



OST

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Distributed Systems (DSy)

HTTP/3

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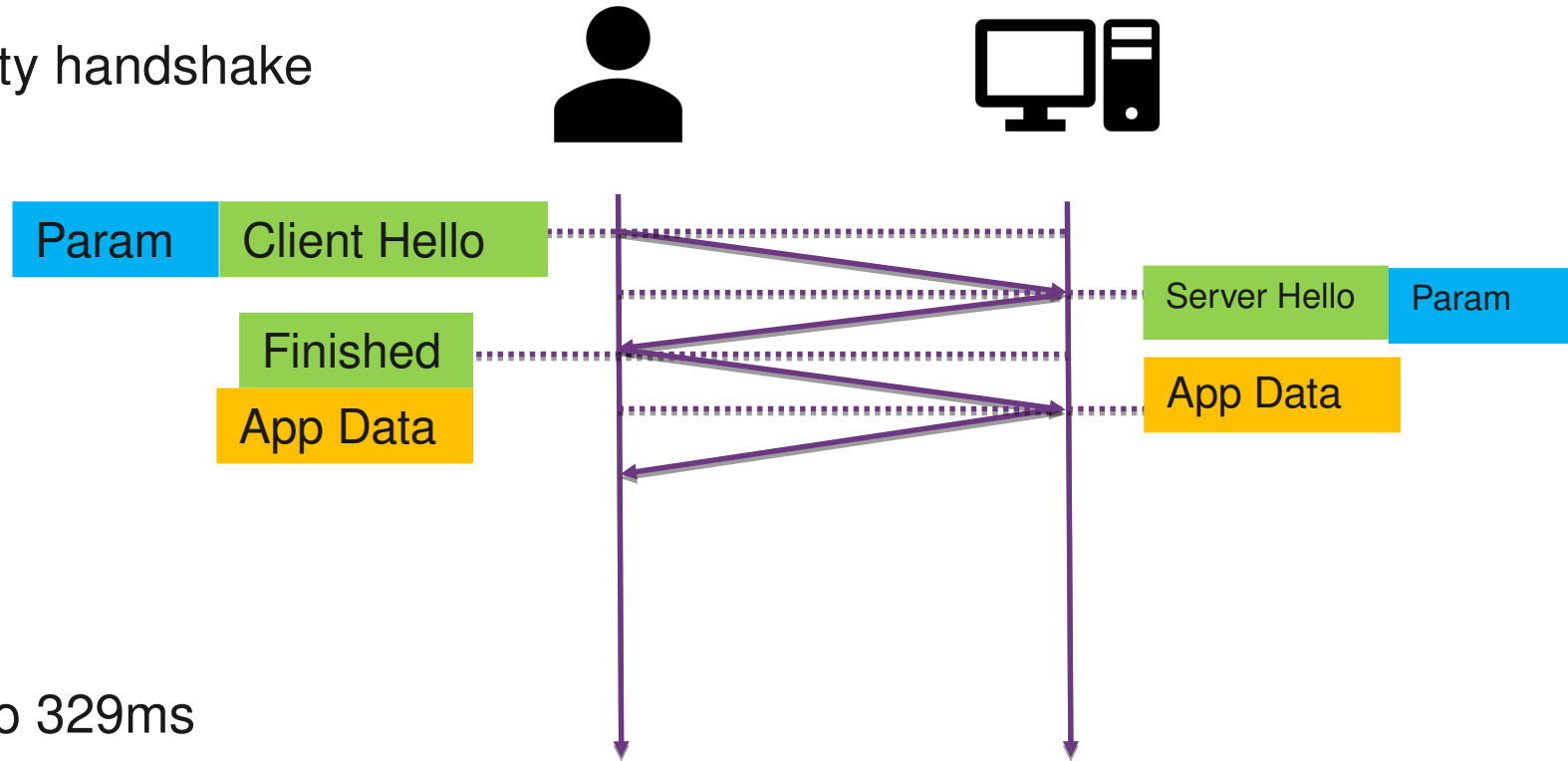
12.03.2023

Learning Goals

- Lecture 4 (HTTP/3)
 - How to use HTTP/3 for the challenge task

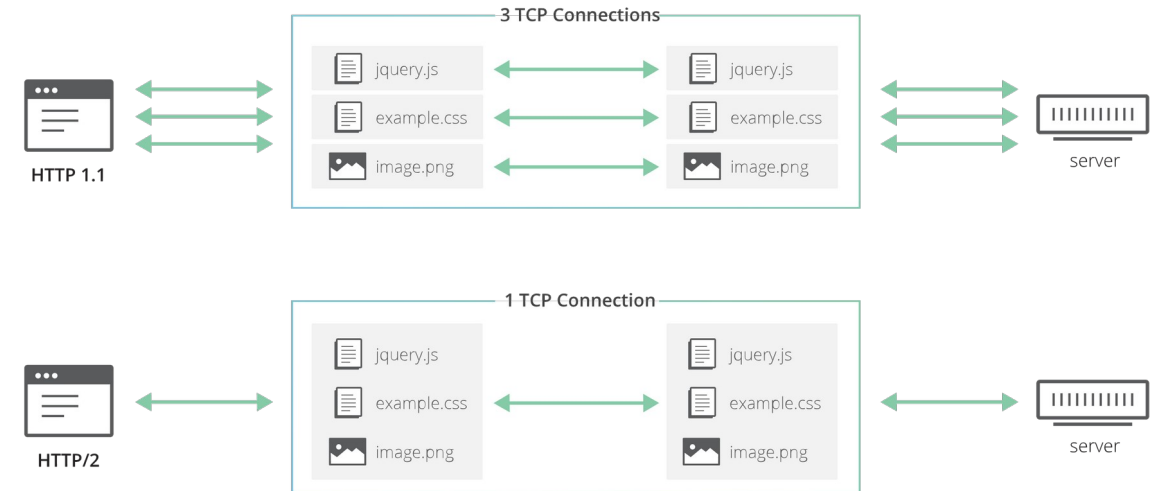
QUIC / HTTP/3

- QUIC: 1RTT connection + security handshake
 - For known connections: 0RTT
 - Built in security
 - “Google's 'QUIC' TCP alternative slow to excite anyone outside Google” [link] ([9%](#), [25%](#), 75%)
 - [Facebook](#)
 - [Cloudflare](#), [state of HTTP](#)
- Example Australia: from 987ms to 329ms



QUIC / HTTP3

- Multiplexing in HTTP/2
 - [HTTP/1 → HTTP/2](#)
- HTTP/2: Head-of-line blocking
 - One packet loss, TCP needs to be ordered
 - QUIC can multiplex requests: one stream does not affect others
- HTTP/3 is great, but...
 - NAT → SYN, ACK, FIN, conntrack knows when connection ends, not with QUIC, timeouts, new entries, many entries
 - HTTP header compression, referencing previous headers
 - Many TCP [optimizations](#)

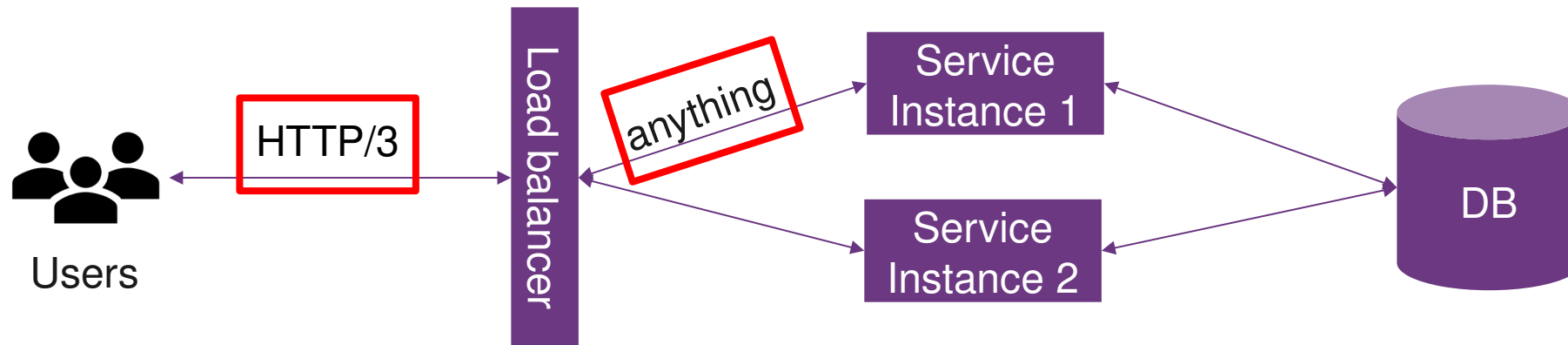


source: <https://blog.cloudflare.com/the-road-to-quic/>



HTTP/3 in Load Balancers

- Architecture (without frontend/backend, lets call it service for the moment)



HTTP/3 in Load Balancers

- Nginx – not yet supported
 - <https://dsl.i.ost.ch> uses Nginx, I have not yet enabled HTTP/3
 - 08.02.2023: Preview available [[link](#)]
- Caddy - supported
 - Example configuration
 - Rut with docker-compose
 - Tell browser that we support HTTP/3 with Alt-Svc header (localhost). Alternatively, use DNS to announce Alt-Svc [[link](#)] (not yet ready)
 - With headers, always need http1 or http2 in addition to http3
 - DNS: new RR types with same info as in headers [[link](#)]
 - Firefox / Chrome are caching aggressively, to make it work, clean cache + restart browser

```
#docker-compose-http3.yml
version: '3.9'
services:
  caddy:
    image: caddy:latest
    container_name: caddy
    volumes:
      - ./Caddyfile-http3:/etc/caddy/Caddyfile
    ports:
      - 80:80
      - 443:443
      - "443:443/udp"
    restart: unless-stopped
```

```
#Caddyfile-http3
localhost:443 {
  respond "Hello, world! You're using {http.request.proto}"
  header Alt-Svc: h3=":443"; ma=86400
}
```

HTTP/3 in Load Balancers

- Caddy / Nginx not only LB / RP, also webservers, unlike HA Proxy, Traefik
- HA Proxy
 - Experimental [\[link\]](#)
 - Services also HTTP/3?
 - No required, but possible [\[link\]](#)
- Traefik
 - Experimental [\[link\]](#)
 - Config in docker-compose [\[link\]](#)

```
frontend mysite
  bind :80
  bind :443 ssl crt /etc/haproxy/certs/foo.com/cert.pem alpn h2

  # enables HTTP/3 over QUIC
  bind quic4@:443 ssl crt /etc/haproxy/certs/foo.com/cert.pem alpn h3

  # Redirects to HTTPS
  http-request redirect scheme https unless { ssl_fc }

  # 'Alt-Svc' header invites client to switch to the QUIC protocol
  # Max age (ma) is set to 15 minutes (900 seconds), but
  # can be increased once verified working as expected
  http-response set-header alt-svc "h3=\":443\";ma=900;"

  default_backend webservers
```

<https://www.haproxy.com/blog/announcing-haproxy-2-6/>