

Workgroup: HTTP
Internet-Draft:
draft-ietf-httpbis-h3-websockets-04
Published: 8 February 2022
Intended Status: Standards Track
Expires: 12 August 2022
Authors: R. Hamilton
Google

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

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <https://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 12 August 2022.

Copyright Notice

Copyright (c) 2022 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Revised BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Revised BSD License.

Table of Contents

- [1. Introduction](#)
- [2. Conventions and Definitions](#)
- [3. Websockets Upgrade over HTTP/3](#)
- [4. Security Considerations](#)
- [5. IANA Considerations](#)
- [6. Normative References](#)
- [Acknowledgments](#)
- [Author's Address](#)

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

[HTTP] Fielding, R. T., Nottingham, M., and J. Reschke, "HTTP Semantics", Work in Progress, Internet-Draft, draft-ietf-httpbis-semantics-19, 12 September 2021, <<https://>

datatracker.ietf.org/doc/html/draft-ietf-httpbis-semantics-19>.

- [HTTP2] Thomson, M. and C. Benfield, "HTTP/2", Work in Progress, Internet-Draft, draft-ietf-httpbis-http2bis-07, 24 January 2022, <<https://datatracker.ietf.org/doc/html/draft-ietf-httpbis-http2bis-07>>.
- [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>>.
- [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/rfc/rfc2119>>.
- [RFC6455] Fette, I. and A. Melnikov, "The WebSocket Protocol", RFC 6455, DOI 10.17487/RFC6455, December 2011, <<https://www.rfc-editor.org/rfc/rfc6455>>.
- [RFC7807] Nottingham, M. and E. Wilde, "Problem Details for HTTP APIs", RFC 7807, DOI 10.17487/RFC7807, March 2016, <<https://www.rfc-editor.org/rfc/rfc7807>>.
- [RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/rfc/rfc8174>>.
- [RFC8441] McManus, P., "Bootstrapping WebSockets with HTTP/2", RFC 8441, DOI 10.17487/RFC8441, September 2018, <<https://www.rfc-editor.org/rfc/rfc8441>>.

Acknowledgments

This document had reviews and input from many contributors in the IETF HTTP and QUIC Working Groups, with substantive input from David Schinazi, Martin Thomson, Lucas Pardue, Mike Bishop, Dragana Damjanovic, Mark Nottingham, and Julian Reschke.

Author's Address

Ryan Hamilton
Google

Email: rch@google.com