Pantheon Report

Generated at 2025-04-17 21:36:26 (UTC).

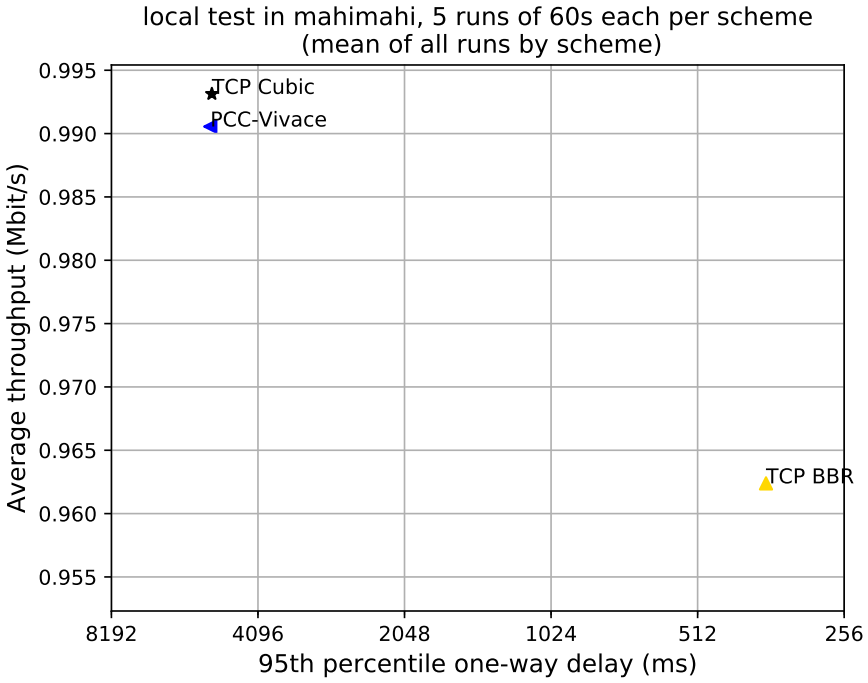
Tested in mahimahi: `mm-delay 100 mm-link 1mbps_200ms.trace 1mbps_200ms.trace --uplink-queue=droptail --uplink-queue-args=bytes=625000`

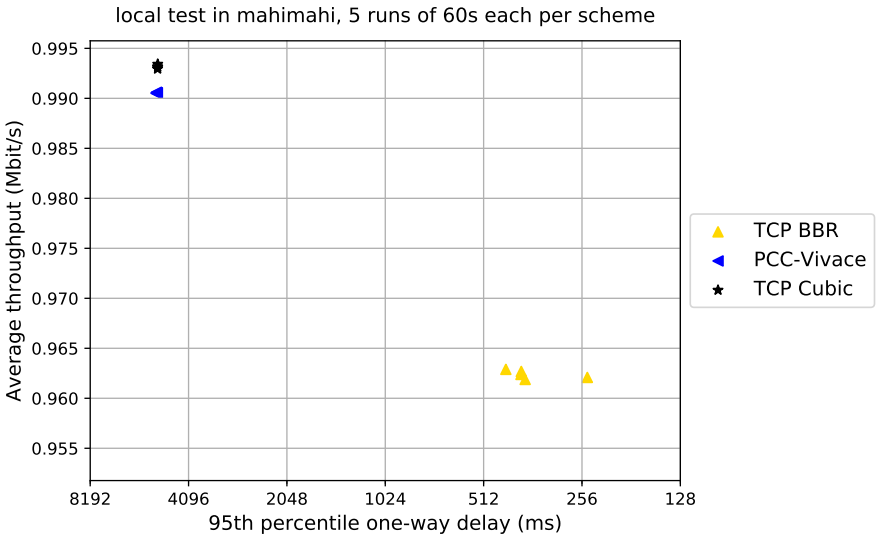
Repeated the test of 3 congestion control schemes 5 times.

Each test lasted for 60 seconds running 1 flow.

```
System info:
Linux 5.4.0-150-generic
net.core.default_qdisc = fq
net.core.rmem_default = 212992
net.core.rmem_max = 212992
net.core.wmem_default = 212992
net.core.wmem_max = 212992
net.ipv4.tcp_rmem = 4096 131072 6291456
net.ipv4.tcp_wmem = 4096 16384 4194304

Git summary:
branch: main @ 8e1f00d040ee07d555e806128c3774c646a388b2
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 463d89b09699a57bfdfbae351646df6a60040b90
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
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
```


local test in mahimahi, 5 runs of 60s each per scheme
(mean of all runs by scheme)
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
TCP Cubic
PCC-Vivace
TCP BBR
0.995
0.990
0.985
0.980
0.975
0.970
0.965
0.960
0.955
8192
4096
2048
1024
512
256


local test in mahimahi, 5 runs of 60s each per scheme
Average throughput (Mbit/s)
95th percentile one-way delay (ms)
TCP BBR
PCC-Vivace
TCP Cubic
0.995
0.990
0.985
0.980
0.975
0.970
0.965
0.960
0.955
8192
4096
2048
1024
512
256
128

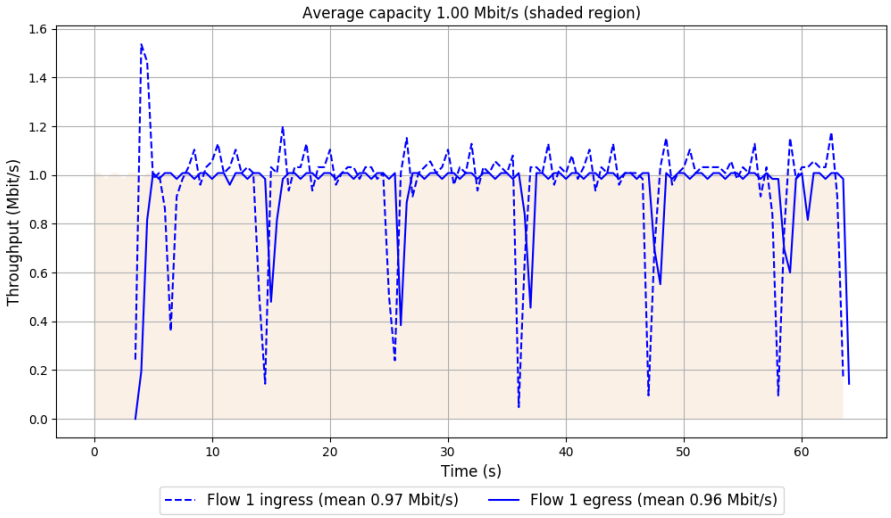
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	5	0.96	370.51	0.53
TCP Cubic	5	0.99	5093.83	14.27
PCC-Vivace	4	0.99	5133.11	23.96

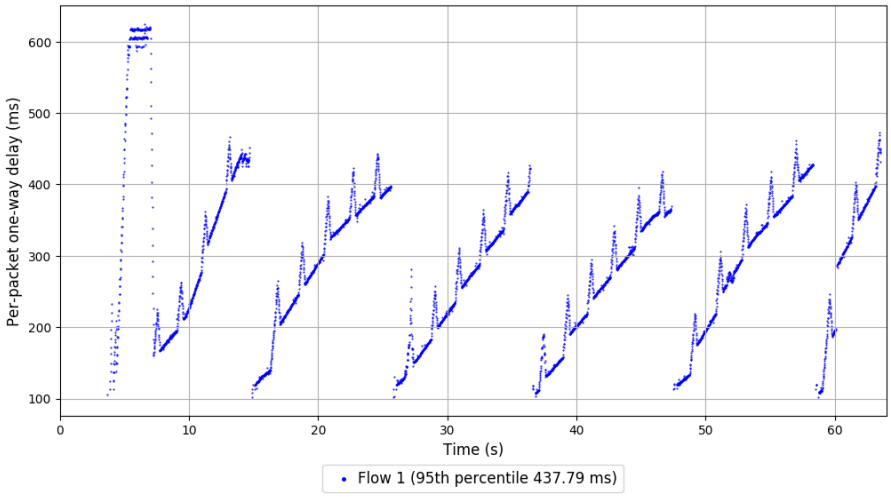
```
Run 1: Statistics of TCP BBR

Start at: 2025-04-17 21:20:29
End at: 2025-04-17 21:21:29

# Below is generated by plot.py at 2025-04-17 21:36:10
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.96 Mbit/s (96.4% utilization)
95th percentile per-packet one-way delay: 437.787 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 437.787 ms
Loss rate: 0.76%
```

Run 1: Report of TCP BBR — Data Link



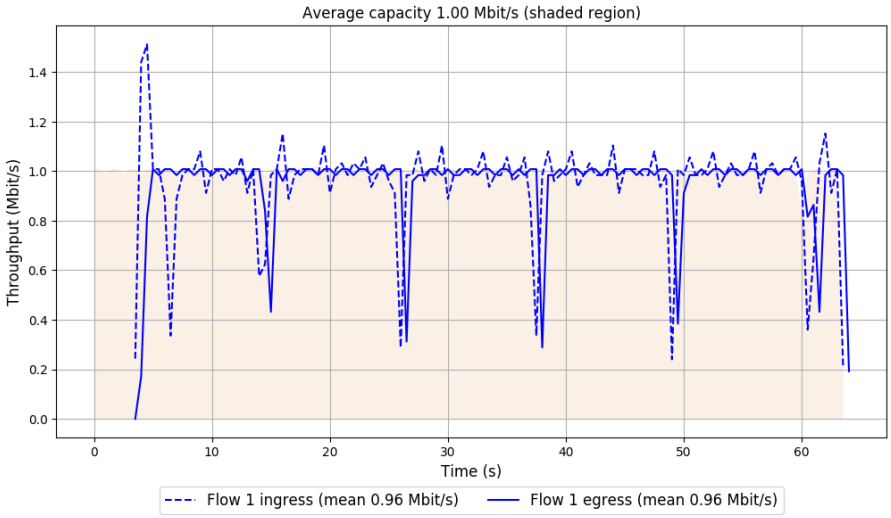


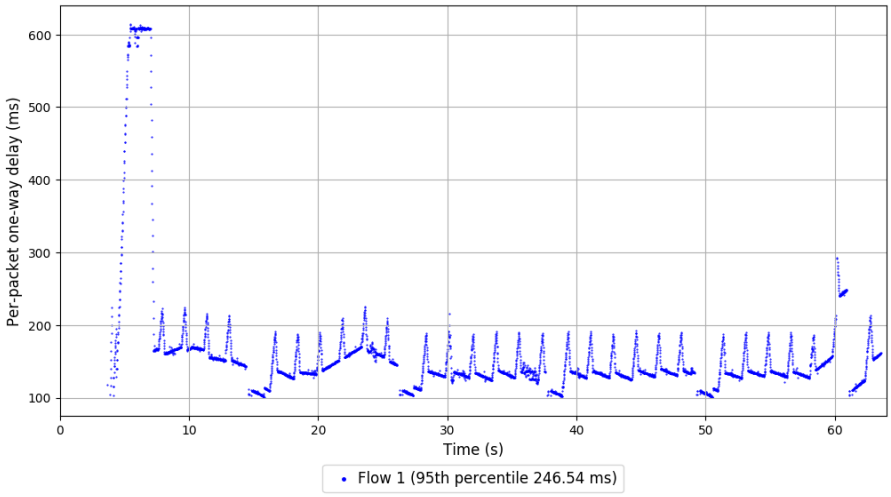
```
Run 2: Statistics of TCP BBR

Start at: 2025-04-17 21:23:54
End at: 2025-04-17 21:24:54

# Below is generated by plot.py at 2025-04-17 21:36:11
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.96 Mbit/s (96.3% utilization)
95th percentile per-packet one-way delay: 246.540 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 246.540 ms
Loss rate: 0.31%
```

Run 2: Report of TCP BBR — Data Link



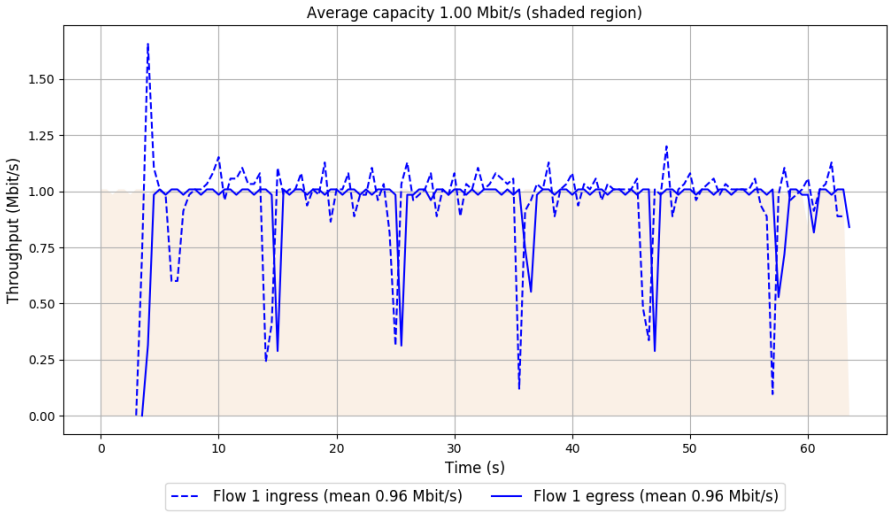


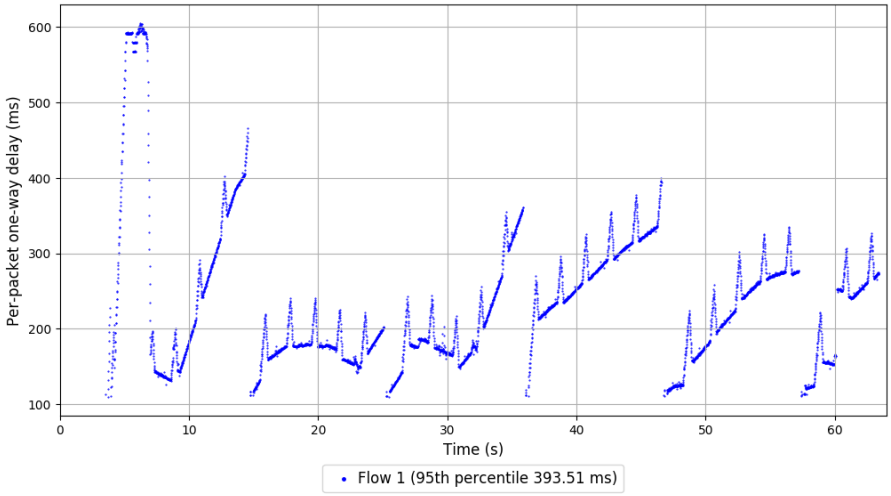
```
Run 3: Statistics of TCP BBR

Start at: 2025-04-17 21:27:09
End at: 2025-04-17 21:28:09

# Below is generated by plot.py at 2025-04-17 21:36:12
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.96 Mbit/s (96.4% utilization)
95th percentile per-packet one-way delay: 393.506 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 393.506 ms
Loss rate: 0.50%
```

Run 3: Report of TCP BBR — Data Link



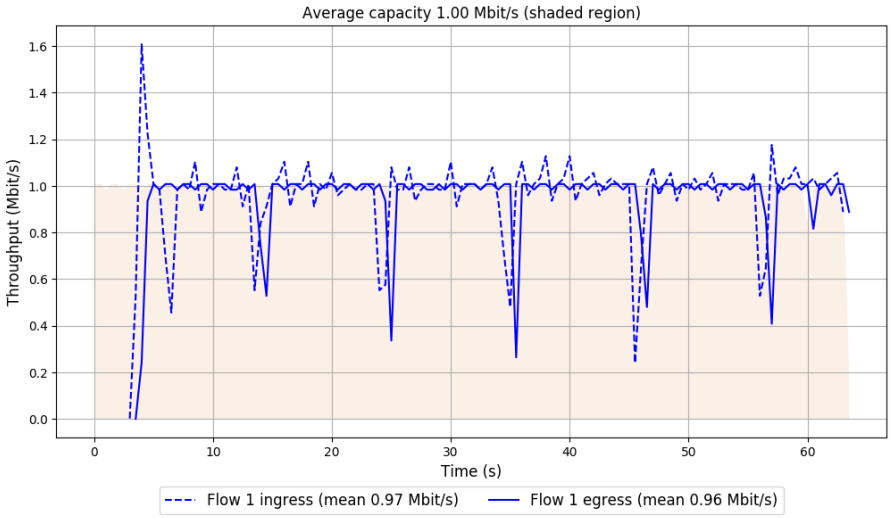


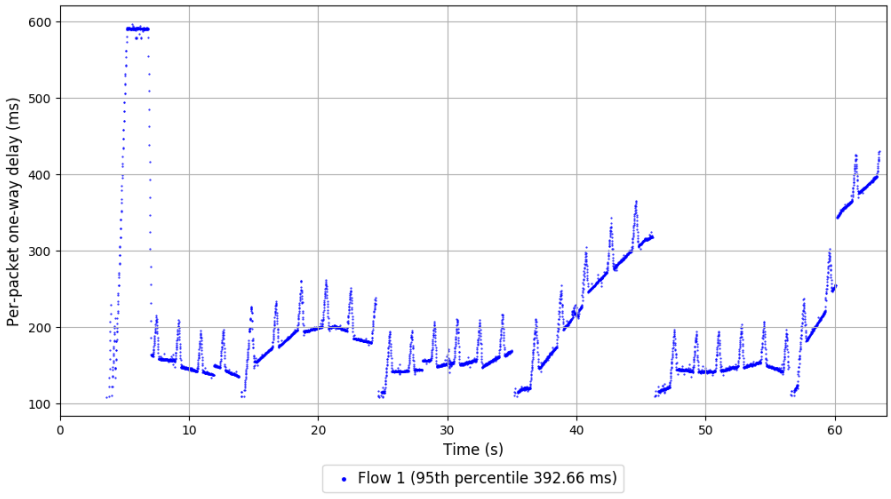
```
Run 4: Statistics of TCP BBR

Start at: 2025-04-17 21:30:24
End at: 2025-04-17 21:31:24

# Below is generated by plot.py at 2025-04-17 21:36:13
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.96 Mbit/s (96.4% utilization)
95th percentile per-packet one-way delay: 392.662 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 392.662 ms
Loss rate: 0.72%
```

Run 4: Report of TCP BBR — Data Link



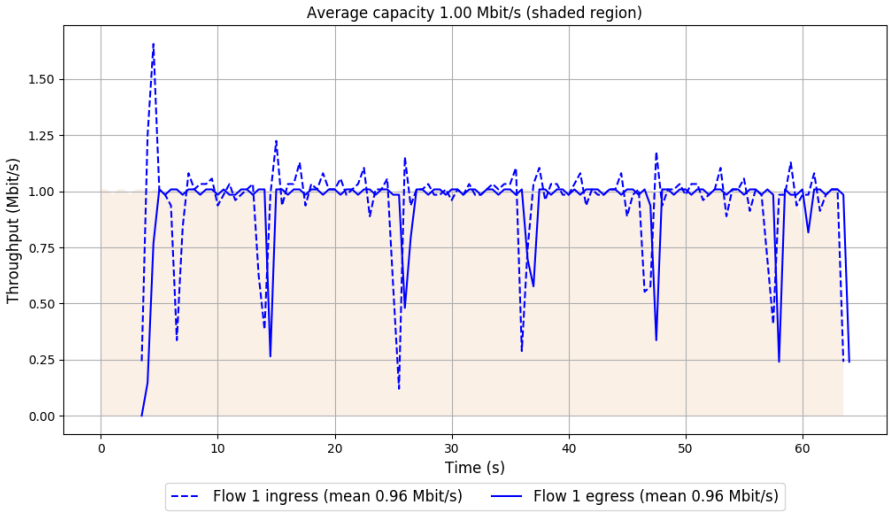


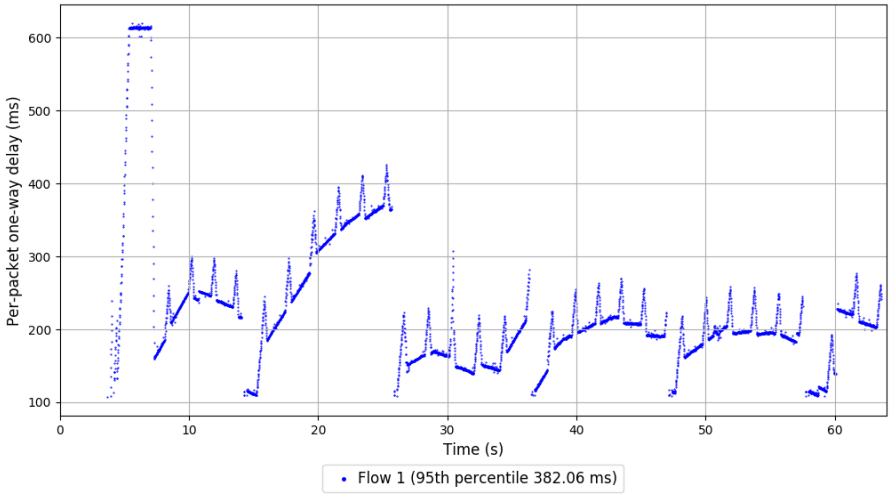
```
Run 5: Statistics of TCP BBR

Start at: 2025-04-17 21:33:39
End at: 2025-04-17 21:34:40

# Below is generated by plot.py at 2025-04-17 21:36:14
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.96 Mbit/s (96.3% utilization)
95th percentile per-packet one-way delay: 382.061 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 382.061 ms
Loss rate: 0.37%
```

Run 5: Report of TCP BBR — Data Link



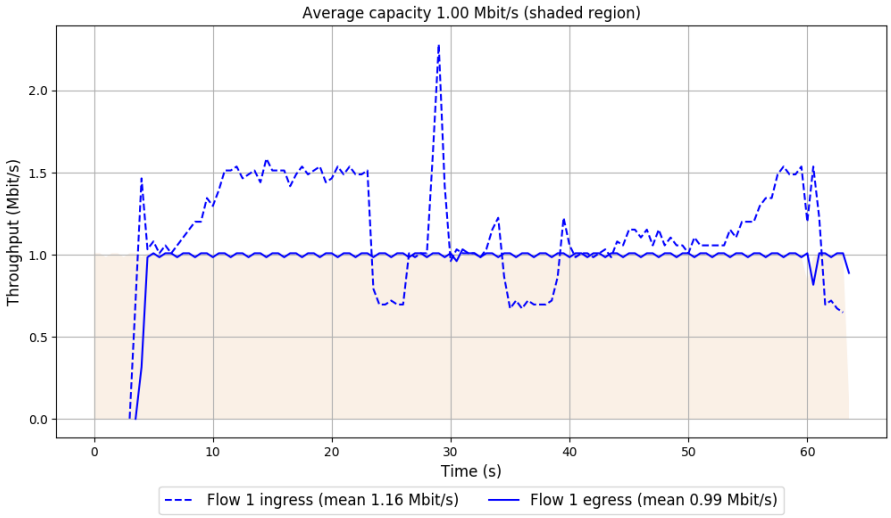


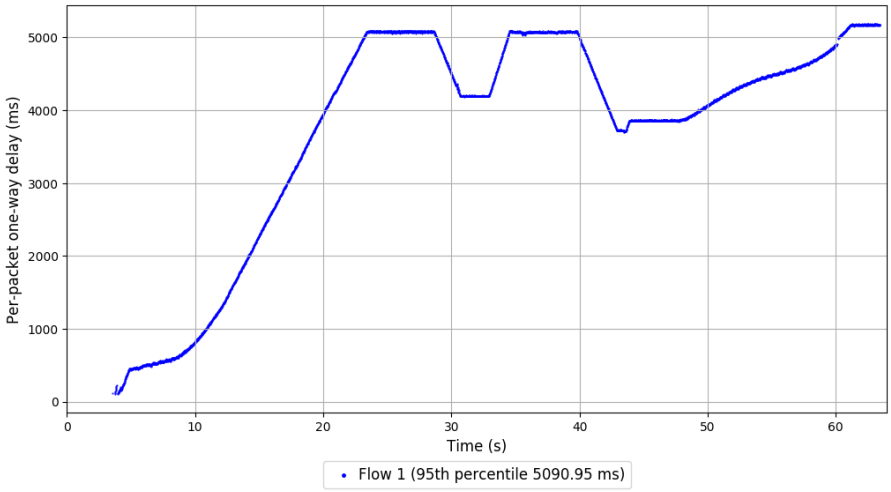
```
Run 1: Statistics of TCP Cubic

Start at: 2025-04-17 21:19:24
End at: 2025-04-17 21:20:24

# Below is generated by plot.py at 2025-04-17 21:36:15
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.5% utilization)
95th percentile per-packet one-way delay: 5090.947 ms
Loss rate: 14.31%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5090.947 ms
Loss rate: 14.31%
```

Run 1: Report of TCP Cubic — Data Link



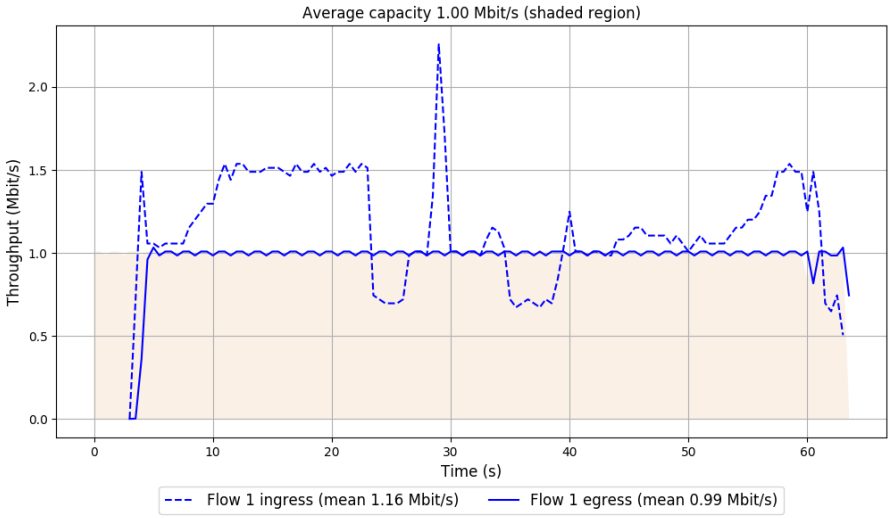


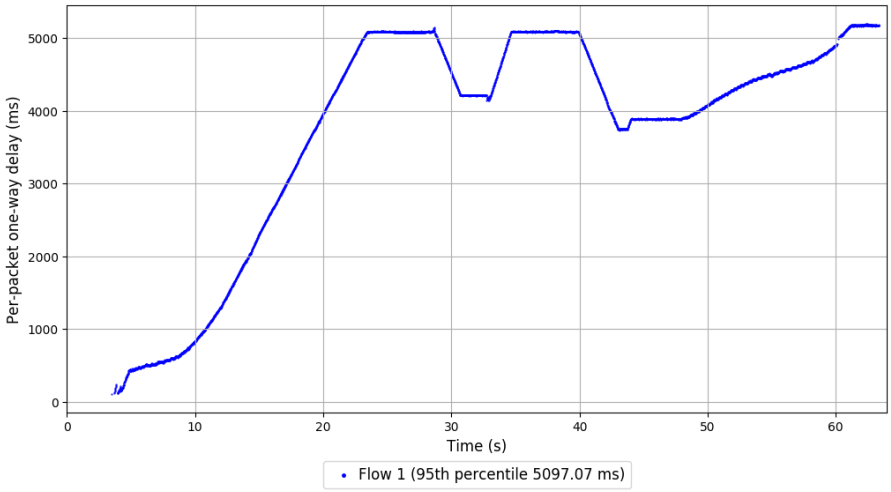
```
Run 2: Statistics of TCP Cubic

Start at: 2025-04-17 21:22:48
End at: 2025-04-17 21:23:48

# Below is generated by plot.py at 2025-04-17 21:36:16
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 5097.072 ms
Loss rate: 14.33%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5097.072 ms
Loss rate: 14.33%
```

Run 2: Report of TCP Cubic — Data Link



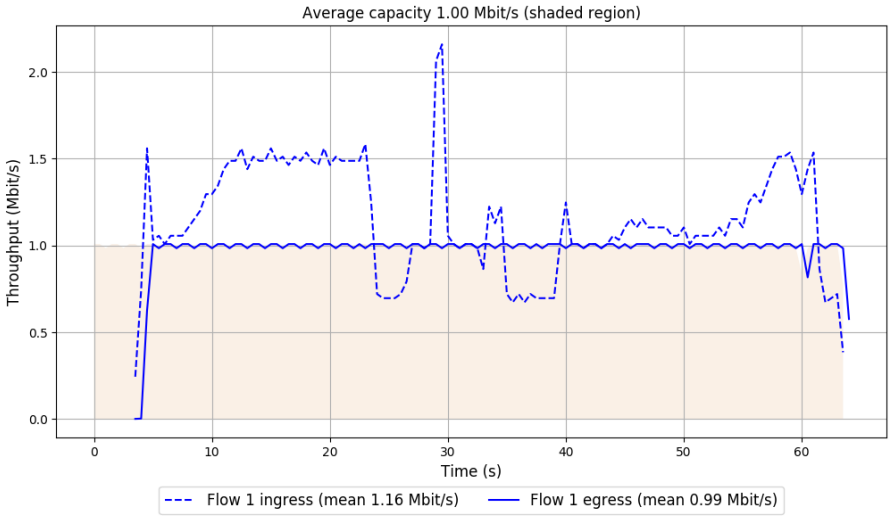


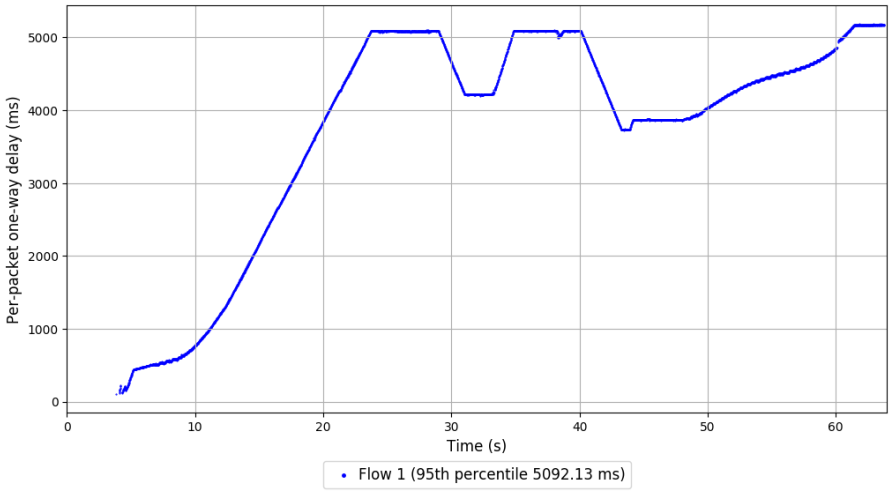
```
Run 3: Statistics of TCP Cubic

Start at: 2025-04-17 21:26:04
End at: 2025-04-17 21:27:04

# Below is generated by plot.py at 2025-04-17 21:36:17
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 5092.126 ms
Loss rate: 14.22%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5092.126 ms
Loss rate: 14.22%
```

Run 3: Report of TCP Cubic — Data Link



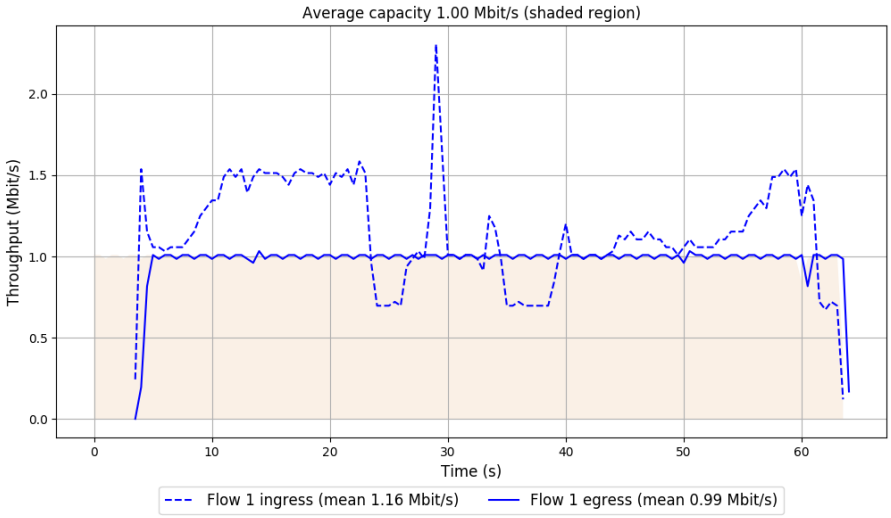


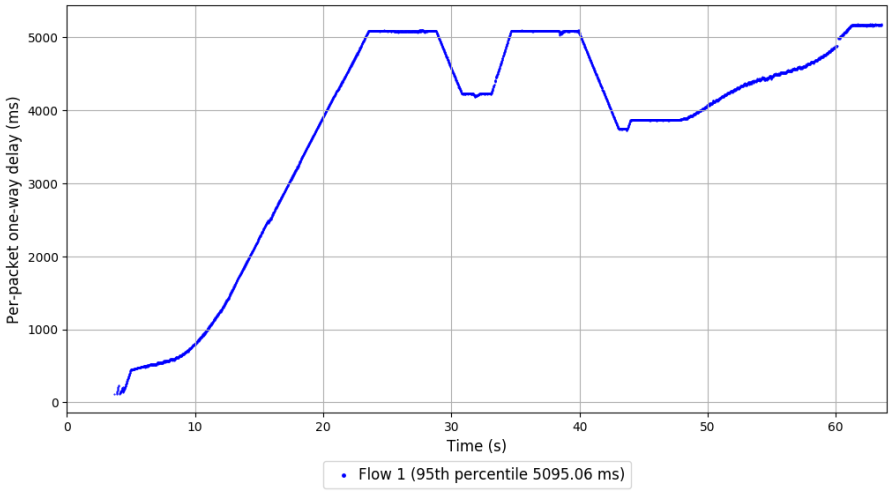
```
Run 4: Statistics of TCP Cubic

Start at: 2025-04-17 21:29:19
End at: 2025-04-17 21:30:19

# Below is generated by plot.py at 2025-04-17 21:36:18
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 5095.060 ms
Loss rate: 14.24%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5095.060 ms
Loss rate: 14.24%
```

Run 4: Report of TCP Cubic — Data Link



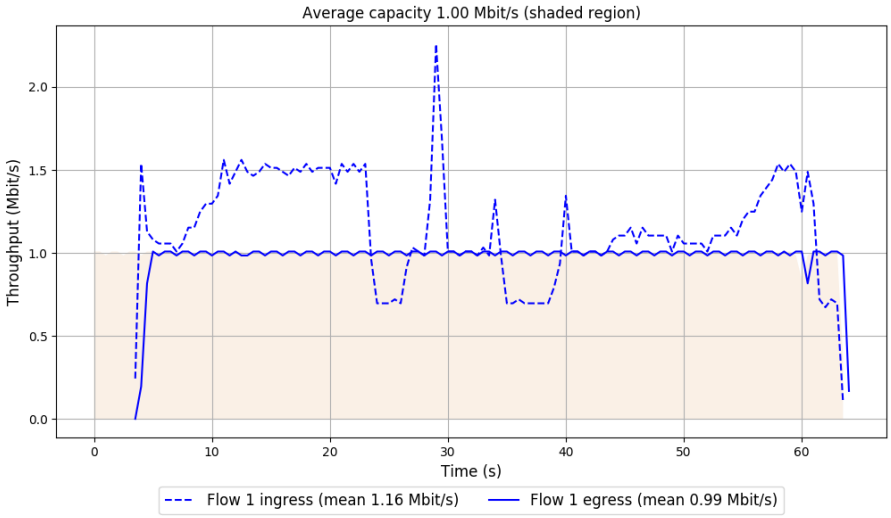


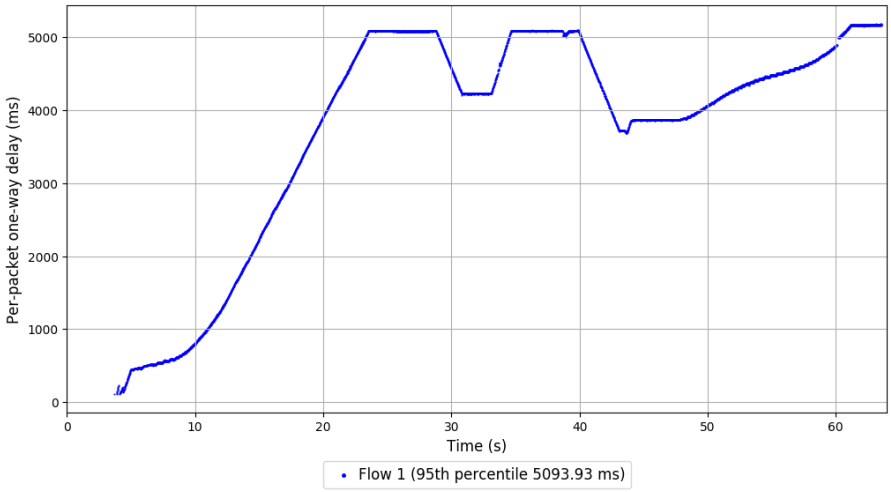
```
Run 5: Statistics of TCP Cubic

Start at: 2025-04-17 21:32:34
End at: 2025-04-17 21:33:34

# Below is generated by plot.py at 2025-04-17 21:36:19
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.4% utilization)
95th percentile per-packet one-way delay: 5093.934 ms
Loss rate: 14.24%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5093.934 ms
Loss rate: 14.24%
```

Run 5: Report of TCP Cubic — Data Link

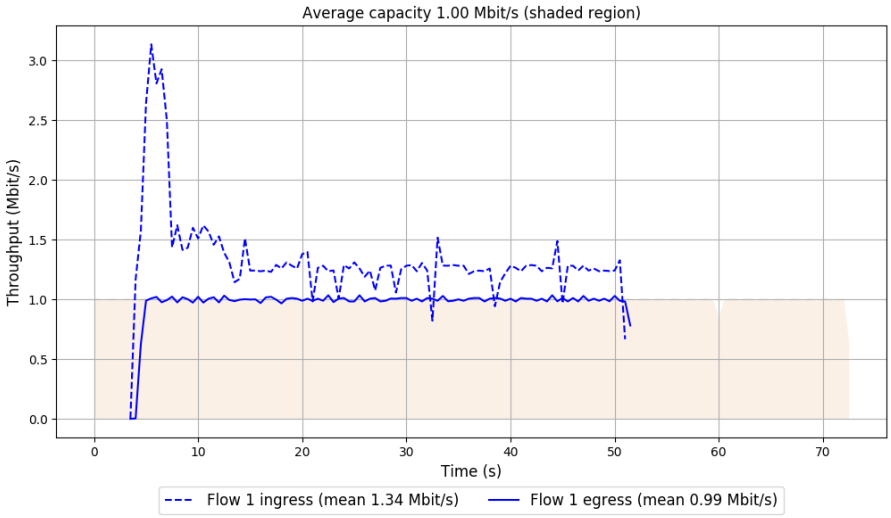


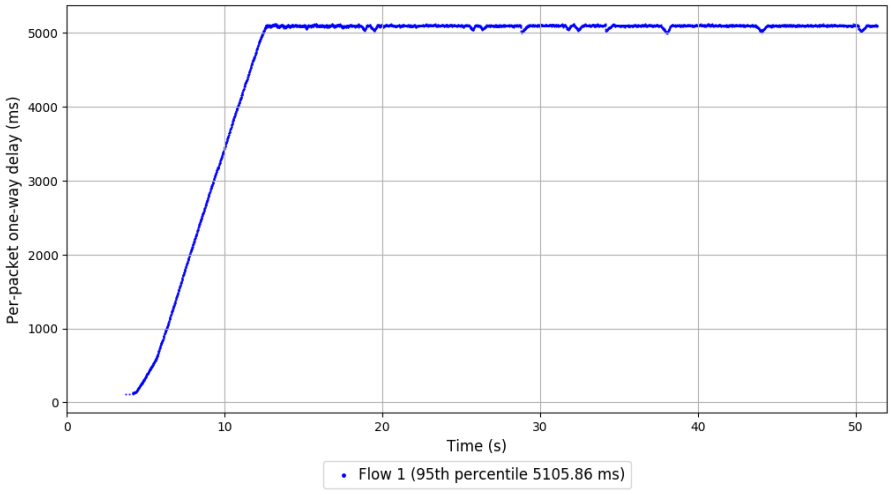


```
Run 1: Statistics of PCC-Vivace

Start at: 2025-04-17 21:21:34
End at: 2025-04-17 21:22:43
```

Run 1: Report of PCC-Vivace — Data Link



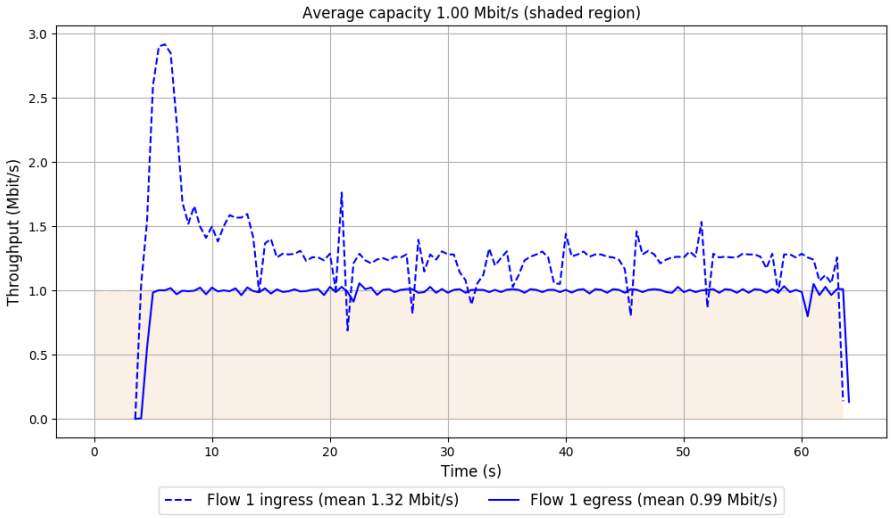


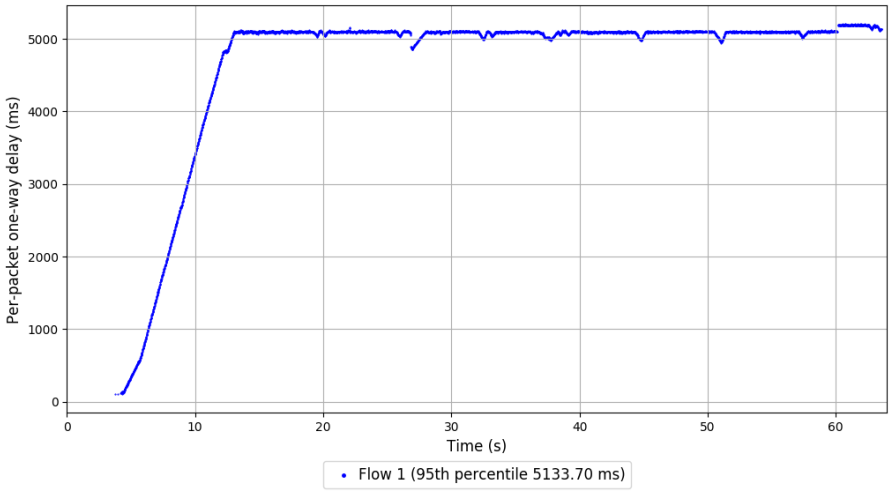
```
Run 2: Statistics of PCC-Vivace

Start at: 2025-04-17 21:24:58
End at: 2025-04-17 21:25:59

# Below is generated by plot.py at 2025-04-17 21:36:21
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 5133.705 ms
Loss rate: 24.89%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5133.705 ms
Loss rate: 24.89%
```

Run 2: Report of PCC-Vivace — Data Link



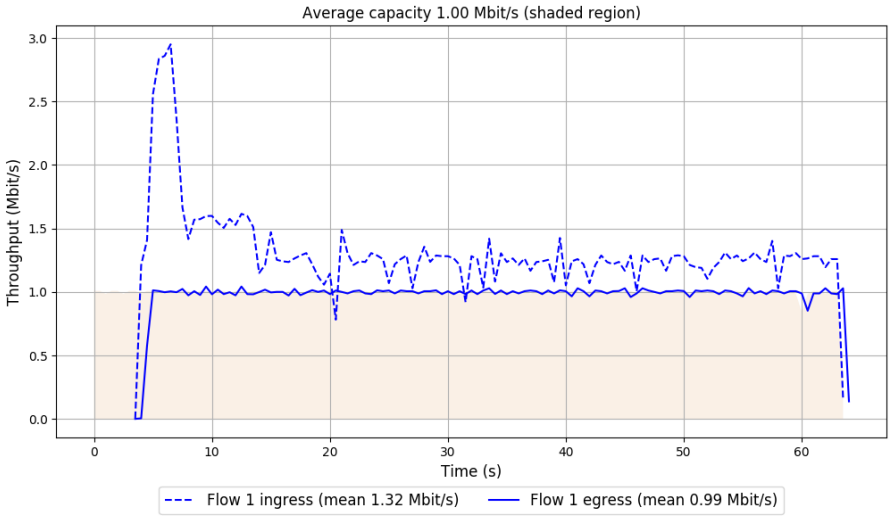


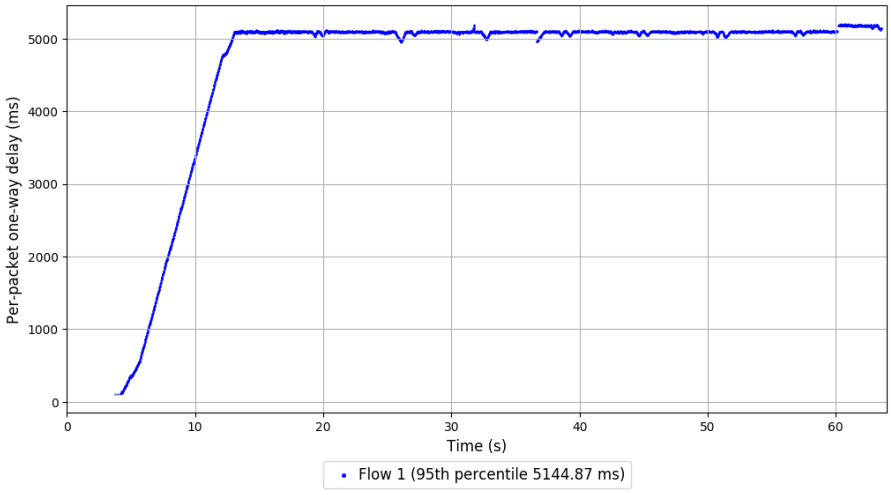
```
Run 3: Statistics of PCC-Vivace

Start at: 2025-04-17 21:28:14
End at: 2025-04-17 21:29:14

# Below is generated by plot.py at 2025-04-17 21:36:21
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 5144.874 ms
Loss rate: 25.13%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5144.874 ms
Loss rate: 25.13%
```

Run 3: Report of PCC-Vivace — Data Link



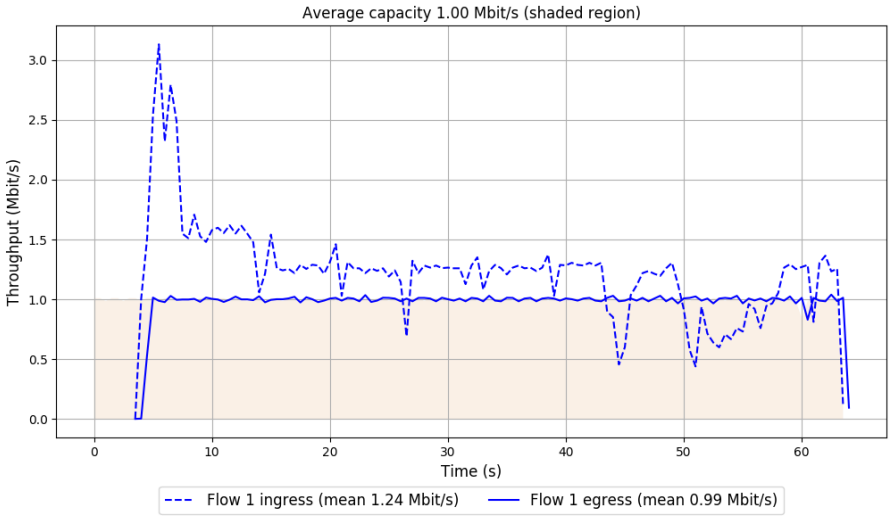


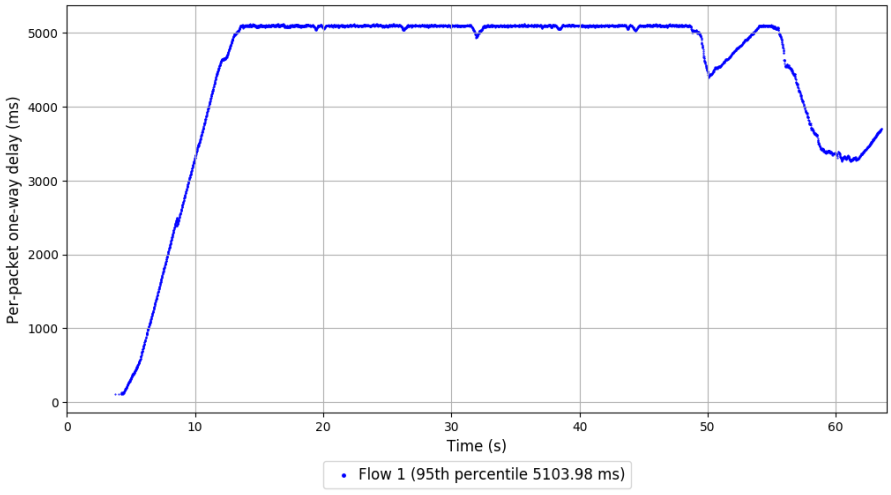
```
Run 4: Statistics of PCC-Vivace

Start at: 2025-04-17 21:31:29
End at: 2025-04-17 21:32:29

# Below is generated by plot.py at 2025-04-17 21:36:22
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 5103.981 ms
Loss rate: 20.41%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5103.981 ms
Loss rate: 20.41%
```

Run 4: Report of PCC-Vivace — Data Link





```
Run 5: Statistics of PCC-Vivace

Start at: 2025-04-17 21:34:45
End at: 2025-04-17 21:35:45

# Below is generated by plot.py at 2025-04-17 21:36:24
# Datalink statistics
-- Total of 1 flow:
Average capacity: 1.00 Mbit/s
Average throughput: 0.99 Mbit/s (99.2% utilization)
95th percentile per-packet one-way delay: 5149.876 ms
Loss rate: 25.41%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 5149.876 ms
Loss rate: 25.41%
```

Run 5: Report of PCC-Vivace — Data Link