

L4S Interoperability Events

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TSVWG @ IETF124

Nov 3, 2025

L4S Interop Activities

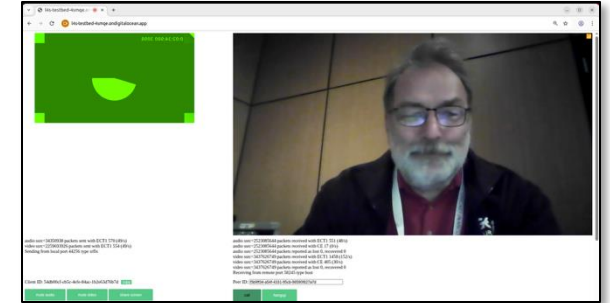
- IETF Interops
 - Eight L4S Interops held during IETF Meetings/Hackathons July 2022 – Nov 2025
- CableLabs Interops
 - Twelve L4S Interops hosted at CableLabs (Denver, USA) October 2022 – October 2025
 - All implementations of Low Latency DOCSIS network gear available & configurable
 - Not restricted to DOCSIS network gear
 - Remote & In-person participation possible
- Over 20 organizations have participated, 11 L4S Congestion Controllers, 14 receivers (QUIC/TCP/RTCP/other), 11 network bottlenecks

What got done, so far, this time

- Chrome canary libwebrtc
 - Tested peer-to-peer video conference application w/ SCReAM

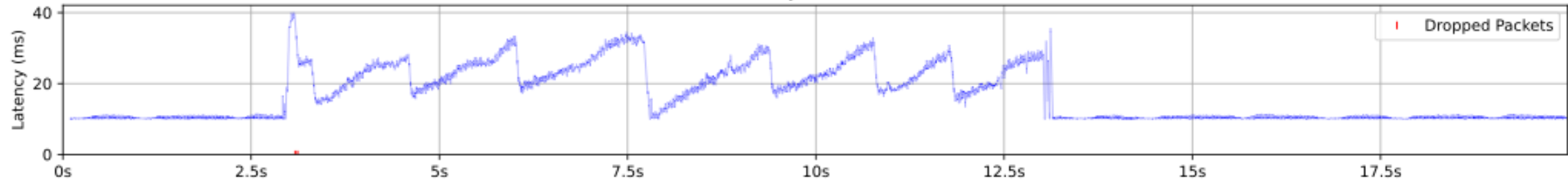
```
google-chrome-canary --force-fieldtrials=WebRTC-RFC8888CongestionControlFeedback/Enabled,offer:true,force_send:true/WebRTC-Bwe-ScreamV2/Enabled/
```

 - Discovered that feedback packets were incorrectly marked NotECT, bug filed.
 - Tested with Netflix cloud gaming server using webRTC
 - Tested with NVIDIA cloud gaming server using webRTC
 - Discovered rfc8888-negotiation issue, bug reported
- Netflix
 - Validation against production cloud gaming service
 - Multiple gaming flows
 - Different encoder configs
- PragueCC (UDP-Prague)
 - Testing new growth algorithm (see ICCRG for details)
 - L4S and DropTail bottlenecks

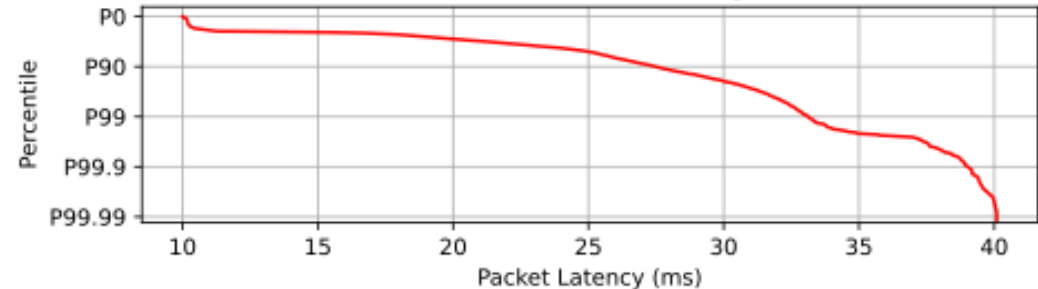


GFN game stream w/ Chrome client, Cubic cross traffic, downlink trace, L4S Disabled

Latency Timeseries



CCDF of Packet Latency



Packet Delay Statistics

P0	10.002 ms
P0.1	10.003 ms
P1	10.008 ms
P10	10.153 ms
P50	13.311 ms
P90	27.496 ms
P99	33.121 ms
P99.9	39.019 ms
P100	40.097 ms
P99 PDV	23.112 ms
P99.9 PDV	29.017 ms

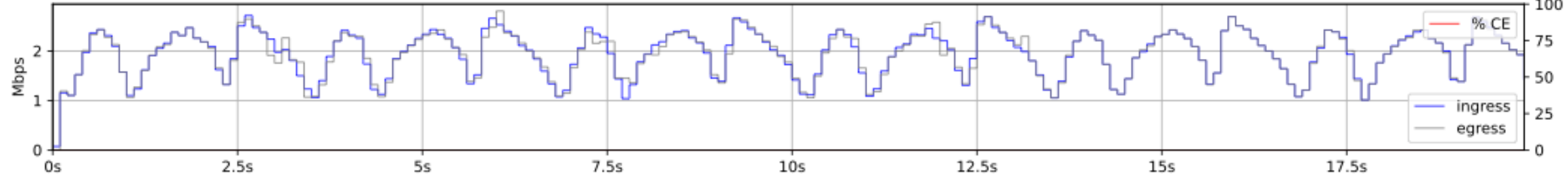
Data Rate Statistics

Mean data rate	1.9 Mbps
P10 of data rate	1.8 Mbps
P10 % of mean	89.8%
Ramp time to 90%	400 ms

Packet Counts

DSCP 0	8217	99.98%
Not ECT	8217	99.98%
Drops	2	0.02%
Missing	0	0.0%
Total	8219	100%

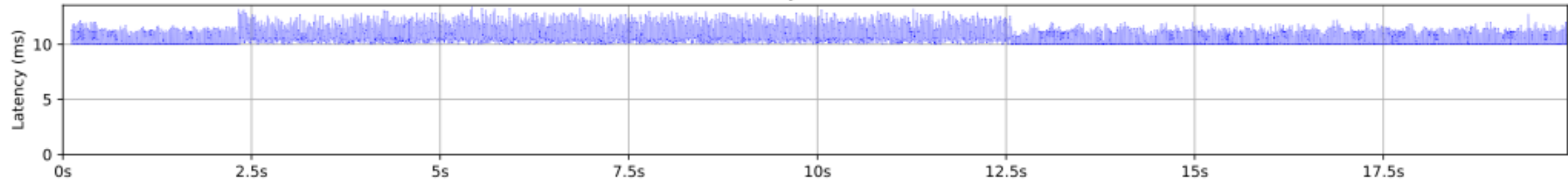
Mbps Timeseries



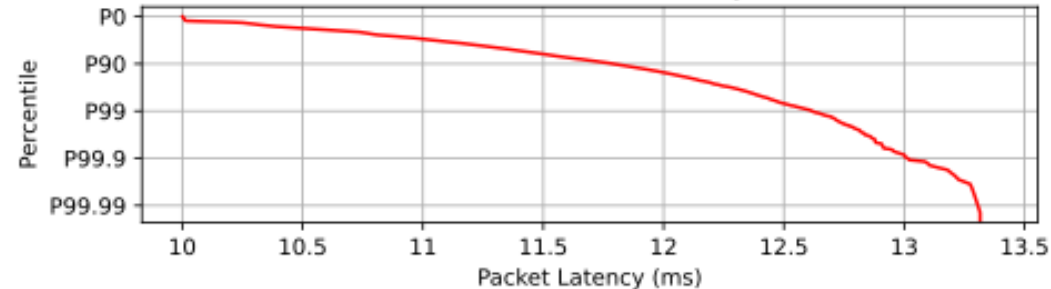
nvidia_test2_w-feedback-cubic_2025_11_01_13_59

GFN game stream w/ Chrome client, Cubic cross traffic, downlink trace, L4S Enabled

Latency Timeseries



CCDF of Packet Latency



Packet Delay Statistics

P0	10.001 ms
P0.1	10.002 ms
P1	10.002 ms
P10	10.008 ms
P50	10.676 ms
P90	11.790 ms
P99	12.615 ms
P99.9	13.014 ms
P100	13.385 ms
P99 PDV	2.613 ms
P99.9 PDV	3.012 ms

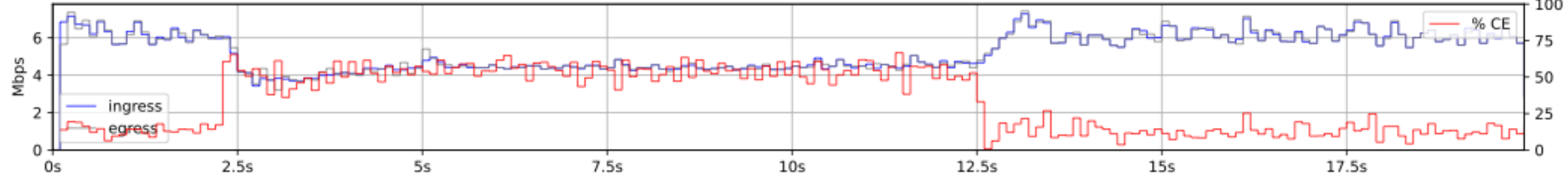
Data Rate Statistics

Mean data rate	5.2 Mbps
P10 of data rate	3.9 Mbps
P10 % of mean	75.7%
Ramp time to 90%	0 ms

Packet Counts

DSCP 0	14079	100.0%
ECT1	9519	67.61%
CE	4560	32.39%
Drops	0	0.0%
Missing	0	0.0%
Total	14079	100%

Mbps Timeseries



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Upcoming Opportunities

- Next CableLabs L4S Interop – Denver, early 2026 (dates TBC)
- Next IETF L4S Interop – IETF 126 Vienna, July 2026
- Interested in participating?
 - contact: Greg White g.white@cablelabs.com