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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.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at https://www.rfc-editor.org/info/rfc9220.

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1. Introduction

"Bootstrapping WebSockets with HTTP/2" [RFC8441] defines an extension to HTTP/2 [HTTP/2] that is also useful in HTTP/3 [HTTP/3]. This extension makes use of an HTTP/2 setting. Appendix A.3 of [HTTP/3] 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 that 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 in [RFC8441]. Appendix A.3 of [HTTP/3] 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 4.4 of [HTTP/3]). RST exceptions are represented with a stream error (Section 8 of [HTTP/3]) of type H3_REQUEST_CANCELLED (Section 8.1 of [HTTP/3]).

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 [HTTP/3]).

Value: 0x08
Setting Name: SETTINGS_ENABLE_CONNECT_PROTOCOL
Default: 0
Status: permanent
Specification: This document
Change Controller: IETF
Contact: HTTP Working Group (ietf-http-wg@w3.org)

6. Normative References

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[RFC7807] Nottingham, M. and E. Wilde, "Problem Details for HTTP APIs", RFC 7807, DOI 10.17487/RFC7807, March 2016, <https://www.rfc-editor.org/info/rfc7807>.

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