Secondary Certificates

...in HTTP?
Why is HTTP doing certs?

- **TLS**: One server identity, one client identity
  - HTTP/2 multiplexing - different client identities for different resources

- **Client certs**
  - HTTP/2 prohibits renegotiation
  - Most TLS 1.2 implementations can’t do renegotiation while application data flows
    - Spec doesn’t mandate this, but is deployment reality
  - TLS 1.3 *might* improve this

- **Multiplexing**
  - HTTP/2 connection coalescing currently only works if the server cert has all possible names
    - Forces servers to use mega-certs with large numbers of SANs
  - Desire to support coalescing across origins while using discrete certificates
Server Certificate

Stream N

Stream 0

Request (HEADERS...)

CERTIFICATE_REQUEST

CERTIFICATE_NEEDED

CERTIFICATE

CERTIFICATE_PROOF

USE_CERTIFICATE

C

C

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S
Client Certificate

Stream N

C

Request (HEADERS...)

CERTIFICATE_REQUEST

CERTIFICATE_NEEDED

S

CERTIFICATE

CERTIFICATE_PROOF

USE_CERTIFICATE

Response (HEADERS...)

Stream 0

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But again, why in HTTP?

- Could replace Stream 0 exchange with TLS 1.3 Post-Handshake Auth
  - PHA would require more capabilities
    - Already capable of exchanging a client certificate; multiple?
    - Could this be used to exchange additional server certificates?
  - HTTP on-stream frames look about the same
  - HTTP layer needs to retrieve identifiers for the exchanges to reference

- What about TLS 1.2?
  - Backport something?
  - Leave alone; carrot to migrate to 1.3