Streamed Oblivious HTTP Messages

A discussion

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Status quo OHTTP

OHTTP currently defines a single message in each direction, that

- Must be encrypted and decrypted in one chunk

- This is great for DNS, and other small messages

- However, Binary HTTP (RFC 9292) does support indeterminate messages

Why streamed OHTTP?

Some usage patterns can benefit from allowing encryption/decryption in multiple chunks

Long (or slowly generated) messages that can be processed in multiple parts — *large database lookup, etc.*

Interactive workflows where the request can be completed after the headers from the response are received

What needs to change?

Changes

1. Chunk encapsulation (HPKE / AEAD)

2. Request/response format

3. Media type

Chunk encapsulation

New requirements:

1. Protect against chunk reordering

2. Protect against truncation/removal of entire chunks

Truncation attacks within a single chunk are already prevented by the AEAD

Chunk encapsulation

Proposal

Sequence of chunks

- Requests: HPKE already has sequence numbers for additional operations
- Responses: Add a counter to the AEAD message nonce

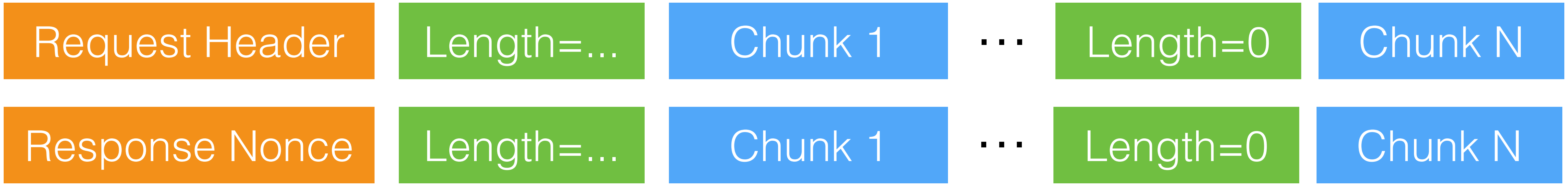
Final chunk integrity

- Add a sentinel AAD value "final" for both the final request and response chunks

Request / response format

Add a varint "length" field before each chunk

- Final chunk is indicated by length=0, and extends to the end of the outer stream



Request Header | Length=... | Chunk 1 | ··· | Length=0 | Chunk N

Response Nonce | Length=... | Chunk 1 | ··· | Length=0 | Chunk N

Note that the encapsulation does not need to directly authenticate this format, just the content and order of the chunks

- Allows flexibility for the formats for sending chunks
- Any concerns with this?

Media types

Format is different, so we need a different media type

```
  message/ohttp-streamed-req

  message/ohttp-streamed-res
```

Open questions

Any negotiation or indication of support?

- Many uses of OHTTP are some a priori configuration

- Implications for discovered support (SVCB)

Must servers reply with streamed if clients send streamed requests?

Next steps

Publish draft

Update implementations for interop

Consider adoption