HeaderDiff
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Overview

- Compact encoding of HTTP headers
  - Take advantage of similarities between header sets
- Encoder driven
  - Simple, “generic” and “dumb” decoder
  - Encoder can be simple or very complex
    - Adaptable to different scenario
    - Adaptable to HTTP usage evolution
Principle

- **Header Table**: list of (name, value) pairs
  - Most headers represented as index
  - Customizable maximum size
    - Works well with small size
- **Encoder decides insertions and deletions**
  - Transmitted on the wire
    - Simpler for the decoder
Index Tables

• Name Table
  • Index of all the header names
  • Pre-populated with common entries

• Header Table
  • Index of (name, value) pairs
  • Three choices for a new pair
    • Not added to the table
    • Added to the table
    • Replace an existing pair
Header Representation

- **Index**
  - Reference to a (name, value) pair

- **Literal**
  - Existing or new name
  - New value

- **Delta**
  - Reference to a (name, value) (same name)
  - Value has a common prefix + new suffix
Low-Level Encoding

- **Design**
  - Byte-aligned streams
  - Frequent headers encoded on 1 byte

- **Implementation**
  - Representation choice: 2-3 bits
  - Indexing mode (add or replace): 1 bit
  - Data: remaining bits + 0 or more bytes
Deflate

• Post-processing of encoded headers
  • More compact and faster than SPDY/3

• Optional Step
  • Too costly in some setups
  • Can be source of security risks
    • Subject to CRIME attacks
Making Deflate Secure

• Disable Deflate for sensitive interactions
  • Secure connections (i.e. https) in open environments (i.e. browser)

• Use a partial Deflate
  • Sensitive headers are not compressed

• Remove sensitive information from headers
  • New authentication mechanism
Open Questions

- Typed Codecs
  - Dates, integers...

- Parameter Negotiation
  - Maximum Header Table size
  - Deflate usage
## Preliminary Results

<table>
<thead>
<tr>
<th></th>
<th>Codec size relative to HTTP size</th>
<th>Request</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPDY/3</strong></td>
<td></td>
<td>10,4 %</td>
<td>14,7 %</td>
</tr>
<tr>
<td><strong>HeaderDiff</strong></td>
<td></td>
<td>14,8 %</td>
<td>16,2 %</td>
</tr>
<tr>
<td><strong>HeaderDiff</strong></td>
<td>Small Buffer</td>
<td>19,4 %</td>
<td>23,4 %</td>
</tr>
<tr>
<td><strong>HeaderDiff</strong></td>
<td>+ Deflate</td>
<td>6,51 %</td>
<td>10,5 %</td>
</tr>
</tbody>
</table>
Summary

- Compact HTTP Header representation
  - Simple and “dumb” Decoder
  - Controller by Encoder
- Good compaction results
  - Can adapt to small buffer
- Combine well with Deflate
  - Optional step
Questions?