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Unreliable Transmission Extension for HTTP/2 over QUIC
draft-tiesel-quic-unreliable-http-00

Abstract

This draft outlines methods for requesting unreliable delivery of HTTP response bodies over QUIC with unreliable streams specified in [I-D.tiesel-quic-unreliable-streams].

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1. Conventions and Definitions

The words "MUST", "MUST NOT", "SHALL", "SHALL NOT", "SHOULD", and "MAY" are used in this document. It's not shouting; when these words are capitalized, they have a special meaning as defined in [RFC2119].

2. Introduction

HTTP has become part of application protocols used for time sensitive applications such as video streaming and back-office ad auctions. These applications might have time constraints that can make retransmissions of lost frames useless. Some of these applications can operate on partially delivered messages, but waiting for retransmissions blocks the delivery of data after a gap in the stream by design.

This draft enables applications to request partial delivery of HTTP objects by allowing to disable retransmissions for HTTP response bodies.

3. General Concept

This draft specifies a new HTTP header for requesting unreliable delivery of the HTTP request body. For answering requests including this header, the server uses unreliable QUIC streams as specified in [I-D.tiesel-quic-unreliable-streams] to transfer HTTP request bodies in a (partially) unreliable way. To use the regular HTTP client logic, headers are always transferred reliably.

4. Requesting Unreliable transmission

By adding the following header, an HTTP client can request unreliable transmission of the response body

Transport-Response-Reliability: unreliable

In case unreliable transmission should only be used to prevent retransmissions after a certain deadline, the client hat add the following header

Transport-Response-Reliability: unreliable-after DATE

Where DATE is either a relative offset in milliseconds or a date as specified in [RFC7231] with optionally extending time-of-day to

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time-of-day = hour ":" minute ":" second
            | hour ":" minute ":" second "." msec
```

In case of having requested unreliable delivery with the "unreliable-after" verb, retransmissions on that stream should be stopped after the time specified.

For unreliable deliver with using the "unreliable" verb, the server may use domain knowledge about the data transmitted to decide whether to retransmit parts of the data.

5. Stream Mapping

The stream mapping scheme changes between versions -04 and -05 of [I-D.ietf-quic-http]. While version -04 separates HTTP header and body into different QUIC streams, version -05 transports multiple HTTP/2 frames of different types within one stream. We present different stream mapping for these versions.

Note that draft-ietf-quic-http-04 allows a simpler implementation as it does not require partial retransmission within an unreliable stream.

5.1. Stream Mapping for draft-ietf-quic-http-04

The control stream MUST alway use a reliable stream to ease state keeping.

When indicated by the "Transport-Response-Reliability" HTTP header, the server SHOULD open the data stream as unreliable stream.

5.2. Stream Mapping for draft-ietf-quic-http-05

As a prerequisite to requesting unreliable delivery of HTTP objects, the client MUST open a stream used for the request as an unreliable stream. The "Transport-Response-Reliability" HTTP header sent over reliable streams SHOULD be ignored.

Despite opening the stream as an unreliable stream, all HTTP/QUIC frame headers, as well as the payload of "HEADERS" frames, MUST be transmitted reliably to re-use normal HTTP/2 application logic.

6. Security Considerations

TBD

7. IANA Considerations

TBD

8. References

8.1. Normative References

[RFC7231] Fielding, R., Ed. and J. Reschke, Ed., "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content", RFC 7231, DOI 10.17487/RFC7231, June 2014, <https://www.rfc-editor.org/info/rfc7231>.

[RFC7540] Belshe, M., Peon, R., and M. Thomson, Ed., "Hypertext Transfer Protocol Version 2 (HTTP/2)", RFC 7540, DOI 10.17487/RFC7540, May 2015, <https://www.rfc-editor.org/info/rfc7540>.

8.2. Informative References

[I-D.ietf-quic-http]
Bishop, M., "Hypertext Transfer Protocol (HTTP) over QUIC", draft-ietf-quic-http-05 (work in progress), August 2017.

[I-D.ietf-quic-transport]
Iyengar, J. and M. Thomson, "QUIC: A UDP-Based Multiplexed and Secure Transport", draft-ietf-quic-transport-05 (work in progress), August 2017.

[I-D.tiesel-quic-unreliable-streams]
Tiesel, P., Palmer, M., Chandrasekaran, B., Feldmann, A., and J. Ott, "Considerations for Unreliable Streams in QUIC", draft-tiesel-quic-unreliable-streams-00 (work in progress), September 2017.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

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