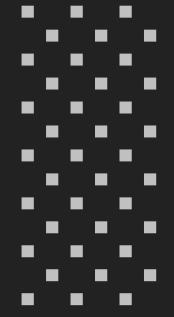


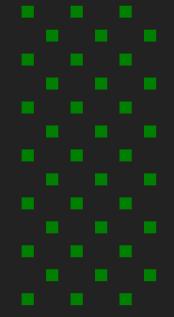
Wed 29 Oct 1969

~ ucla\$

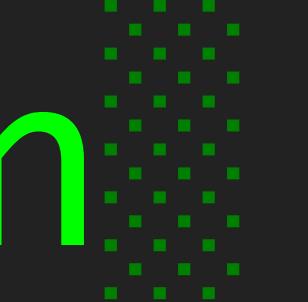


Wed 29 Oct 1969

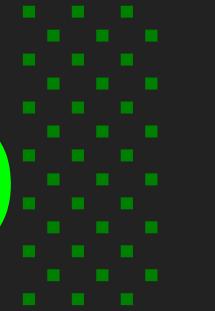
~ ucla\$



Wed 29 Oct 1969

~ ucla\$ login

Wed 29 Oct 1969

~ ucla\$ lo

Seven times faster: a study in front-end optimisation

Peter Wilson • peterwilson.cc • @pwcc

Humanmade

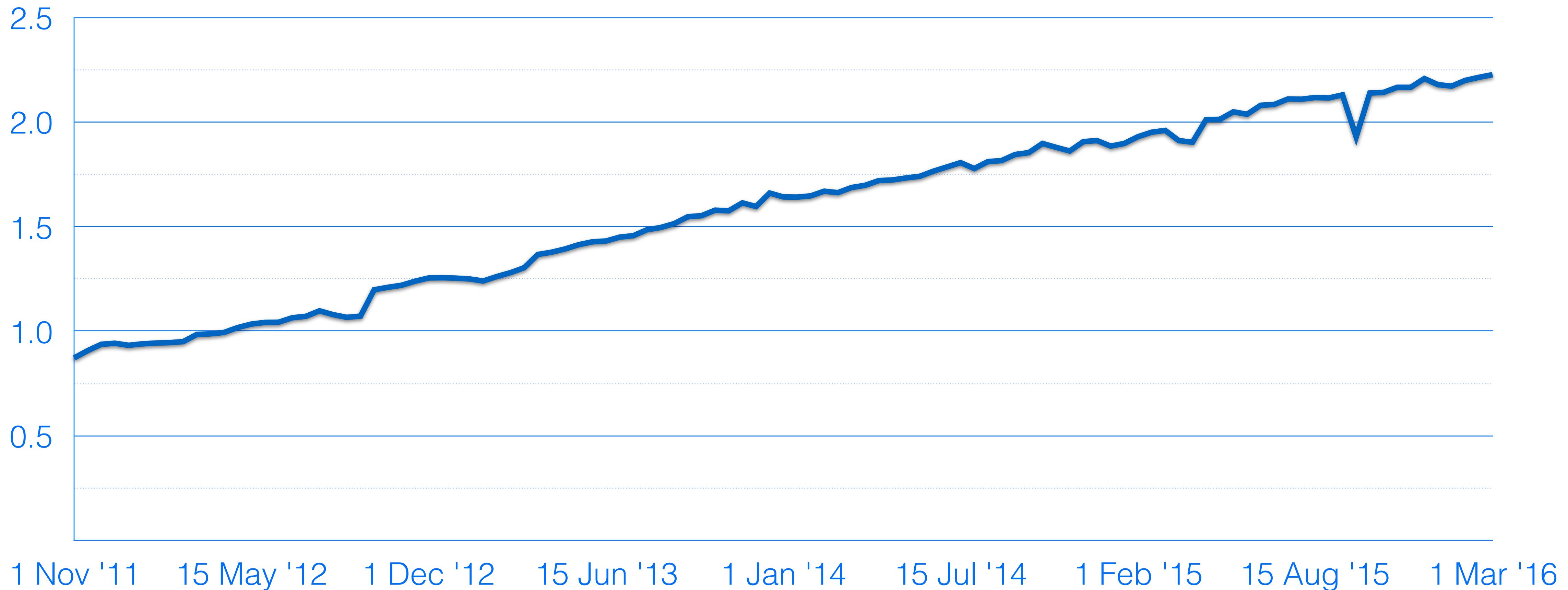
WordPress is slow

Front-end code is slow

Bytes on the page

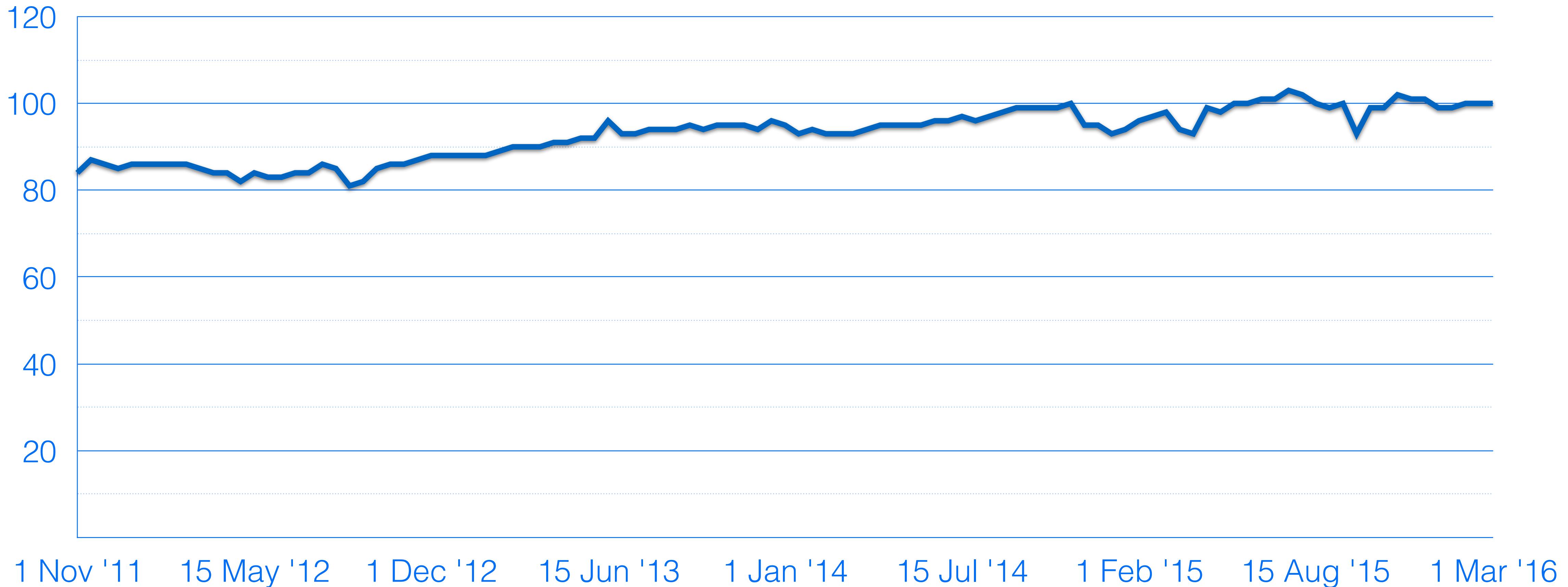
Total page size (MB)

Nov 2011 - March 2016



Assets per page

Nov 2011 - March 2016

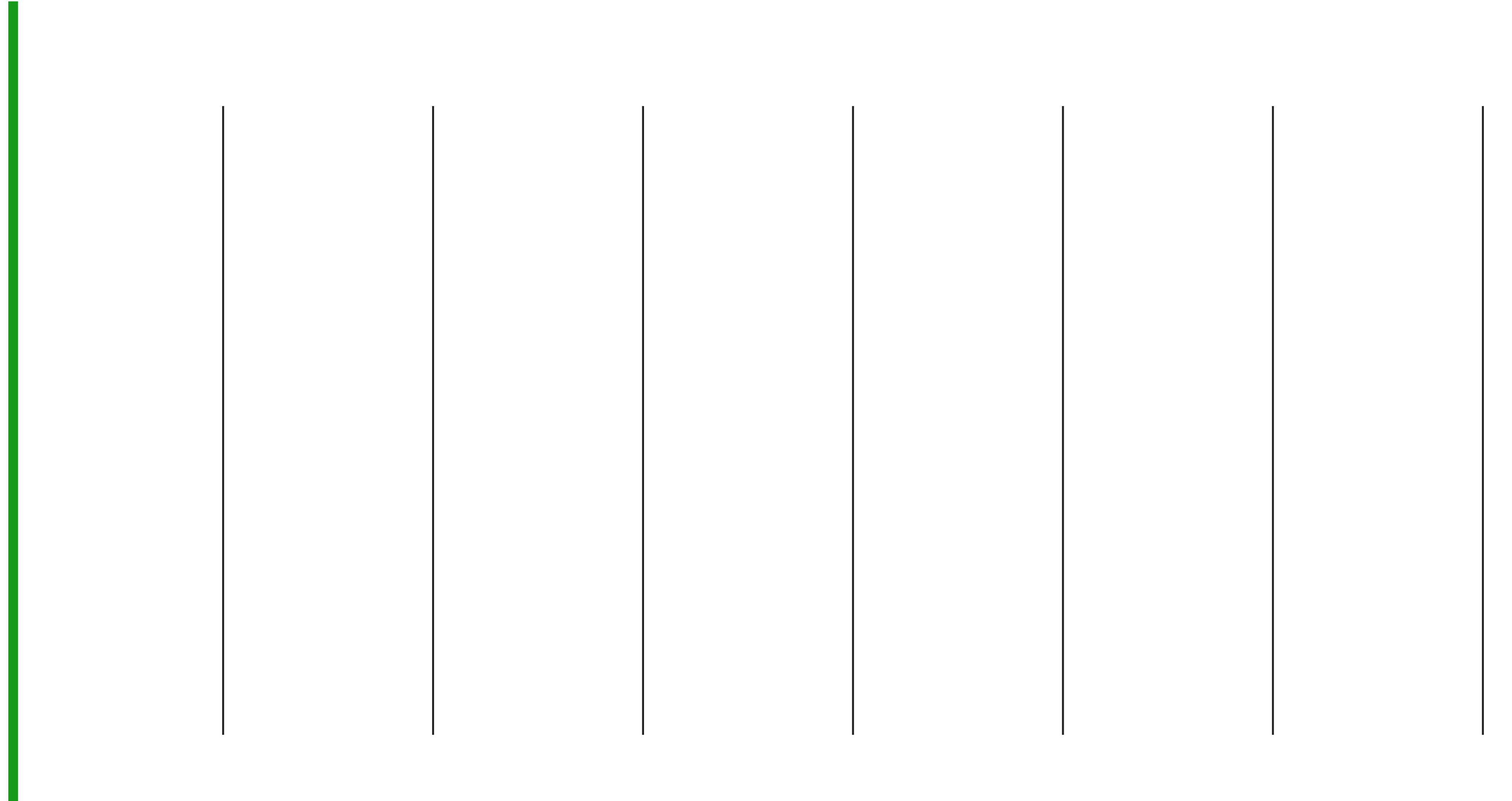


Webfonts

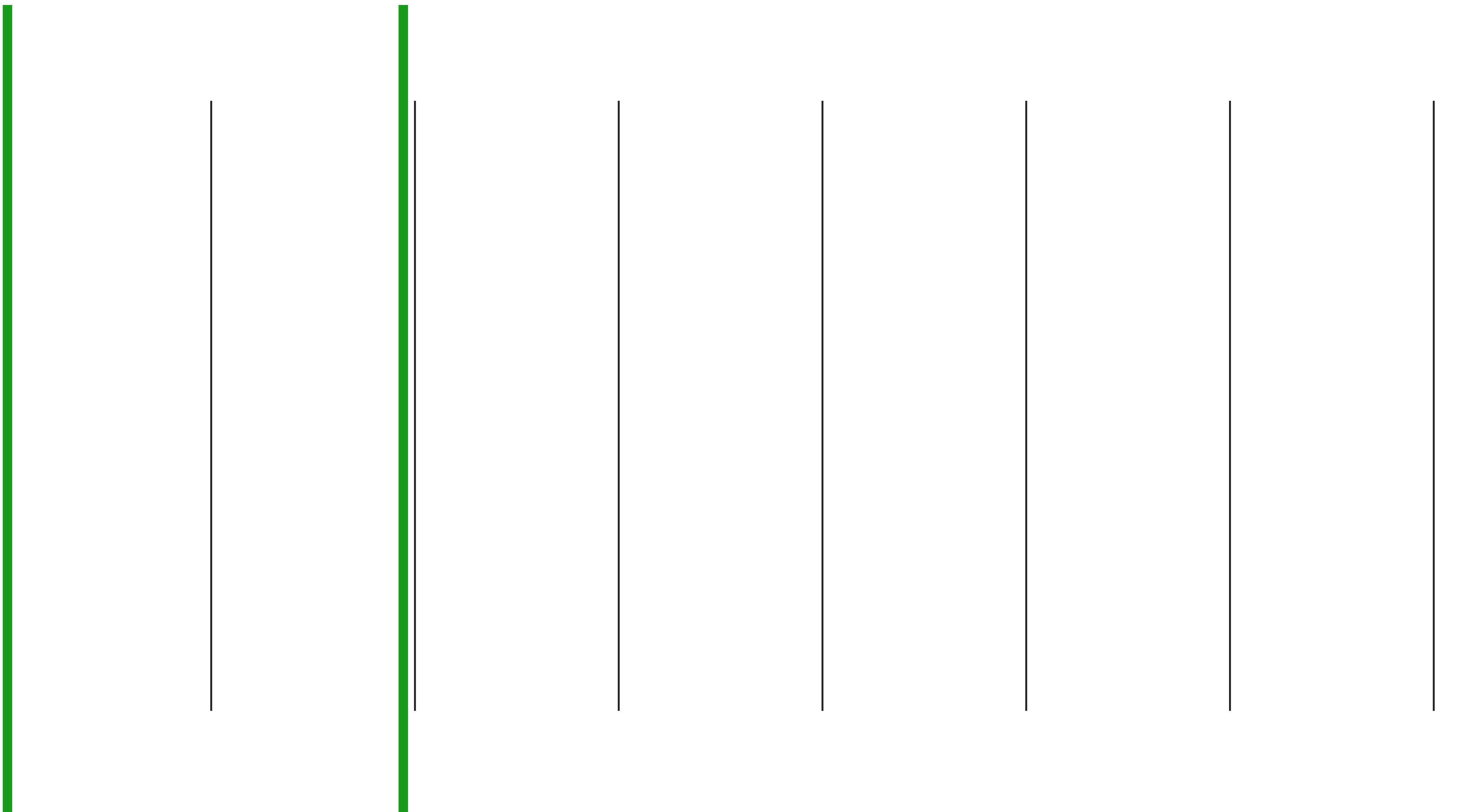
Multiple of Nov 2011 (bytes)



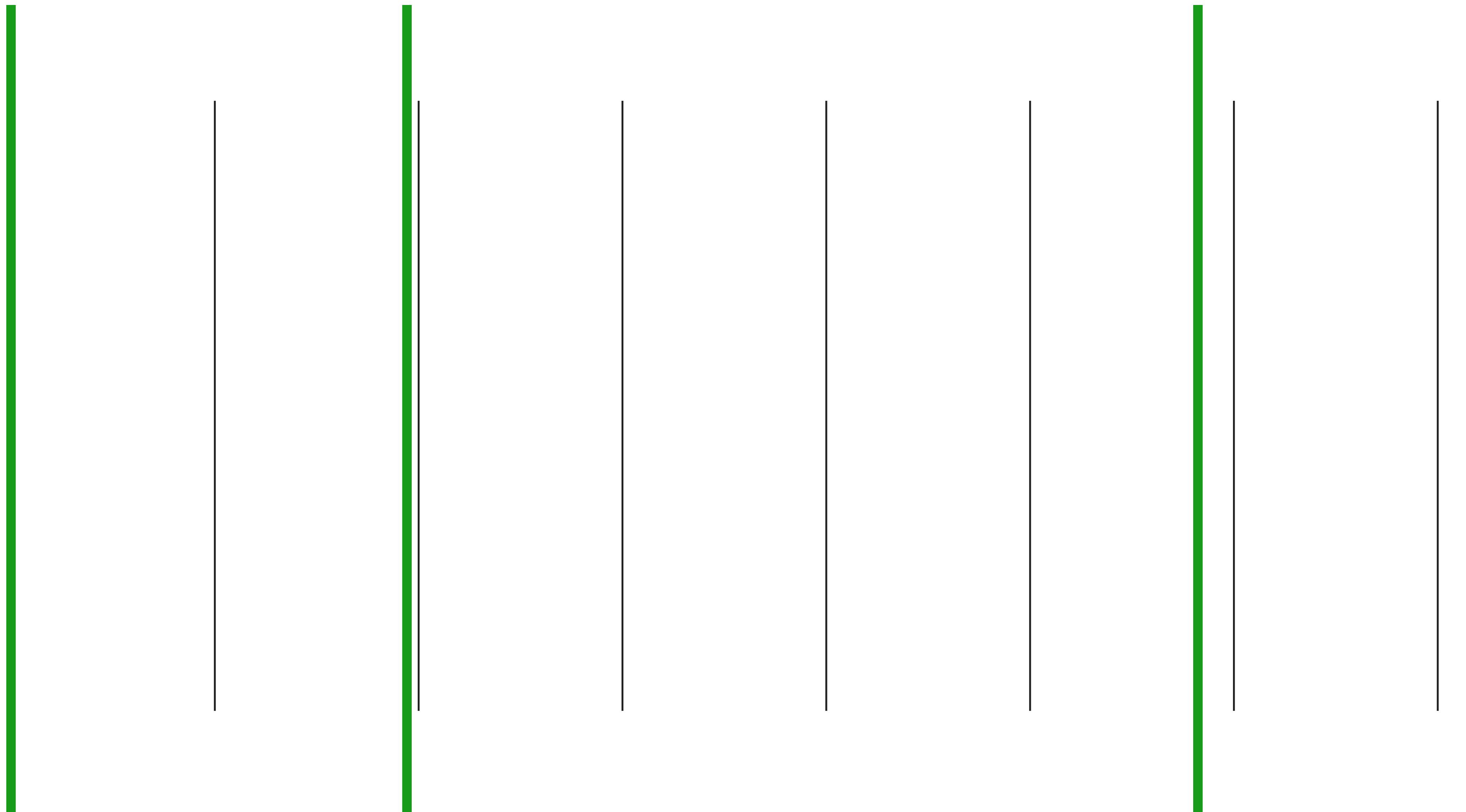
Load time



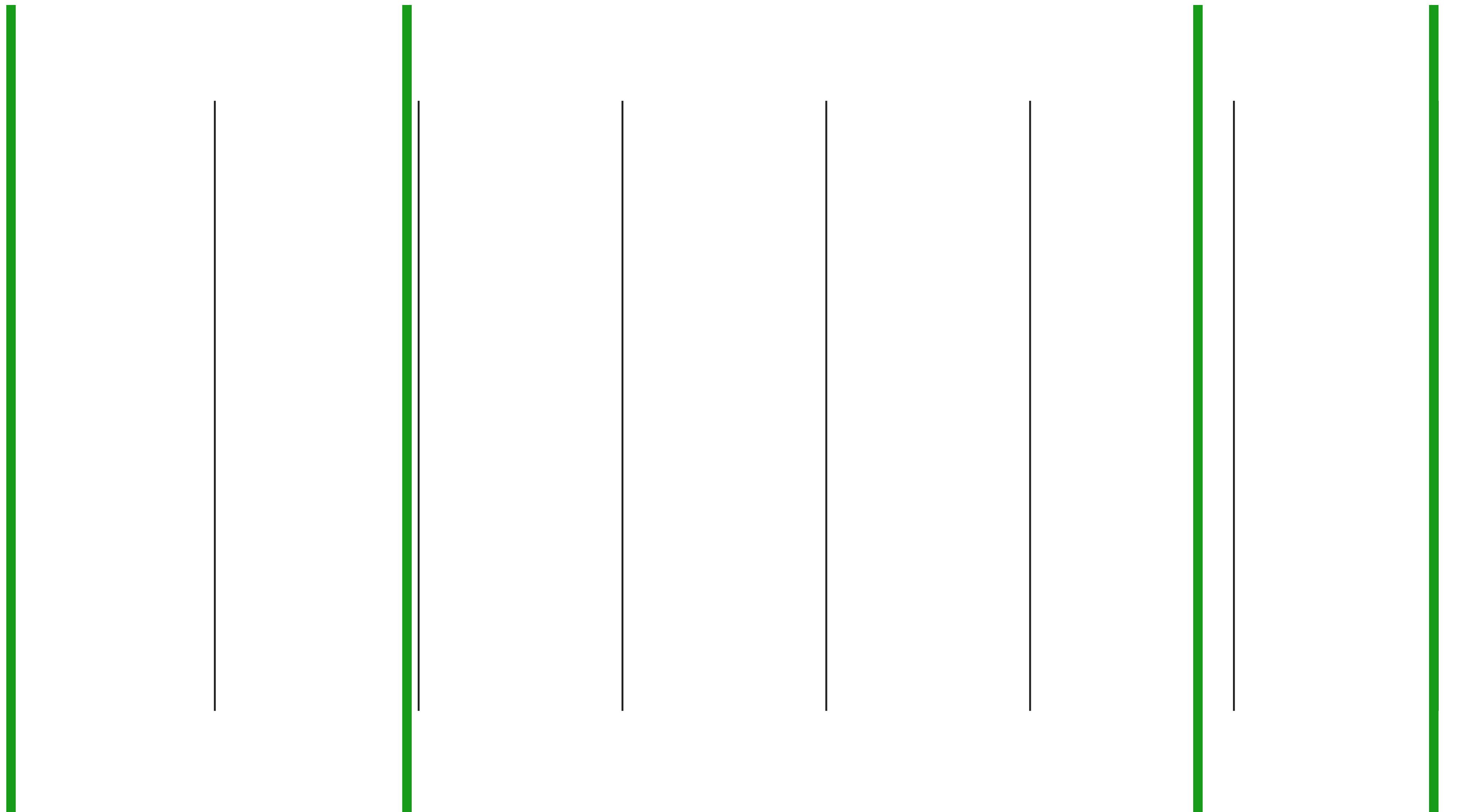
Start render: 4.2 seconds



Visually complete: 12.7 seconds

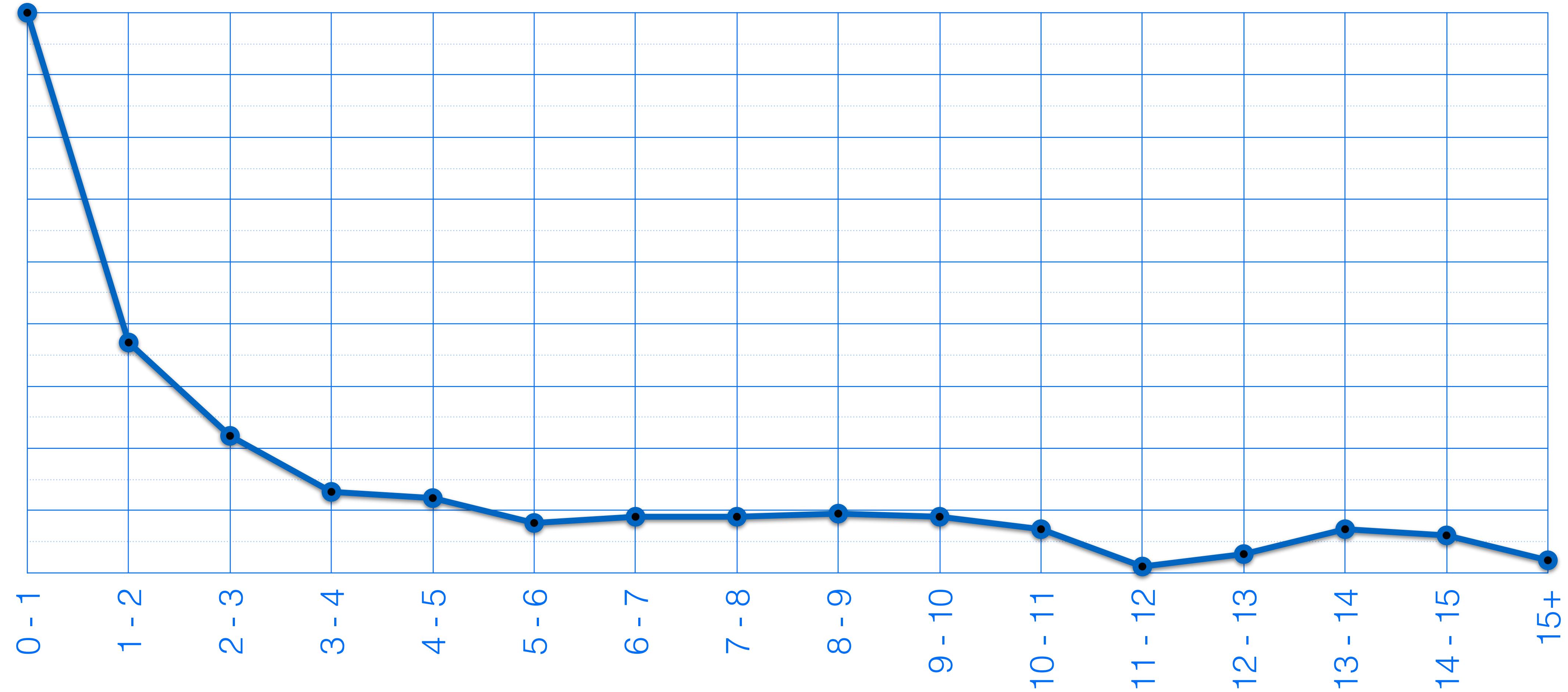


Document complete: 15.23 sec



Two seconds

Walmart conversion rate



The average site kills conversions.

Measure a starting point

<https://peterwilson.cc/>

[ANALYZE](#)



Mobile



Desktop

53 / 100 Suggestions Summary

! Should Fix:

Optimize images

► [Show how to fix](#)

! Consider Fixing:

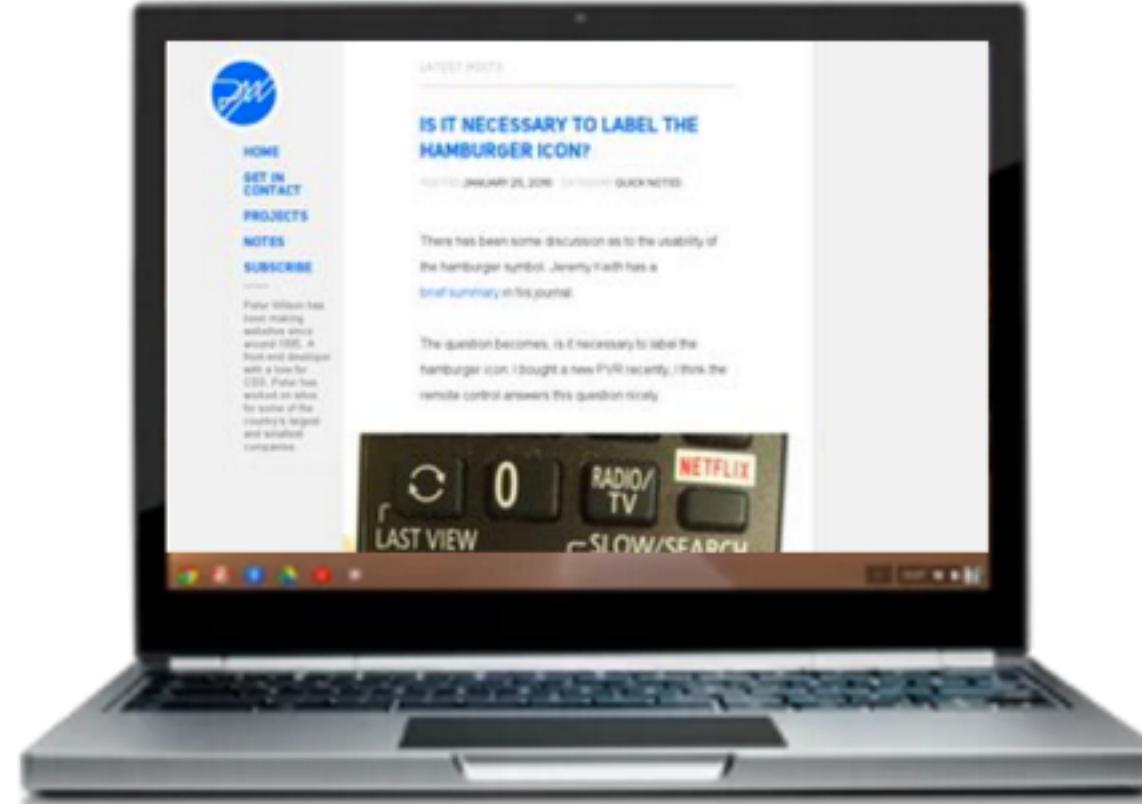
Leverage browser caching

► [Show how to fix](#)

✓ 8 Passed Rules

► [Show details](#)

Download optimized [image](#), [JavaScript](#), and [CSS](#) resources for this page.



Test a website's performance

[!\[\]\(1cc6b6b27654a411b0e71d314f64dde2_img.jpg\) Analytical Review](#)[!\[\]\(825a36b09fc56e9eaf2c1cd6e83cbde6_img.jpg\) Visual Comparison](#)[!\[\]\(45508b8427911c5831891e2446b8470d_img.jpg\) Traceroute](#)[START TEST](#)**Test Location**

Dulles, VA USA (IE 8-11,Chrome,Firefox,Android,iOS)

[Select from Map](#)**Browser**

Chrome

Advanced Settings ▼[Test Settings](#)[Advanced](#)[Chrome](#)[Auth](#)[Script](#)[Block](#)[SPOF](#)[Custom](#)**Connection**

Cable (5/1 Mbps 28ms RTT)

Number of Tests to Run

Up to 9

1

[Report View](#)

Key metrics

Load Time	First Byte	Start Render	Speed Index	DOM Elements	Document Complete			Fully Loaded		
					Time	Requests	Bytes In	Time	Requests	Bytes In
3.770s	0.771s	1.789s	1834	397	3.770s	27	635 KB	4.072s	33	661 KB

Timeline view

LATEST POSTS

IS IT NECESSARY TO LABEL THE HAMBURGER ICON?

PETER WILSON · JANUARY 25, 2014 · 1 COMMENT · CLICK NOTES

There has been some discussion as to the usability of the hamburger symbol. Jeremy Kaif has a [brief summary](#) in his journal.

The question becomes, is it necessary to label the hamburger icon. I bought a new PVR recently. I think the remote control answers this question nicely.

Peter Wilson has been writing columns since around 1980. A frequent contributor with a mix of C&S. Peter has worked on sites for some of the country's largest and most well known companies.

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LATEST POSTS

IS IT NECESSARY TO LABEL THE HAMBURGER ICON?

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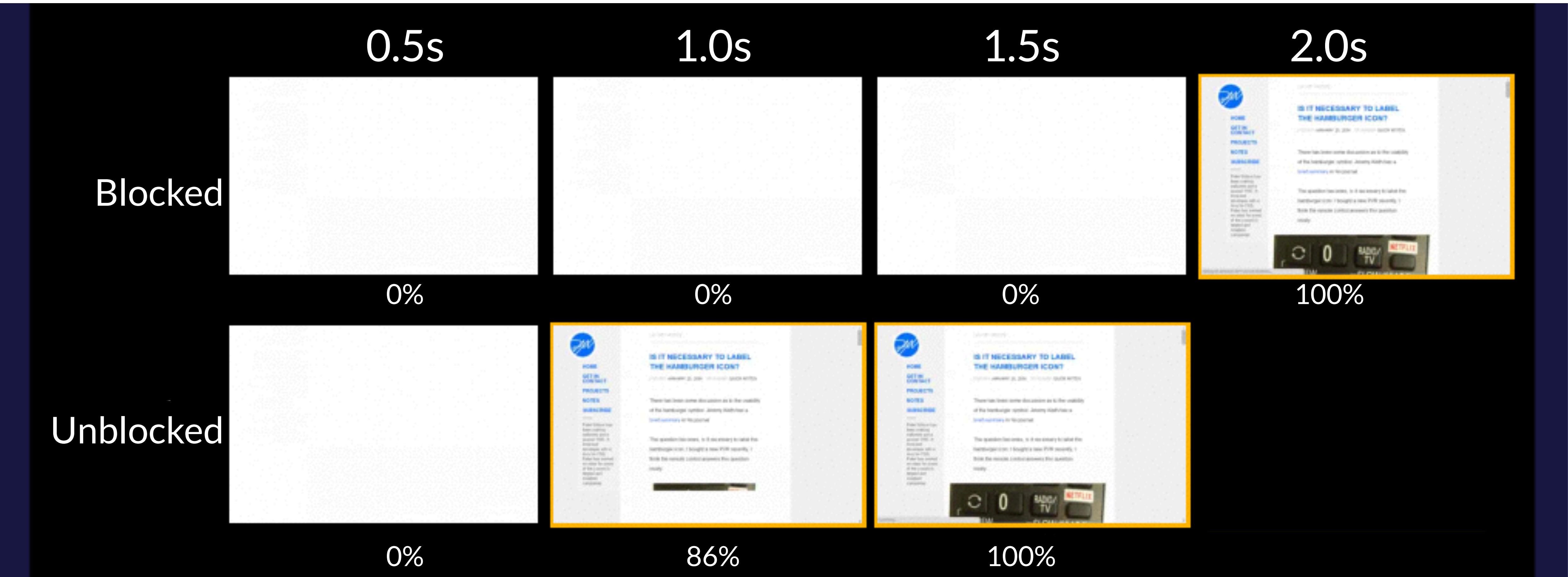
The question becomes, is it necessary to label the hamburger icon. I bought a new PVR recently. I think the remote control answers this question nicely.

NETFLIX

REWIND 0 RADIO/TV CHANNELS

Comparison timelines

Additional blocking request in HTML Header



Our PageSpeed score is

53 / 100

you won't believe how
much it's costing



**What will get my visitors
reading quickest?**



Doing it wrong

JavaScript in the footer



**All visitors have JavaScript
disabled while it downloads.**

- Every progressive enhancement advocate ever



JavaScript, the WordPress way

```
wp_enqueue_script(  
    'pwcc-scripts', // handle  
    '/functions.js', // source  
    null,           // no dependancies  
    '20160624-26', // version  
    true            // load in footer  
) ;
```

JavaScript, the WordPress way

```
wp_enqueue_script(  
    'pwcc-scripts', // handle  
    '/functions.js', // source  
    null,           // no dependancies  
    '20160624-26', // version  
    true            // load in footer  
) ;
```

jQuery, the WordPress way

```
wp_enqueue_script(  
    'pwcc-scripts',           // handle  
    '/functions.js',          // source  
    array( 'jquery' ),        // jQuery loads automatically  
    '20160624-26',            // version  
    true                      // load in footer  
) ;
```

jQuery, the WordPress way

```
wp_enqueue_script(  
    'pwcc-scripts',           // handle  
    '/functions.js',          // source  
    array( 'jquery' ),        // jQuery loads automatically  
    '20160624-26',            // version  
    true                      // load in footer  
) ;
```

jQuery, doing_it_wrong()

```
<html>

<head>

  <script src='jquery.js'></script><!--32kB-->
  <script src='jquery-migrate.js'></script><!--4.4kB-->

</head>

<body>

  <!-- Site content. -->

  <script src='/functions.js'></script>
```

jQuery, doing_it_wrong()

```
<script src='jquery.js'></script><!--32kB-->  
  
<script src='jquery-migrate.js'></script><!--4.4kB-->  
  
</head>  
  
<body>  
  <!-- Site content. -->  
  <script src='/functions.js'></script>  
  
</body>  
  
</html>
```



Daniel Zedda (CC) - flic.kr/p/a6wwAh

jQuery, doing_it_wrong()

```
function pwcc_jquery_to_footer() {  
    if ( is_admin() )  
        return;  
  
    wp_script_add_data( 'jquery' , 'group' , 1 );  
    wp_script_add_data( 'jquery-core' , 'group' , 1 );  
    wp_script_add_data( 'jquery-migrate' , 'group' , 1 );  
}  
  
add_action( 'wp' , 'pwcc_jquery_to_footer' );
```

jQuery, doing_it_wrong()

```
function pwcc_jquery_to_footer() {  
    if ( is_admin() )  
        return;  
  
    wp_script_add_data( 'jquery' , 'group' , 1 );  
    wp_script_add_data( 'jquery-core' , 'group' , 1 );  
    wp_script_add_data( 'jquery-migrate' , 'group' , 1 );  
}  
  
add_action( 'wp' , 'pwcc_jquery_to_footer' );
```

jQuery, doing_it_wrong()

```
function pwcc_jquery_to_footer() {  
    if ( is_admin() )  
        return;  
  
    wp_script_add_data( 'jquery' , 'group' , 1 );  
    wp_script_add_data( 'jquery-core' , 'group' , 1 );  
    wp_script_add_data( 'jquery-migrate' , 'group' , 1 );  
}  
  
add_action( 'wp' , 'pwcc_jquery_to_footer' );
```

jQuery, the WordPress way

```
<html>

<head>

    <script src='jquery.js'></script><!--32kB-->
    <script src='jquery-migrate.js'></script><!--4.4kB-->

</head>

<body>

    <!-- Site content. -->

    <script src='/functions.js'></script>
```

jQuery, doing_it_wrong()

```
<html>

<head> <!-- HTML Header. --> </head>

<body>

  <!-- Site content. -->

  <script src='jquery.js'></script><!--32kB-->
  <script src='jquery-migrate.js'></script><!--4.4kB-->
  <script src='/functions.js'></script>

</body>
```

jQuery, doing_it_wrong()

```
<head> <!-- HTML Header. --> </head>
```

```
<body>
<!-- Site content. -->
    pwcc.cc/wceu/jqueryfooter
```

```
    <script src='jquery.js'></script><!--32kB-->
```

```
    <script src='jquery-migrate.js'></script><!--4.4kB-->
```

```
    <script src='/functions.js'></script>
```

```
</body>
```

```
</html>
```

Asynchronous JavaScript

Asynchronous JavaScript

```
<script  
  type='text/javascript'  
  src='/path/file.js' async></script>
```

Asynchronous JavaScript

```
<script  
  type='text/javascript'  
  src='/path/file.js' async></script>
```

Asynchronous JavaScript

```
function pwcc_async_js( $tag, $handle ) {  
    switch ( $handle ) {  
        case 'pwcc-scripts' :  
            $tag = str_replace( '></script', ' async></script', $tag );  
    }  
    return $tag;  
}
```

Asynchronous JavaScript

```
function pwcc_async_js( $tag, $handle ) {  
    switch ( $handle ) {  
        case 'pwcc-scripts' : // Falls through  
        case 'picturefill' :  
            $tag = str_replace( '></script', ' async></script', $tag );  
    }  
    return $tag;  
}
```

Asynchronous JavaScript

```
function pwcc_async_js( $tag, $handle ) {  
    switch ( $handle ) {  
        case 'pwcc-scripts' : // Falls through  
        case 'picturefill' :  
            $tag = str_replace( '></script', ' async></script', $tag );  
    }  
    return $tag;  
}
```

Asynchronous JavaScript

```
$tag = str_replace( '></script', ' async></script', $tag );  
}  
  
return $tag;  
}  
  
add_filter( 'script_loader_tag', 'pwcc_async_js', 10, 2 );
```

Asynchronous JS in the header

```
function pw_async_up() {  
    wp_script_add_data( 'picturefill' , 'group' , 0 );  
    wp_script_add_data( 'pwcc-scripts' , 'group' , 0 );  
}  
  
.add_action( 'wp_enqueue_scripts' , 'pw_async_up' , 99 );
```

Asynchronous JS in the header

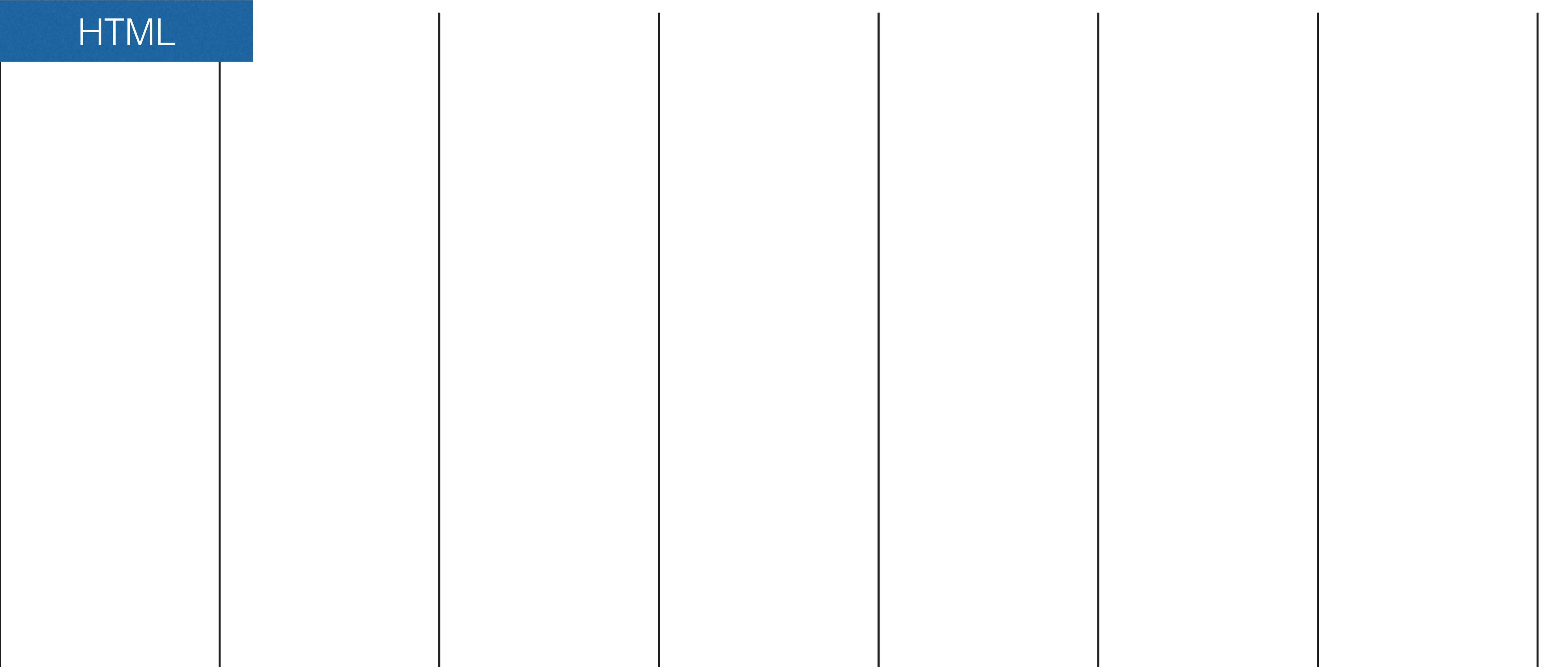
```
function pw_async_up() {  
    wp_script_add_data( 'picturefill', 'group', 0 );  
    wp_script_add_data( 'pwcc-scripts', 'group', 0 );  
}  
  
.add_action( 'wp_enqueue_scripts', 'pw_async_up' , 99 );
```

Browsers initiate requests

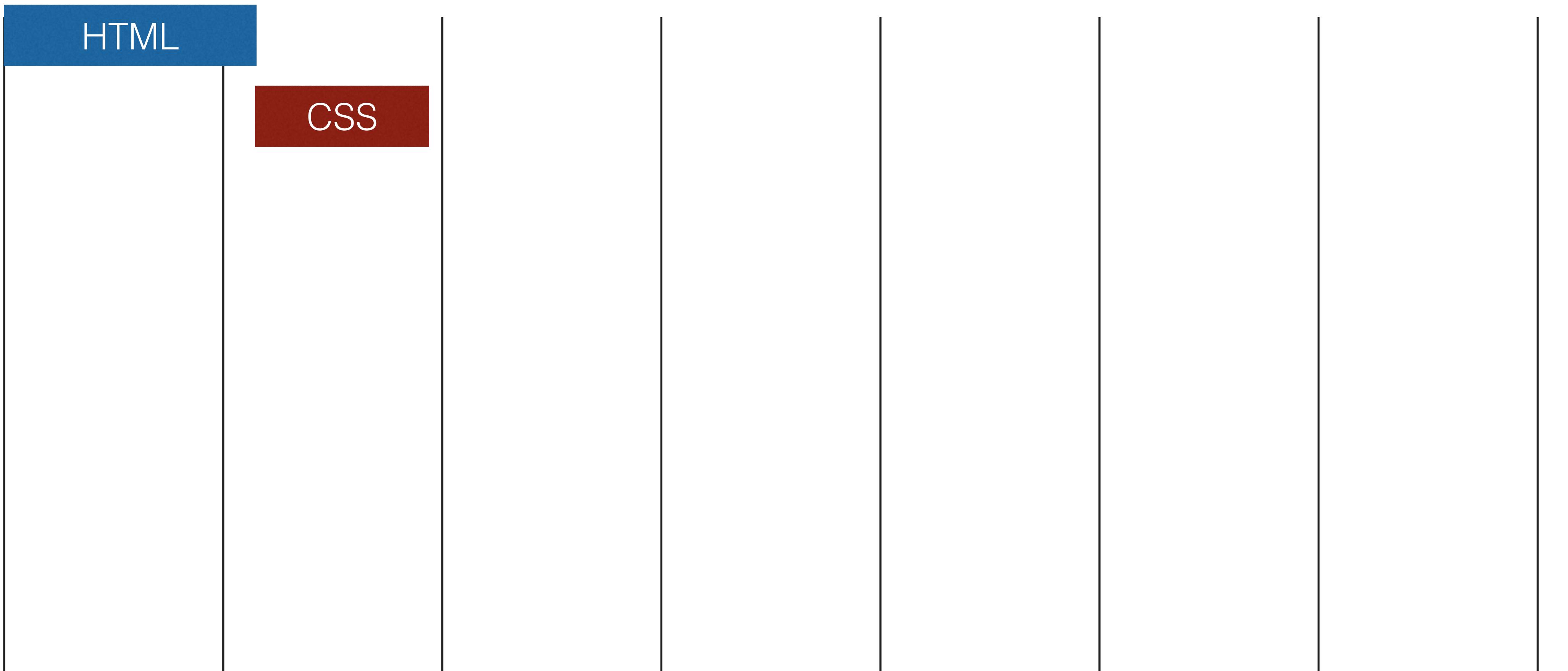
The blocking nature of HTTP 1

Blockers

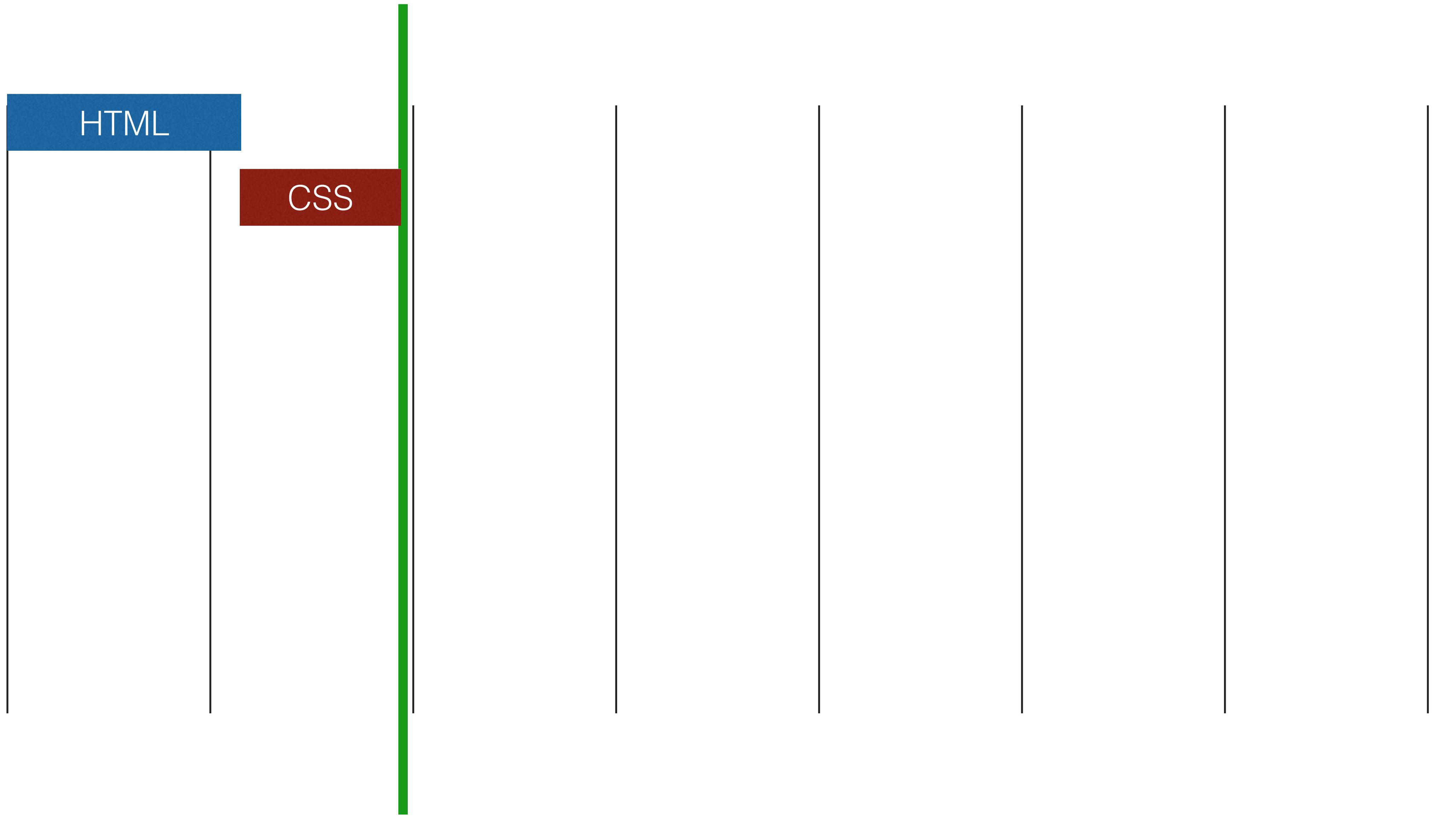
HTML



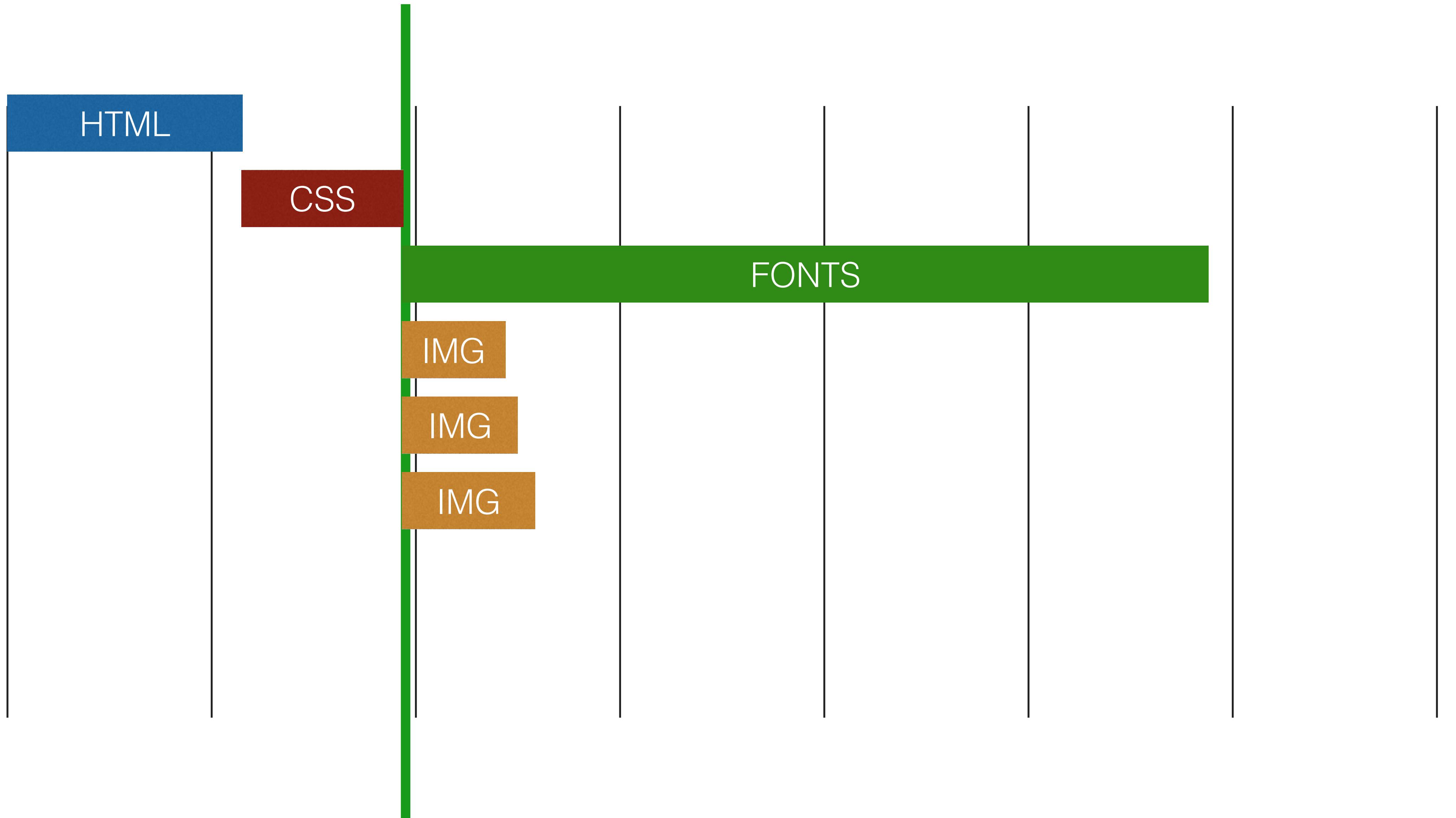
Blockers



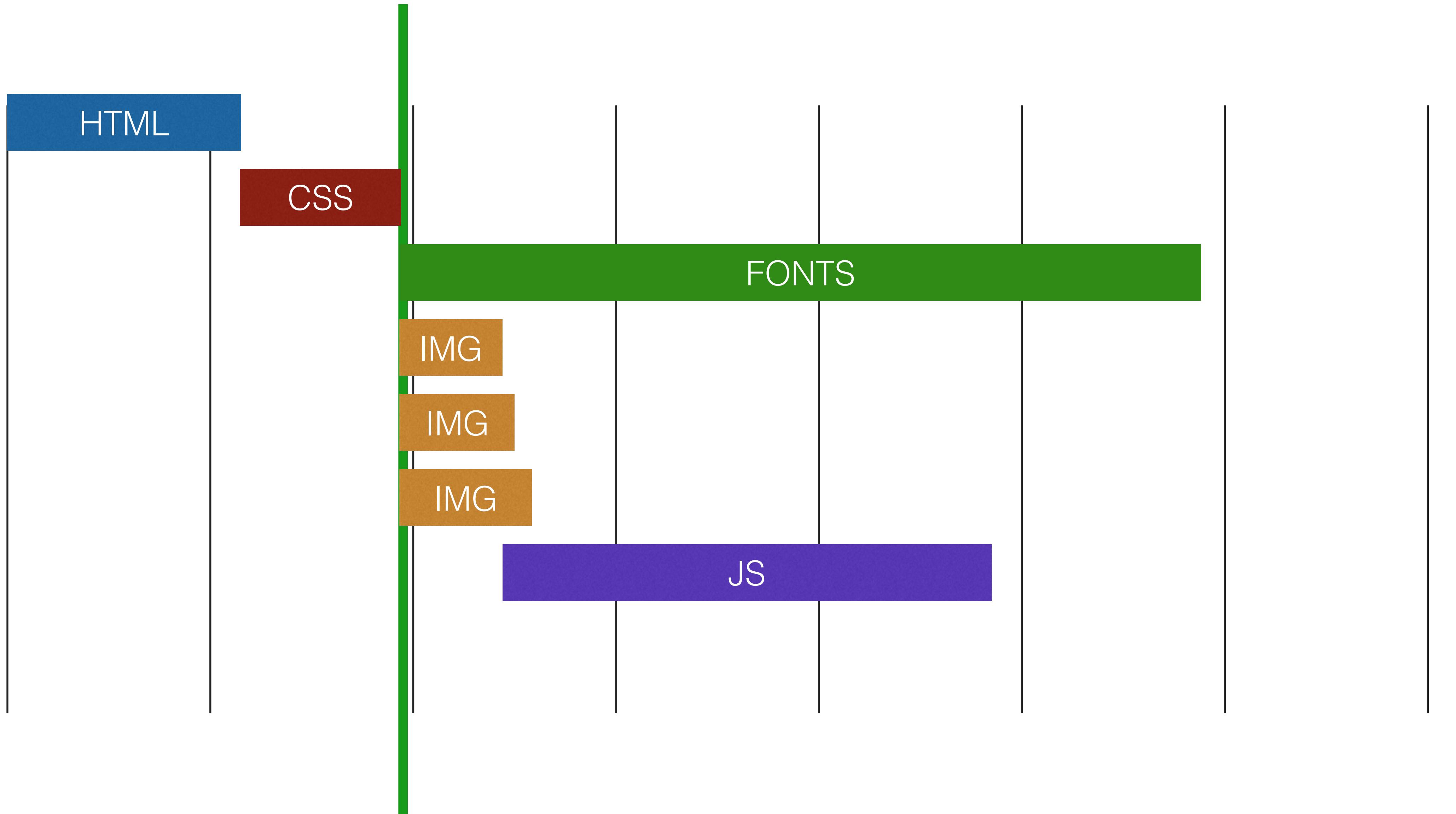
Blockers



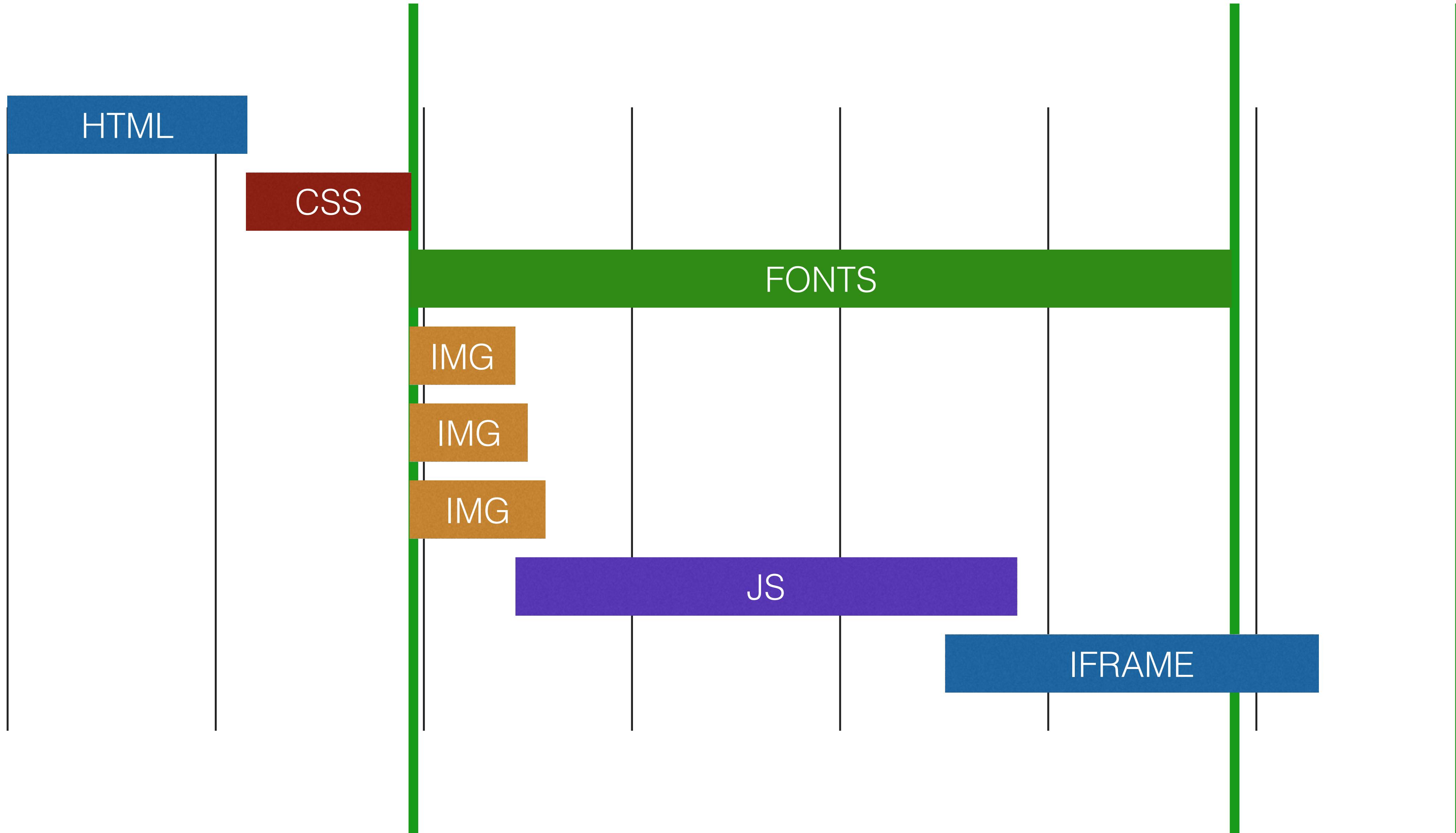
Blockers



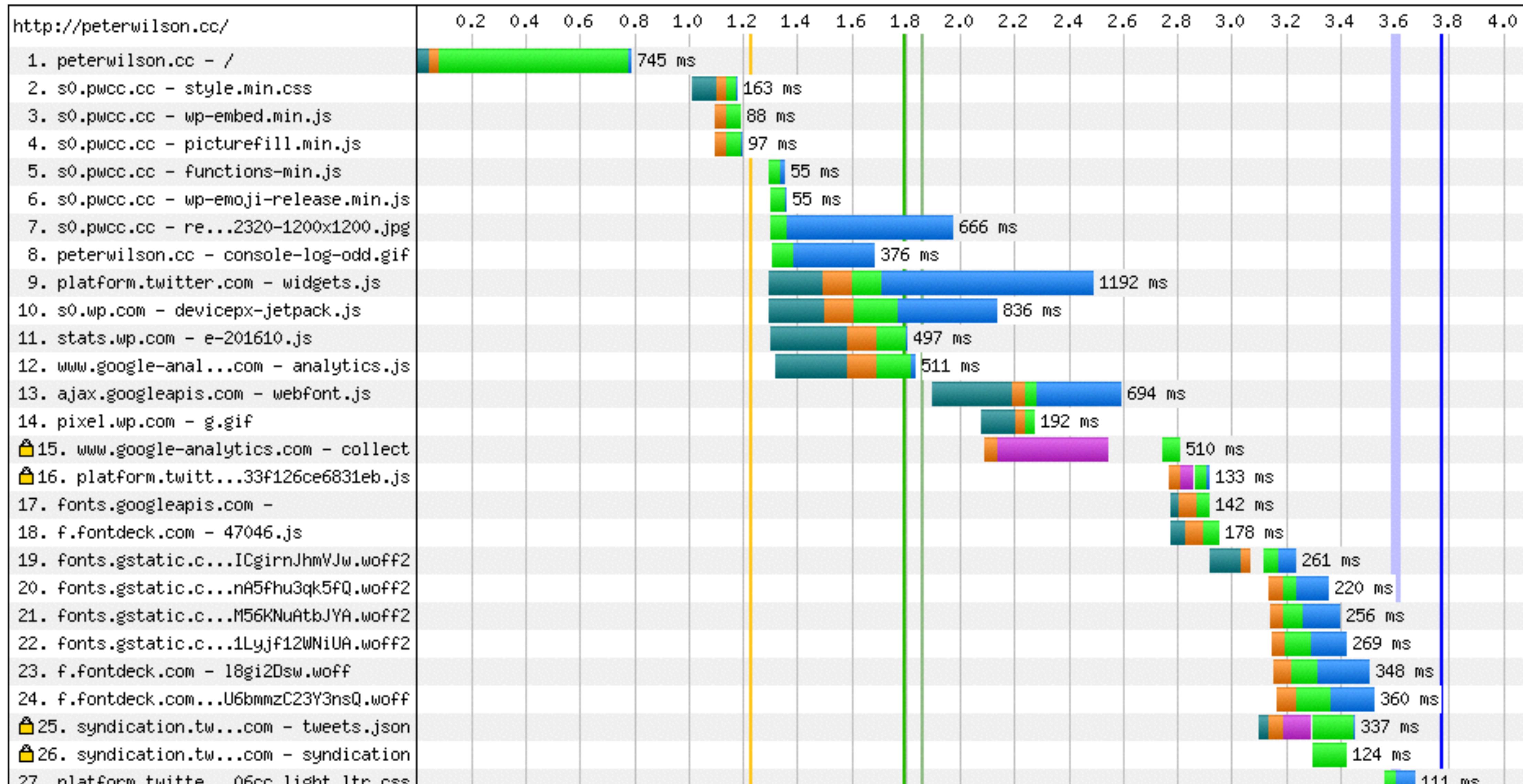
Blockers



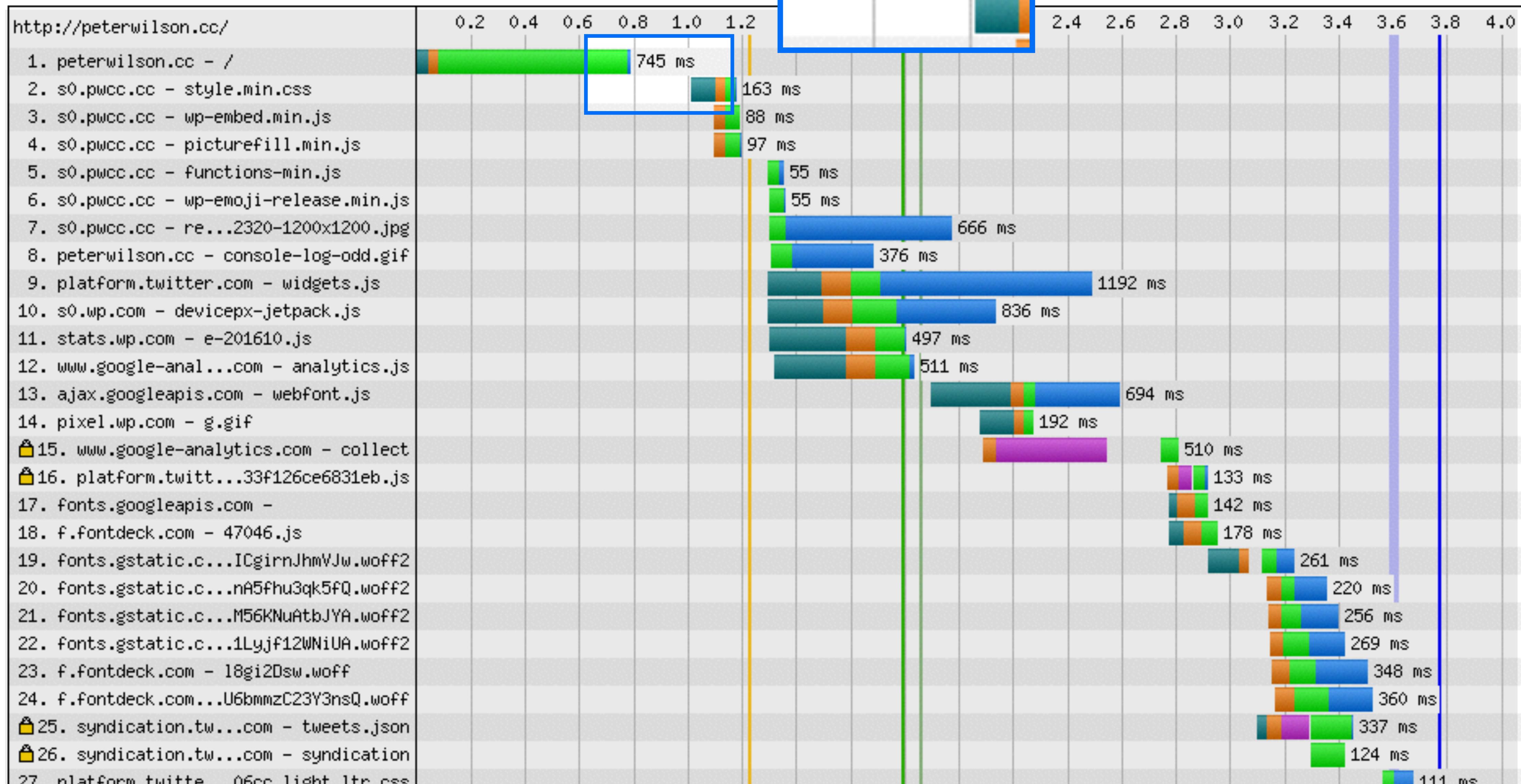
Blockers



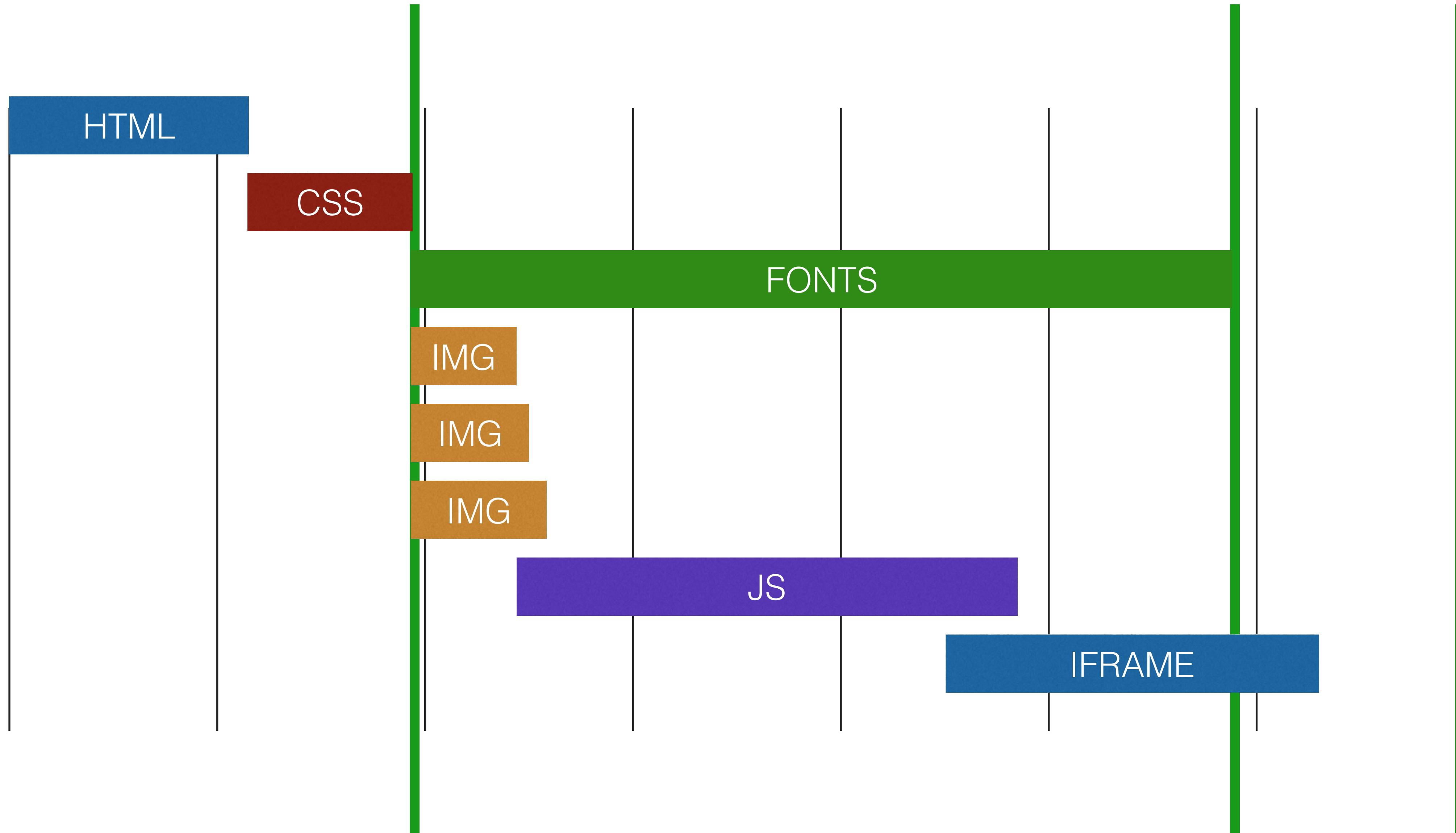
Waterfall



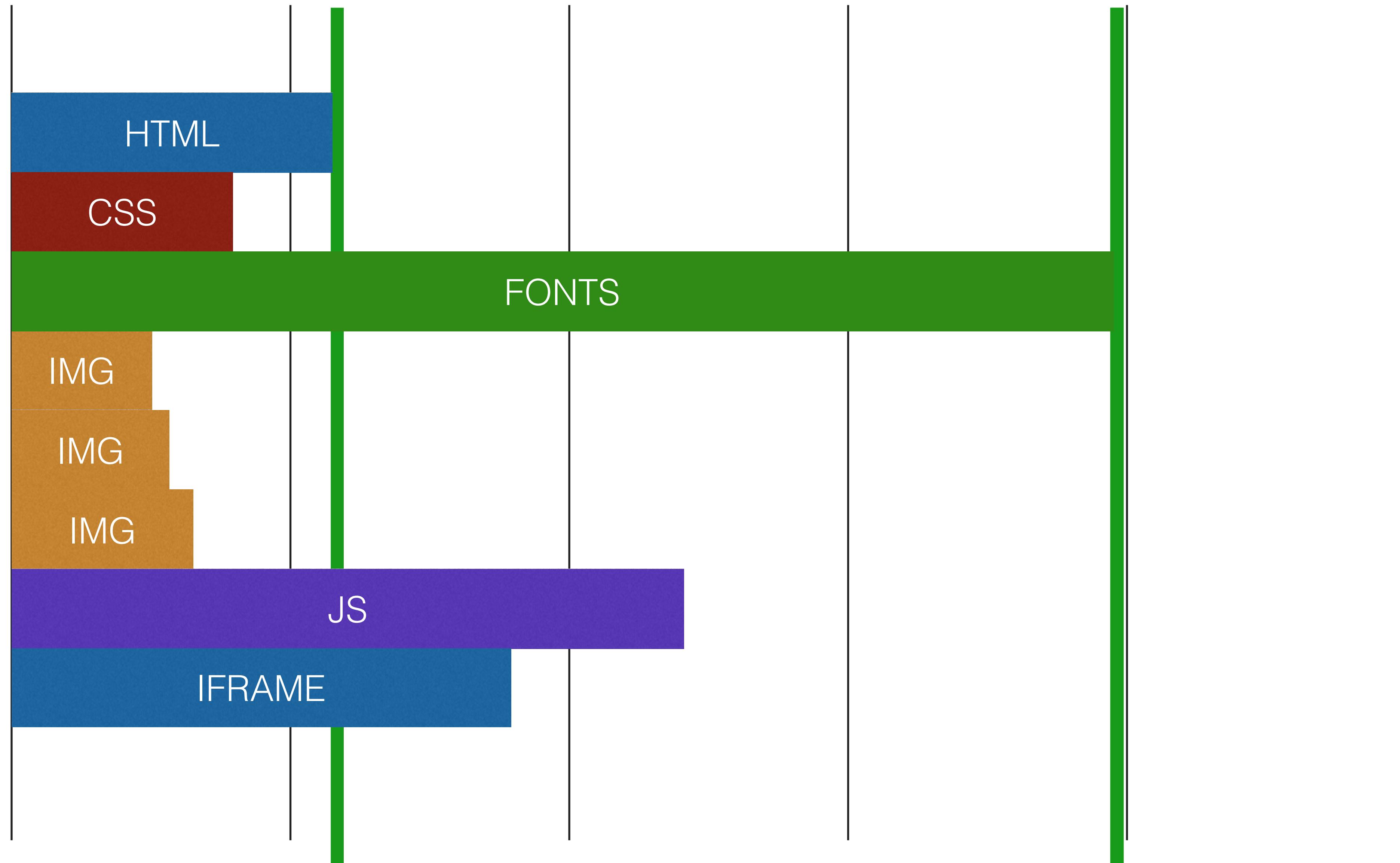
Waterfall



Waterfall



Waterfall



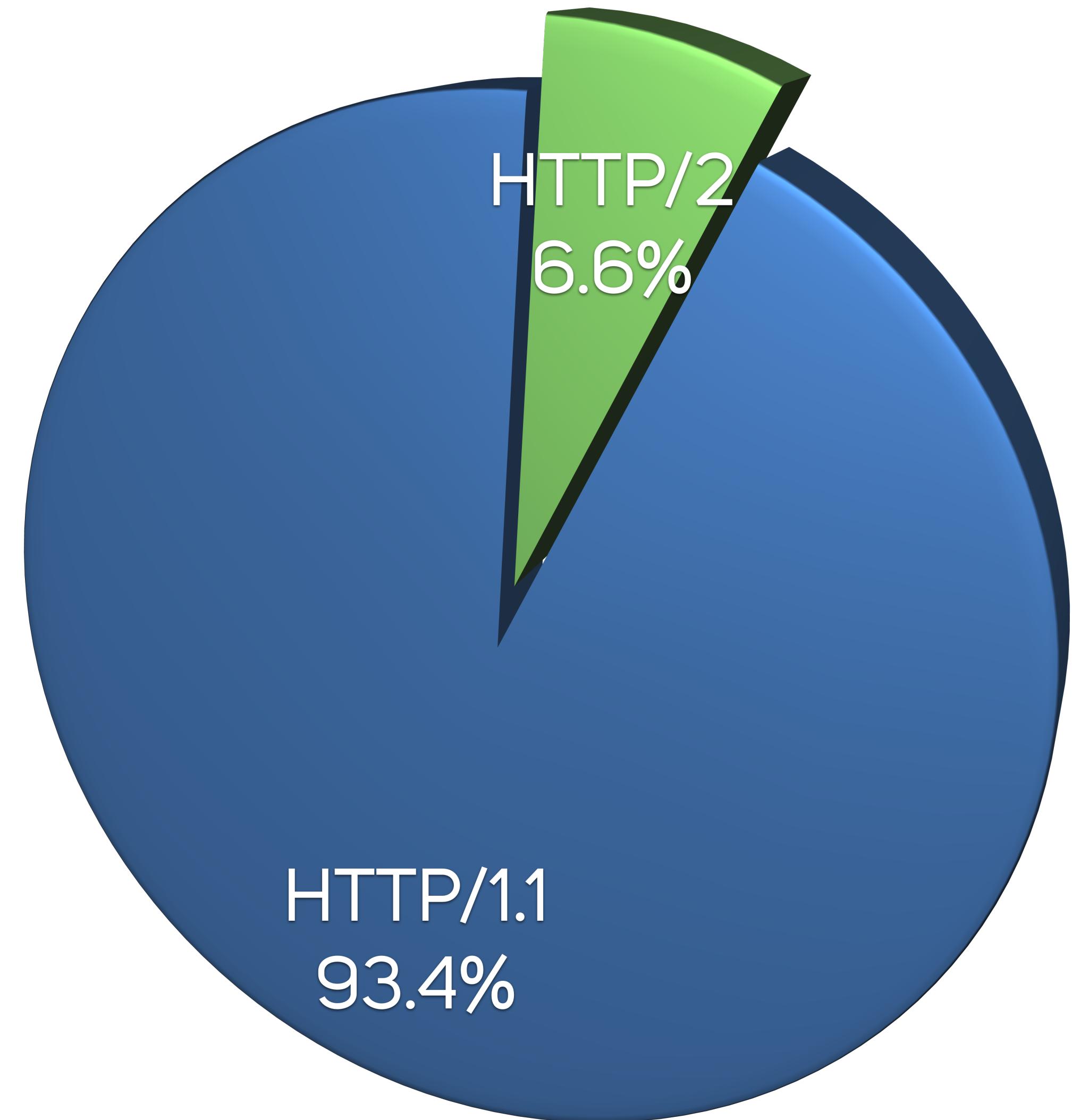
HTTP/2

An aside

**Everything you know about
performance is now wrong and
former best practices are now an
anti-pattern and considered
harmful.**

**These titles are
considered harmful**

Sites using HTTP/2

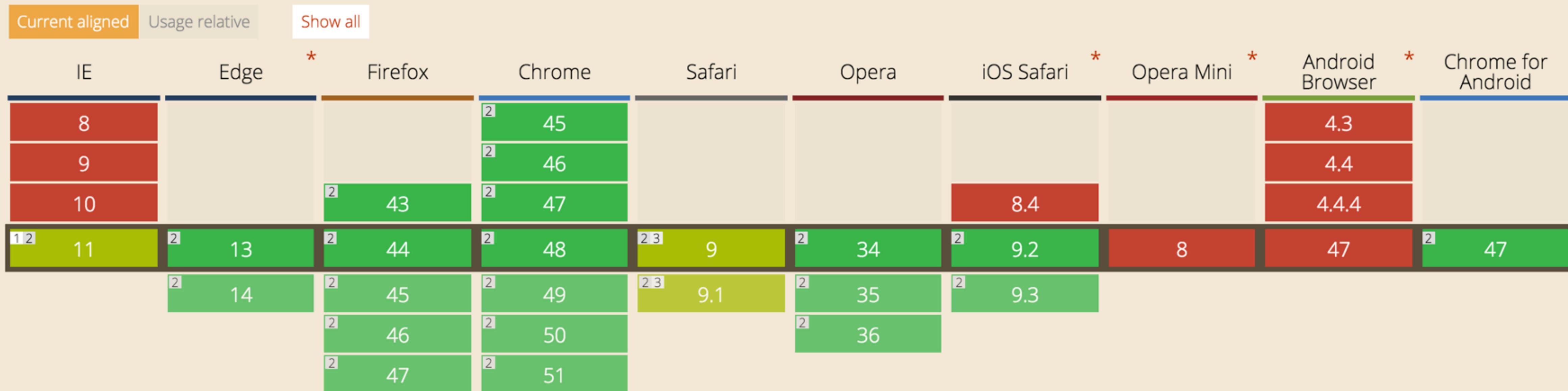


HTTP/2 protocol

Global

$$63.24\% + 7.89\% = 71.14\%$$

Networking protocol for low-latency transport of content over the web. Originally started out from the SPDY protocol, now standardized as HTTP version 2.



See also support for [the SPDY protocol](#), precursor of HTTP2.

¹ Partial support in IE11 refers to being limited to Windows 10.

² Only supports HTTP2 over TLS (https)

³ Partial support in Safari refers to being limited to OSX 10.11+

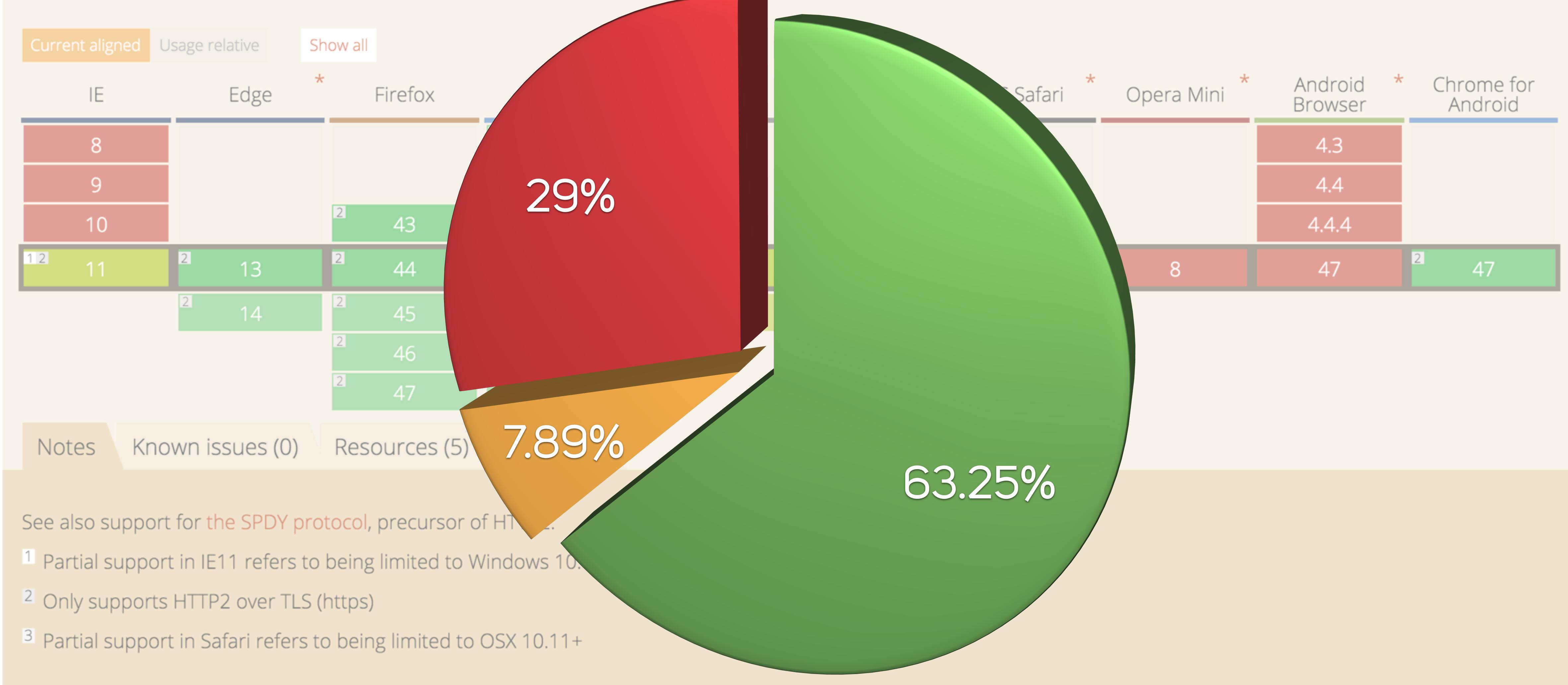
HTTP/2 protocol

- OTHER

Global

63.24% + 7.89% = 71.14%

Networking protocol for low-latency transport of content over the web. Originally started out from the SPDY protocol, now standardized as HTTP version 2.



Critical Path CSS



Preload

W3C Working Draft 25 February 2016

This version:

<http://www.w3.org/TR/2016/WD-preload-20160225/>

Latest published version:

<http://www.w3.org/TR/preload/>

Latest editor's draft:

<http://w3c.github.io/preload/>

Previous version:

<http://www.w3.org/TR/2016/WD-preload-20160224/>

Editor:

[Ilya Grigorik](#), [Google](#), igrigorik@gmail.com

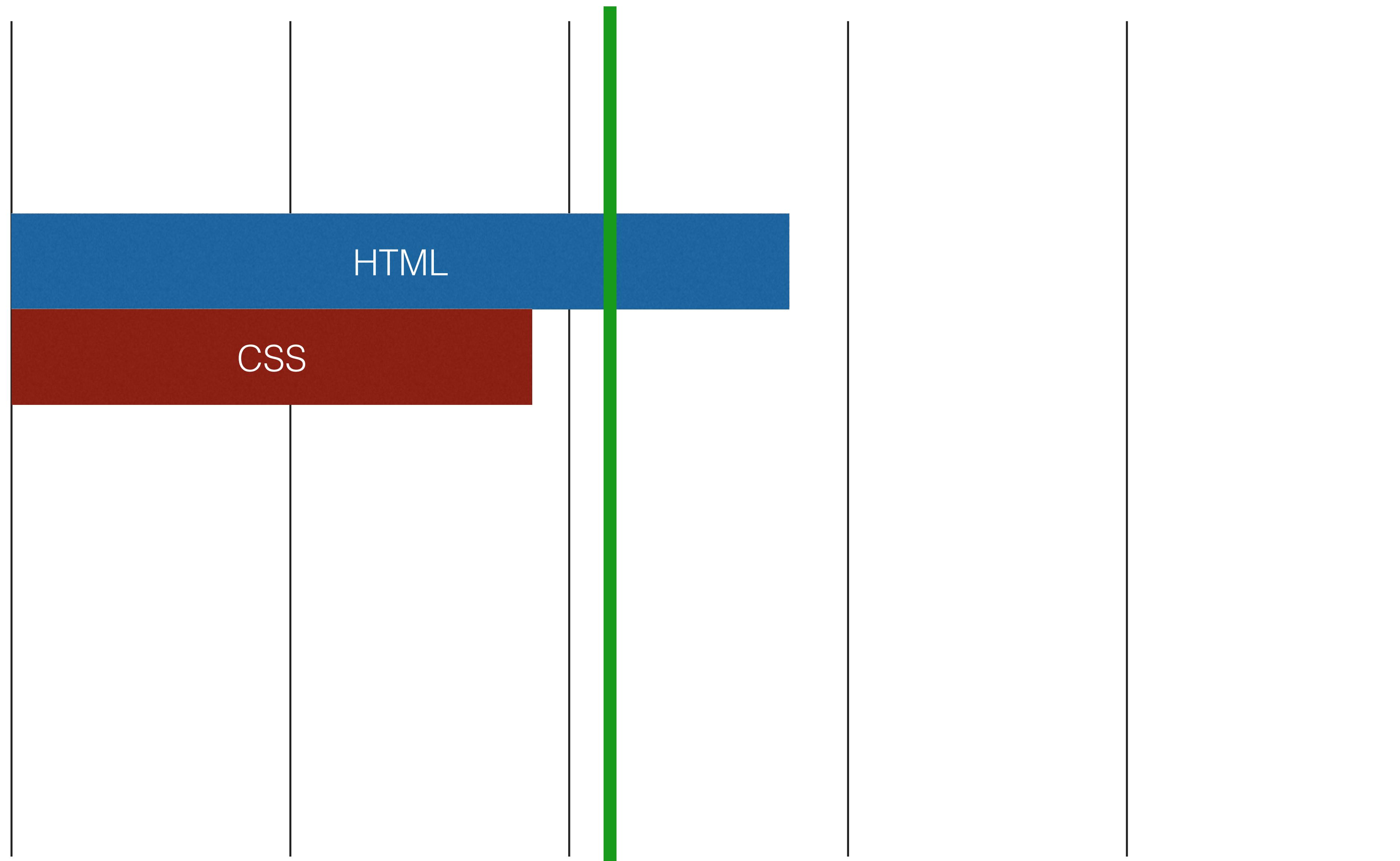
Repository:

[We are on Github.](#)

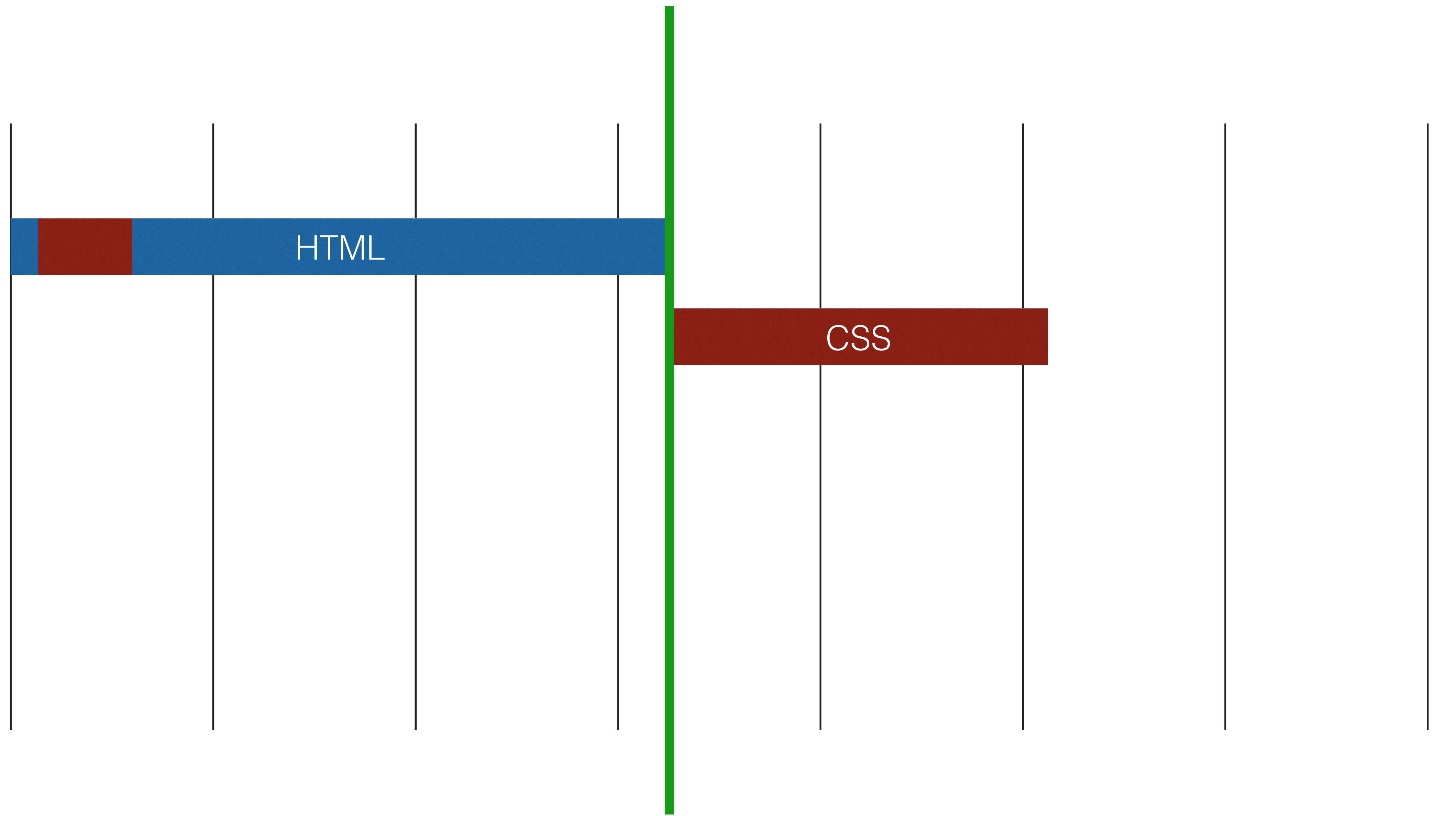
[File a bug.](#)

[Commit history.](#)

HTTP/2, without critical path CSS



HTTP/1, with critical path CSS

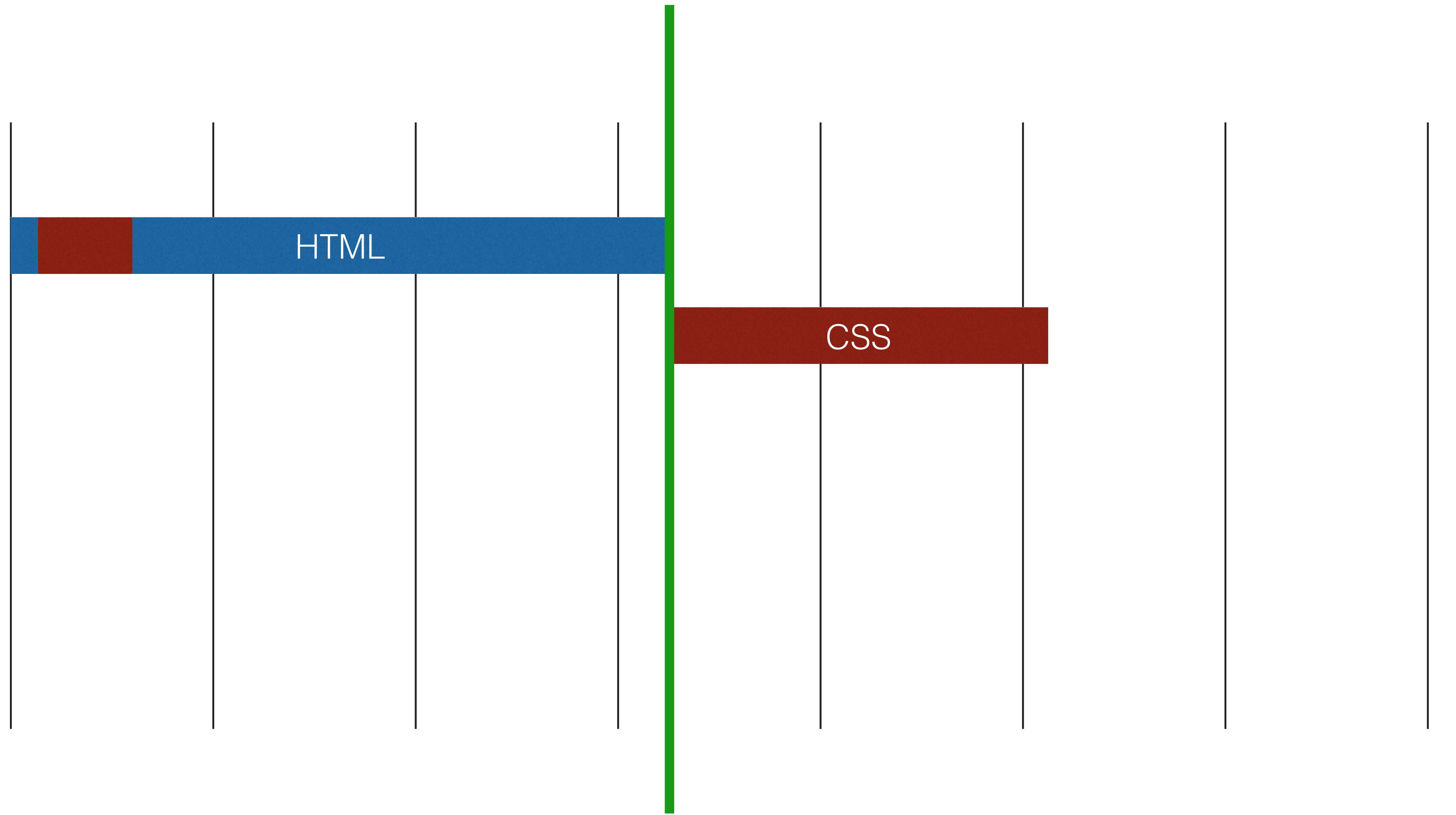


```
<html>

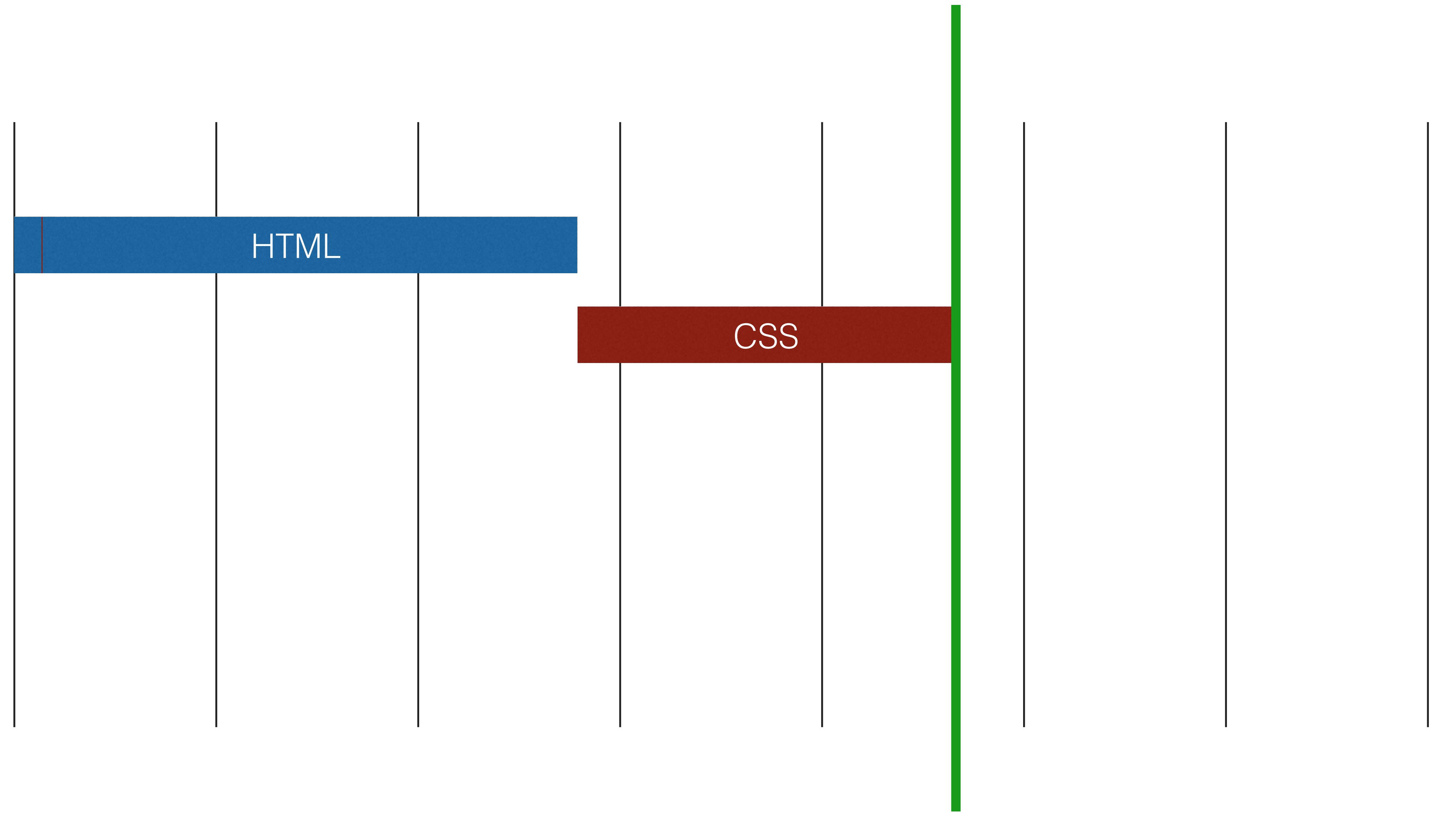
<head>

<style>html{font-family:sans-serif;-ms-text-size-adjust:100%;-webkit-text-size-adjust:100%}body{margin:0}article,aside,details,figcaption,figure,footer,header,hgroup,main,nav,section,summary{display:block}audio,canvas,progress,video{display:inline-block;vertical-align:baseline}audio:not([controls]){display:none;height:0}[hidden],template{display:none}a{background:transparent}a:active,a:hover{outline:0}abbr[title]{border-bottom:1px dotted}b,strong{font-weight:bold}dfn{font-style:italic}h1{font-
```

HTTP/1, with critical path CSS



HTTP/1, without critical path CSS



CSS, the WordPress way

```
wp_enqueue_style(  
    'pwcc-style', // handle  
    get_stylesheet_uri(), // source  
    array(), // no dependancies  
    '20160624-26', // version  
    'all' // media  
) ;
```

Preloading CSS

Name
Path

Name	Path	Headers	Preview	Response	Cookies	Timing
?p=1241		General				
css?family=Open...	fonts.googleapis....	Response Headers	view source			
dashicons.css?ver..	/wp-includes/css	Cache-Control: no-cache, must-revalidate, max-age=0				
		Connection: Keep-Alive				
		Content-Type: text/html; charset=UTF-8				
		Date: Sun, 06 Mar 2016 00:49:43 GMT				
		Expires: Wed, 11 Jan 1984 05:00:00 GMT				
		Keep-Alive: timeout=5, max=100				
		Link: < http://wptrac.on.pwcc.cc/?p=1241 >; rel=shortlink				
		Link: < ">http://wptrac.on.pwcc.cc/?rest_route=/> ; rel="https://api.w.org/"				
		Link: </style.css>; rel=preload				
		Link: </functions.js>; rel=preload				
		Pragma: no-cache				
		Server: Apache				
		Transfer-Encoding: chunked				
		X-Pingback: http://wptrac.on.pwcc.cc/xmlrpc.php				

Preloading CSS

Link: </style.css>; rel=preload

The screenshot shows the Network tab of a browser developer tools interface. On the left, a list of resources is shown with icons indicating they are CSS files. The main resource at the top is selected and highlighted with a blue background. To the right, the response headers for this resource are displayed in a tree view. A blue box highlights the 'Link' header entry, which contains the value: "Link: </style.css>; rel=preload". Other visible headers include Cache-Control, Connection, Content-Type, Date, Expires, Keep-Alive, Link (shortlink and rest_route), Pragma, Server, Transfer-Encoding, and X-Pingback.

Name	Path	Headers	Preview	Res
?p=1241		x Headers		
css?family=Open...	fonts.googleapis....			
dashicons.css?ver..	/wp-includes/css			
admin-bar.css?ve..	/wp-includes/css			
css?family=Merri...	fonts.googleapis....			
genericons.css?ve..	/wp-content/plu...			

►General

▼Response Headers view source

Cache-Control: no-cache, must-revalidate, max-age=0
Connection: Keep-Alive
Content-Type: text/html; charset=UTF-8
Date: Sun, 06 Mar 2016 00:49:43 GMT
Expires: Wed, 11 Jan 1984 05:00:00 GMT
Keep-Alive: timeout=5, max=100
Link: <http://wptrac.on.pwcc.cc/?p=1241>; rel=shortlink
Link: <http://wptrac.on.pwcc.cc/?rest_route=/>; rel="https://api.w.org/"
Link: </style.css>; rel=preload
Link: </functions.js>; rel=preload
Pragma: no-cache
Server: Apache
Transfer-Encoding: chunked
X-Pingback: http://wptrac.on.pwcc.cc/xmlrpc.php

Preloading CSS

Link: </style.css>; rel=preload; as=style

Preloading CSS

Link: </style.css>; rel=preload; as=style; nopush

Preloading CSS

```
pwcc_preload_style( 'pwcc-style' );           // push  
  
pwcc_preload_style( 'pwcc-style', false ); // no push
```

Server push

```
pwcc_preload_style( 'pwcc-style' );
```

Server push

```
if ( is_cached( 'pwcc-style' ) ) {  
    pwcc_preload_style( 'pwcc-style' );  
} else /* file not cached */ {  
    pwcc_preload_style( 'pwcc-style', false );  
}
```

Server push

```
$version = '20160624-26';  
setcookie( 'pwcc-style', $version, 0, '/' );
```

is_cached()

```
function is_cached( $handle, $version ) {  
    if ( $version === $_COOKIE[ $handle ] ) {  
        return true;  
    }  
    else {  
        return false;  
    }  
}
```

```
<html>

<head>

<style>html{font-family:sans-serif;-ms-text-size-adjust:100%;-webkit-text-size-adjust:100%}body{margin:0}article,aside,details,figcaption,figure,footer,header,hgroup,main,nav,section,summary{display:block}audio,canvas,progress,video{display:inline-block;vertical-align:baseline}audio:not([controls]){display:none;height:0}[hidden],template{display:none}a{background:transparent}a:active,a:hover{outline:0}abbr[title]{border-bottom:1px dotted}b,strong{font-weight:bold}dfn{font-style:italic}h1{font-
```



filamentgroup / loadCSS

Watch ▾

106

Star

1,794

Fork

138

A function for loading CSS asynchronously

61 commits

3 branches

6 releases

11 contributors



branch: master ▾

loadCSS / +

Code

Issues 6

Pull requests 4

Wiki

Pulse

Graphs

SSH clone URL

git@github.com:filar



You can clone with HTTPS, SSH, or Subversion. ⓘ

Clone in Desktop

Download ZIP

Update preload.html



scottjehl authored 12 days ago

latest commit 1830ab1d8a ↗



test

Update preload.html

12 days ago



.gitignore

linting and travis

2 months ago



.jshintrc

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2 months ago



.repo-report

linting and travis

2 months ago



.travis.yml

linting and travis

2 months ago



CONTRIBUTING.md

contribution guidelines

2 months ago



Gruntfile.js

linting and travis

2 months ago



LICENSE

Initial commit

11 months ago



README.md

Adds `onloadCSS` utility to add callbacks to `loadCSS` asynchronously...

2 months ago



bower.json

0.1.6 package files.

2 months ago



filamentgroup / loadCSS

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A function for loading CSS asynchronously

61 commits

3 branches

6 releases

11 contributors

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loadCSS / +

Update preload.html
scottjehl authored 12 days ago

latest commit 1830ab1d8a ↗

test	Update preload.html	12 days ago
.gitignore	linting and travis	2 months ago
.jshintrc	linting and travis	2 months ago
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.travis.yml	linting and travis	2 months ago
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LICENSE	Initial commit	11 months ago
README.md	Adds `onloadCSS` utility to add callbacks to `loadCSS` asynchronously...	2 months ago
bower.json	0.1.6 package files.	2 months ago

Register loadCSS

```
wp_register_script(  
    'pwcc-load-css',           // handle  
    '/loadcss.js',            // file  
    array(),                  // dependencies  
    "1.2.0",                  // version  
    true                      // load in footer  
) ;
```

HTML: uncached HTTP/1

```
<style type='text/css'>/* Critical CSS */</style>
<link rel='preload' href='/style.css'
      as='style' onload='this.rel="stylesheet"'>
<noscript>
  <link rel='stylesheet' href='/style.css' />
</noscript>
```

Inline CSS

```
if ( ! is_cached( 'pwcc-style' ) && ! is_http2() ) {  
    print_style_inline( 'pwcc-style' );  
    wp_enqueue_script( 'pwcc-load-css' );  
}
```

Inline CSS

```
if ( ! is_cached( 'pwcc-style' ) && ! is_http2() ) {  
    print_style_ipwcc.cc/wceu/rapidcss  
    wp_enqueue_script( 'pwcc-load-css' );  
}
```

```
<html>

<head>

<style>html{font-family:sans-serif;-ms-text-size-adjust:100%;-webkit-text-size-adjust:100%}body{margin:0}article,aside,details,figcaption,figure,footer,header,hgroup,main,nav,section,summary{display:block}audio,canvas,progress,video{display:inline-block;vertical-align:baseline}audio:not([controls]){display:none;height:0}[hidden],template{display:none}a{background:transparent}a:active,a:hover{outline:0}abbr[title]{border-bottom:1px dotted}b,strong{font-weight:bold}dfn{font-style:italic}h1{font-
```

Cached Stylesheet

```
<link rel="stylesheet" href="/style.css" />
```

```
<link rel='shortcut icon' href='/favicon.ico'>
<link rel='apple-touch-icon' sizes='57x57' href='...png'>
<link rel='apple-touch-icon' sizes='114x114' href='...png'>
<link rel='apple-touch-icon' sizes='72x72' href='...png'>
<link rel='apple-touch-icon' sizes='144x144' href='...png'>
<link rel='apple-touch-icon' sizes='60x60' href='...png'>
<link rel='apple-touch-icon' sizes='120x120' href='...png'>
<link rel='apple-touch-icon' sizes='76x76' href='...png'>
<link rel='apple-touch-icon' sizes='152x152' href='...png'>
<link rel='icon' type='image/png' href='...png'>
<link rel='icon' type='image/png' href='...png' sizes='160x160'>
<link rel='icon' type='image/png' href='...png' sizes='96x96'>
<link rel='icon' type='image/png' href='...png' sizes='16x16'>
<link rel='icon' type='image/png' href='...png' sizes='32x32'>
<meta name='msapplication-TileColor' content='#006ef6'>
<meta name='msapplication-TileImage' content='...png'>
<meta name='msapplication-config' content='/browserconfig.xml'>
```

**Everything you know about
performance is now wrong and
former best practices are now an
anti-pattern and considered
harmful.**

**Everything you know about
performance is now
twice as complicated.**

Thank you

Peter Wilson • peterwilson.cc • @pwcc