STATEFUL COMPRESSION

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Data Compression @ Facebook

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Zstandard

(RFC 8478)

Discussion Scope

improving compression

HTTP response content-coding

small responses (<16 KB)

external context

Compression

effective compression $\approx$ modeling input $\approx$ context

context (aka state) $\approx$ input stream history

short messages $\rightarrow$ no history $\rightarrow$
no model $\rightarrow$ poor compression

Solution

external context aka "dictionary"

compression is effective immediately

Context Sources

Repurposed Data
- Cached Responses
- Connection History

Dedicated Data
- Static Dictionary
- Dynamic Dictionary

Prior Art

- SDCH (Shared Dictionary Compression over HTTP)

  `(draft-lee-sdch-spec)`

- Brotli & Shared Brotli

  `(RFC 7932, draft-vandevenne-shared-brotli-format)`

- Compression Dictionaries for HTTP/2

  `(draft-vkrasnov-h2-compression-dictionaries)`

- Zstandard

  `(RFC 8478)`

Challenges

Statefulness

Complexity

Security

Compression in general.

CRIME/BREACH/HEIST/&c.

Security Considerations Regarding
Compression Dictionaries

(draft-kucherawy-httpbis-dict-sec)

Current Work: Implementation

FB is shipping dictionary compression for HTTP

Static dedicated dictionary

Expect ∼30% improvement over Zlib
Expect ∼15% improvement over Brotli

Conclusion

Looking for interested parties:

potential collaborators, implementors, browsers

Thanks!

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