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HTTP 2.0 Negotiation
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Abstract

This document describes an Upgrade-based protocol negotiation proposal for HTTP 2.0.

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1. Introduction

HTTP/2.0 will have the capability (but not the requirement) to use the same ports as HTTP/1.X, typically, but not limited to, 80 (in the clear) and 443 (when over TLS/SSL). Of course, it is possible for a client to somehow acquire knowledge that a server implements HTTP/2.0 at a given port. In such a case, the client can immediately begin sending HTTP/2.0 binary frames to the server, and the server can immediately respond with the corresponding HTTP/2.0 frames. How that knowledge is acquired is not the subject of this note. It could be acquired by some out-of-band means such as using the DNS/DANE, or by some configuration prior to the HTTP/2.0 exchange. Or it could have been acquired earlier in-band in an earlier exchange. It could have been acquired at an earlier phase of this same exchange, for example, via TLS-NPN.

Nevertheless, there may be some situations, in which the client can only assume that a server speaks HTTP/1.X. In such cases, a connection upgrade mechanism to opportunistically attempt to HTTP/2.0 is essential. Otherwise, the exchange will remain at HTTP/1.X despite both client and server being able to speak HTTP/2.0.

This document specifies such a connection upgrade for HTTP/2.0. This handshake does not incur any extra delay in obtaining a response in HTTP/2.0, as the protocol switch is immediate and effective within the first round trip. There is no delay either if there is no protocol switch, as the server is capable to respond via HTTP/1.1 also within the first initial round trip.

This handshake uses the Upgrade header defined in HTTP/1.1 [[I-D.ietf-httpbis-p1-messaging](#)]. This Upgrade header is also in wide use by the WebSocket protocol for similar purposes [[RFC6455](#)].

The goal of this document is to propose additional text to the HTTP/2.0 specification. The starting point for HTTP/2.0, the SPDY [[I-D.mbelshe-httpbis-spy](#)] protocol, has no language with respect to a connection upgrade procedure. Hence, the text below could be incorporated as a new section or sections within the HTTP/2.0 document.

2. Negotiation

If a client has no knowledge about a server's support for HTTP/2.0, it starts with HTTP/1.1 and attempt an upgrade to HTTP/2.0 as follows:

```
GET /default.htm HTTP/1.1
Host: server.example.com
Connection: Upgrade
Upgrade: HTTP/2.0
```

If the server does not support the new protocol, it will simply respond to the client using HTTP/1.1:

```
HTTP/1.1 200 OK
Content-length: 243
Content-type: text/html
...
```

If the server switches to the new protocol, it will signal so via a 101 response. The server switches to HTTP/2.0 immediately after the empty line which terminates the 101 response [[I-D.ietf-httpbis-p2-semantics](#)].

```
HTTP/1.1 101 Switching Protocols
Connection: Upgrade
Upgrade: HTTP/2.0

[ HTTP/2.0 frame ]
```


3. Optimizing the Handshake

This handshake may be further optimized by the definition of HTTP headers of the form "HTTP2-header_name". These "HTTP2" headers would be meant to be interpreted exclusively by HTTP/2.0 servers and applied upon a successful Upgrade to further optimize or proactively configure the subsequent HTTP/2.0 exchanges. These headers would be ignored by HTTP/1.1 servers. The HTTP2 headers are for future revisions of this document.

4. Acknowledgements

This document incorporates material from
[[I-D.tarreau-httpbis-network-friendly](#)] and
[[I-D.montenegro-httpbis-speed-mobility](#)].

This document was produced using the xml2rfc tool [[RFC2629](#)].

5. References

5.1. Normative References

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