

HTTP/2 Features in ATS

Apache Traffic Server Fall 2015 Summit

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Agenda

- Details on HTTP/2 features in ATS
- Testing HTTP/2
- FetchSM and PluginVC
- Future work

Details on HTTP/2 features in ATS

1. Binary Protocol ✓ DONE
2. Multiple Stream ✓ DONE
3. Header Compression (a.k.a. HPACK)
 - a. Decode Request Headers ✓ DONE (we need to optimize this)
 - b. Encode Response Headers x NOT DONE (there're HPACK Encoder, but not called)
4. Stream Priority x NOT DONE
5. Server Push x NOT DONE

Testing of ATS and HTTP/2

- Unit Test (make test)
 - Tests for Huffman Code
- Regression Test (traffic_server -R 3)
 - Tests for HAPCK using examples of RFC 7541
 - Tests for masks for frame frags of HTTP/2
- TSQA
 - 1 basic test case using hyper
 - ☂ Testing HTTP/2 features by h2spec (TS-3808)
 - h2spec v1.1.1 : ✓ All tests are passed
 - h2spec v1.2.0): x Some test are failed

h2spec

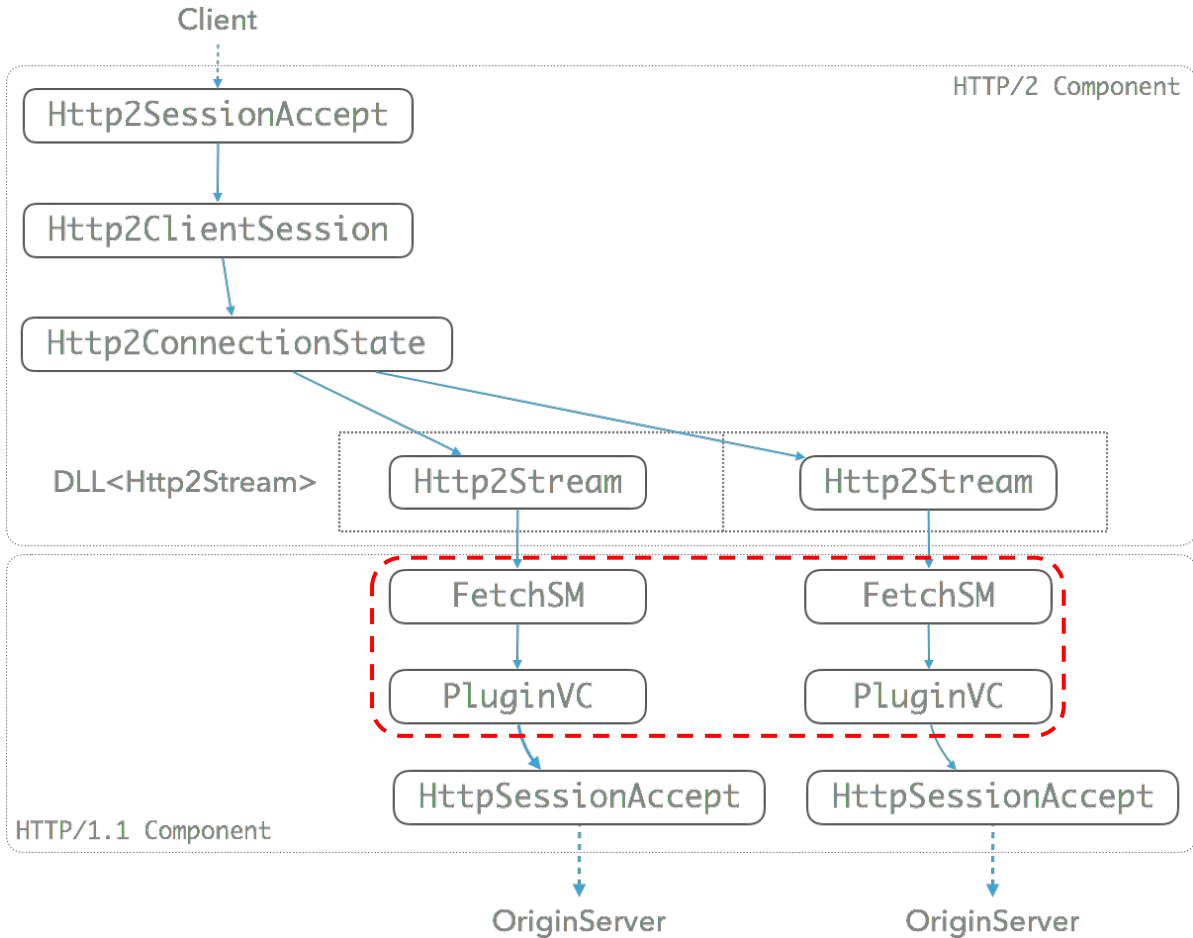
h2spec

A conformance testing tool for HTTP/2 implementation

Moto Ishizawa
@summerwind

h2spec - A conformance testing tool for HTTP/2 implementation by Moto Ishizawa

FetchSM and PluginVC



FetchSM & PluginVC are bridges to HTTP/1.1 component. Those come from SPDY Plugin.

FetchSM uses 36 KB at least for one request. (4KB for request, 32KB for response)

PluginVC uses 64 KB at least for one request. (32KB for request buffer, 32KB for response buffer)

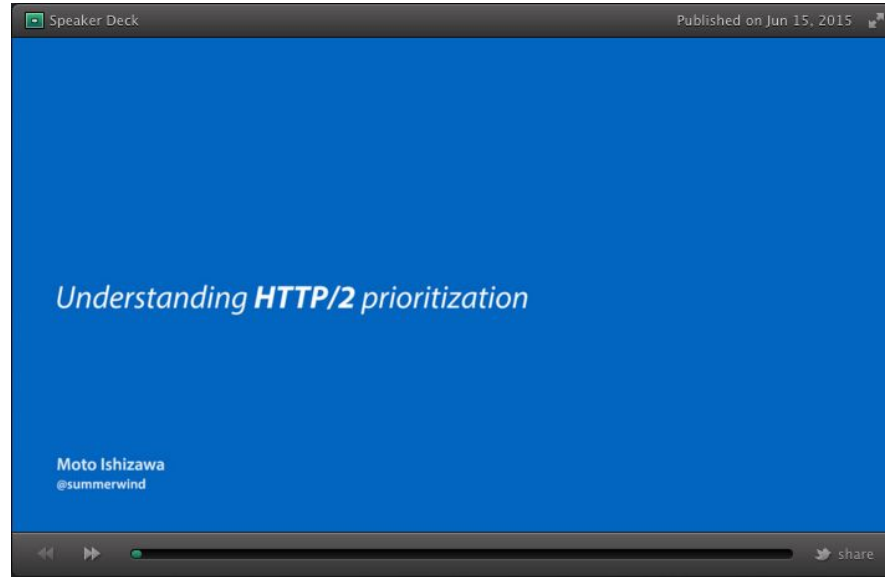
TS-3612 could be a solution

Future Work

1. Stabilize and Secure HTTP/2 component
 - a. Bug fixes
 - b. Tests
 - c. Restructuring
 - d. Measure Performance
 - e. Optimization
2. Stream Priority
3. Server Push
4. HTTP/2 to origin server

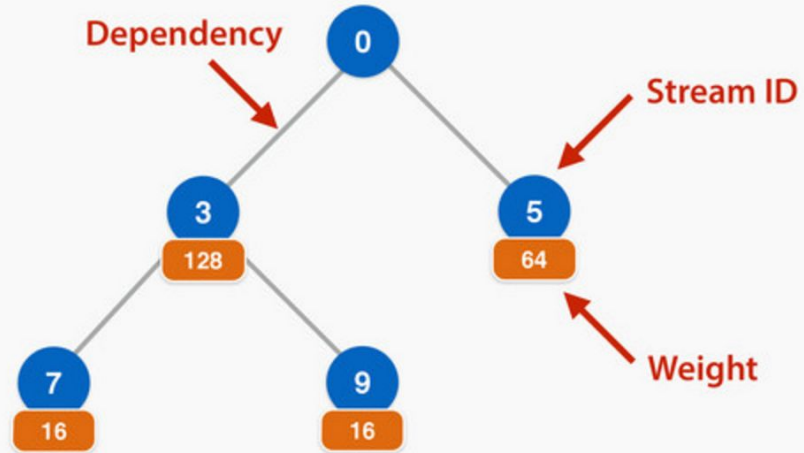
Future Work - Stream Priority

Stream Priority



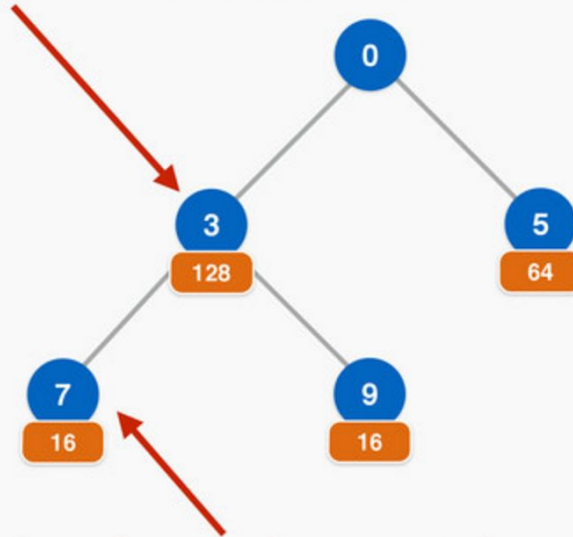
[Understanding HTTP/2 prioritization](#) by Moto Ishizawa

Priority Tree



Priority Tree

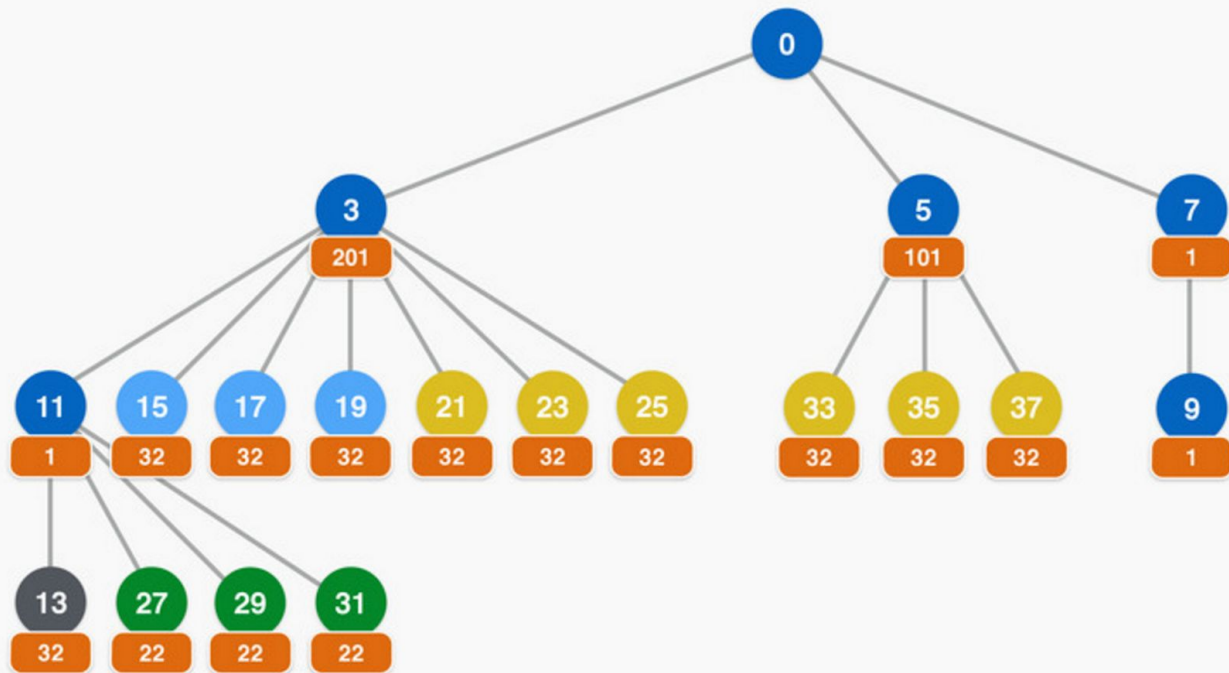
The priority of the stream is determined by the relative proportions of the weights.
Stream ID 3 should receive two-thirds of available resources.



The priority of the stream that depends on another stream is determined by the weight of dependent stream.
Stream ID 7 should receive half of the resources of Stream ID 3.

Firefox's Priority Tree

7. Download

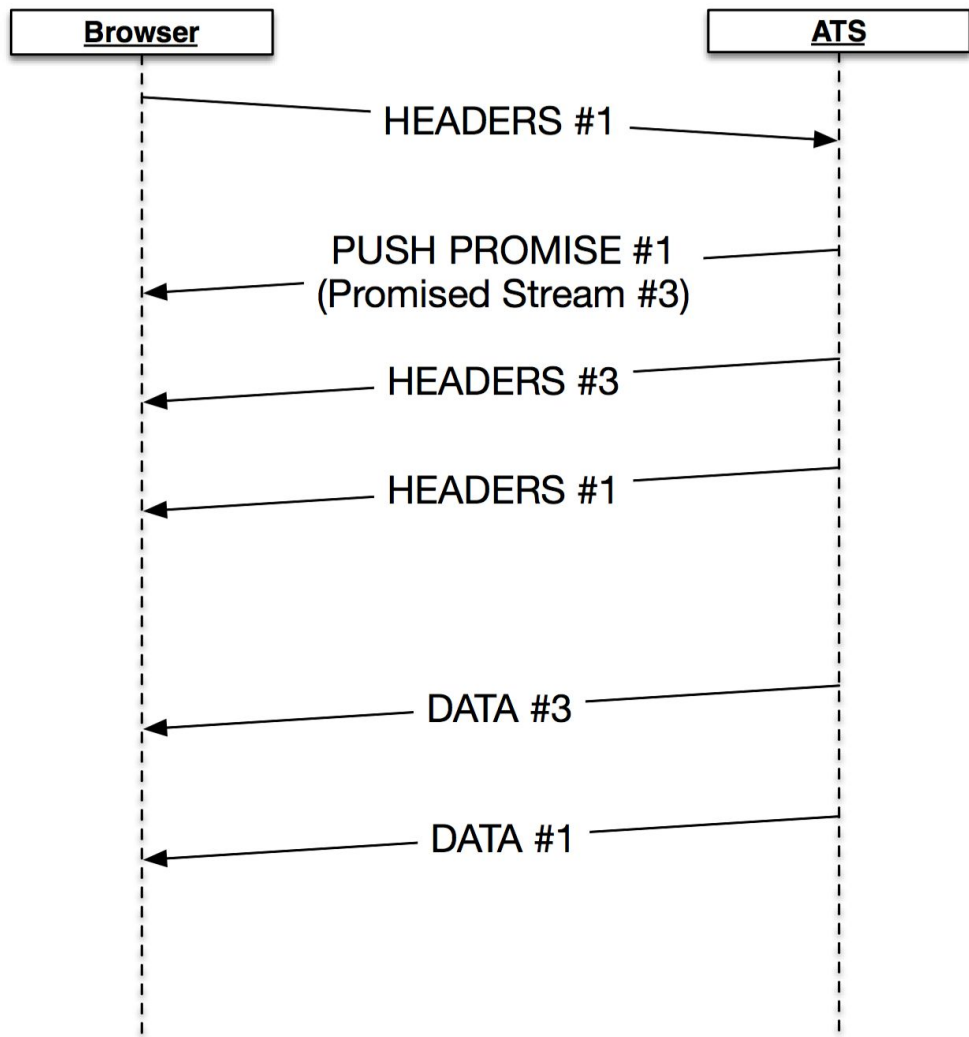


Future Work - Server Push

Server Push

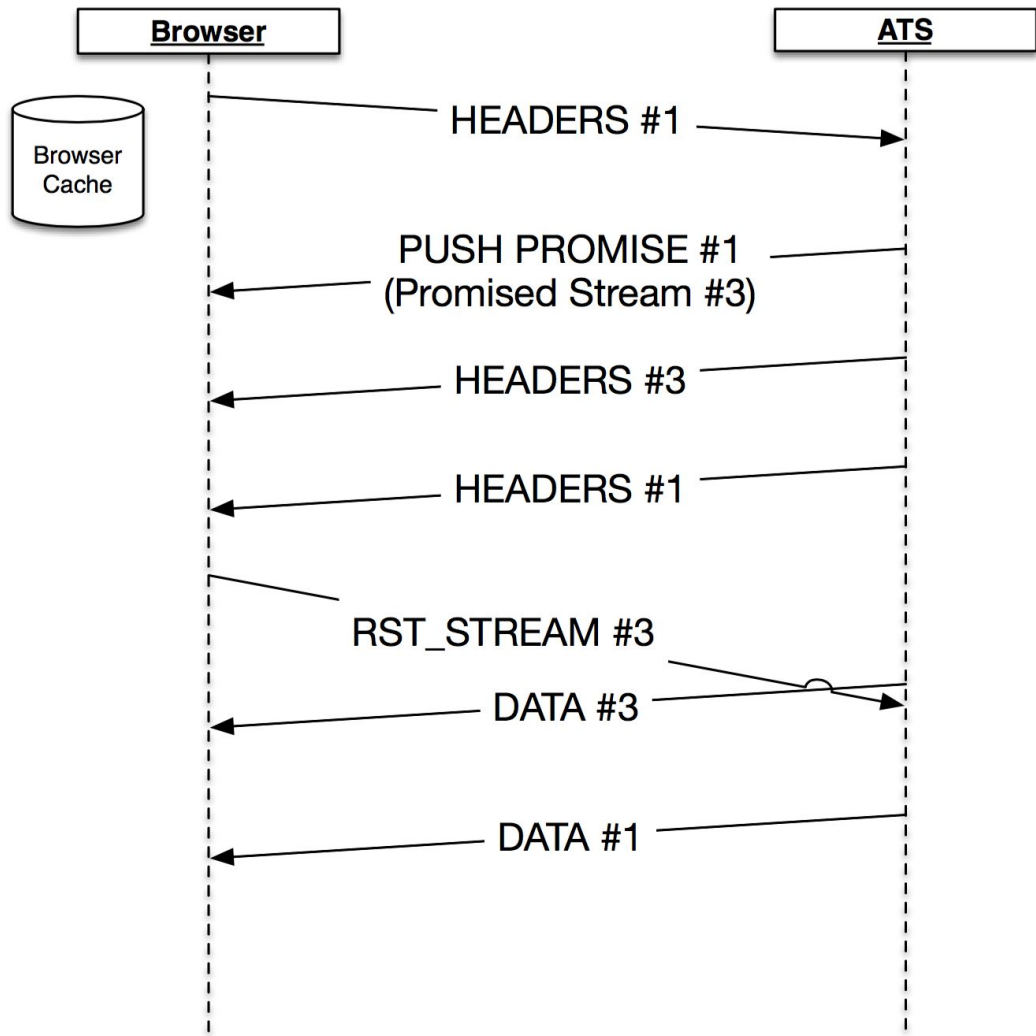
‘Server Push allows the server to avoid this round trip of delay by “pushing” the responses it thinks the client will need into its cache.’

- HTTP/2 FAQ



Server Push

- If the browser has contents in its cache, pushing data is wasting resources like bandwidth.
- In some cases, canceling PUSH PROMISE does not work.



Proposals related Server Push

- [Accept Push Policy Header](#) by Herve Ruellan
- [Cache fingerprinting for HTTP](#) by Kazuho Oku

Appendixes

- General
 - [HTTP/2 Frequently Asked Questions](#) by IETF HTTP WG
- Stream Priority
 - [Understanding HTTP/2 prioritization](#) by Moto Ishizawa
 - [Server Implementations of HTTP/2 Priority](#) by Kazu Yamamoto
 - [Stream scheduling utilizing HTTP/2 priority](#) by Tatsuhiro Tsujikawa
 - [Benchmarks](#) of H2O by Kazuho Oku
(How Stream Priority improve First-Paint)
- Optimization of HPACK
 - [Implementation and Analysis of HPACK 05](#) by Kazu Yamamoto

- Server Push

- [Accept Push Policy Header](#) by Herve Ruellan
- [Cache fingerprinting for HTTP](#) by Kazuho Oku

- Testing

- [h2spec - A conformance testing tool for HTTP/2 implementation](#) by Moto Ishizawa
- [Apache Traffic Server - HTTP2 Fuzzing](#) by yahoo-security