Upgrade-based Negotiation for HTTP/2.0


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Role of Upgrade-based negotiation

Role #1: A mechanism to use in the absence of any knowledge about the server’s HTTP/2 capability, in order to upgrade from HTTP/1.X to HTTP/2

• If a server at a given port is known to be HTTP/2 capable, no need for negotiation.
• Many ways to acquire knowledge that a server speaks HTTP/2
  – DNS
  – Negotiation at a lower layer of the stack (TLS–NPN)
  – Alternate-Protocol header
  – Previous successful run of this Upgrade–based header
  – Pixie dust, configuration, etc.
• But: Bypassing an upgrade handshake and starting a new Request/Response Exchange with HTTP/2 directly could result in more failures to communicate (e.g., due to inspecting intermediaries)
Proposal

• Client initiates assuming HTTP/1.1 and proposes HTTP/2 switch via the Upgrade header defined in HTTP/1.1
  – also used by RFC6455 (WebSockets)
• No extra delay
• If server switches to HTTP/2.0:
  – protocol switch is immediate
  – effective within the first round trip
• If server does not switch to HTTP/2.0:
  – server ignores the Upgrade header
  – responds in HTTP/1.1 as usual.
• Further optimizations possible as client could also use
  – HTTP2-<header_name>
  – Ignored by HTTP/1.X servers, consumed by HTTP/2 servers
Negotiation Flow

Client attempts a switch to HTTP/2:

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

Server accepts the switch (else just respond in 1.X):

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

[ HTTP/2.0 frame ]