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A. Hutton
Unify
J. Uberti
Google
M. Thomson
Mozilla
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The Tunnel-Protocol HTTP Request Header Field
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Abstract

This specification allows HTTP CONNECT requests to indicate what protocol will be used within the tunnel once established, using the Tunnel-Protocol request header field.

Editorial Note (To be removed by RFC Editor)

Discussion of this draft takes place on the HTTPBIS working group mailing list (ietf-http-wg@w3.org), which is archived at [\[1\]](#).

Working Group information can be found at [\[2\]](#) and [\[3\]](#); source code and issues list for this draft can be found at [\[4\]](#).

Status of This Memo

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1. Introduction

The HTTP CONNECT method ([Section 4.3.6 of \[RFC7231\]](#)) requests that the recipient establish a tunnel to the identified origin server and thereafter forward packets, in both directions, until the tunnel is closed. Such tunnels are commonly used to create end-to-end virtual connections, through one or more proxies, which may then be secured using TLS (Transport Layer Security, [\[RFC5246\]](#)).

The HTTP Tunnel-Protocol header field identifies the protocol that will be spoken within the tunnel, using the application layer next protocol identifier [\[RFC7301\]](#) specified for TLS [\[RFC5246\]](#).

When CONNECT is used to establish a TLS tunnel, the Tunnel-Protocol header field may be used to carry the same application protocol label as will be carried within the TLS handshake. If there are multiple possible application protocols, all of those application protocols are indicated.

The Tunnel-Protocol header field carries an indication only. In TLS, the final choice of application protocol is made by the server. Proxies do not implement the tunneled protocol, though they might choose to make policy decisions based on the value of the header field.

1.1. Requirements Language

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 [RFC 2119](#) [[RFC2119](#)].

2. The Tunnel-Protocol HTTP Request Header Field

Clients include the `Tunnel-Protocol` Request Header field in an HTTP CONNECT request to indicate the application layer protocol will be used within the tunnel, or the set of protocols that might be used within the tunnel.

2.1. Header Field Values

Valid values for the protocol field are taken from the registry established in [[RFC7301](#)].

2.2. Syntax

The ABNF (Augmented Backus-Naur Form) syntax for the `Tunnel-Protocol` header field is given below. It is based on the Generic Grammar defined in [Section 2 of \[RFC7230\]](#).

```
Tunnel-Protocol = "Tunnel-Protocol":" 1#protocol-id
protocol-id      = token ; percent-encoded ALPN protocol identifier
```

ALPN protocol names are octet sequences with no additional constraints on format. Octets not allowed in tokens ([\[RFC7230\]](#), [Section 3.2.6](#)) must be percent-encoded as per [Section 2.1 of \[RFC3986\]](#). Consequently, the octet representing the percent character "%" (hex 25) must be percent-encoded as well.

In order to have precisely one way to represent any ALPN protocol name, the following additional constraints apply:

- o Octets in the ALPN protocol must not be percent-encoded if they are valid token characters except "%", and
- o When using percent-encoding, uppercase hex digits must be used.

With these constraints, recipients can apply simple string comparison to match protocol identifiers.

For example:

```
CONNECT www.example.com HTTP/1.1
Host: www.example.com
Tunnel-Protocol: h2, http%2F1.1
```

3. IANA Considerations

HTTP header fields are registered within the "Message Headers" registry maintained at [5]. This document defines and registers the `Tunnel-Protocol` header field, according to [RFC3864] as follows:

Header Field Name: Tunnel-Protocol

Protocol: http

Status: Standard

Reference: [Section 2](#)

Change Controller: IETF (iesg@ietf.org) - Internet Engineering Task Force

4. Security Considerations

In case of using HTTP CONNECT to a TURN server the security considerations of [Section 4.3.6 of \[RFC7231\]](#) apply. It states that there "are significant risks in establishing a tunnel to arbitrary servers, particularly when the destination is a well-known or reserved TCP port that is not intended for Web traffic. Proxies that support CONNECT SHOULD restrict its use to a limited set of known ports or a configurable whitelist of safe request targets."

The `Tunnel-Protocol` request header field described in this document is an optional header. Clients and HTTP Proxies could choose to not support the header and therefore fail to provide it, or ignore it when present. If the header is not available or ignored, a proxy cannot identify the purpose of the tunnel and use this as input to any authorization decision regarding the tunnel. This is indistinguishable from the case where either client or proxy does not support the `Tunnel-Protocol` header.

5. References

5.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC3864] Klyne, G., Nottingham, M., and J. Mogul, "Registration Procedures for Message Header Fields", [BCP 90](#), [RFC 3864](#), September 2004.
- [RFC3986] Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, [RFC 3986](#), January 2005.
- [RFC7230] Fielding, R. and J. Reschke, "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing", [RFC 7230](#), June 2014.
- [RFC7231] Fielding, R. and J. Reschke, "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content", [RFC 7231](#), June 2014.
- [RFC7301] Friedl, S., Popov, A., Langley, A., and E. Stephan, "Transport Layer Security (TLS) Application-Layer Protocol Negotiation Extension", [RFC 7301](#), July 2014.

5.2. Informative References

- [RFC5246] Dierks, T. and E. Rescorla, "The Transport Layer Security (TLS) Protocol Version 1.2", [RFC 5246](#), August 2008.

5.3. URIs

- [1] <https://www.iana.org/assignments/message-headers>

Authors' Addresses

Andrew Hutton
Unify
Technology Drive
Nottingham NG9 1LA
UK

E-Mail: andrew.hutton@unify.com

Justin Uberti
Google
747 6th Ave S
Kirkland, WA 98033
US

EMail: justin@uberti.name

Martin Thomson
Mozilla
331 E Evelyn Street
Mountain View, CA 94041
US

EMail: martin.thomson@gmail.com

