STATEFUL COMPRESSION

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Zstandard

(RFC 8478)
improving compression
HTTP response content-coding
small responses (<16 KB)
external context
Compression

effective compression \approx \text{modeling input} \approx \text{context}

\text{context (aka state)} \approx \text{input stream history}

short messages \rightarrow \text{no history} \rightarrow \text{no model} \rightarrow \text{poor compression}
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
Challenge: 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 $\sim 30\%$ improvement over Zlib
Expect $\sim 15\%$ improvement over Brotli
Looking for interested parties:
potential collaborators, implementors, browsers
Thanks!

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