intalio

HTTP/2 & Java
Current Status

geecon

Simone Bordet
sbordet@intalio.com

Who Am I

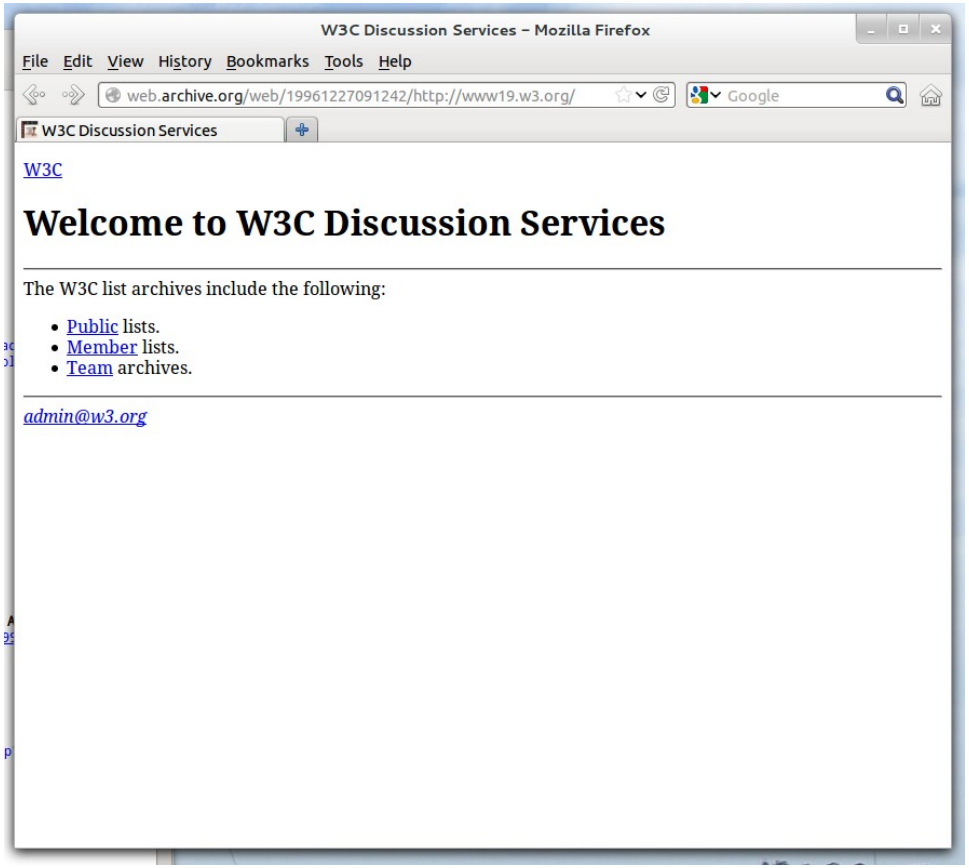
- **Simone Bordet**
  - sbordet@intalio.com - @simonebordet
- **Lead Architect at Intalio/Webtide**
  - Jetty's HTTP/2, SPDY and HTTP client maintainer
- **Open Source Contributor**
  - Jetty, CometD, MX4J, Foxtrot, LiveTribe, JBoss, Larex
- **CometD project leader**
  - Web messaging framework
- **JVM tuning expert**

HTTP/2: Why

Simone Bordet
sbordet@intalio.com

HTTP/2: Why

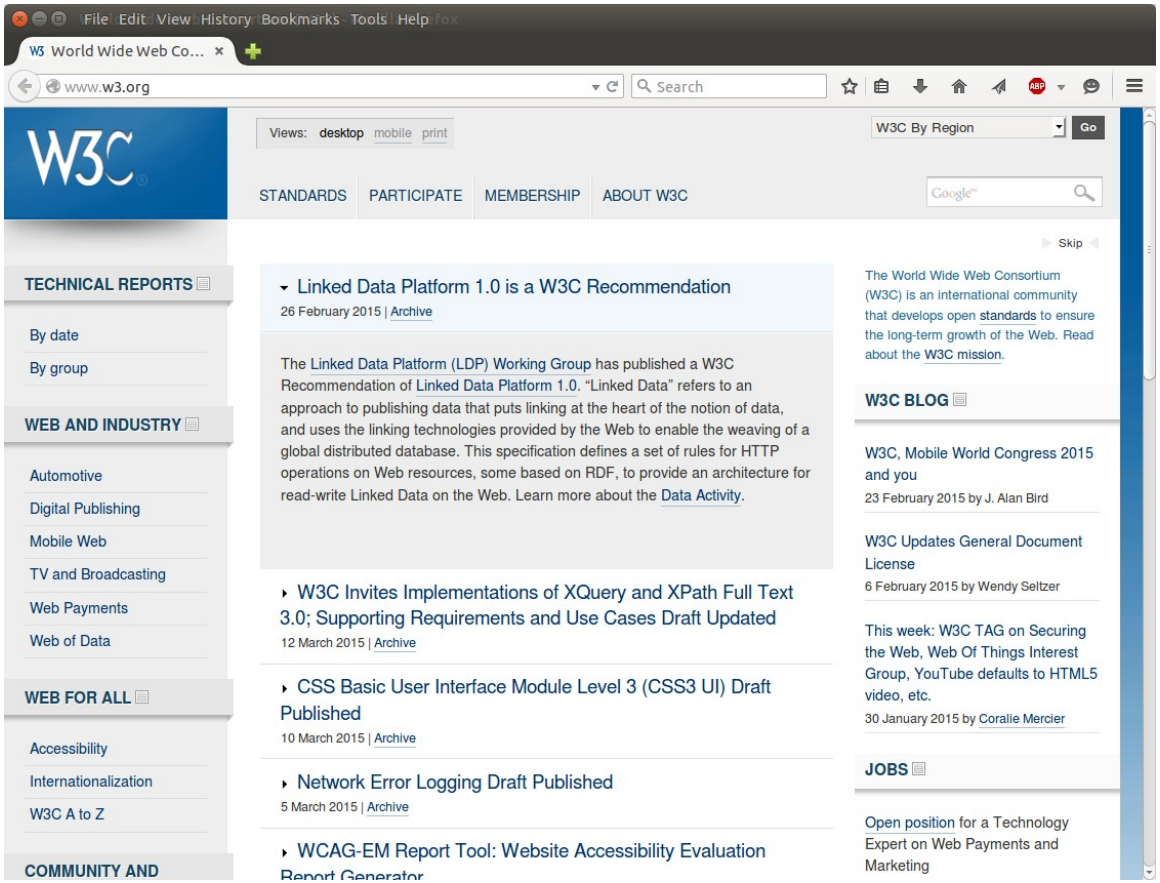
- **http://w3c.org ~ 1996**
  - 1 HTML file, 600 bytes



Simone Bordet
sbordet@intalio.com

HTTP/2: Why

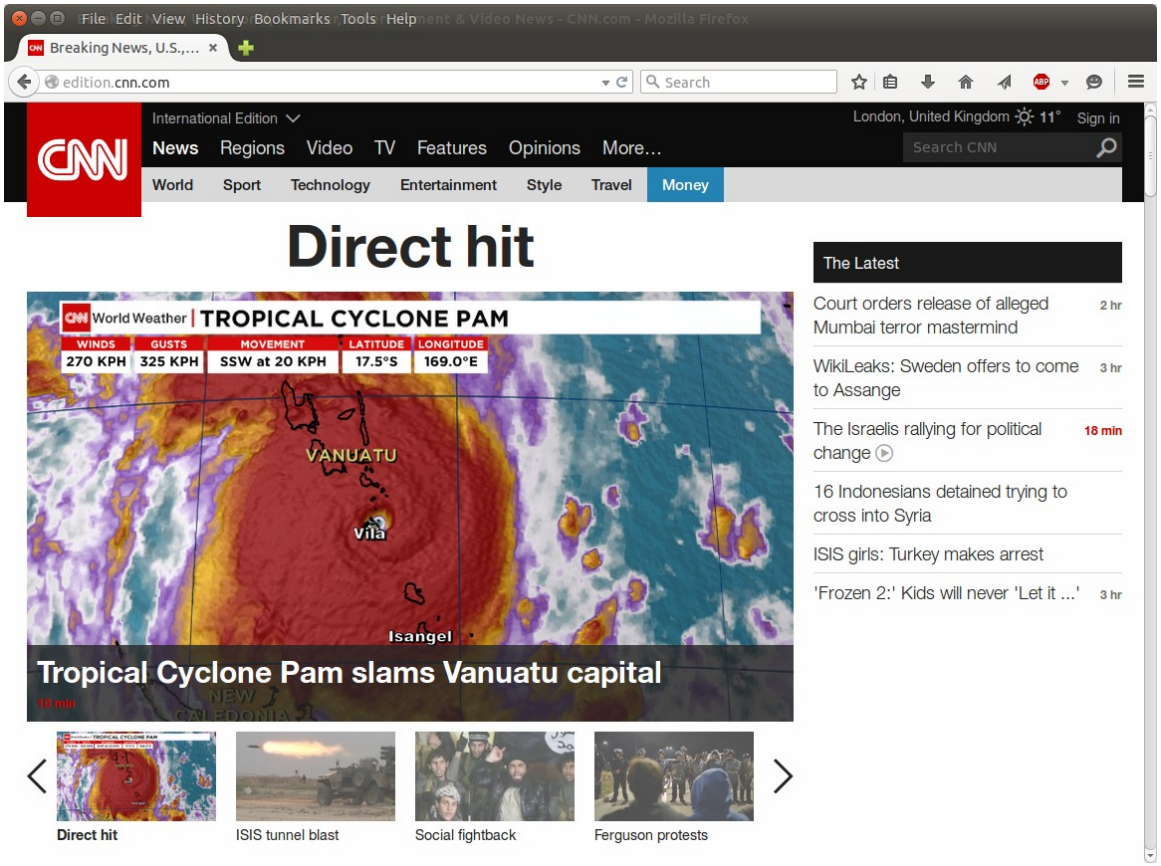
- **http://w3c.org ~ 2015**
  - 41 resources, 366 KiB ~ 1 HTML, 4 CSS, 2 JS, 34 images



Simone Bordet
sbordet@intalio.com

HTTP/2: Why

- **http://cnn.com ~ 2015**
  - 95 resources, 6.7 MiB ~ 3 HTML, 4 CSS, 30 JS, 58 imgs



Simone Bordet
sbordet@intalio.com

HTTP/2: Why

- **The Web EXPLODED !**
- **HTTP 1.1 is an old protocol**
  - Extremely inefficient
  - No multiplexing, no resource correlation
- **Web developers hacking around limitations**
  - Domain sharding, resource inlining, image spriting, etc.
- **Browser vendors want to make browsers FAST**
  - Break HTTP 1.1 recommendations

Simone Bordet
sbordet@intalio.com

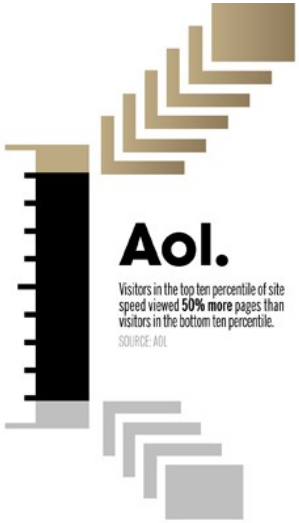
HTTP/2: Why

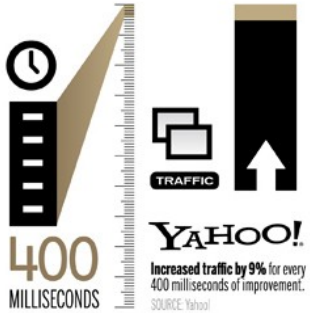
- Servers want to

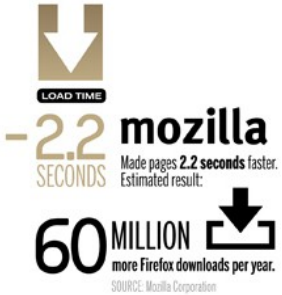
BE

REALLY

FAST







strangeloop www.strangeloopnetworks.com

Simone Bordet
sbordet@intalio.com

HTTP/2: Why

Better HTTP

means

MORE MONEY

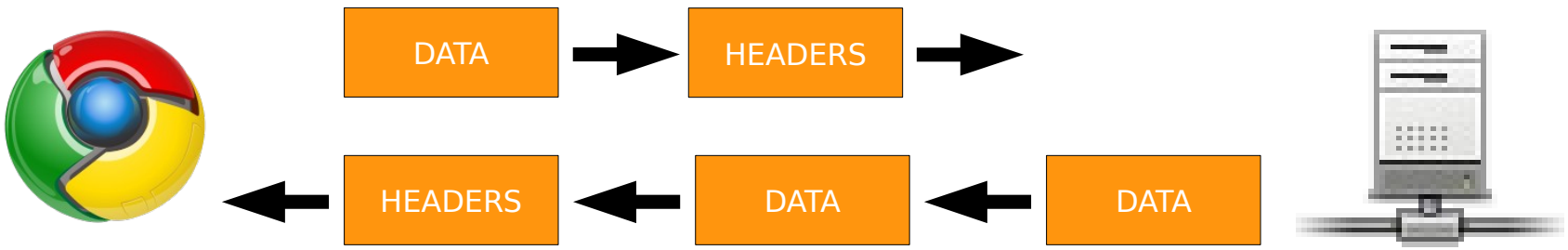
Simone Bordet
sbordet@intalio.com

HTTP/2: How

Simone Bordet
sbordet@intalio.com

HTTP/2: How

- **HTTP/2: Binary protocol**
  - Based on the SPDY protocol (Google's experiment)
  - Efficient to parse and generate
  - Based on frames



Simone Bordet
sbordet@intalio.com

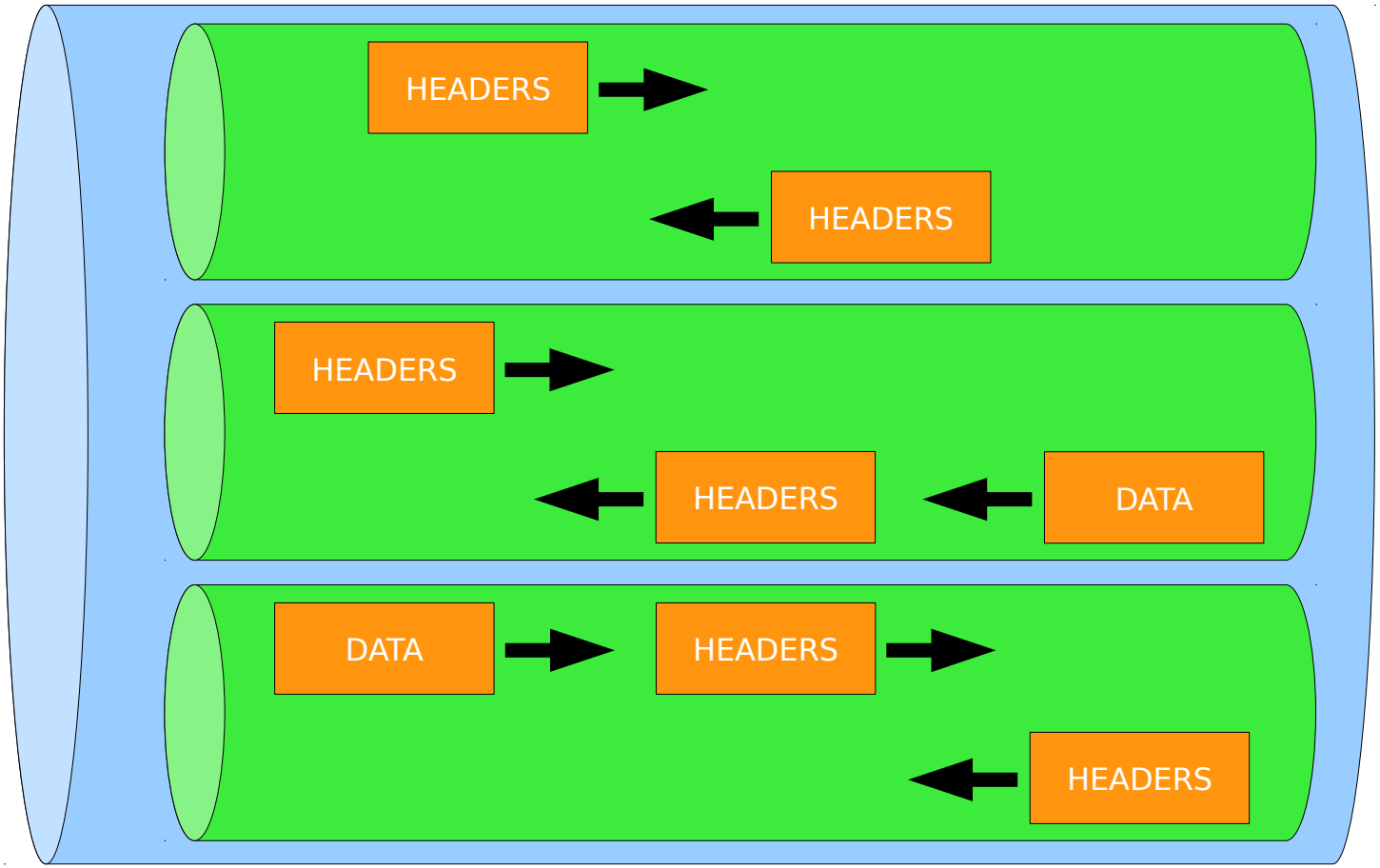
HTTP/2: How

- **HTTP/2: TLS everywhere**
  - Usage of TLS (SSL) is a MUST for browsers
  - Very strict subset of strong ciphers
- **Transparent proxy problem**
  - Caching proxies don't work anymore
  - Big problem for certain countries
- **Server-to-Server communication may be in clear**
  - Not every server supports clear-text HTTP/2

Simone Bordet
sbordet@intalio.com

HTTP/2: Multiplexed

- No more domain sharding and spriting hacks needed



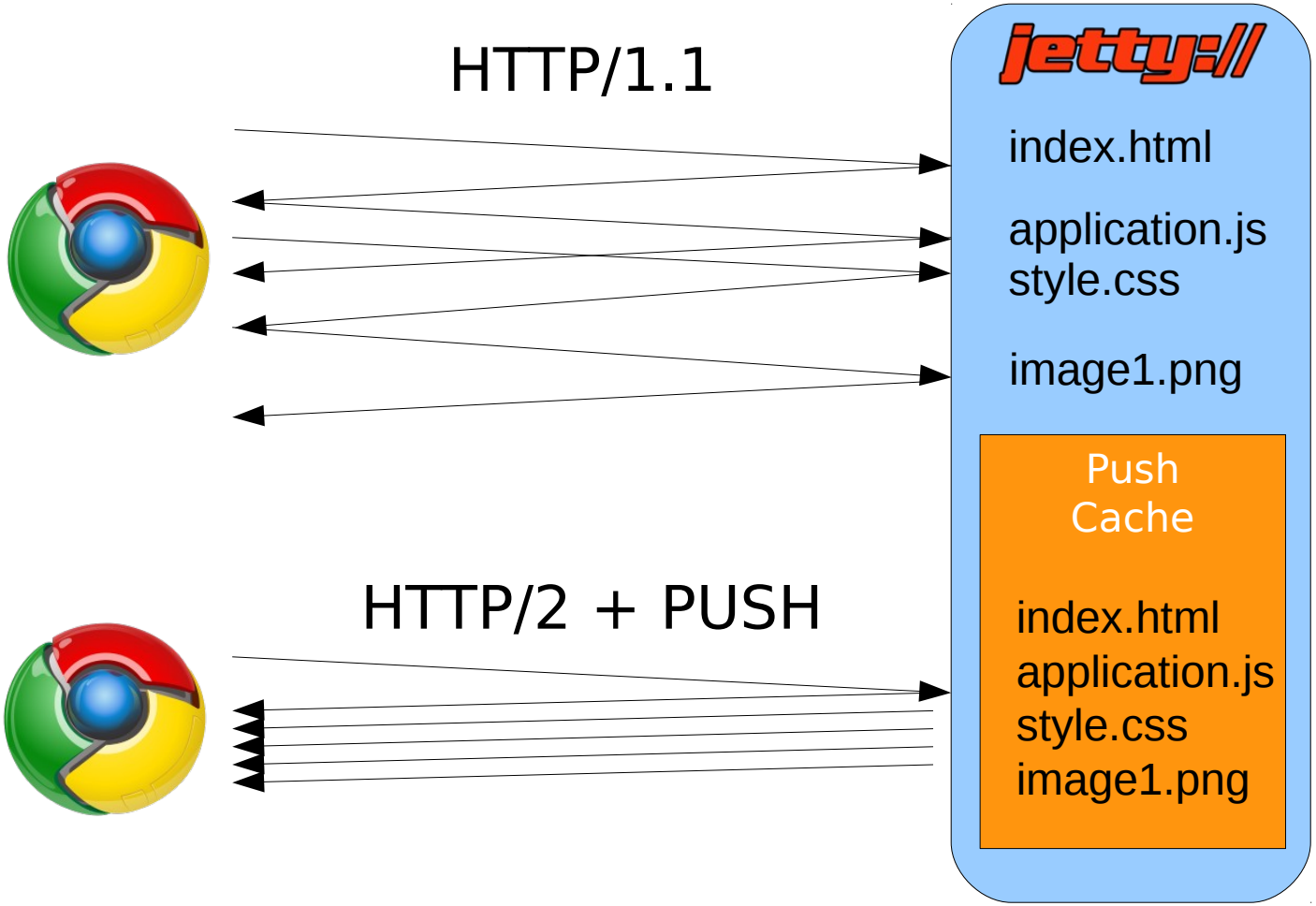
Simone Bordet
sbordet@intalio.com

HTTP/2: How

- **HTTP/2: HTTP Headers compression**
  - Optimized usage of network
  - Using Huffman coding
  - ~600B → ~90B => 85% saved on headers
- **HTTP/2: Request Prioritazion**
  - Resources may have a priority
  - Clients may even re-prioritize
- **HTTP/2: Push of correlated HTTP resources**
  - Less roundtrips to get all resources
  - Huge benefits in page rendering

Simone Bordet
sbordet@intalio.com

HTTP/2: How



Simone Bordet
sbordet@intalio.com

HTTP/2: When

Simone Bordet
sbordet@intalio.com

HTTP/2: When

- **HTTP/2 Specification under IESG editing**
  - It's basically a standard, unlikely to change further
- **Browsers already implement HTTP/2 (TLS only)**
  - Firefox 34
  - Chrome 38
  - Internet Explorer 11
- **It's already there**
  - Twitter, Google, major websites
  - Our own https://webtide.com

Simone Bordet
sbordet@intalio.com

HTTP/2: Who

Simone Bordet
sbordet@intalio.com

HTTP/2: Who

- **cURL & Wireshark**
  - Unix tools support for HTTP/2
- **35+ Implementations**
  - https://github.com/http2/http2-spec/wiki/Implementations
- **Java, C, C++, Go, NodeJS, Erlang, Haskell, etc.**

Simone Bordet
sbordet@intalio.com

HTTP/2: Java

Simone Bordet
sbordet@intalio.com

HTTP/2: Java

- **No changes required to your WARs**
- **Existing web applications work out-of-the-box**
- **Push functionalities provided by servers**
  - Possibly by frameworks too
- **Possible action: remove old HTTP/1.1 hacks**

Simone Bordet
sbordet@intalio.com

HTTP/2: Java

- **HTTP/2 compliant servers require JDK 8**
  - Due to the fact that HTTP/2 requires strong ciphers
  - Server-to-Server clear text may run on JDK 7
- **Servlet 4.0 will support HTTP/2**
  - Backwards compatible
  - Few new API changes
  - New HTTP Push API

Simone Bordet
sbordet@intalio.com

HTTP/2: Java

- **JEP 110 (http://openjdk.java.net/jeps/110)**
  - HTTP/2 Client proposal for JDK 9
  - HTTP/2 Client API proposed:
  - http://cr.openjdk.java.net/~michaelm/httpclient/01/

- **In the Java World:**
  - Jetty (server + client) – Live @ https://webtide.com
  - Netty
  - Undertow
  - OkHttp (Android)

Simone Bordet
sbordet@intalio.com

HTTP/2: Java

- **Jetty provides a pure HTTP/2 client**

- **Jetty's HttpClient provides a HTTP/2 transport**
  - Applications use HttpClient high-level API

```
// Standard HTTP/1.1 client
new HttpClient();

// HTTP/2 transport client
new HttpClient(new HttpClientTransportOverHTTP2());
```


Simone Bordet
sbordet@intalio.com

Demo

Simone Bordet
sbordet@intalio.com

HTTP/2: Conclusions

Simone Bordet
sbordet@intalio.com

HTTP/2: Conclusions

- **No changes for Web Developers**
  - Servlet API backward compatible
  - Frameworks (JSF) will be able to leverage HTTP Push
  - No more domain sharding / spriting hacks needed
  - JDK 9 possibly updated to support HTTP 2.0

- **Some change for Deployers (devops / sysops)**
  - TLS everywhere
  - Upgrade your Servlet Container
    - Jetty 9.3
  - Upgrade network infrastructure (e.g. load balancers)

Simone Bordet
sbordet@intalio.com

HTTP/2: Conclusions

HTTP/2 Makes You Money

Upgrade To Jetty :)

Simone Bordet
sbordet@intalio.com

Questions
&
Answers

Simone Bordet
sbordet@intalio.com