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Does TCP New Congestion Window Validation Improve HTTP Adaptive Streaming Performance?

Mihail Yanev, Stephen McQuistin, and Colin Perkins

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Does TCP New Congestion Window Validation Improve HTTP Adaptive Streaming Performance?

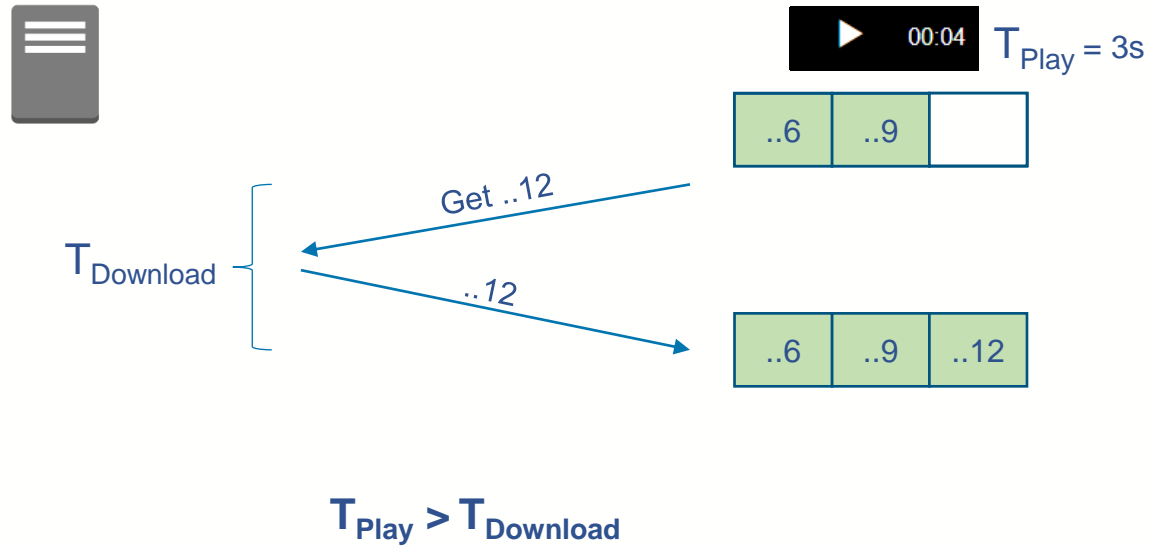
Yes.



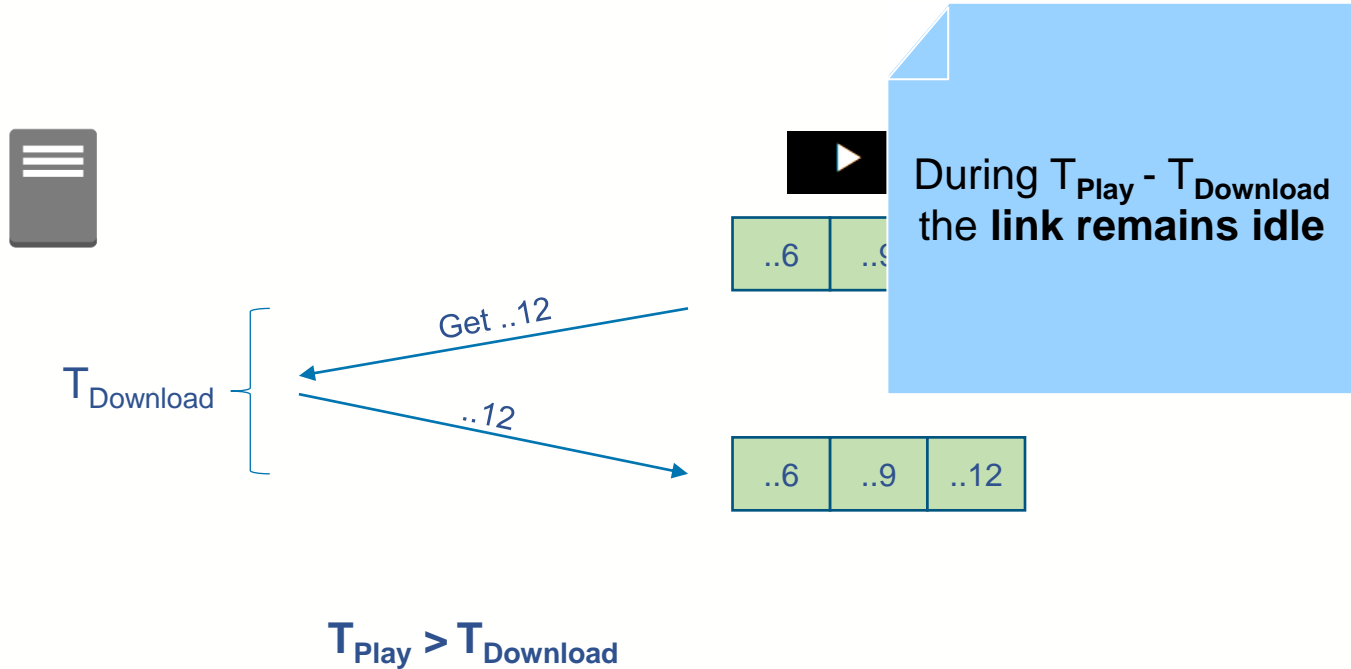
Does TCP New Congestion Window Validation Improve HTTP Adaptive Streaming Performance?

Yes. And now I will tell you why...

HTTP Adaptive Streaming

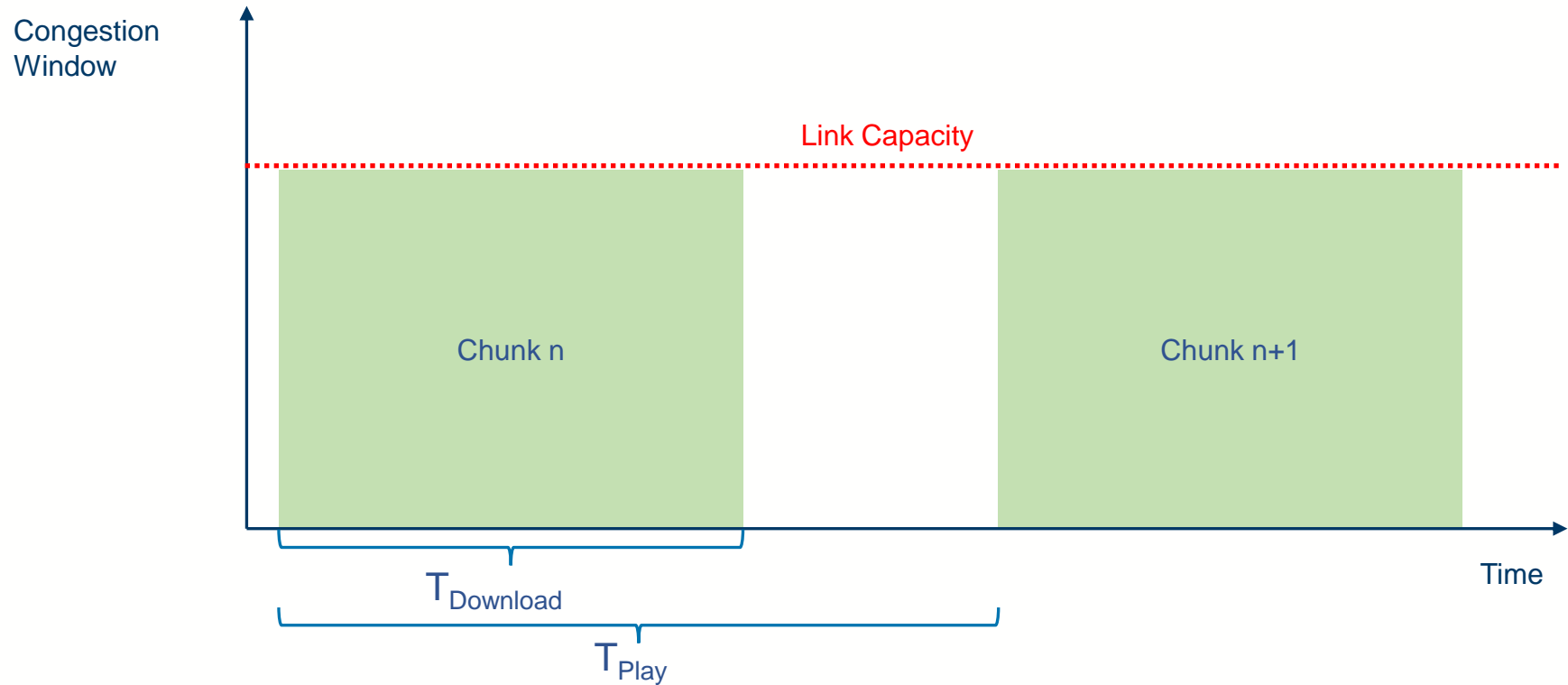


HTTP Adaptive Streaming



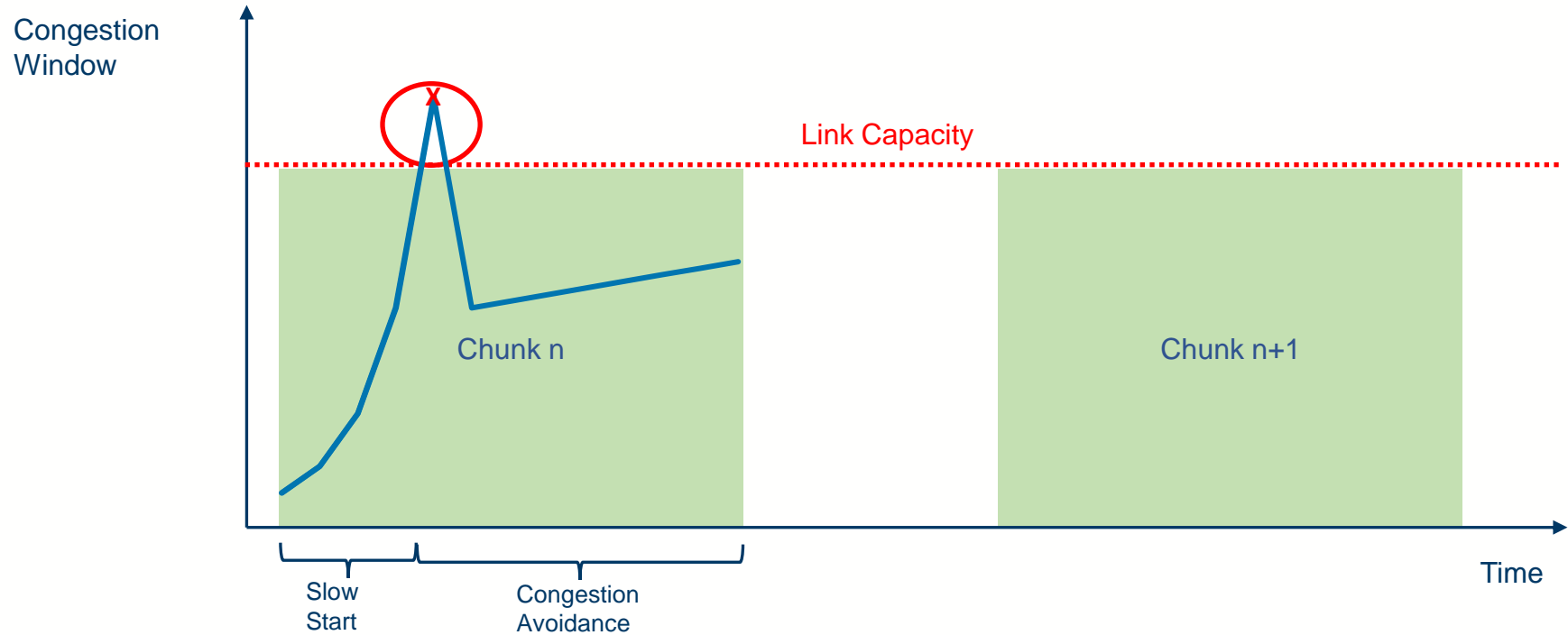


Video Transfer





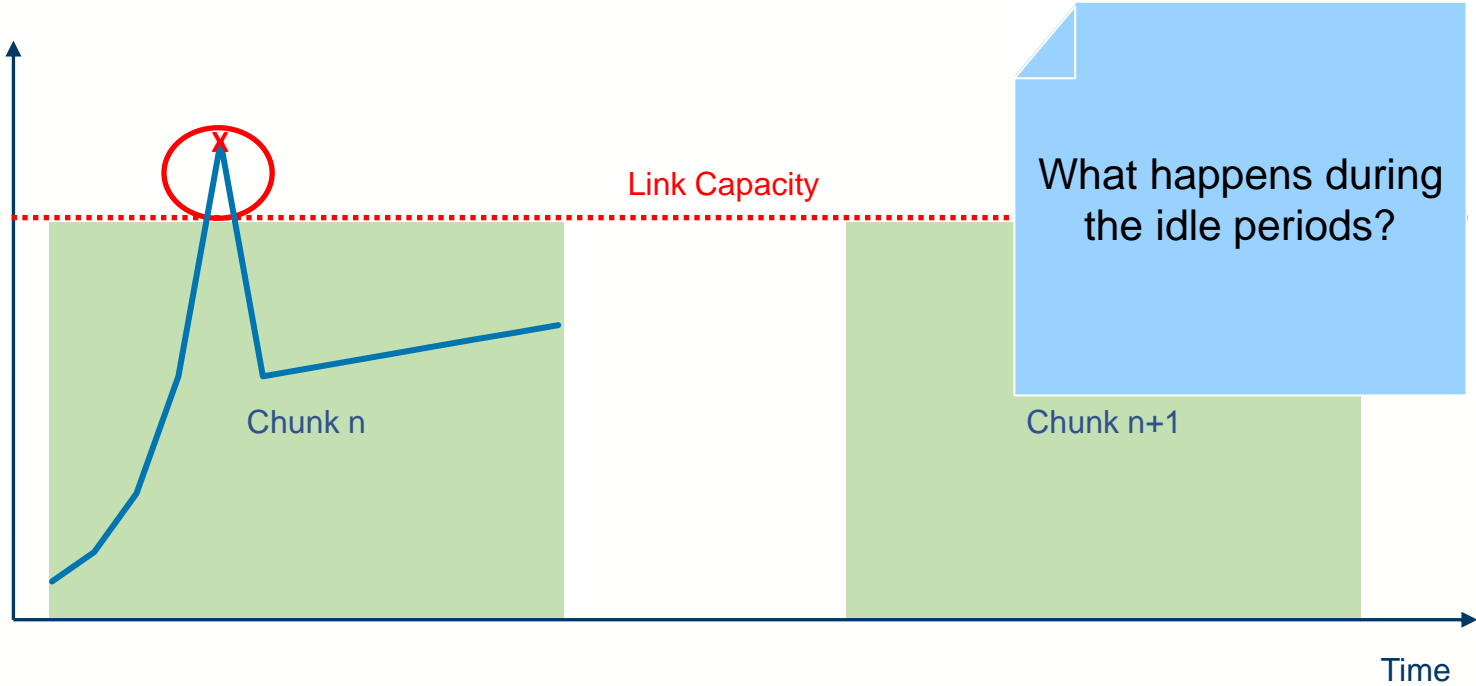
Video Transfer





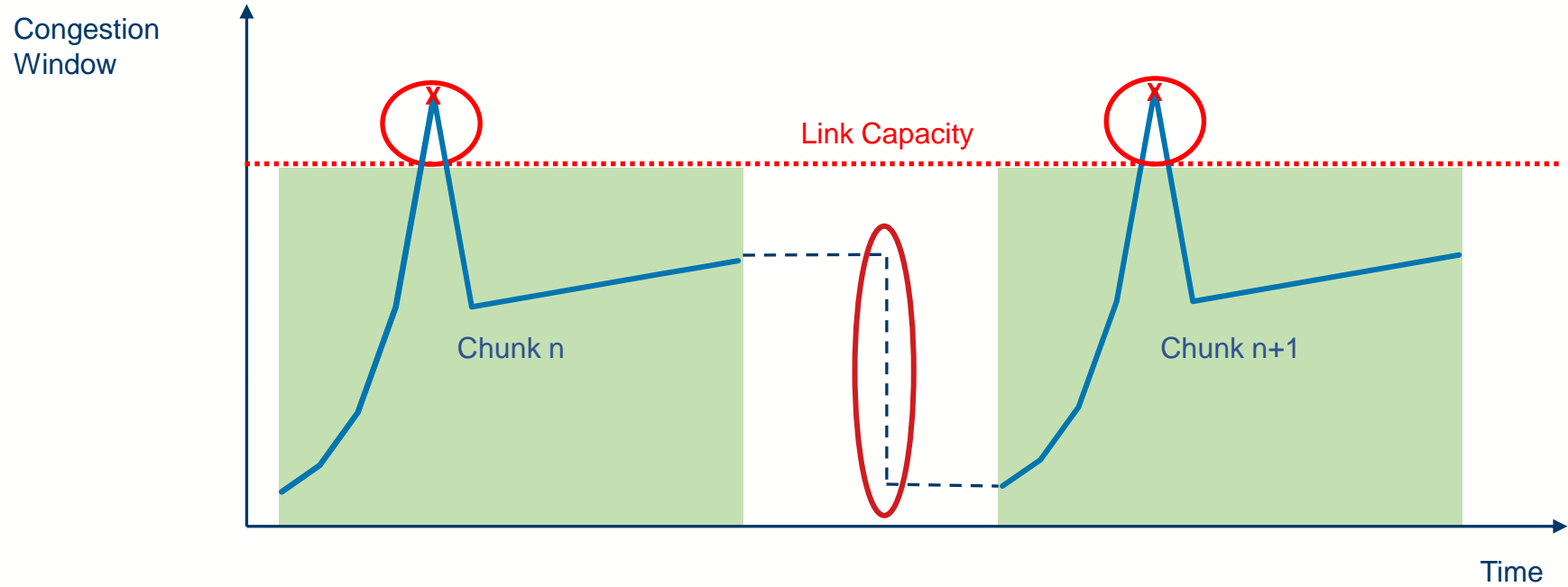
Video Transfer

Congestion Window



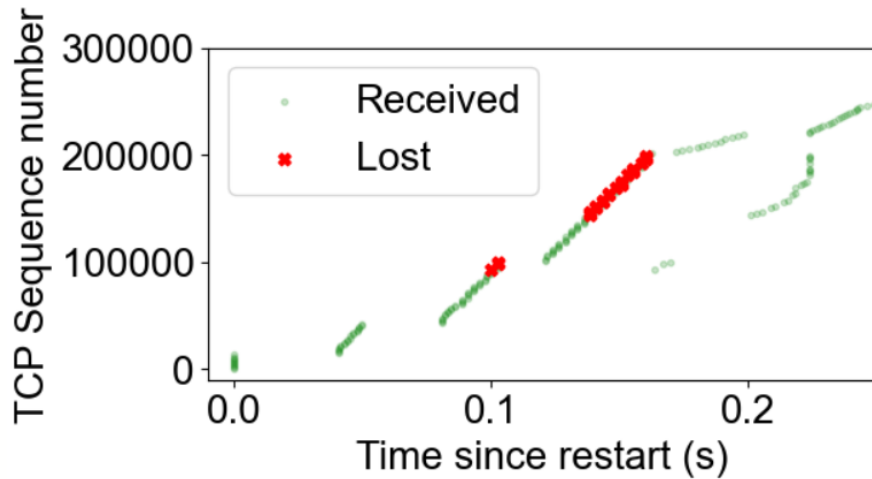


Congestion Window Validation





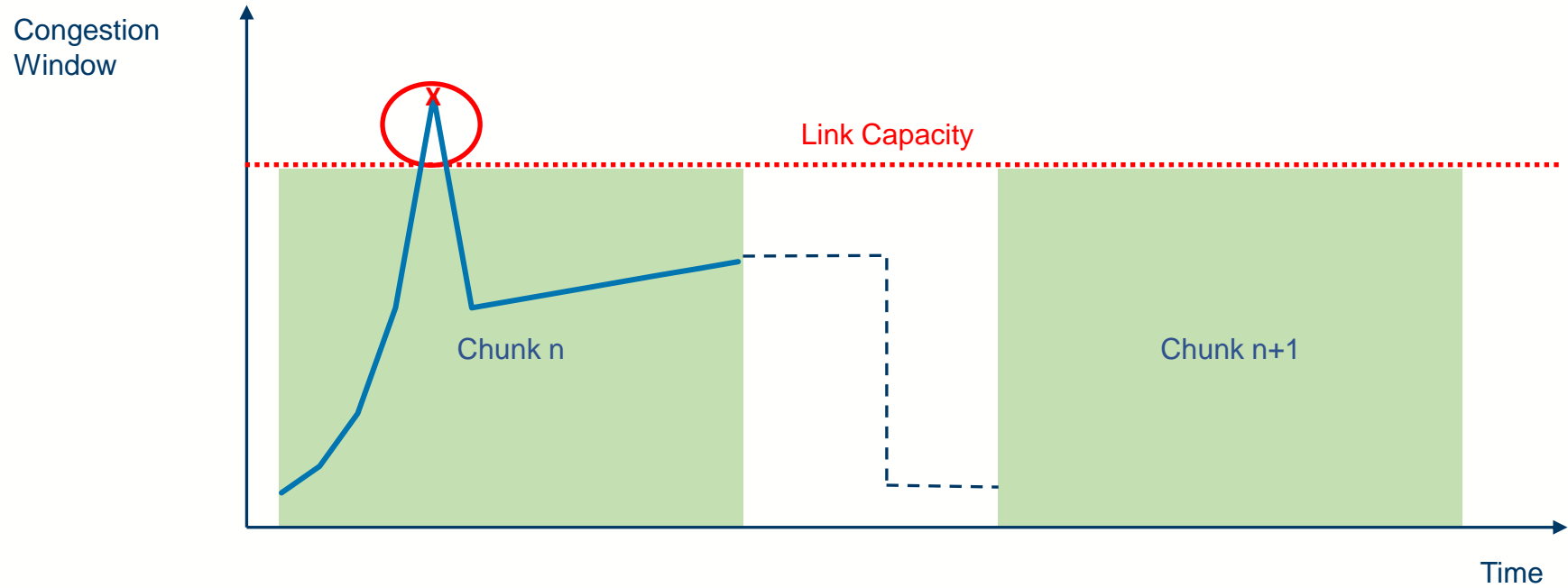
Transfer After Idle



CWV

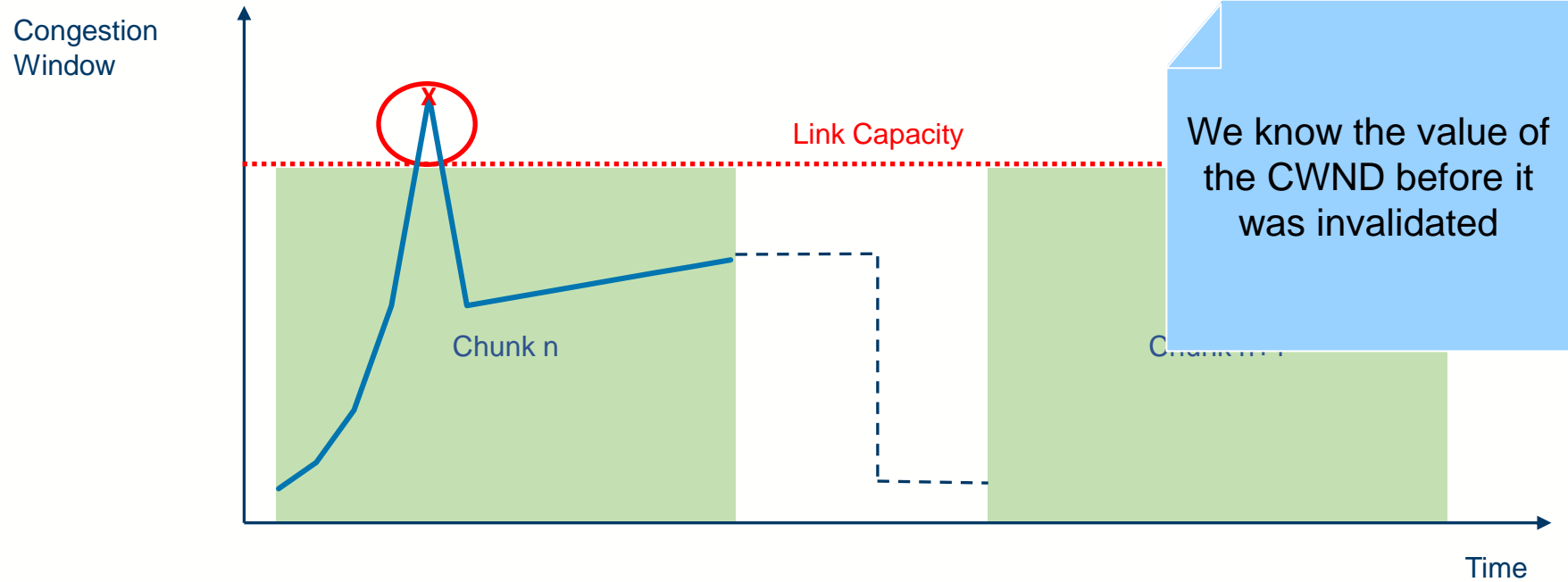


Approach #2



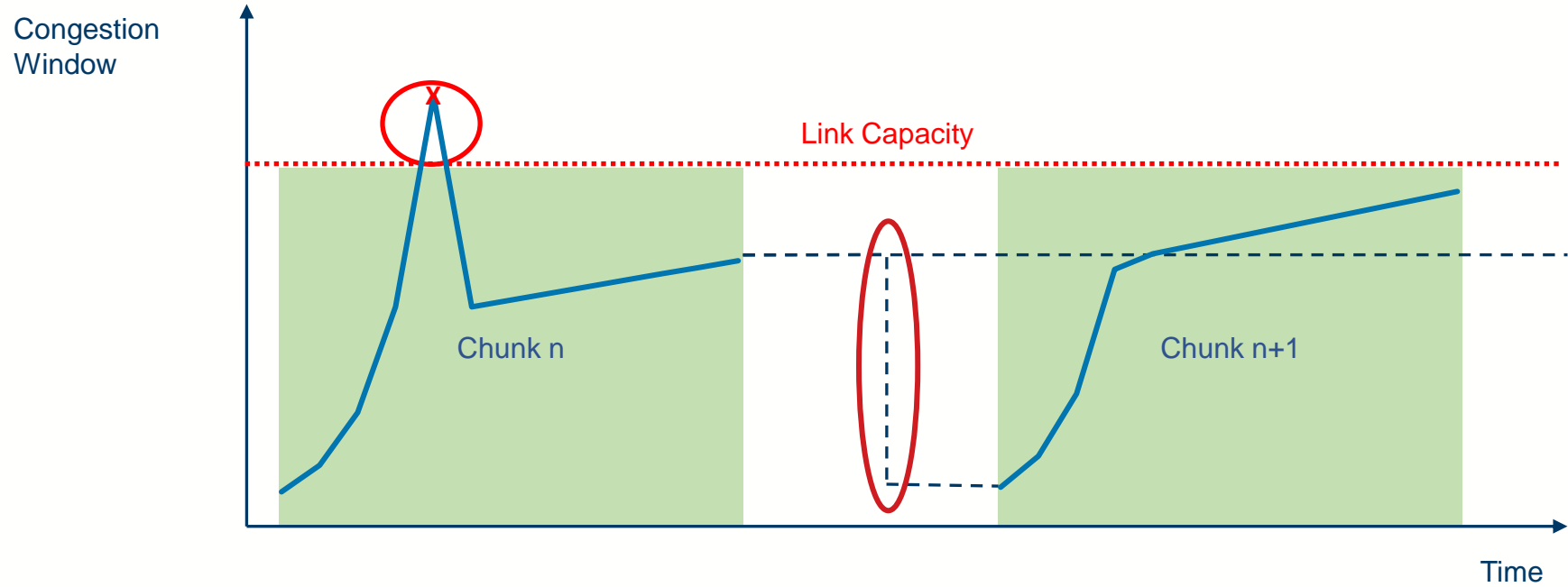


Approach #2





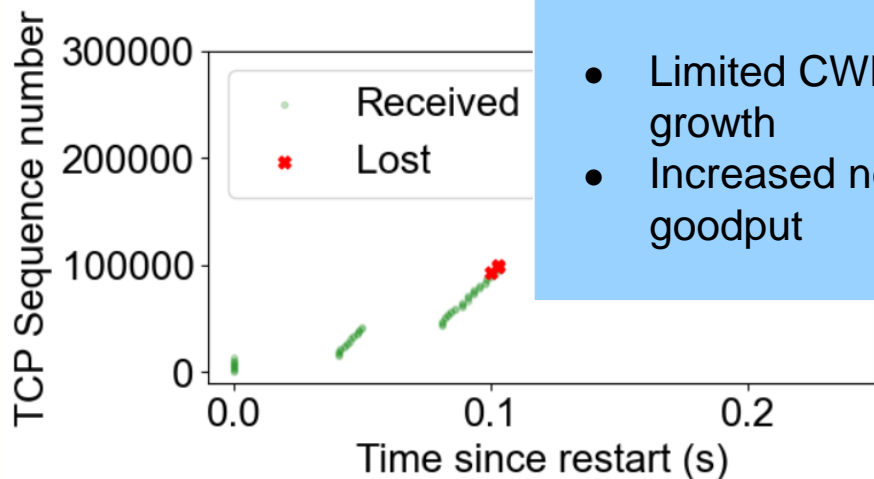
New Congestion Window Validation



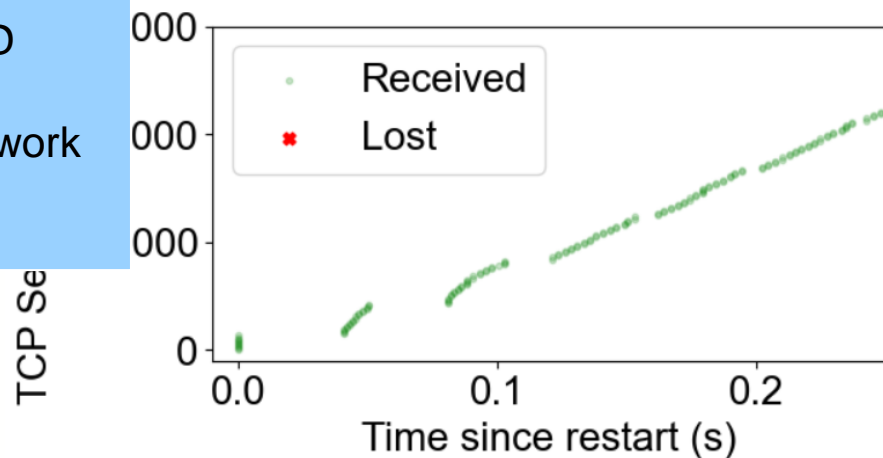
Transfer After Idle

Fewer lost packets:

- Limited CWND growth
- Increased network goodput



CWV



New CWV

Effect of New CWV on Video

Transport layer benefits from:

- Limiting CWND growth after idle.
- Reducing the burst packet loss.

Video (application) effect has not been studied.



Effect of New CWV on Video

Transport layer benefits from:

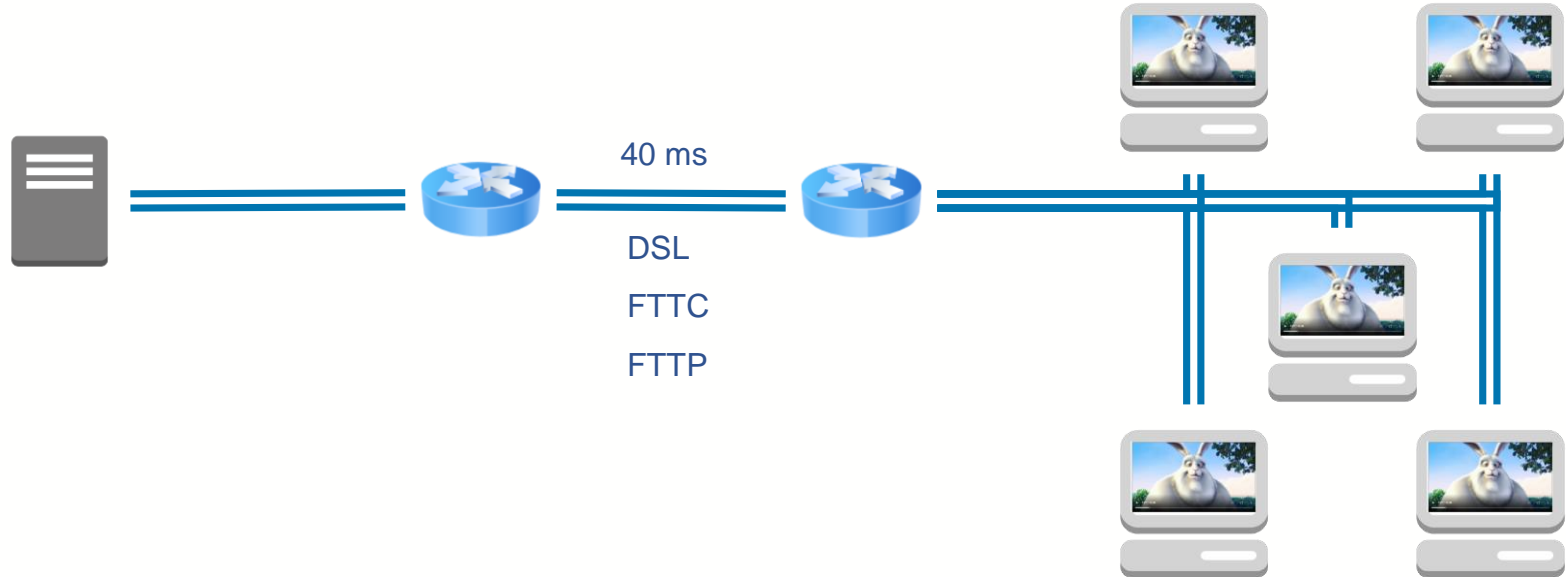
- Limiting CWND growth after idle.
- Reducing the burst packet loss.

Video (application) effect has not been studied. **Yet...**



Experimental Setup

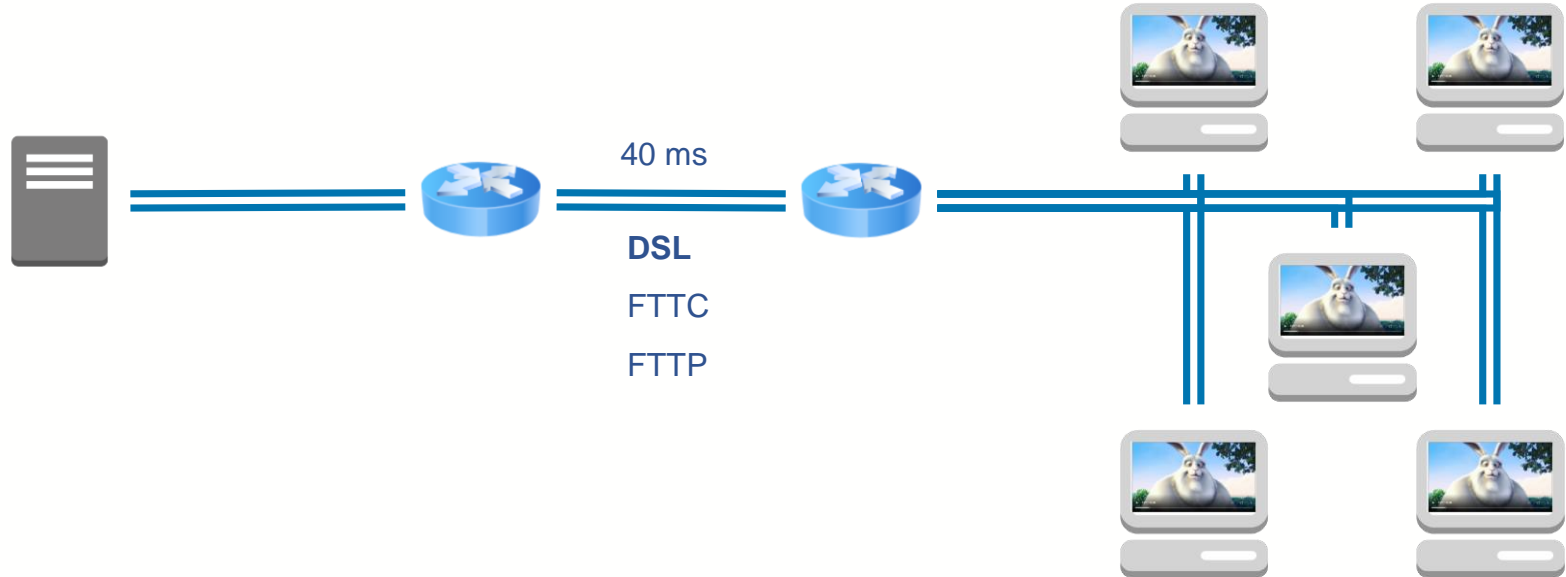
Server





Experimental Setup

Server





Application Impact

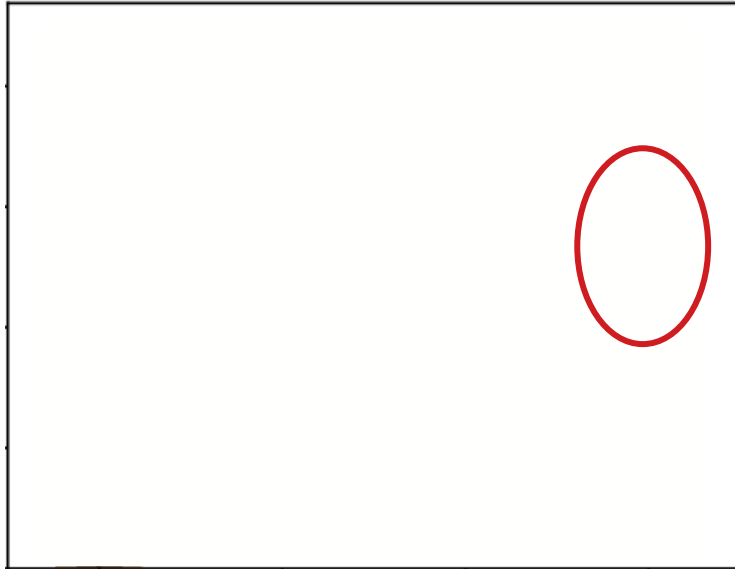
Rebuffer Ratio





Rebuffer Ratio

CWV



New CWV





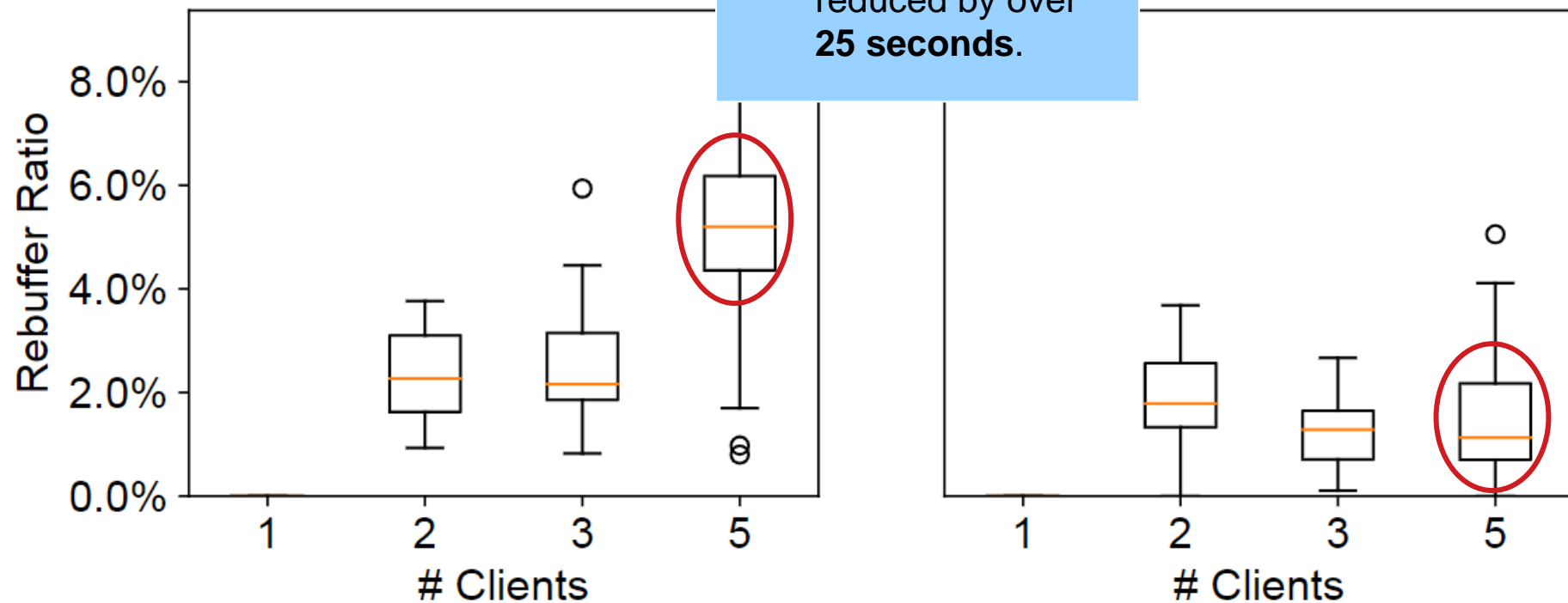
Rebuffer Ratio

A mean difference of **4% points**.

Rebuffering reduced by over **25 seconds**.

CWV

New CWV





Application Impact

Bit-rate Switch
Frequency





Bit-rate Switch Frequency

DSL 1 Clients



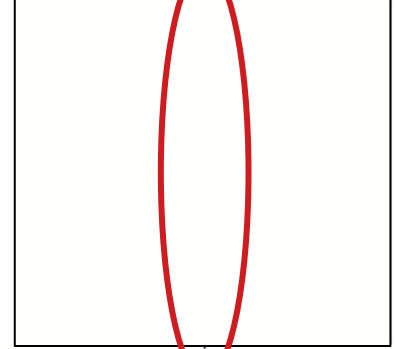
DSL 2 Clients



DSL 3 Clients

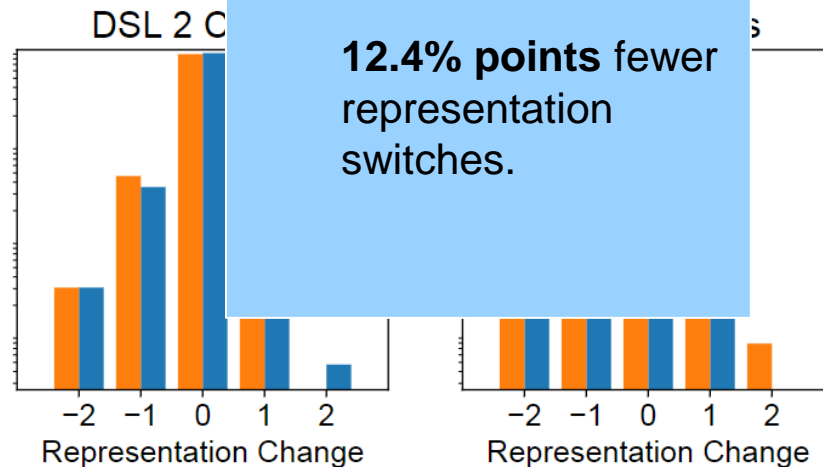
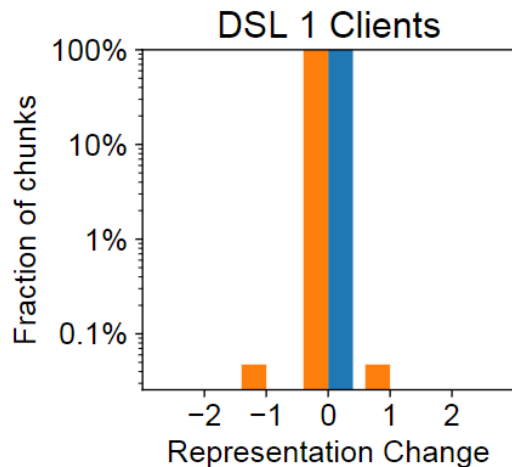


DSL 5 Clients

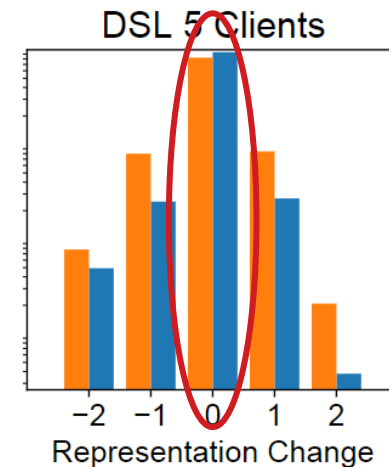




Bit-rate Switch Frequency



12.4% points fewer representation switches.



■ New CWV ■ CWV

Does TCP New Congestion Window Validation Improve HTTP Adaptive Streaming Performance?

Yes.

Does TCP New Congestion Window Validation Improve HTTP Adaptive Streaming Performance?

Yes. In our simulations we observed that compared to current CWND validation, New CWV:

- Reduced rebuffering events by 4% points.
- Limited representation switches by 12.4% points.

- <https://doi.org/10.1145/3534088.3534347>
- m.yanev.1@research.gla.ac.uk
- <https://yanev.uk>