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Authors: (M. Yamamoto)
The University of Tokyo/WIDE Project

SETTINGS_ENABLE_WEBSOCKETS settings parameter for HTTP/2 and HTTP/3

Abstract

This document proposes a new HTTP settings parameter, SETTINGS_ENABLE_WEBSOCKETS. This parameter indicates whether the server supports bootstrapping WebSockets over the established connection.

Discussion Venues

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

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

Source for this draft and an issue tracker can be found at https://github.com/momoka0122y/draft-settings-enable-websockets.

Status of This Memo

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

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This Internet-Draft will expire on 1 October 2023.

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1. Introduction

The mechanisms for running the WebSocket protocol [RFC6455] over a single stream of an HTTP/2 and HTTP/3 connection is defined in [RFC8441] and [RFC9220]. The extended CONNECT mechanism is used for bootstrapping WebSockets from HTTP/2 and HTTP/3. Support for the extended CONNECT mechanism is advertised using HTTP/2 and HTTP/3 settings parameter SETTINGS_ENABLE_CONNECT_PROTOCOL.

However, the support of extended CONNECT does not necessarily indicate support for WebSockets over that HTTP connection. Other protocols such as [WEBTRANSPORT] also use extended CONNECT and send SETTINGS_ENABLE_CONNECT_PROTOCOL settings parameters as well.

Suppose the server supports Extended CONNECT and has a wss:// URL, but does not support bootstrapping WebSockets over this HTTP connection. In this case, a client attempting to initiate a WebSocket handshake using Extended CONNECT will fail, and the client would need to create a WebSocket connection using the HTTP/1.1 Upgrade mechanism.

This is why a SETTINGS_ENABLE_WEBSOCKETS settings parameter is needed.

2. SETTINGS_ENABLE_WEBSOCKETS Parameter

This document defines the SETTINGS_ENABLE_WEBSOCKETS parameter for HTTP/2 and HTTP/3. A server can send this setting to inform a client that it supports bootstrapping WebSockets over the HTTP connection.

The value of the parameter MUST be 0 or 1.

This parameter has no default value, as its absence indicates a lack of information from the server.

If the server supports bootstrapping WebSockets over the HTTP connection, it SHOULD include the SETTINGS_ENABLE_WEBSOCKETS parameter in the SETTINGS frame with a value of 1. If the server does not support bootstrapping WebSockets over the HTTP connection it SHOULD send the parameter with a value of 0.

A server MUST NOT send a SETTINGS_ENABLE_WEBSOCKETS parameter with the value of 0 after previously sending a value of 1.

A client MUST NOT send this setting parameter. Receipt of this parameter by a server does not have any impact.

The SETTINGS_ENABLE_WEBSOCKETS parameter is an explicit signal about the server support for bootstrapping WebSockets on the connection. Where a server declares it does not support WebSockets, clients can avoid sending WebSocket handshake requests that would fail. This saves unnecessary work for both client and server, and potentially reduces delays. For instance, a client that learns an HTTP/2 or HTTP/3 connection does not support WebSockets via the setting, could instead attempt to create a WebSocket using the HTTP/1.1 Upgrade mechanism at the immediate moment it is required.

Other protocols also rely on the extended CONNECT extension for bootstrapping. This mechanism provides clients with a stronger signal about whether the WebSocket protocol is supported on a connection. This can help improve compatibility with other extended CONNECT-based protocols by avoiding the client making assumption about the supported protocols.

Clients that do not implement this extension will not be able to use its signal. In order to support legacy deployments, clients MAY initiate a WebSocket request when they receive SETTINGS_ENABLE_WEBSOCKETS with a value of 0, or if the parameter is omitted from received settings. Such requests could fail, introducing additional latency, which this extension is intended to help avoid.

A server that sends SETTINGS_ENABLE_WEBSOCKETS with a value of 0 or omits the parameter MUST NOT treat reception of the a WebSocket request as a stream or connection error. Instead, the server can reject the request with a suitable status code.

3. SETTINGS_ENABLE_CONNECT_PROTOCOL Parameter

A server which sends SETTINGS_ENABLE_WEBSOCKETS parameter MUST also send the SETTINGS_ENABLE_CONNECT_PROTOCOL = 1.

4. Security Considerations

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

5. IANA Considerations

5.1. HTTP/2 Setting

IANA is requested to register the following entry in the "HTTP/2 Settings" registry maintained at <https://www.iana.org/assignments/http2-parameters>:

Code: TBD

Name: SETTINGS_ENABLE_WEBSOCKETS

Initial Value: None

Specification: This document

5.2. HTTP/3 Setting

IANA is requested to register the following entry in the "HTTP/3 Settings" registry maintained at <https://www.iana.org/assignments/http3-parameters>:

Value: TBD

Setting Name: SETTINGS_ENABLE_WEBSOCKETS

Default: None

Status: provisional

Reference: This document

Change Controller: Momoka Yamamoto (IETF if this document is approved)

Contact: Momoka Yamamoto (HTTP_WG; HTTP working group; ietf-http-wg@w3.org if this document is approved)

6. References

6.1. Normative References

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[RFC9220] Hamilton, R., "Bootstrapping WebSockets with HTTP/3", RFC 9220, DOI 10.17487/RFC9220, June 2022, <https://www.rfc-editor.org/rfc/rfc9220>.

6.2. Informative References

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Acknowledgments

TODO acknowledge people.

Thank you for reading this draft. :)

Author's Address

Momoka Yamamoto
The University of Tokyo/WIDE Project
Japan

Email: momoka.my6@gmail.com
Additional contact information:

Japan
The University of Tokyo/WIDE Project