HTTP Working Group
Internet-Draft
Intended status: Standards Track
Expires: April 1, 2017

M. Nottingham
E. Nygren
Akamai

September 28, 2016

The ORIGIN HTTP/2 Frame
draft-ietf-httpbis-origin-frame-01

Abstract

This document specifies the ORIGIN frame for HTTP/2, to indicate what origins are available on a given connection.

Note to Readers

Discussion of this draft 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/ .

Working Group information can be found at http://httpwg.github.io/ ; source code and issues list for this draft can be found at https://github.com/httpwg/http-extensions/labels/origin-frame .

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 http://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 April 1, 2017.

Copyright Notice

Table of Contents

1. Introduction

HTTP/2 [RFC7540] allows clients to coalesce different origins [RFC6454] onto the same connection when certain conditions are met. However, in certain cases, a connection is is not usable for a coalesced origin, so the 421 (Misdirected Request) status code ([RFC7540], Section 9.1.2) was defined.

Using a status code in this manner allows clients to recover from misdirected requests, but at the penalty of adding latency. To address that, this specification defines a new HTTP/2 frame type, "ORIGIN", to allow servers to indicate what origins a connection is usable for.

1.1. Notational Conventions

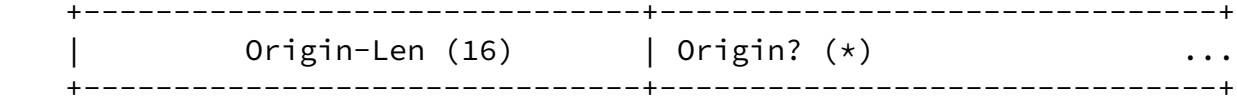
The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

2. The ORIGIN HTTP/2 Frame

The ORIGIN HTTP/2 frame ([RFC7540], Section 4) allows a server to indicate what origin(s) [RFC6454] the server would like the client to

consider as members of the Origin Set (Section 2.1) for the connection it occurs within.

The ORIGIN frame type is 0xb (decimal 11).



The ORIGIN frame's payload contains the following fields, sets of which may be repeated within the frame to indicate multiple origins:

Origin-Len: An unsigned, 16-bit integer indicating the length, in octets, of the Origin field.

Origin: An optional sequence of characters containing the ASCII serialization of an origin ([RFC6454], Section 6.2) that the sender believes this connection is or could be authoritative for.

The ORIGIN frame defines the following flags:

CLEAR (0x1): Indicates that the Origin Set MUST be reset to an empty set before processing the contents of the frame it occurs upon.

REMOVE (0x2): Indicates that the origin(s) carried in the payload must be removed from the Origin Set, if present; if not present, it/they have no effect.

2.1. The Origin Set

The set of origins (as per [RFC6454]) that a given connection might be used for is known in this specification as the Origin Set.

When a connection is first established, its Origin Set is defined to be those origins that the client would normally consider the connection authoritative for; see [RFC7540], Section 10.1.

The ORIGIN frame allows the server to modify the Origin Set. In particular:

1. A server can add to its members by sending an ORIGIN frame

(without any flags set);

2. A server can prune one or more origins from it by sending an ORIGIN frame with the REMOVE flag set;

3. A server can remove all its members and then add zero or more members by sending an ORIGIN frame with the CLEAR flag set and a payload containing the new origins.

Adding to the Origin Set (cases 1 and 3 above) does not imply that the connection is authoritative for the added origins (in the sense

of [RFC7540], Section 10.1) on its own; this MUST be established by some other mechanism.

A client that implements this specification MUST NOT use a connection for a given origin unless that origin appears in the Origin Set for the connection, regardless of whether or not it believes that the connection is authoritative for that origin.

2.2. Processing ORIGIN Frames

The ORIGIN frame is a non-critical extension to HTTP/2. Endpoints that do not support this frame can safely ignore it upon receipt.

When received by a client, it can be used to inform HTTP/2 connection coalescing (see Section 2.1), but does not relax the requirement there that the server is authoritative.

The origin frame MUST be sent on stream 0; an ORIGIN frame on any other stream is invalid and MUST be ignored.

The ORIGIN frame is processed hop-by-hop. An intermediary MUST NOT forward ORIGIN frames. Clients configured to use a proxy MUST ignore any ORIGIN frames received from it.

The following algorithm illustrates how a client can handle received ORIGIN frames:

1. If the client is configured to use a proxy, ignore the frame and stop processing.

2. If the frame occurs upon any stream except stream 0, ignore the frame and stop processing.

3. If the CLEAR flag is set, remove all members from the Origin Set.

4. For each Origin field "origin_raw" in the frame payload:

    1. Parse "origin_raw" as an ASCII serialization of an origin ([RFC6454], Section 6.2) and let the result be "parsed_origin".

    2. If the REMOVE flag is set, remove any member of the Origin Set that is the same as "parsed_origin" (as per [RFC6454], Section 5), and continue to the next "parsed_origin".

    3. Otherwise, add "parsed_origin" to the Origin Set.

3. Security Considerations

Clients that blindly trust the ORIGIN frame's contents will be vulnerable to a large number of attacks; hence the reinforcement that this specification does not relax the requirement for server authority in [RFC7540], Section 10.1.

4. Normative References

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

[RFC6454] Barth, A., "The Web Origin Concept", RFC 6454, DOI 10.17487/RFC6454, December 2011, <http://www.rfc-editor.org/info/rfc6454>.

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

Authors' Addresses

Mark Nottingham
Akamai

Email: mnot@mnot.net
URI: https://www.mnot.net/

Erik Nygren
Akamai

Email: nygren@akamai.com