HTTP/2 Regrets


Y U FORBID
CLIENT CERTIFICATES?
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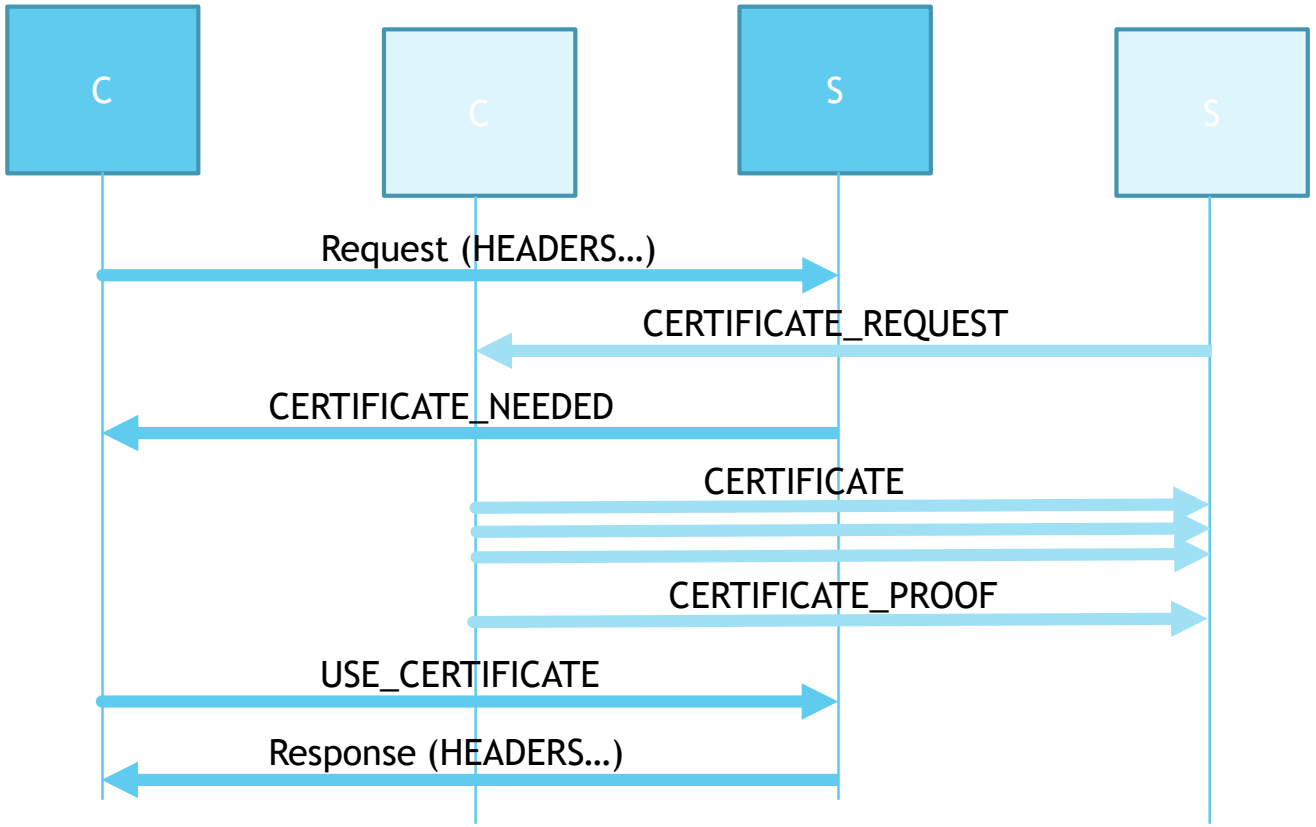
Client Certificate

TLS Extension

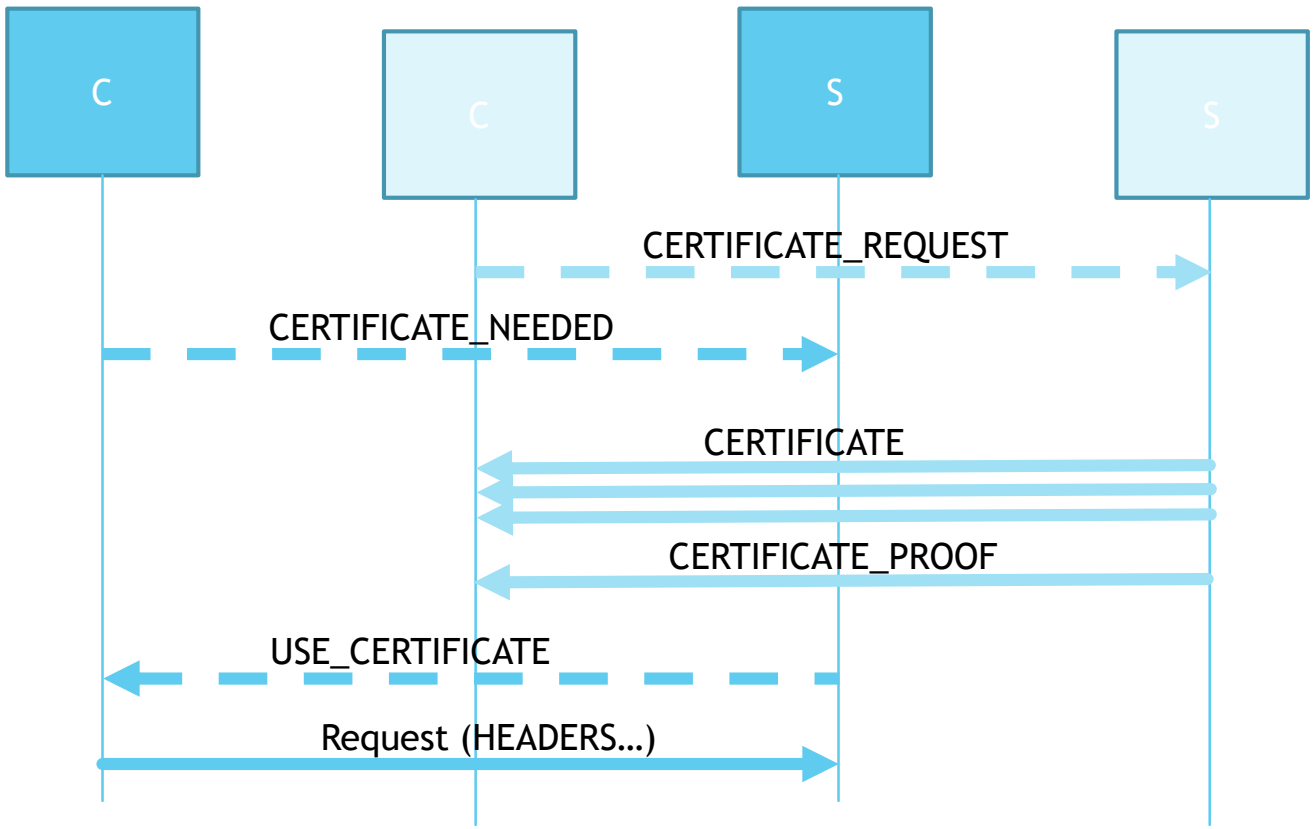
Stream N

Stream 0



Server Certificate

TLS Extension




WE PUT OUR OPTIONS IN 32 BITS
BUT WE HATES IT!

Payload layout

SETTINGS

EXTENDED_SETTINGS

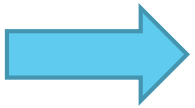
EXTENDED_SETTINGS vs. vanilla SETTINGS

- Borrows heavily from RFC7540 SETTINGS text
- Values are length-prefixed blobs
  - Currently static 16-bit length; could do something variable if desired
- ACK works differently:
  - Sender of EXTENDED_SETTINGS sets flag if ACK is desired
  - Recipient sends back EXTENDED_SETTINGS_ACK listing the values which it understood from the EXTENDED_SETTINGS frame
    - If it received the frame, but didn't understand any of the values, the ACK is sent but empty
- Never-seen is a different value than zero
  - Implicitly true in SETTINGS as well; RFC 7540 defines some initial values which can't be expressed on the wire.
- Future: Possible optimization for specific lengths
  - Want to minimize overhead for single-bit value
  - Don't make existing 32-bit values more bloated


SO THEN I SAID
"COMPRESS" FOUR BYTES INTO TWENTY-NINE!

Old Proposal – Typed Values

Equivalent to 0-bit prefix integer representation from earlier.



8-bit Value prefix

- 2 bits Type
- 1 bit Reserved (future types)
- 5 bits Count

…followed by Count instances of Type:

- Variable-length Integers (UVarInt):

  Continuation byte … Final byte

  0x80-FF 0x00-7F
- Dates:

  UVarInt of ticks since epoch
  - 6 bytes for rest of 21st century
  - Thereafter, 7 bytes until 40th century
- Strings:

  UVarInt Length | Huffman-encoded UTF-8
- Binary:

  UVarInt Length | Binary content

More recently

- Julian’s JFV proposals
- CBOR
- Custom-designed binary format


I DON'T ALWAYS INCLUDE EXPERIMENTAL FEATURES....
BUT WHEN I DO, I BASE MY ENTIRE STATE MACHINE ON THEM!
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