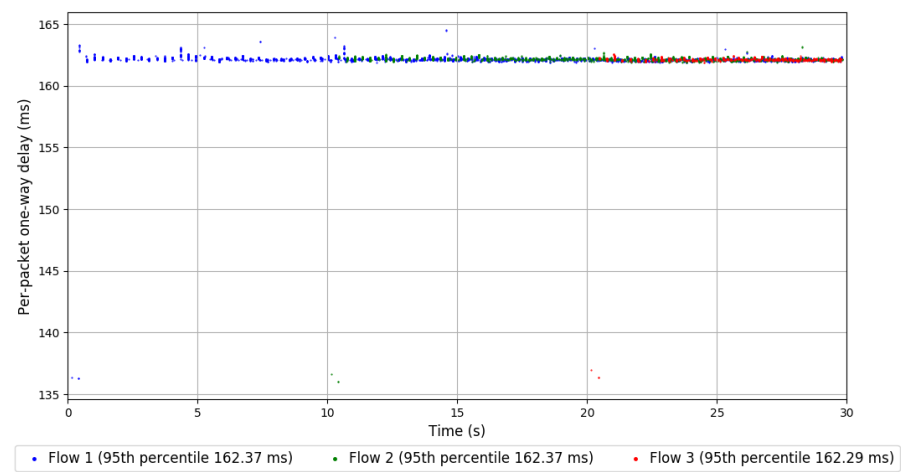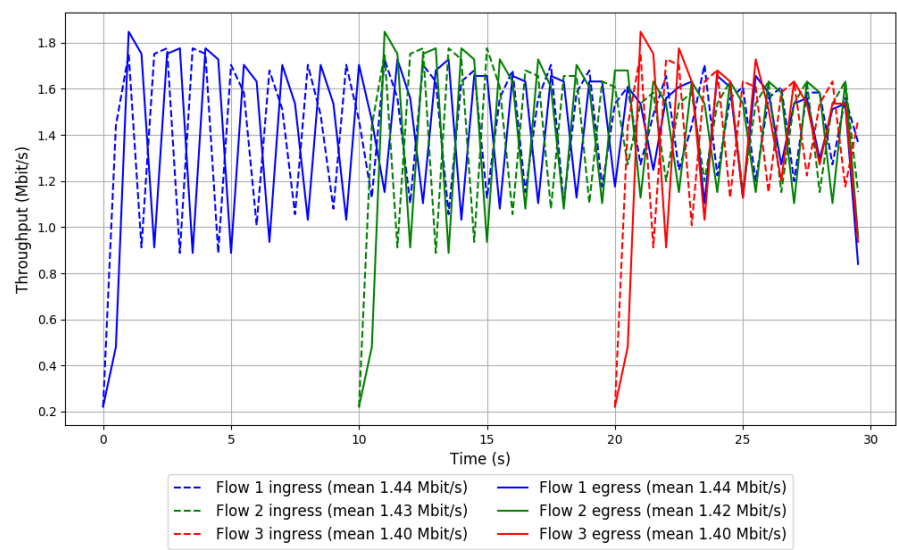
Run 10: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2017-09-19 04:06:38
End at: 2017-09-19 04:07:08

# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 248.74 Mbit/s
95th percentile per-packet one-way delay: 182.404 ms
Loss rate: 1.34%
-- Flow 1:
Average throughput: 139.77 Mbit/s
95th percentile per-packet one-way delay: 177.172 ms
Loss rate: 1.12%
-- Flow 2:
Average throughput: 151.50 Mbit/s
95th percentile per-packet one-way delay: 187.470 ms
Loss rate: 1.07%
-- Flow 3:
Average throughput: 27.79 Mbit/s
95th percentile per-packet one-way delay: 201.280 ms
Loss rate: 7.32%
```
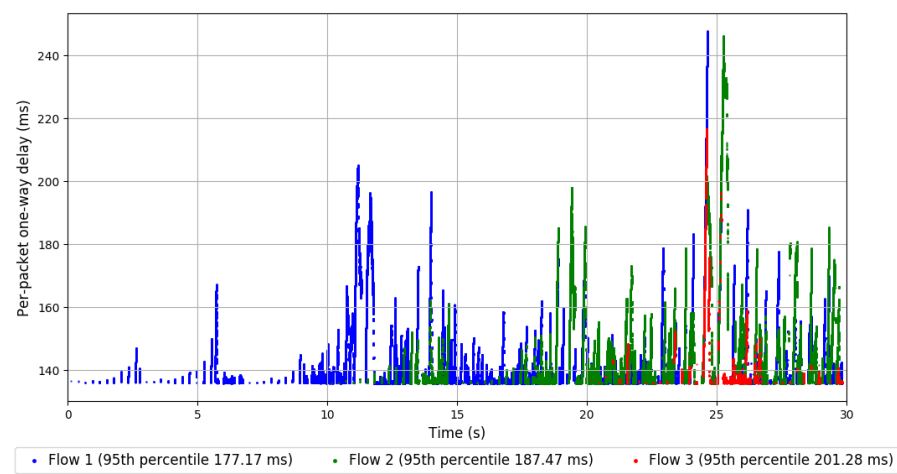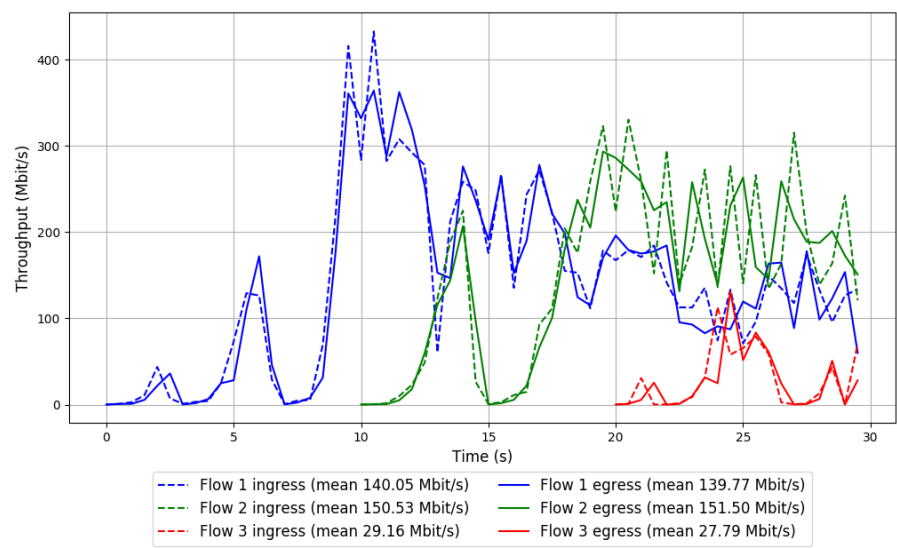
Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2017-09-19 04:17:21
End at: 2017-09-19 04:17:51


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 169.72 Mbit/s
95th percentile per-packet one-way delay: 314.316 ms
Loss rate: 7.49%
-- Flow 1:
Average throughput: 77.43 Mbit/s
95th percentile per-packet one-way delay: 146.818 ms
Loss rate: 0.72%
-- Flow 2:
Average throughput: 113.37 Mbit/s
95th percentile per-packet one-way delay: 337.884 ms
Loss rate: 13.07%
-- Flow 3:
Average throughput: 55.24 Mbit/s
95th percentile per-packet one-way delay: 226.031 ms
Loss rate: 10.00%
```
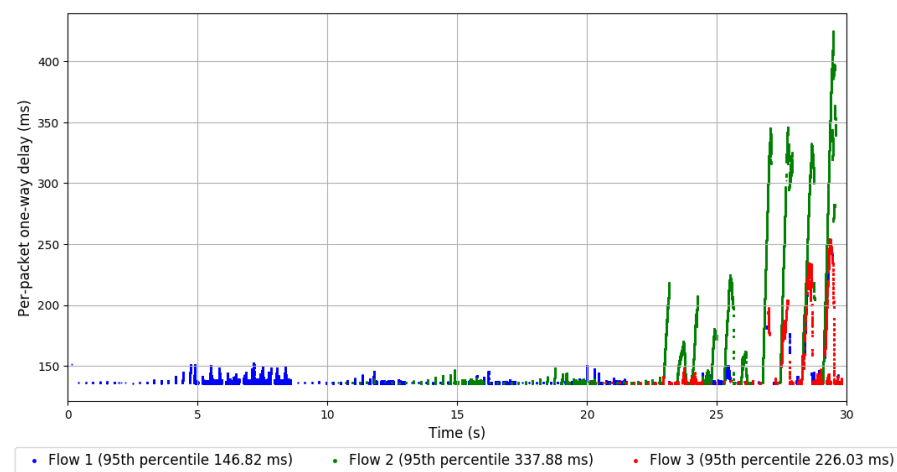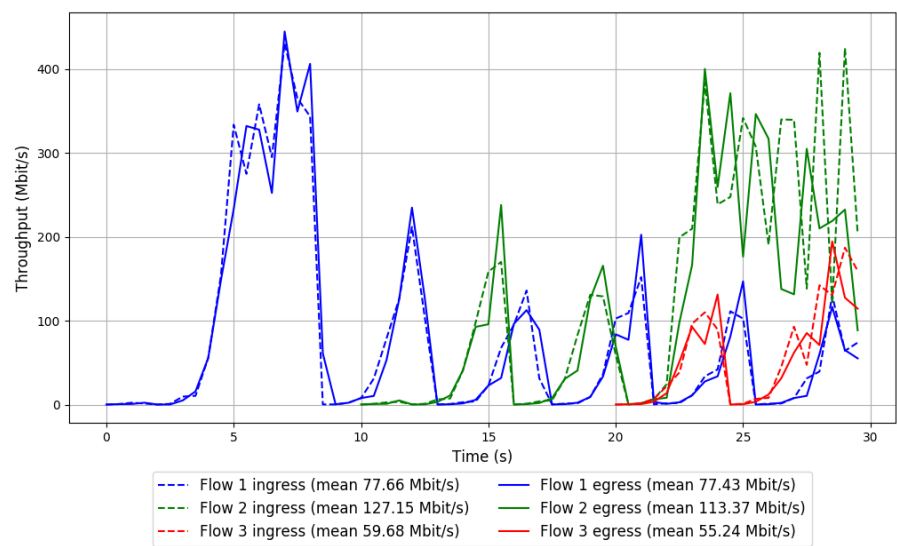
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2017-09-19 04:28:06
End at: 2017-09-19 04:28:36


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 153.66 Mbit/s
95th percentile per-packet one-way delay: 355.504 ms
Loss rate: 10.48%
-- Flow 1:
Average throughput: 69.97 Mbit/s
95th percentile per-packet one-way delay: 265.208 ms
Loss rate: 2.90%
-- Flow 2:
Average throughput: 59.48 Mbit/s
95th percentile per-packet one-way delay: 190.279 ms
Loss rate: 1.88%
-- Flow 3:
Average throughput: 140.49 Mbit/s
95th percentile per-packet one-way delay: 382.003 ms
Loss rate: 25.39%
```

Run 3: Report of Verus — Data Link

Flow 1 ingress (mean 71.32 Mbit/s)   Flow 1 egress (mean 69.97 Mbit/s)
Flow 2 ingress (mean 59.37 Mbit/s)   Flow 2 egress (mean 59.48 Mbit/s)
Flow 3 ingress (mean 177.75 Mbit/s) Flow 3 egress (mean 140.49 Mbit/s)

Flow 1 (95th percentile 265.21 ms)   Flow 2 (95th percentile 190.28 ms)   Flow 3 (95th percentile 382.00 ms)

```
Run 4: Statistics of Verus

Start at: 2017-09-19 04:37:35
End at: 2017-09-19 04:38:05


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 205.72 Mbit/s
95th percentile per-packet one-way delay: 229.150 ms
Loss rate: 3.07%
-- Flow 1:
Average throughput: 121.54 Mbit/s
95th percentile per-packet one-way delay: 266.559 ms
Loss rate: 3.51%
-- Flow 2:
Average throughput: 116.27 Mbit/s
95th percentile per-packet one-way delay: 185.467 ms
Loss rate: 2.59%
-- Flow 3:
Average throughput: 22.13 Mbit/s
95th percentile per-packet one-way delay: 230.806 ms
Loss rate: 0.79%
```
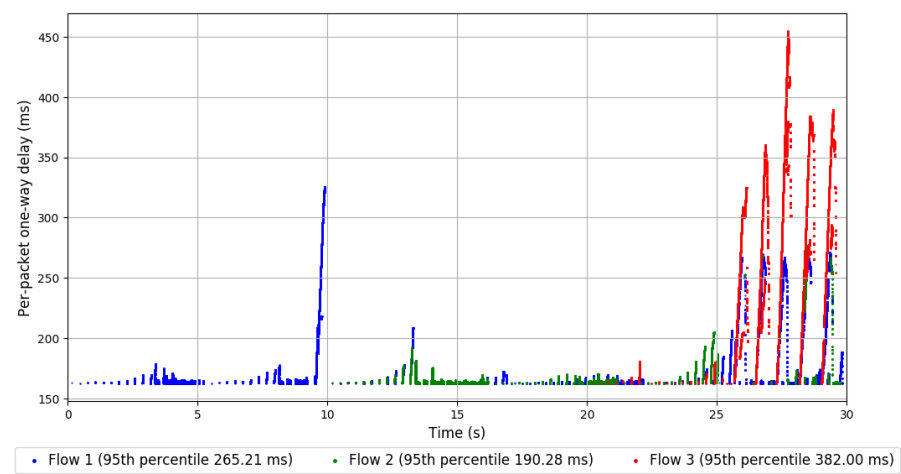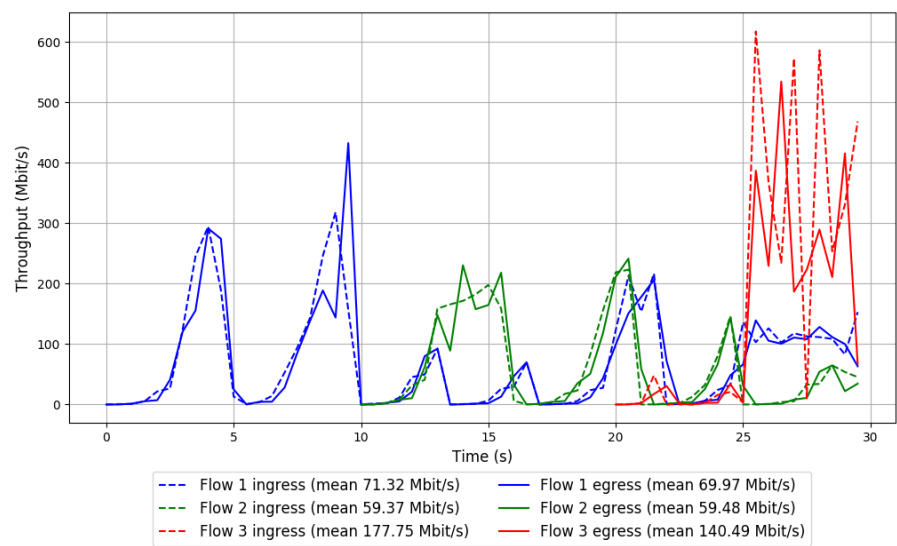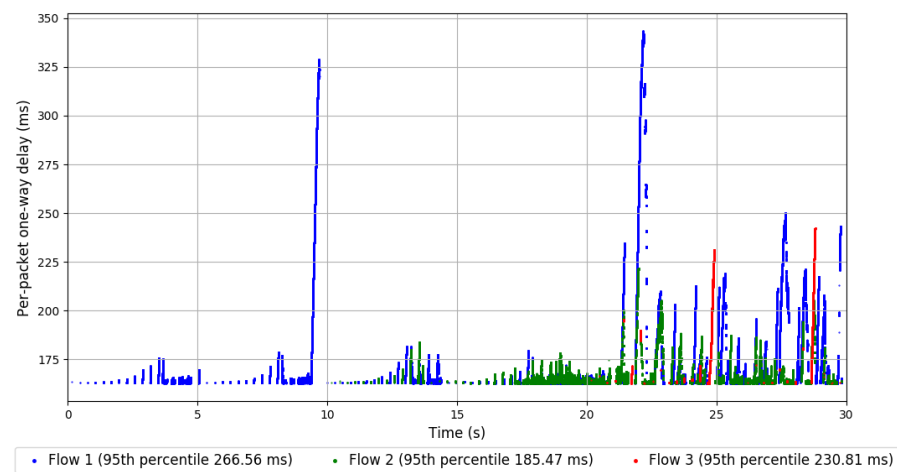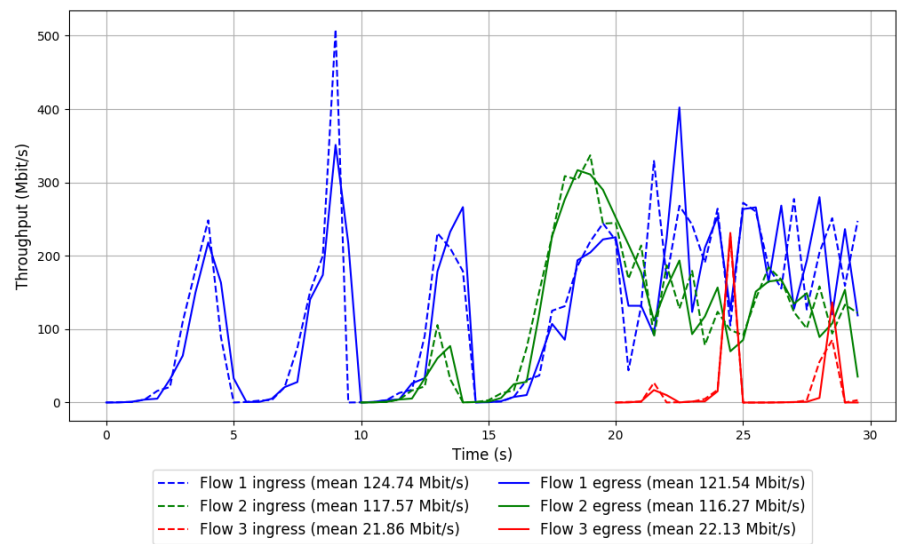
Run 4: Report of Verus — Data Link

```
Run 5: Statistics of Verus

Start at: 2017-09-19 04:48:05
End at: 2017-09-19 04:48:35


# Below is generated by plot.py at 2017-09-19 08:14:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 144.91 Mbit/s
95th percentile per-packet one-way delay: 199.620 ms
Loss rate: 2.49%
-- Flow 1:
Average throughput: 87.27 Mbit/s
95th percentile per-packet one-way delay: 179.375 ms
Loss rate: 2.41%
-- Flow 2:
Average throughput: 70.57 Mbit/s
95th percentile per-packet one-way delay: 208.703 ms
Loss rate: 3.18%
-- Flow 3:
Average throughput: 34.26 Mbit/s
95th percentile per-packet one-way delay: 177.225 ms
Loss rate: 0.08%
```
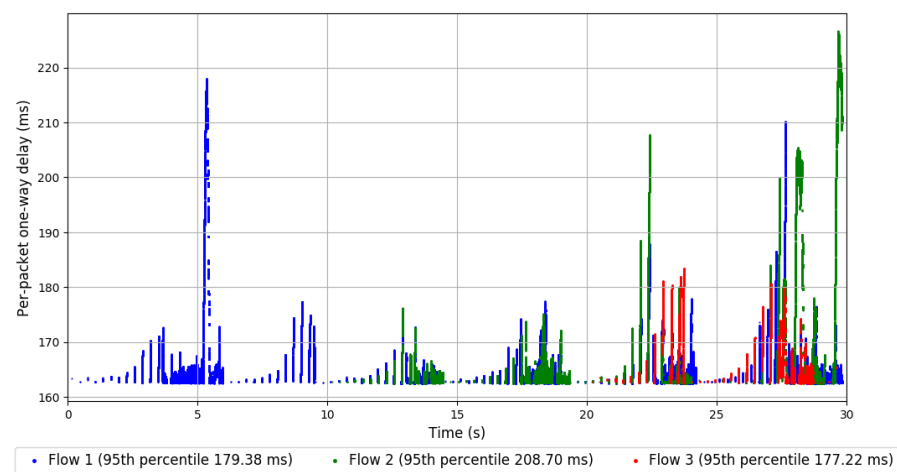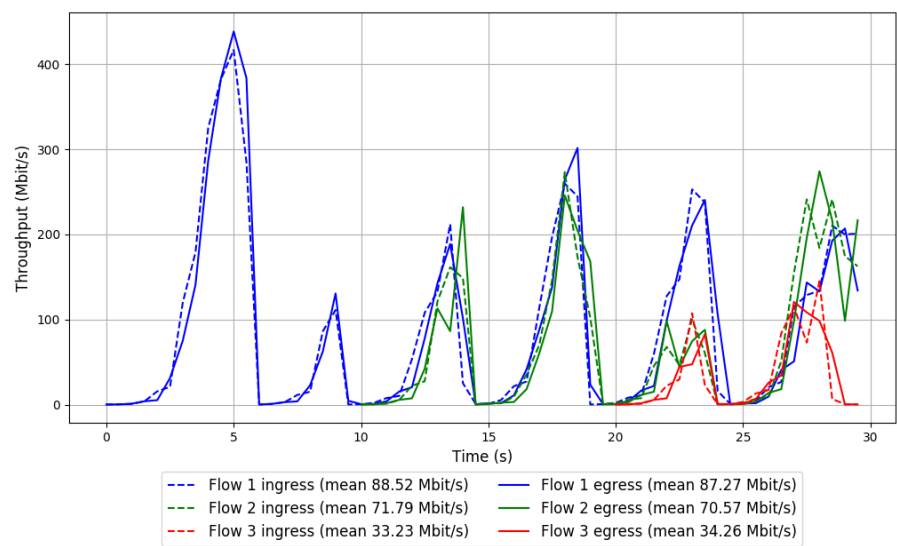
Run 5: Report of Verus — Data Link

```
Run 6: Statistics of Verus

Start at: 2017-09-19 04:57:38
End at: 2017-09-19 04:58:08

# Below is generated by plot.py at 2017-09-19 08:14:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 152.16 Mbit/s
95th percentile per-packet one-way delay: 297.578 ms
Loss rate: 8.19%
-- Flow 1:
Average throughput: 69.15 Mbit/s
95th percentile per-packet one-way delay: 321.752 ms
Loss rate: 13.45%
-- Flow 2:
Average throughput: 103.16 Mbit/s
95th percentile per-packet one-way delay: 244.784 ms
Loss rate: 3.90%
-- Flow 3:
Average throughput: 44.94 Mbit/s
95th percentile per-packet one-way delay: 178.715 ms
Loss rate: 0.35%
```

Run 6: Report of Verus — Data Link

Flow 1 ingress (mean 79.60 Mbit/s) --- Flow 1 egress (mean 69.15 Mbit/s)
Flow 2 ingress (mean 106.32 Mbit/s) --- Flow 2 egress (mean 103.16 Mbit/s)
Flow 3 ingress (mean 43.74 Mbit/s) --- Flow 3 egress (mean 44.94 Mbit/s)

Flow 1 (95th percentile 321.75 ms)   Flow 2 (95th percentile 244.78 ms)   Flow 3 (95th percentile 178.72 ms)

```
Run 7: Statistics of Verus

Start at: 2017-09-19 05:07:43
End at: 2017-09-19 05:08:13


# Below is generated by plot.py at 2017-09-19 08:14:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 189.32 Mbit/s
95th percentile per-packet one-way delay: 152.342 ms
Loss rate: 2.17%
-- Flow 1:
Average throughput: 67.93 Mbit/s
95th percentile per-packet one-way delay: 151.549 ms
Loss rate: 2.08%
-- Flow 2:
Average throughput: 124.05 Mbit/s
95th percentile per-packet one-way delay: 154.013 ms
Loss rate: 1.53%
-- Flow 3:
Average throughput: 122.19 Mbit/s
95th percentile per-packet one-way delay: 150.774 ms
Loss rate: 3.64%
```
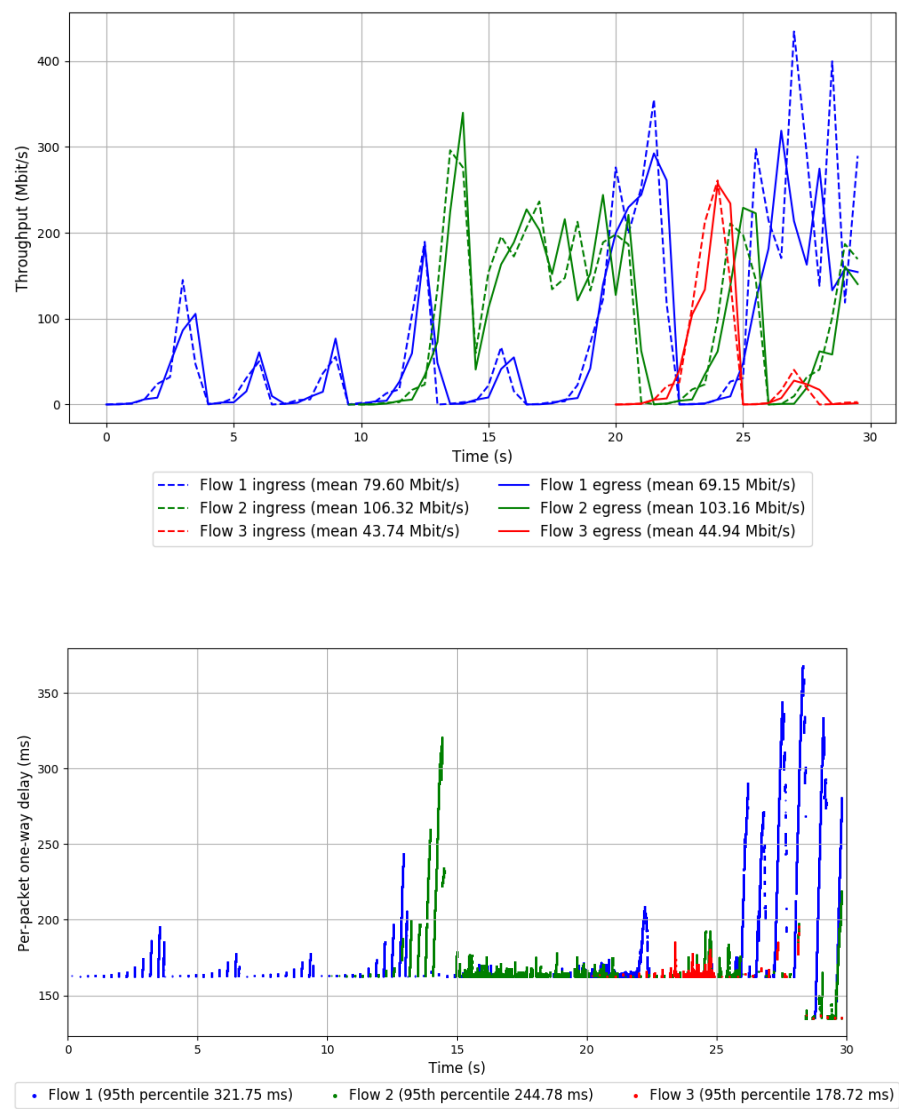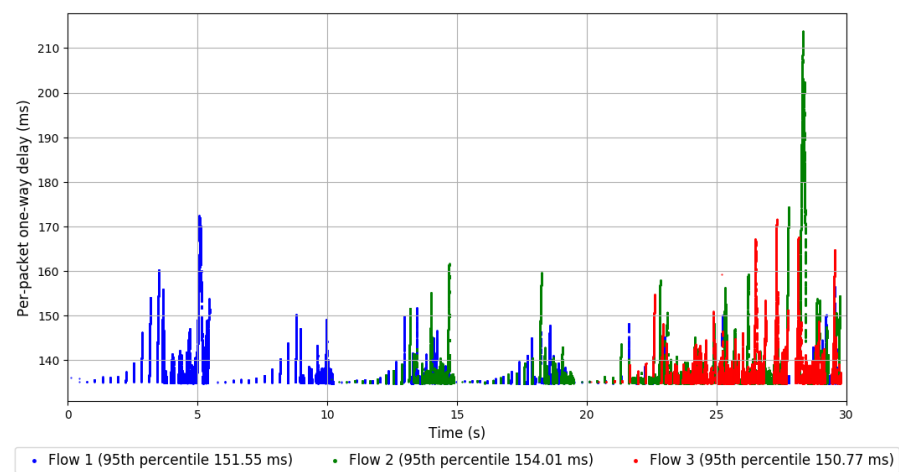
Run 7: Report of Verus — Data Link

Flow 1 ingress (mean 68.46 Mbit/s)   Flow 1 egress (mean 67.93 Mbit/s)
Flow 2 ingress (mean 124.57 Mbit/s)   Flow 2 egress (mean 124.05 Mbit/s)
Flow 3 ingress (mean 123.92 Mbit/s)   Flow 3 egress (mean 122.19 Mbit/s)

Flow 1 (95th percentile 151.55 ms)   Flow 2 (95th percentile 154.01 ms)   Flow 3 (95th percentile 150.77 ms)

```
Run 8: Statistics of Verus

Start at: 2017-09-19 05:18:12
End at: 2017-09-19 05:18:42


# Below is generated by plot.py at 2017-09-19 08:14:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 194.54 Mbit/s
95th percentile per-packet one-way delay: 207.533 ms
Loss rate: 1.51%
-- Flow 1:
Average throughput: 122.23 Mbit/s
95th percentile per-packet one-way delay: 218.894 ms
Loss rate: 1.39%
-- Flow 2:
Average throughput: 88.82 Mbit/s
95th percentile per-packet one-way delay: 146.089 ms
Loss rate: 1.03%
-- Flow 3:
Average throughput: 43.03 Mbit/s
95th percentile per-packet one-way delay: 210.936 ms
Loss rate: 4.53%
```
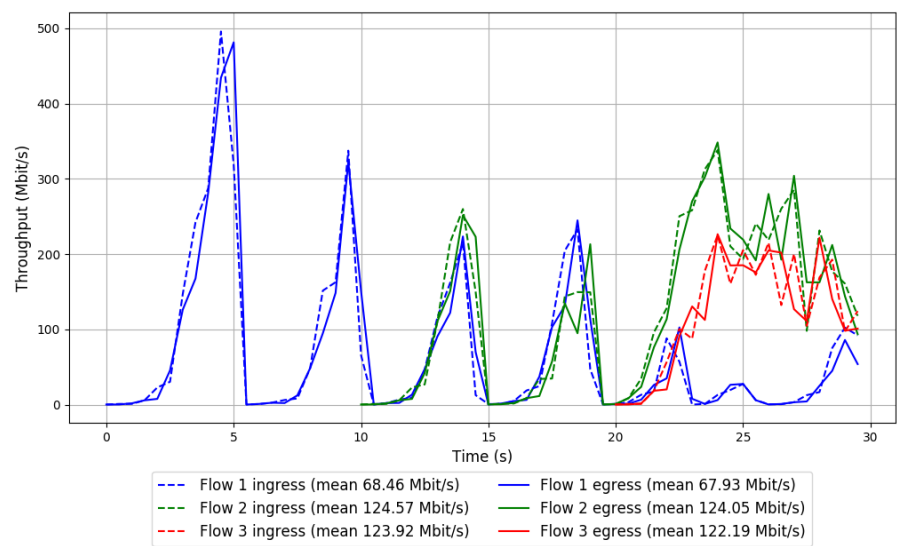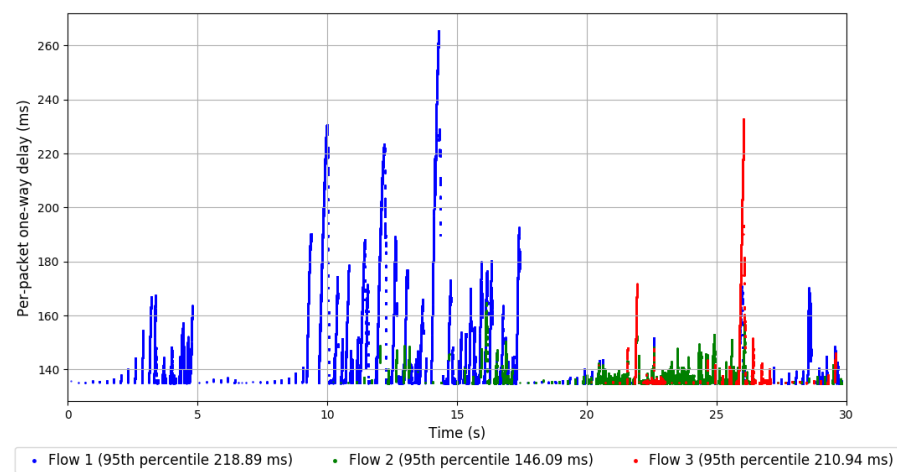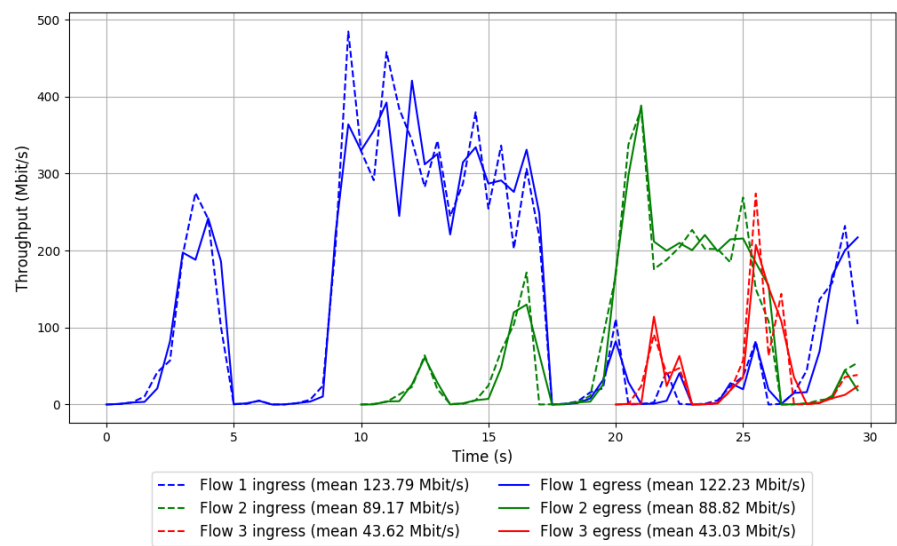
Run 8: Report of Verus — Data Link

Flow 1 ingress (mean 123.79 Mbit/s)   Flow 1 egress (mean 122.23 Mbit/s)
Flow 2 ingress (mean 89.17 Mbit/s)   Flow 2 egress (mean 88.82 Mbit/s)
Flow 3 ingress (mean 43.62 Mbit/s)   Flow 3 egress (mean 43.03 Mbit/s)

Flow 1 (95th percentile 218.89 ms)   Flow 2 (95th percentile 146.09 ms)   Flow 3 (95th percentile 210.94 ms)

```
Run 9: Statistics of Verus

Start at: 2017-09-19 05:28:40
End at: 2017-09-19 05:29:10


# Below is generated by plot.py at 2017-09-19 08:15:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 279.00 Mbit/s
95th percentile per-packet one-way delay: 319.956 ms
Loss rate: 5.16%
-- Flow 1:
Average throughput: 208.83 Mbit/s
95th percentile per-packet one-way delay: 329.086 ms
Loss rate: 6.62%
-- Flow 2:
Average throughput: 96.56 Mbit/s
95th percentile per-packet one-way delay: 213.146 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 20.09 Mbit/s
95th percentile per-packet one-way delay: 205.584 ms
Loss rate: 5.52%
```
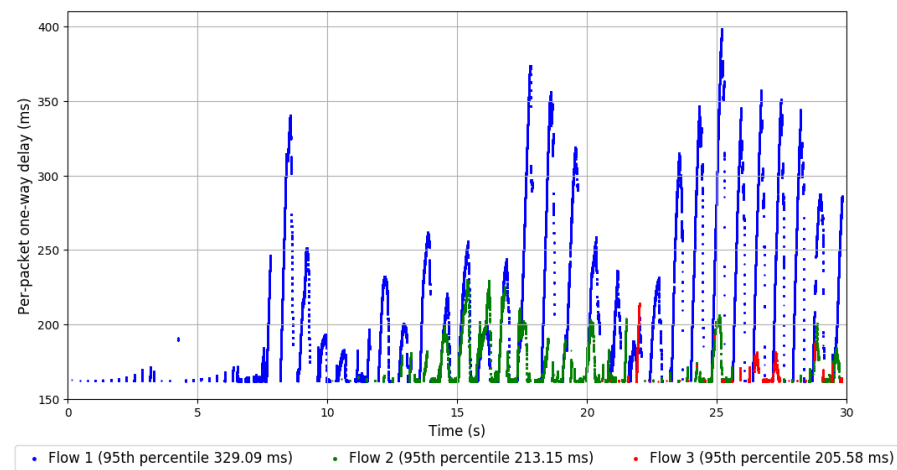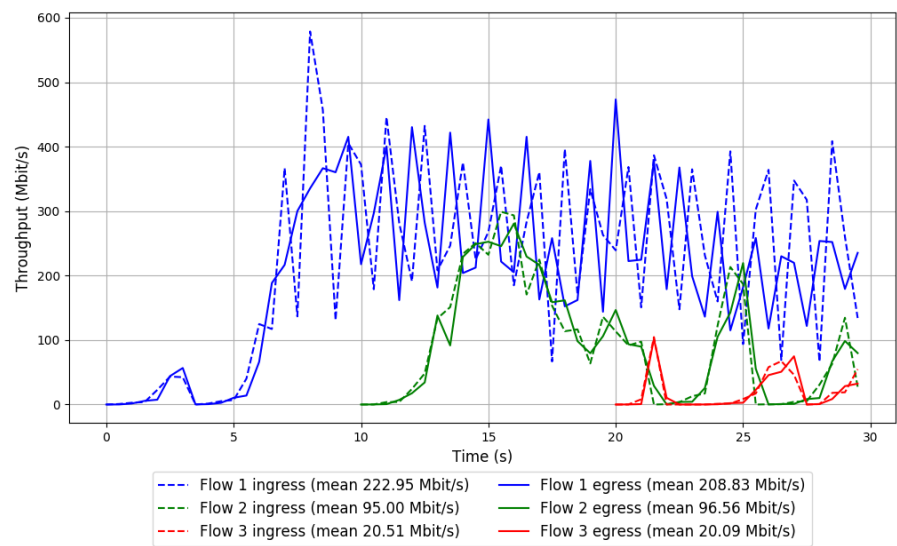
Run 9: Report of Verus — Data Link

Flow 1 ingress (mean 222.95 Mbit/s) --- Flow 1 egress (mean 208.83 Mbit/s)
Flow 2 ingress (mean 95.00 Mbit/s) --- Flow 2 egress (mean 96.56 Mbit/s)
Flow 3 ingress (mean 20.51 Mbit/s) --- Flow 3 egress (mean 20.09 Mbit/s)

Flow 1 (95th percentile 329.09 ms)   Flow 2 (95th percentile 213.15 ms)   Flow 3 (95th percentile 205.58 ms)

201

```
Run 10: Statistics of Verus

Start at: 2017-09-19 05:38:23
End at: 2017-09-19 05:38:53


# Below is generated by plot.py at 2017-09-19 08:15:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 293.79 Mbit/s
95th percentile per-packet one-way delay: 227.983 ms
Loss rate: 1.95%
-- Flow 1:
Average throughput: 197.45 Mbit/s
95th percentile per-packet one-way delay: 203.604 ms
Loss rate: 0.90%
-- Flow 2:
Average throughput: 52.70 Mbit/s
95th percentile per-packet one-way delay: 291.475 ms
Loss rate: 2.11%
-- Flow 3:
Average throughput: 195.56 Mbit/s
95th percentile per-packet one-way delay: 236.063 ms
Loss rate: 5.03%
```

Run 10: Report of Verus — Data Link