



Dissecting the Applicability of HTTP/3 in Content Delivery Networks

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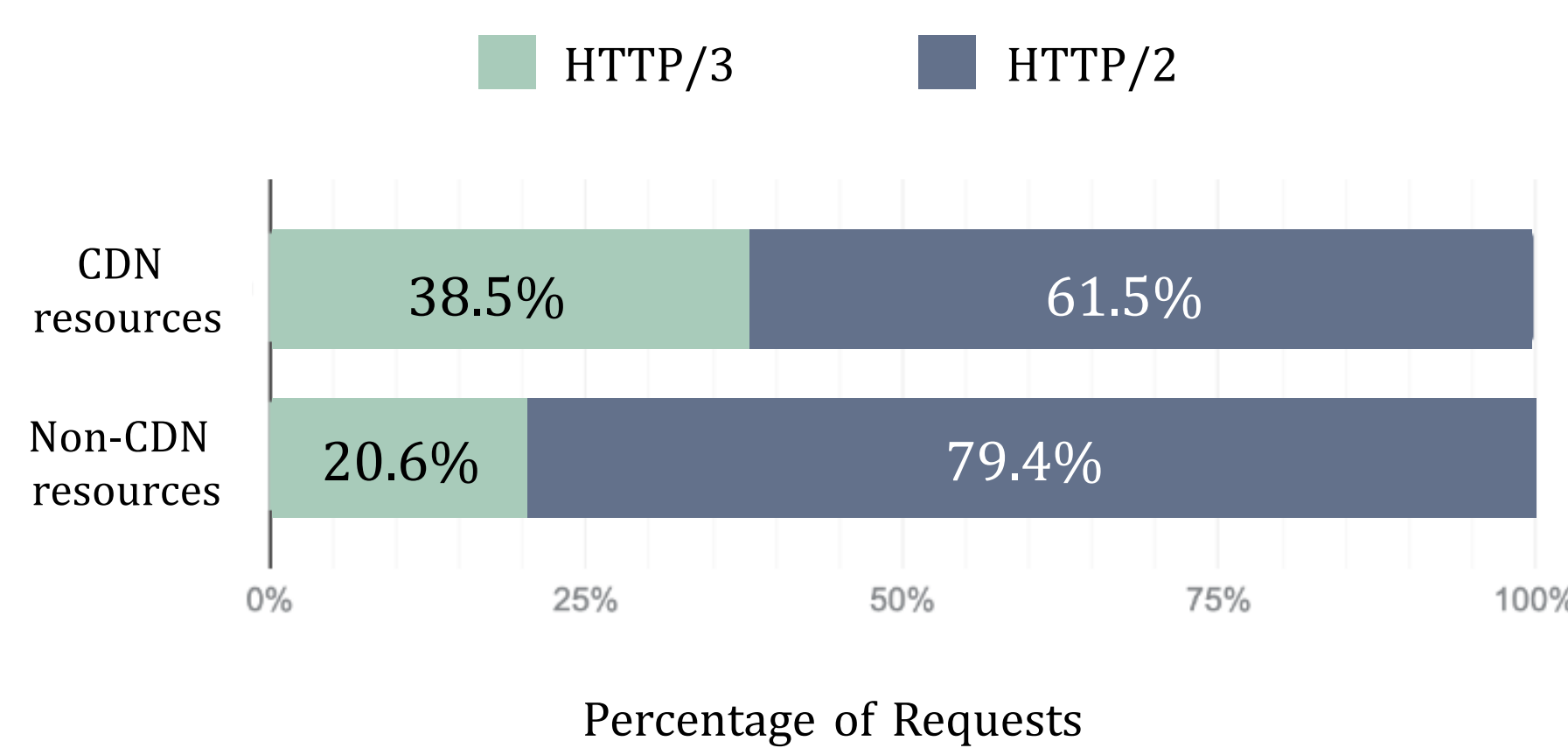
Motivation

Explore the reasons why H3 performs well in CDN-specific environments and their synergistic collaboration from a holistic perspective.

H3 Adoption in CDNs / 1

Provider	Release Year	Performance Report	H3 supported (%)
Cloudflare	2019 [1]	H3 performs 12.4% better in TTFB, but 1-4% worse in PLT than H2.	44.8%
Google Cloud CDN	2021 [2]	Reduce reach latency by 2%, video rebuffer times by 9%, and improves mobile device throughput by 7%.	95.7%
Fastly	2021 [3]	QUIC can represent an 8% increase in throughput.	8.1%
QUIC.Cloud	2021 [4]	H3 turns TTFB from 231ms to 24ms.	/
Amazon CloudFront	2022 [5]	N/A	7.7%
Meta	2022 [6]	H3 reduces tail latency by 20% and MTBR by 22%.	/
Akamai	2023 [7]	6.5% enhancement in users with TAT under 25ms; 12.7% improvement for requests exceeding 1 Mbps.	/

HTTP/3 usage in CDN resources and Non-CDN resources (Jan. 2024)



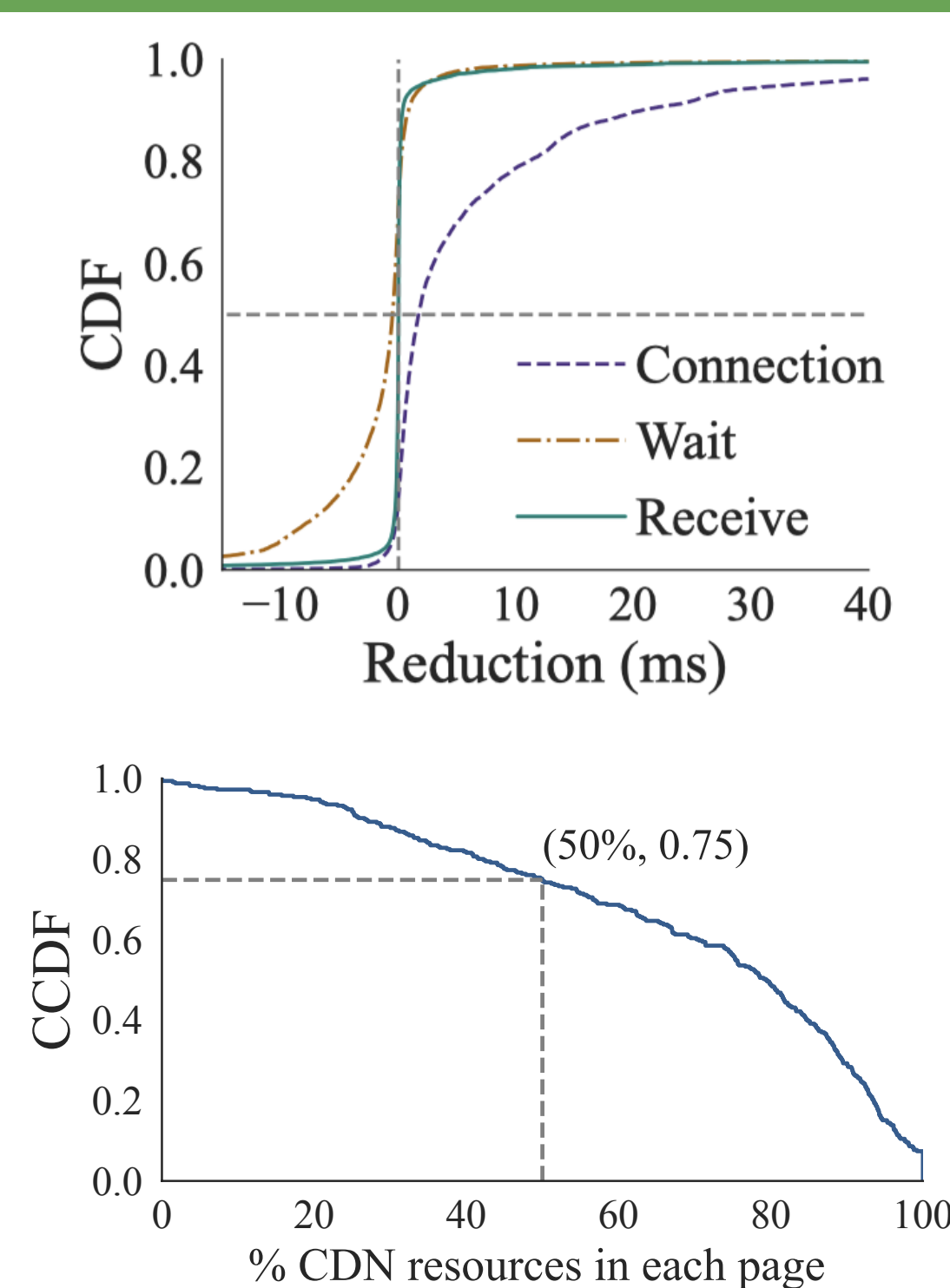
Takeaway 1

◀ Mainstream CDN providers now support H3. As of January, CDN resources using H3 are nearly double those of non-CDN resources.

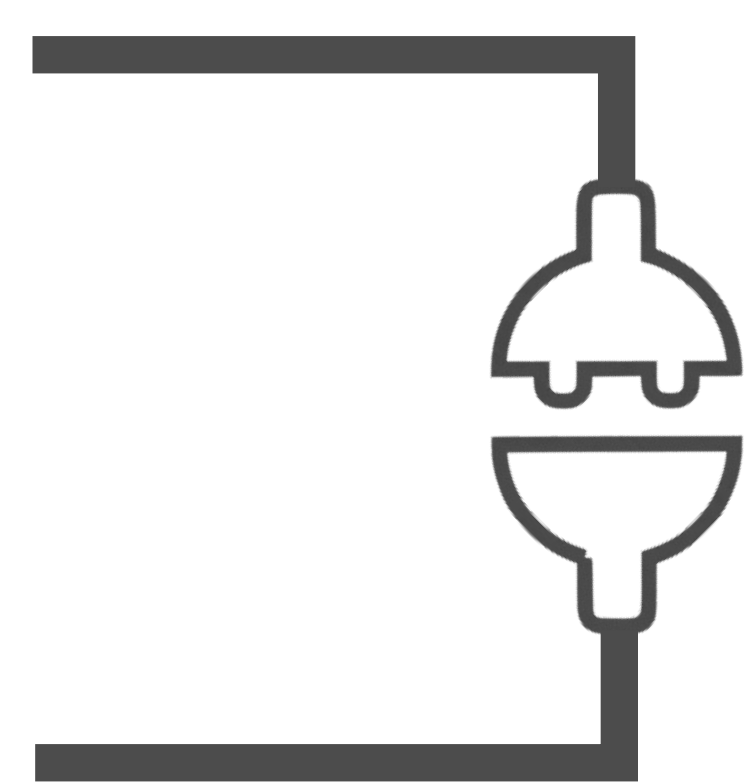
◀ H3 adoption in mainstream CDNs

◀ Higher usage of H3 in CDN resources

CDN Resources Quantity Amplify Connection Optimization / 2

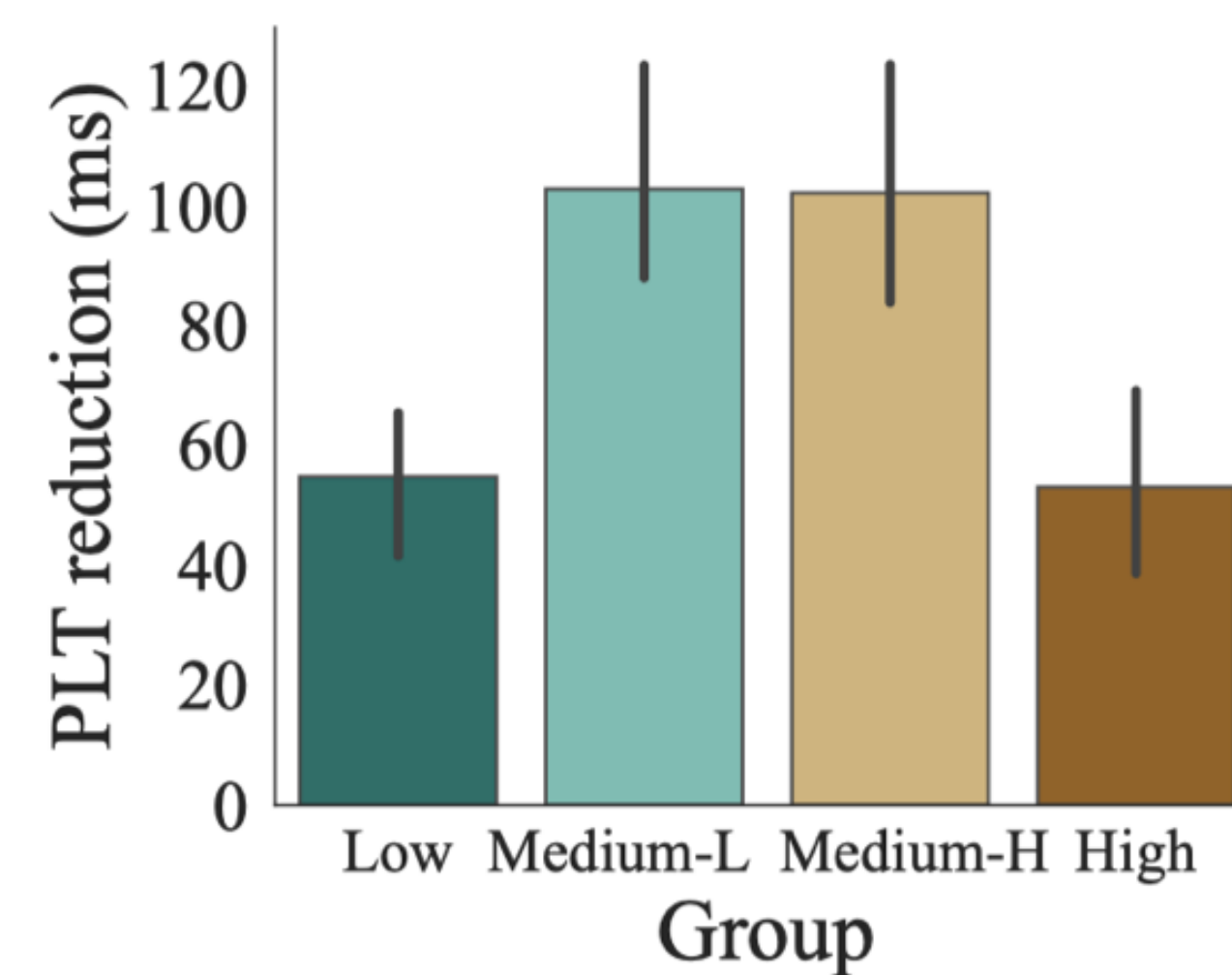


◀ Fast connection contributes the most



▶ largely amplifying the benefits of H3's fast connections

◀ 75% of pages' CDN percentage are over 50%

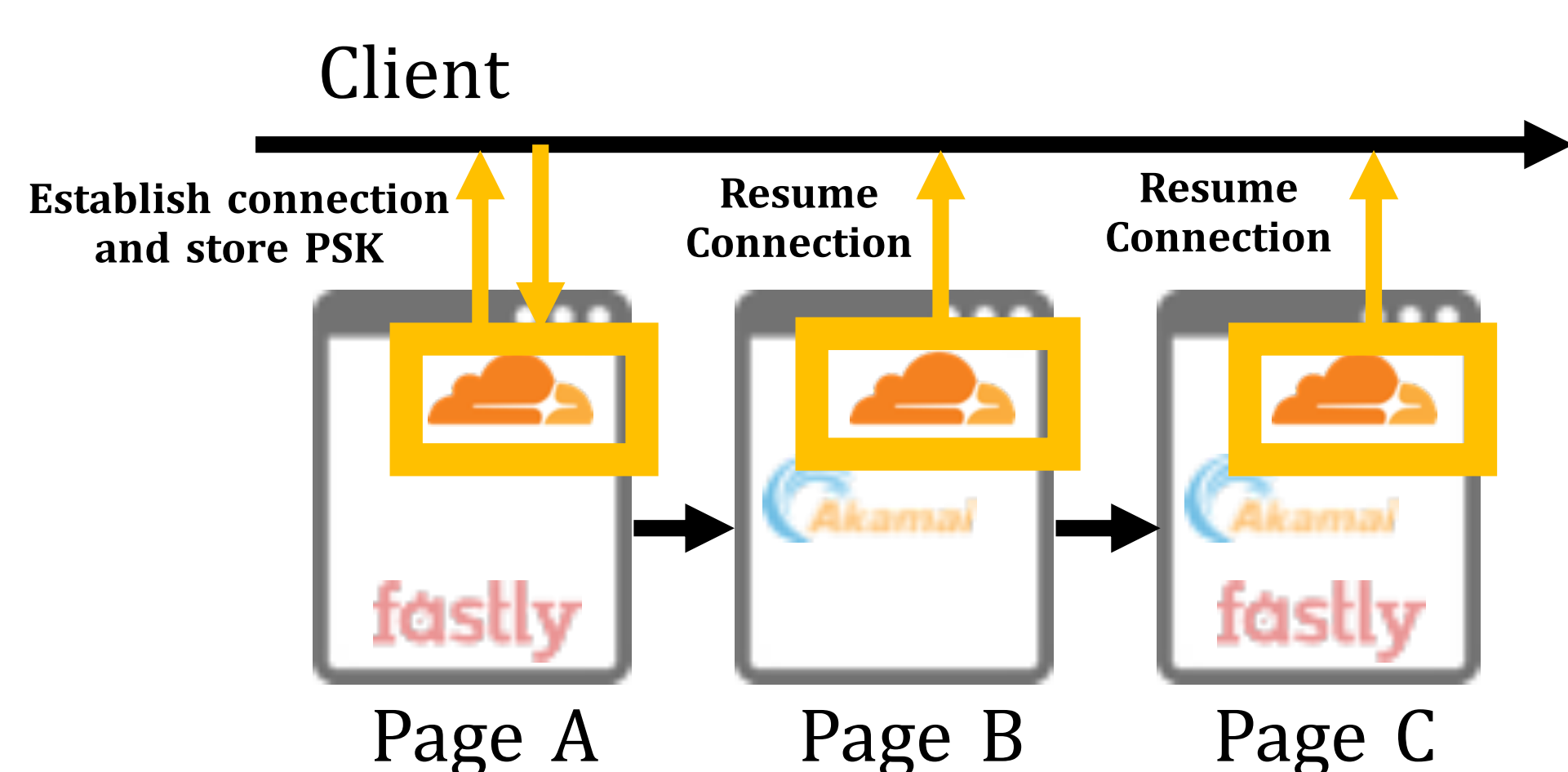


PLT reduction for websites with different H3 adoption levels

Takeaway 2

◀ Fast connection in H3 contributes to page acceleration.
◀ Dominant proportion of CDN resources amplifies such acceleration.

Resume Connections Across Pages to Accelerate / 3



◀ H3 connections can be resumed across pages by the same CDN provider, with using the pre-shared keys

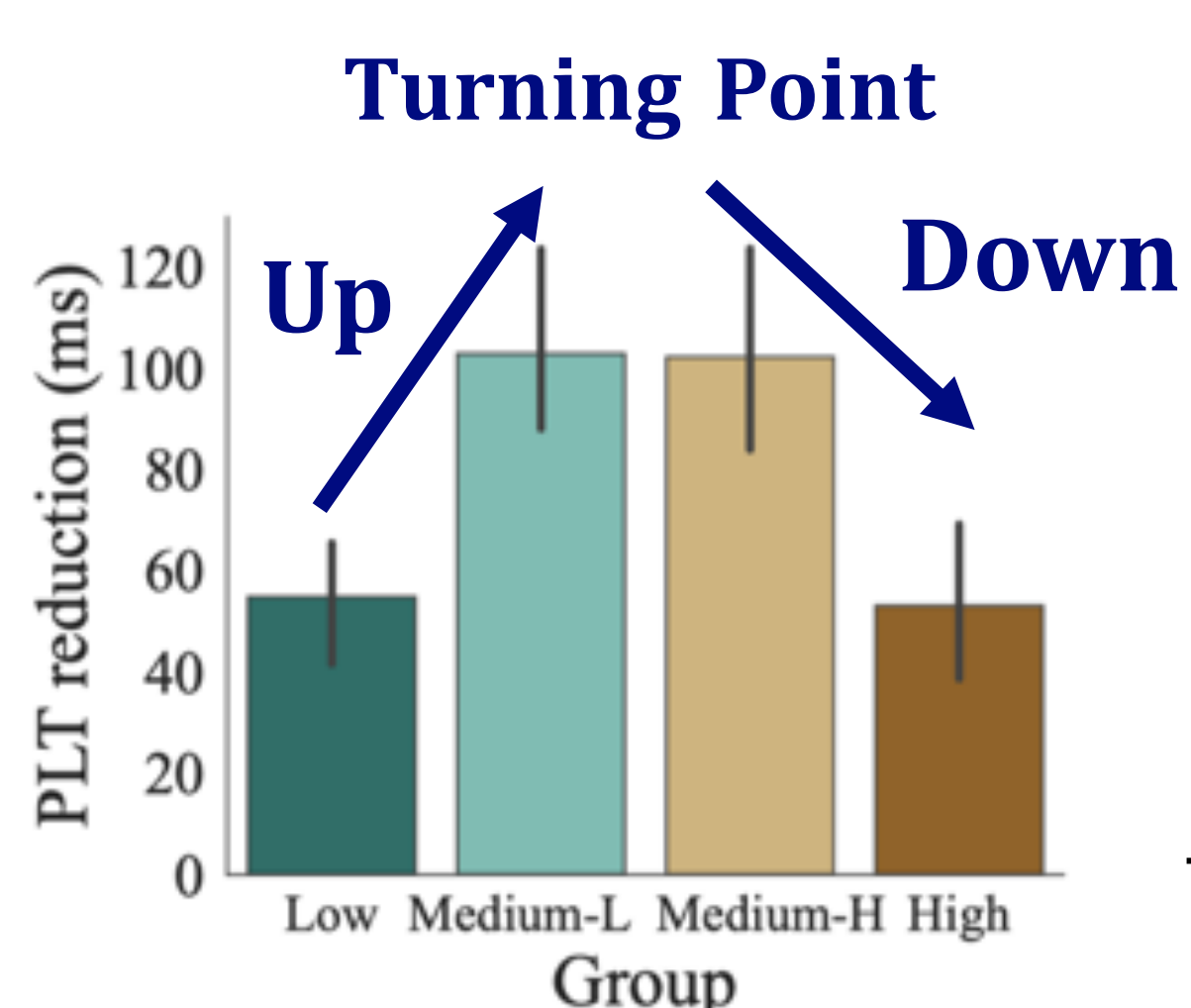
Metric	High sharing group	Low sharing group
Avg num. of shared providers	4.16	2.58
Avg num. of resumed connection	101.64	73.74
PLT reduction (ms)	109.3	54.35

◀ The higher the degree of sharing among these browsed pages, the more significant the optimization becomes

Takeaway 3

◀ There is a phenomenon of giant CDN providers being shared across different pages.
◀ This phenomenon accelerates page loading by triggering connection resumption of H3.

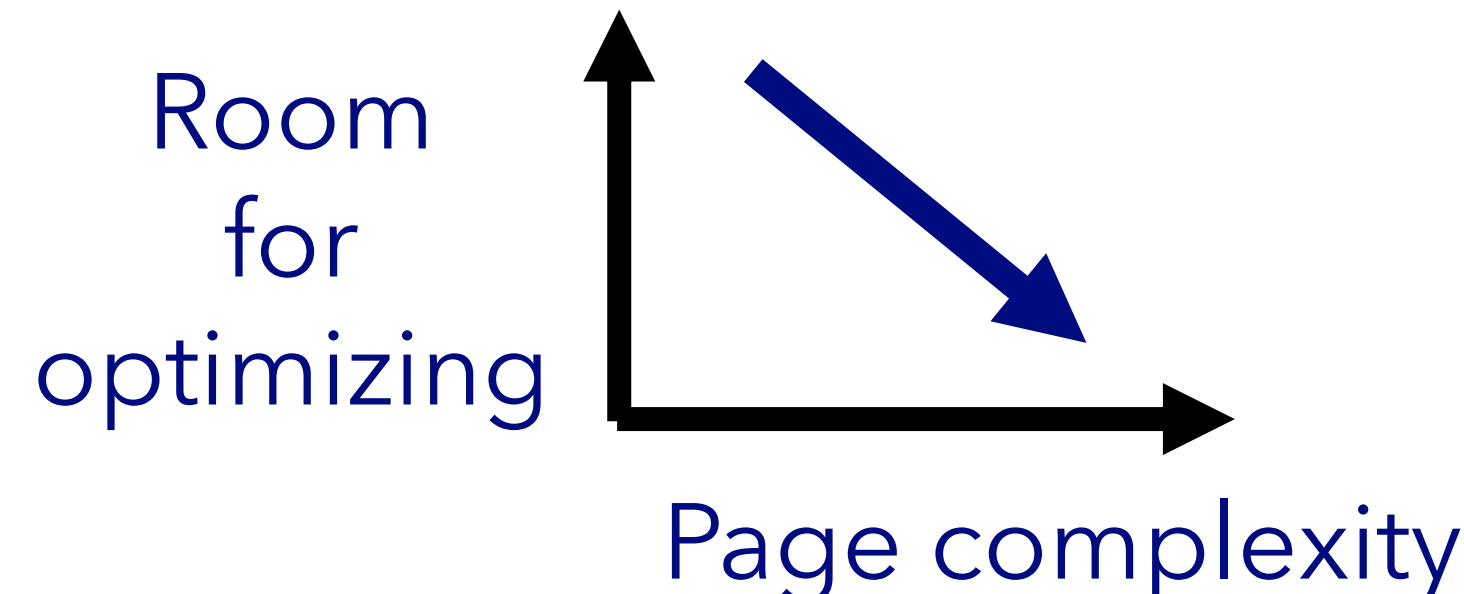
Full transition of CDN services to H3 ? / 4



Our lesson:

◀ Watch out optimization turning points

HTTP keep-alive in H2 \approx Similar to H3's fast connection



Takeaway 4

◀ Watch out the optimization turning points, rather than adopting H3 blindly.