

Eliminating Latency Issues w/LibreQoS

Understanding Latency 3.0

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World Data. Now tracking 8225 flows and 429 locations.

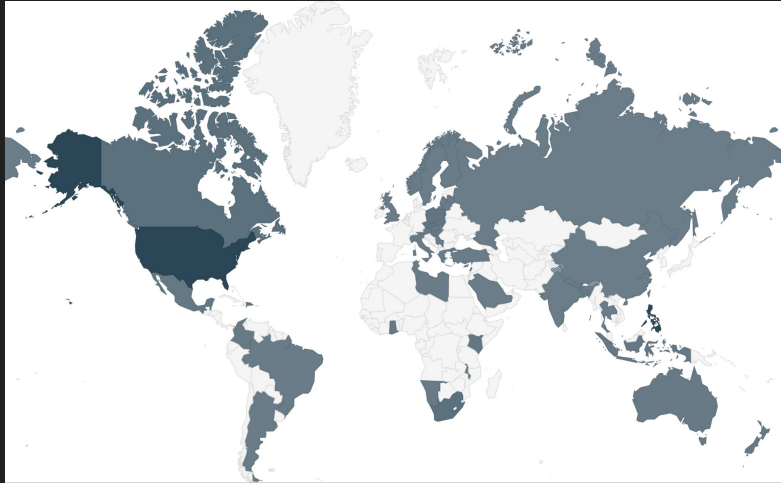
Measuring live latency worldwide



About LibreQoS

World beating ISP bufferbloat solution - leveraging Rust, C, python, eBPF, CAKE

Core engine is Open source. Over 300 ISPs using it today! 30k subscribers/box.



#LibreQoS Adoption Worldwide (December 2024:

 (28 states)



Core Supported by NLNET's NGI0 Fund

An answer


LibreQoS's FQ, packet shaping and AQM algorithms completely remove excess latency from an ISP network.

Really. If you don't believe us, schedule a demo.

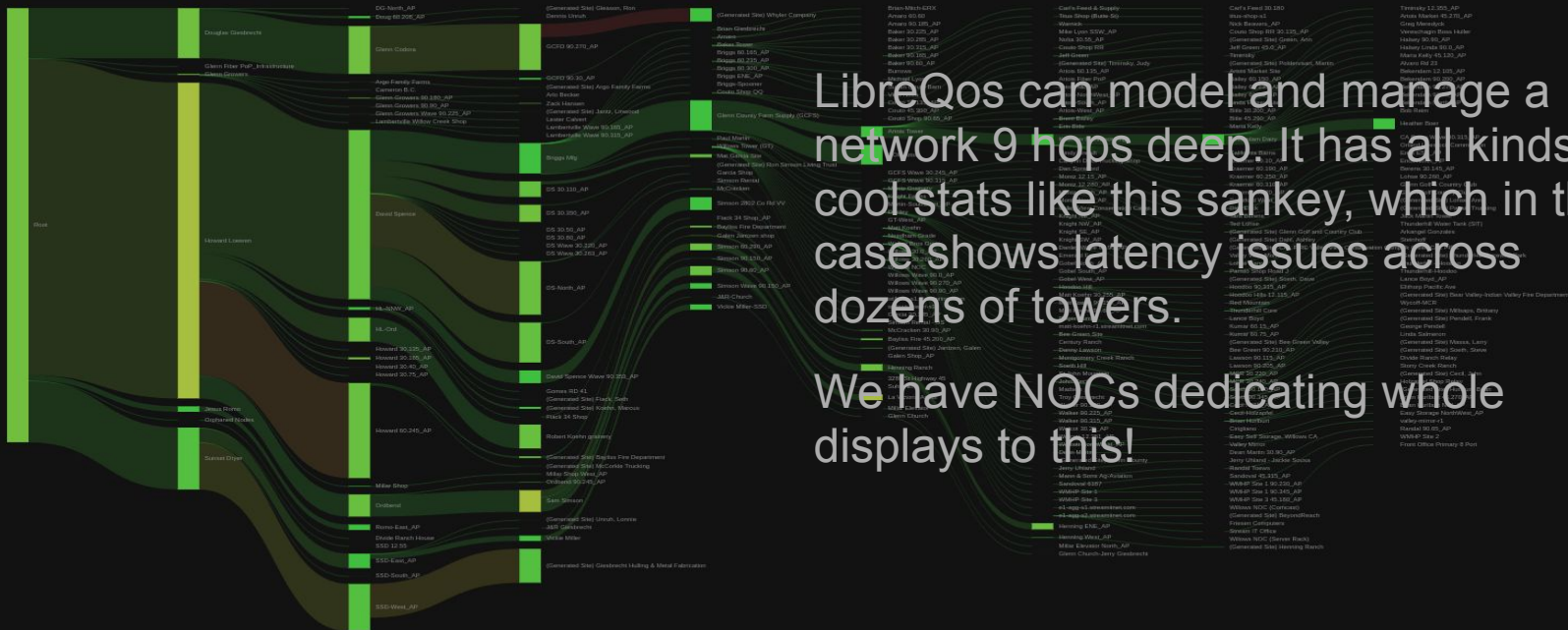
That said, once your network is LibreQoS optimized, our extensive passive statistics stats can track new problems and old in and outside your network.



LibreQoS Sankey Total Network Overview

Top node: Root  Max Depth: 10

 Pause Refresh Rate: 1



Sector Latency Heatmaps

LibreQoS Long-Term Stats

Dashboard

Shaper Nodes

Site Tree

Reports

Possible Issues

iZones Admin

Logout

LibreQoS Long-Term Stats

24h

Search

27 Interface speed warnings. 93 Impossible capacity warnings. 5 CINR warnings.

LibreQoS Long-Term Stats - LibreQoS Long-Term Stats -

Throughput

Throughput

Packets

Child Sites

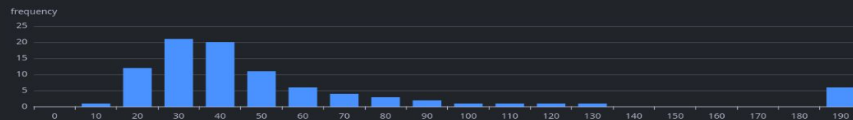


LibreQoS Long-Term Stats

Latency (TCP Round-Trip Time)

Histogram

Time Series



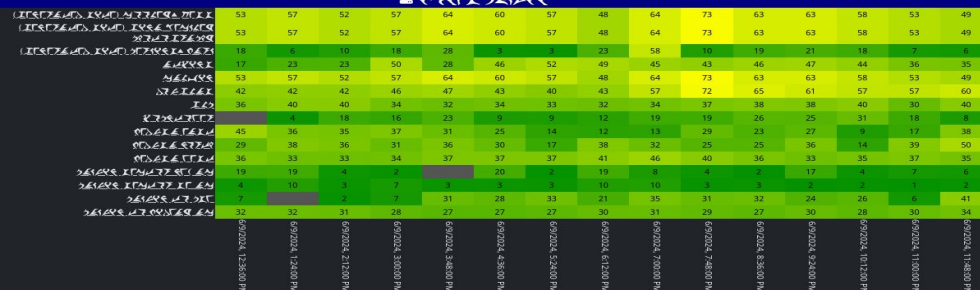
LibreQoS Long-Term Stats

Heatmaps

TCP Round-Trip Time

Throughput

LibreQoS Long-Term Stats



Per-ASN Performance

Bytes	RTT	Client	Remote	Protocol	12/6/2024, 9:32:57 AM	12/6/2024, 9:37:47 AM
18M / 500.17K	9ms / 47ms		151.101.66.202	HTTPS		
4K / 7.42K	- / -		162.247.243.35	HTTPS		
27M / 654.51K	- / -		199.232.210.172	HTTP		
28K / 9.26K	- / -		199.232.75.6	QUIC		
19M / 454.99K	- / -		199.232.210.172	HTTP		
85K / 8.92K	- / -		199.232.210.172	HTTP		
74K / 8.75K	9ms / 9ms		151.101.129.108	HTTPS		
5M / 239.98K	18ms / 51ms		146.75.106.68	HTTP		
2K / 4.78K	- / -		162.247.243.35	HTTPS		
7K / 5.51K	- / -		162.247.243.35	HTTPS		
5K / 4.27K	- / -		162.247.243.35	HTTPS		
8K / 4.72K	- / -		162.247.243.35	HTTPS		
26M / 1.06M	16ms / 7ms		151.101.130.202	HTTPS		
9M / 265.44K	9ms / 9ms		151.101.66.202	HTTPS		
7M / 228.18K	9ms / 10ms		151.101.66.202	HTTPS		
2M / 34.52K	- / -		151.101.194.137	HTTPS		
5K / 3.54K	- / -		151.101.193.10	HTTPS		
16M / 360.4K	15ms / 182ms	172.29.106.66	151.101.194.202	HTTPS		
10M / 239.88K	15ms / 81ms	172.29.106.66	151.101.2.202	HTTPS		
515K / 26.02K	9ms / 386ms	172.29.106.66	151.101.194.202	HTTPS		

Test Tools of the trade

Flent v2.2 - the rrul and rtt_fair tests

Iperf2 - many new features!

Crusader - Rust rrul on everything

Xtcp2 - Monitor TCP_DIAG in docker

networkQuality - from Apple

All the speedtests have bufferbloat

Metrics now!

"It is wrong to suppose that if you can't measure it, you can't manage it – a costly myth." - E.W. Deming

<https://flent.org>

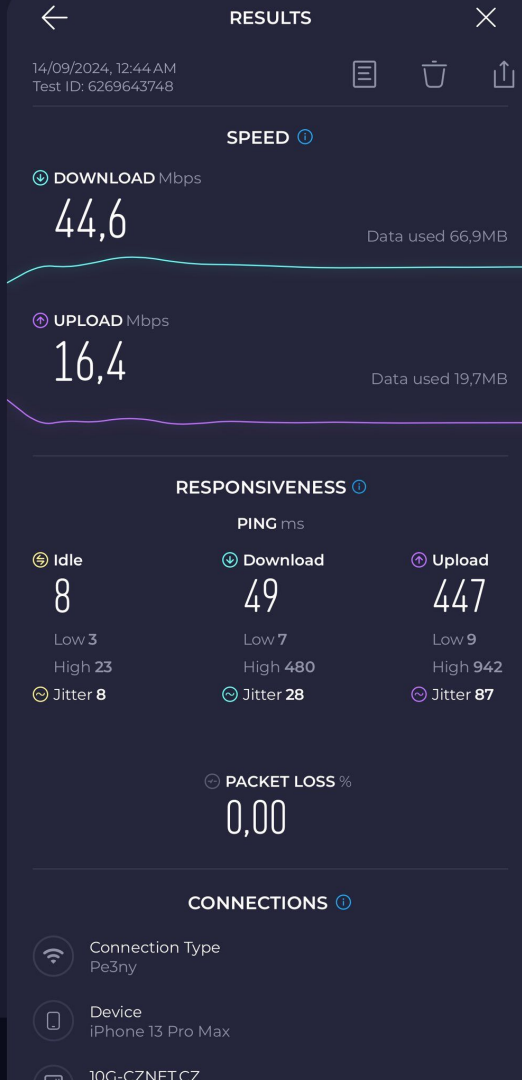
<https://sourceforge.net/projects/iperf2/>

<https://github.com/Zoxc/crusader>

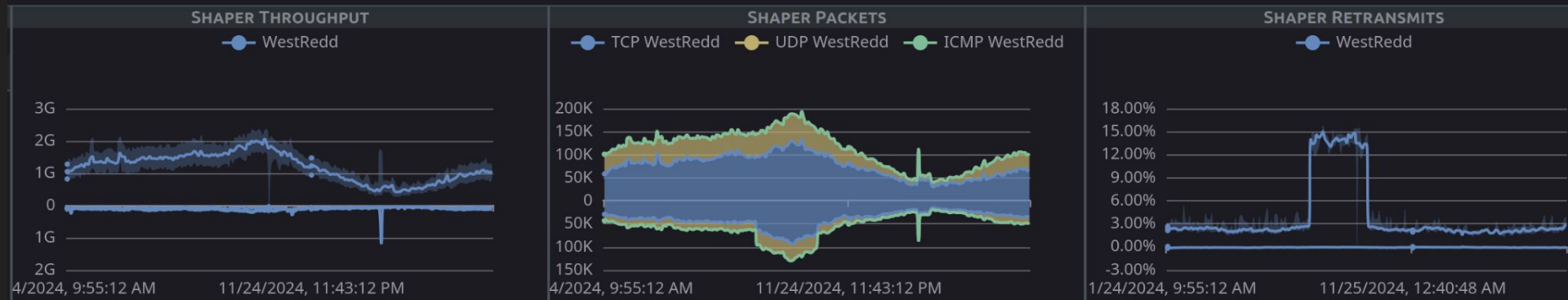
<https://github.com/randomizedcoder/xtcp2>

<https://github.com/network-quality>

<https://www.waveform.com/tools/bufferbloat>



Tracking TCP retransmits



(this was a case where a packet sniffer on a given network segment caused excess packet loss)

Experimenting with AI

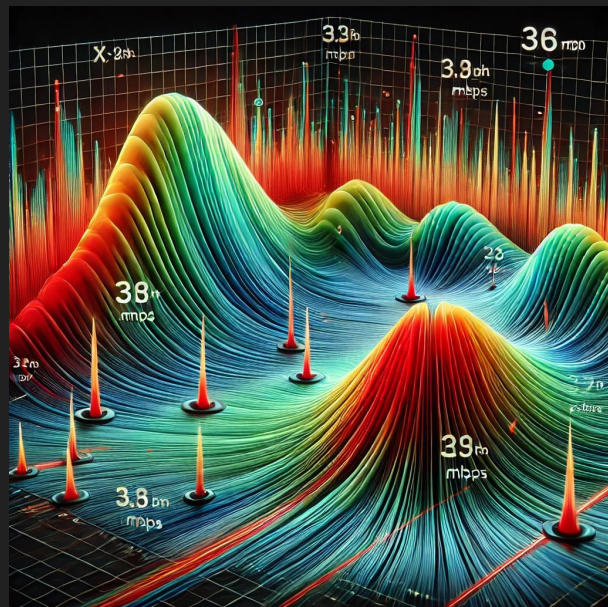
For code generation we leverage:

- Co-pilot
- ChatGPT

With careful supervision it helps a lot!

You can also dig bigger holes, faster!

For analysis, we've fed some data to various LLMs but operational usefulness has thus far eluded us.



NOTE: Flow Queueing is almost enough today!!

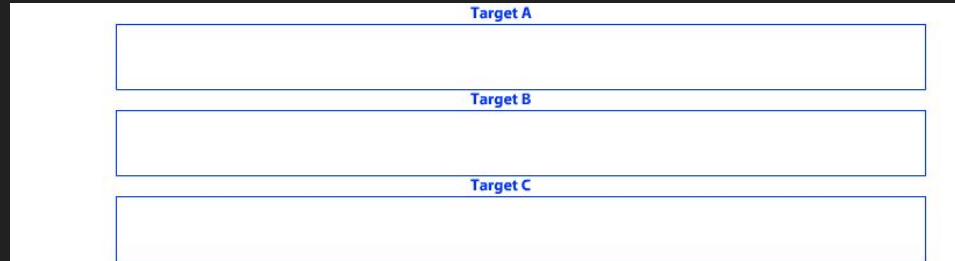
98% of flows don't need AQM, but the 2% need it desperately and the 98% need the 2% well taken care of.

Otherwise the principal driver of subscriber bandwidth need is video streaming.

- To get 4K video, provision about 35Mbits to the user (DASH 4/10 rule)
- Per customer average usage at peak time is no more than 6-10Mbits.
- Gaming, DNS, keystrokes, VOIP and videoconferencing always just work
- Once uploads are CAKEd...

nobody cares about lag anymore.

(except on WiFi)



Client: "The internet is great it's just the downloads are so slow...."



Trendal Toews: Problem is I think \$85 is the top of their budget

Trendal Toews: Their facebook doom scrolling and other interactive stuff is great, which is why she was a little puzzled. "The internet is working great, but the download is a little slow". That's because the xbox/gaming platform in the other room is taking 100% of the speed minus whatever QoS is letting through for interactive stuff.

I offered our 50M plan, but they declined. Then I explained that we are running "software" that makes it so interactive.... yeah repeating what I just said, and she came back with this.

"You guys are the best internet we've ever had."

LibreQoS 1.5-Beta New Features

NetFlow

ISIS support

Close integration with ISP CRMS: Splynx, UISP, Sonar, and Powercode

WIP: Gaiia, WISPGATE, VISP

Flow Tracking - RTT, directionally, by ASN, Etc.

New Web UI and long term stats backends

Vastly reduced memory usage

Installation Statistics

LibreQoS is fixing the Internet, one ISP at a time.

Connections Debloated

10492001 Shaped Devices
256778 Network Hierarchy Nodes

Min: 24.3 ms
Median: 24.9 ms
Max: 33.4 ms
Mean: 25.3 ms

25th %ile: 24.7 ms
75th %ile: 25.1 ms
95th %ile: 28.7 ms
Jitter: 0.8 ms

Min: 24.2 ms
Median: 25 ms
Max: 38.1 ms
Mean: 26.1 ms

25th %ile: 24.7 ms
75th %ile: 26.2 ms
95th %ile: 32.2 ms
Jitter: 1.8 ms

Min: 24.4 ms
Median: 27 ms
Max: 97 ms
Mean: 28.3 ms

25th %ile: 25.5 ms
75th %ile: 28.9 ms
95th %ile: 34.5 ms
Jitter: 3 ms

Thanks!

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