Spring Boot Microservices

Beginner to Guru

HTTP - Hypertext Transfer Protocol

HTTP History

- Development of HTTP was started by Tim Berners-Lee of CERN in 1989
- HTTP/0.9 is the Original HTTP proposal by Tim Berners-Lee
- Started as a telnet friendly protocol

HTTP History

```
$> telnet google.com 80

Connected to 74.125.xxx.xxx

GET /about/

(hypertext response)
(connection closed)
```

HTTP History

- HTTP/1.0 - From 1991 to 1995 the HTTP/HTML specifications grew rapidly
- New software known as a “web browser” emerged
- HTTP standards were developed by:
  - IETF - Internet Engineering Task Force
  - W3C - World Wide Web Consortium

HTTP History - HTTP/1.0

```
$> telnet website.org 80

Connected to xxx.xxx.xxx.xxx

GET /rfc/rfc1945.txt HTTP/1.0 (1)
User-Agent: CERN-LineMode/2.15 libwww/2.17b3
Accept: */*

HTTP/1.0 200 OK (2)
Content-Type: text/plain
Content-Length: 137582
Expires: Thu, 01 Dec 1997 16:00:00 GMT
Last-Modified: Wed, 1 May 1996 12:45:26 GMT
Server: Apache 0.84

(plain-text response)
(connection closed)
```

1. Request line with HTTP version number, followed by request headers
2. Response status, followed by response headers

HTTP History - HTTP/1.1

- HTTP/1.1 - Originally released in 1997
  - Solved a lot of ambiguities from earlier versions
  - Added support for keep alive connections, chunked encoding transfers, byte-range requests, transfer encodings, and request pipelining

HTTP History - HTTP/1.1

- HTTP/1.1 - Updated by RFC 2616 in 1999
- Updated again by RFC 7230 in 2014
- Still in use today

HTTP History - HTTP/1.1

- **Request** Added encoding, charset, and cookies

```
$> telnet website.org 80
Connected to xxx.xxx.xxx.xxx

GET /index.html HTTP/1.1 (1)
Host: website.org
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_7_4)... (snip)
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Encoding: gzip,deflate,sdch
Accept-Language: en-US,en;q=0.8
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.3
Cookie: __qca=P0-800083390... (snip)
```

HTTP History - HTTP/1.1

- **Response** - Added encoding, charset, and cookies

```
HTTP/1.1 200 OK (2)
Server: nginx/1.0.11
Connection: keep-alive
Content-Type: text/html; charset=utf-8
Via: HTTP/1.1 GWA
Date: Wed, 25 Jul 2012 20:23:35 GMT
Expires: Wed, 25 Jul 2012 20:23:35 GMT
Cache-Control: max-age=0, no-cache
Transfer-Encoding: chunked

100 (3)
<!doctype html>
(snip)

100
(snip)

0 (4)
```

HTTP History - HTTP/2

- HTTP/2 Standardized in 2015
  - Originally named HTTP/2.0
- Supported by most servers and browsers by the end of 2015
- As of October 2021, 47% of the top 10 Million websites supported HTTP/2
- Has high level of compatibility with HTTP/1.1

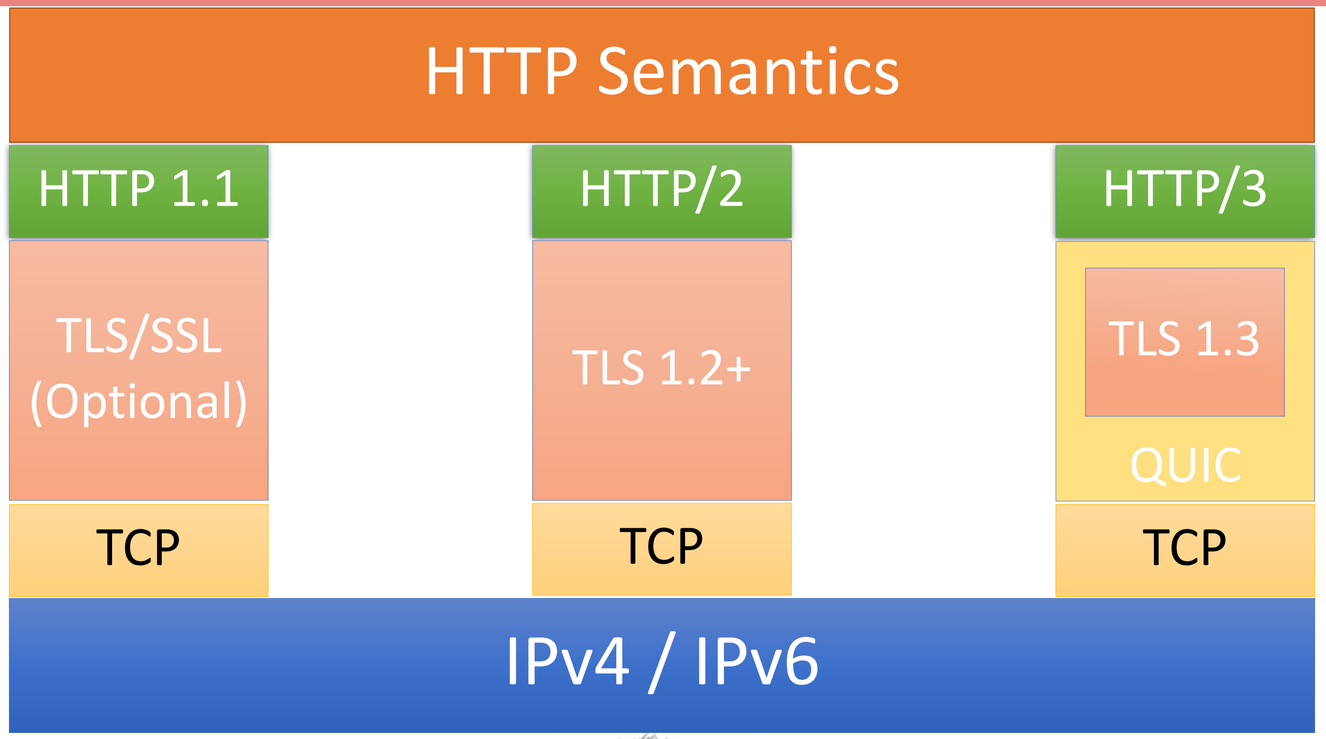
HTTP History - HTTP/2

- Transport Performance was a focus of HTTP/2
- Improves page load speed by:
  - Lower Latency
  - Higher Throughput
- Differences from HTTP/1.1 are largely transparent for web developers

HTTP History - HTTP/3

- HTTP/3 was accepted by IETF in November of 2018
- As of summer of 2022, HTTP/3 is supported by 73% of browsers and 25% of the top 10 million websites.
- Builds on concepts of HTTP/2
- Most significant change is use of the QUIC network protocol rather than TCP
- No significant changes for developers
- Adoption in the Java community is early and evolving

HTTP Protocol Stacks



SPRING FRAMEWORK

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