30m Jan 17, 8:20 pm – Jan 17, 8:50 pm Open Notebook in Datadog

Libp2p WebRTC comparitive performance tests

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WebRTC Transport Performance Tests

Basic performance tests were run comparing the webrtc transport to the existing tcp transport. There are two test scenarios:

Scenario 1:

1. Server listens on webrtc or tcp multiaddress.
2. A client dials 10 connections, with 1000 streams per connection to the server.

- Connections are ramped up at the rate of 1 connection/sec.
- Streams are created at the rate of 10 streams/sec.
- This is done to ensure the webrtc transport's inflight request limiting does not start rejecting connections.

1. The client opens streams to the server and runs the echo protocol writing 2KB/s per stream (1 KB every 500ms).

Scenario 2:

1. Server listens on webrtc or tcp multiaddress.
2. A client dials 100 connections, with 100 streams per connection to the server.

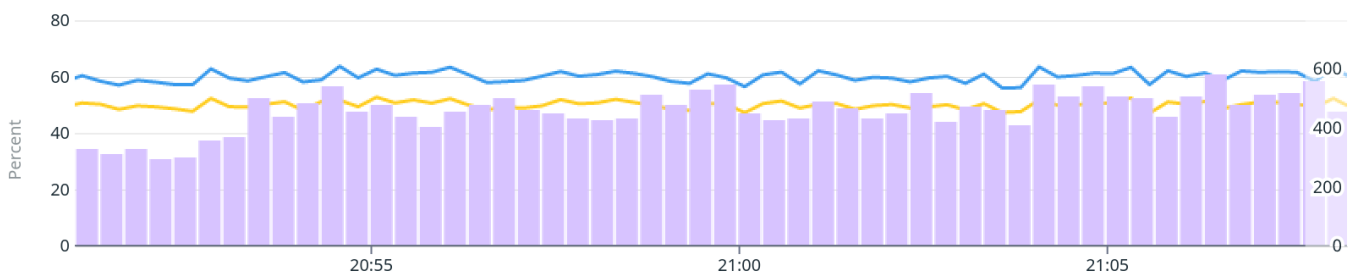
- Connections are ramped up at the rate of 1 connection/sec.
- Streams are created at the rate of 10 streams/sec.
- This is done to ensure the webrtc transport's inflight request limiting does not start rejecting connections.

1. The client opens streams to the server and runs the echo protocol writing 2KB/s per stream (1 KB every 500ms).

Hardware: Both the client and server are AWS c5.2xlarge instances on the same VPC. The configuration is 8vCPUs and 16GiB RAM.

[Scenario 1][WebRTC] Aggregate CPU usage b...

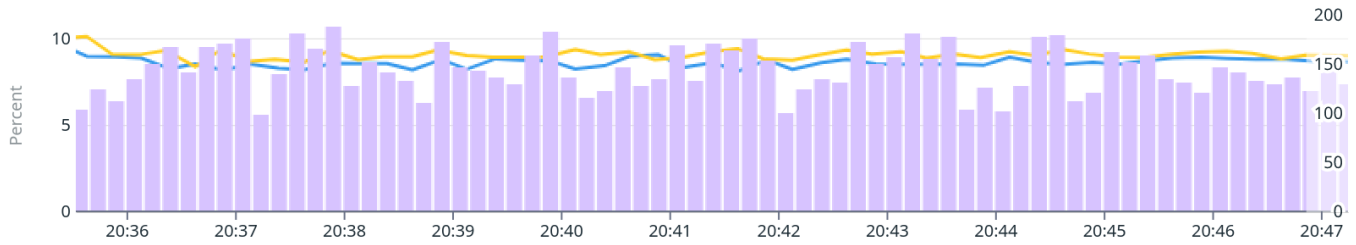
17m Jan 13, 8:50 pm – Jan 13, 9:08 pm



Tags	Metric	Avg	Min	Max	Sum	Value
*	server	59.9 %	55.9 %	63.6 %	4.14k %	8.8 %
*	client-0	49.9 %	47.0 %	52.7 %	3.45k %	9.2 %
*	avg:memory	456 MiB	294 MiB	580 MiB	23.2 GiB	143 MiB

[Scenario 1][TCP] Aggregate CPU usage by clie...

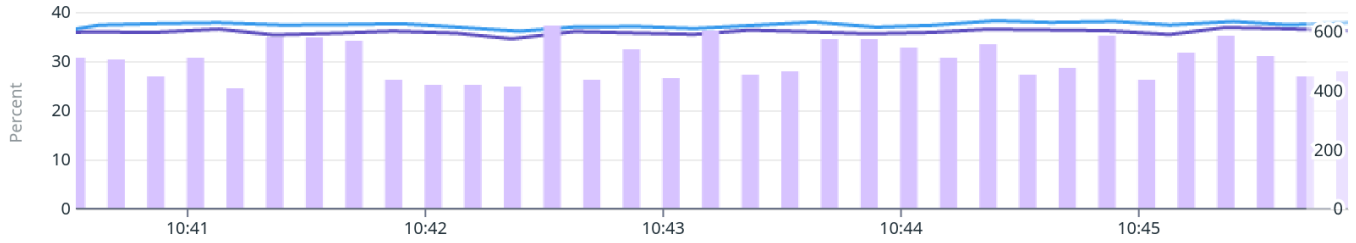
12m Jan 13, 8:35 pm – Jan 13, 8:47 pm



Tags	Metric	Avg	Min	Max	Sum	Value
*	server	8.57 %	8.09 %	9.03 %	403 %	3.67 %
*	client-0	9.03 %	8.35 %	10.09 %	425 %	4.30 %
*	avg:memory	144 MiB	97.4 MiB	188 MiB	9.82 GiB	58 MiB

[Scenario 2][WebRTC] Aggregate CPU usage b...

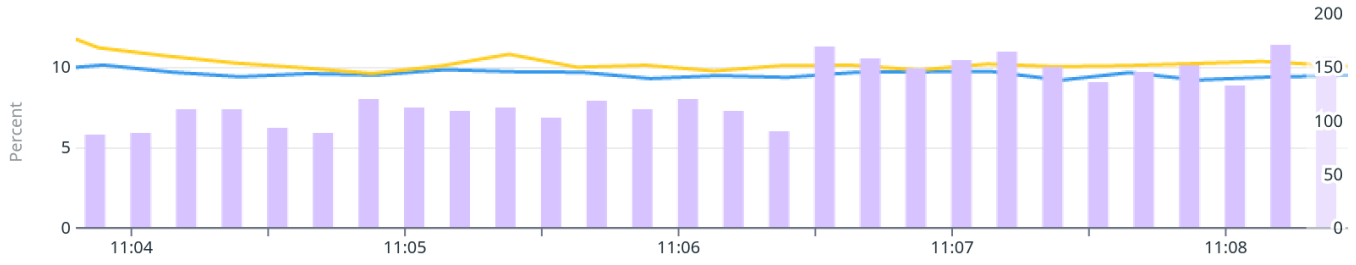
5m Jan 14, 10:40 am – Jan 14, 10:45 am



Tags	Metric	Avg	Min	Max	Sum	Value
*	server	37.4 %	36.1 %	38.2 %	785 %	0.067 %
*	client-0	35.9 %	34.5 %	36.8 %	790 %	0.017 %
*	avg:memory	503 MiB	406 MiB	620 MiB	15.7 GiB	30 MiB

[Scenario 2][TCP] Aggregate CPU usage by clie...

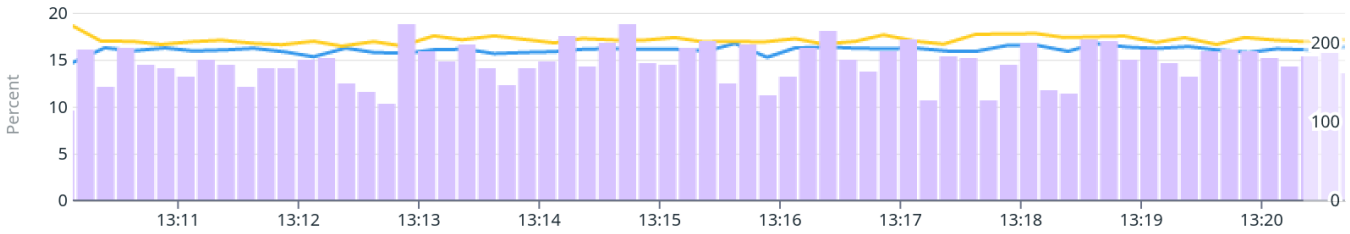
5m Jan 14, 11:03 am – Jan 14, 11:08 am



Tags	Metric	Avg	Min	Max	Sum	Value
*	server	9.55 %	9.17 %	10.1 %	181 %	—
*	client-0	10.17 %	9.59 %	11.2 %	193 %	0.058 %
*	avg:memory	126 MiB	87.5 MiB	170 MiB	3.44 GiB	33 MiB

[Scenario 2][QUIC] Aggregate CPU usage by cl...

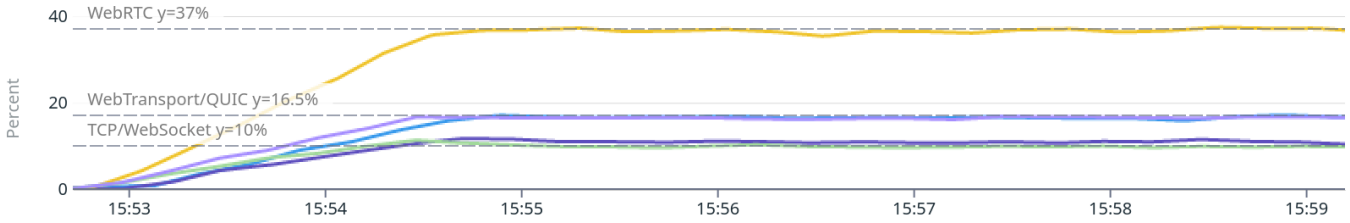
11m Jan 16, 1:10 pm – Jan 16, 1:20 pm



Tags	Metric	Avg	Min	Max	Sum	Value
*	server	16.0 %	14.7 %	16.7 %	689 %	16.4 %
*	client-0	17.1 %	16.4 %	18.6 %	735 %	—
*	avg:memory	175 MiB	123 MiB	224 MiB	11.0 GiB	189 MiB

[Scenario 2] Comparative

6m Jan 16, 3:52 pm – Jan 16, 3:59 pm



Tags	Metric	Avg	Min	Max	Sum	Value
*	webtransport	13.7 %	0.42 %	17.1 %	534 %	—
*	WebSocket	9.2 %	0.058 %	11.7 %	350 %	0.045 %
*	WebRTC	31.0 %	0.075 %	37.3 %	1 207 %	—
*	TCP	8.8 %	0.22 %	11.3 %	334 %	0.11 %

Results

- In Scenario 1, where the number of streams to connection ratio is high, WebRTC uses 6 - 7 times more CPU and 3 - 4 times more memory than TCP.
- In Scenario 2, where the number of connections is higher while maintaining the total number of streams, WebRTC uses 4 times as much CPU but memory usage increases to 4 times as much as TCP.
- In Scenario 2, compared to QUIC, WebRTC uses 2.2 times more CPU and 3 times more memory.