Pantheon Report

Generated at 2018-12-12 15:23:56 (UTC).

Data path: GCE London on `ens4` (*local*) →GCE Iowa on `ens4` (*remote*).

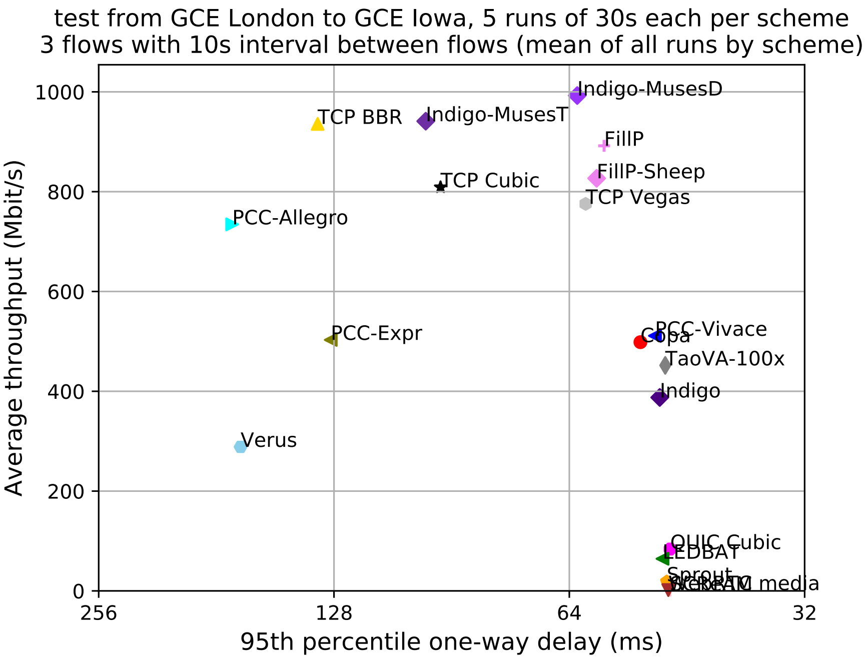
Repeated the test of 19 congestion control schemes 5 times.

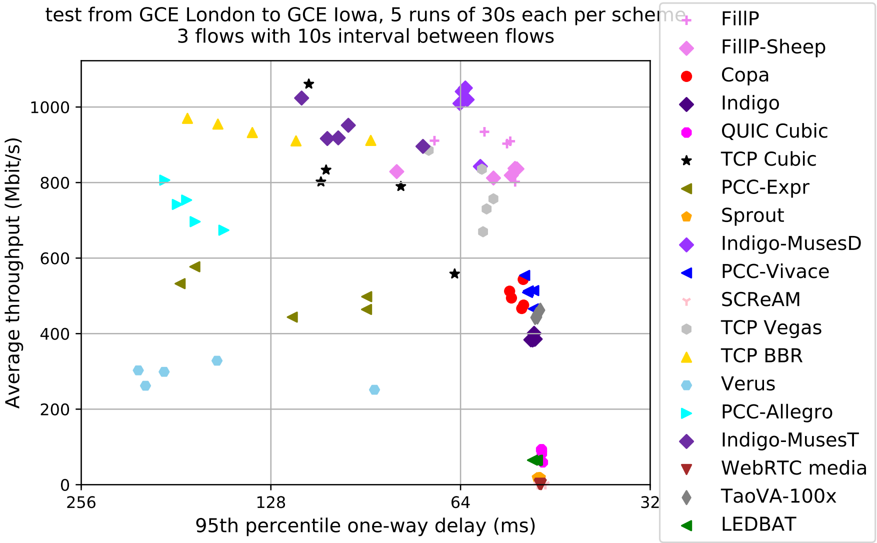
Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

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

```
System info:
Linux 4.15.0-1024-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

```
Git summary:
branch: muses @ c654af0b7d59d4ef4b914cfac404e1fc2e96dc68
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
third_party/muses-refactored @ 31f8f0ba8ef8b1da76c2bc0cd0a7850c33ff64fb
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
 M src/ScreamClient
 M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
 M src/examples/cellsim.cc
 M src/examples/sproutbt2.cc
 M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

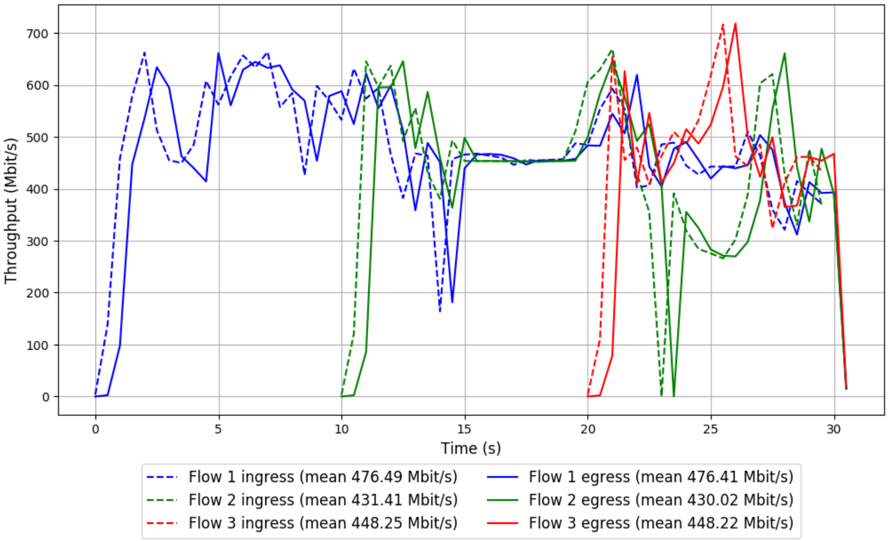

test from GCE London to GCE Iowa, 5 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)
Average throughput (Mbit/s)
1000
800
600
400
200
0
256
128
64
32
95th percentile one-way delay (ms)
Indigo-MusesD
TCP BBR
Indigo-MusesT
FillP
FillP-Sheep
TCP Cubic
TCP Vegas
PCC-Allegro
PCC-Vivace
Copa
PCC-Expr
TaoVA-100x
Indigo
Verus
QUIC Cubic
LEDBAT
Sprout
SCReAM
WebRTC media

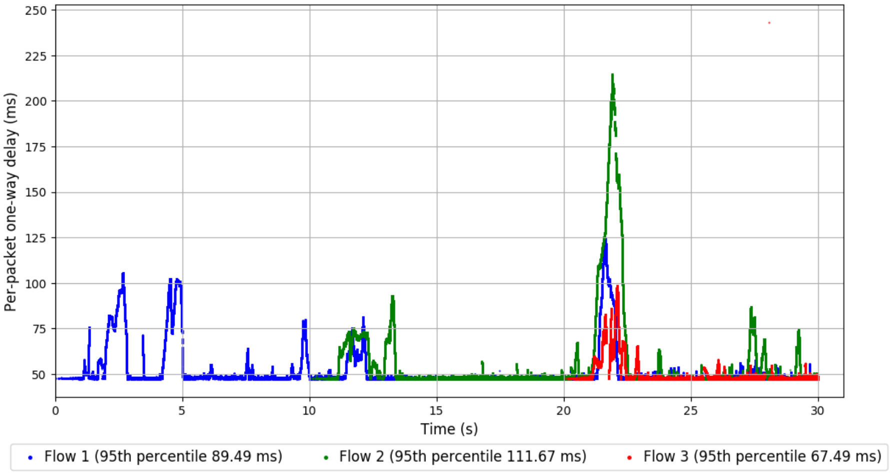

test from GCE London to GCE Iowa, 5 runs of 30s each per scheme
3 flows with 10s interval between flows
Average throughput (Mbit/s)
1000
800
600
400
200
0
256
128
64
32
95th percentile one-way delay (ms)
FillP
FillP-Sheep
Copa
Indigo
QUIC Cubic
TCP Cubic
PCC-Expr
Sprout
Indigo-MusesD
PCC-Vivace
SCReAM
TCP Vegas
TCP BBR
Verus
PCC-Allegro
Indigo-MusesT
WebRTC media
TaoVA-100x
LEDBAT

		mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
scheme	# runs	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	5	503.73	442.45	413.46	131.53	137.97	131.92	0.38	0.61	0.65
Copa	5	252.78	246.70	244.78	50.06	52.77	54.72	0.00	0.00	0.01
TCP Cubic	5	492.66	247.62	455.24	87.51	57.82	99.89	0.00	0.01	0.02
FillP	5	571.00	355.83	253.50	60.01	51.08	50.01	0.03	0.01	0.01
FillP-Sheep	5	529.04	325.78	244.53	61.32	50.91	50.30	0.02	0.00	0.01
Indigo	5	204.86	192.74	169.03	48.95	49.03	48.92	0.00	0.00	0.00
Indigo-MusesD	5	520.69	508.56	410.15	65.47	61.24	59.61	0.00	0.01	0.02
Indigo-MusesT	5	552.70	445.60	346.78	92.30	77.54	64.23	0.03	0.05	0.01
LEDBAT	5	41.43	27.68	13.82	48.67	48.47	48.21	0.00	0.00	0.00
PCC-Allegro	5	418.79	334.26	284.80	177.80	94.47	104.06	5.11	0.89	1.78
PCC-Expr	5	297.37	254.43	110.00	118.93	141.55	77.90	2.24	4.29	1.99
QUIC Cubic	5	37.34	48.47	43.57	47.40	47.46	47.41	0.00	0.00	0.00
SCReAM	5	0.22	0.22	0.22	47.53	47.59	47.56	0.00	0.00	0.00
Sprout	5	9.57	9.49	9.10	47.90	48.06	47.83	0.00	0.00	0.00
TaoVA-100x	5	229.70	227.73	212.18	48.10	48.20	49.03	0.00	0.00	0.00
TCP Vegas	5	400.35	451.14	225.41	54.39	60.26	51.86	0.01	0.02	0.03
Verus	5	155.01	155.18	93.62	122.03	122.34	94.99	1.62	0.40	2.05
PCC-Vivace	5	304.79	256.24	108.94	49.85	54.48	48.94	0.00	0.00	0.00
WebRTC media	5	0.85	0.55	0.24	47.45	47.72	47.35	0.01	0.01	0.00

```
Run 1: Statistics of TCP BBR

Start at: 2018-12-12 09:50:15
End at: 2018-12-12 09:50:45
Local clock offset: -0.109 ms
Remote clock offset: -0.009 ms

# Below is generated by plot.py at 2018-12-12 13:03:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 911.60 Mbit/s
95th percentile per-packet one-way delay: 88.852 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 476.41 Mbit/s
95th percentile per-packet one-way delay: 89.488 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 430.02 Mbit/s
95th percentile per-packet one-way delay: 111.675 ms
Loss rate: 0.32%
-- Flow 3:
Average throughput: 448.22 Mbit/s
95th percentile per-packet one-way delay: 67.493 ms
Loss rate: 0.00%
```

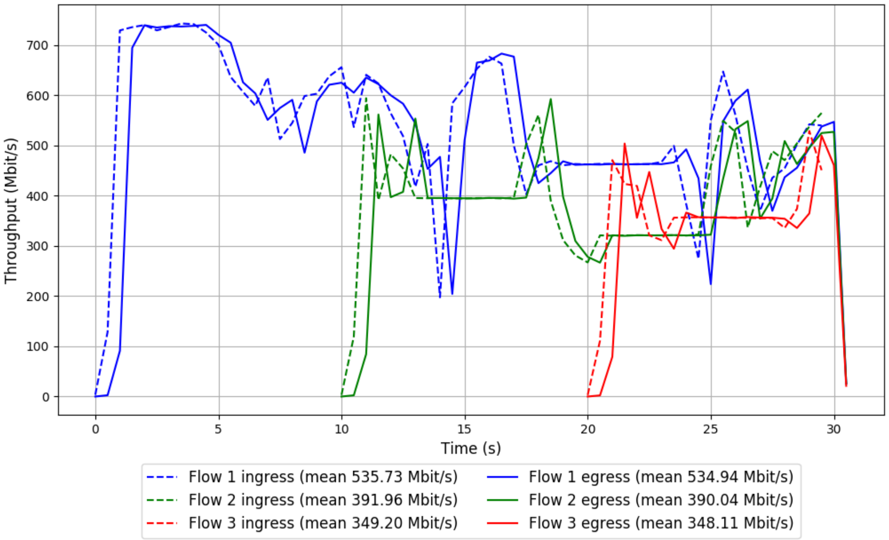
Run 1: Report of TCP BBR — Data Link

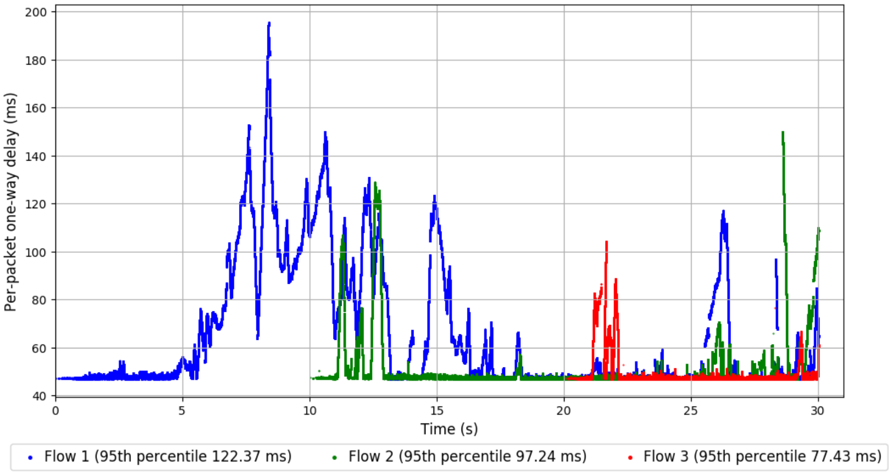




```
Run 2: Statistics of TCP BBR

Start at: 2018-12-12 10:25:10
End at: 2018-12-12 10:25:40
Local clock offset: 0.324 ms
Remote clock offset: -0.036 ms

# Below is generated by plot.py at 2018-12-12 13:03:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 910.38 Mbit/s
95th percentile per-packet one-way delay: 116.767 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 534.94 Mbit/s
95th percentile per-packet one-way delay: 122.368 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 390.04 Mbit/s
95th percentile per-packet one-way delay: 97.239 ms
Loss rate: 0.49%
-- Flow 3:
Average throughput: 348.11 Mbit/s
95th percentile per-packet one-way delay: 77.427 ms
Loss rate: 0.31%
```

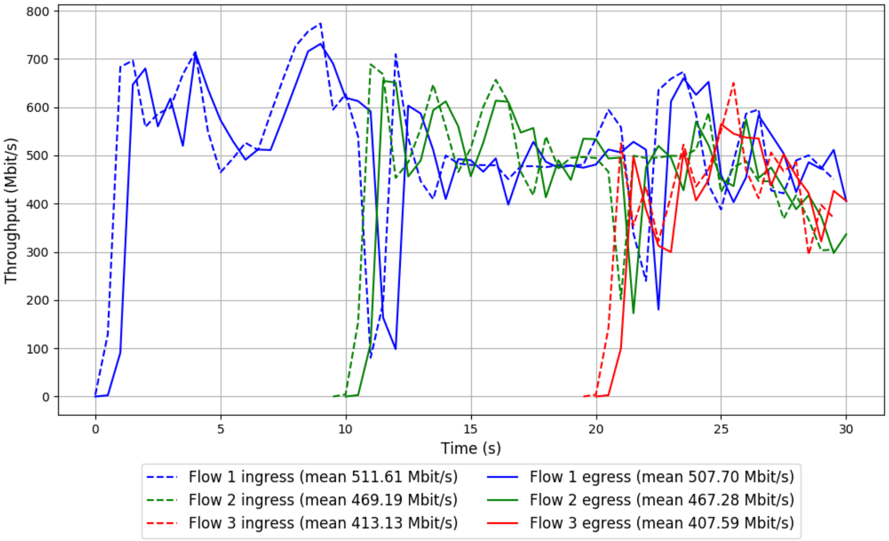
Run 2: Report of TCP BBR — Data Link

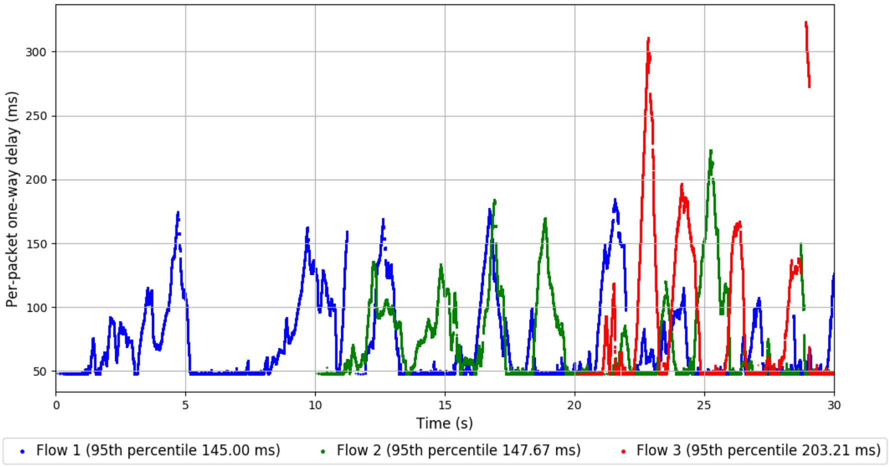




```
Run 3: Statistics of TCP BBR

Start at: 2018-12-12 11:01:04
End at: 2018-12-12 11:01:34
Local clock offset: -0.241 ms
Remote clock offset: -0.203 ms

# Below is generated by plot.py at 2018-12-12 13:03:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 954.86 Mbit/s
95th percentile per-packet one-way delay: 155.347 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 507.70 Mbit/s
95th percentile per-packet one-way delay: 144.997 ms
Loss rate: 0.76%
-- Flow 2:
Average throughput: 467.28 Mbit/s
95th percentile per-packet one-way delay: 147.667 ms
Loss rate: 0.41%
-- Flow 3:
Average throughput: 407.59 Mbit/s
95th percentile per-packet one-way delay: 203.211 ms
Loss rate: 1.34%
```

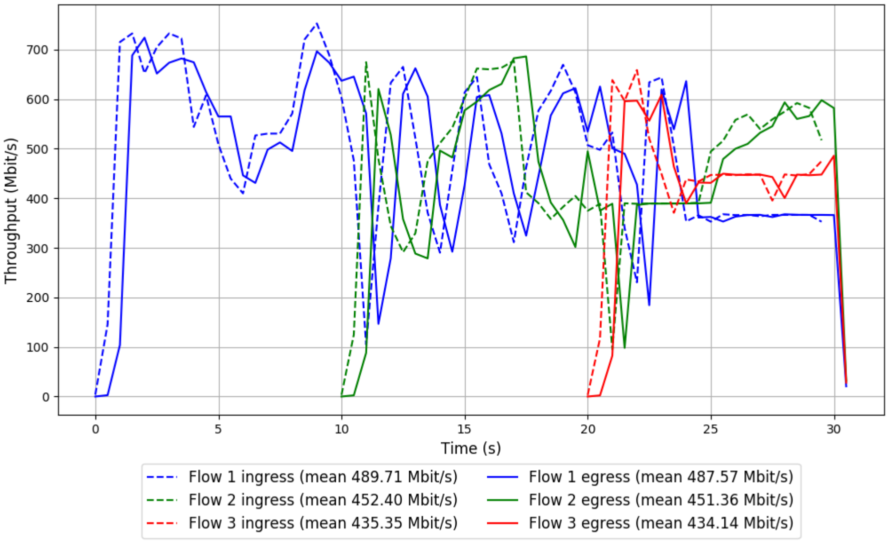
Run 3: Report of TCP BBR — Data Link

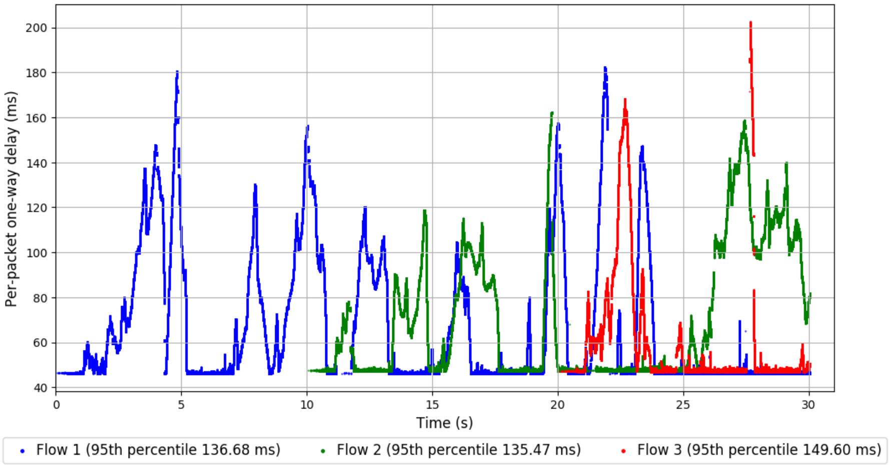




```
Run 4: Statistics of TCP BBR

Start at: 2018-12-12 11:36:19
End at: 2018-12-12 11:36:49
Local clock offset: 0.203 ms
Remote clock offset: -0.296 ms

# Below is generated by plot.py at 2018-12-12 13:03:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 932.41 Mbit/s
95th percentile per-packet one-way delay: 136.985 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 487.57 Mbit/s
95th percentile per-packet one-way delay: 136.680 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 451.36 Mbit/s
95th percentile per-packet one-way delay: 135.469 ms
Loss rate: 0.24%
-- Flow 3:
Average throughput: 434.14 Mbit/s
95th percentile per-packet one-way delay: 149.598 ms
Loss rate: 0.29%
```

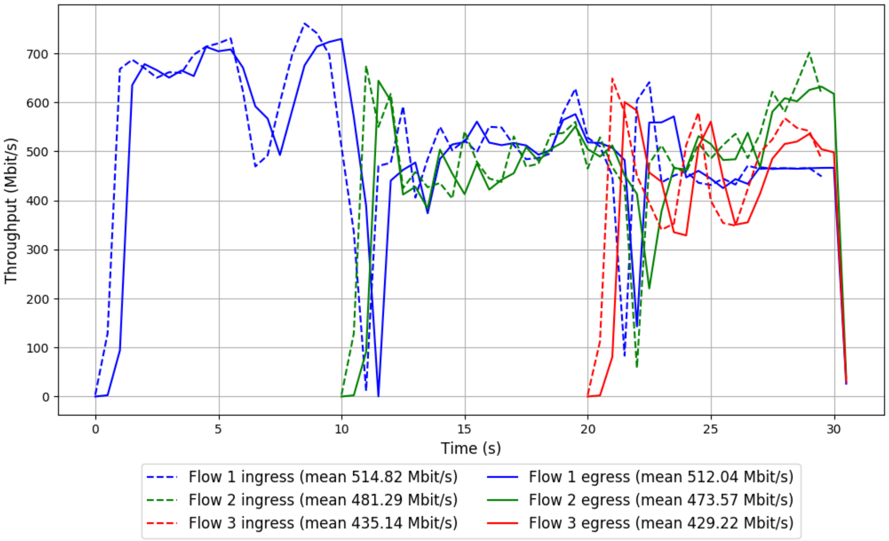
Run 4: Report of TCP BBR — Data Link

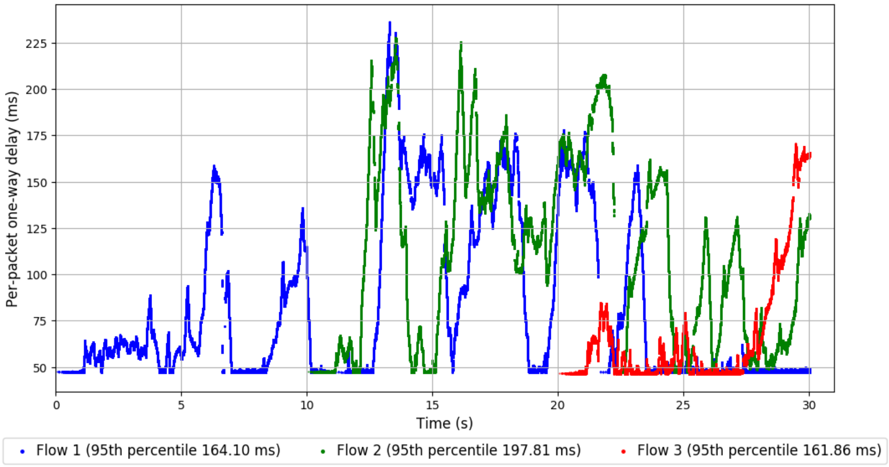




```
Run 5: Statistics of TCP BBR

Start at: 2018-12-12 12:12:15
End at: 2018-12-12 12:12:45
Local clock offset: -0.006 ms
Remote clock offset: -0.424 ms

# Below is generated by plot.py at 2018-12-12 13:04:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 970.02 Mbit/s
95th percentile per-packet one-way delay: 173.625 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 512.04 Mbit/s
95th percentile per-packet one-way delay: 164.097 ms
Loss rate: 0.54%
-- Flow 2:
Average throughput: 473.57 Mbit/s
95th percentile per-packet one-way delay: 197.808 ms
Loss rate: 1.60%
-- Flow 3:
Average throughput: 429.22 Mbit/s
95th percentile per-packet one-way delay: 161.857 ms
Loss rate: 1.33%
```

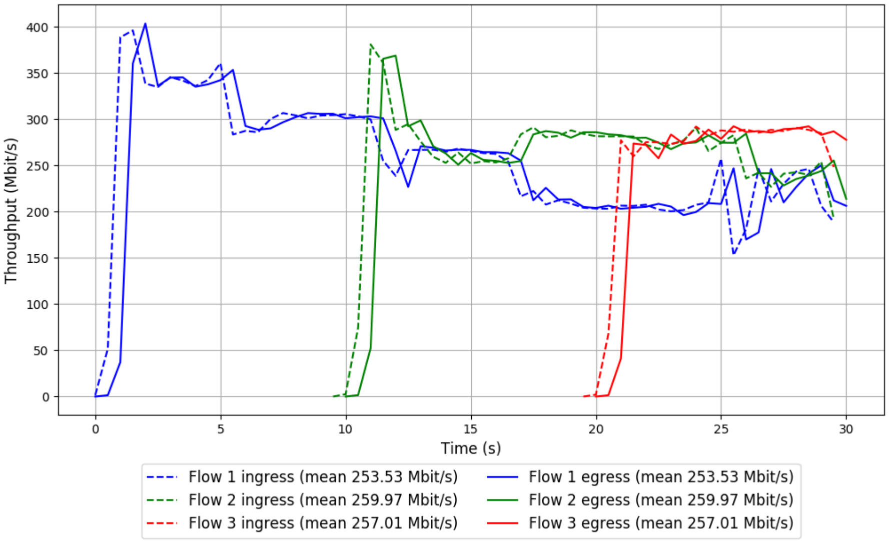
Run 5: Report of TCP BBR — Data Link

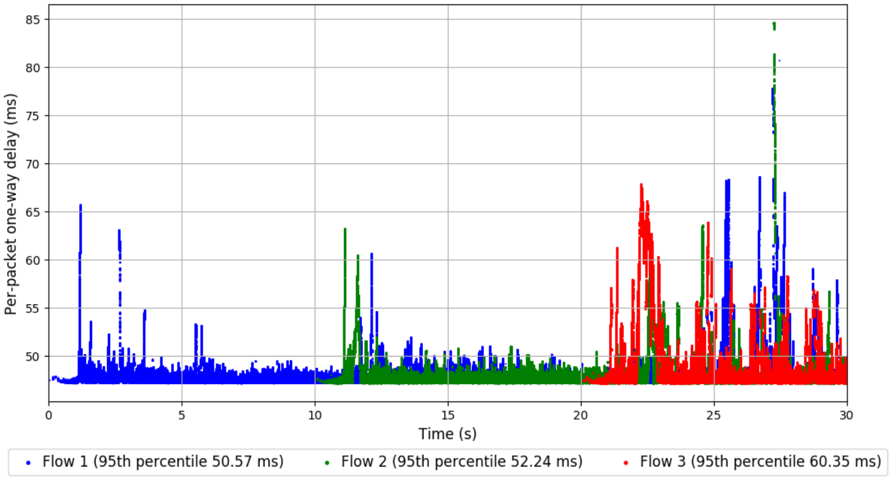




```
Run 1: Statistics of Copa

Start at: 2018-12-12 09:37:02
End at: 2018-12-12 09:37:32
Local clock offset: -0.072 ms
Remote clock offset: 0.022 ms

# Below is generated by plot.py at 2018-12-12 13:04:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 512.40 Mbit/s
95th percentile per-packet one-way delay: 53.492 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 253.53 Mbit/s
95th percentile per-packet one-way delay: 50.569 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 259.97 Mbit/s
95th percentile per-packet one-way delay: 52.242 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 257.01 Mbit/s
95th percentile per-packet one-way delay: 60.355 ms
Loss rate: 0.00%
```

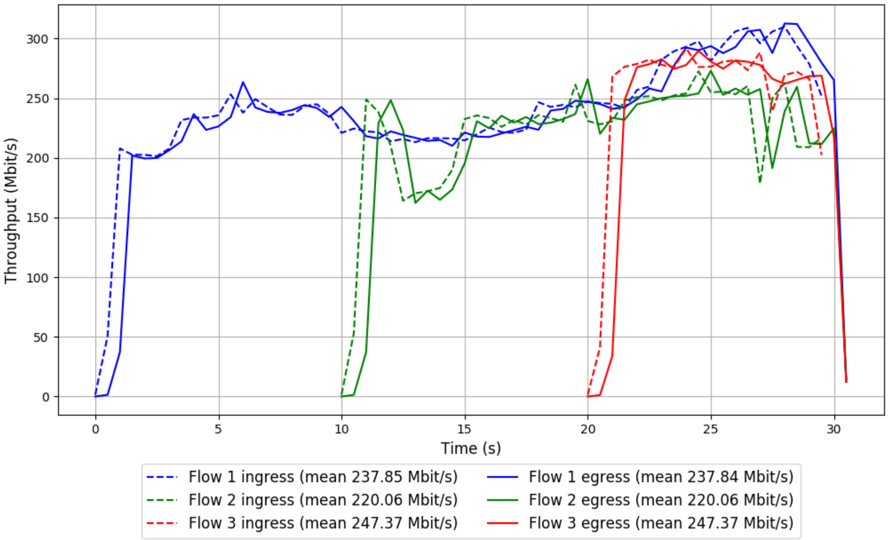
Run 1: Report of Copa — Data Link

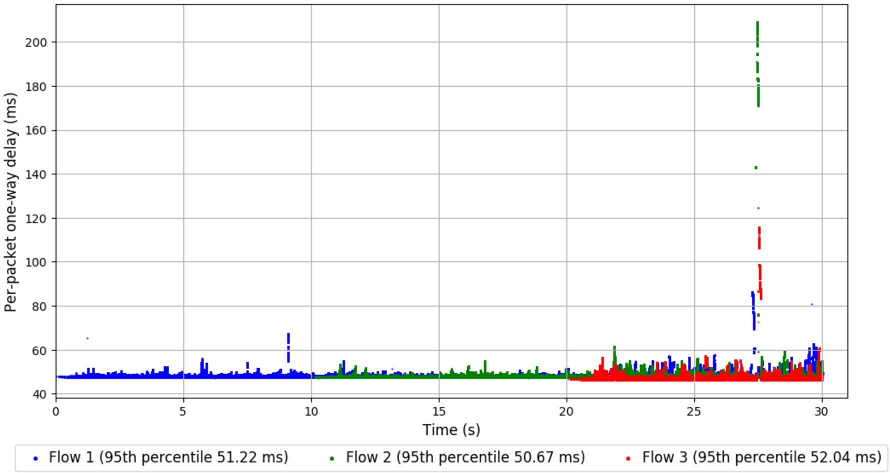




```
Run 2: Statistics of Copa

Start at: 2018-12-12 10:12:11
End at: 2018-12-12 10:12:41
Local clock offset: -0.104 ms
Remote clock offset: -0.063 ms

# Below is generated by plot.py at 2018-12-12 13:04:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 466.50 Mbit/s
95th percentile per-packet one-way delay: 51.177 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 237.84 Mbit/s
95th percentile per-packet one-way delay: 51.222 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 220.06 Mbit/s
95th percentile per-packet one-way delay: 50.673 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 247.37 Mbit/s
95th percentile per-packet one-way delay: 52.043 ms
Loss rate: 0.00%
```

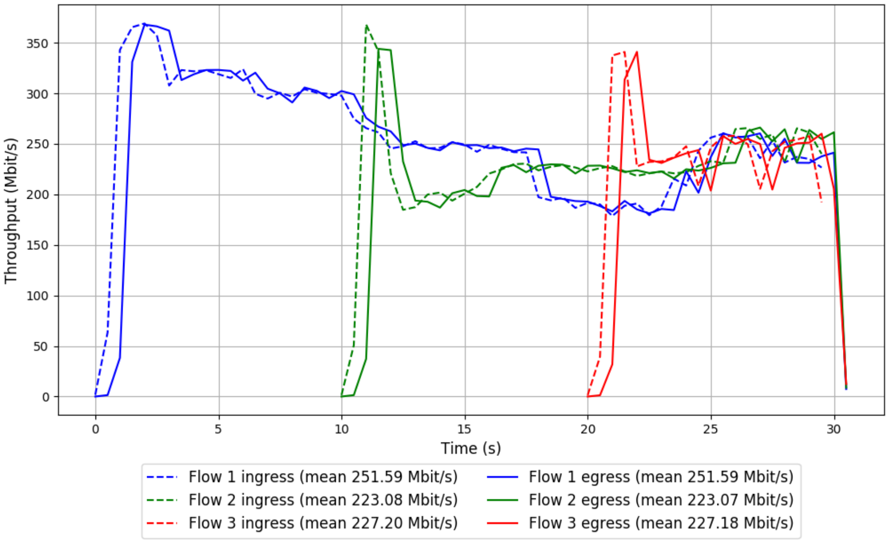
Run 2: Report of Copa — Data Link

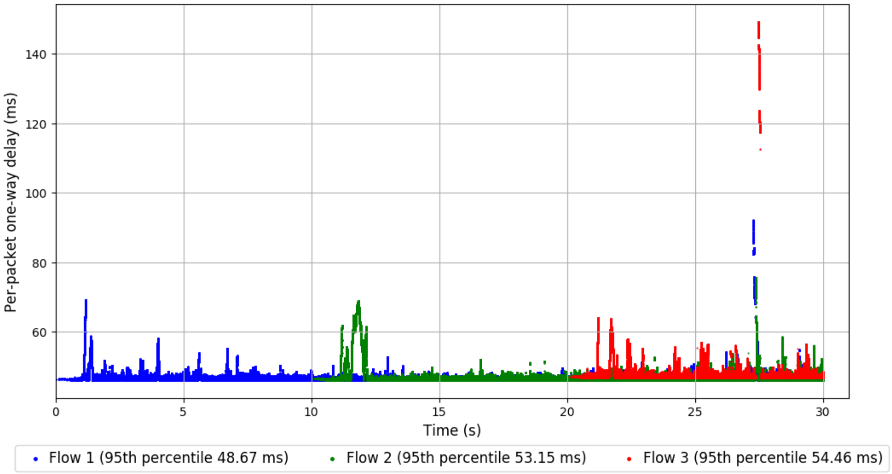




```
Run 3: Statistics of Copa

Start at: 2018-12-12 10:47:49
End at: 2018-12-12 10:48:19
Local clock offset: 0.271 ms
Remote clock offset: -0.099 ms

# Below is generated by plot.py at 2018-12-12 13:04:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 475.53 Mbit/s
95th percentile per-packet one-way delay: 50.822 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 251.59 Mbit/s
95th percentile per-packet one-way delay: 48.668 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 223.07 Mbit/s
95th percentile per-packet one-way delay: 53.149 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 227.18 Mbit/s
95th percentile per-packet one-way delay: 54.457 ms
Loss rate: 0.00%
```

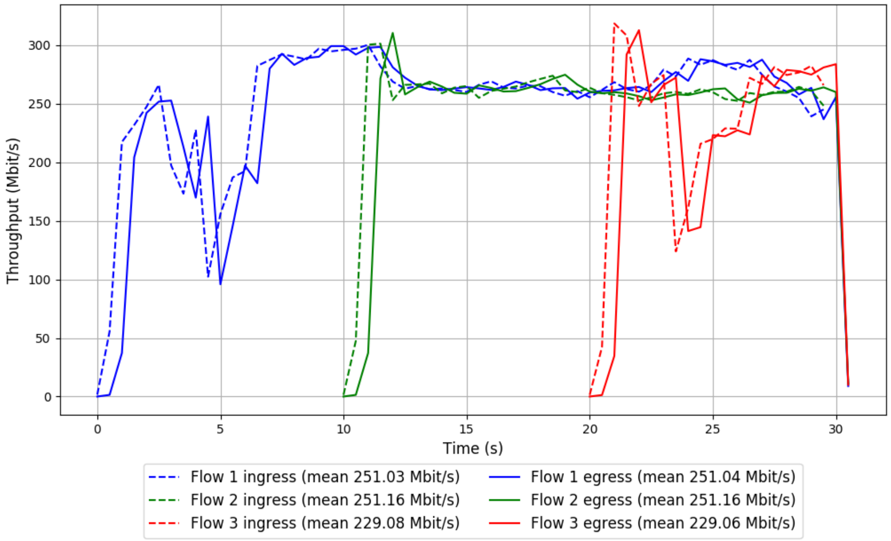
Run 3: Report of Copa — Data Link

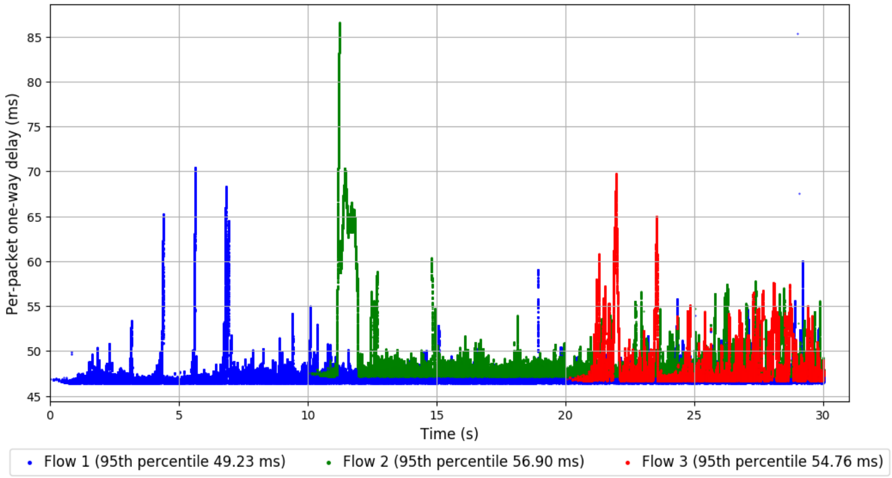




```
Run 4: Statistics of Copa

Start at: 2018-12-12 11:23:08
End at: 2018-12-12 11:23:38
Local clock offset: -0.19 ms
Remote clock offset: -0.262 ms

# Below is generated by plot.py at 2018-12-12 13:20:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 494.33 Mbit/s
95th percentile per-packet one-way delay: 53.133 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 251.04 Mbit/s
95th percentile per-packet one-way delay: 49.228 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 251.16 Mbit/s
95th percentile per-packet one-way delay: 56.895 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 229.06 Mbit/s
95th percentile per-packet one-way delay: 54.759 ms
Loss rate: 0.00%
```

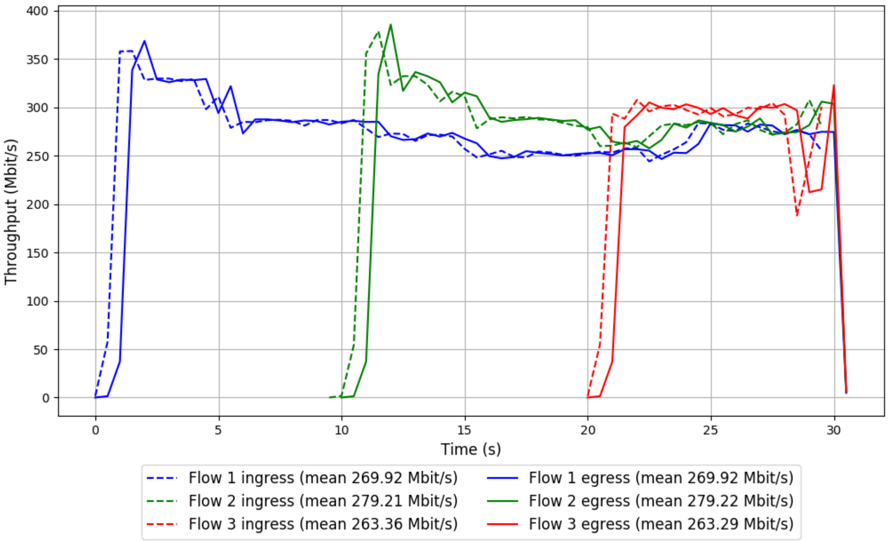
Run 4: Report of Copa — Data Link

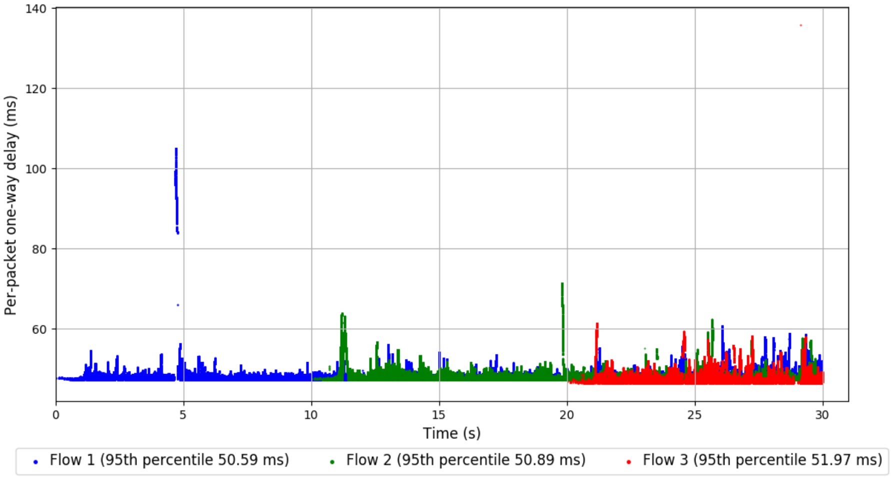




```
Run 5: Statistics of Copa

Start at: 2018-12-12 11:59:16
End at: 2018-12-12 11:59:46
Local clock offset: -0.077 ms
Remote clock offset: -0.383 ms

# Below is generated by plot.py at 2018-12-12 13:22:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 543.50 Mbit/s
95th percentile per-packet one-way delay: 50.900 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 269.92 Mbit/s
95th percentile per-packet one-way delay: 50.595 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 279.22 Mbit/s
95th percentile per-packet one-way delay: 50.887 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 263.29 Mbit/s
95th percentile per-packet one-way delay: 51.966 ms
Loss rate: 0.03%
```

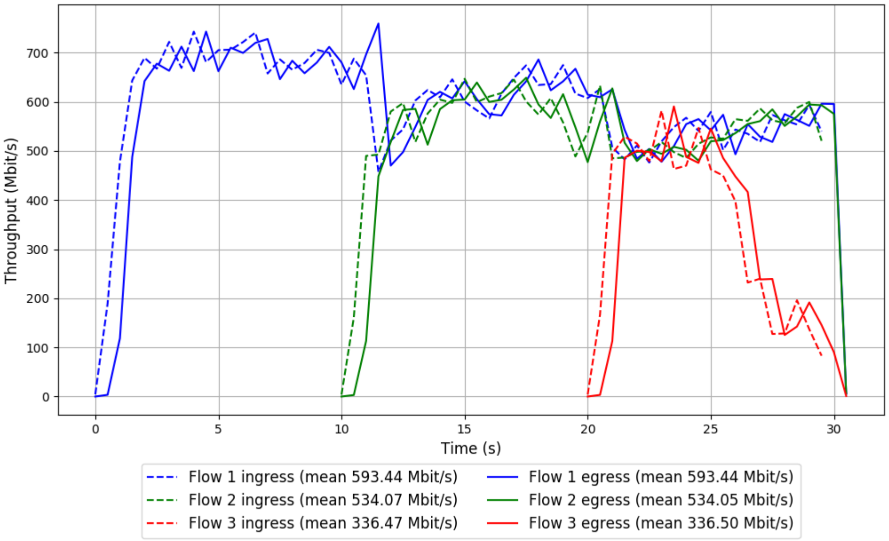
Run 5: Report of Copa — Data Link

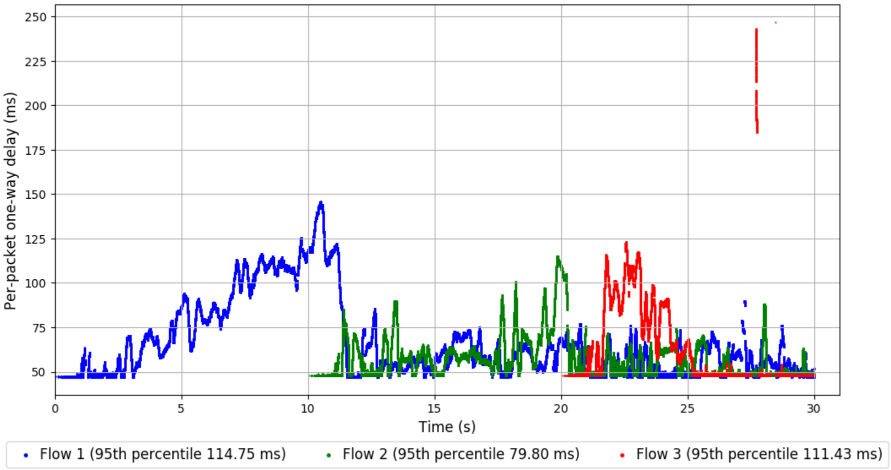




```
Run 1: Statistics of TCP Cubic

Start at: 2018-12-12 09:30:17
End at: 2018-12-12 09:30:47
Local clock offset: -0.491 ms
Remote clock offset: 0.045 ms

# Below is generated by plot.py at 2018-12-12 13:23:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1060.86 Mbit/s
95th percentile per-packet one-way delay: 111.431 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 593.44 Mbit/s
95th percentile per-packet one-way delay: 114.747 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 534.05 Mbit/s
95th percentile per-packet one-way delay: 79.800 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 336.50 Mbit/s
95th percentile per-packet one-way delay: 111.429 ms
Loss rate: 0.00%
```

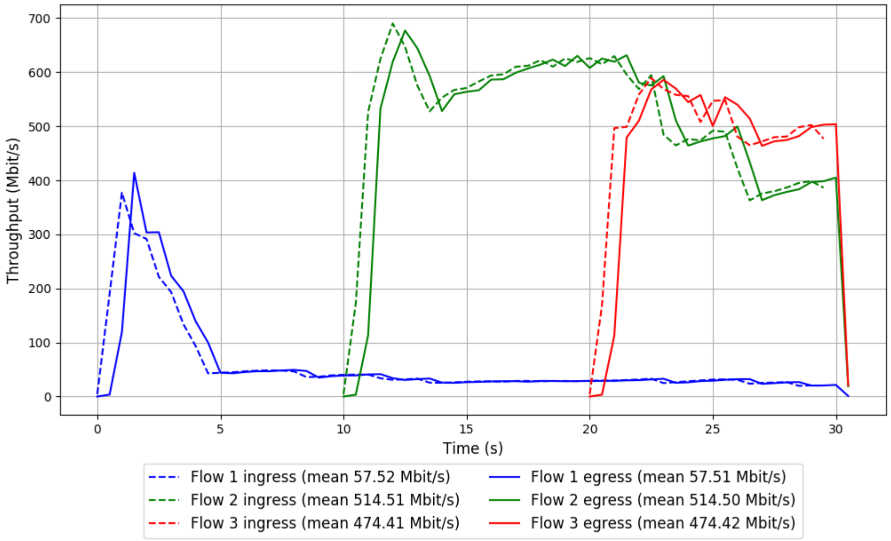
Run 1: Report of TCP Cubic — Data Link

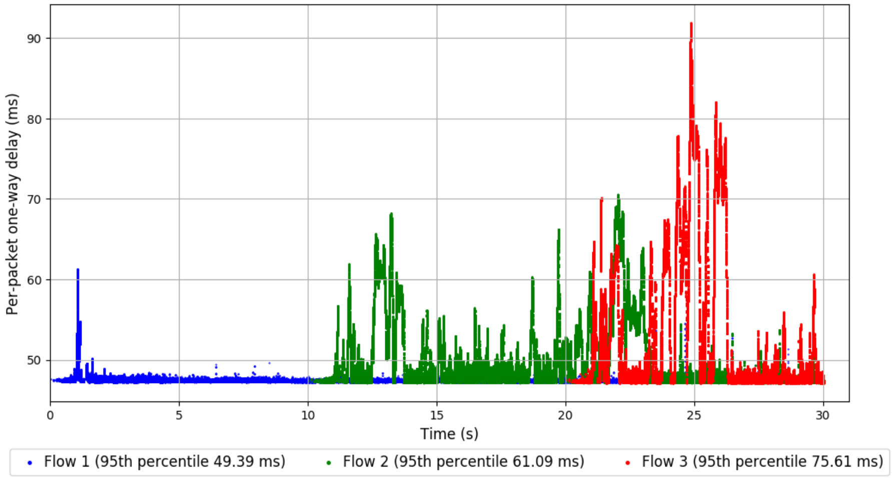




```
Run 2: Statistics of TCP Cubic

Start at: 2018-12-12 10:05:20
End at: 2018-12-12 10:05:50
Local clock offset: -0.076 ms
Remote clock offset: -0.066 ms

# Below is generated by plot.py at 2018-12-12 13:23:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 558.11 Mbit/s
95th percentile per-packet one-way delay: 65.388 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 57.51 Mbit/s
95th percentile per-packet one-way delay: 49.393 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 514.50 Mbit/s
95th percentile per-packet one-way delay: 61.089 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 474.42 Mbit/s
95th percentile per-packet one-way delay: 75.615 ms
Loss rate: 0.00%
```

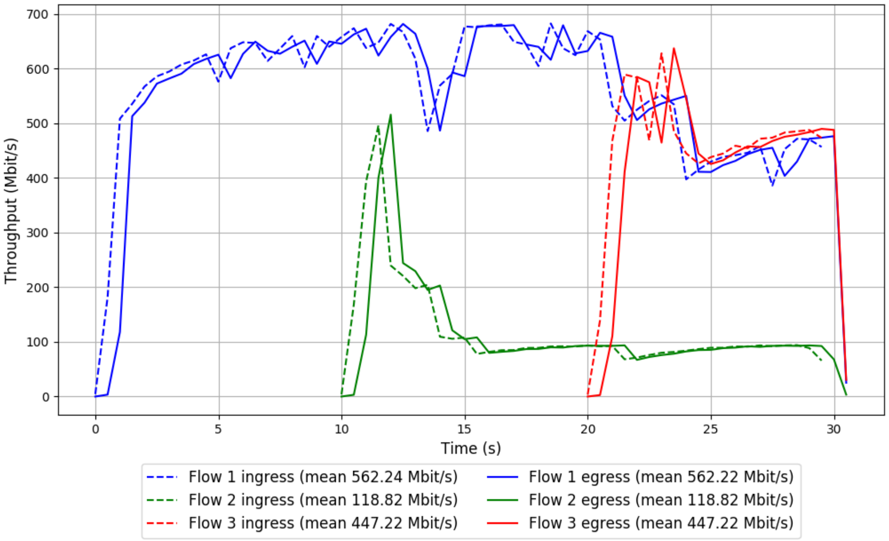
Run 2: Report of TCP Cubic — Data Link

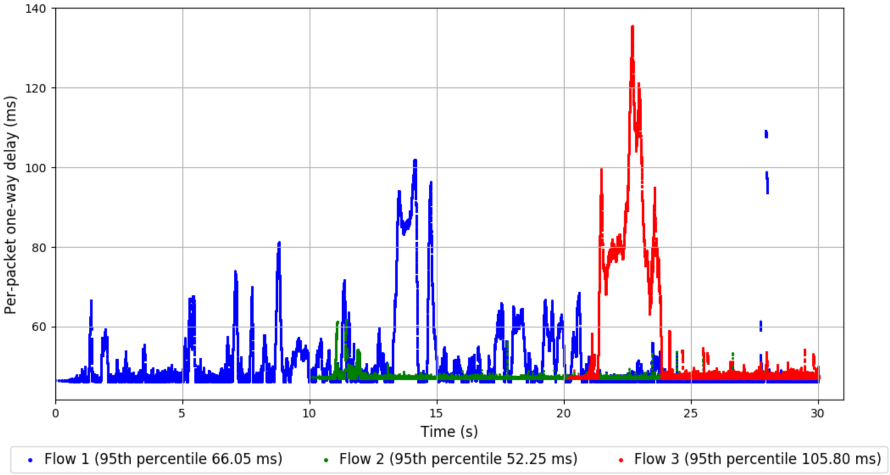




```
Run 3: Statistics of TCP Cubic

Start at: 2018-12-12 10:41:07
End at: 2018-12-12 10:41:37
Local clock offset: 0.351 ms
Remote clock offset: -0.017 ms

# Below is generated by plot.py at 2018-12-12 13:23:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 789.82 Mbit/s
95th percentile per-packet one-way delay: 79.600 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 562.22 Mbit/s
95th percentile per-packet one-way delay: 66.053 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 118.82 Mbit/s
95th percentile per-packet one-way delay: 52.248 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 447.22 Mbit/s
95th percentile per-packet one-way delay: 105.800 ms
Loss rate: 0.00%
```

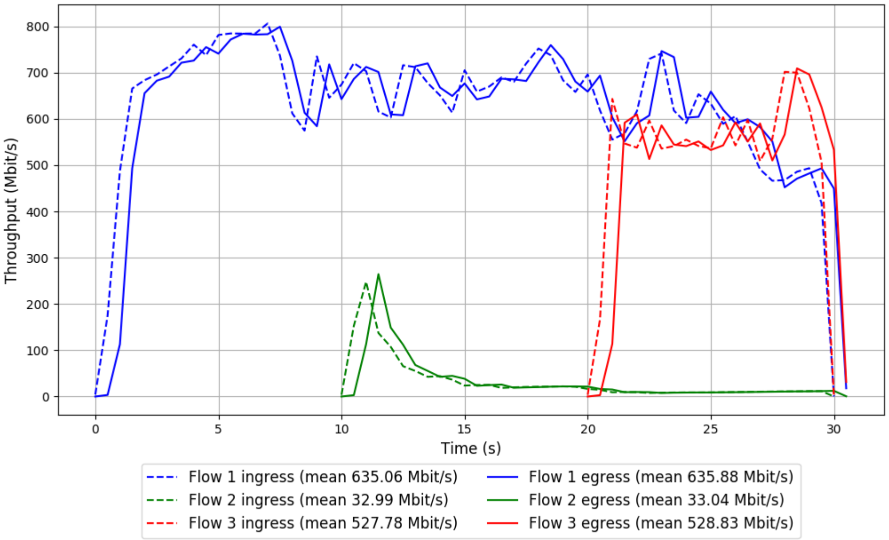
Run 3: Report of TCP Cubic — Data Link

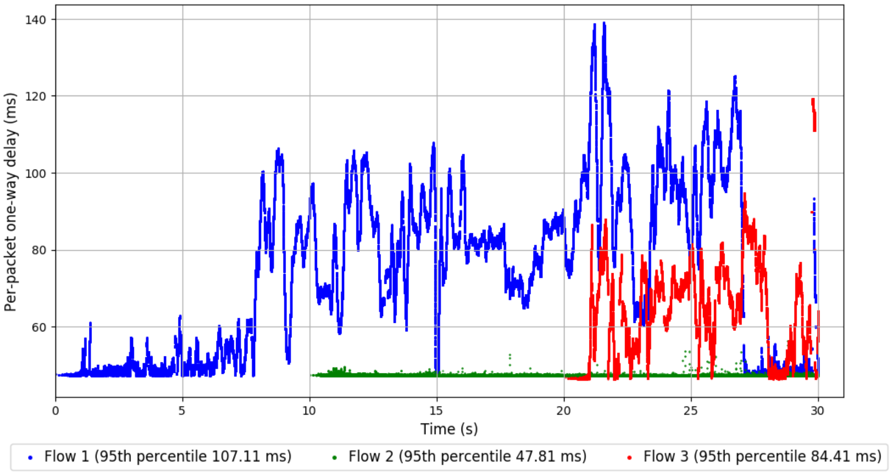




```
Run 4: Statistics of TCP Cubic

Start at: 2018-12-12 11:16:03
End at: 2018-12-12 11:16:33
Local clock offset: -0.293 ms
Remote clock offset: -0.292 ms

# Below is generated by plot.py at 2018-12-12 13:23:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 833.34 Mbit/s
95th percentile per-packet one-way delay: 104.609 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 635.88 Mbit/s
95th percentile per-packet one-way delay: 107.109 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 33.04 Mbit/s
95th percentile per-packet one-way delay: 47.812 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 528.83 Mbit/s
95th percentile per-packet one-way delay: 84.408 ms
Loss rate: 0.11%
```

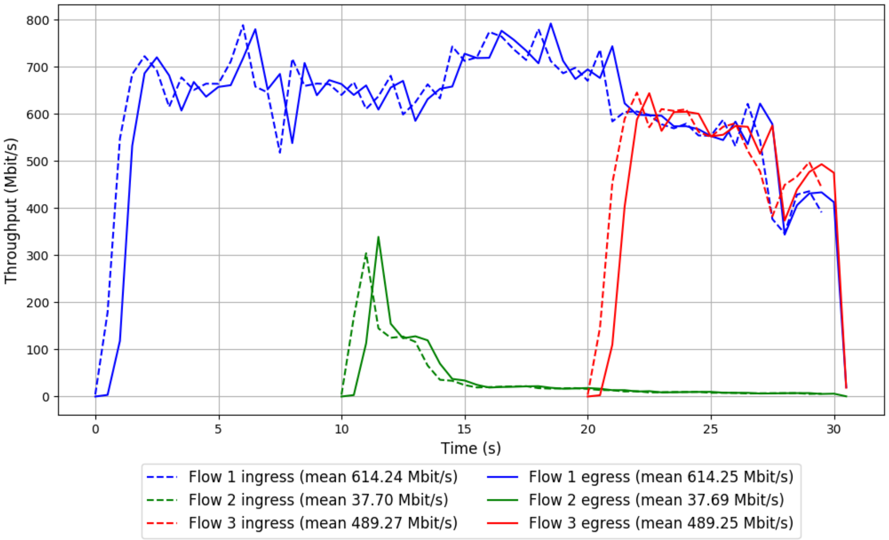
Run 4: Report of TCP Cubic — Data Link

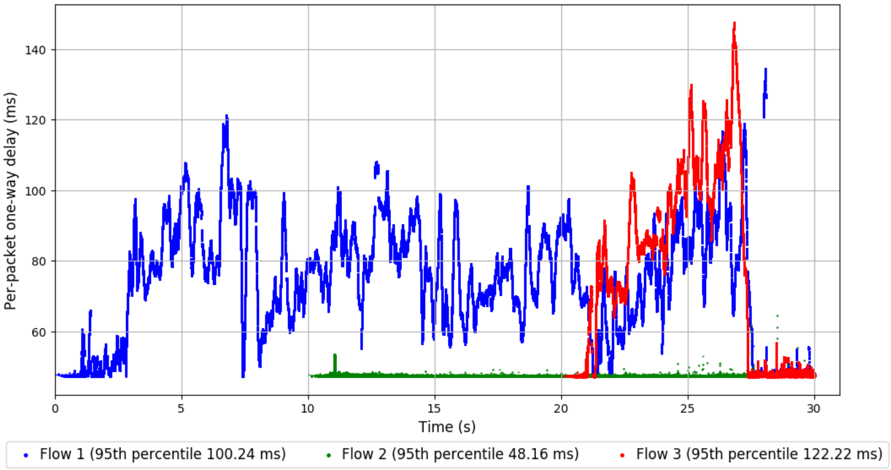




```
Run 5: Statistics of TCP Cubic

Start at: 2018-12-12 11:52:13
End at: 2018-12-12 11:52:43
Local clock offset: -0.12 ms
Remote clock offset: -0.334 ms

# Below is generated by plot.py at 2018-12-12 13:23:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 801.88 Mbit/s
95th percentile per-packet one-way delay: 106.611 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 614.25 Mbit/s
95th percentile per-packet one-way delay: 100.240 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 37.69 Mbit/s
95th percentile per-packet one-way delay: 48.160 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 489.25 Mbit/s
95th percentile per-packet one-way delay: 122.219 ms
Loss rate: 0.00%
```

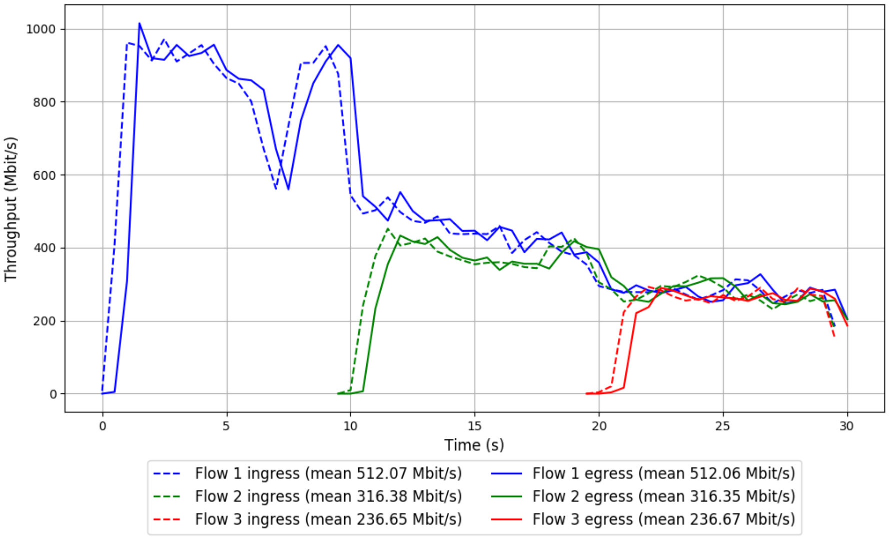
Run 5: Report of TCP Cubic — Data Link

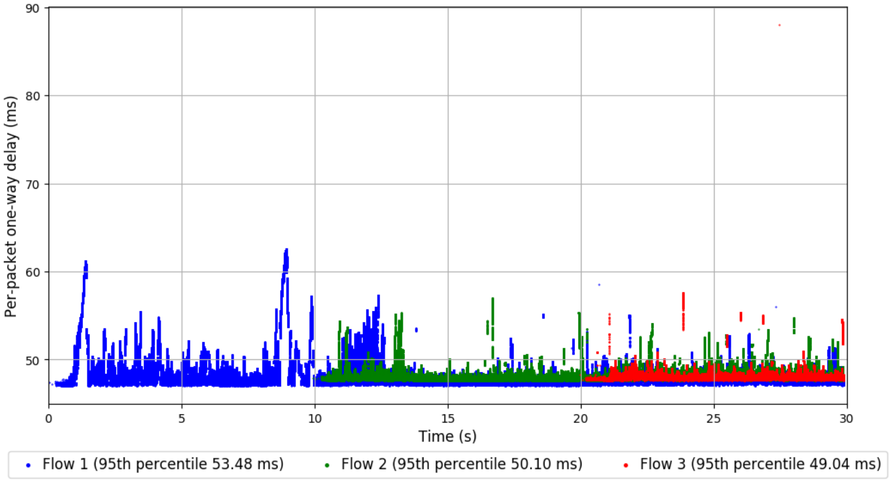




```
Run 1: Statistics of FillP

Start at: 2018-12-12 09:42:45
End at: 2018-12-12 09:43:15
Local clock offset: -0.481 ms
Remote clock offset: -0.021 ms

# Below is generated by plot.py at 2018-12-12 13:23:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 801.90 Mbit/s
95th percentile per-packet one-way delay: 52.420 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 512.06 Mbit/s
95th percentile per-packet one-way delay: 53.477 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 316.35 Mbit/s
95th percentile per-packet one-way delay: 50.099 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 236.67 Mbit/s
95th percentile per-packet one-way delay: 49.044 ms
Loss rate: 0.00%
```

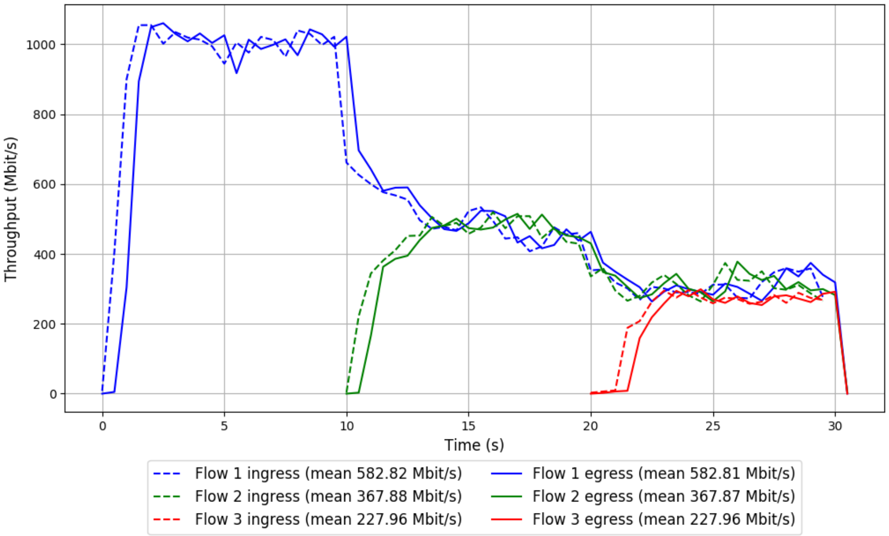
Run 1: Report of FillP — Data Link

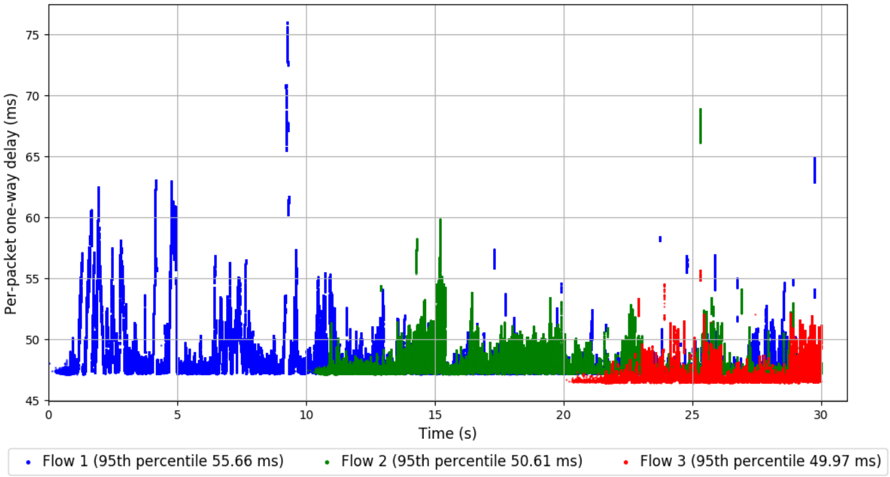




```
Run 2: Statistics of FillP

Start at: 2018-12-12 10:17:37
End at: 2018-12-12 10:18:07
Local clock offset: -0.069 ms
Remote clock offset: -0.041 ms

# Below is generated by plot.py at 2018-12-12 13:33:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 903.04 Mbit/s
95th percentile per-packet one-way delay: 53.998 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 582.81 Mbit/s
95th percentile per-packet one-way delay: 55.665 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 367.87 Mbit/s
95th percentile per-packet one-way delay: 50.607 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 227.96 Mbit/s
95th percentile per-packet one-way delay: 49.972 ms
Loss rate: 0.00%
```

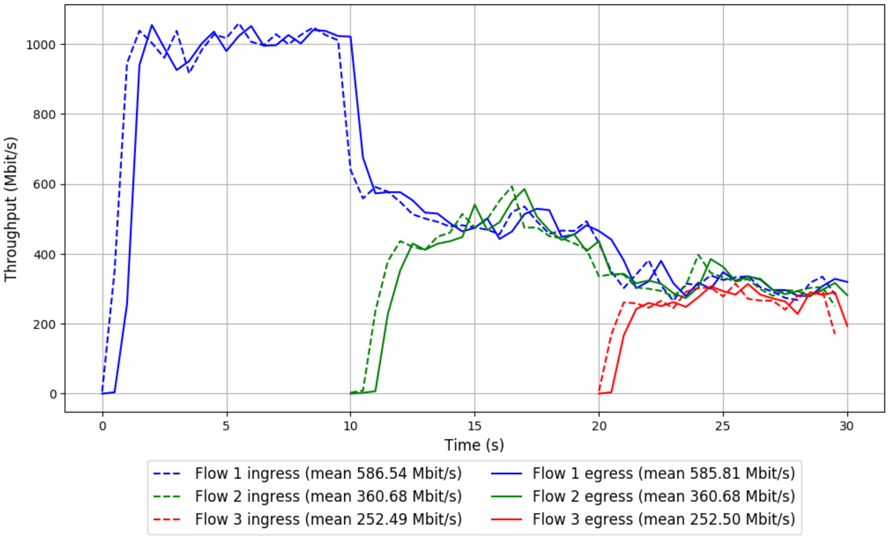
Run 2: Report of FillP — Data Link

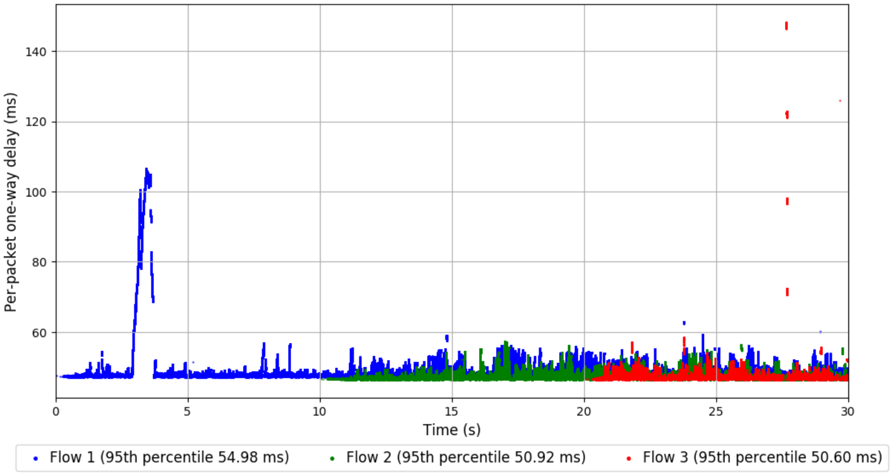




```
Run 3: Statistics of FillP

Start at: 2018-12-12 10:53:25
End at: 2018-12-12 10:53:55
Local clock offset: -0.139 ms
Remote clock offset: -0.156 ms

# Below is generated by plot.py at 2018-12-12 13:40:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 909.41 Mbit/s
95th percentile per-packet one-way delay: 53.367 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 585.81 Mbit/s
95th percentile per-packet one-way delay: 54.978 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 360.68 Mbit/s
95th percentile per-packet one-way delay: 50.921 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 252.50 Mbit/s
95th percentile per-packet one-way delay: 50.603 ms
Loss rate: 0.00%
```

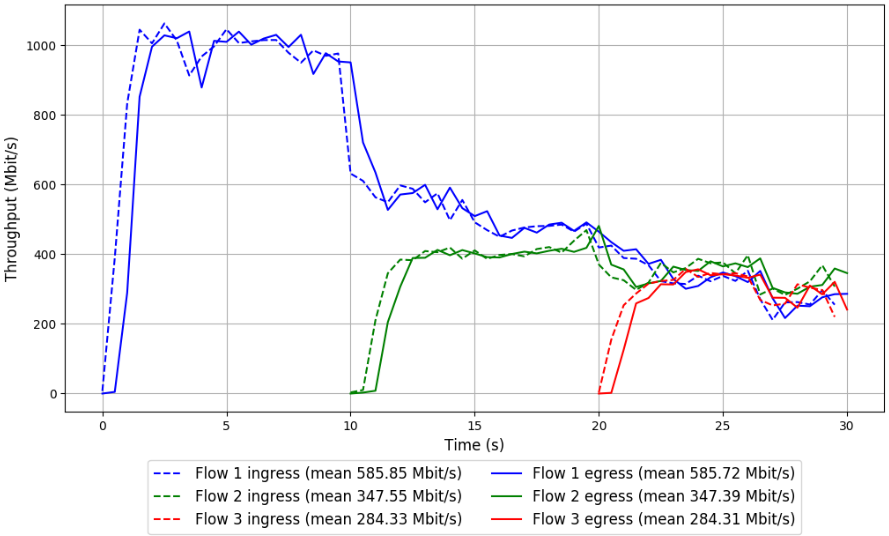
Run 3: Report of FillP — Data Link

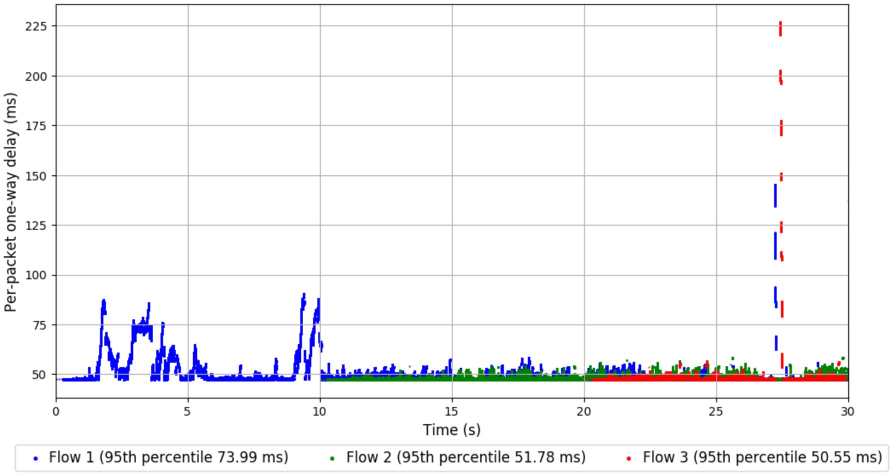




```
Run 4: Statistics of FillP

Start at: 2018-12-12 11:28:45
End at: 2018-12-12 11:29:15
Local clock offset: -0.169 ms
Remote clock offset: -0.295 ms

# Below is generated by plot.py at 2018-12-12 13:41:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 910.88 Mbit/s
95th percentile per-packet one-way delay: 70.398 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 585.72 Mbit/s
95th percentile per-packet one-way delay: 73.993 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 347.39 Mbit/s
95th percentile per-packet one-way delay: 51.778 ms
Loss rate: 0.04%
-- Flow 3:
Average throughput: 284.31 Mbit/s
95th percentile per-packet one-way delay: 50.548 ms
Loss rate: 0.00%
```

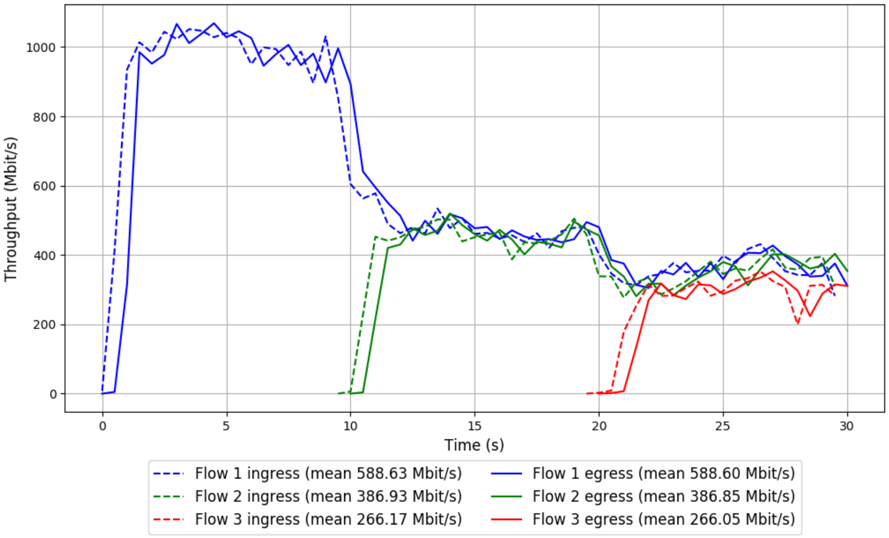
Run 4: Report of FillP — Data Link

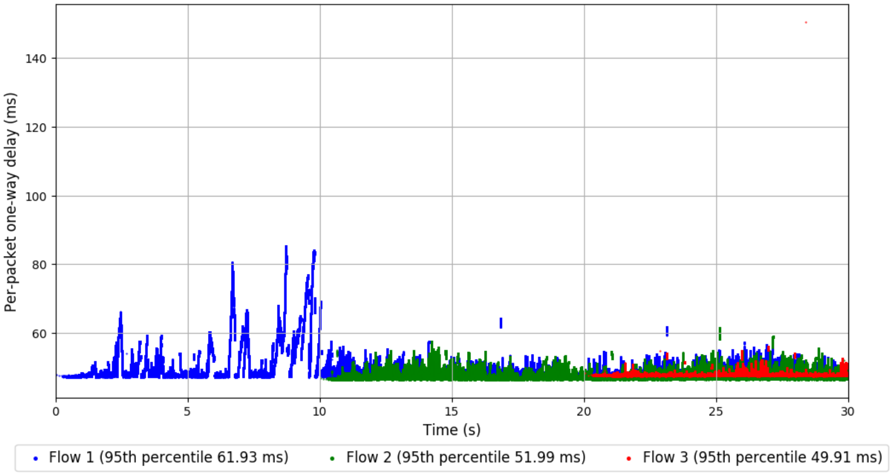




```
Run 5: Statistics of FillP

Start at: 2018-12-12 12:04:55
End at: 2018-12-12 12:05:25
Local clock offset: -0.027 ms
Remote clock offset: -0.349 ms

# Below is generated by plot.py at 2018-12-12 13:42:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 934.37 Mbit/s
95th percentile per-packet one-way delay: 58.643 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 588.60 Mbit/s
95th percentile per-packet one-way delay: 61.930 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 386.85 Mbit/s
95th percentile per-packet one-way delay: 51.993 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 266.05 Mbit/s
95th percentile per-packet one-way delay: 49.906 ms
Loss rate: 0.06%
```

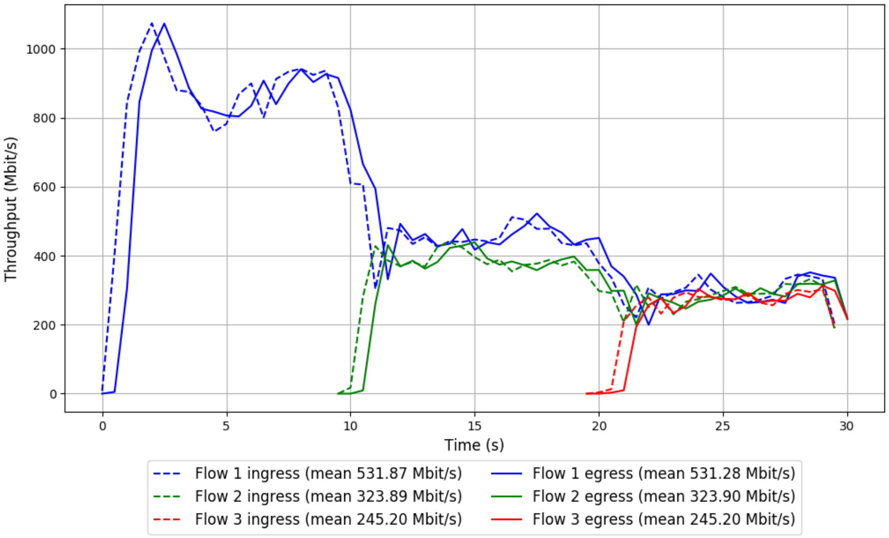
Run 5: Report of FillP — Data Link

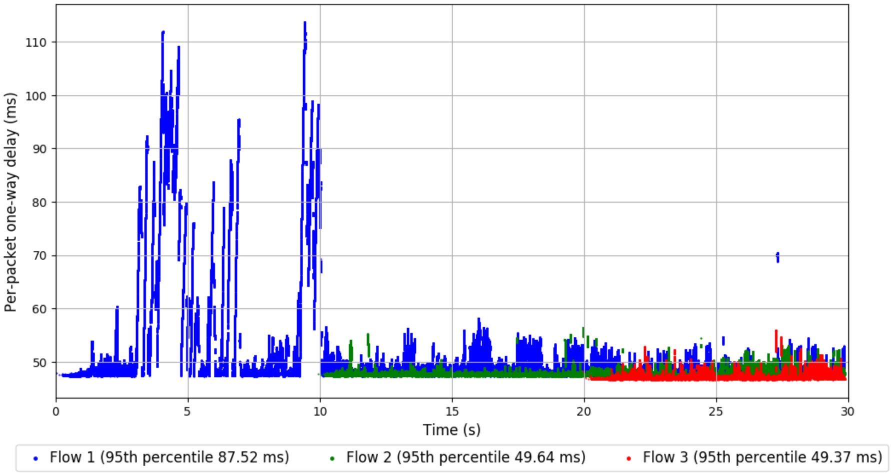




```
Run 1: Statistics of FillP-Sheep

Start at: 2018-12-12 10:02:19
End at: 2018-12-12 10:02:49
Local clock offset: -0.12 ms
Remote clock offset: -0.059 ms

# Below is generated by plot.py at 2018-12-12 13:42:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 829.03 Mbit/s
95th percentile per-packet one-way delay: 80.809 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 531.28 Mbit/s
95th percentile per-packet one-way delay: 87.522 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 323.90 Mbit/s
95th percentile per-packet one-way delay: 49.640 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 245.20 Mbit/s
95th percentile per-packet one-way delay: 49.370 ms
Loss rate: 0.01%
```

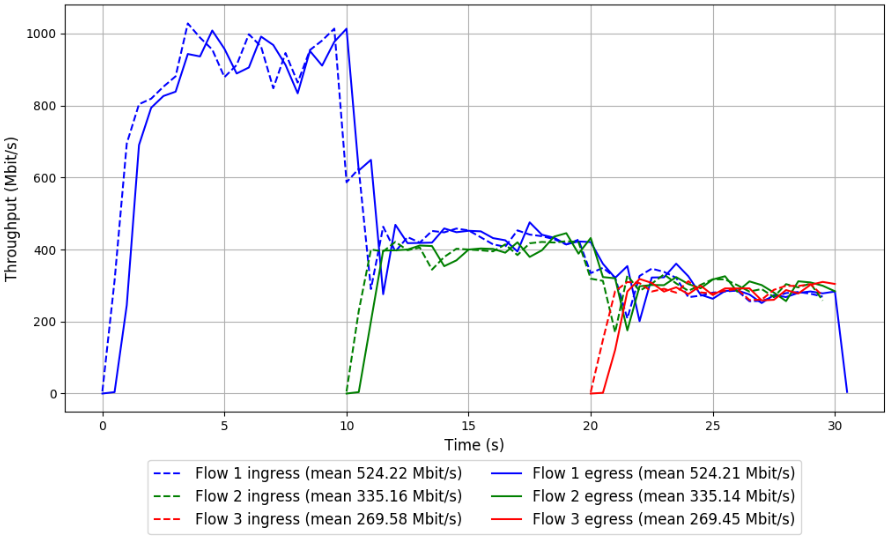
Run 1: Report of FillP-Sheep — Data Link

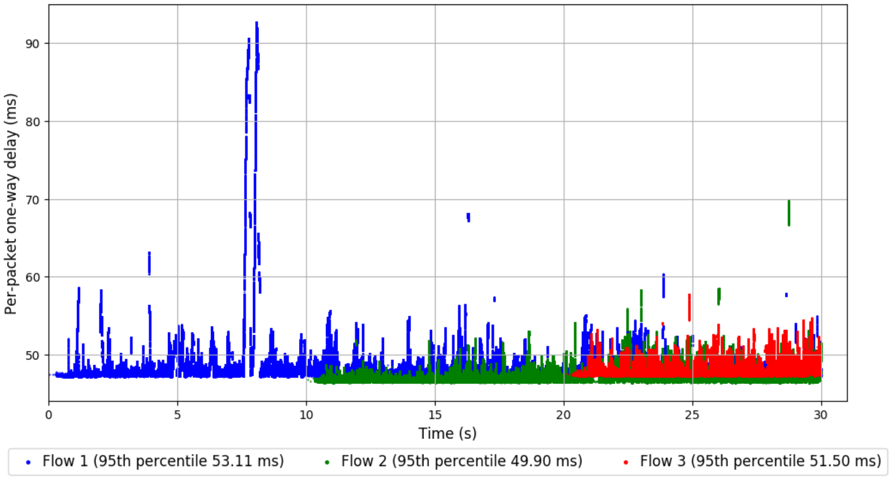




```
Run 2: Statistics of FillP-Sheep

Start at: 2018-12-12 10:38:02
End at: 2018-12-12 10:38:32
Local clock offset: 0.001 ms
Remote clock offset: 0.001 ms

# Below is generated by plot.py at 2018-12-12 13:42:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 836.22 Mbit/s
95th percentile per-packet one-way delay: 52.080 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 524.21 Mbit/s
95th percentile per-packet one-way delay: 53.107 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 335.14 Mbit/s
95th percentile per-packet one-way delay: 49.900 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 269.45 Mbit/s
95th percentile per-packet one-way delay: 51.498 ms
Loss rate: 0.03%
```

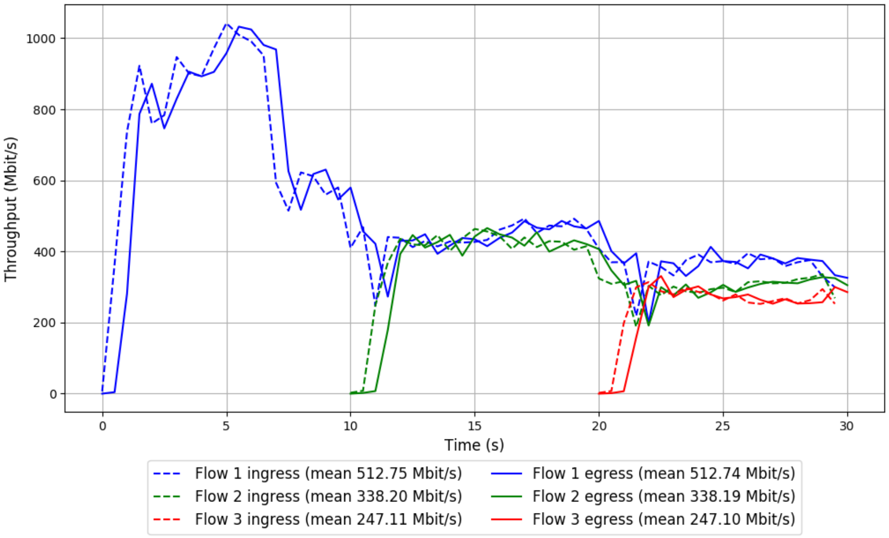
Run 2: Report of FillP-Sheep — Data Link

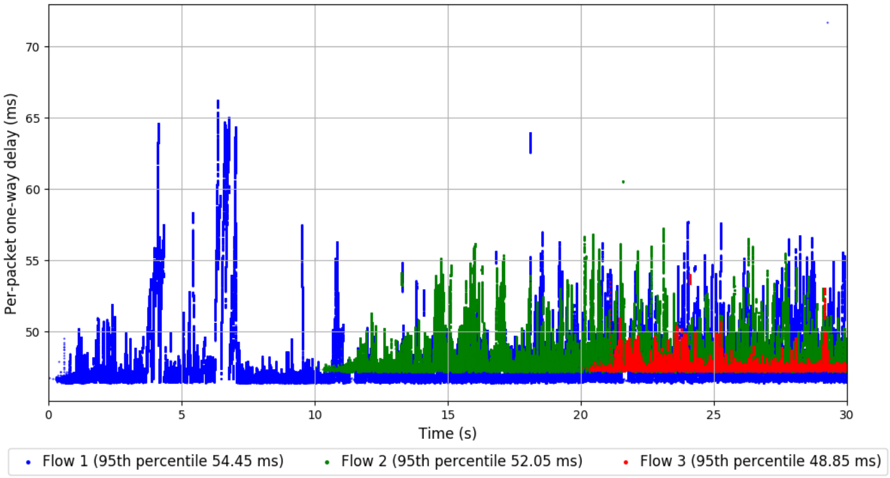




```
Run 3: Statistics of FillP-Sheep

Start at: 2018-12-12 11:12:57
End at: 2018-12-12 11:13:27
Local clock offset: -0.282 ms
Remote clock offset: -0.248 ms

# Below is generated by plot.py at 2018-12-12 13:42:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 819.19 Mbit/s
95th percentile per-packet one-way delay: 53.161 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 512.74 Mbit/s
95th percentile per-packet one-way delay: 54.452 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 338.19 Mbit/s
95th percentile per-packet one-way delay: 52.052 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 247.10 Mbit/s
95th percentile per-packet one-way delay: 48.854 ms
Loss rate: 0.00%
```

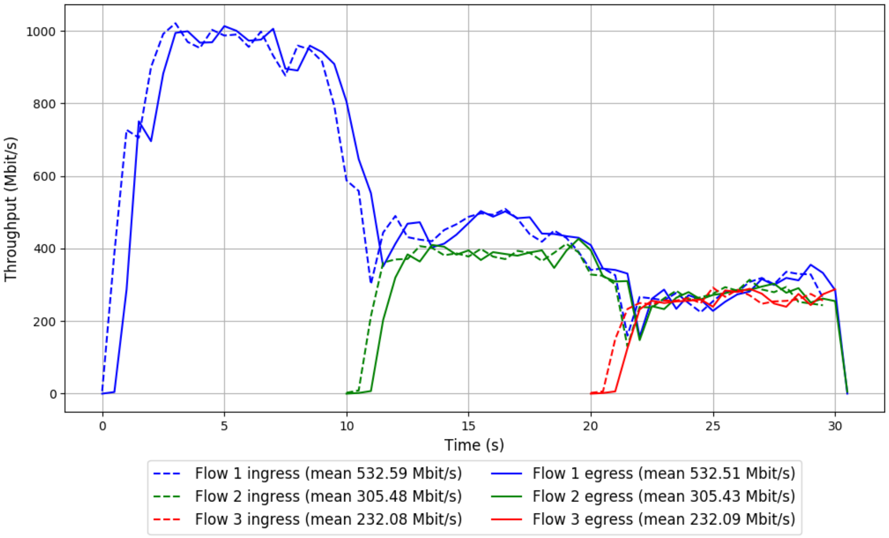
Run 3: Report of FillP-Sheep — Data Link

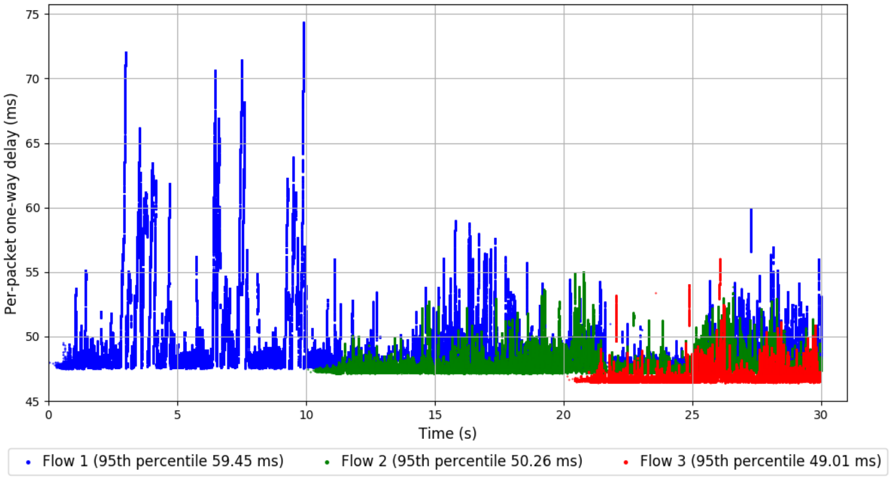




```
Run 4: Statistics of FillP-Sheep

Start at: 2018-12-12 11:49:04
End at: 2018-12-12 11:49:34
Local clock offset: -0.113 ms
Remote clock offset: -0.332 ms

# Below is generated by plot.py at 2018-12-12 13:43:30
# Datalink statistics
-- Total of 3 flows:
Average throughput: 812.02 Mbit/s
95th percentile per-packet one-way delay: 56.744 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 532.51 Mbit/s
95th percentile per-packet one-way delay: 59.445 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 305.43 Mbit/s
95th percentile per-packet one-way delay: 50.255 ms
Loss rate: 0.02%
-- Flow 3:
Average throughput: 232.09 Mbit/s
95th percentile per-packet one-way delay: 49.010 ms
Loss rate: 0.00%
```

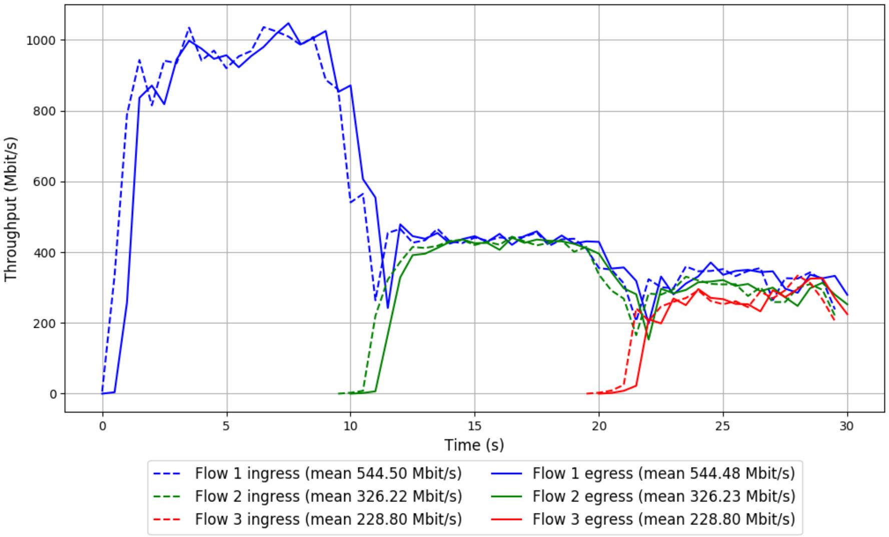
Run 4: Report of FillP-Sheep — Data Link

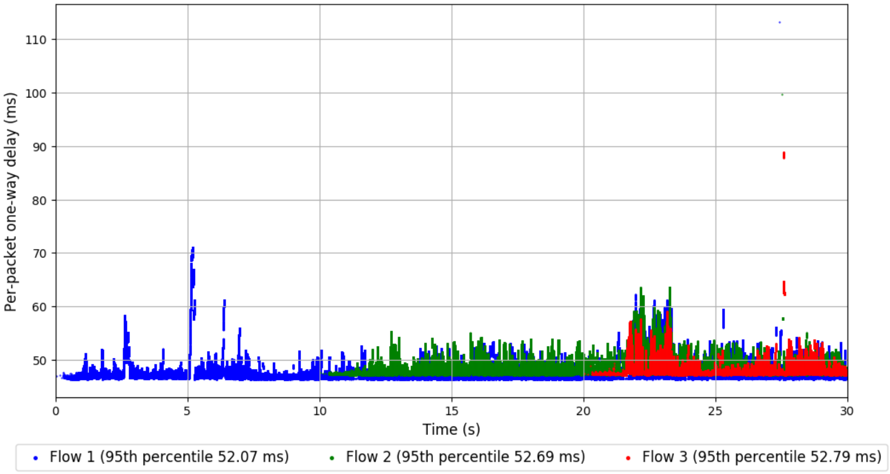




```
Run 5: Statistics of FillP-Sheep

Start at: 2018-12-12 12:24:35
End at: 2018-12-12 12:25:05
Local clock offset: -0.019 ms
Remote clock offset: -0.456 ms

# Below is generated by plot.py at 2018-12-12 13:55:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 837.40 Mbit/s
95th percentile per-packet one-way delay: 52.452 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 544.48 Mbit/s
95th percentile per-packet one-way delay: 52.072 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 326.23 Mbit/s
95th percentile per-packet one-way delay: 52.685 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 228.80 Mbit/s
95th percentile per-packet one-way delay: 52.792 ms
Loss rate: 0.00%
```

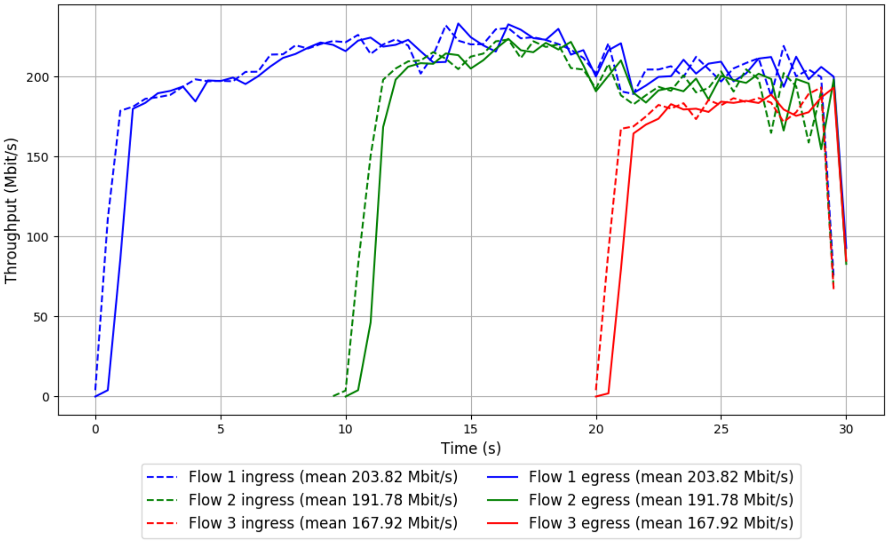
Run 5: Report of FillP-Sheep — Data Link

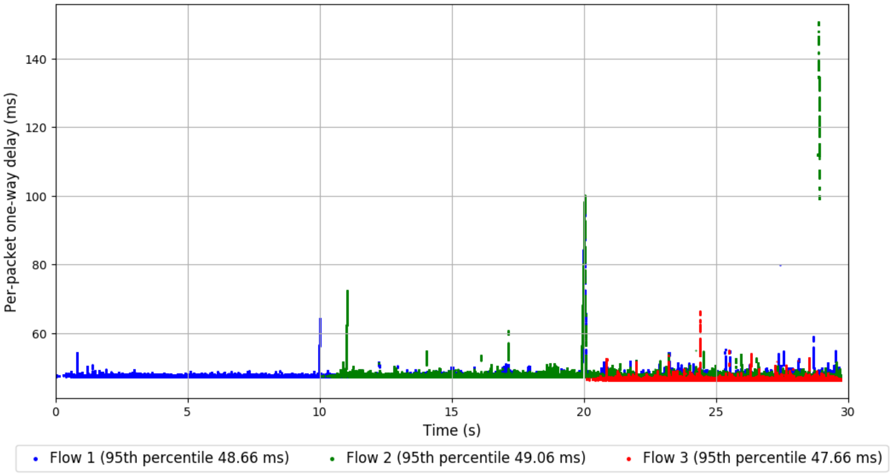




```
Run 1: Statistics of Indigo

Start at: 2018-12-12 09:52:36
End at: 2018-12-12 09:53:06
Local clock offset: -0.127 ms
Remote clock offset: -0.033 ms

# Below is generated by plot.py at 2018-12-12 13:55:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 385.54 Mbit/s
95th percentile per-packet one-way delay: 48.718 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 203.82 Mbit/s
95th percentile per-packet one-way delay: 48.658 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 191.78 Mbit/s
95th percentile per-packet one-way delay: 49.064 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 167.92 Mbit/s
95th percentile per-packet one-way delay: 47.655 ms
Loss rate: 0.00%
```

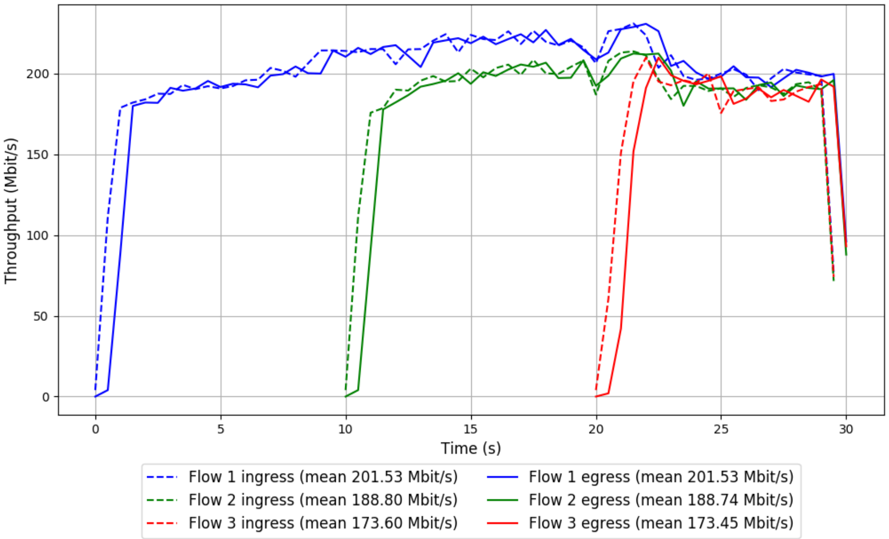
Run 1: Report of Indigo — Data Link

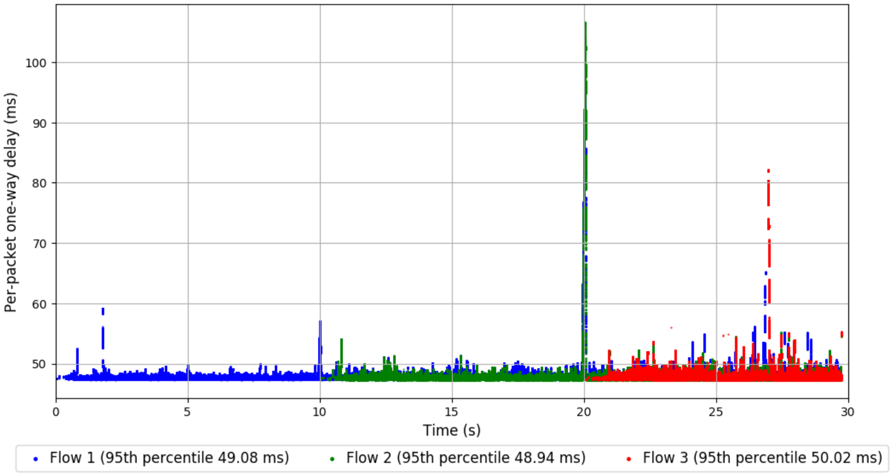




```
Run 2: Statistics of Indigo

Start at: 2018-12-12 10:27:37
End at: 2018-12-12 10:28:07
Local clock offset: -0.056 ms
Remote clock offset: -0.029 ms

# Below is generated by plot.py at 2018-12-12 13:55:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 383.18 Mbit/s
95th percentile per-packet one-way delay: 49.171 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 201.53 Mbit/s
95th percentile per-packet one-way delay: 49.076 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 188.74 Mbit/s
95th percentile per-packet one-way delay: 48.936 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 173.45 Mbit/s
95th percentile per-packet one-way delay: 50.020 ms
Loss rate: 0.01%
```

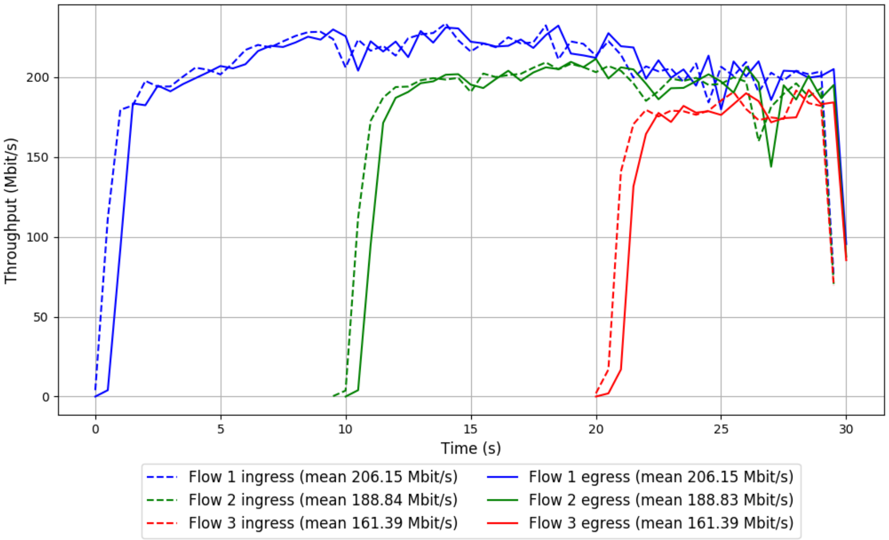
Run 2: Report of Indigo — Data Link

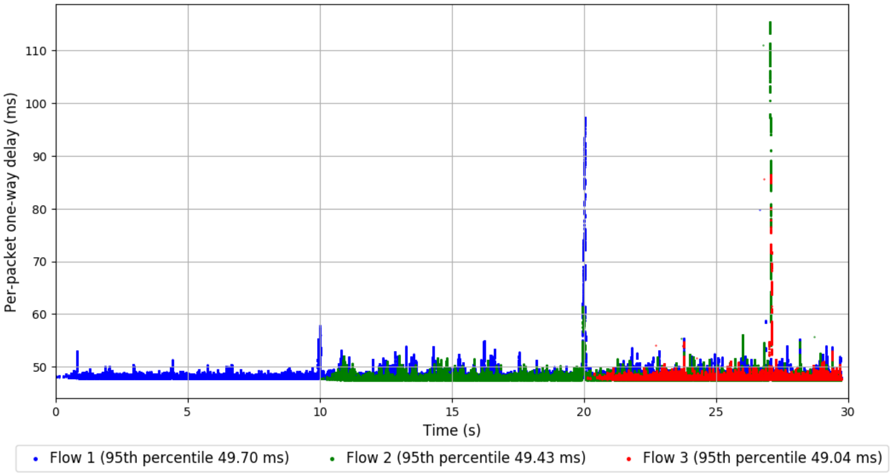




```
Run 3: Statistics of Indigo

Start at: 2018-12-12 11:03:25
End at: 2018-12-12 11:03:55
Local clock offset: -0.601 ms
Remote clock offset: -0.195 ms

# Below is generated by plot.py at 2018-12-12 13:56:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 383.67 Mbit/s
95th percentile per-packet one-way delay: 49.498 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 206.15 Mbit/s
95th percentile per-packet one-way delay: 49.700 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 188.83 Mbit/s
95th percentile per-packet one-way delay: 49.426 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 161.39 Mbit/s
95th percentile per-packet one-way delay: 49.043 ms
Loss rate: 0.00%
```

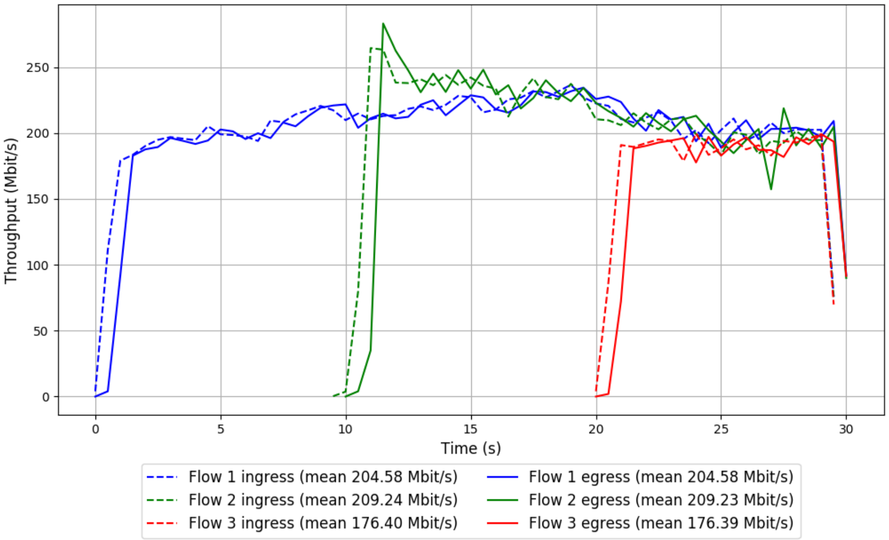
Run 3: Report of Indigo — Data Link

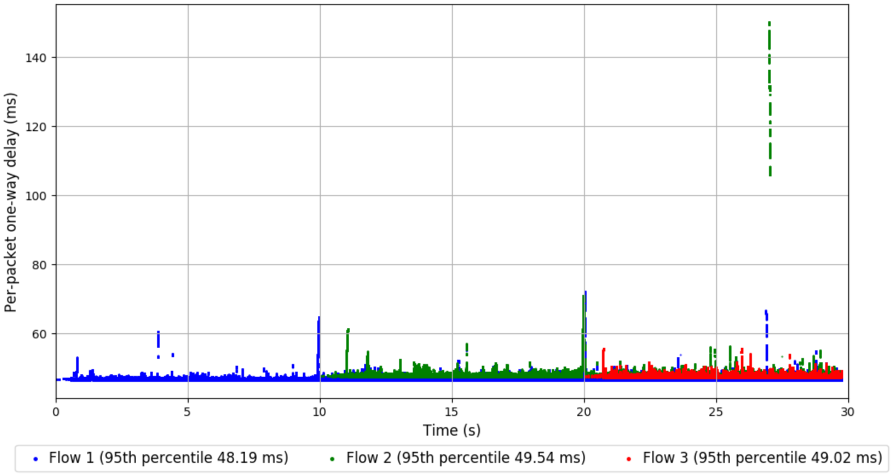




```
Run 4: Statistics of Indigo

Start at: 2018-12-12 11:38:47
End at: 2018-12-12 11:39:17
Local clock offset: -0.131 ms
Remote clock offset: -0.297 ms

# Below is generated by plot.py at 2018-12-12 13:57:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 400.77 Mbit/s
95th percentile per-packet one-way delay: 48.913 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 204.58 Mbit/s
95th percentile per-packet one-way delay: 48.186 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 209.23 Mbit/s
95th percentile per-packet one-way delay: 49.541 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 176.39 Mbit/s
95th percentile per-packet one-way delay: 49.023 ms
Loss rate: 0.00%
```

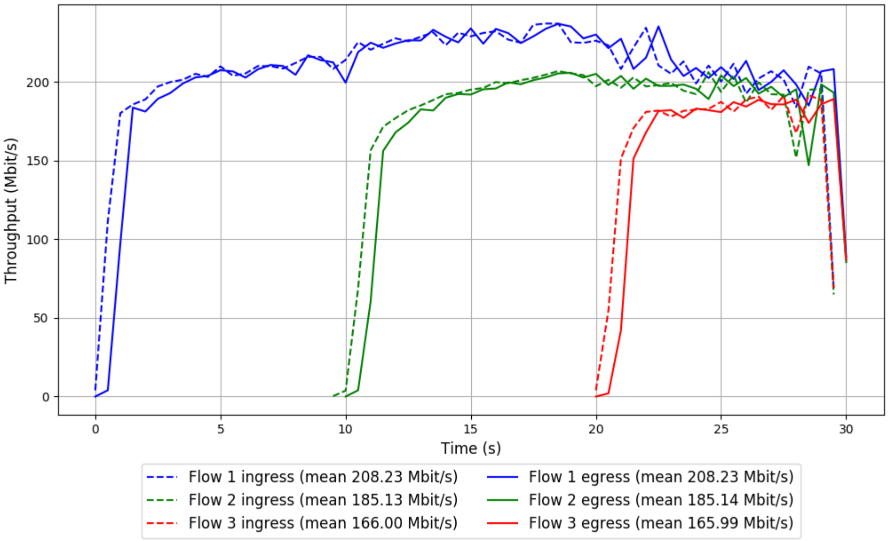
Run 4: Report of Indigo — Data Link

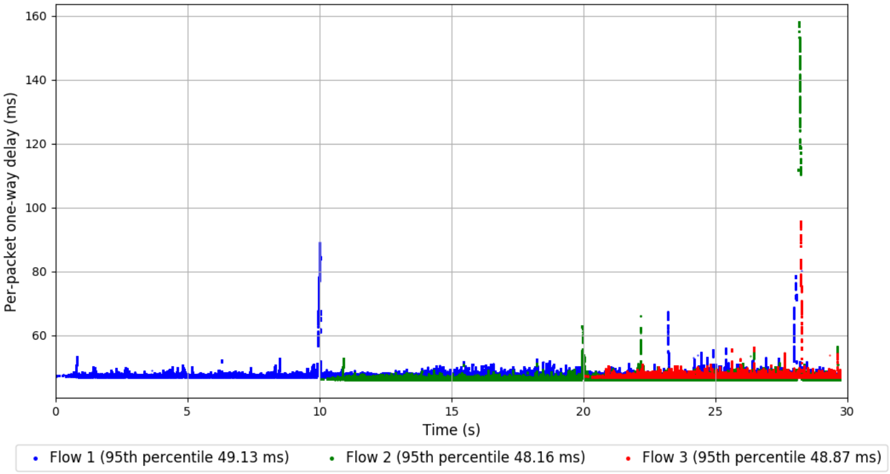




```
Run 5: Statistics of Indigo

Start at: 2018-12-12 12:14:37
End at: 2018-12-12 12:15:07
Local clock offset: 0.332 ms
Remote clock offset: -0.398 ms

# Below is generated by plot.py at 2018-12-12 13:57:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 385.01 Mbit/s
95th percentile per-packet one-way delay: 48.870 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 208.23 Mbit/s
95th percentile per-packet one-way delay: 49.126 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 185.14 Mbit/s
95th percentile per-packet one-way delay: 48.161 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 165.99 Mbit/s
95th percentile per-packet one-way delay: 48.869 ms
Loss rate: 0.00%
```

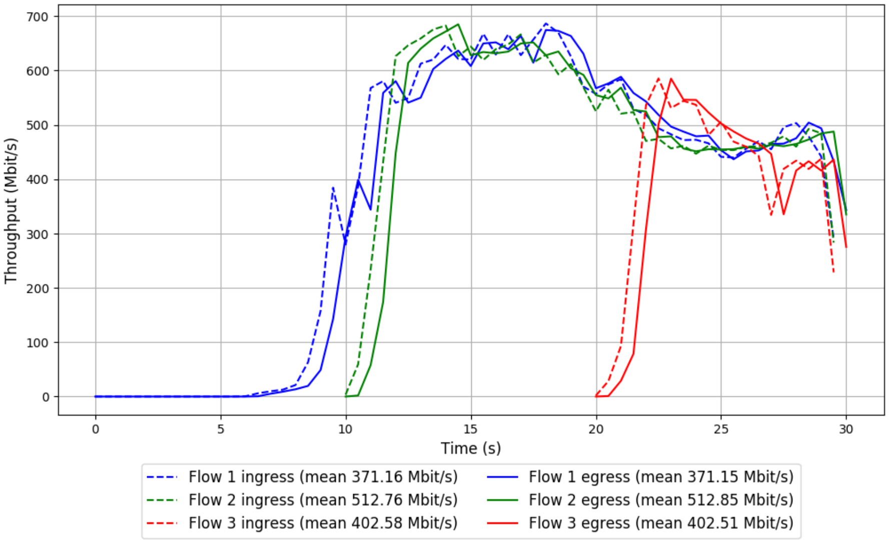
Run 5: Report of Indigo — Data Link

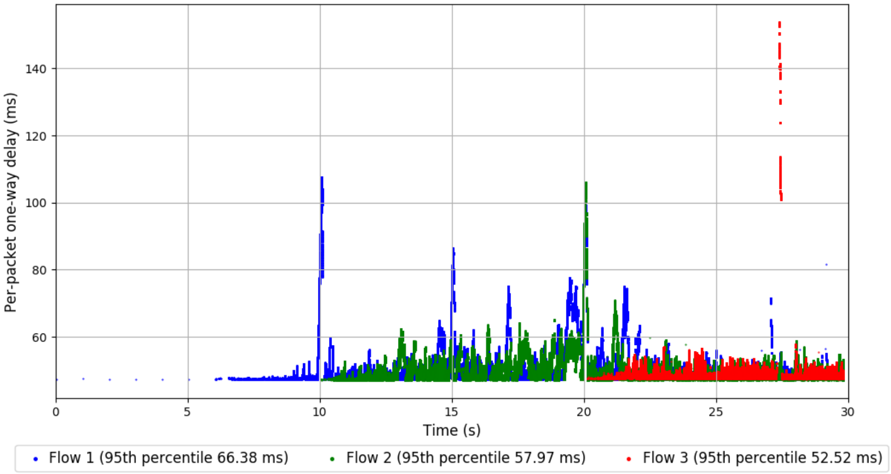




```
Run 1: Statistics of Indigo-MusesD

Start at: 2018-12-12 09:32:21
End at: 2018-12-12 09:32:51
Local clock offset: -0.098 ms
Remote clock offset: 0.031 ms

# Below is generated by plot.py at 2018-12-12 13:59:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 842.70 Mbit/s
95th percentile per-packet one-way delay: 59.529 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 371.15 Mbit/s
95th percentile per-packet one-way delay: 66.375 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 512.85 Mbit/s
95th percentile per-packet one-way delay: 57.974 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 402.51 Mbit/s
95th percentile per-packet one-way delay: 52.517 ms
Loss rate: 0.00%
```

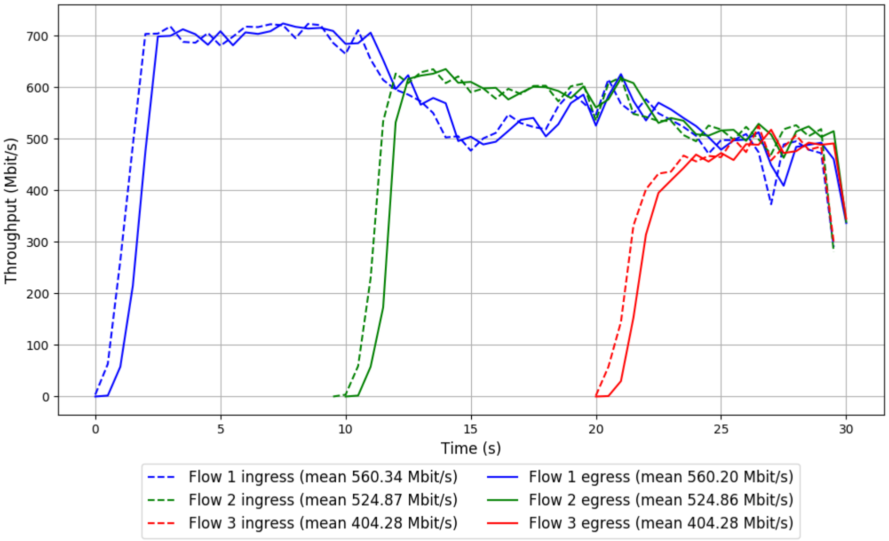
Run 1: Report of Indigo-MusesD — Data Link

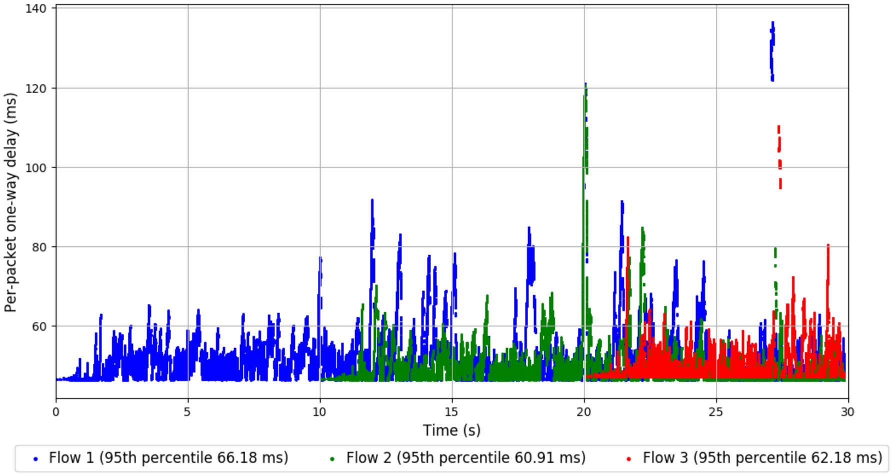




```
Run 2: Statistics of Indigo-MusesD

Start at: 2018-12-12 10:07:04
End at: 2018-12-12 10:07:34
Local clock offset: -0.133 ms
Remote clock offset: -0.123 ms

# Below is generated by plot.py at 2018-12-12 14:03:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1041.03 Mbit/s
95th percentile per-packet one-way delay: 63.598 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 560.20 Mbit/s
95th percentile per-packet one-way delay: 66.178 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 524.86 Mbit/s
95th percentile per-packet one-way delay: 60.907 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 404.28 Mbit/s
95th percentile per-packet one-way delay: 62.177 ms
Loss rate: 0.00%
```

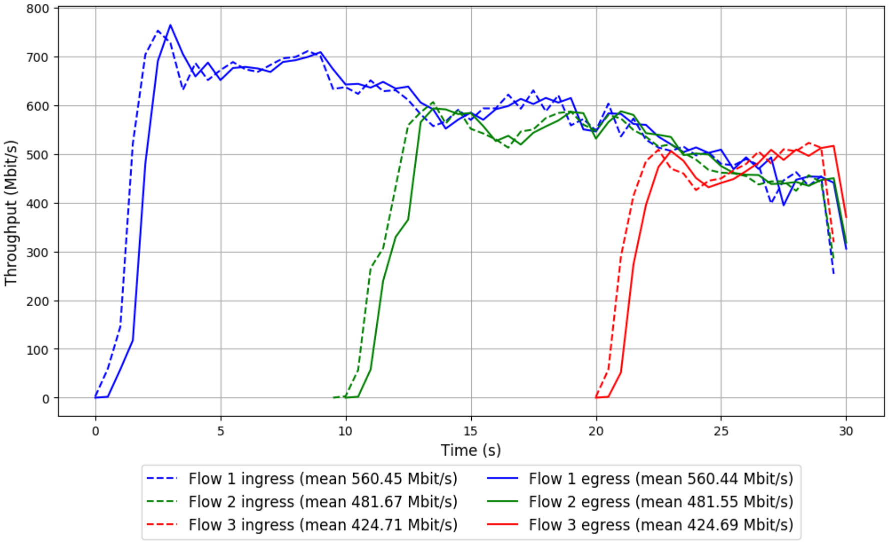
Run 2: Report of Indigo-MusesD — Data Link

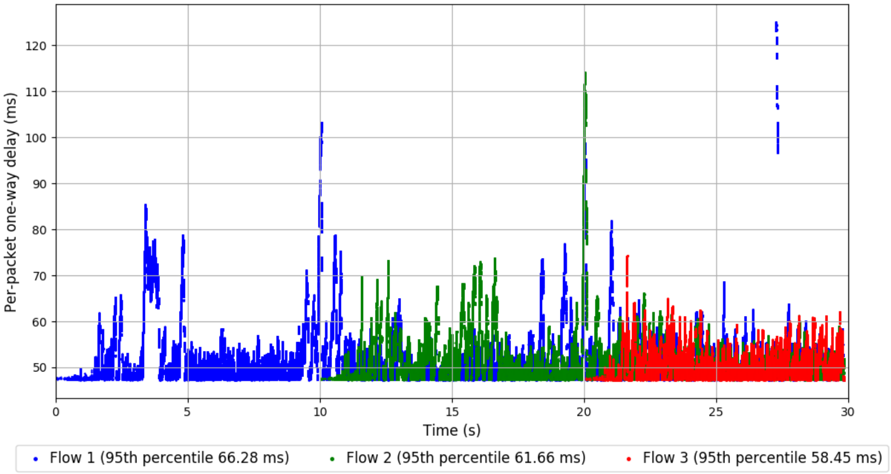




```
Run 3: Statistics of Indigo-MusesD

Start at: 2018-12-12 10:42:59
End at: 2018-12-12 10:43:29
Local clock offset: 0.011 ms
Remote clock offset: -0.062 ms

# Below is generated by plot.py at 2018-12-12 14:15:43
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1019.55 Mbit/s
95th percentile per-packet one-way delay: 62.477 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 560.44 Mbit/s
95th percentile per-packet one-way delay: 66.277 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 481.55 Mbit/s
95th percentile per-packet one-way delay: 61.659 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 424.69 Mbit/s
95th percentile per-packet one-way delay: 58.453 ms
Loss rate: 0.03%
```

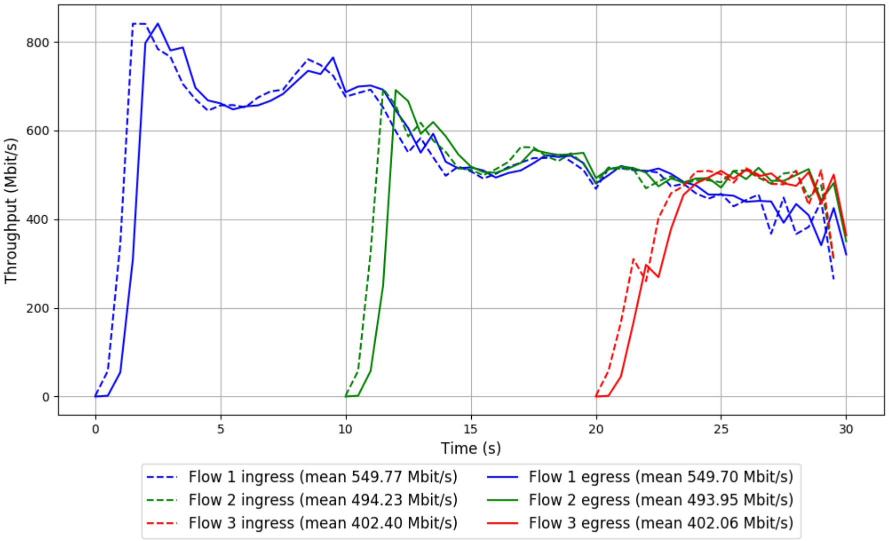
Run 3: Report of Indigo-MusesD — Data Link

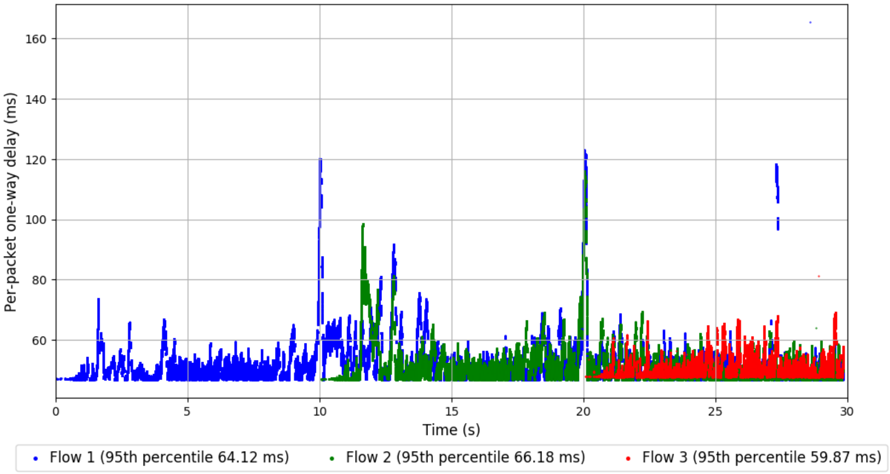




```
Run 4: Statistics of Indigo-MusesD

Start at: 2018-12-12 11:18:19
End at: 2018-12-12 11:18:49
Local clock offset: -0.725 ms
Remote clock offset: -0.27 ms

# Below is generated by plot.py at 2018-12-12 14:16:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1009.44 Mbit/s
95th percentile per-packet one-way delay: 64.139 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 549.70 Mbit/s
95th percentile per-packet one-way delay: 64.118 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 493.95 Mbit/s
95th percentile per-packet one-way delay: 66.177 ms
Loss rate: 0.04%
-- Flow 3:
Average throughput: 402.06 Mbit/s
95th percentile per-packet one-way delay: 59.866 ms
Loss rate: 0.08%
```

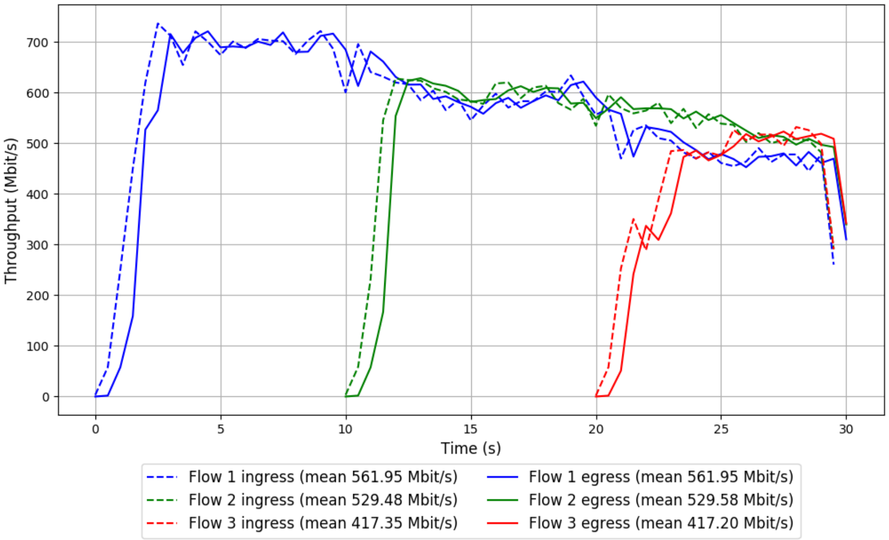
Run 4: Report of Indigo-MusesD — Data Link

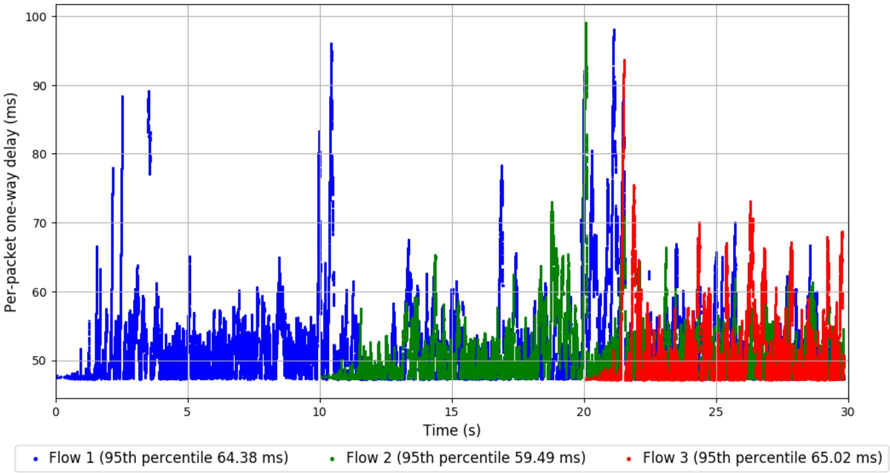




```
Run 5: Statistics of Indigo-MusesD

Start at: 2018-12-12 11:54:25
End at: 2018-12-12 11:54:55
Local clock offset: -0.124 ms
Remote clock offset: -0.349 ms

# Below is generated by plot.py at 2018-12-12 14:17:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1050.43 Mbit/s
95th percentile per-packet one-way delay: 62.885 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 561.95 Mbit/s
95th percentile per-packet one-way delay: 64.378 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 529.58 Mbit/s
95th percentile per-packet one-way delay: 59.490 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 417.20 Mbit/s
95th percentile per-packet one-way delay: 65.018 ms
Loss rate: 0.00%
```

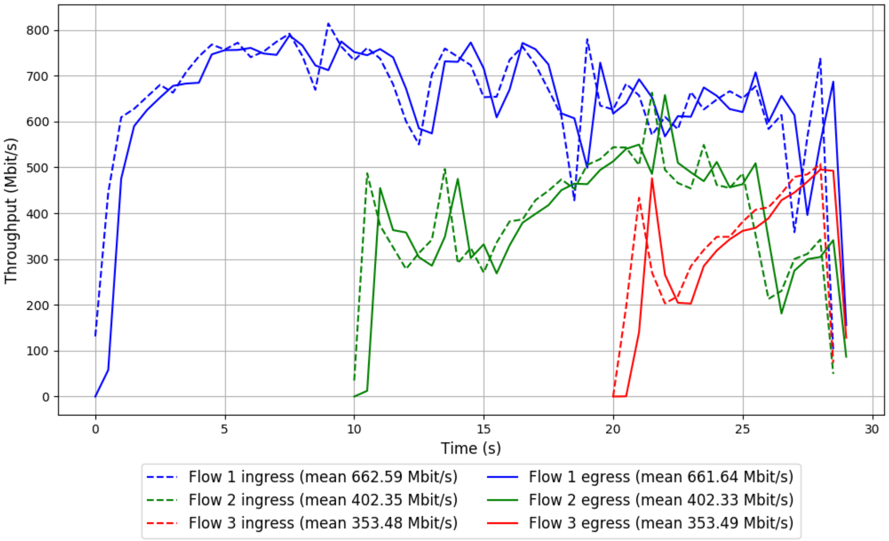
Run 5: Report of Indigo-MusesD — Data Link

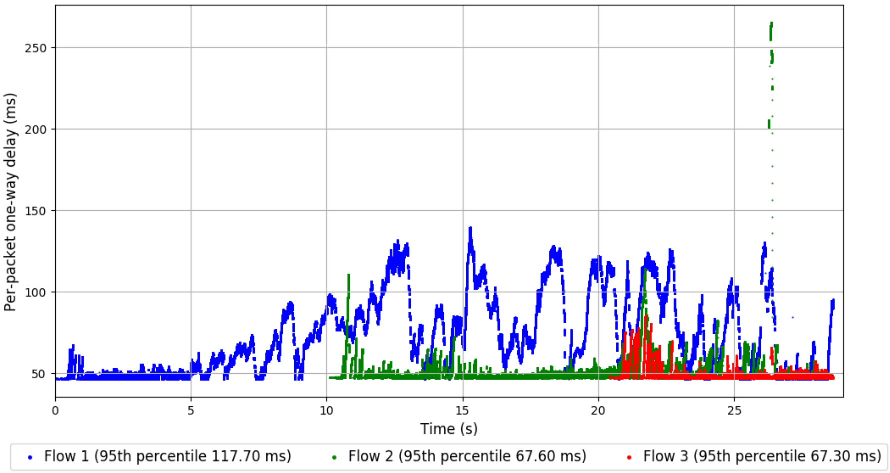




```
Run 1: Statistics of Indigo-MusesT

Start at: 2018-12-12 09:40:33
End at: 2018-12-12 09:41:03
Local clock offset: -0.172 ms
Remote clock offset: -0.019 ms

# Below is generated by plot.py at 2018-12-12 14:17:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1023.79 Mbit/s
95th percentile per-packet one-way delay: 114.400 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 661.64 Mbit/s
95th percentile per-packet one-way delay: 117.705 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 402.33 Mbit/s
95th percentile per-packet one-way delay: 67.599 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 353.49 Mbit/s
95th percentile per-packet one-way delay: 67.295 ms
Loss rate: 0.00%
```

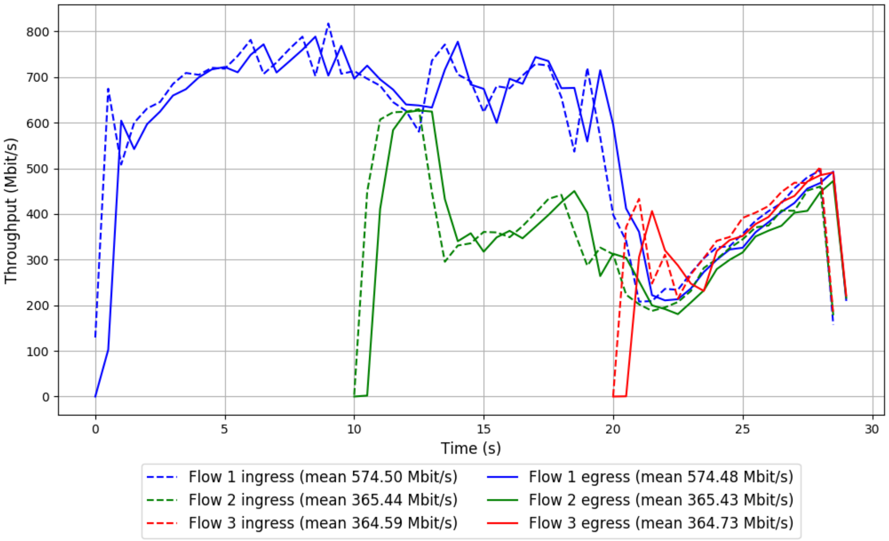
Run 1: Report of Indigo-MusesT — Data Link

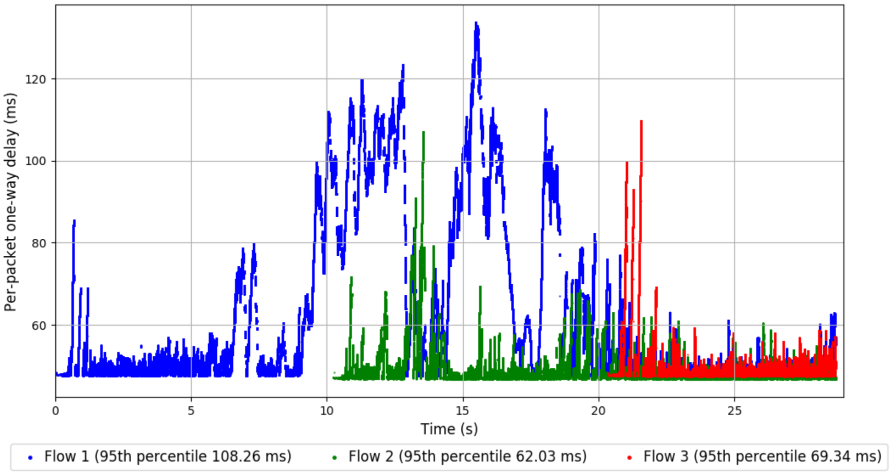




```
Run 2: Statistics of Indigo-MusesT

Start at: 2018-12-12 10:15:31
End at: 2018-12-12 10:16:01
Local clock offset: -0.427 ms
Remote clock offset: -0.06 ms

# Below is generated by plot.py at 2018-12-12 14:17:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 916.56 Mbit/s
95th percentile per-packet one-way delay: 104.143 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 574.48 Mbit/s
95th percentile per-packet one-way delay: 108.262 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 365.43 Mbit/s
95th percentile per-packet one-way delay: 62.031 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 364.73 Mbit/s
95th percentile per-packet one-way delay: 69.338 ms
Loss rate: 0.02%
```

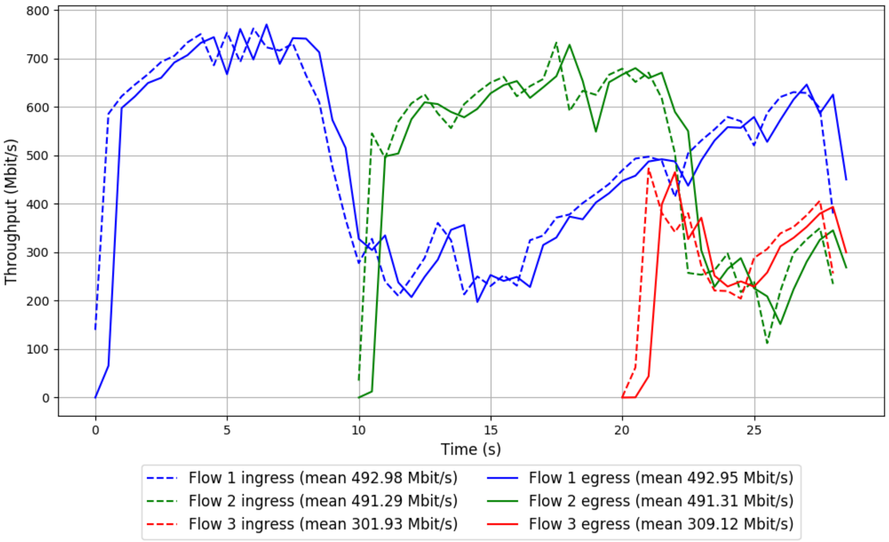
Run 2: Report of Indigo-MusesT — Data Link

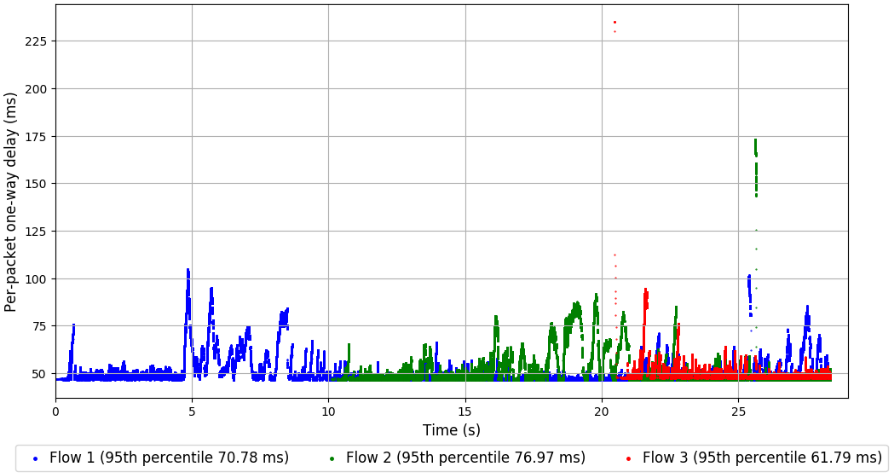




```
Run 3: Statistics of Indigo-MusesT

Start at: 2018-12-12 10:51:12
End at: 2018-12-12 10:51:42
Local clock offset: -0.144 ms
Remote clock offset: -0.136 ms

# Below is generated by plot.py at 2018-12-12 14:17:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 895.78 Mbit/s
95th percentile per-packet one-way delay: 73.421 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 492.95 Mbit/s
95th percentile per-packet one-way delay: 70.782 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 491.31 Mbit/s
95th percentile per-packet one-way delay: 76.974 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 309.12 Mbit/s
95th percentile per-packet one-way delay: 61.791 ms
Loss rate: 0.01%
```

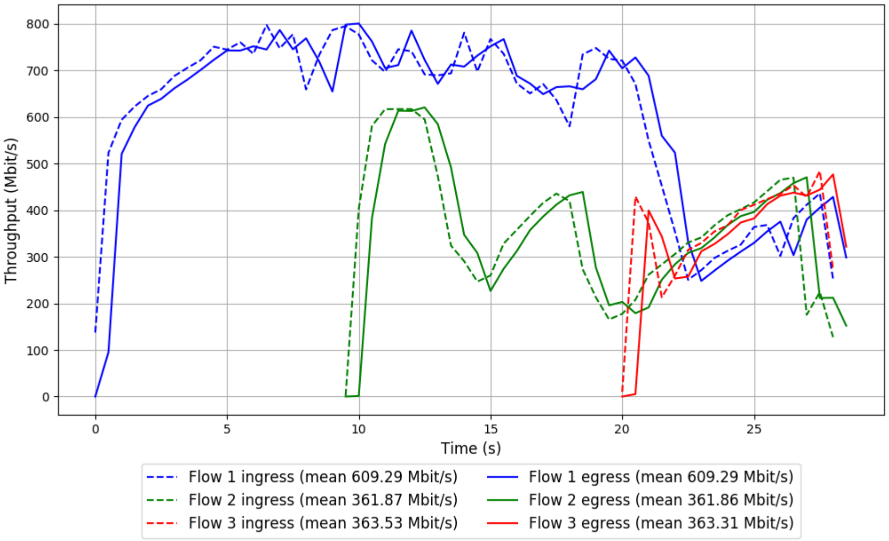
Run 3: Report of Indigo-MusesT — Data Link

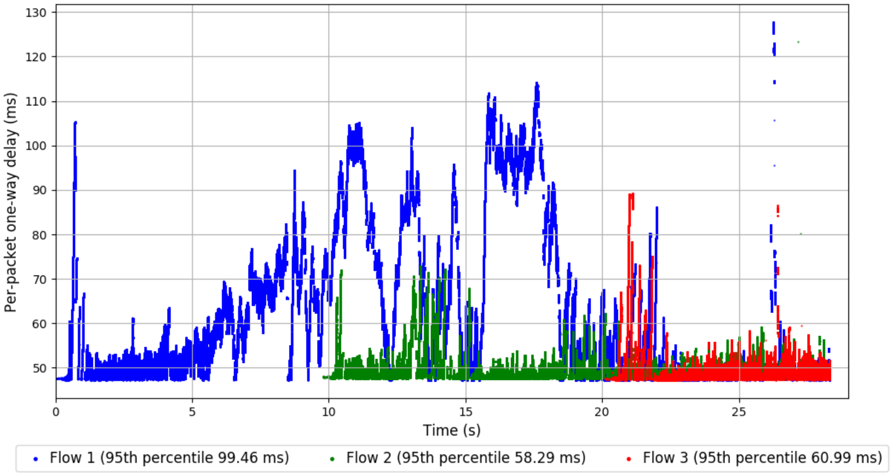




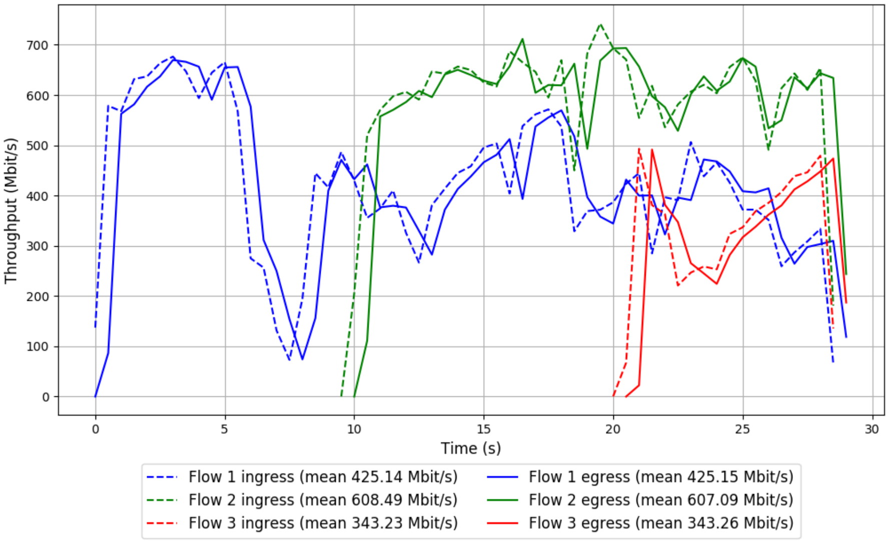
```
Run 4: Statistics of Indigo-MusesT

Start at: 2018-12-12 11:26:26
End at: 2018-12-12 11:26:56
Local clock offset: -0.141 ms
Remote clock offset: -0.287 ms

# Below is generated by plot.py at 2018-12-12 14:19:22
# Datalink statistics
-- Total of 3 flows:
Average throughput: 951.60 Mbit/s
95th percentile per-packet one-way delay: 96.443 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 609.29 Mbit/s
95th percentile per-packet one-way delay: 99.462 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 361.86 Mbit/s
95th percentile per-packet one-way delay: 58.287 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 363.31 Mbit/s
95th percentile per-packet one-way delay: 60.987 ms
Loss rate: 0.04%
```

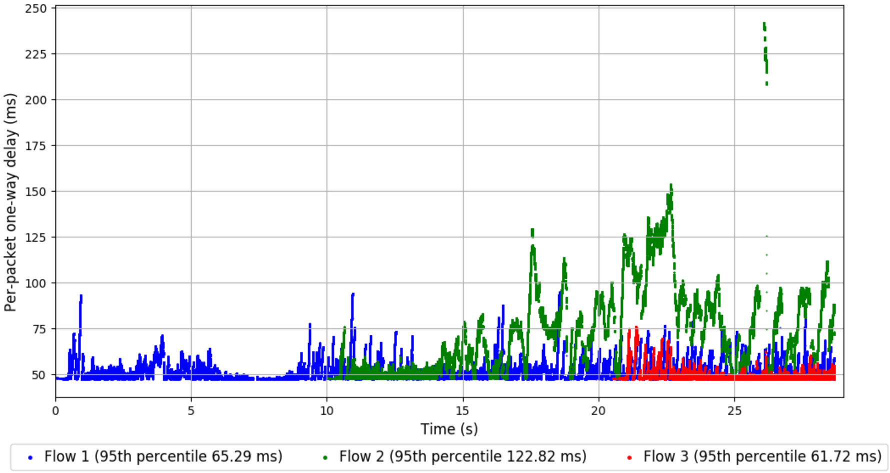
Run 4: Report of Indigo-MusesT — Data Link





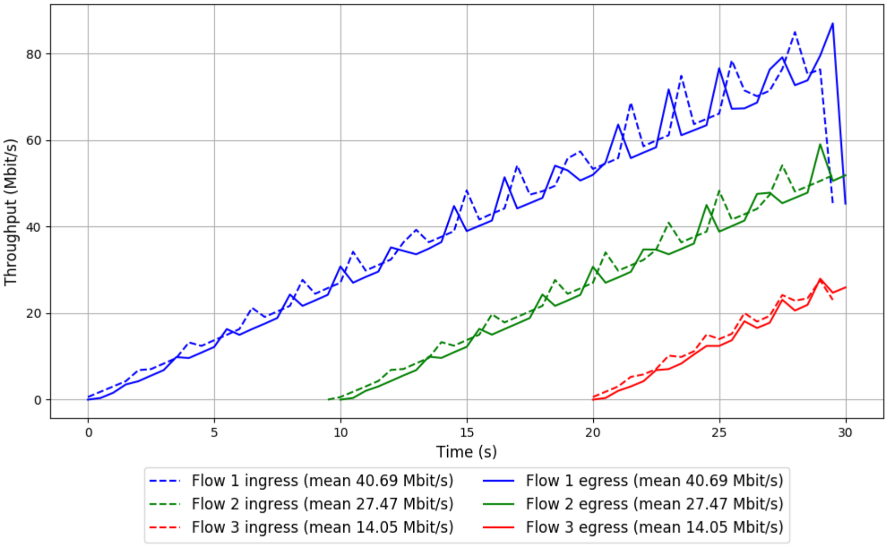
```
Run 5: Statistics of Indigo-MusesT

Start at: 2018-12-12 12:02:40
End at: 2018-12-12 12:03:10
Local clock offset: -0.069 ms
Remote clock offset: -0.38 ms

# Below is generated by plot.py at 2018-12-12 14:22:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 918.34 Mbit/s
95th percentile per-packet one-way delay: 100.066 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 425.15 Mbit/s
95th percentile per-packet one-way delay: 65.292 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 607.09 Mbit/s
95th percentile per-packet one-way delay: 122.819 ms
Loss rate: 0.23%
-- Flow 3:
Average throughput: 343.26 Mbit/s
95th percentile per-packet one-way delay: 61.722 ms
Loss rate: 0.00%
```

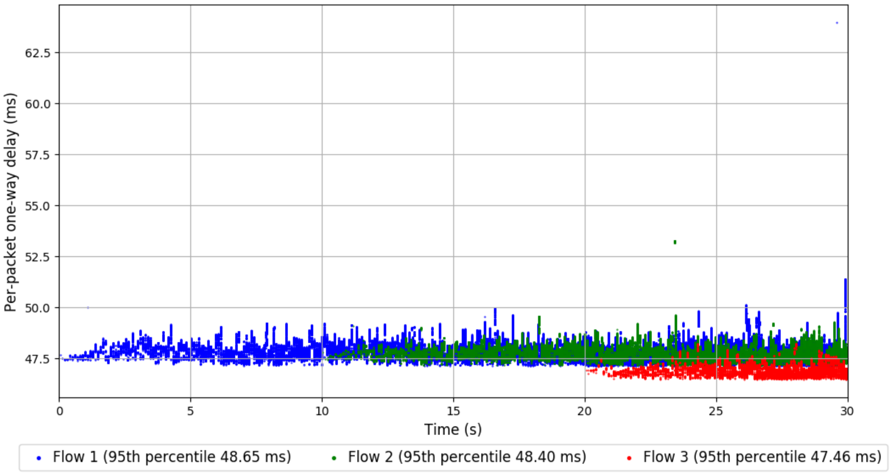

Throughput (Mbit/s)
700
600
500
400
300
200
100
0
0
5
10
15
20
25
30
Time (s)
Flow 1 ingress (mean 425.14 Mbit/s)
Flow 1 egress (mean 425.15 Mbit/s)
Flow 2 ingress (mean 608.49 Mbit/s)
Flow 2 egress (mean 607.09 Mbit/s)
Flow 3 ingress (mean 343.23 Mbit/s)
Flow 3 egress (mean 343.26 Mbit/s)


Per-packet one-way delay (ms)
250
225
200
175
150
125
100
75
50
0
5
10
15
20
25
Time (s)
Flow 1 (95th percentile 65.29 ms)
Flow 2 (95th percentile 122.82 ms)
Flow 3 (95th percentile 61.72 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2018-12-12 09:48:56
End at: 2018-12-12 09:49:26
Local clock offset: -0.149 ms
Remote clock offset: -0.053 ms

# Below is generated by plot.py at 2018-12-12 14:22:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 63.59 Mbit/s
95th percentile per-packet one-way delay: 48.536 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 40.69 Mbit/s
95th percentile per-packet one-way delay: 48.650 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 27.47 Mbit/s
95th percentile per-packet one-way delay: 48.403 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 14.05 Mbit/s
95th percentile per-packet one-way delay: 47.456 ms
Loss rate: 0.00%
```

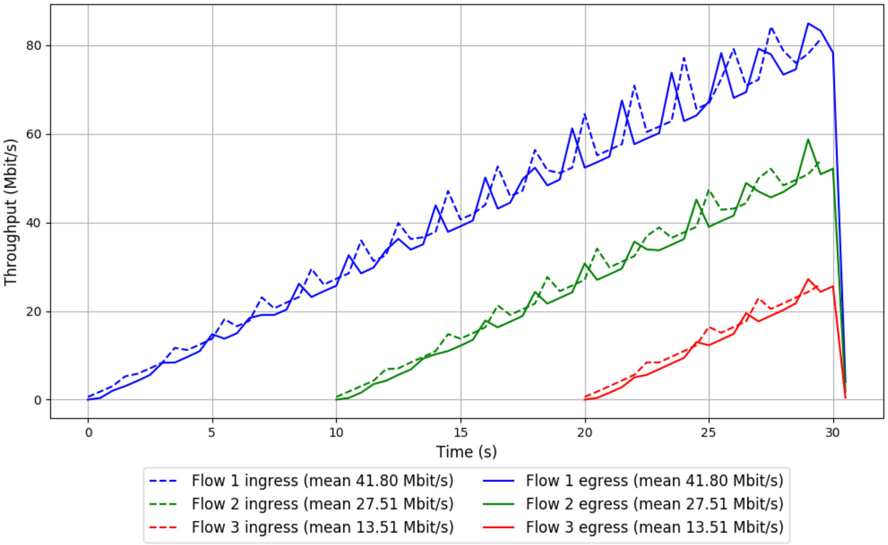
Run 1: Report of LEDBAT — Data Link

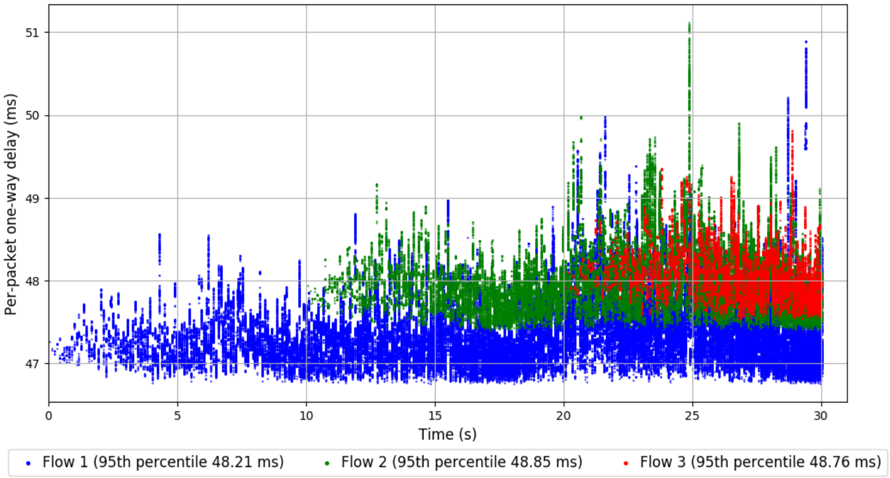




```
Run 2: Statistics of LEDBAT

Start at: 2018-12-12 10:23:49
End at: 2018-12-12 10:24:19
Local clock offset: -0.379 ms
Remote clock offset: -0.044 ms

# Below is generated by plot.py at 2018-12-12 14:22:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 64.61 Mbit/s
95th percentile per-packet one-way delay: 48.534 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 41.80 Mbit/s
95th percentile per-packet one-way delay: 48.207 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 27.51 Mbit/s
95th percentile per-packet one-way delay: 48.854 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 13.51 Mbit/s
95th percentile per-packet one-way delay: 48.757 ms
Loss rate: 0.00%
```

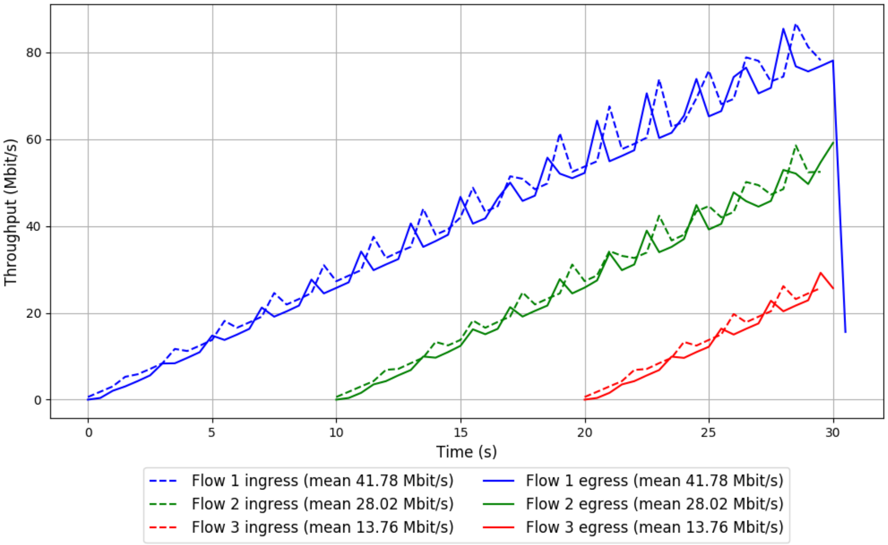
Run 2: Report of LEDBAT — Data Link

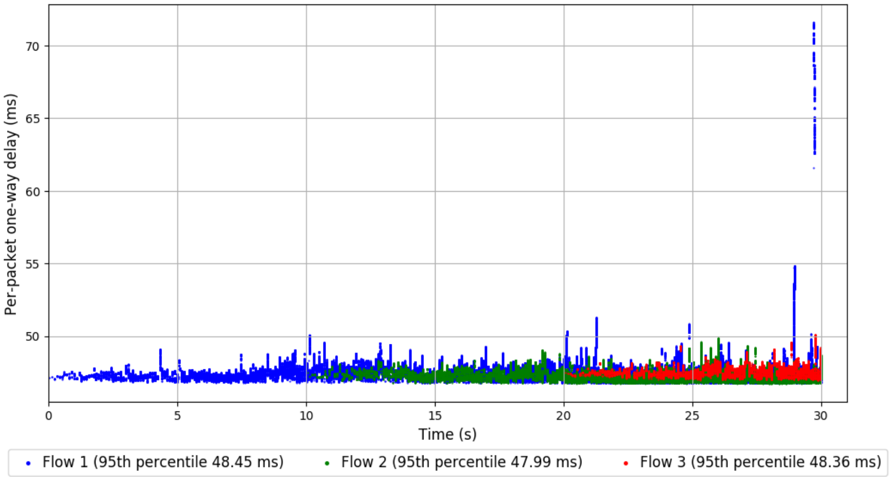




```
Run 3: Statistics of LEDBAT

Start at: 2018-12-12 10:59:46
End at: 2018-12-12 11:00:16
Local clock offset: -0.567 ms
Remote clock offset: -0.215 ms

# Below is generated by plot.py at 2018-12-12 14:22:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 64.97 Mbit/s
95th percentile per-packet one-way delay: 48.318 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 41.78 Mbit/s
95th percentile per-packet one-way delay: 48.454 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 28.02 Mbit/s
95th percentile per-packet one-way delay: 47.995 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 13.76 Mbit/s
95th percentile per-packet one-way delay: 48.362 ms
Loss rate: 0.00%
```

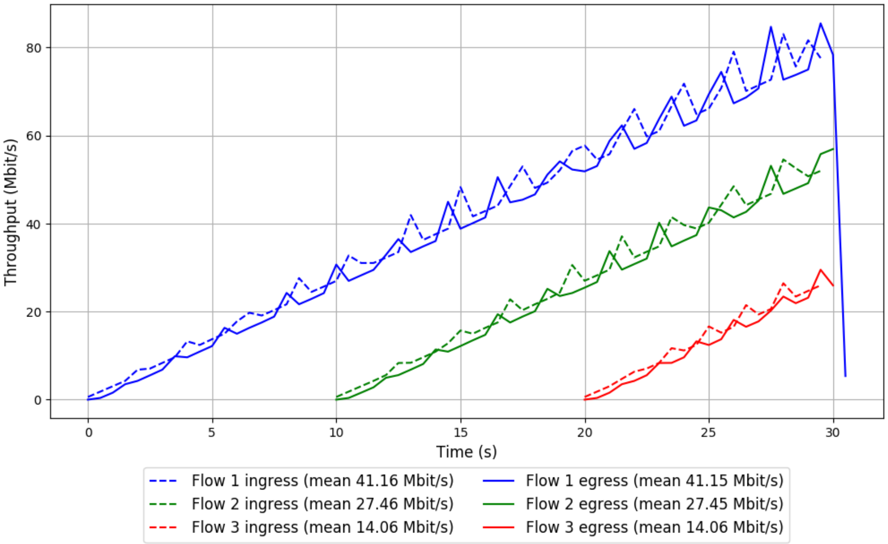
Run 3: Report of LEDBAT — Data Link

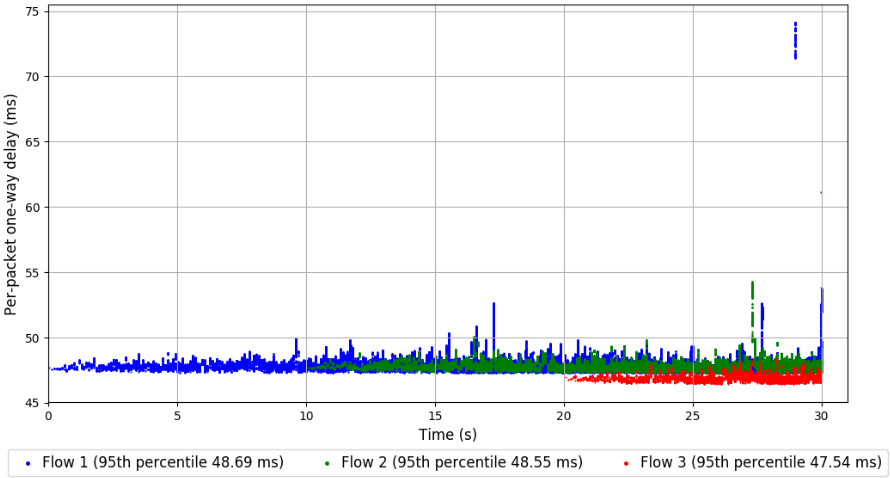




```
Run 4: Statistics of LEDBAT

Start at: 2018-12-12 11:34:59
End at: 2018-12-12 11:35:29
Local clock offset: -0.17 ms
Remote clock offset: -0.315 ms

# Below is generated by plot.py at 2018-12-12 14:22:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 64.04 Mbit/s
95th percentile per-packet one-way delay: 48.608 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 41.15 Mbit/s
95th percentile per-packet one-way delay: 48.690 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 27.45 Mbit/s
95th percentile per-packet one-way delay: 48.547 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 14.06 Mbit/s
95th percentile per-packet one-way delay: 47.544 ms
Loss rate: 0.00%
```

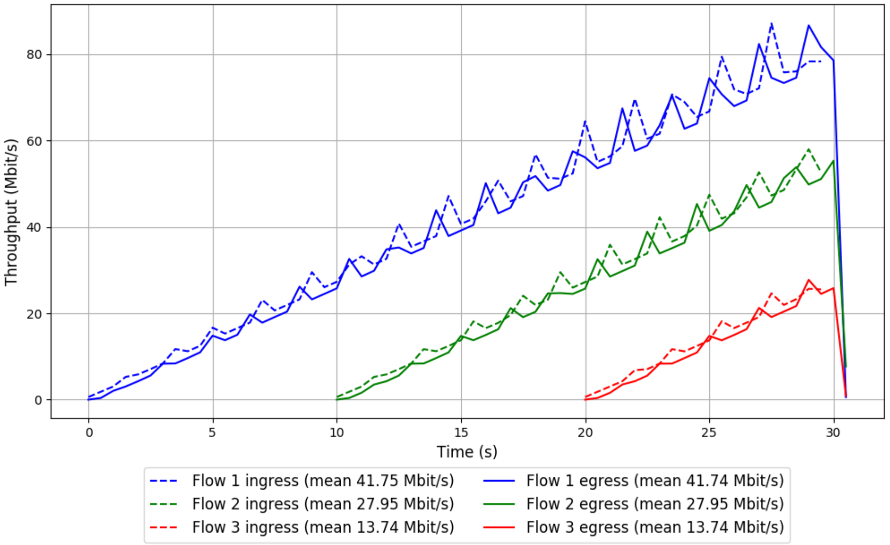
Run 4: Report of LEDBAT — Data Link

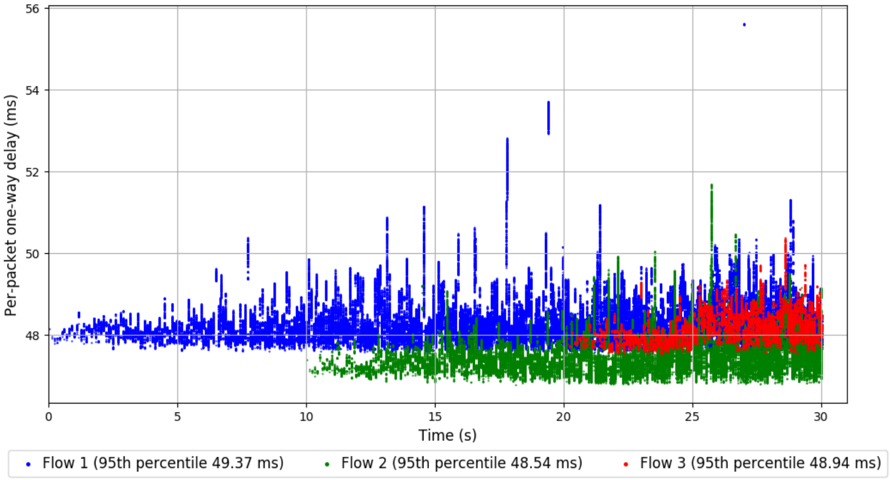




```
Run 5: Statistics of LEDBAT

Start at: 2018-12-12 12:10:57
End at: 2018-12-12 12:11:27
Local clock offset: -0.416 ms
Remote clock offset: -0.384 ms

# Below is generated by plot.py at 2018-12-12 14:22:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 64.92 Mbit/s
95th percentile per-packet one-way delay: 49.206 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 41.74 Mbit/s
95th percentile per-packet one-way delay: 49.374 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 27.95 Mbit/s
95th percentile per-packet one-way delay: 48.536 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 13.74 Mbit/s
95th percentile per-packet one-way delay: 48.939 ms
Loss rate: 0.00%
```

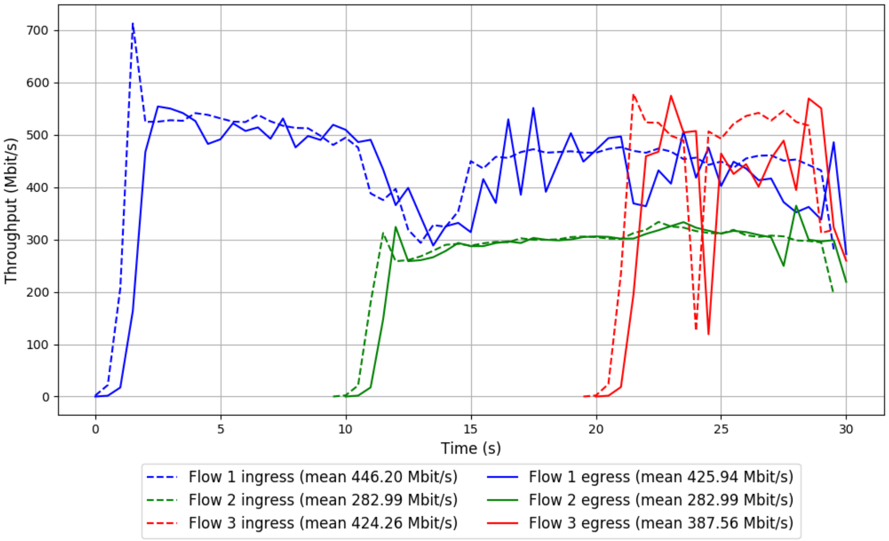
Run 5: Report of LEDBAT — Data Link

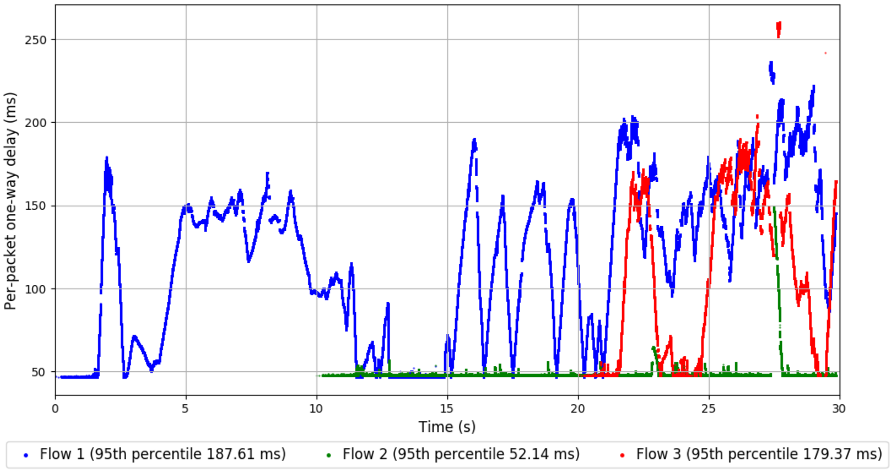




```
Run 1: Statistics of PCC-Allegro

Start at: 2018-12-12 09:56:22
End at: 2018-12-12 09:56:52
Local clock offset: -0.099 ms
Remote clock offset: -0.087 ms

# Below is generated by plot.py at 2018-12-12 14:45:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 742.05 Mbit/s
95th percentile per-packet one-way delay: 180.164 ms
Loss rate: 4.17%
-- Flow 1:
Average throughput: 425.94 Mbit/s
95th percentile per-packet one-way delay: 187.609 ms
Loss rate: 4.53%
-- Flow 2:
Average throughput: 282.99 Mbit/s
95th percentile per-packet one-way delay: 52.143 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 387.56 Mbit/s
95th percentile per-packet one-way delay: 179.365 ms
Loss rate: 8.65%
```

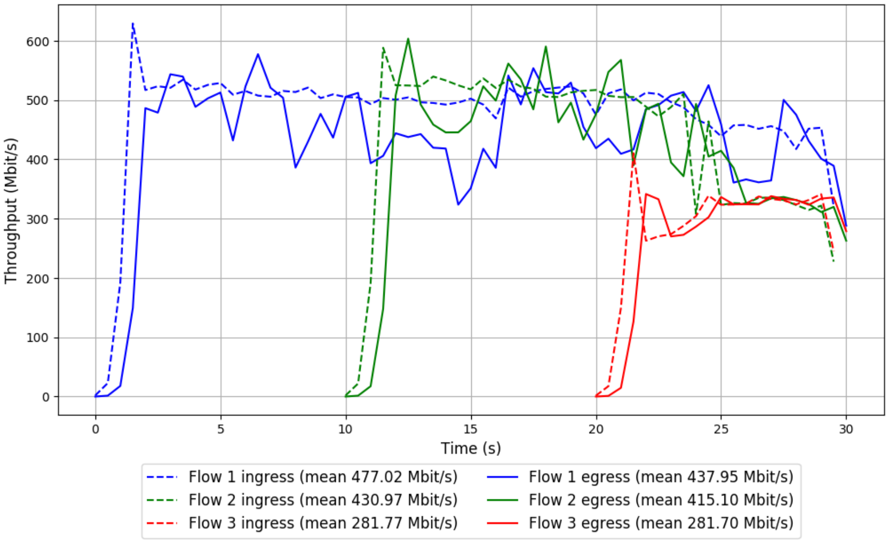
Run 1: Report of PCC-Allegro — Data Link

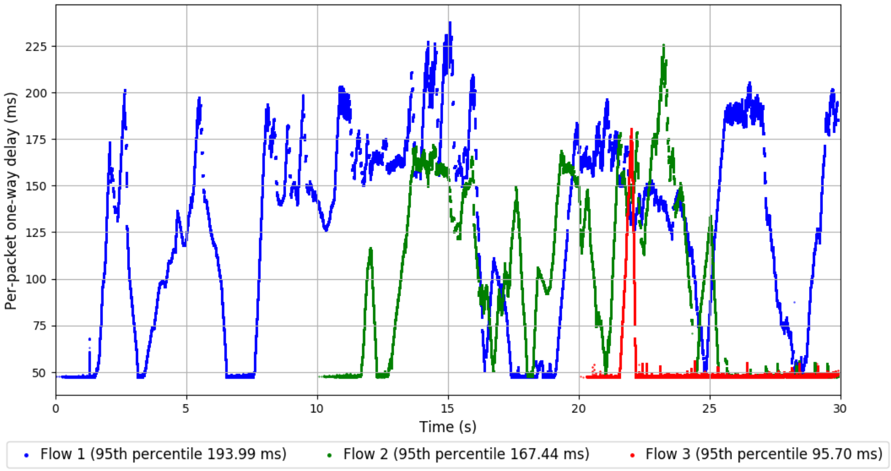




```
Run 2: Statistics of PCC-Allegro

Start at: 2018-12-12 10:31:44
End at: 2018-12-12 10:32:14
Local clock offset: -0.021 ms
Remote clock offset: -0.025 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 806.40 Mbit/s
95th percentile per-packet one-way delay: 188.629 ms
Loss rate: 5.80%
-- Flow 1:
Average throughput: 437.95 Mbit/s
95th percentile per-packet one-way delay: 193.992 ms
Loss rate: 8.19%
-- Flow 2:
Average throughput: 415.10 Mbit/s
95th percentile per-packet one-way delay: 167.441 ms
Loss rate: 3.68%
-- Flow 3:
Average throughput: 281.70 Mbit/s
95th percentile per-packet one-way delay: 95.697 ms
Loss rate: 0.01%
```

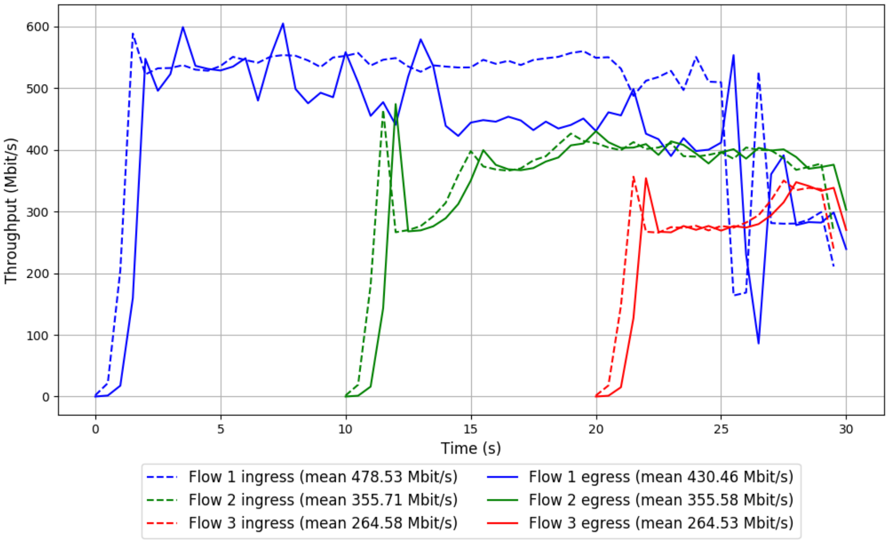
Run 2: Report of PCC-Allegro — Data Link

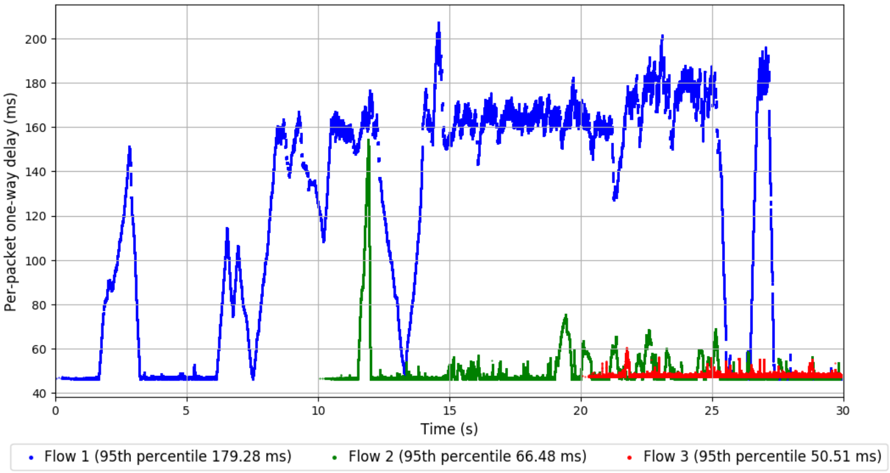




```
Run 3: Statistics of PCC-Allegro

Start at: 2018-12-12 11:06:55
End at: 2018-12-12 11:07:25
Local clock offset: -0.255 ms
Remote clock offset: -0.292 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 753.64 Mbit/s
95th percentile per-packet one-way delay: 174.152 ms
Loss rate: 6.01%
-- Flow 1:
Average throughput: 430.46 Mbit/s
95th percentile per-packet one-way delay: 179.283 ms
Loss rate: 10.05%
-- Flow 2:
Average throughput: 355.58 Mbit/s
95th percentile per-packet one-way delay: 66.479 ms
Loss rate: 0.04%
-- Flow 3:
Average throughput: 264.53 Mbit/s
95th percentile per-packet one-way delay: 50.508 ms
Loss rate: 0.02%
```

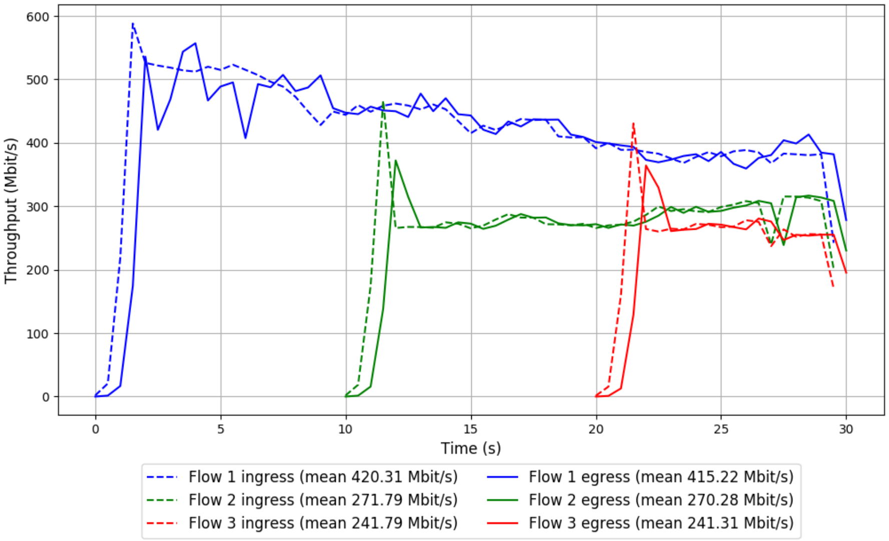
Run 3: Report of PCC-Allegro — Data Link

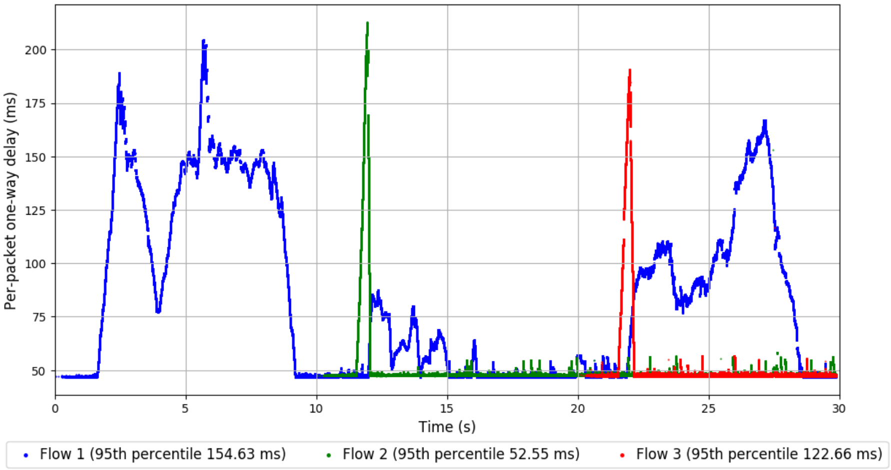




```
Run 4: Statistics of PCC-Allegro

Start at: 2018-12-12 11:42:43
End at: 2018-12-12 11:43:13
Local clock offset: -0.132 ms
Remote clock offset: -0.304 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 673.88 Mbit/s
95th percentile per-packet one-way delay: 151.989 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 415.22 Mbit/s
95th percentile per-packet one-way delay: 154.635 ms
Loss rate: 1.21%
-- Flow 2:
Average throughput: 270.28 Mbit/s
95th percentile per-packet one-way delay: 52.555 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 241.31 Mbit/s
95th percentile per-packet one-way delay: 122.657 ms
Loss rate: 0.20%
```

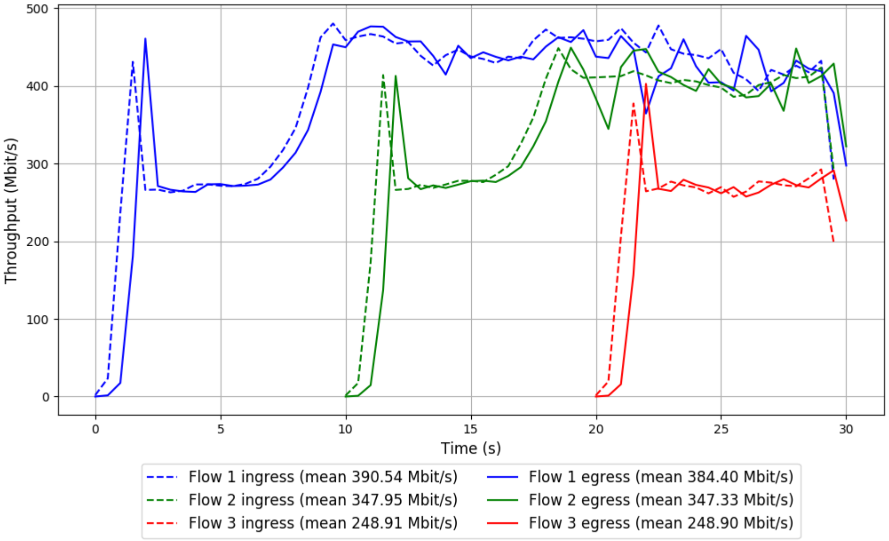
Run 4: Report of PCC-Allegro — Data Link

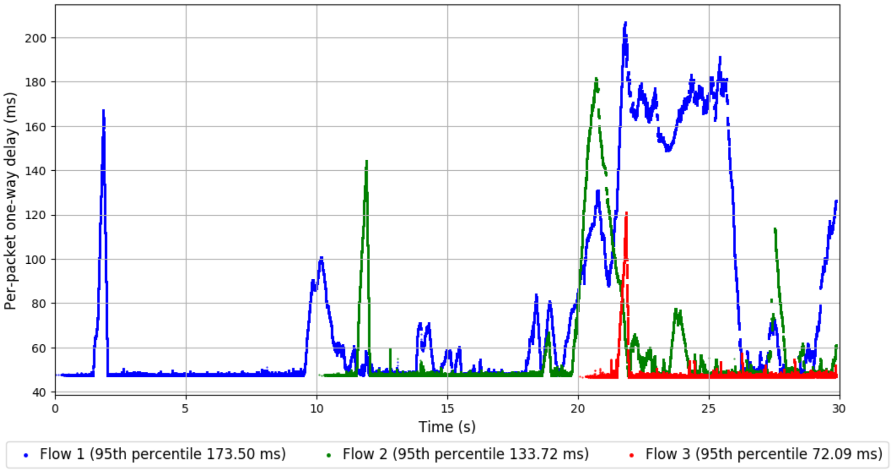




```
Run 5: Statistics of PCC-Allegro

Start at: 2018-12-12 12:18:18
End at: 2018-12-12 12:18:48
Local clock offset: -0.025 ms
Remote clock offset: -0.409 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 696.49 Mbit/s
95th percentile per-packet one-way delay: 168.808 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 384.40 Mbit/s
95th percentile per-packet one-way delay: 173.504 ms
Loss rate: 1.57%
-- Flow 2:
Average throughput: 347.33 Mbit/s
95th percentile per-packet one-way delay: 133.725 ms
Loss rate: 0.18%
-- Flow 3:
Average throughput: 248.90 Mbit/s
95th percentile per-packet one-way delay: 72.086 ms
Loss rate: 0.00%
```

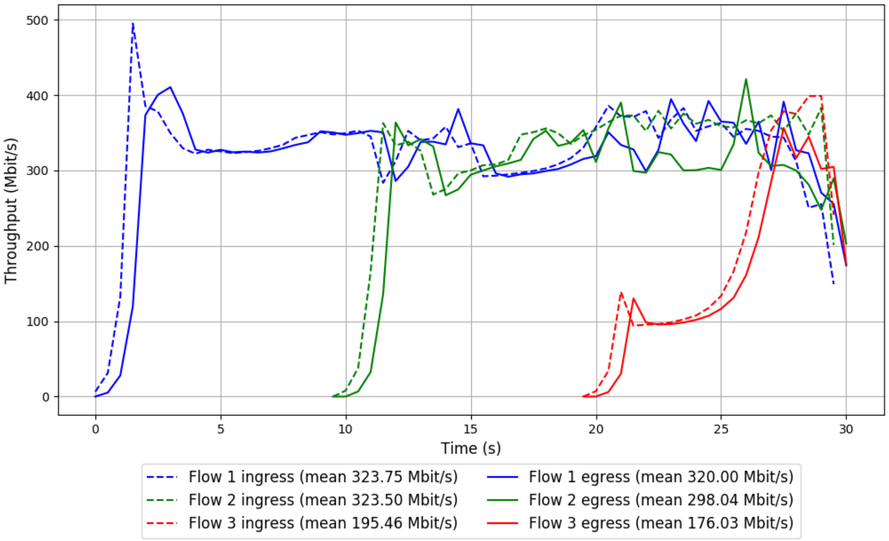
Run 5: Report of PCC-Allegro — Data Link

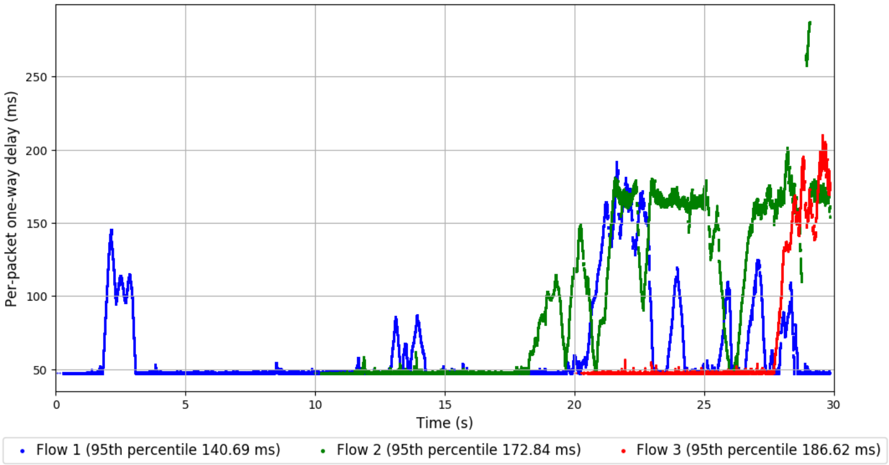




```
Run 1: Statistics of PCC-Expr

Start at: 2018-12-12 09:46:40
End at: 2018-12-12 09:47:10
Local clock offset: -0.121 ms
Remote clock offset: -0.049 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 577.04 Mbit/s
95th percentile per-packet one-way delay: 169.033 ms
Loss rate: 4.50%
-- Flow 1:
Average throughput: 320.00 Mbit/s
95th percentile per-packet one-way delay: 140.685 ms
Loss rate: 1.16%
-- Flow 2:
Average throughput: 298.04 Mbit/s
95th percentile per-packet one-way delay: 172.842 ms
Loss rate: 7.87%
-- Flow 3:
Average throughput: 176.03 Mbit/s
95th percentile per-packet one-way delay: 186.616 ms
Loss rate: 9.94%
```

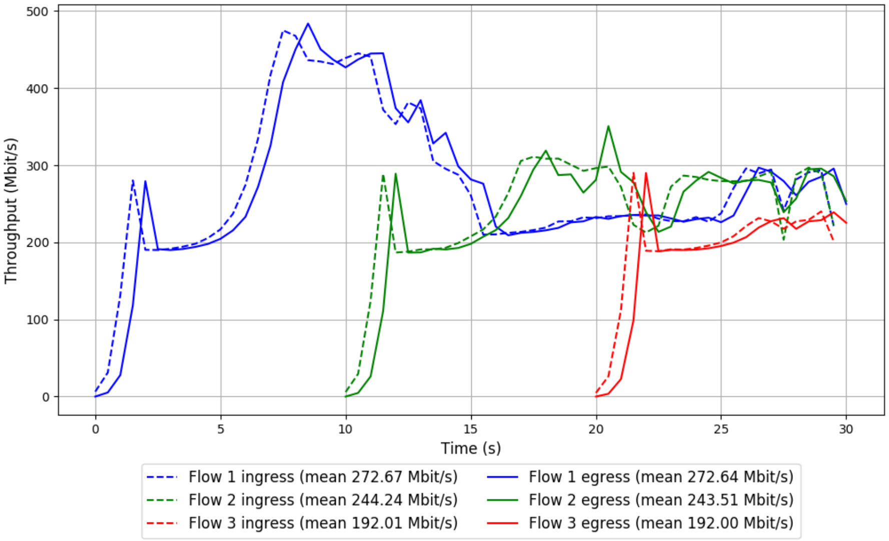
Run 1: Report of PCC-Expr — Data Link

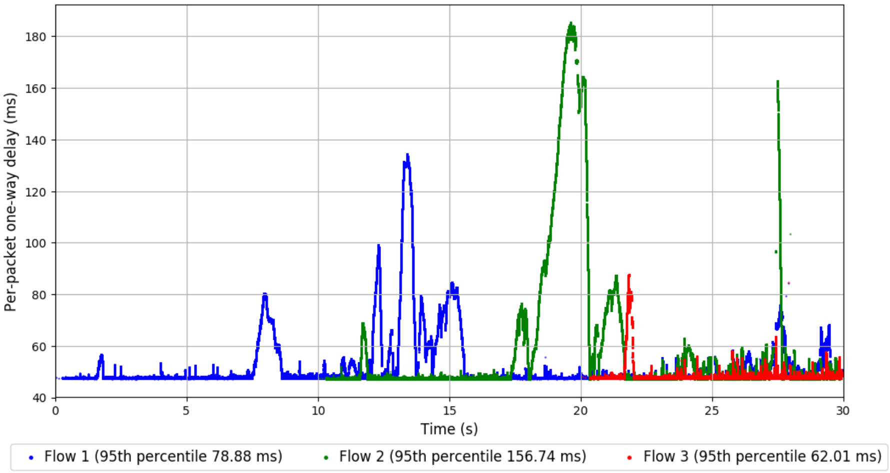




```
Run 2: Statistics of PCC-Expr

Start at: 2018-12-12 10:21:34
End at: 2018-12-12 10:22:04
Local clock offset: -0.064 ms
Remote clock offset: -0.06 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 497.86 Mbit/s
95th percentile per-packet one-way delay: 90.191 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 272.64 Mbit/s
95th percentile per-packet one-way delay: 78.876 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 243.51 Mbit/s
95th percentile per-packet one-way delay: 156.739 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 192.00 Mbit/s
95th percentile per-packet one-way delay: 62.009 ms
Loss rate: 0.00%
```

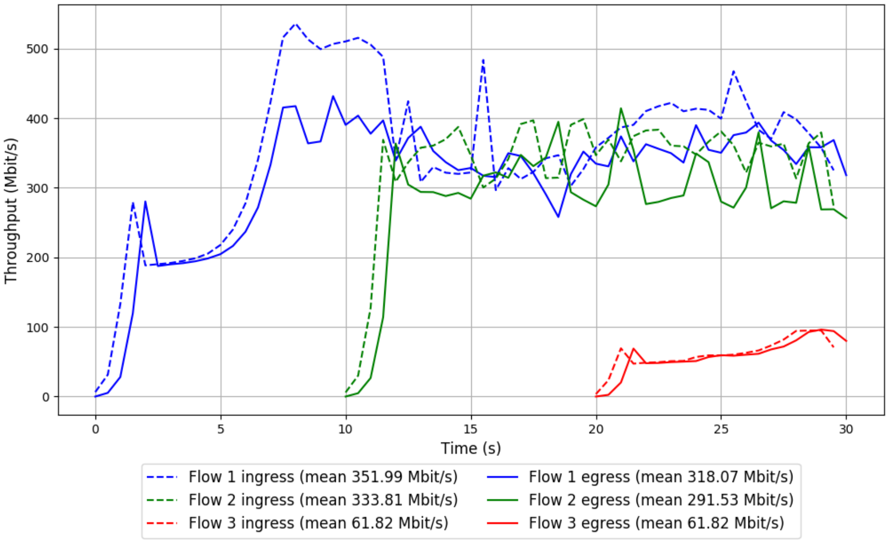
Run 2: Report of PCC-Expr — Data Link

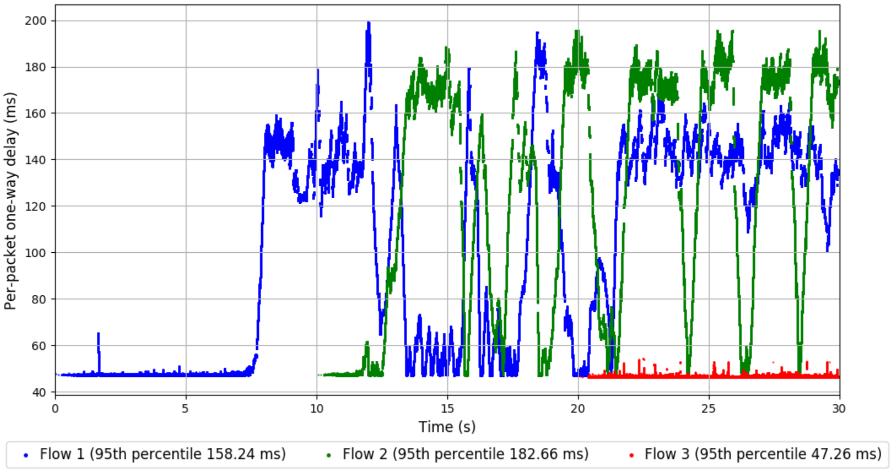




```
Run 3: Statistics of PCC-Expr

Start at: 2018-12-12 10:57:33
End at: 2018-12-12 10:58:03
Local clock offset: -0.187 ms
Remote clock offset: -0.161 ms

# Below is generated by plot.py at 2018-12-12 14:48:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 532.30 Mbit/s
95th percentile per-packet one-way delay: 178.378 ms
Loss rate: 10.42%
-- Flow 1:
Average throughput: 318.07 Mbit/s
95th percentile per-packet one-way delay: 158.239 ms
Loss rate: 9.63%
-- Flow 2:
Average throughput: 291.53 Mbit/s
95th percentile per-packet one-way delay: 182.655 ms
Loss rate: 12.64%
-- Flow 3:
Average throughput: 61.82 Mbit/s
95th percentile per-packet one-way delay: 47.257 ms
Loss rate: 0.00%
```

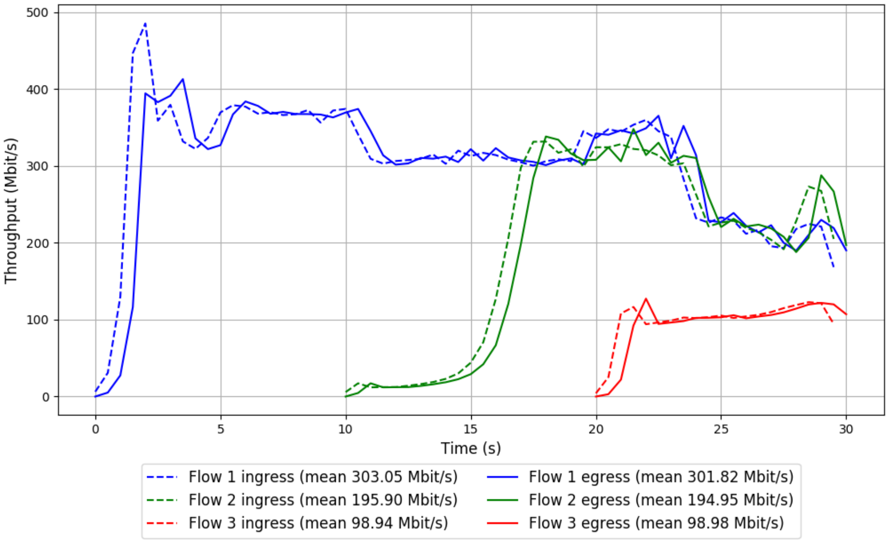
Run 3: Report of PCC-Expr — Data Link

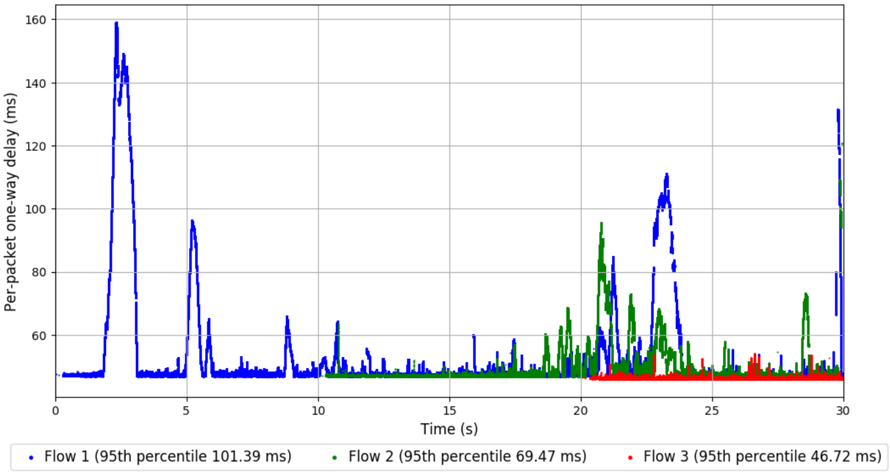




```
Run 4: Statistics of PCC-Expr

Start at: 2018-12-12 11:32:49
End at: 2018-12-12 11:33:19
Local clock offset: 0.259 ms
Remote clock offset: -0.285 ms

# Below is generated by plot.py at 2018-12-12 14:53:11
# Datalink statistics
-- Total of 3 flows:
Average throughput: 464.03 Mbit/s
95th percentile per-packet one-way delay: 90.245 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 301.82 Mbit/s
95th percentile per-packet one-way delay: 101.395 ms
Loss rate: 0.41%
-- Flow 2:
Average throughput: 194.95 Mbit/s
95th percentile per-packet one-way delay: 69.465 ms
Loss rate: 0.44%
-- Flow 3:
Average throughput: 98.98 Mbit/s
95th percentile per-packet one-way delay: 46.715 ms
Loss rate: 0.00%
```

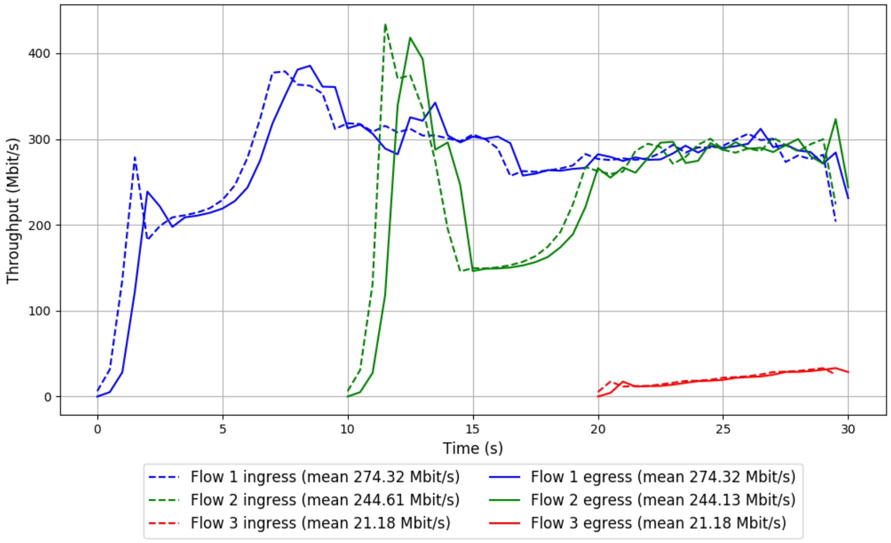
Run 4: Report of PCC-Expr — Data Link

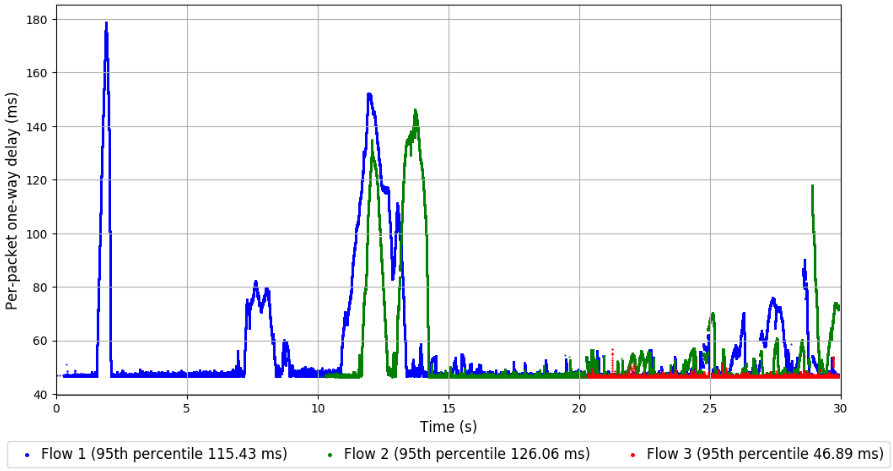




```
Run 5: Statistics of PCC-Expr

Start at: 2018-12-12 12:08:55
End at: 2018-12-12 12:09:25
Local clock offset: -0.045 ms
Remote clock offset: -0.392 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 443.65 Mbit/s
95th percentile per-packet one-way delay: 118.377 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 274.32 Mbit/s
95th percentile per-packet one-way delay: 115.431 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 244.13 Mbit/s
95th percentile per-packet one-way delay: 126.060 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 21.18 Mbit/s
95th percentile per-packet one-way delay: 46.894 ms
Loss rate: 0.00%
```

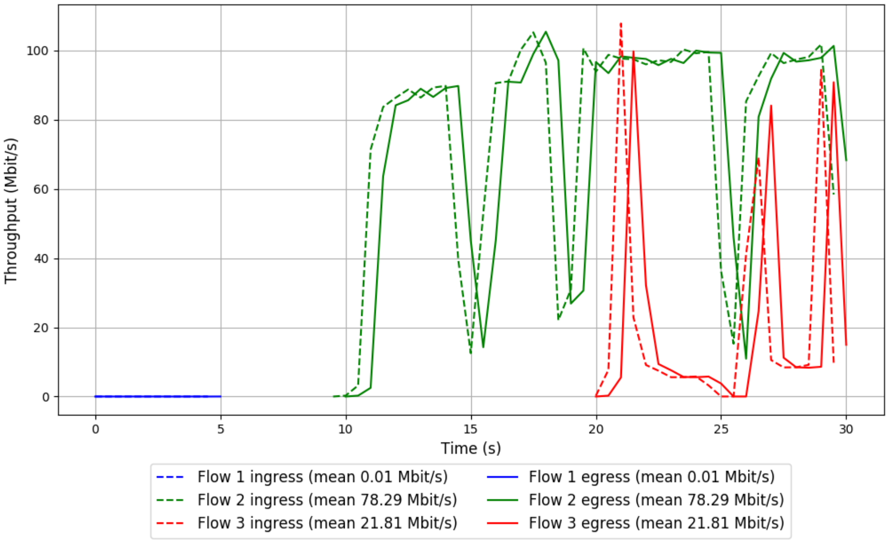
Run 5: Report of PCC-Expr — Data Link

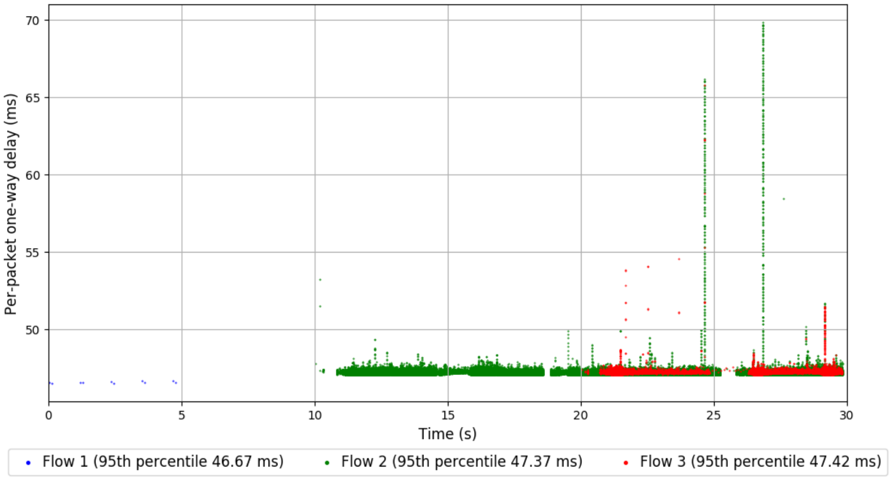




```
Run 1: Statistics of QUIC Cubic

Start at: 2018-12-12 09:34:33
End at: 2018-12-12 09:35:03
Local clock offset: -0.084 ms
Remote clock offset: -0.024 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 59.18 Mbit/s
95th percentile per-packet one-way delay: 47.379 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 46.675 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 78.29 Mbit/s
95th percentile per-packet one-way delay: 47.373 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 21.81 Mbit/s
95th percentile per-packet one-way delay: 47.420 ms
Loss rate: 0.00%
```

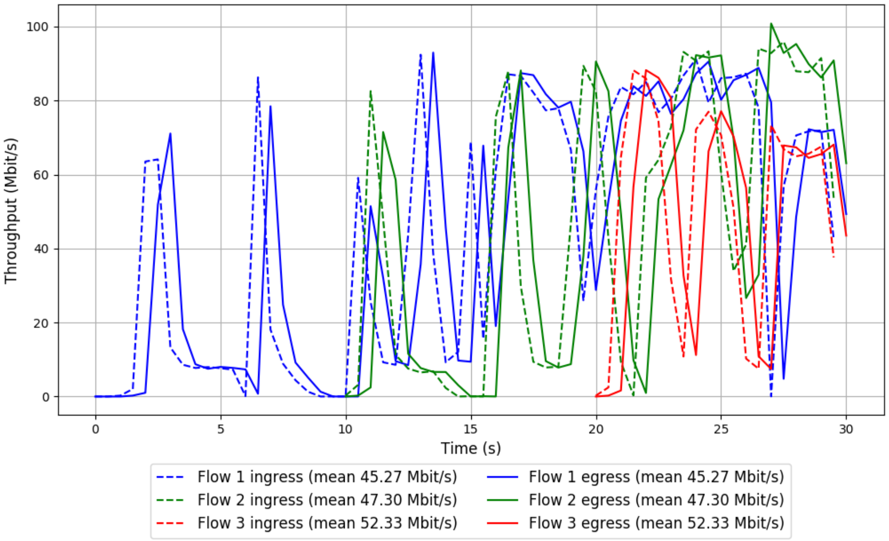
Run 1: Report of QUIC Cubic — Data Link

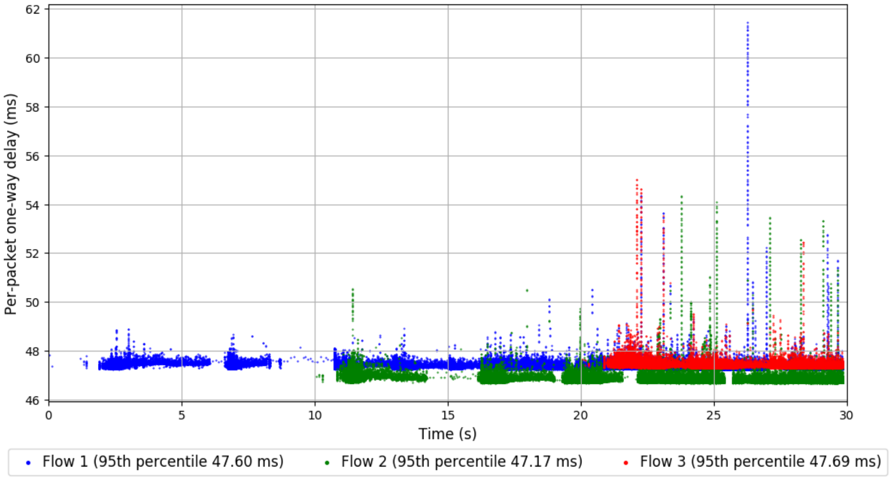




```
Run 2: Statistics of QUIC Cubic

Start at: 2018-12-12 10:09:39
End at: 2018-12-12 10:10:09
Local clock offset: -0.139 ms
Remote clock offset: -0.087 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 93.81 Mbit/s
95th percentile per-packet one-way delay: 47.589 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 45.27 Mbit/s
95th percentile per-packet one-way delay: 47.603 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 47.30 Mbit/s
95th percentile per-packet one-way delay: 47.175 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 52.33 Mbit/s
95th percentile per-packet one-way delay: 47.685 ms
Loss rate: 0.00%
```

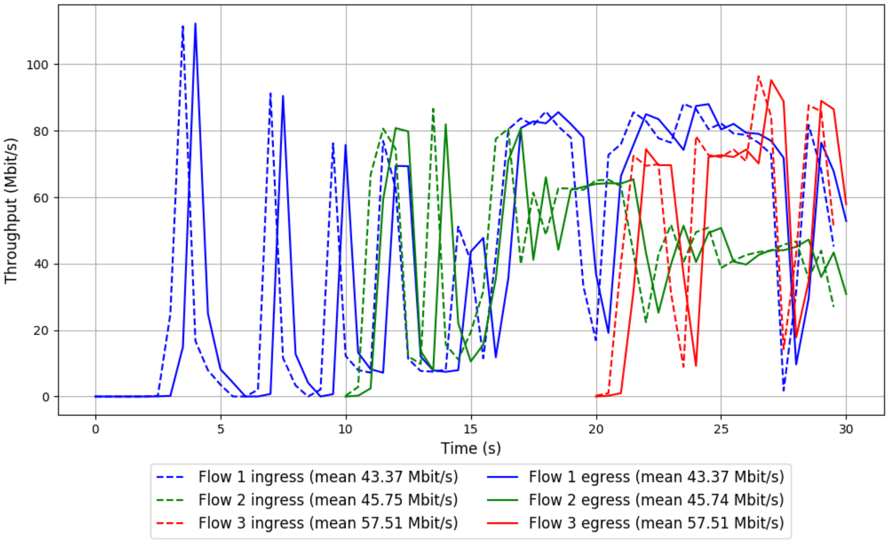
Run 2: Report of QUIC Cubic — Data Link

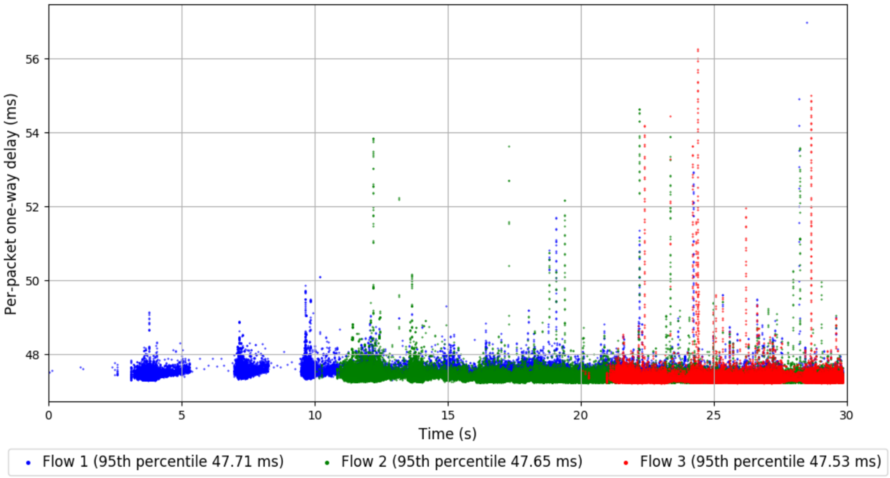




```
Run 3: Statistics of QUIC Cubic

Start at: 2018-12-12 10:45:15
End at: 2018-12-12 10:45:45
Local clock offset: -0.073 ms
Remote clock offset: -0.062 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 92.61 Mbit/s
95th percentile per-packet one-way delay: 47.670 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 43.37 Mbit/s
95th percentile per-packet one-way delay: 47.711 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 45.74 Mbit/s
95th percentile per-packet one-way delay: 47.645 ms
Loss rate: 0.02%
-- Flow 3:
Average throughput: 57.51 Mbit/s
95th percentile per-packet one-way delay: 47.535 ms
Loss rate: 0.00%
```

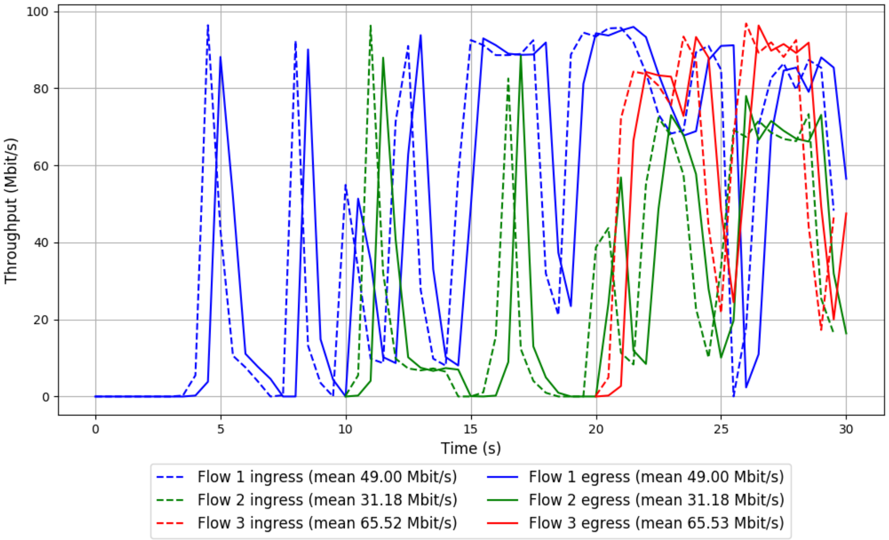
Run 3: Report of QUIC Cubic — Data Link

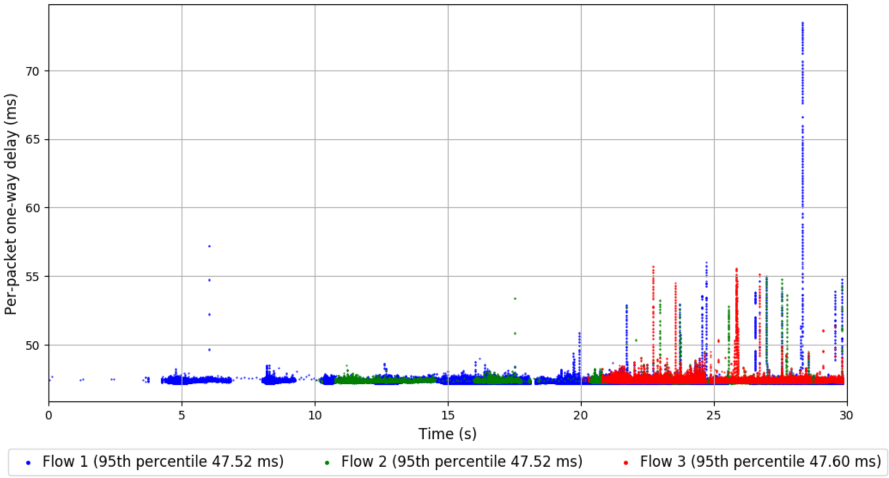




```
Run 4: Statistics of QUIC Cubic

Start at: 2018-12-12 11:20:37
End at: 2018-12-12 11:21:07
Local clock offset: -0.244 ms
Remote clock offset: -0.275 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 91.22 Mbit/s
95th percentile per-packet one-way delay: 47.540 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 49.00 Mbit/s
95th percentile per-packet one-way delay: 47.524 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 31.18 Mbit/s
95th percentile per-packet one-way delay: 47.515 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 65.53 Mbit/s
95th percentile per-packet one-way delay: 47.603 ms
Loss rate: 0.00%
```

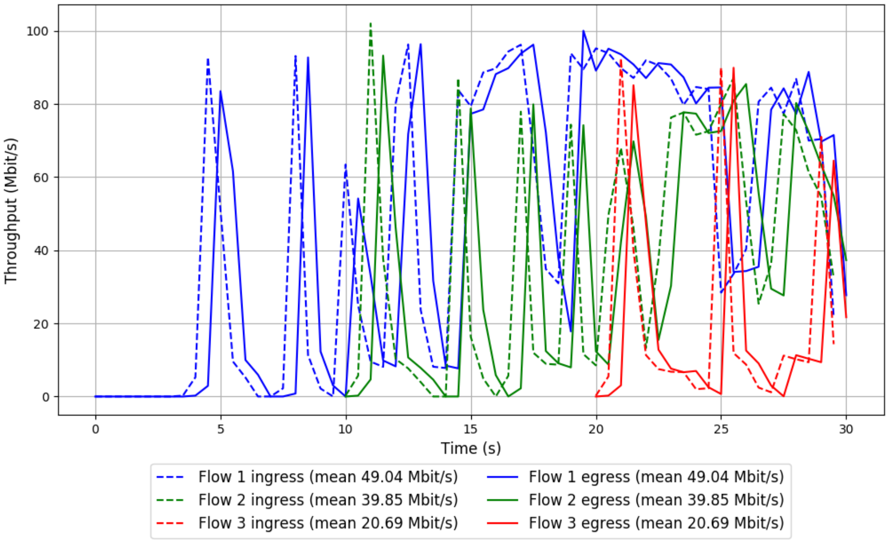
Run 4: Report of QUIC Cubic — Data Link

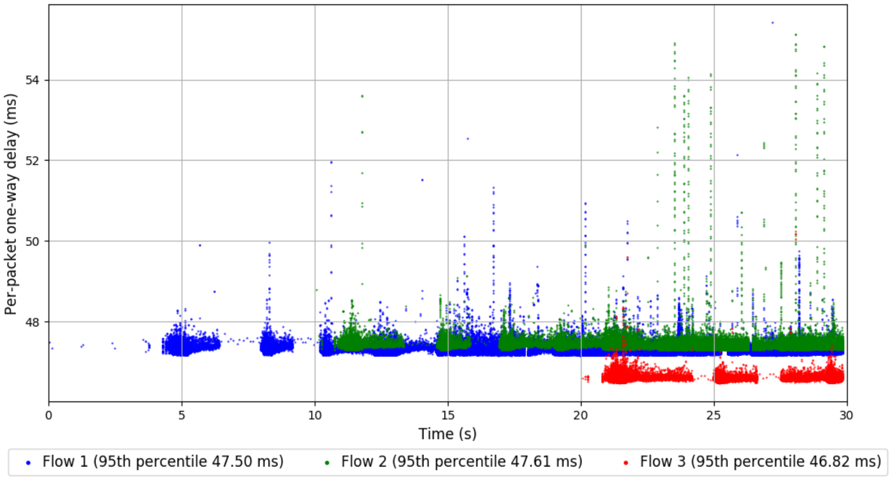




```
Run 5: Statistics of QUIC Cubic

Start at: 2018-12-12 11:56:46
End at: 2018-12-12 11:57:16
Local clock offset: -0.11 ms
Remote clock offset: -0.342 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 82.31 Mbit/s
95th percentile per-packet one-way delay: 47.547 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 49.04 Mbit/s
95th percentile per-packet one-way delay: 47.499 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 39.85 Mbit/s
95th percentile per-packet one-way delay: 47.612 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 20.69 Mbit/s
95th percentile per-packet one-way delay: 46.821 ms
Loss rate: 0.00%
```

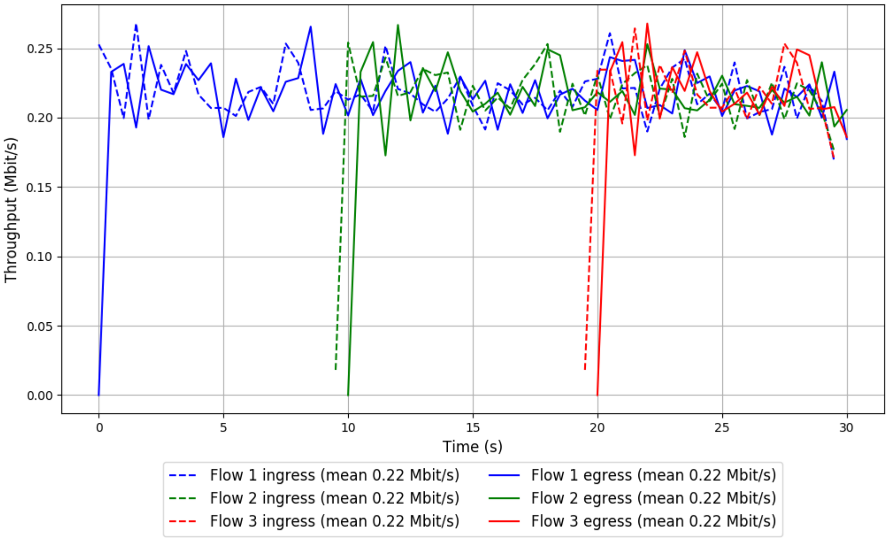
Run 5: Report of QUIC Cubic — Data Link

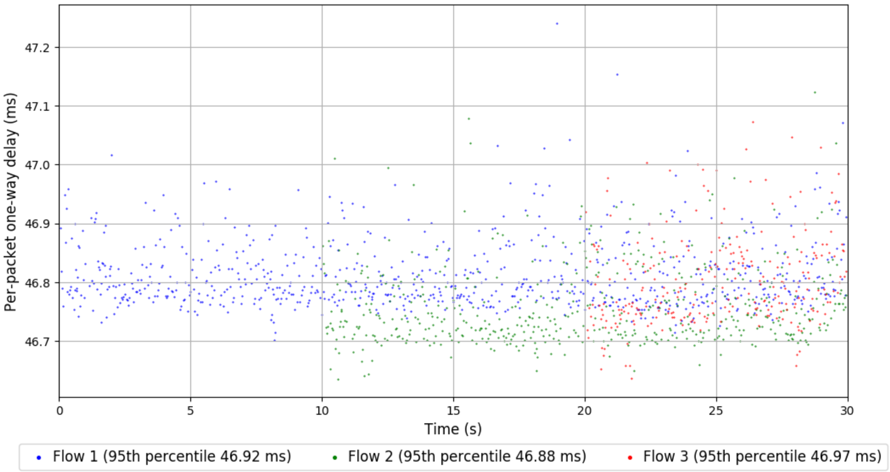




```
Run 1: Statistics of SCReAM

Start at: 2018-12-12 09:39:22
End at: 2018-12-12 09:39:52
Local clock offset: -0.165 ms
Remote clock offset: 0.012 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 46.922 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.923 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.883 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.965 ms
Loss rate: 0.00%
```

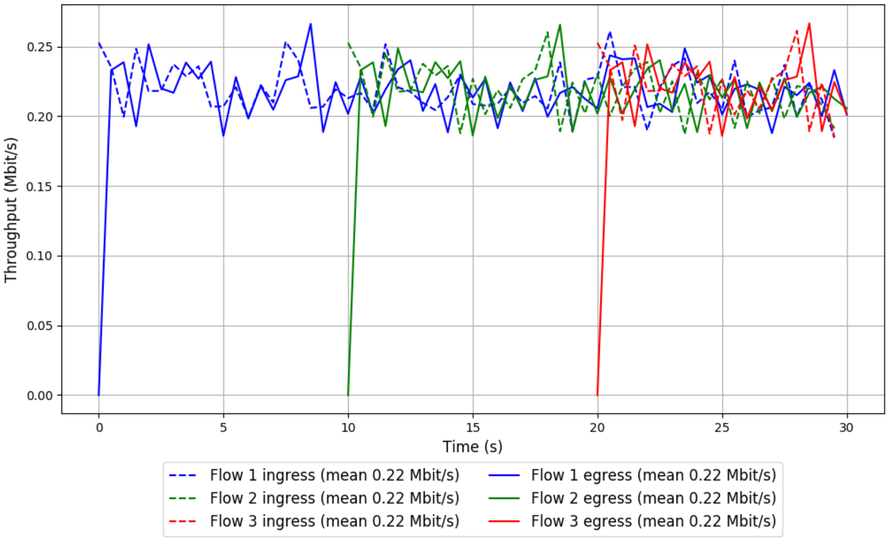
Run 1: Report of SCReAM — Data Link

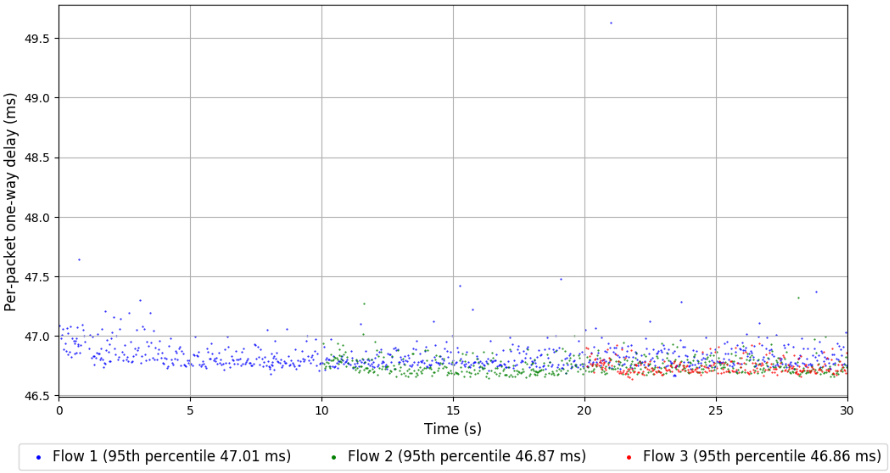




```
Run 2: Statistics of SCReAM

Start at: 2018-12-12 10:14:20
End at: 2018-12-12 10:14:50
Local clock offset: -0.09 ms
Remote clock offset: -0.015 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 46.957 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.011 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.873 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.864 ms
Loss rate: 0.00%
```

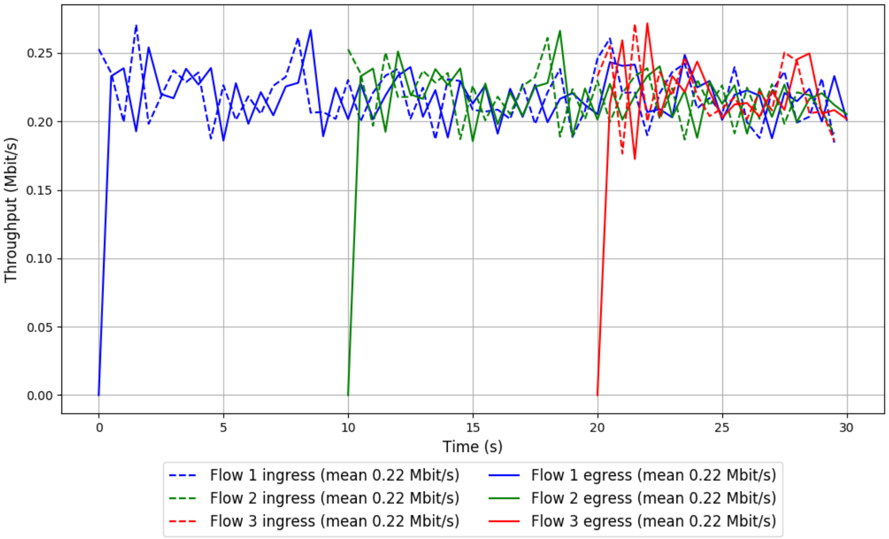
Run 2: Report of SCReAM — Data Link

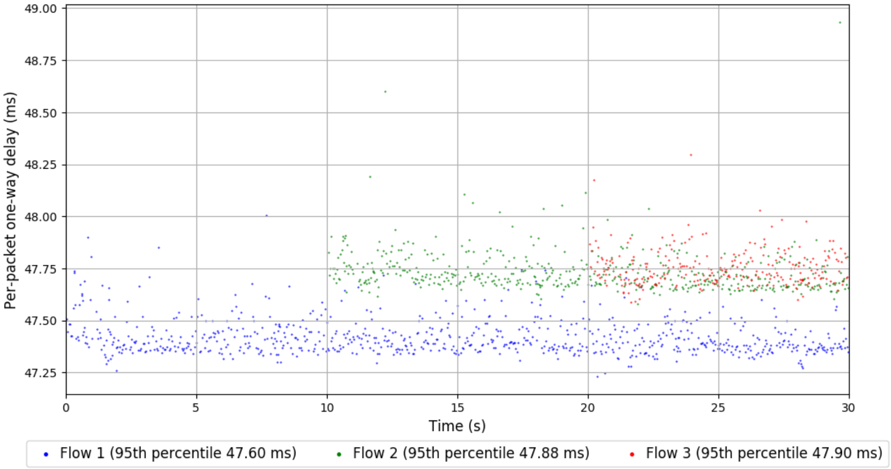




```
Run 3: Statistics of SCReAM

Start at: 2018-12-12 10:50:00
End at: 2018-12-12 10:50:30
Local clock offset: -0.104 ms
Remote clock offset: -0.153 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 47.847 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.596 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.881 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.898 ms
Loss rate: 0.00%
```

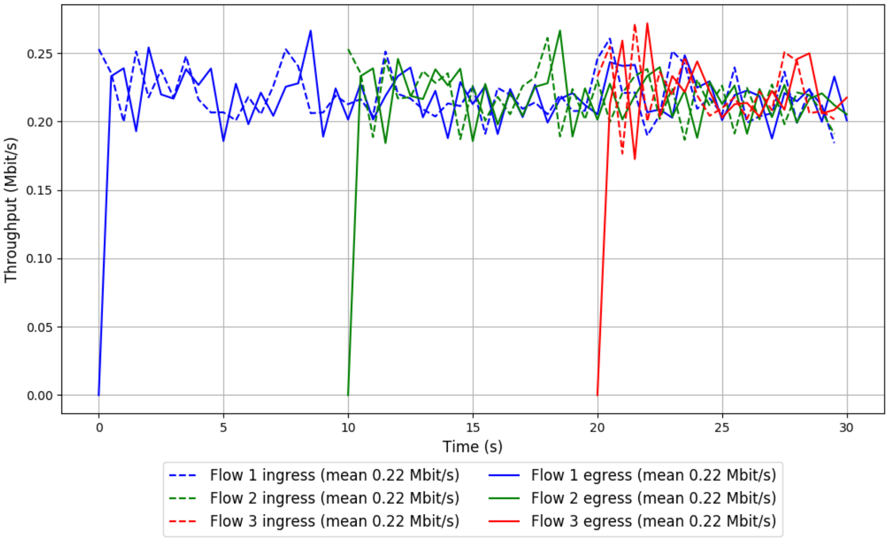
Run 3: Report of SCReAM — Data Link

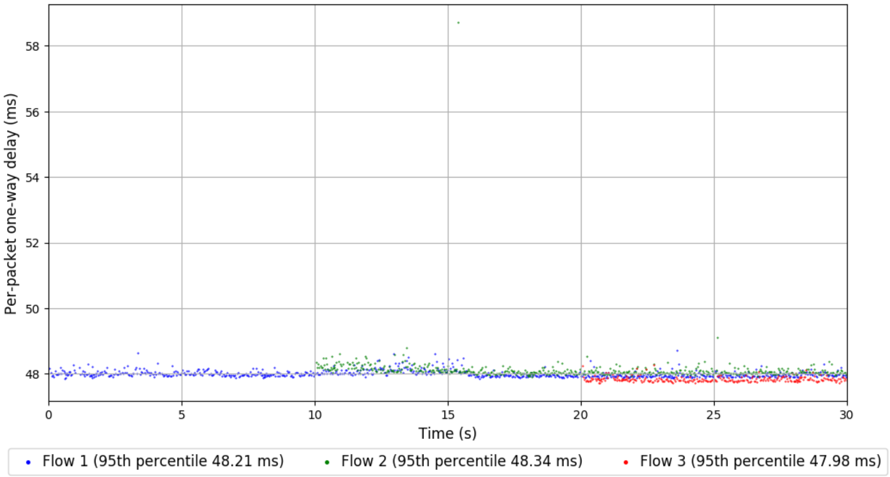




```
Run 4: Statistics of SCReAM

Start at: 2018-12-12 11:25:15
End at: 2018-12-12 11:25:45
Local clock offset: -0.557 ms
Remote clock offset: -0.26 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 48.276 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 48.207 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 48.340 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.984 ms
Loss rate: 0.00%
```

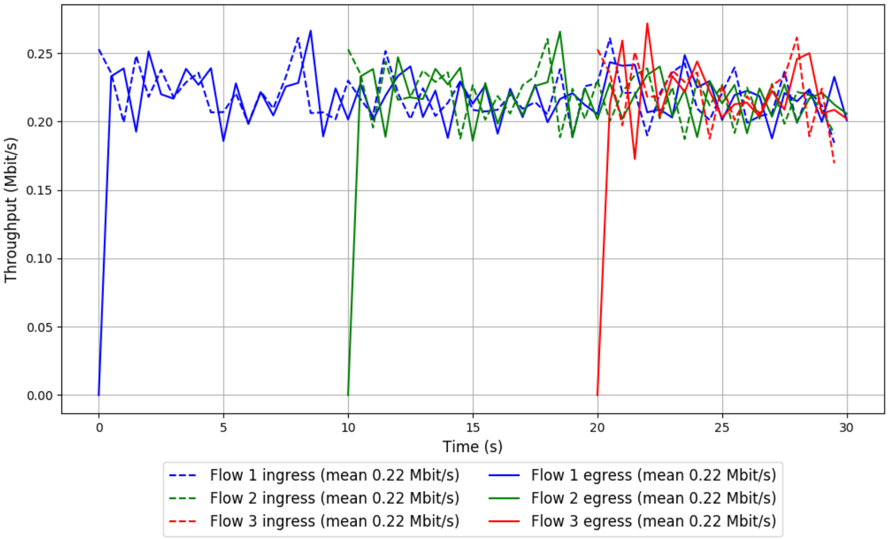
Run 4: Report of SCReAM — Data Link

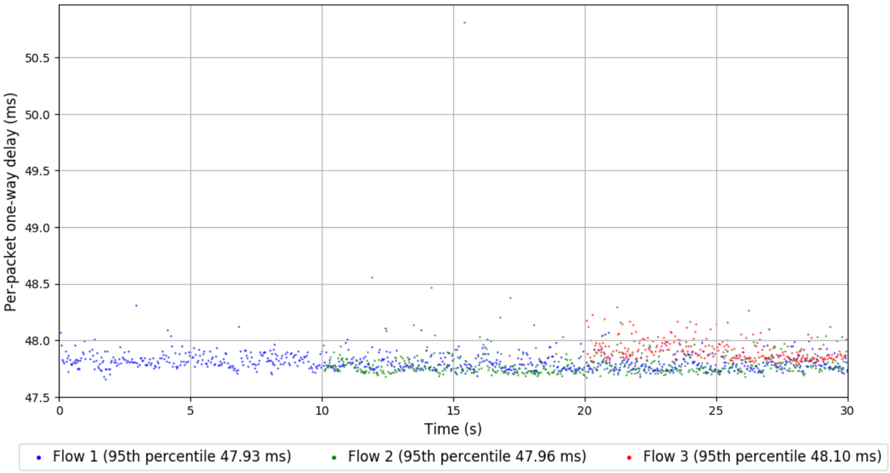




```
Run 5: Statistics of SCReAM

Start at: 2018-12-12 12:01:29
End at: 2018-12-12 12:01:59
Local clock offset: -0.428 ms
Remote clock offset: -0.366 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 47.993 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.933 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.963 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 48.100 ms
Loss rate: 0.00%
```

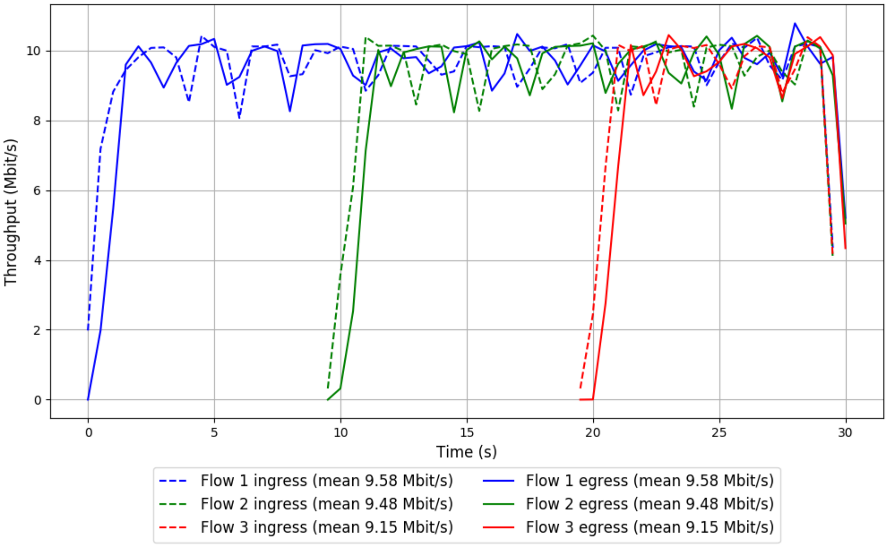
Run 5: Report of SCReAM — Data Link

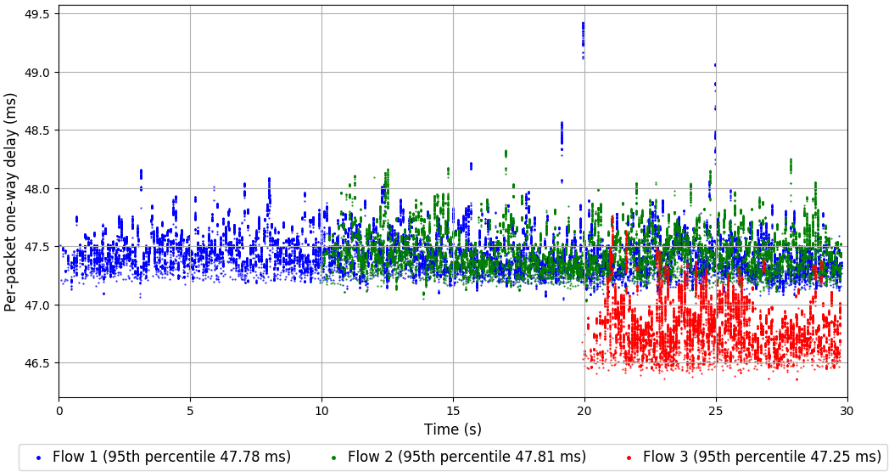




```
Run 1: Statistics of Sprout

Start at: 2018-12-12 09:35:49
End at: 2018-12-12 09:36:19
Local clock offset: -0.053 ms
Remote clock offset: -0.087 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.94 Mbit/s
95th percentile per-packet one-way delay: 47.775 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.58 Mbit/s
95th percentile per-packet one-way delay: 47.781 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 9.48 Mbit/s
95th percentile per-packet one-way delay: 47.815 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 9.15 Mbit/s
95th percentile per-packet one-way delay: 47.254 ms
Loss rate: 0.00%
```

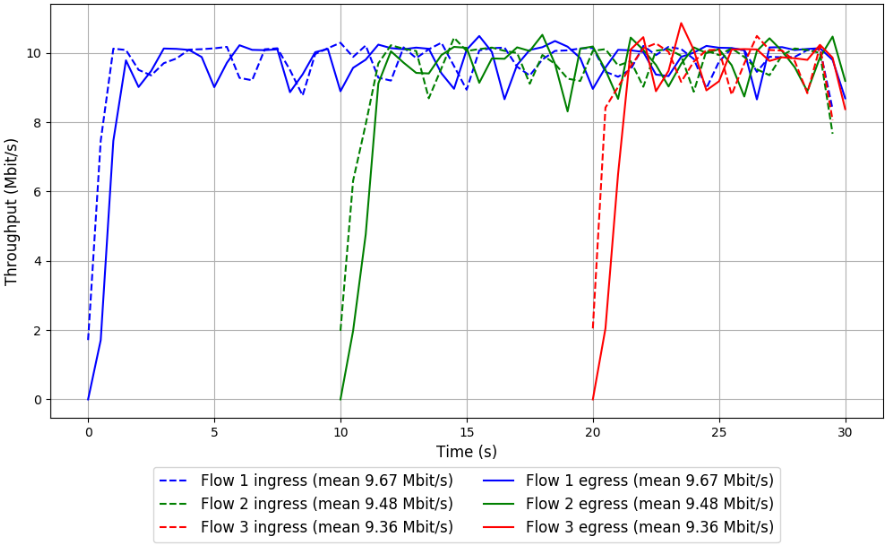
Run 1: Report of Sprout — Data Link

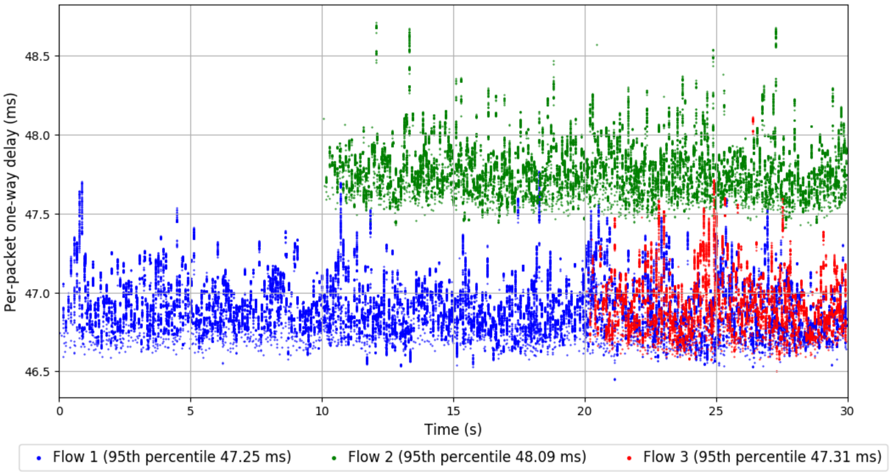




```
Run 2: Statistics of Sprout

Start at: 2018-12-12 10:10:58
End at: 2018-12-12 10:11:28
Local clock offset: -0.093 ms
Remote clock offset: -0.068 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.06 Mbit/s
95th percentile per-packet one-way delay: 47.935 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.67 Mbit/s
95th percentile per-packet one-way delay: 47.250 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 9.48 Mbit/s
95th percentile per-packet one-way delay: 48.087 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 9.36 Mbit/s
95th percentile per-packet one-way delay: 47.313 ms
Loss rate: 0.00%
```

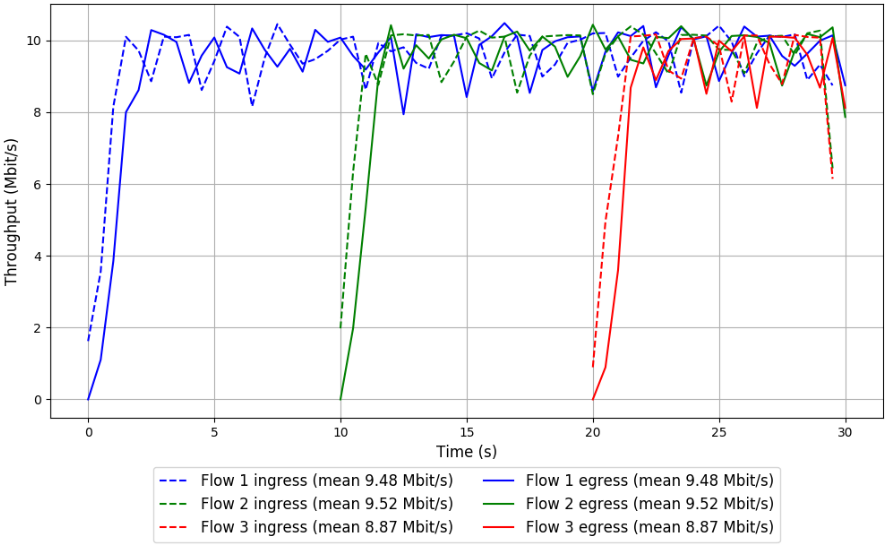
Run 2: Report of Sprout — Data Link

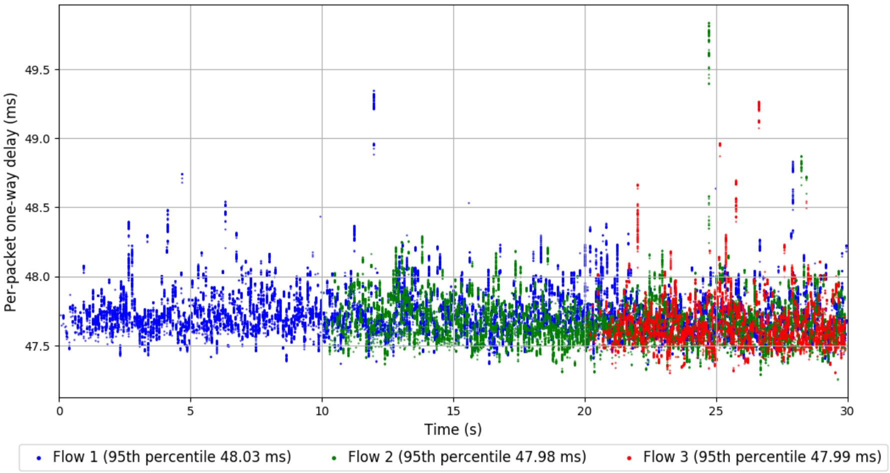




```
Run 3: Statistics of Sprout

Start at: 2018-12-12 10:46:36
End at: 2018-12-12 10:47:06
Local clock offset: -0.064 ms
Remote clock offset: -0.063 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.73 Mbit/s
95th percentile per-packet one-way delay: 48.014 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.48 Mbit/s
95th percentile per-packet one-way delay: 48.032 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 9.52 Mbit/s
95th percentile per-packet one-way delay: 47.979 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 8.87 Mbit/s
95th percentile per-packet one-way delay: 47.992 ms
Loss rate: 0.00%
```

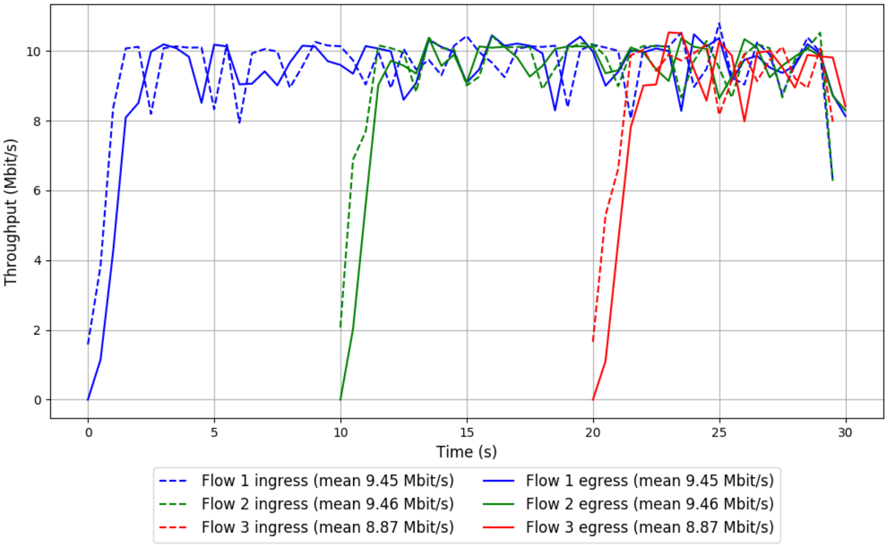
Run 3: Report of Sprout — Data Link

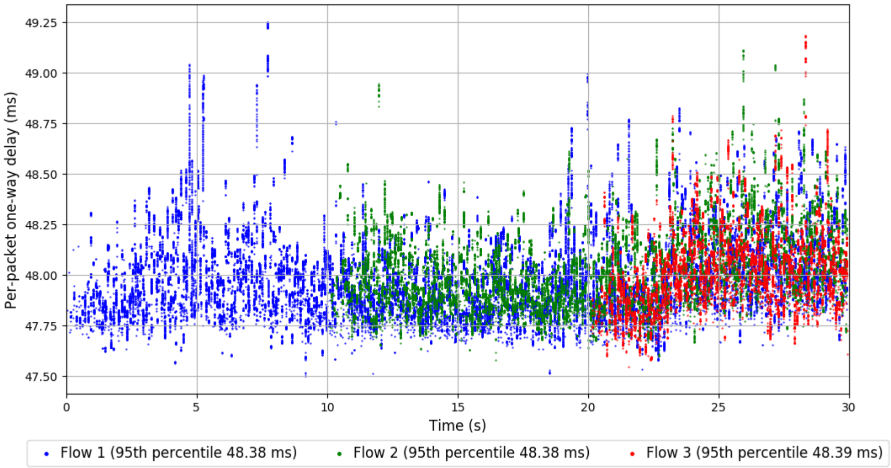




```
Run 4: Statistics of Sprout

Start at: 2018-12-12 11:21:55
End at: 2018-12-12 11:22:25
Local clock offset: -0.594 ms
Remote clock offset: -0.267 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 18.65 Mbit/s
95th percentile per-packet one-way delay: 48.384 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.45 Mbit/s
95th percentile per-packet one-way delay: 48.378 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 9.46 Mbit/s
95th percentile per-packet one-way delay: 48.384 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 8.87 Mbit/s
95th percentile per-packet one-way delay: 48.392 ms
Loss rate: 0.00%
```

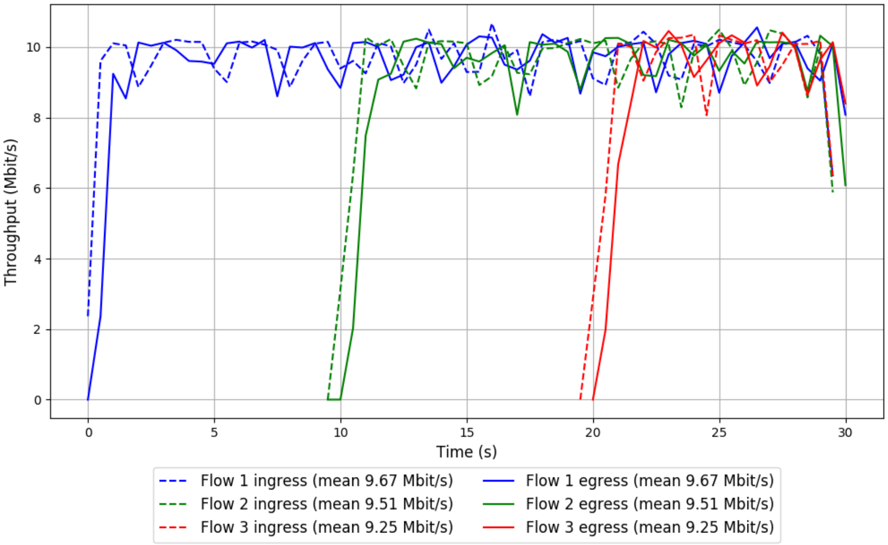
Run 4: Report of Sprout — Data Link

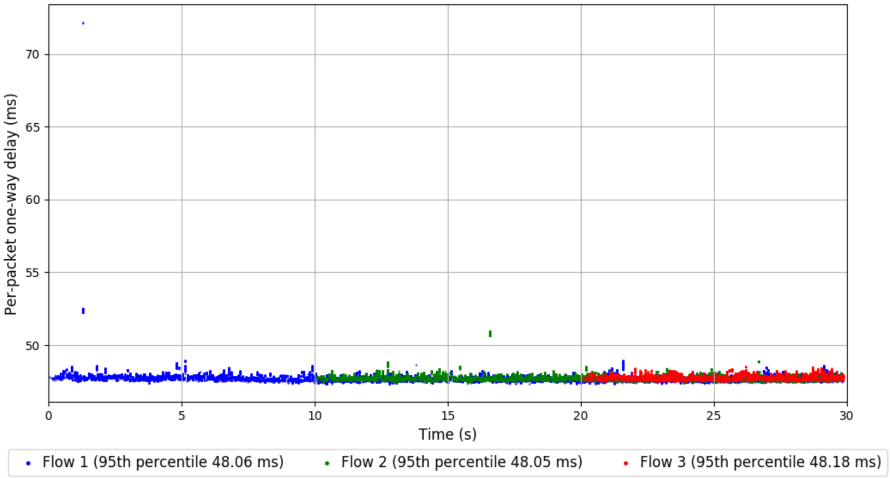




```
Run 5: Statistics of Sprout

Start at: 2018-12-12 11:58:03
End at: 2018-12-12 11:58:33
Local clock offset: -0.106 ms
Remote clock offset: -0.34 ms

# Below is generated by plot.py at 2018-12-12 14:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 19.06 Mbit/s
95th percentile per-packet one-way delay: 48.091 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.67 Mbit/s
95th percentile per-packet one-way delay: 48.062 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 9.51 Mbit/s
95th percentile per-packet one-way delay: 48.046 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 9.25 Mbit/s
95th percentile per-packet one-way delay: 48.179 ms
Loss rate: 0.00%
```

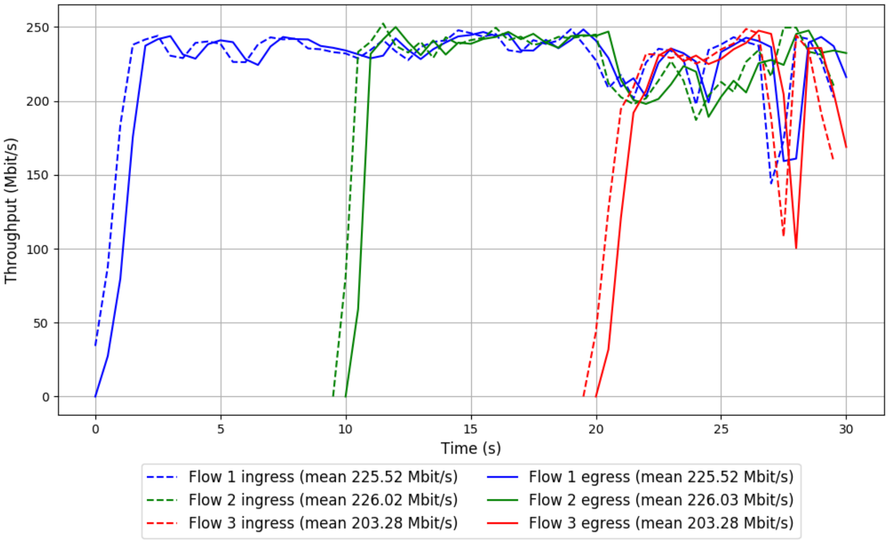
Run 5: Report of Sprout — Data Link

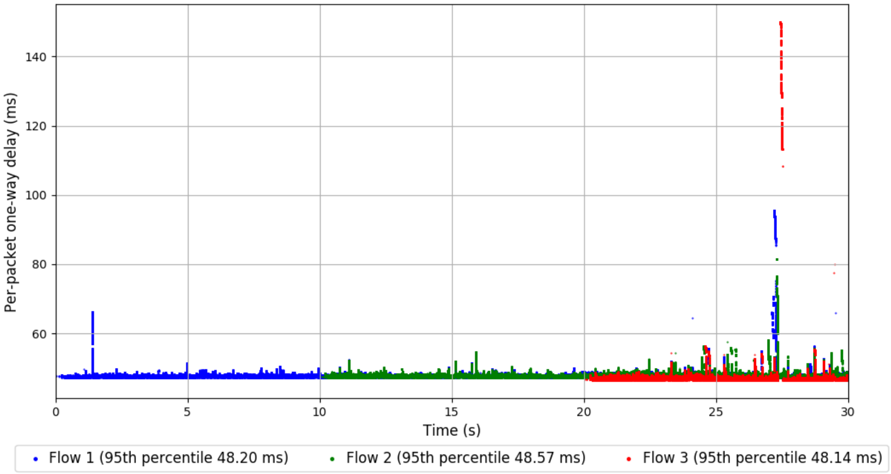




```
Run 1: Statistics of TaoVA-100x

Start at: 2018-12-12 09:44:37
End at: 2018-12-12 09:45:07
Local clock offset: -0.095 ms
Remote clock offset: -0.045 ms

# Below is generated by plot.py at 2018-12-12 15:03:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 443.87 Mbit/s
95th percentile per-packet one-way delay: 48.323 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 225.52 Mbit/s
95th percentile per-packet one-way delay: 48.205 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 226.03 Mbit/s
95th percentile per-packet one-way delay: 48.566 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 203.28 Mbit/s
95th percentile per-packet one-way delay: 48.137 ms
Loss rate: 0.00%
```

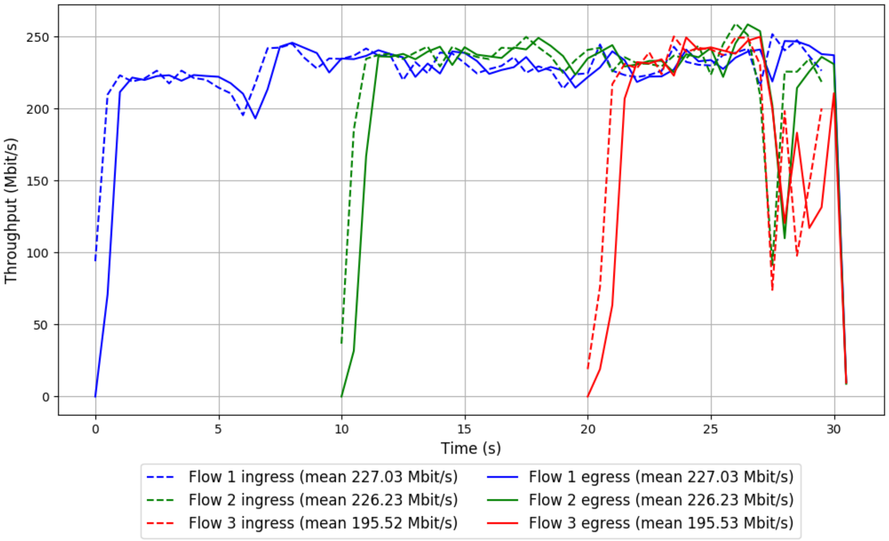
Run 1: Report of TaoVA-100x — Data Link

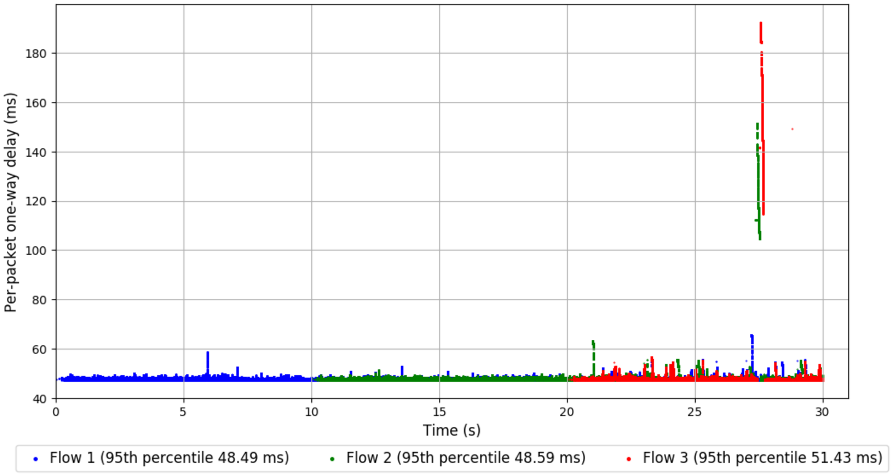




```
Run 2: Statistics of TaoVA-100x

Start at: 2018-12-12 10:19:28
End at: 2018-12-12 10:19:58
Local clock offset: -0.081 ms
Remote clock offset: -0.024 ms

# Below is generated by plot.py at 2018-12-12 15:04:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 442.63 Mbit/s
95th percentile per-packet one-way delay: 48.735 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 227.03 Mbit/s
95th percentile per-packet one-way delay: 48.490 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 226.23 Mbit/s
95th percentile per-packet one-way delay: 48.587 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 195.53 Mbit/s
95th percentile per-packet one-way delay: 51.433 ms
Loss rate: 0.00%
```

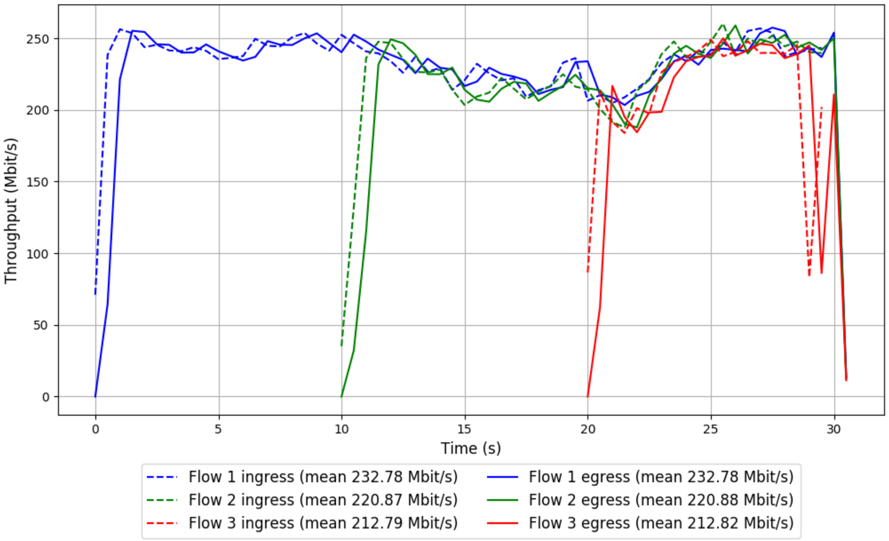
Run 2: Report of TaoVA-100x — Data Link

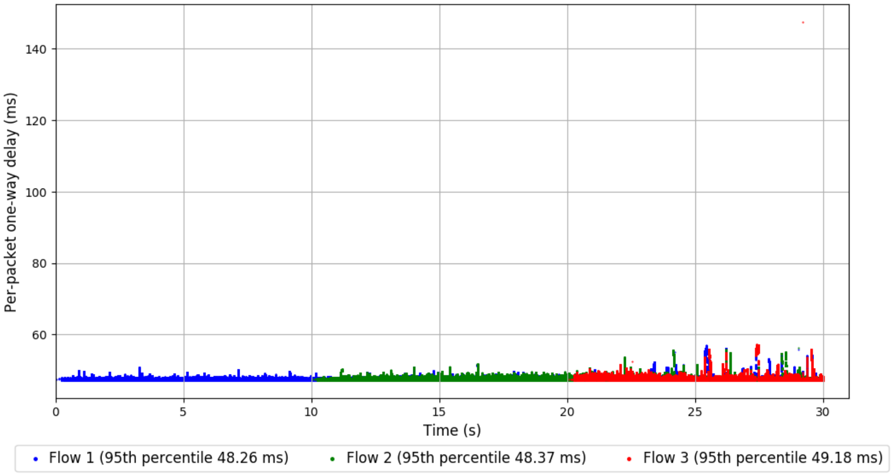




```
Run 3: Statistics of TaoVA-100x

Start at: 2018-12-12 10:55:30
End at: 2018-12-12 10:56:00
Local clock offset: -0.18 ms
Remote clock offset: -0.172 ms

# Below is generated by plot.py at 2018-12-12 15:04:30
# Datalink statistics
-- Total of 3 flows:
Average throughput: 450.53 Mbit/s
95th percentile per-packet one-way delay: 48.450 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 232.78 Mbit/s
95th percentile per-packet one-way delay: 48.255 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 220.88 Mbit/s
95th percentile per-packet one-way delay: 48.369 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 212.82 Mbit/s
95th percentile per-packet one-way delay: 49.181 ms
Loss rate: 0.00%
```

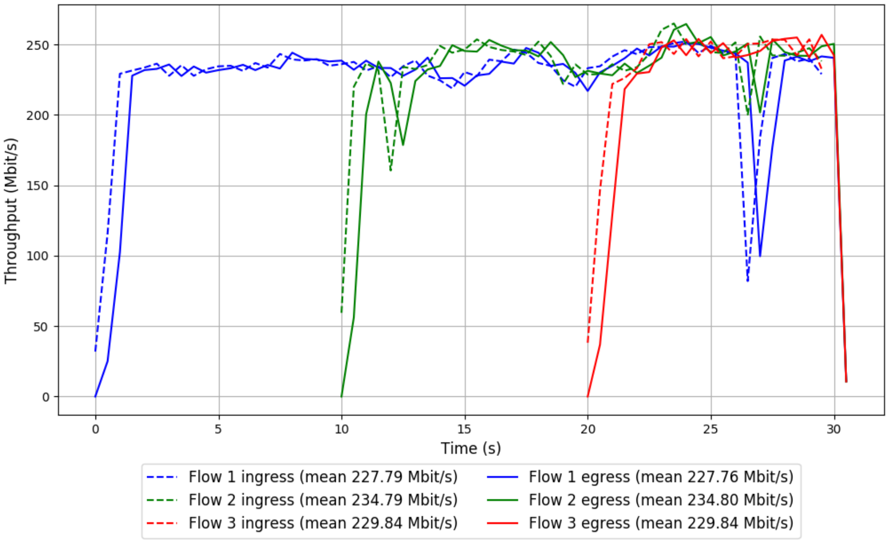
Run 3: Report of TaoVA-100x — Data Link

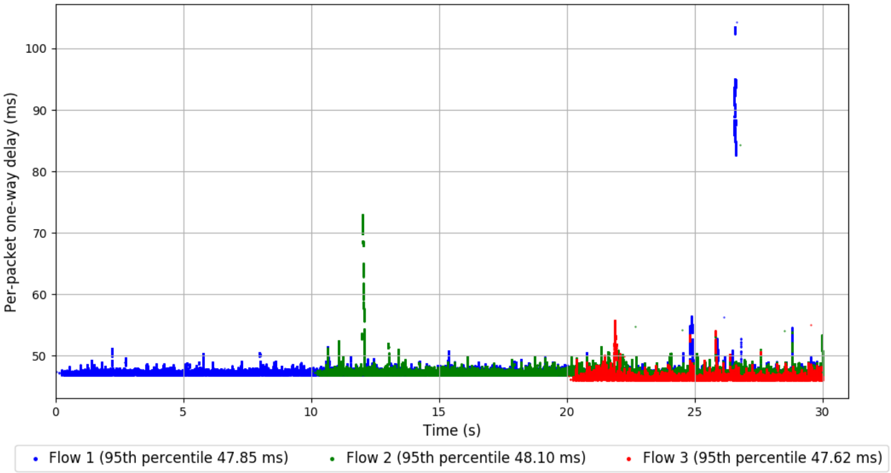




```
Run 4: Statistics of TaoVA-100x

Start at: 2018-12-12 11:30:43
End at: 2018-12-12 11:31:13
Local clock offset: 0.245 ms
Remote clock offset: -0.235 ms

# Below is generated by plot.py at 2018-12-12 15:04:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 460.49 Mbit/s
95th percentile per-packet one-way delay: 47.928 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 227.76 Mbit/s
95th percentile per-packet one-way delay: 47.850 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 234.80 Mbit/s
95th percentile per-packet one-way delay: 48.105 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 229.84 Mbit/s
95th percentile per-packet one-way delay: 47.618 ms
Loss rate: 0.01%
```

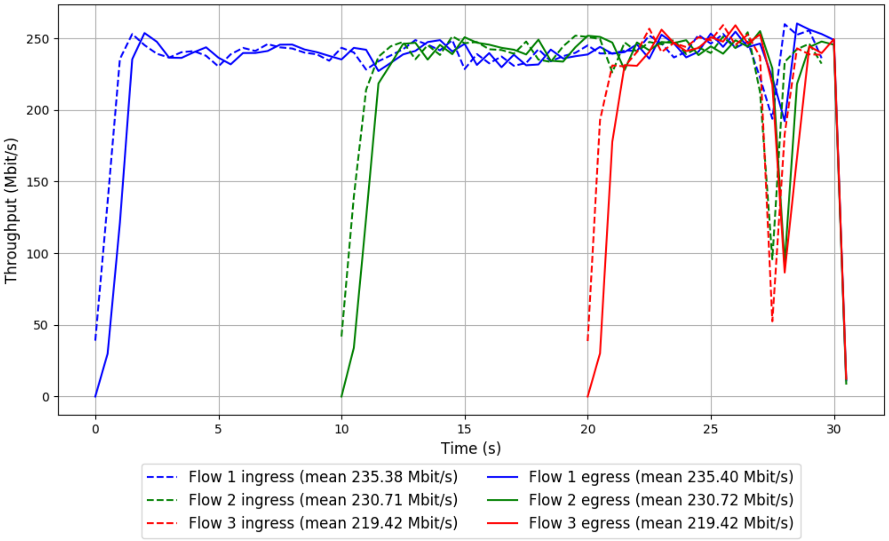
Run 4: Report of TaoVA-100x — Data Link

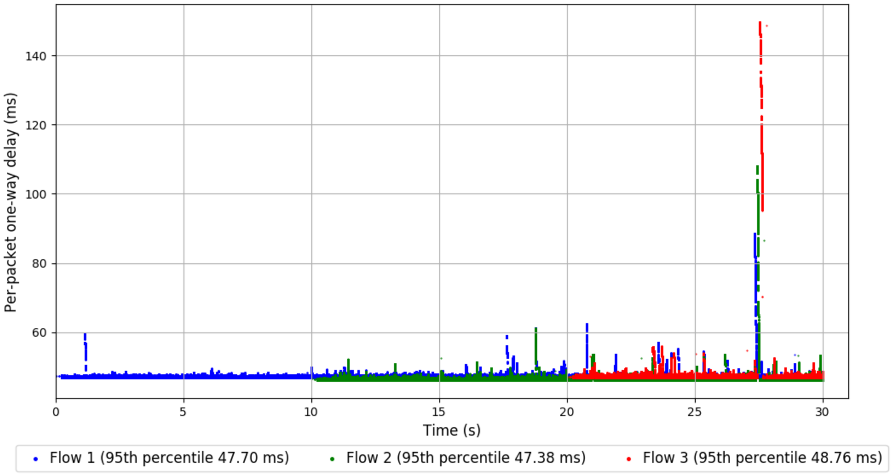




```
Run 5: Statistics of TaoVA-100x

Start at: 2018-12-12 12:06:50
End at: 2018-12-12 12:07:20
Local clock offset: 0.334 ms
Remote clock offset: -0.358 ms

# Below is generated by plot.py at 2018-12-12 15:05:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 461.99 Mbit/s
95th percentile per-packet one-way delay: 47.796 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 235.40 Mbit/s
95th percentile per-packet one-way delay: 47.705 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 230.72 Mbit/s
95th percentile per-packet one-way delay: 47.375 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 219.42 Mbit/s
95th percentile per-packet one-way delay: 48.757 ms
Loss rate: 0.00%
```

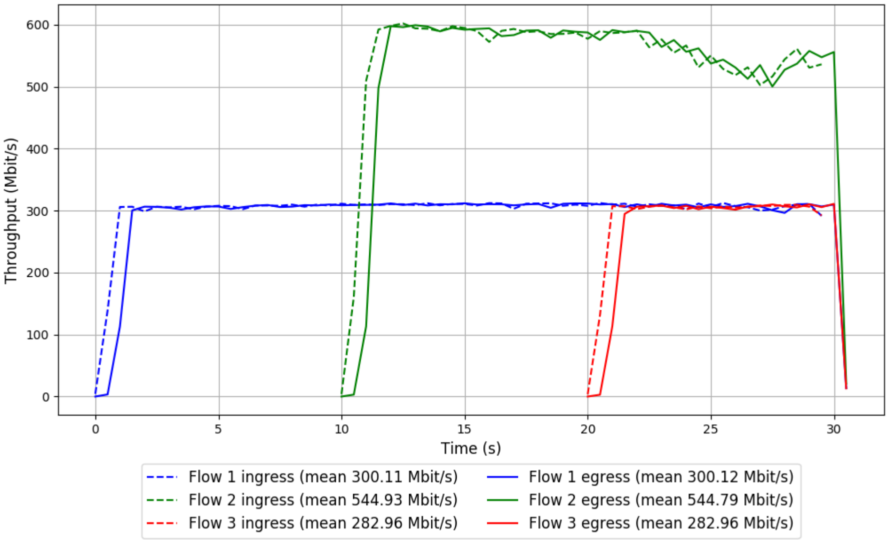
Run 5: Report of TaoVA-100x — Data Link

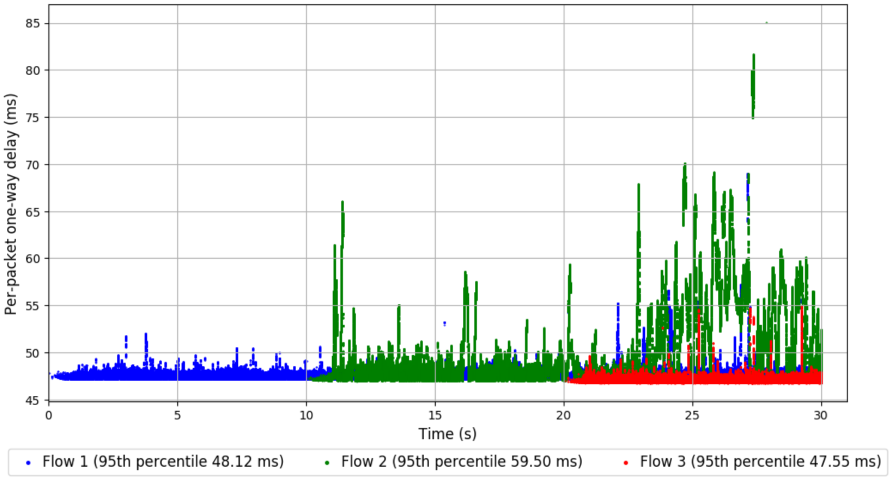




```
Run 1: Statistics of TCP Vegas

Start at: 2018-12-12 10:00:28
End at: 2018-12-12 10:00:58
Local clock offset: 0.271 ms
Remote clock offset: -0.048 ms

# Below is generated by plot.py at 2018-12-12 15:05:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 756.93 Mbit/s
95th percentile per-packet one-way delay: 56.757 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 300.12 Mbit/s
95th percentile per-packet one-way delay: 48.117 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 544.79 Mbit/s
95th percentile per-packet one-way delay: 59.501 ms
Loss rate: 0.02%
-- Flow 3:
Average throughput: 282.96 Mbit/s
95th percentile per-packet one-way delay: 47.553 ms
Loss rate: 0.00%
```

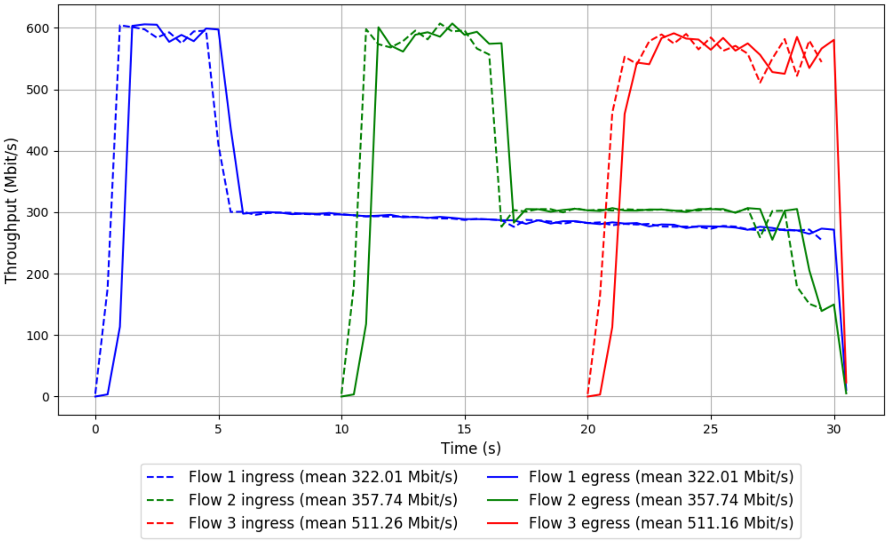
Run 1: Report of TCP Vegas — Data Link

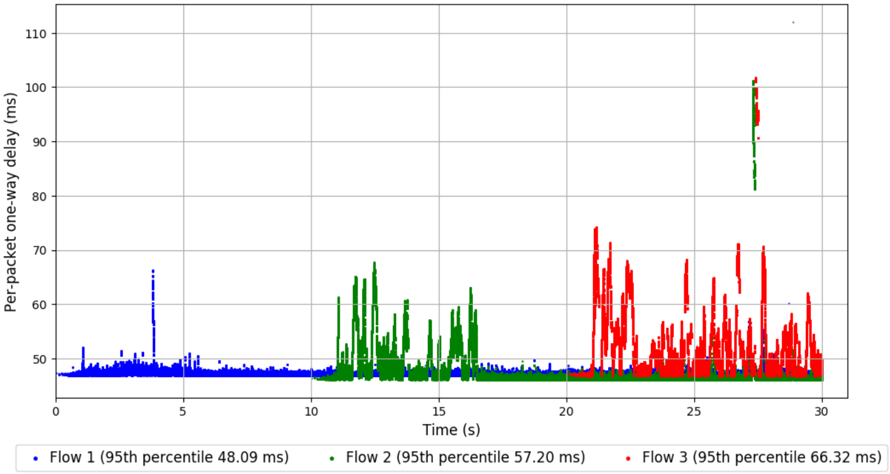




```
Run 2: Statistics of TCP Vegas

Start at: 2018-12-12 10:35:59
End at: 2018-12-12 10:36:29
Local clock offset: 0.3 ms
Remote clock offset: -0.051 ms

# Below is generated by plot.py at 2018-12-12 15:08:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 730.19 Mbit/s
95th percentile per-packet one-way delay: 58.186 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 322.01 Mbit/s
95th percentile per-packet one-way delay: 48.093 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 357.74 Mbit/s
95th percentile per-packet one-way delay: 57.204 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 511.16 Mbit/s
95th percentile per-packet one-way delay: 66.316 ms
Loss rate: 0.01%
```

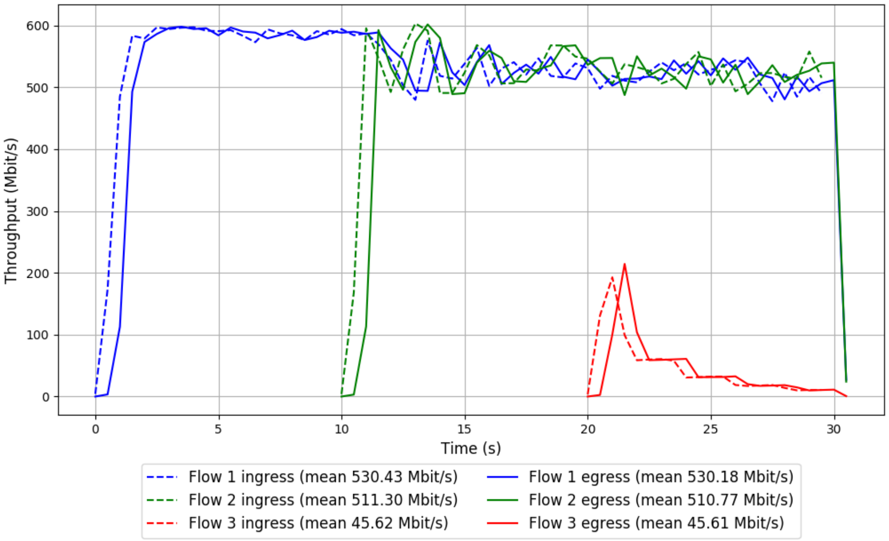
Run 2: Report of TCP Vegas — Data Link

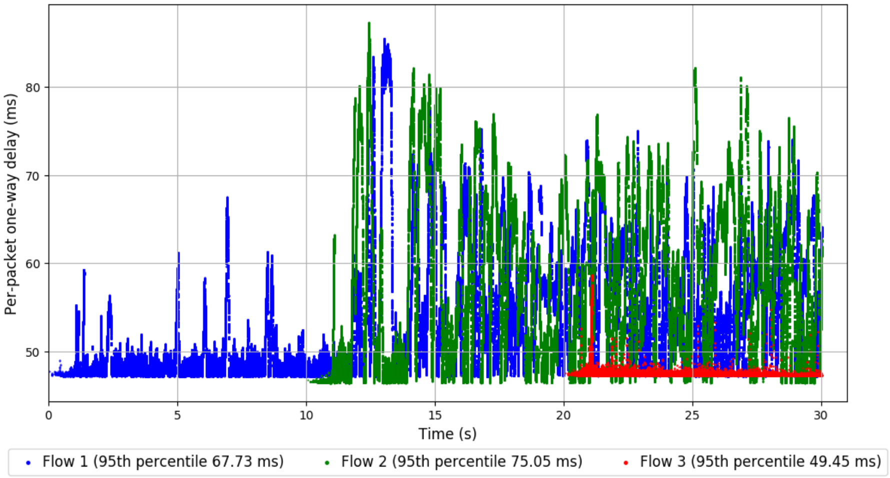




```
Run 3: Statistics of TCP Vegas

Start at: 2018-12-12 11:10:59
End at: 2018-12-12 11:11:29
Local clock offset: -0.253 ms
Remote clock offset: -0.214 ms

# Below is generated by plot.py at 2018-12-12 15:14:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 885.49 Mbit/s
95th percentile per-packet one-way delay: 71.900 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 530.18 Mbit/s
95th percentile per-packet one-way delay: 67.731 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 510.77 Mbit/s
95th percentile per-packet one-way delay: 75.045 ms
Loss rate: 0.10%
-- Flow 3:
Average throughput: 45.61 Mbit/s
95th percentile per-packet one-way delay: 49.451 ms
Loss rate: 0.02%
```

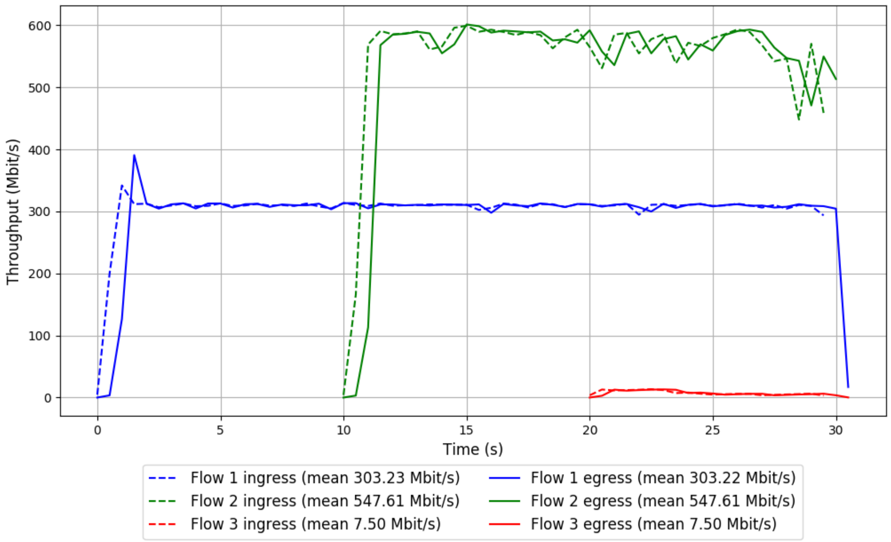
Run 3: Report of TCP Vegas — Data Link

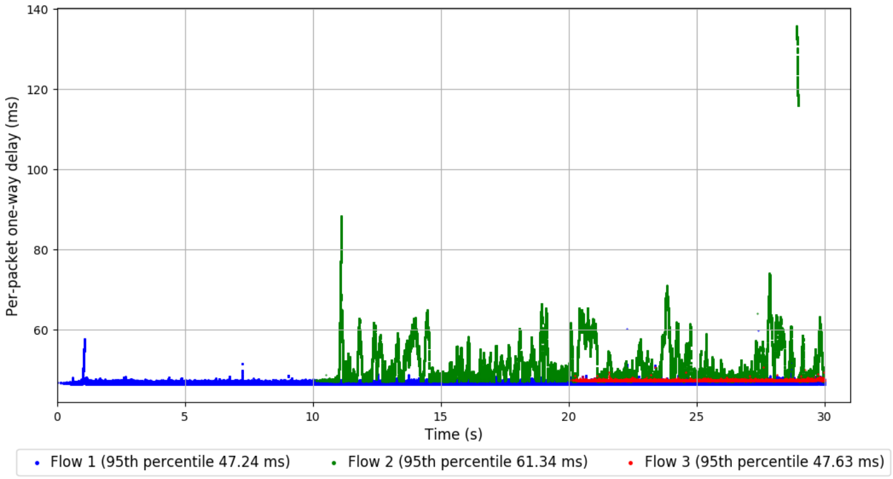




```
Run 4: Statistics of TCP Vegas

Start at: 2018-12-12 11:47:03
End at: 2018-12-12 11:47:33
Local clock offset: -0.115 ms
Remote clock offset: -0.353 ms

# Below is generated by plot.py at 2018-12-12 15:17:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 669.77 Mbit/s
95th percentile per-packet one-way delay: 58.947 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 303.22 Mbit/s
95th percentile per-packet one-way delay: 47.237 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 547.61 Mbit/s
95th percentile per-packet one-way delay: 61.337 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 7.50 Mbit/s
95th percentile per-packet one-way delay: 47.630 ms
Loss rate: 0.11%
```

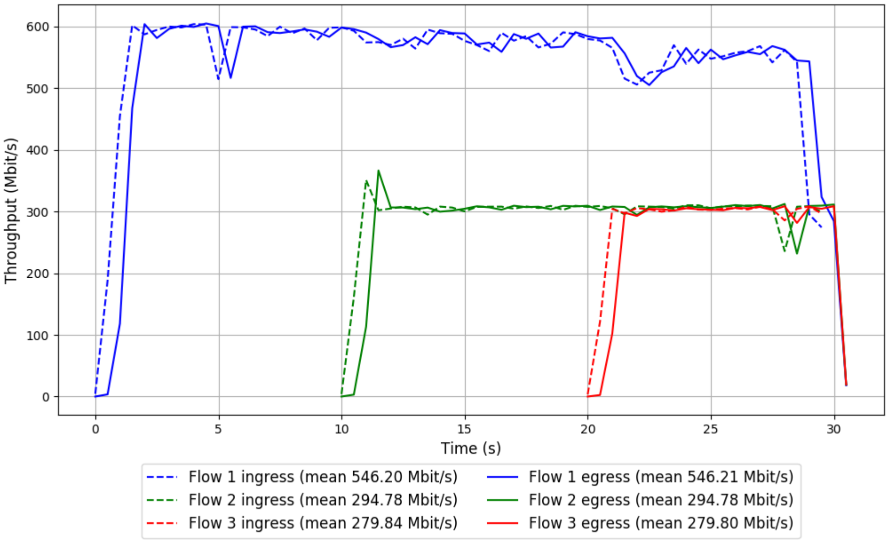
Run 4: Report of TCP Vegas — Data Link

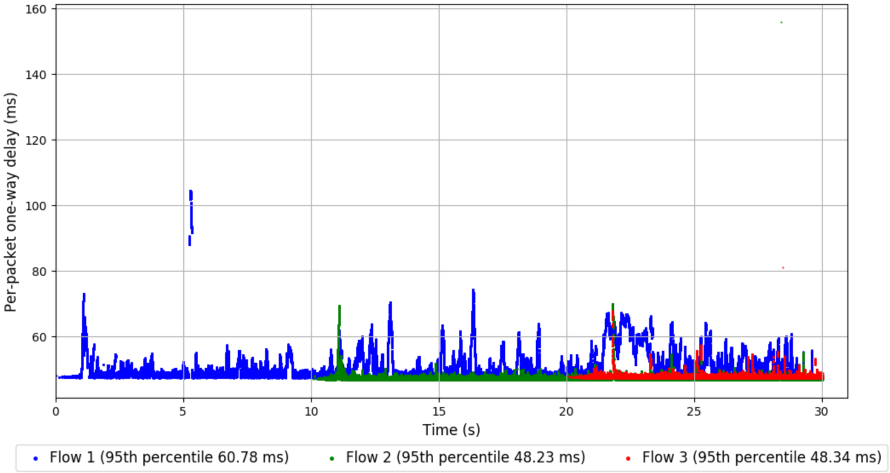




```
Run 5: Statistics of TCP Vegas

Start at: 2018-12-12 12:22:24
End at: 2018-12-12 12:22:54
Local clock offset: -0.047 ms
Remote clock offset: -0.418 ms

# Below is generated by plot.py at 2018-12-12 15:20:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 835.37 Mbit/s
95th percentile per-packet one-way delay: 59.194 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 546.21 Mbit/s
95th percentile per-packet one-way delay: 60.784 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 294.78 Mbit/s
95th percentile per-packet one-way delay: 48.229 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 279.80 Mbit/s
95th percentile per-packet one-way delay: 48.338 ms
Loss rate: 0.00%
```

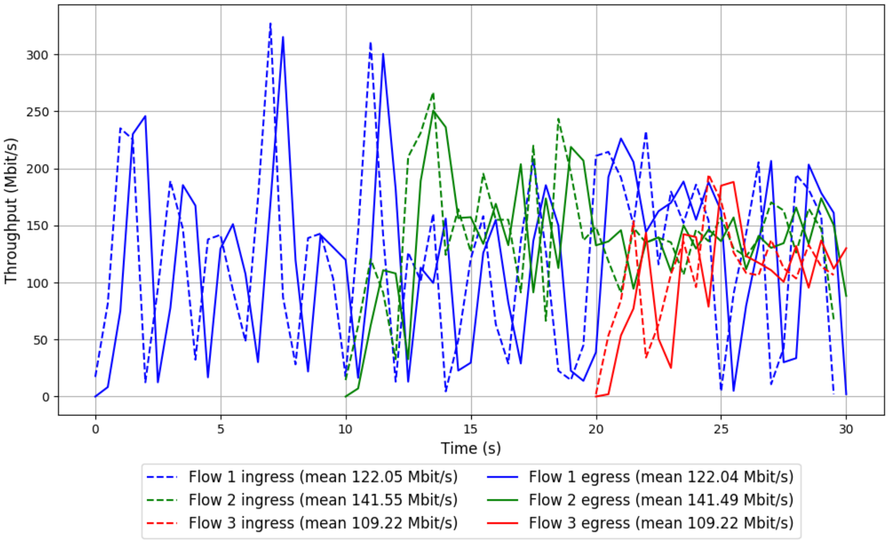
Run 5: Report of TCP Vegas — Data Link

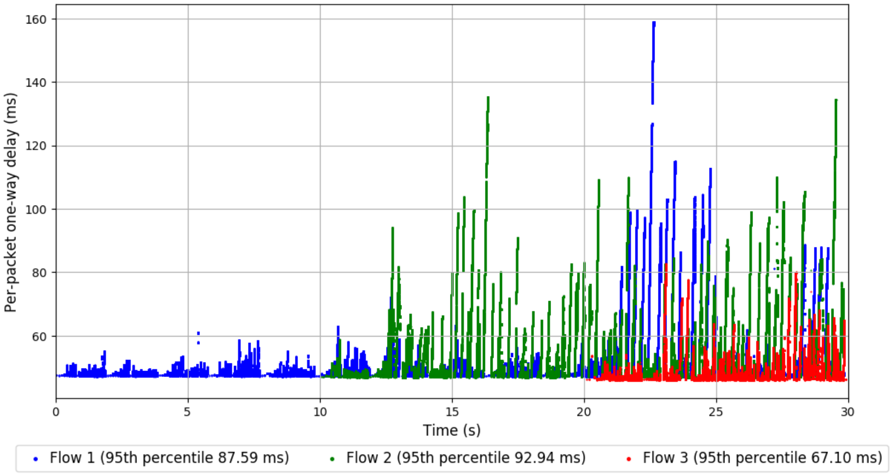




```
Run 1: Statistics of Verus

Start at: 2018-12-12 09:54:34
End at: 2018-12-12 09:55:04
Local clock offset: 0.245 ms
Remote clock offset: -0.083 ms

# Below is generated by plot.py at 2018-12-12 15:20:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 251.32 Mbit/s
95th percentile per-packet one-way delay: 87.643 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 122.04 Mbit/s
95th percentile per-packet one-way delay: 87.594 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 141.49 Mbit/s
95th percentile per-packet one-way delay: 92.942 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 109.22 Mbit/s
95th percentile per-packet one-way delay: 67.099 ms
Loss rate: 0.00%
```

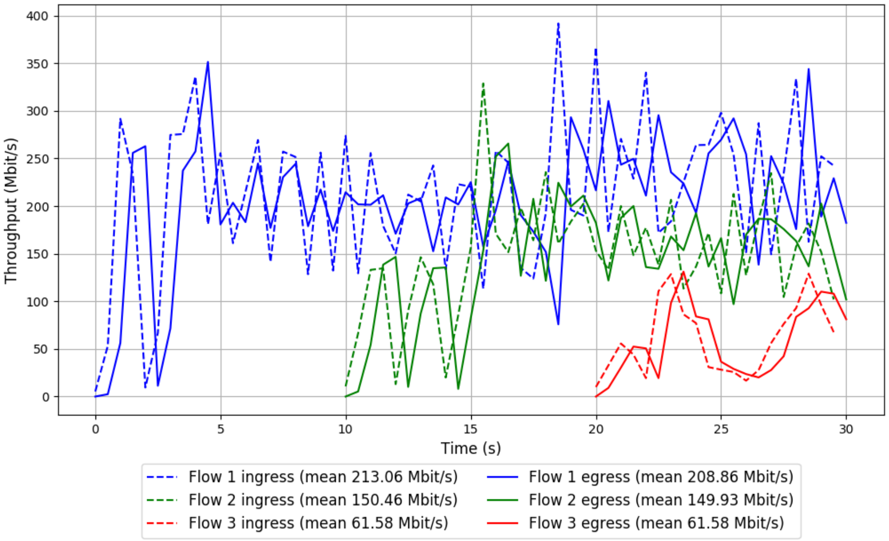
Run 1: Report of Verus — Data Link

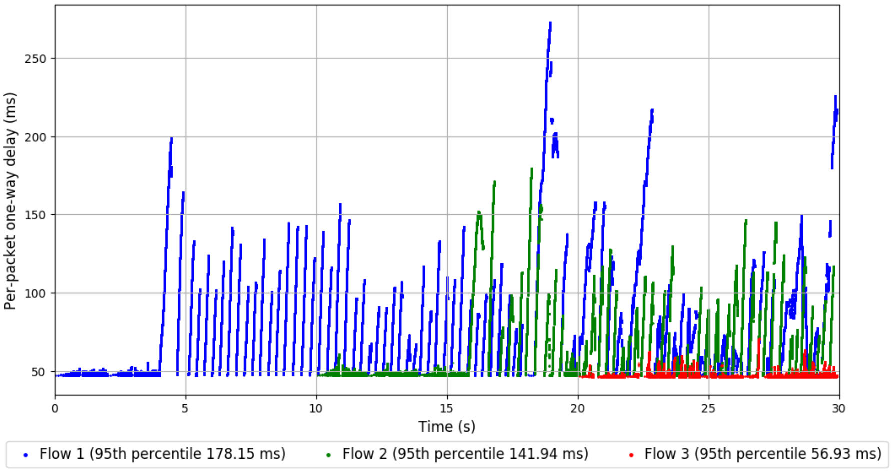




```
Run 2: Statistics of Verus

Start at: 2018-12-12 10:29:42
End at: 2018-12-12 10:30:12
Local clock offset: 0.018 ms
Remote clock offset: -0.077 ms

# Below is generated by plot.py at 2018-12-12 15:20:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 328.26 Mbit/s
95th percentile per-packet one-way delay: 155.850 ms
Loss rate: 1.26%
-- Flow 1:
Average throughput: 208.86 Mbit/s
95th percentile per-packet one-way delay: 178.150 ms
Loss rate: 1.97%
-- Flow 2:
Average throughput: 149.93 Mbit/s
95th percentile per-packet one-way delay: 141.942 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 61.58 Mbit/s
95th percentile per-packet one-way delay: 56.930 ms
Loss rate: 0.00%
```

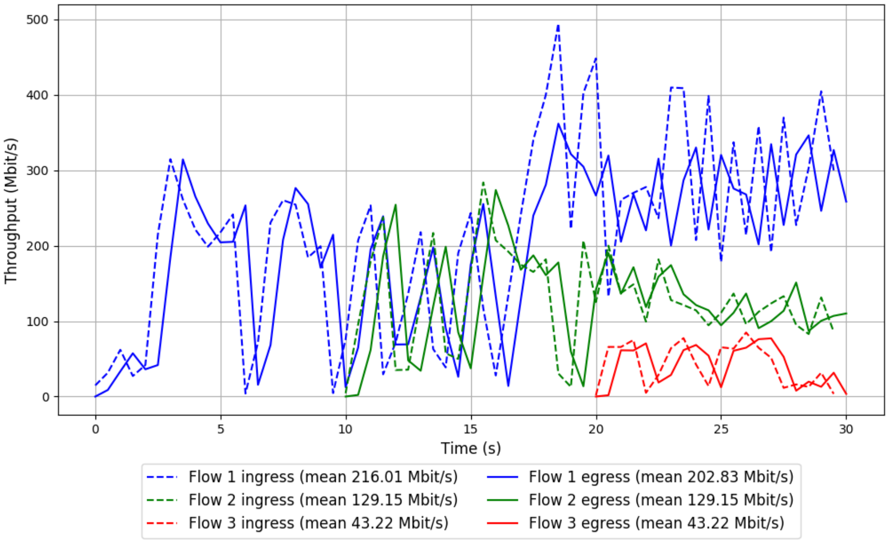
Run 2: Report of Verus — Data Link

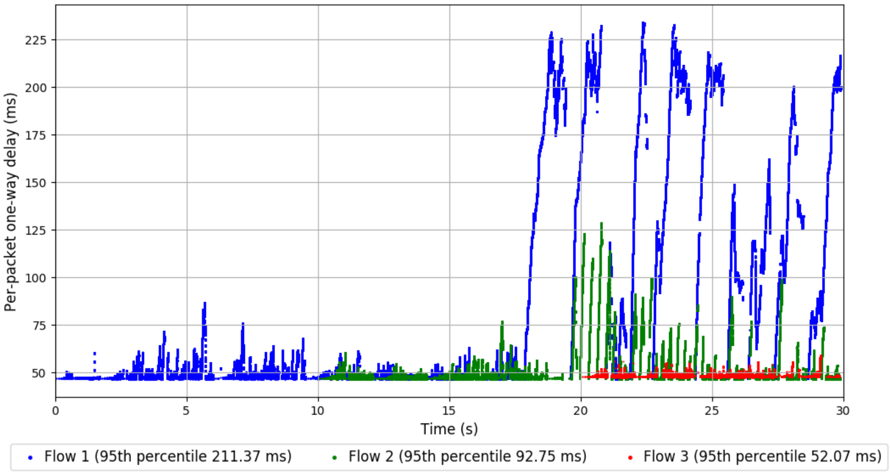




```
Run 3: Statistics of Verus

Start at: 2018-12-12 11:05:13
End at: 2018-12-12 11:05:43
Local clock offset: -0.241 ms
Remote clock offset: -0.214 ms

# Below is generated by plot.py at 2018-12-12 15:20:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 302.73 Mbit/s
95th percentile per-packet one-way delay: 207.808 ms
Loss rate: 4.17%
-- Flow 1:
Average throughput: 202.83 Mbit/s
95th percentile per-packet one-way delay: 211.371 ms
Loss rate: 6.10%
-- Flow 2:
Average throughput: 129.15 Mbit/s
95th percentile per-packet one-way delay: 92.753 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 43.22 Mbit/s
95th percentile per-packet one-way delay: 52.067 ms
Loss rate: 0.00%
```

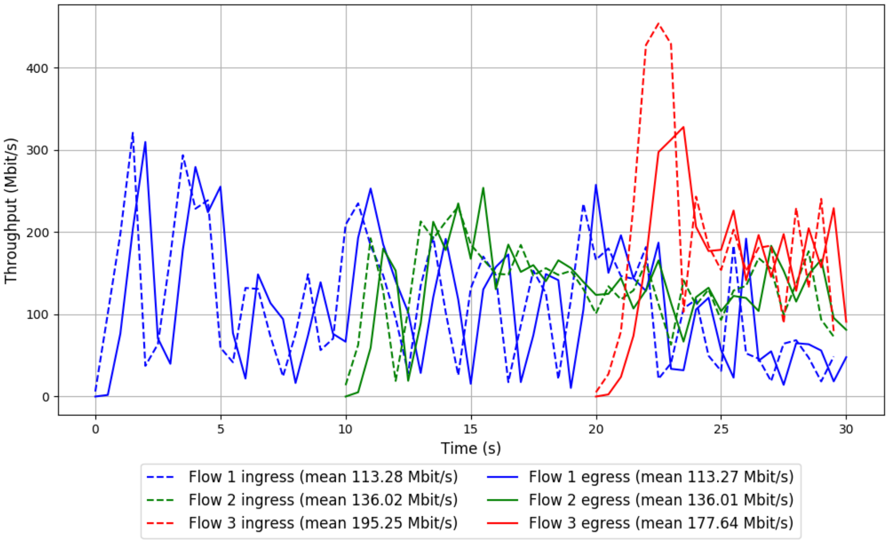
Run 3: Report of Verus — Data Link

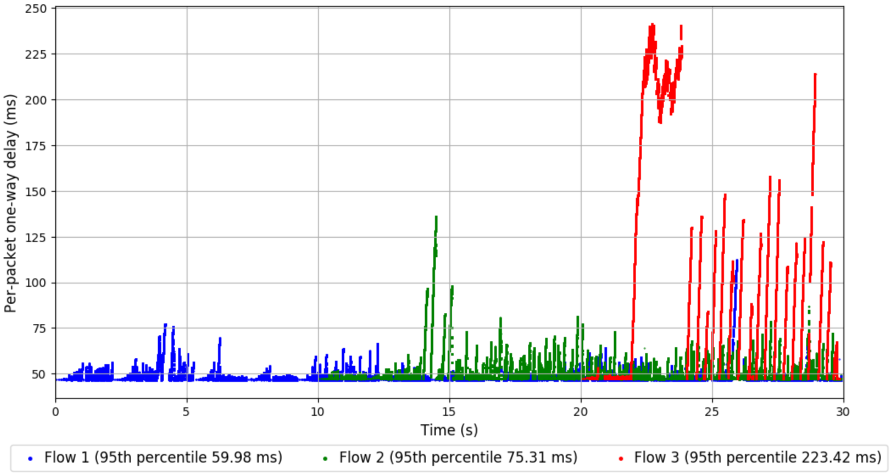




```
Run 4: Statistics of Verus

Start at: 2018-12-12 11:40:52
End at: 2018-12-12 11:41:22
Local clock offset: -0.13 ms
Remote clock offset: -0.306 ms

# Below is generated by plot.py at 2018-12-12 15:20:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 261.98 Mbit/s
95th percentile per-packet one-way delay: 202.411 ms
Loss rate: 2.17%
-- Flow 1:
Average throughput: 113.27 Mbit/s
95th percentile per-packet one-way delay: 59.979 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 136.01 Mbit/s
95th percentile per-packet one-way delay: 75.307 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 177.64 Mbit/s
95th percentile per-packet one-way delay: 223.418 ms
Loss rate: 9.02%
```

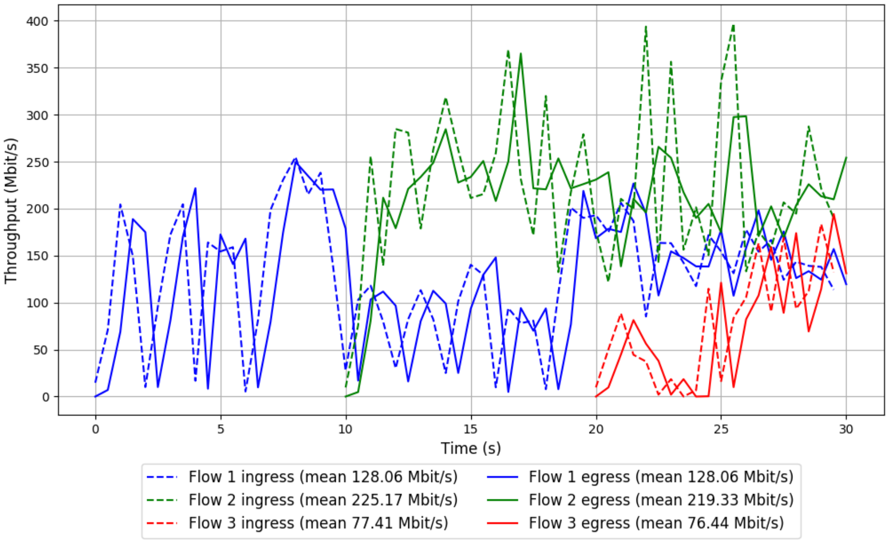
Run 4: Report of Verus — Data Link

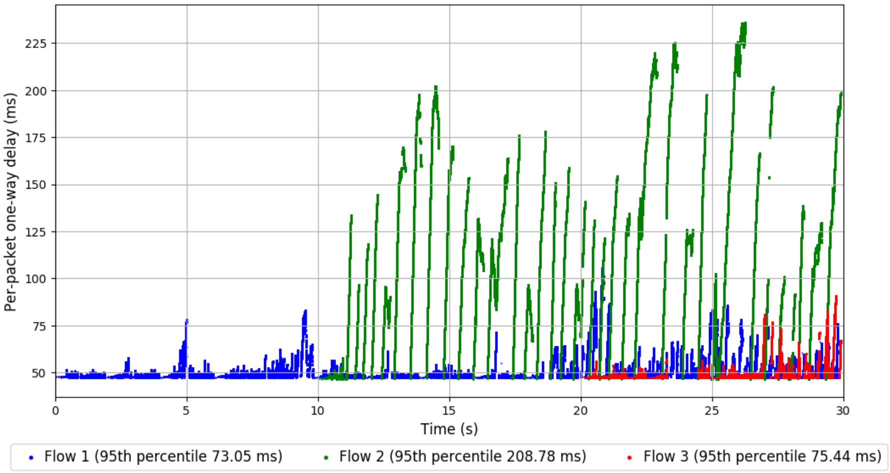




```
Run 5: Statistics of Verus

Start at: 2018-12-12 12:16:35
End at: 2018-12-12 12:17:05
Local clock offset: -0.039 ms
Remote clock offset: -0.401 ms

# Below is generated by plot.py at 2018-12-12 15:20:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 298.81 Mbit/s
95th percentile per-packet one-way delay: 189.071 ms
Loss rate: 1.08%
-- Flow 1:
Average throughput: 128.06 Mbit/s
95th percentile per-packet one-way delay: 73.052 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 219.33 Mbit/s
95th percentile per-packet one-way delay: 208.776 ms
Loss rate: 1.98%
-- Flow 3:
Average throughput: 76.44 Mbit/s
95th percentile per-packet one-way delay: 75.438 ms
Loss rate: 1.21%
```

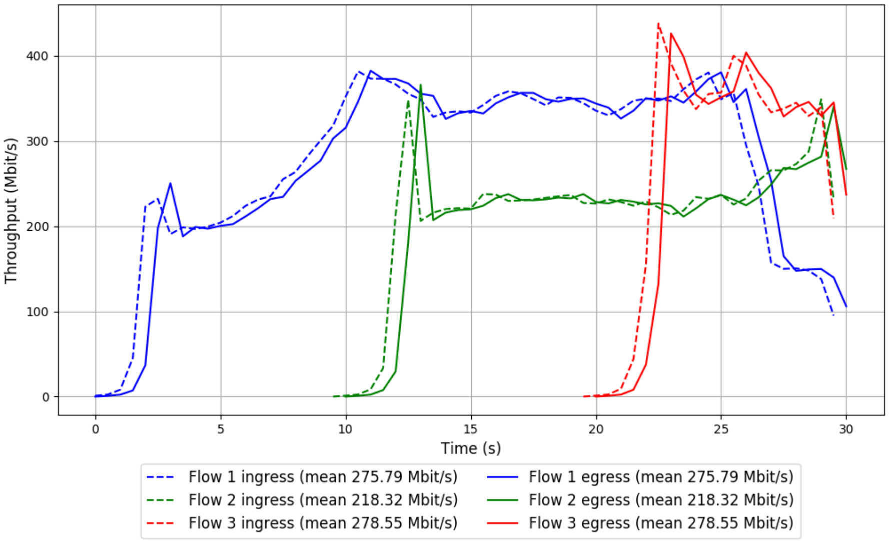
Run 5: Report of Verus — Data Link

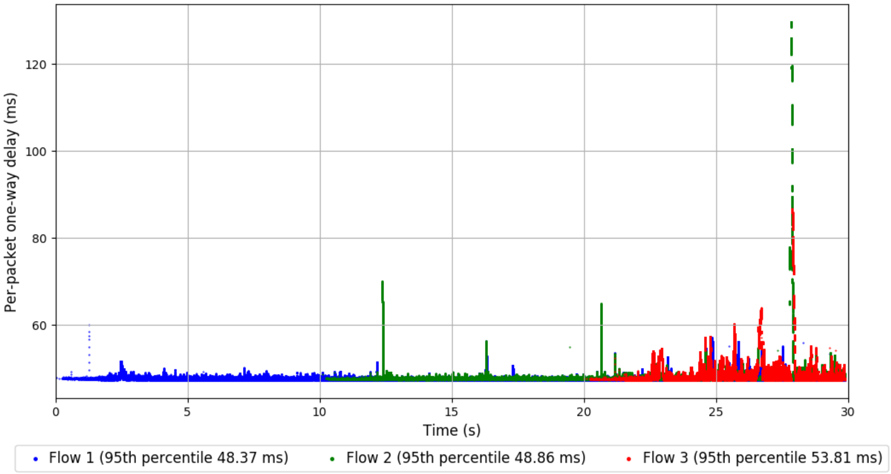




```
Run 1: Statistics of PCC-Vivace

Start at: 2018-12-12 09:58:40
End at: 2018-12-12 09:59:10
Local clock offset: -0.129 ms
Remote clock offset: -0.062 ms

# Below is generated by plot.py at 2018-12-12 15:22:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 513.11 Mbit/s
95th percentile per-packet one-way delay: 49.957 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 275.79 Mbit/s
95th percentile per-packet one-way delay: 48.365 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 218.32 Mbit/s
95th percentile per-packet one-way delay: 48.857 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 278.55 Mbit/s
95th percentile per-packet one-way delay: 53.813 ms
Loss rate: 0.00%
```

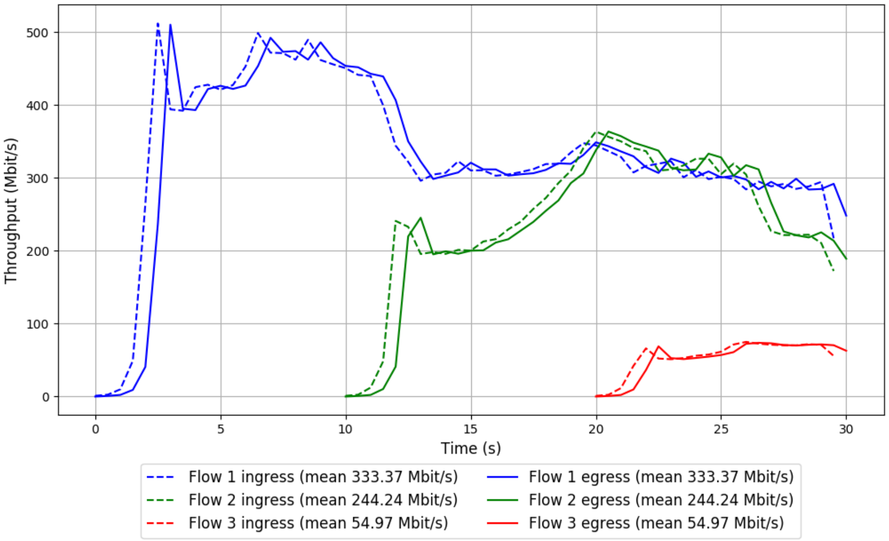
Run 1: Report of PCC-Vivace — Data Link

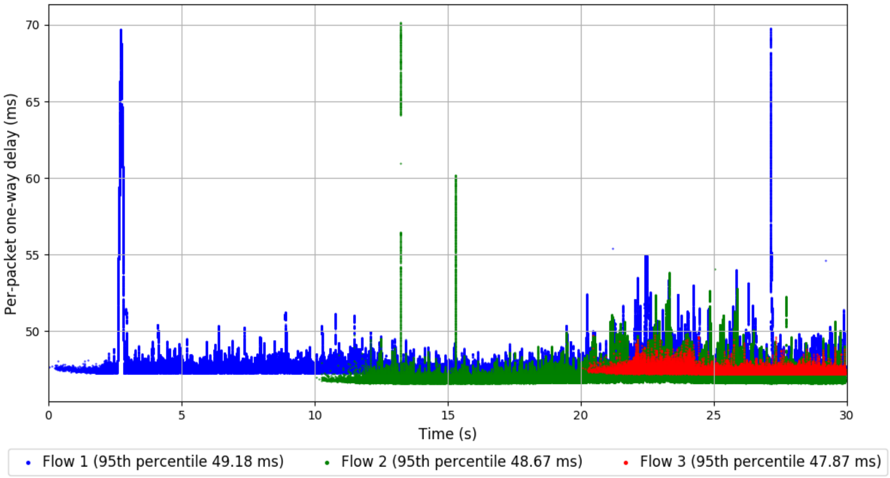




```
Run 2: Statistics of PCC-Vivace

Start at: 2018-12-12 10:34:03
End at: 2018-12-12 10:34:33
Local clock offset: -0.019 ms
Remote clock offset: -0.027 ms

# Below is generated by plot.py at 2018-12-12 15:23:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 513.95 Mbit/s
95th percentile per-packet one-way delay: 48.978 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 333.37 Mbit/s
95th percentile per-packet one-way delay: 49.179 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 244.24 Mbit/s
95th percentile per-packet one-way delay: 48.673 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 54.97 Mbit/s
95th percentile per-packet one-way delay: 47.870 ms
Loss rate: 0.00%
```

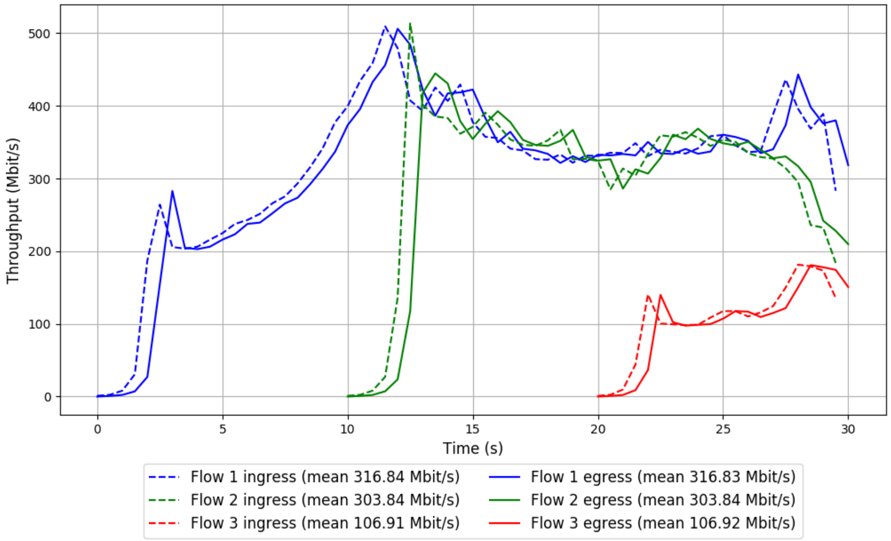
Run 2: Report of PCC-Vivace — Data Link

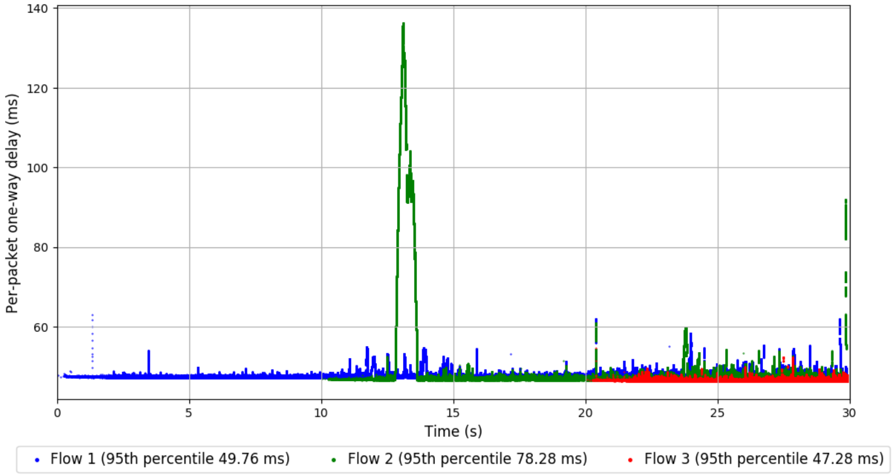




```
Run 3: Statistics of PCC-Vivace

Start at: 2018-12-12 11:09:01
End at: 2018-12-12 11:09:31
Local clock offset: -0.254 ms
Remote clock offset: -0.218 ms

# Below is generated by plot.py at 2018-12-12 15:23:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 554.14 Mbit/s
95th percentile per-packet one-way delay: 50.628 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 316.83 Mbit/s
95th percentile per-packet one-way delay: 49.761 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 303.84 Mbit/s
95th percentile per-packet one-way delay: 78.282 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 106.92 Mbit/s
95th percentile per-packet one-way delay: 47.284 ms
Loss rate: 0.00%
```

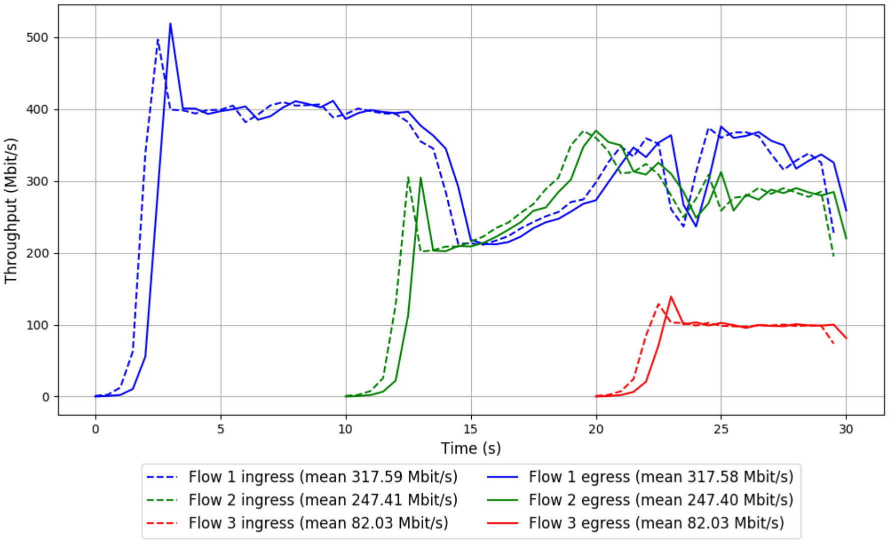
Run 3: Report of PCC-Vivace — Data Link

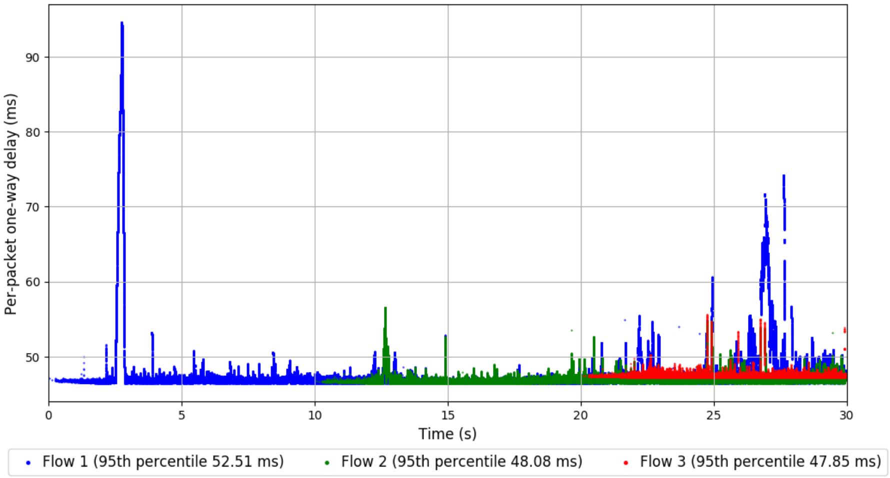




```
Run 4: Statistics of PCC-Vivace

Start at: 2018-12-12 11:45:01
End at: 2018-12-12 11:45:31
Local clock offset: -0.141 ms
Remote clock offset: -0.33 ms

# Below is generated by plot.py at 2018-12-12 15:23:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 509.02 Mbit/s
95th percentile per-packet one-way delay: 50.099 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 317.58 Mbit/s
95th percentile per-packet one-way delay: 52.505 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 247.40 Mbit/s
95th percentile per-packet one-way delay: 48.082 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 82.03 Mbit/s
95th percentile per-packet one-way delay: 47.847 ms
Loss rate: 0.00%
```

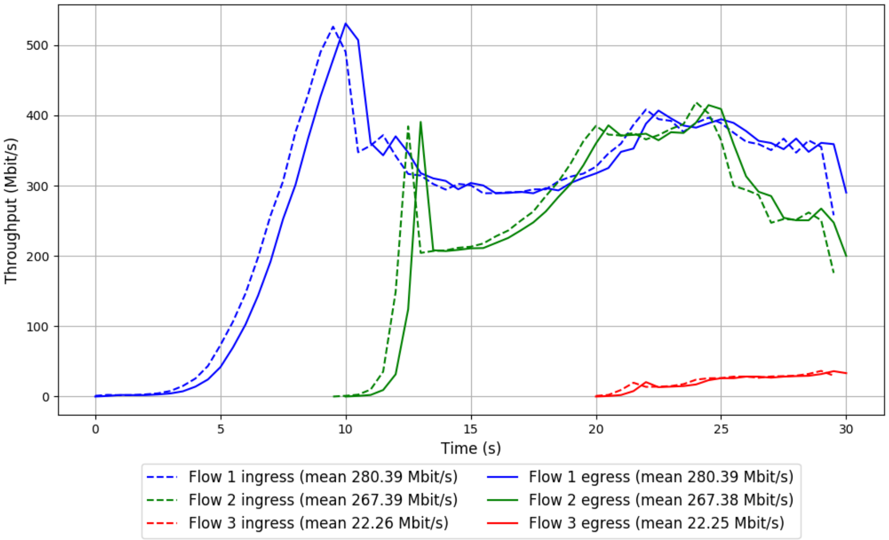
Run 4: Report of PCC-Vivace — Data Link

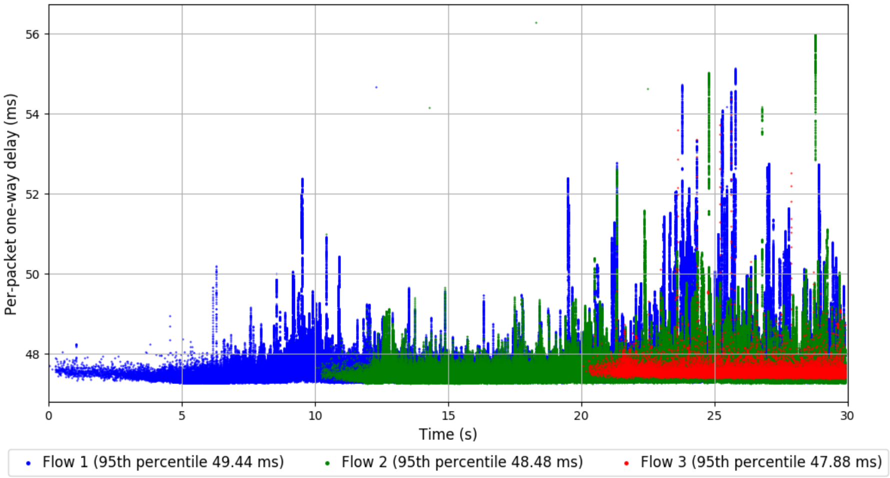




```
Run 5: Statistics of PCC-Vivace

Start at: 2018-12-12 12:20:34
End at: 2018-12-12 12:21:04
Local clock offset: -0.035 ms
Remote clock offset: -0.407 ms

# Below is generated by plot.py at 2018-12-12 15:23:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 465.58 Mbit/s
95th percentile per-packet one-way delay: 49.029 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 280.39 Mbit/s
95th percentile per-packet one-way delay: 49.438 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 267.38 Mbit/s
95th percentile per-packet one-way delay: 48.484 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 22.25 Mbit/s
95th percentile per-packet one-way delay: 47.884 ms
Loss rate: 0.00%
```

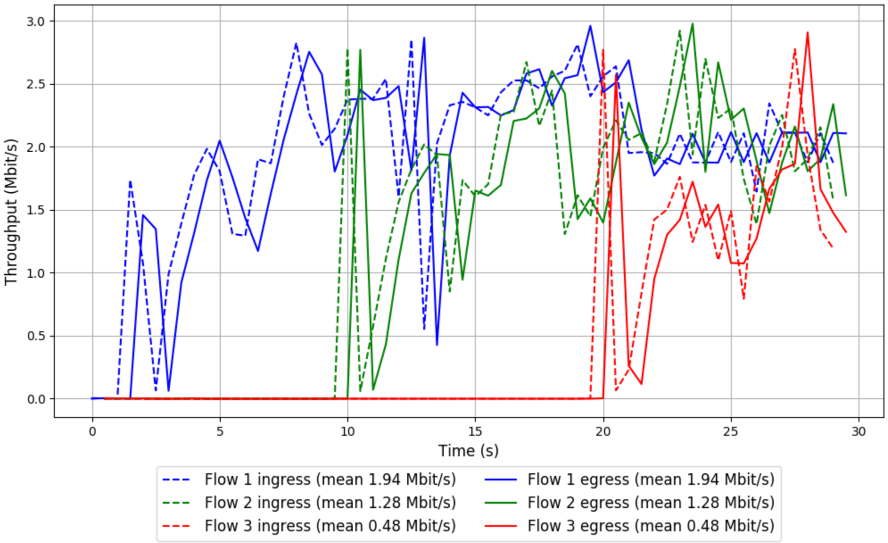
Run 5: Report of PCC-Vivace — Data Link

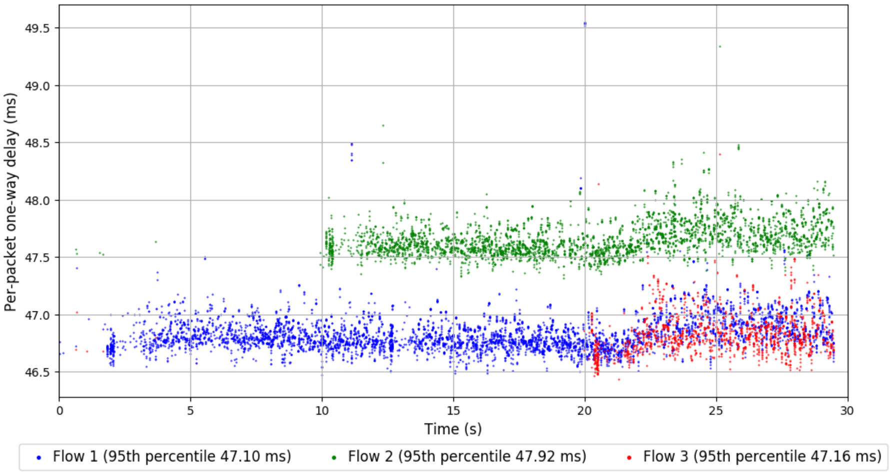




```
Run 1: Statistics of WebRTC media

Start at: 2018-12-12 10:04:08
End at: 2018-12-12 10:04:38
Local clock offset: -0.077 ms
Remote clock offset: -0.046 ms

# Below is generated by plot.py at 2018-12-12 15:23:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.66 Mbit/s
95th percentile per-packet one-way delay: 47.815 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 47.099 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 47.923 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 47.159 ms
Loss rate: 0.01%
```

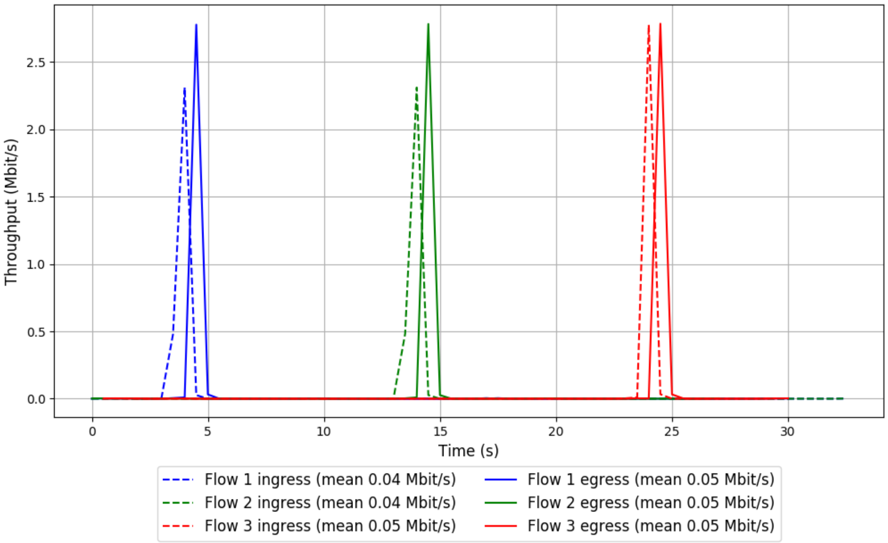
Run 1: Report of WebRTC media — Data Link

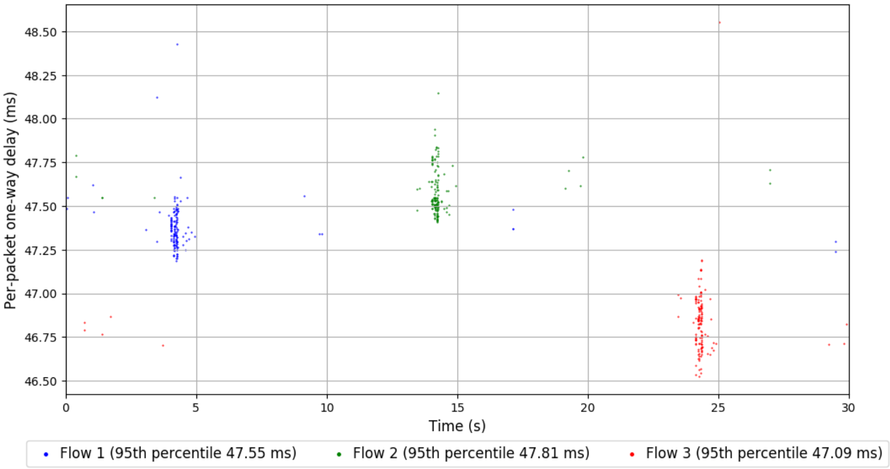




```
Run 2: Statistics of WebRTC media

Start at: 2018-12-12 10:39:56
End at: 2018-12-12 10:40:26
Local clock offset: -0.012 ms
Remote clock offset: -0.015 ms

# Below is generated by plot.py at 2018-12-12 15:23:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 47.765 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 47.546 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 47.812 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 47.085 ms
Loss rate: 0.00%
```

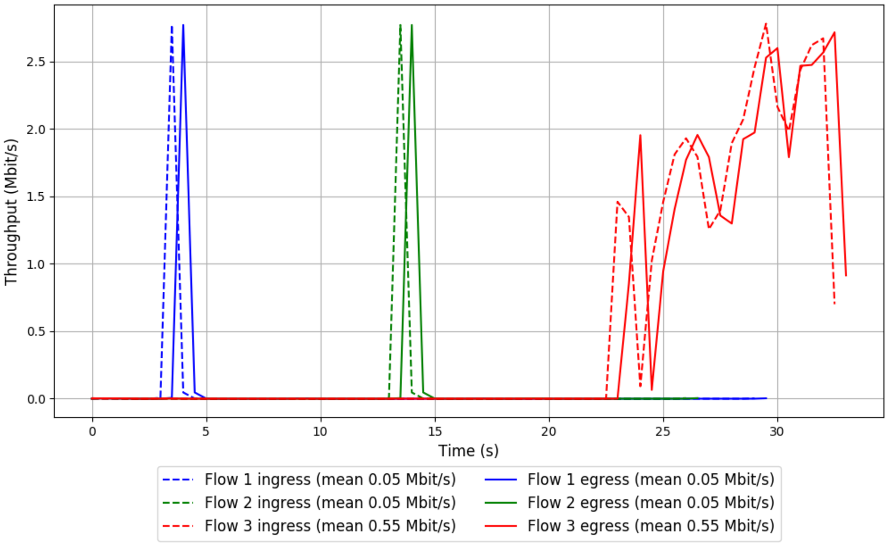
Run 2: Report of WebRTC media — Data Link

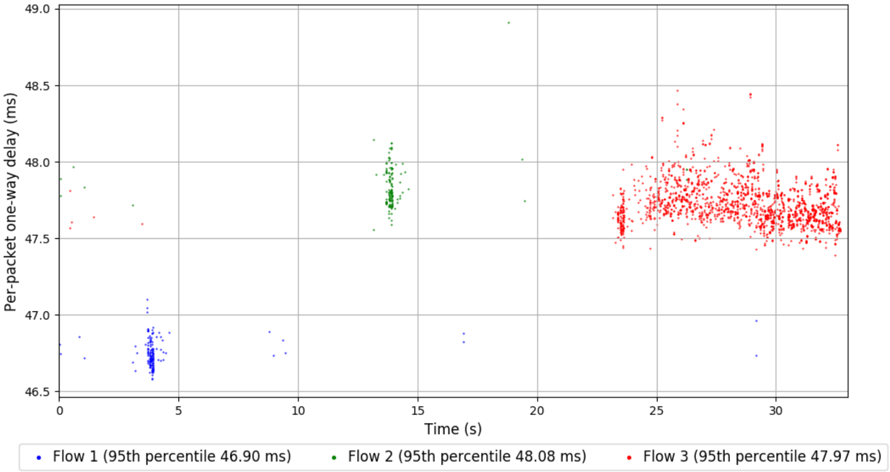




```
Run 3: Statistics of WebRTC media

Start at: 2018-12-12 11:14:51
End at: 2018-12-12 11:15:21
Local clock offset: -0.275 ms
Remote clock offset: -0.188 ms

# Below is generated by plot.py at 2018-12-12 15:23:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 47.978 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 46.896 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 48.082 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 47.971 ms
Loss rate: 0.00%
```

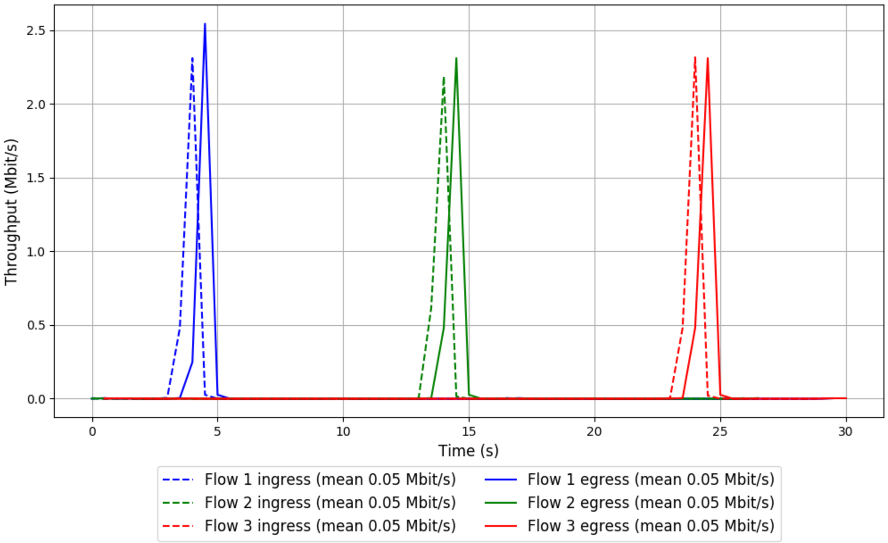
Run 3: Report of WebRTC media — Data Link

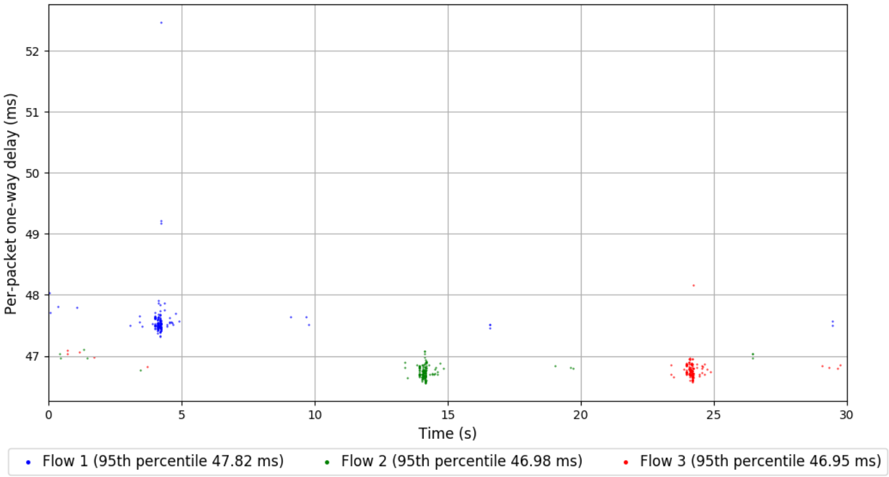




```
Run 4: Statistics of WebRTC media

Start at: 2018-12-12 11:51:02
End at: 2018-12-12 11:51:32
Local clock offset: -0.144 ms
Remote clock offset: -0.338 ms

# Below is generated by plot.py at 2018-12-12 15:23:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 47.645 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 47.816 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 46.975 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 46.953 ms
Loss rate: 0.00%
```

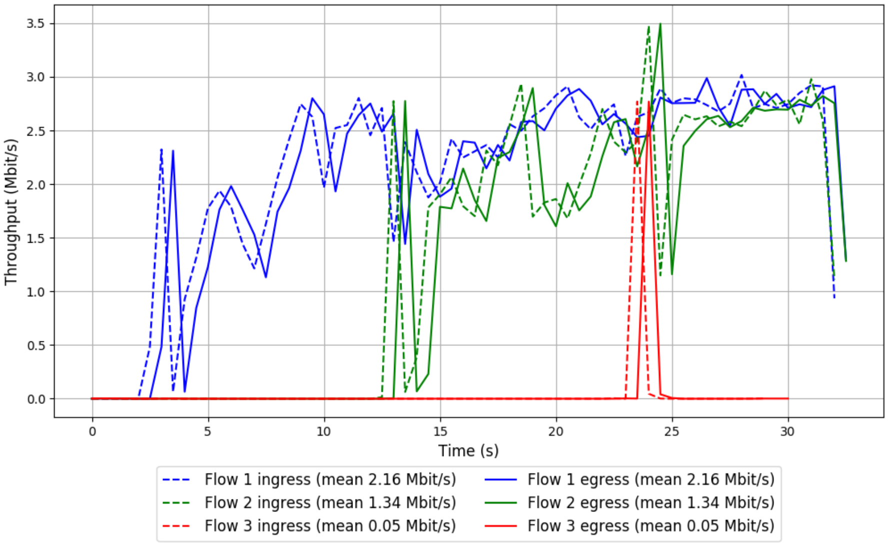
Run 4: Report of WebRTC media — Data Link



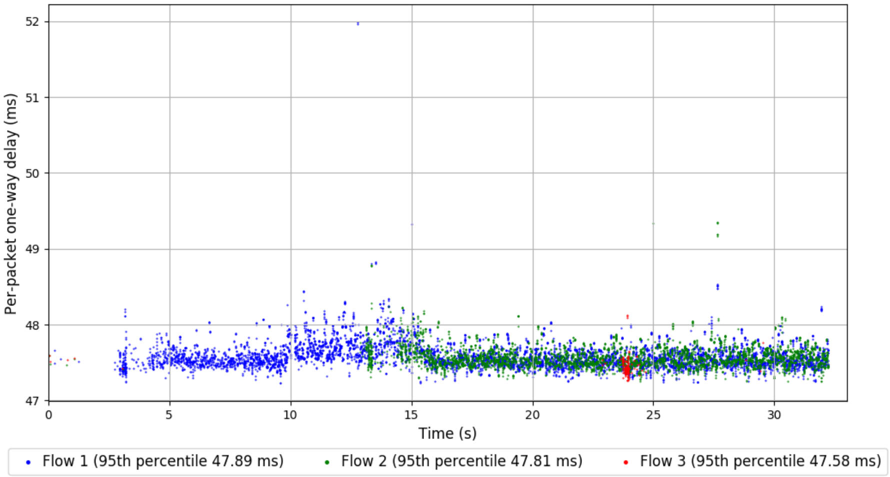


```
Run 5: Statistics of WebRTC media

Start at: 2018-12-12 12:26:33
End at: 2018-12-12 12:27:03
Local clock offset: 0.041 ms
Remote clock offset: -0.44 ms

# Below is generated by plot.py at 2018-12-12 15:23:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.54 Mbit/s
95th percentile per-packet one-way delay: 47.864 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 47.890 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 47.808 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 47.583 ms
Loss rate: 0.00%
```

Run 5: Report of WebRTC media — Data Link



3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Throughput (Mbit/s)
0
5
10
15
20
25
30
Time (s)
Flow 1 ingress (mean 2.16 Mbit/s)
Flow 2 ingress (mean 1.34 Mbit/s)
Flow 3 ingress (mean 0.05 Mbit/s)
Flow 1 egress (mean 2.16 Mbit/s)
Flow 2 egress (mean 1.34 Mbit/s)
Flow 3 egress (mean 0.05 Mbit/s)



52
51
50
49
48
47
Per-packet one-way delay (ms)
0
5
10
15
20
25
30
Time (s)
Flow 1 (95th percentile 47.89 ms)
Flow 2 (95th percentile 47.81 ms)
Flow 3 (95th percentile 47.58 ms)