Modern Network Protocols

What's Next for Firefox and the Web?

FOSDEM 2026
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Mozilla

Max is a software developer interested in networking, distributed systems and type theory. He works at Mozilla on Firefox's networking stack, focusing on HTTP3 and QUIC. Previously he was stewarding the peer-to-peer networking project libp2p, and before that the monitoring system Prometheus and its integration within the Kubernetes orchestrator.

To find out more visit https://max-inden.de/

Andrew is a Firefox performance engineer at Mozilla, focused on making the web faster. He's particularly interested in optimizing network performance, field experiments, performance metrics, and web performance APIs.

HTTP as the thin waist of the Internet

HTTP is already the thin waist of the internet:

- Consistent
- Extensible
- Strong security model
- Hard to censor

And we don’t expect that to change. Only doubling down more:

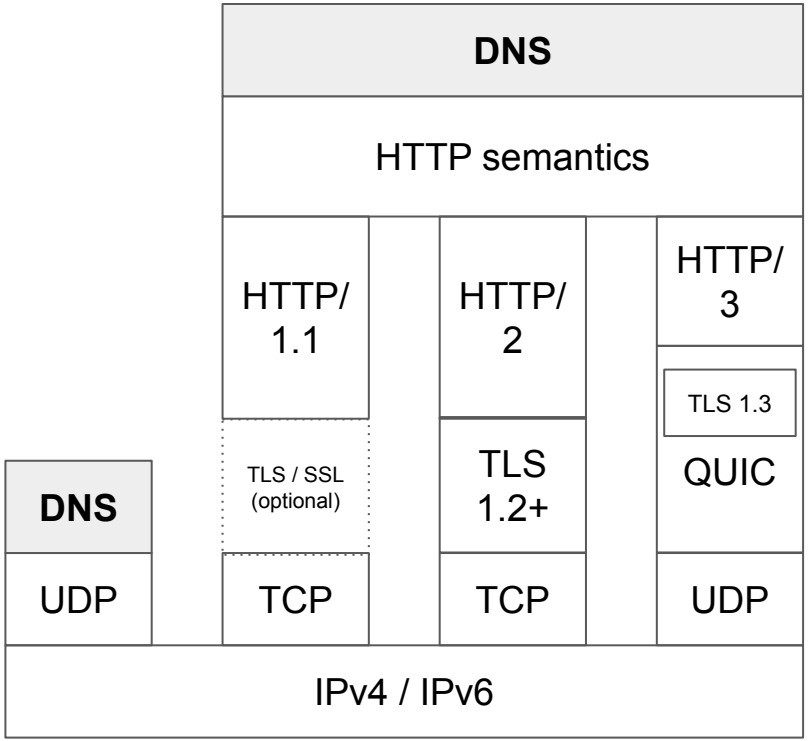
- DoH
- WebTransport
- Masque

DNS over HTTPS (DoH)

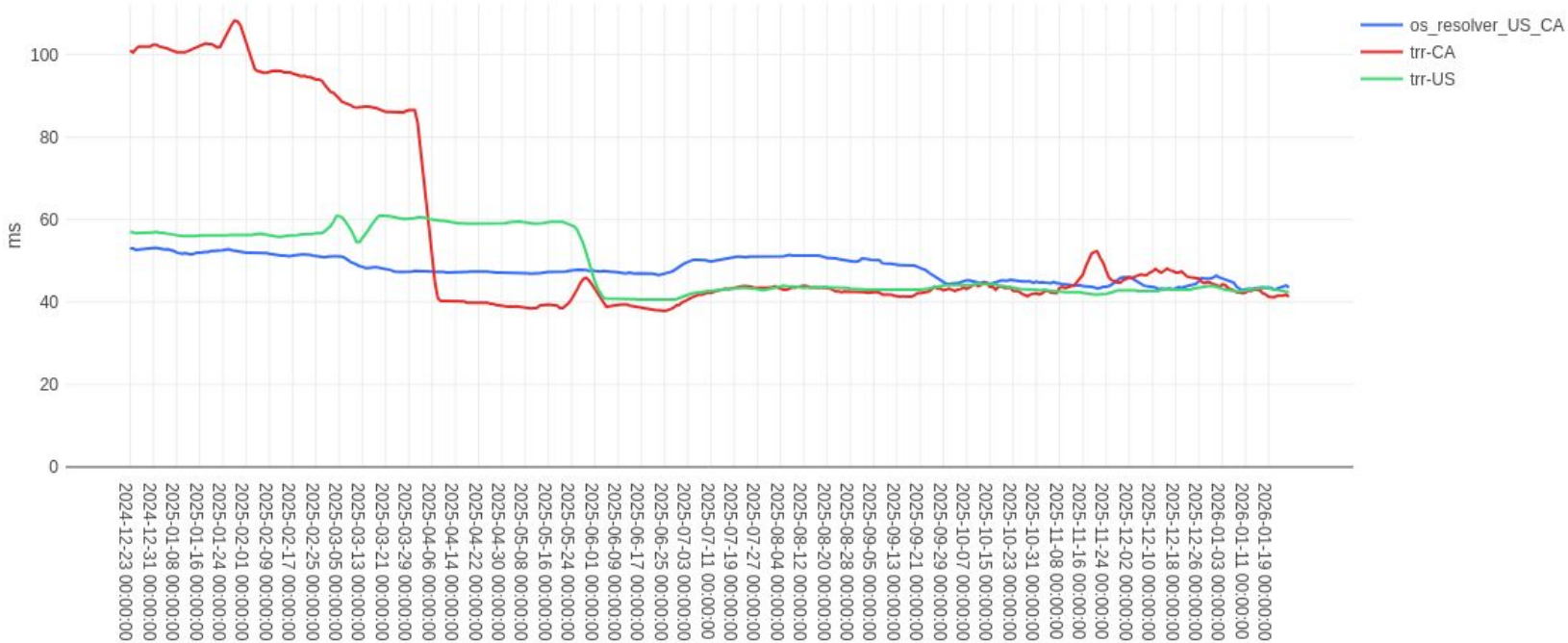
Run DNS queries through encrypted HTTP connection to a DNS server.

- Privacy
- Integrity
- Censorship resistance

Low overhead with QUIC 0-RTT.



DoH performance

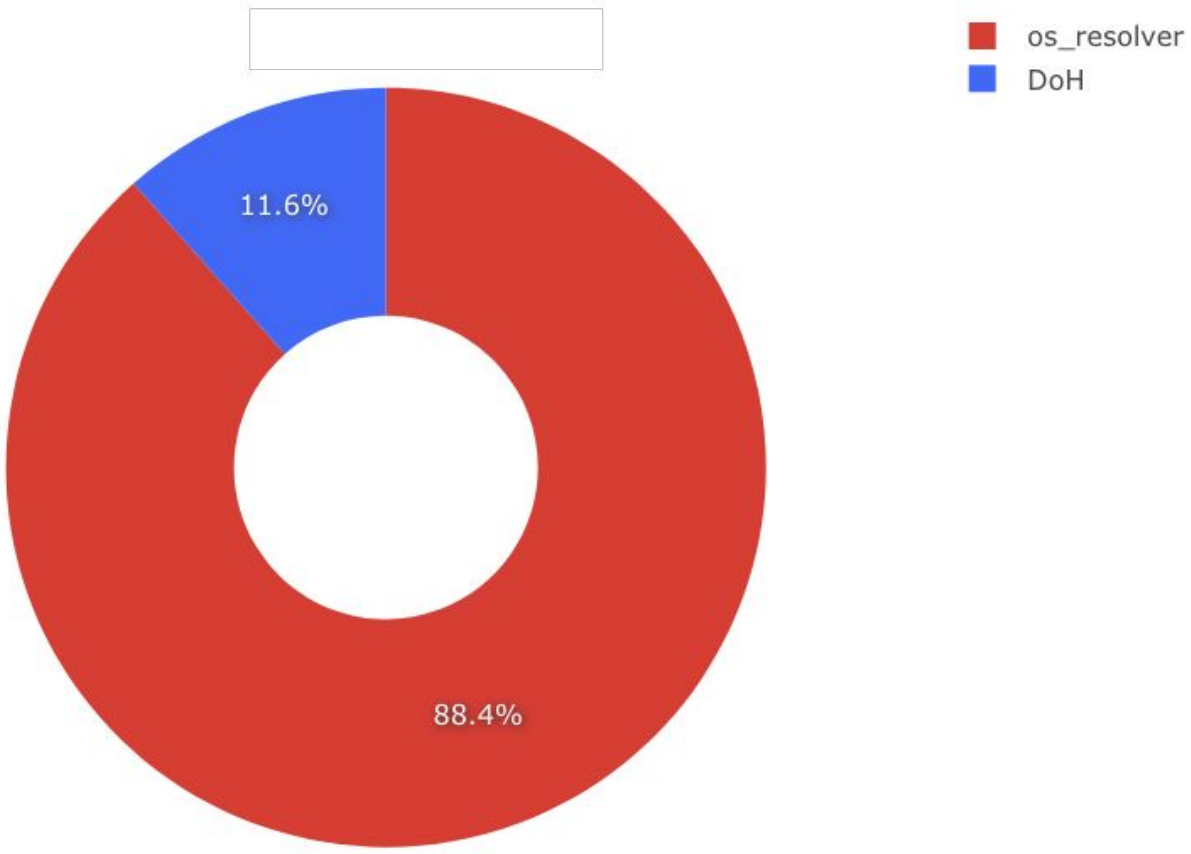


DNS resolution time, ms, P75. United States and Canada

DoH adoption

Global DNS resolution method

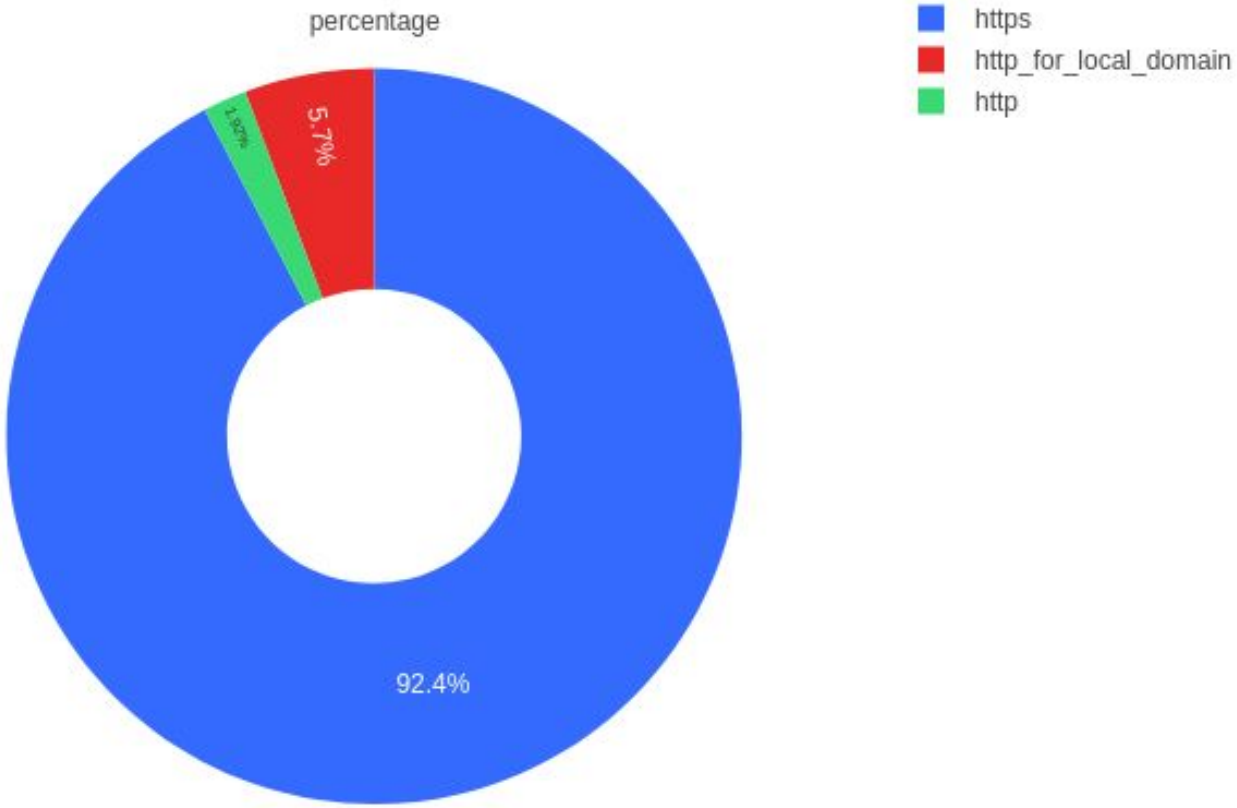
DoH (11.6%)
OS Resolver (88.4%)



HTTPS vs HTTP

Global request scheme

HTTPS (92.4%)
HTTP (1.9%)
HTTP for local domain (5.7%)

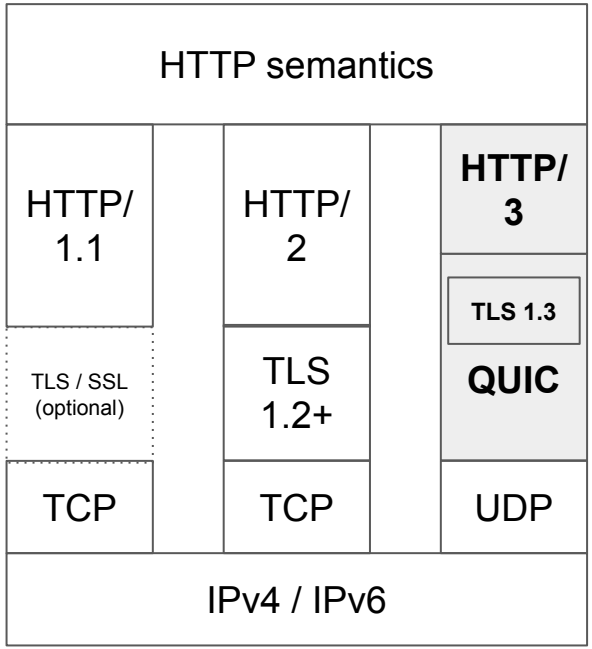


Encrypted Client Hello (ECH)

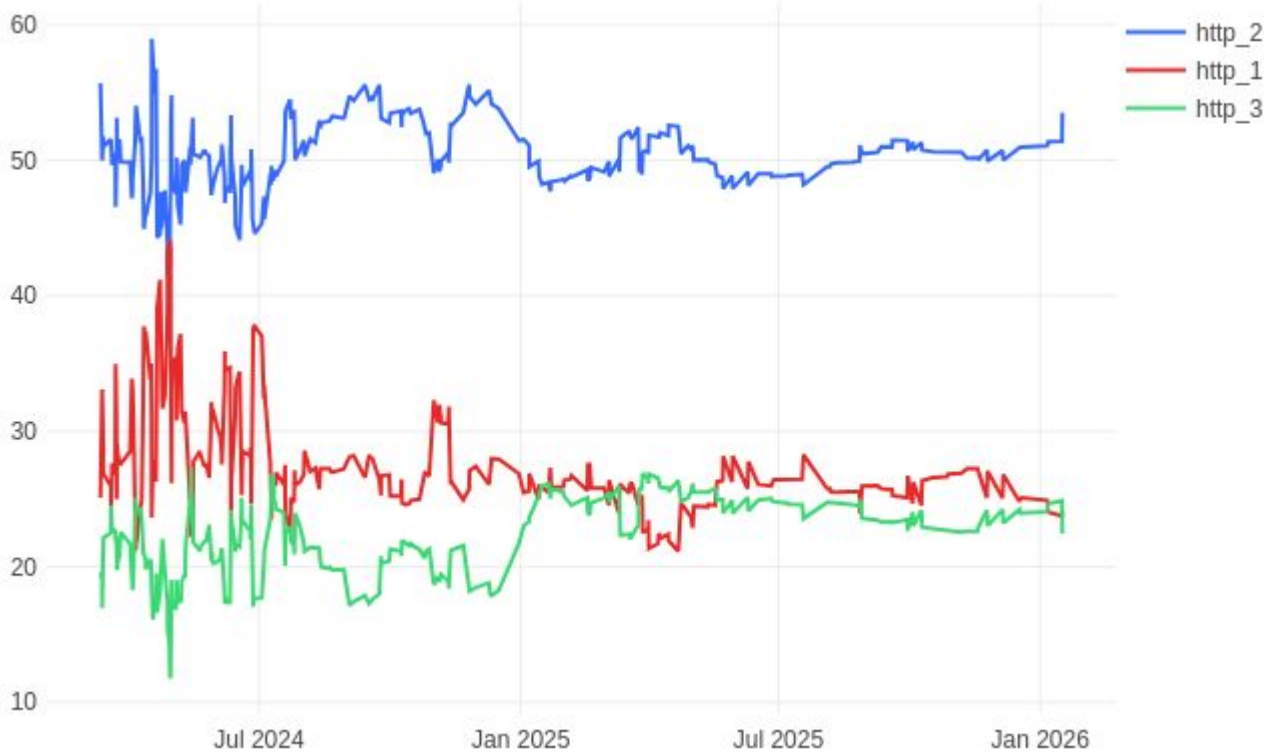
- By default TLS handshake sends Server Name Indicator (SNI) in clear text (e.g. wikipedia.com).
- Major attack vector used by censors today.
- With ECH parts of the TLS Client Hello get encrypted, including the SNI.
- Public key fetched via DNS HTTPS record.
- Especially relevant for websites behind CDNs.
- Adoption still low.
- On TCP Firefox tries to use ECH about 0.3% of the time and it succeeds nearly always.

QUIC and HTTP/3

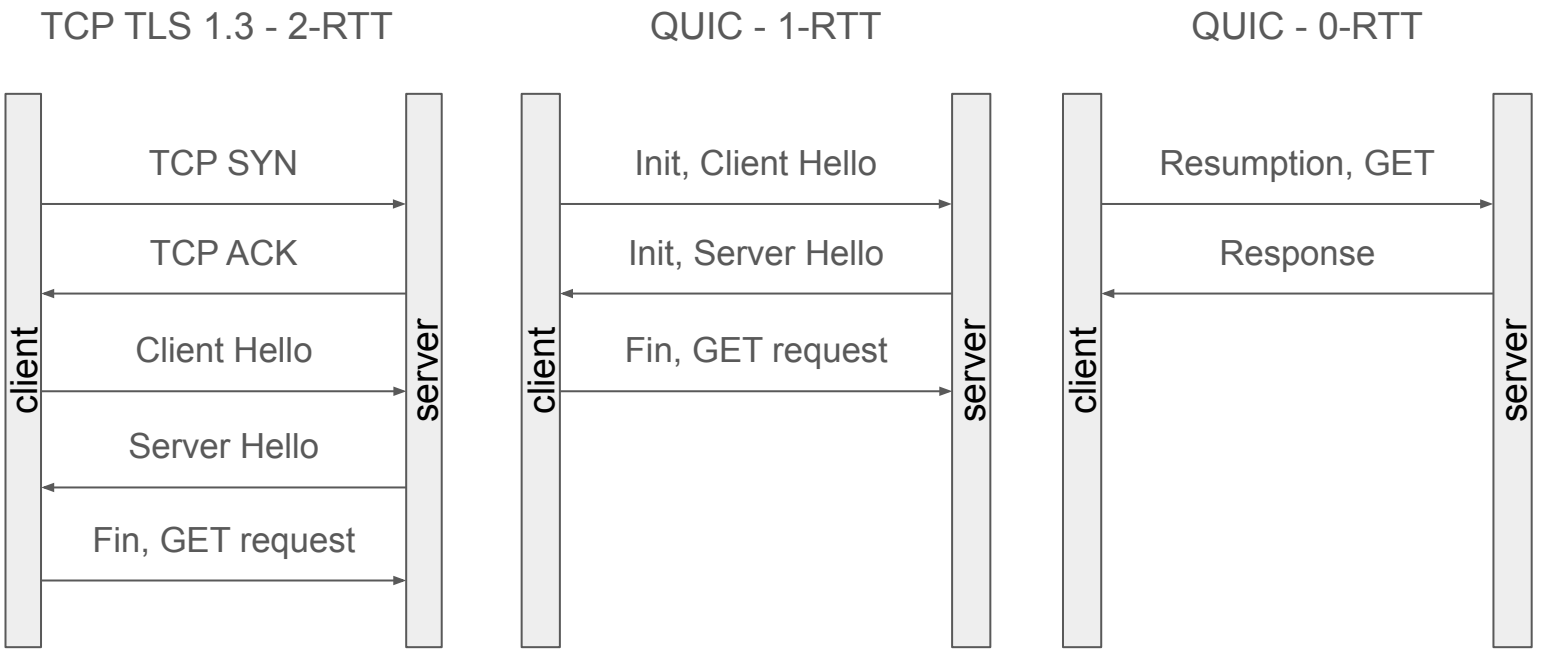
- general purpose transport protocol
- on top of UDP
- encrypted (meta) data
- 1 RTT connection establishment
- 0 RTT on consecutive connections
- Reliable and unreliable delivery
- no head-of-line blocking
- easy to evolve
- …



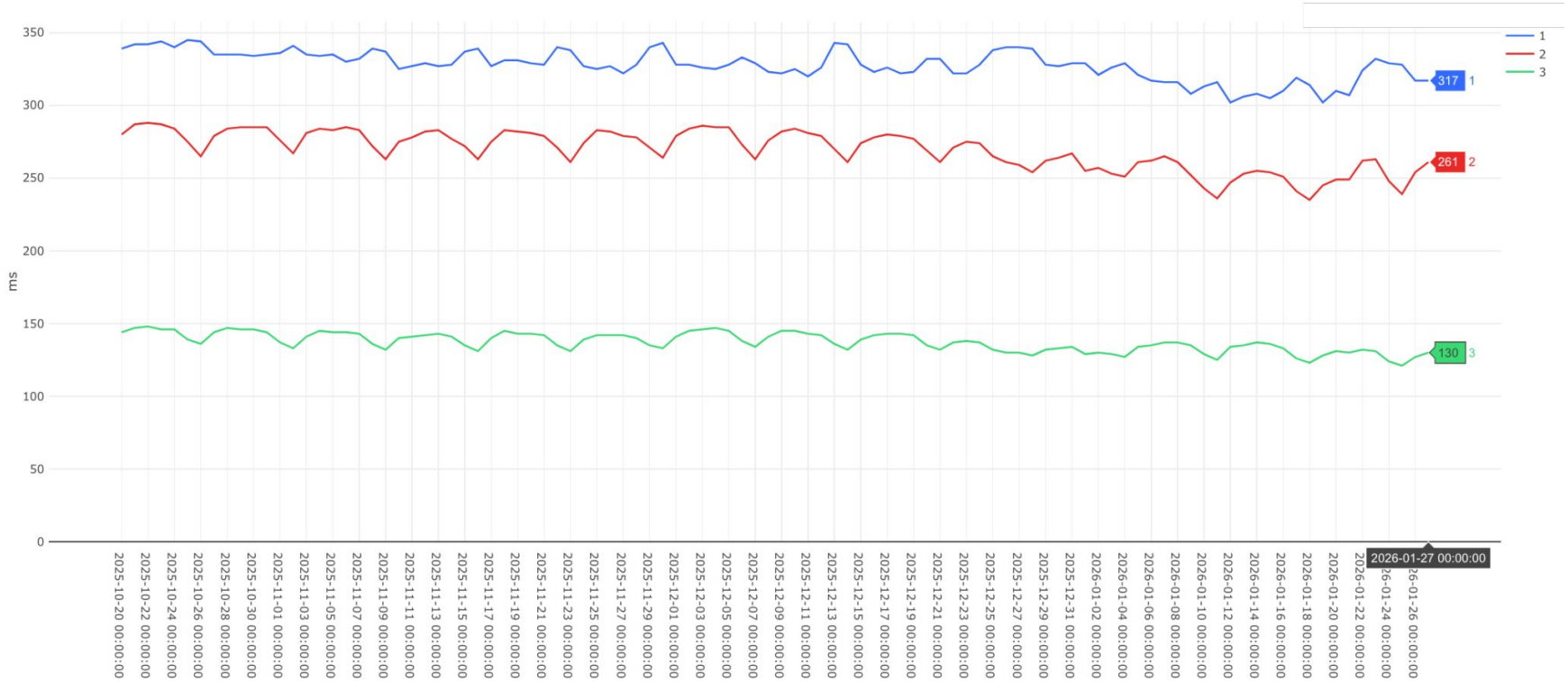
HTTP/3 adoption



QUIC handshake - 1-RTT



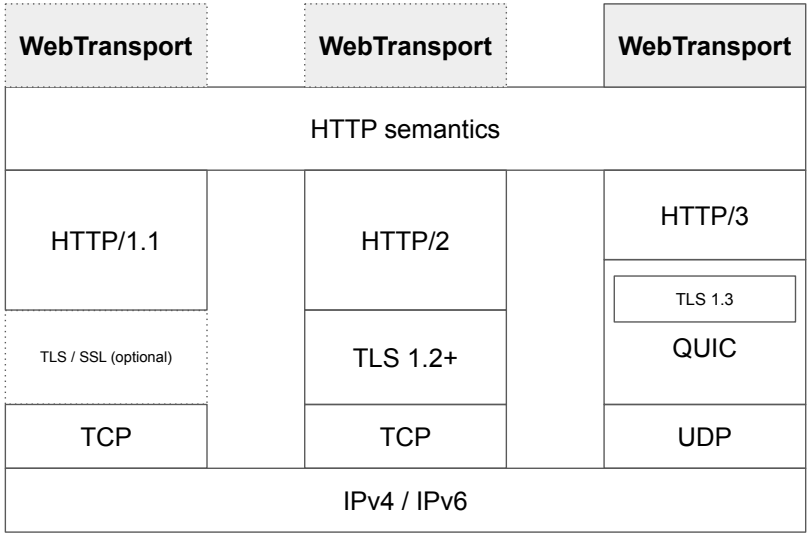
HTTP time to request start by protocol version



Time to request start, ms, P75. Firefox for Android.

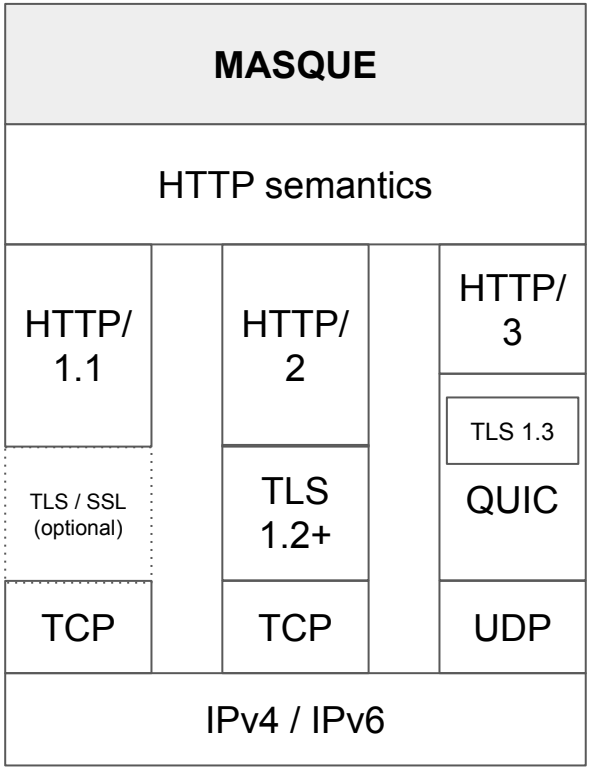
WebTransport

- The next WebSocket ?!
- No major user today other than upcoming Media over QUIC
- WebTransport talk in Browser devroom



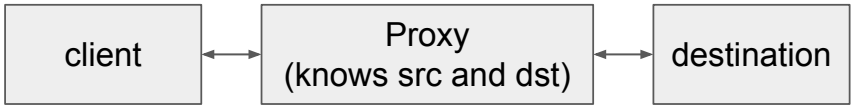
MASQUE

- Proxy protocol on top of HTTP
- E.g. leverages QUIC unreliable datagrams
- Make use of HTTP censorship resistence
- Proxy UDP, TCP, IP, …, (Ethernet)
- Extreme case of HTTP as the thin waist of the internet

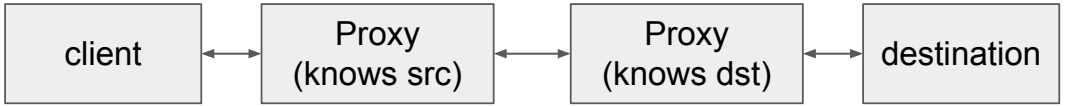


MASQUE

Single hop



Two hop



Oblivious HTTP

- Similar to MASQUE
- Request oriented instead of connection oriented
- Relay sees the client IP, but not the request
- Destination sees the request, but not the client IP
- E.g. used for Telemetry or Oblivious DoH

What do we **not** see happening?

- Old protocols (IPv4, DNS53, HTTP/1 & HTTP/2, …) going away.
- Anonymous colleague: “Hopefully no HTTP/4.”

What can you do for a healthy internet?

- If you use a browser, **enable DoH**.
- If you operate DNS infra, **expose a DoH endpoint**.
- If you operate a website, **serve it via HTTP/3** and **add support for ECH**.

Walkthrough - the Internet of the future

1. DNS over HTTPS

Walkthrough - the Internet of the future

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2. IPv6 0RTT QUIC with ECH

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3. Fetch video player assets via HTTP/3

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4. Open WebTransport session for Media over QUIC

Walkthrough - the Internet of the future

1. DNS over HTTPS
2. IPv6 0RTT QUIC with ECH
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4. Open WebTransport session for Media over QUIC
5. Watch the recording of the ancient FOSDEM 2026 talk “*Modern Network Protocols - What’s Next for Firefox and the Web?*”

Thank you!

- Questions? Talk to us.
- Help us build a healthy Internet.
- Max: In person or mail@max-inden.de or @mxinden.
- Andrew: In person or acreskey@mozilla.com, Matrix: @acreskey:mozilla.org, Firefox Performance: perf:mozilla.org
- We got stickers :)

Happy Eyeballs v3

- Cardinality explosion of protocol combinations
  - IPv4 / IPv6
  - TCP + TLS or QUIC
  - DNS A, AAAA or HTTPS
  - HTTP alt-svc header
  - WebSocket or WebTransport
  - …
  -
- Set of heuristics to reduce connection establishment latency

Congestion Control - ECN and L4S

- Ongoing research area
- Firefox QUIC stack does Cubic today
- No plans to do BBR in near future
- ECN marking and echoing
- ~50% of network paths are ECN capable
- Ready for L4S congestion controller on the server side (👋 Comcast users)