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Bootstrapping WebSockets with HTTP/3

Abstract

The mechanism for running the WebSocket Protocol over a single stream of an HTTP/2 connection is equally applicable to HTTP/3, but the HTTP version-specific details need to be specified. This document describes how the mechanism is adapted for HTTP/3.

About This Document

This note is to be removed before publishing as an RFC.

Status information for this document may be found at https://datatracker.ietf.org/doc/draft-ietf-httpbis-h3-websockets/.

Discussion of this document takes place on the HTTP Working Group mailing list (mailto:ietf-http-wg@w3.org), which is archived at https://lists.w3.org/Archives/Public/ietf-http-wg/. Working Group information can be found at https://httpwg.org/.

Source for this draft and an issue tracker can be found at https://github.com/httpwg/http-extensions/labels/h3-websockets.

Status of This Memo

Copyright Notice

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1. Introduction

"Bootstrapping WebSockets with HTTP/2" [RFC8441] defines an extension to HTTP/2 [HTTP2] which is also useful in HTTP/3 [HTTP3]. This extension makes use of an HTTP/2 setting. Appendix A.3 of [HTTP3] gives some guidance on what changes (if any) are appropriate when porting settings from HTTP/2 to HTTP/3.

2. Conventions and Definitions

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**NOT RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. Websockets Upgrade over HTTP/3

[RFC8441] defines a mechanism for running the WebSocket Protocol [RFC6455] over a single stream of an HTTP/2 connection. It defines an Extended CONNECT method which specifies a new ":protocol" pseudo-header field and new semantics for the ":path" and ":authority" pseudo-header fields. It also defines a new HTTP/2 setting sent by a server to allow the client to use Extended CONNECT.

The semantics of the pseudo-header fields and setting are identical to those in HTTP/2 as defined [RFC8441]. Appendix A.3 of [HTTP3] requires that HTTP/3 settings be registered separately for HTTP/3. The SETTINGS_ENABLE_CONNECT_PROTOCOL value is 0x08 (decimal 8), as in HTTP/2.

If a server advertises support for Extended CONNECT but receives an Extended CONNECT request with a ":protocol" value that is unknown or is not supported, the server **SHOULD** respond to the request with a 501 (Not Implemented) status code (Section 15.6.2 of [HTTP]). A server **MAY** provide more information via a Problem Details response [RFC7807].

The HTTP/3 stream closure is also analogous to the TCP connection closure of [RFC6455]. Orderly TCP-level closures are represented as a FIN bit on the stream (Section 4.2 of [HTTP3]). RST exceptions are represented with a stream error (Section 8 of [HTTP3]) of type H3_REQUEST_CANCELLED (Section 8.1 of [HTTP3]).

4. Security Considerations

This document introduces no new security considerations beyond those discussed in [RFC8441].

5. IANA Considerations

This document registers a new setting in the "HTTP/3 Settings" registry (Section 11.2.2 of [HTTP3]).

Value: 0x08

Setting Name: SETTINGS_ENABLE_CONNECT_PROTOCOL

Default: 0

Status: permanent

Specification: This Document

Date: [date of publication]

Change Controller: IETF

Contact: HTTP Working Group (ietf-http-wg@w3.org)

Notes:

6. Normative References

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[HTTP3] Bishop, M., "Hypertext Transfer Protocol Version 3 (HTTP/3)", Work in Progress, Internet-Draft, draft-ietf-quic-http-34, 2 February 2021, <https://datatracker.ietf.org/doc/html/draft-ietf-quic-http-34>.

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[RFC6455] Fette, I. and A. Melnikov, "The WebSocket Protocol", RFC 6455, DOI 10.17487/RFC6455, December 2011, <https://www.rfc-editor.org/rfc/rfc6455>.

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[RFC8441] McManus, P., "Bootstrapping WebSockets with HTTP/2", RFC 8441, DOI 10.17487/RFC8441, September 2018, <https://www.rfc-editor.org/rfc/rfc8441>.

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