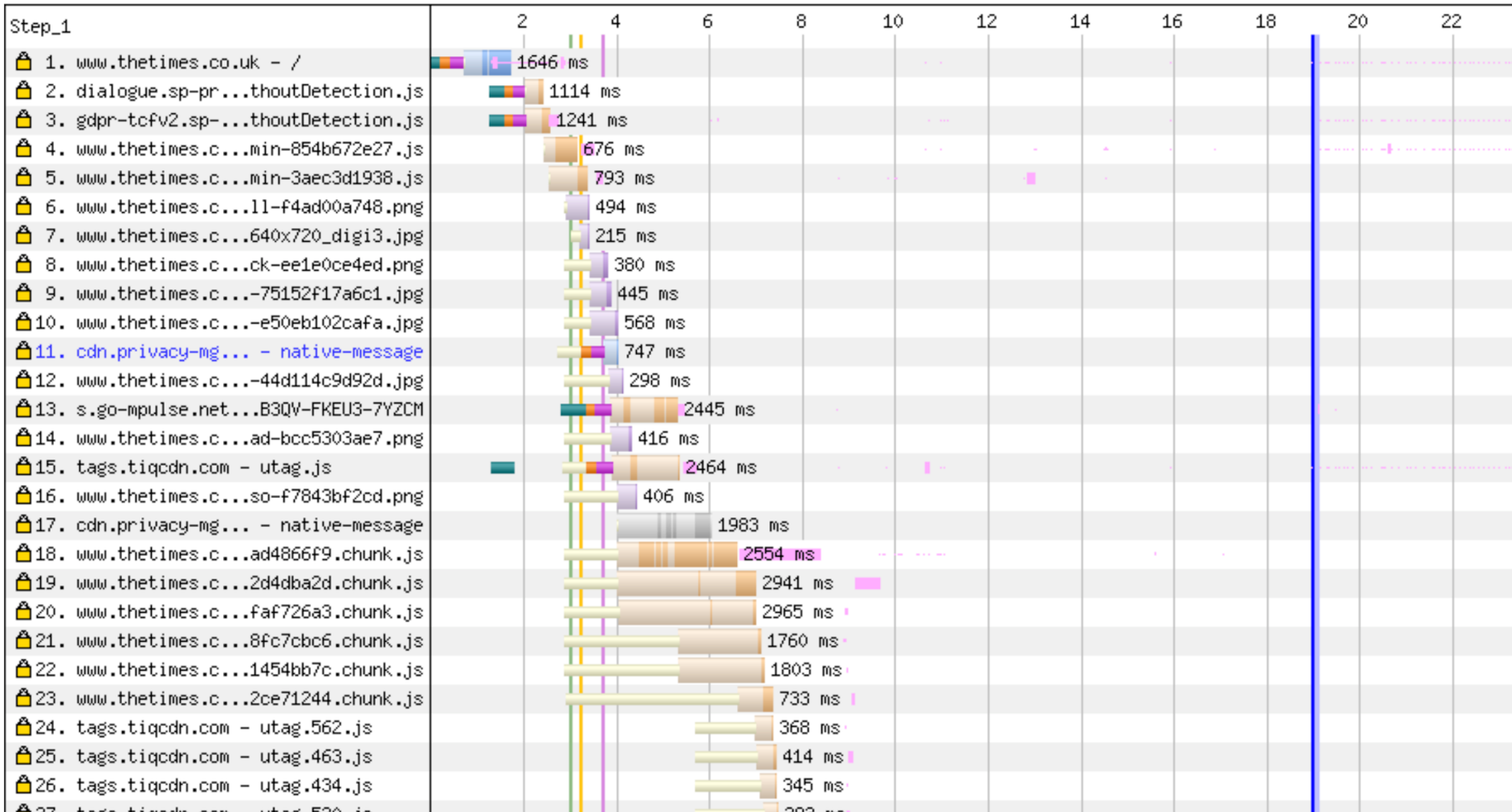




**WEBPAGE**TEST

by Catchpoint<sup>®</sup>

# How to Read a WebPageTest waterfall chart



**Assumed  
knowledge**




# Test. Optimize. Repeat.

 Advanced Testing

 Simple Testing

 Visual Comparison

 Traceroute


<https://www.webpagetest.org/>

Enter a website URL

Start Test

Test Location

London, UK - EC2 (Chrome,Firefox)

 Select from Map

Browser

Chrome

7 Pending Tests

Advanced Settings

Test Settings

Advanced

Chromium

Auth

Script

Block

SPOF

Custom

Connection

Cable (5/1 Mbps 28ms RTT)

# Test. Optimize. Repeat.

Start your journey here

The screenshot shows a web testing interface with a dark blue background. At the top, there are four tabs: "Advanced Testing" (selected), "Simple Testing", "Visual Comparison", and "Traceroute". Below the tabs is a large white input field containing the URL "https://www.your-amazing-website.net" and a yellow "Start Test →" button. A red callout box with the text "Start your journey here" has two arrows pointing to the URL input and the "Start Test" button. Below the URL field, there are two rows of settings: "Test Location" with a dropdown menu showing "London, UK - EC2 (Chrome,Firefox)" and a "Select from Map" button, and "Browser" with a dropdown menu showing "Chrome" and a "7 Pending Tests" indicator. At the bottom, there is a section for "Advanced Settings" with a dropdown arrow, and a row of tabs: "Test Settings" (selected), "Advanced", "Chromium", "Auth", "Script", "Block", "SPOF", and "Custom". Below the "Test Settings" tab, there is a "Connection" dropdown menu showing "Cable (5/1 Mbps 28ms RTT)".

Advanced Testing | Simple Testing | Visual Comparison | Traceroute

https://www.your-amazing-website.net | Start Test →

Test Location: London, UK - EC2 (Chrome,Firefox) | Select from Map

Browser: Chrome | 7 Pending Tests

Advanced Settings ▾

Test Settings | Advanced | Chromium | Auth | Script | Block | SPOF | Custom

Connection: Cable (5/1 Mbps 28ms RTT)

{ KNEELING  
ON THE  
SHOULDERS  
OF GIANTS }

<https://t.ly/Ys4v>



## # How to run a WebPageTest test

Published: Dec 31, 2020 Tagged: [webperf](#), [ramblings](#), [webpagetest](#). Read time: 64 mins

### Table of contents

- [Simple testing tab](#)

**What is  
WebPageTest?**

- Created by Pat Meenan in 2008 at AOL
- IE plugin called Pagetest
- Acquired by Catchpoint in 2020



# Pats basement



# Select Test Location

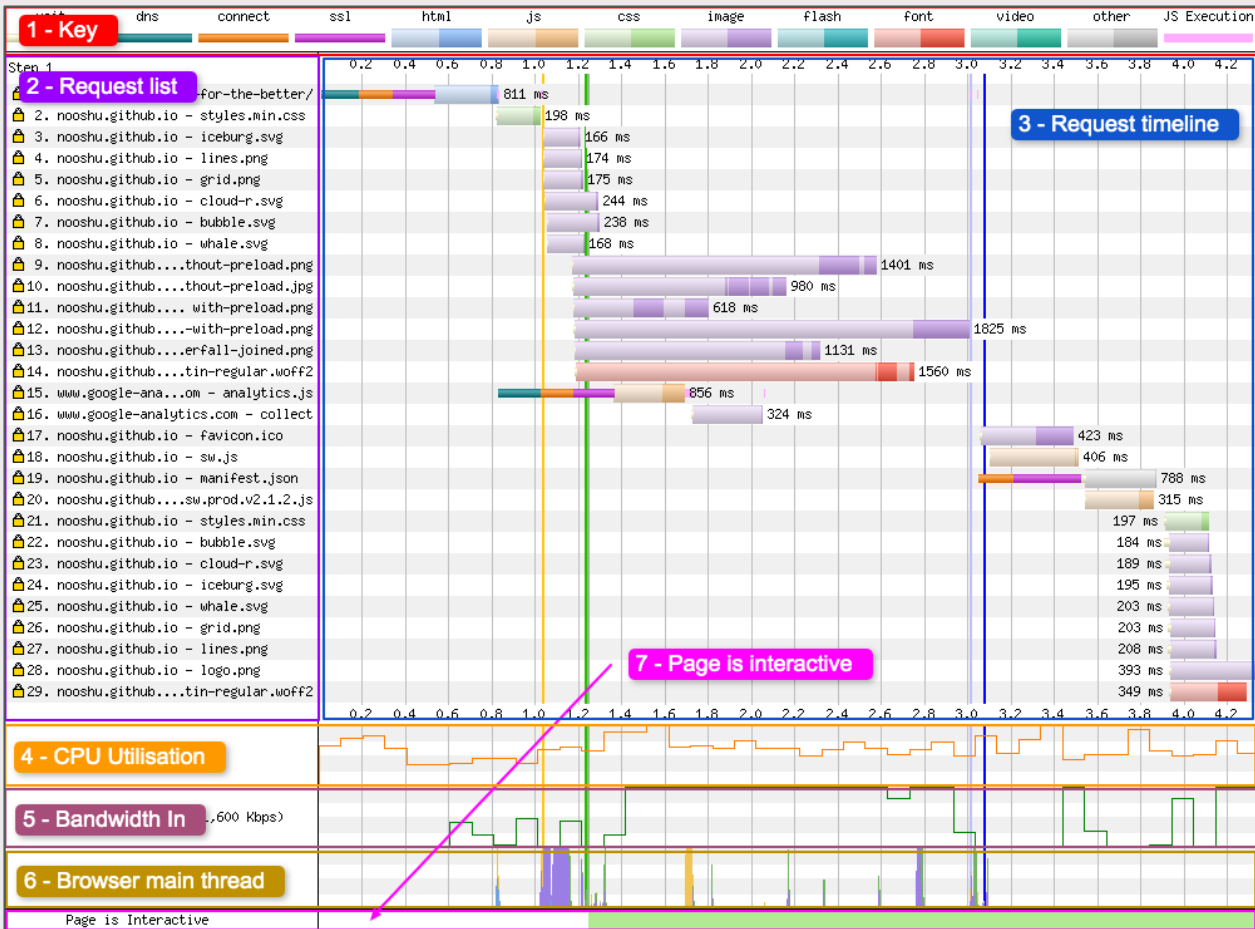


London, UK - Atlantic.net (Chrome,Firefox,Opera) ▼

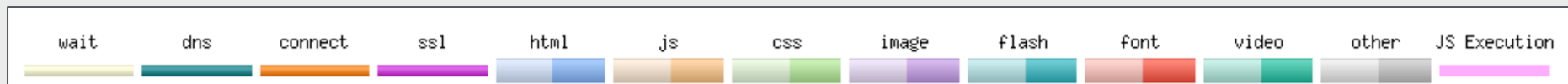
OK

# Basics





**1: Key**

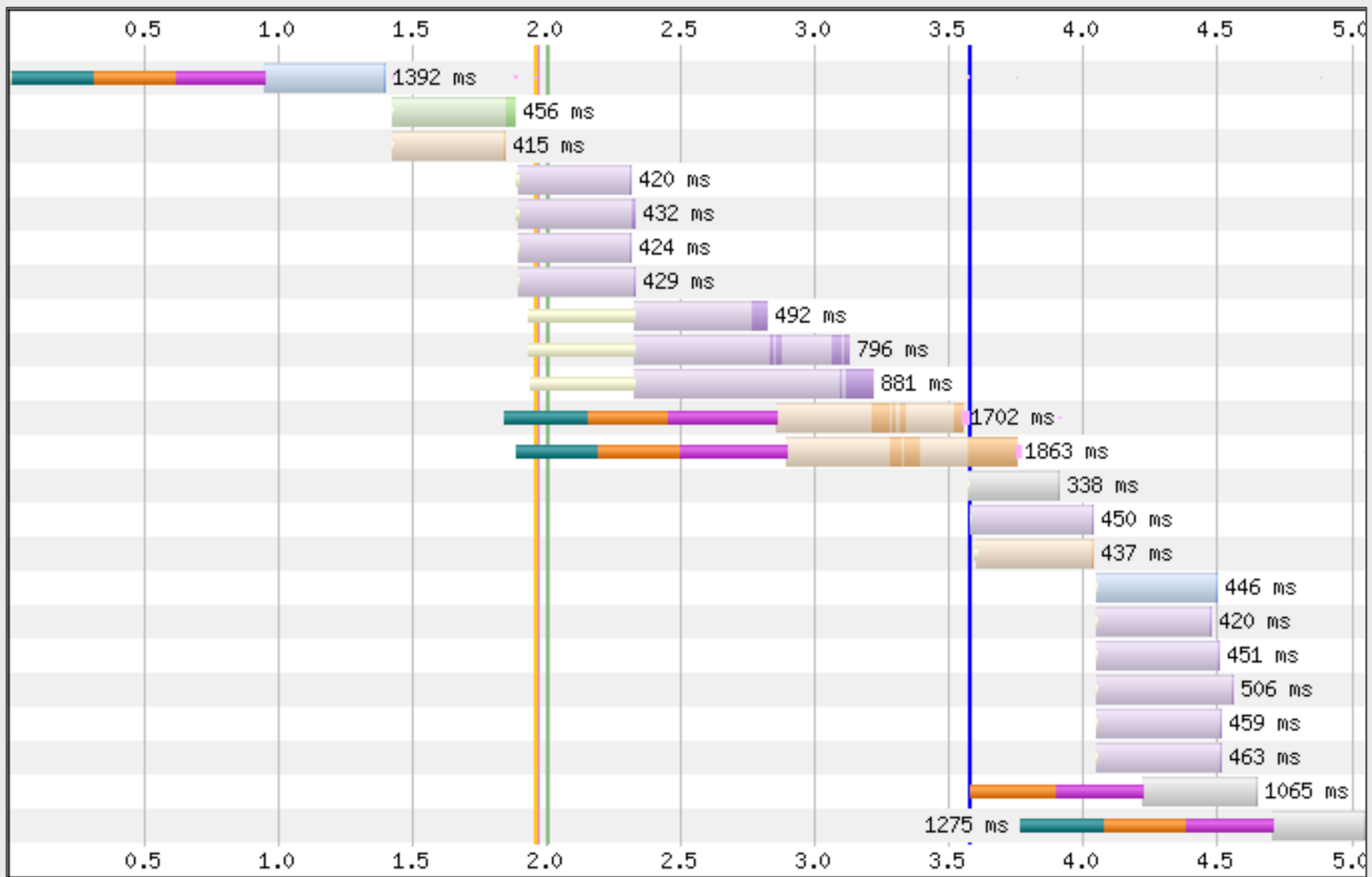


# 2: Request List

## Step\_1

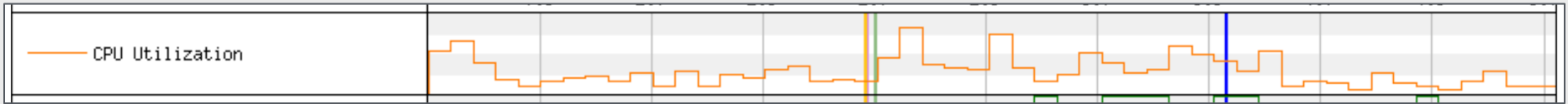
1. nooshu.github.io - /
2. nooshu.github.io - styles.min.css
3. nooshu.github.io - app.js
4. nooshu.github.io - iceburg.svg
5. nooshu.github.io - lines.png
6. nooshu.github.io - grid.png
7. nooshu.github.io - cloud-r.svg
8. nooshu.github.io - featured.jpg
9. nooshu.github.io - featured.jpg
10. nooshu.github.io - featured.jpg
11. www.google-ana...om - analytics.js
12. s2.go-mpulse.n...DQNG8-J9Q6E-9JYX6
13. www.google-analytics.com - collect
14. nooshu.github.io - favicon.ico
15. nooshu.github.io - sw.js
16. nooshu.github.io - offline.html
17. nooshu.github.io - bubble.svg
18. nooshu.github.io - mm.png
19. nooshu.github.io - logo.png
20. nooshu.github.io - whale.svg
21. nooshu.github...ntions-loader.svg
22. nooshu.github.io - manifest.json
23. c.go-mpulse.net - config.json

# 3: Request Timeline

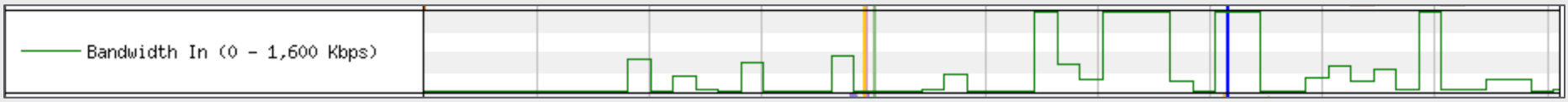


# 4: CPU Utilisation

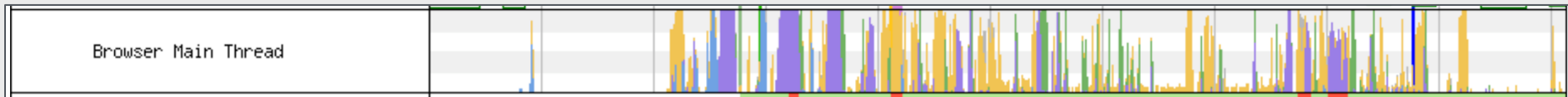




# 5: Bandwidth In



# 6: Browser Main Thread



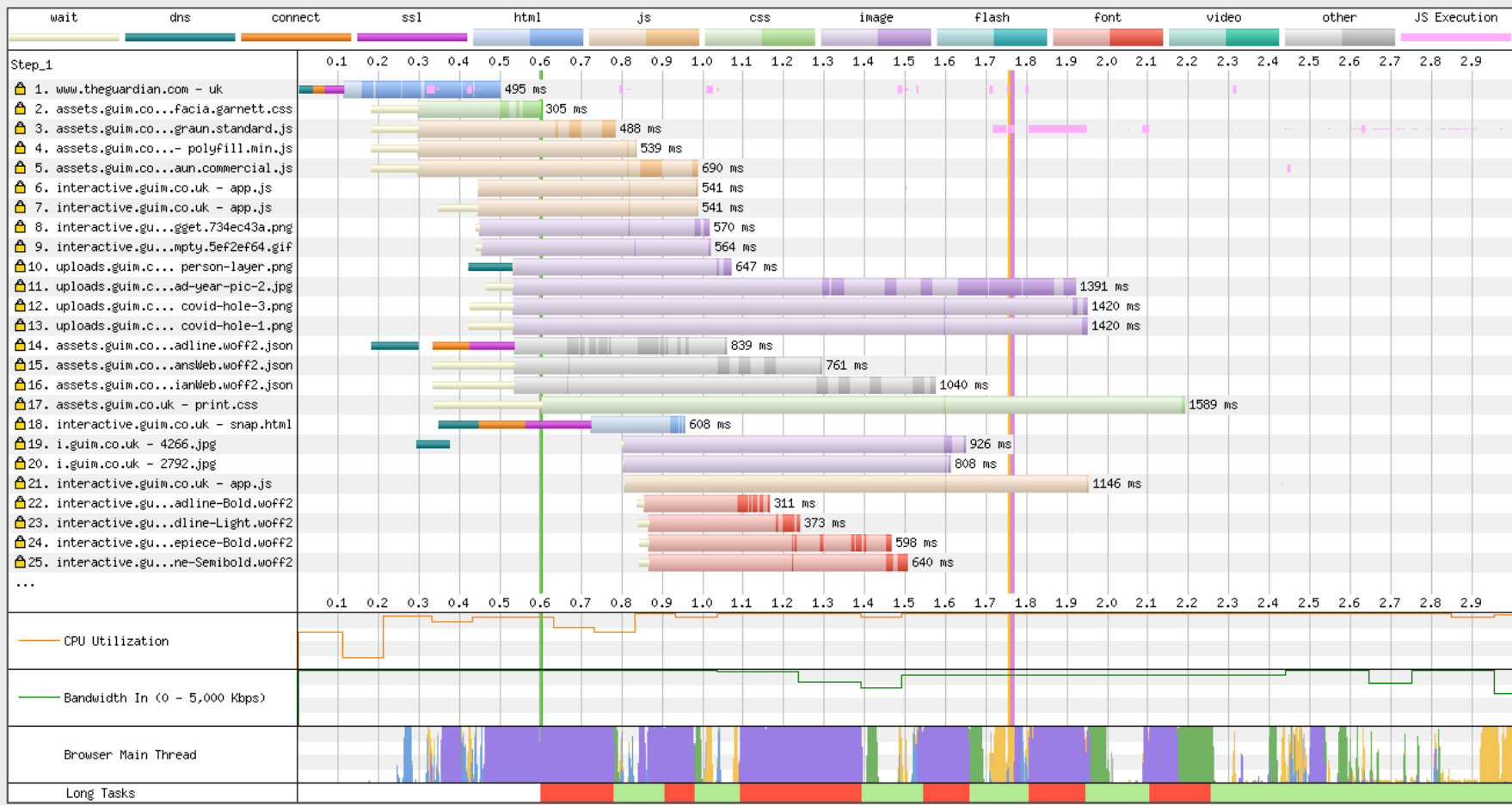
- Orange - Script parsing, evaluation and execution
- Purple - Layout
- Green - Painting
- Blue - HTML parsing
- Grey - Main thread time used for task processing not accounted for in other categories

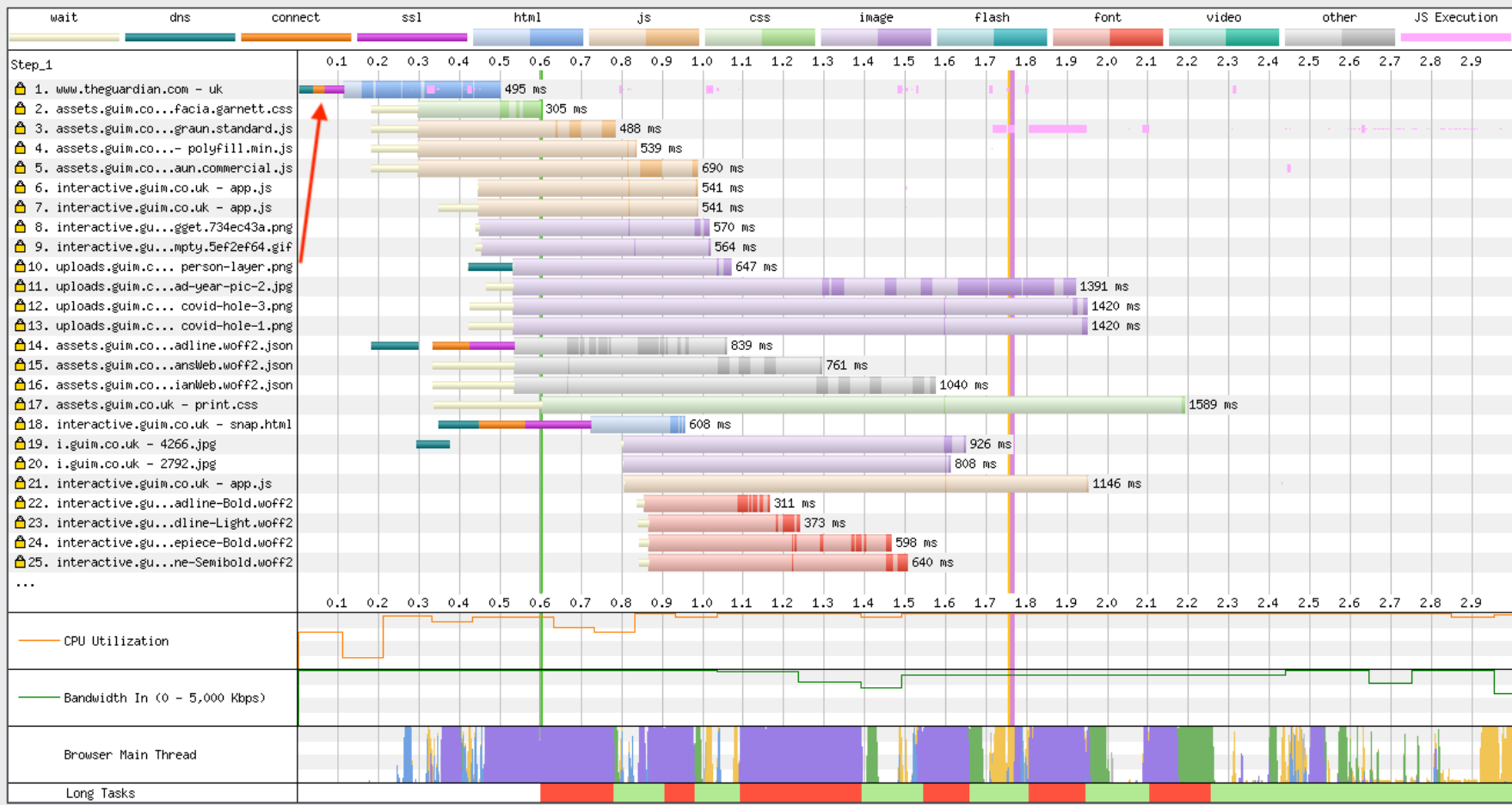
# 7: Long Tasks

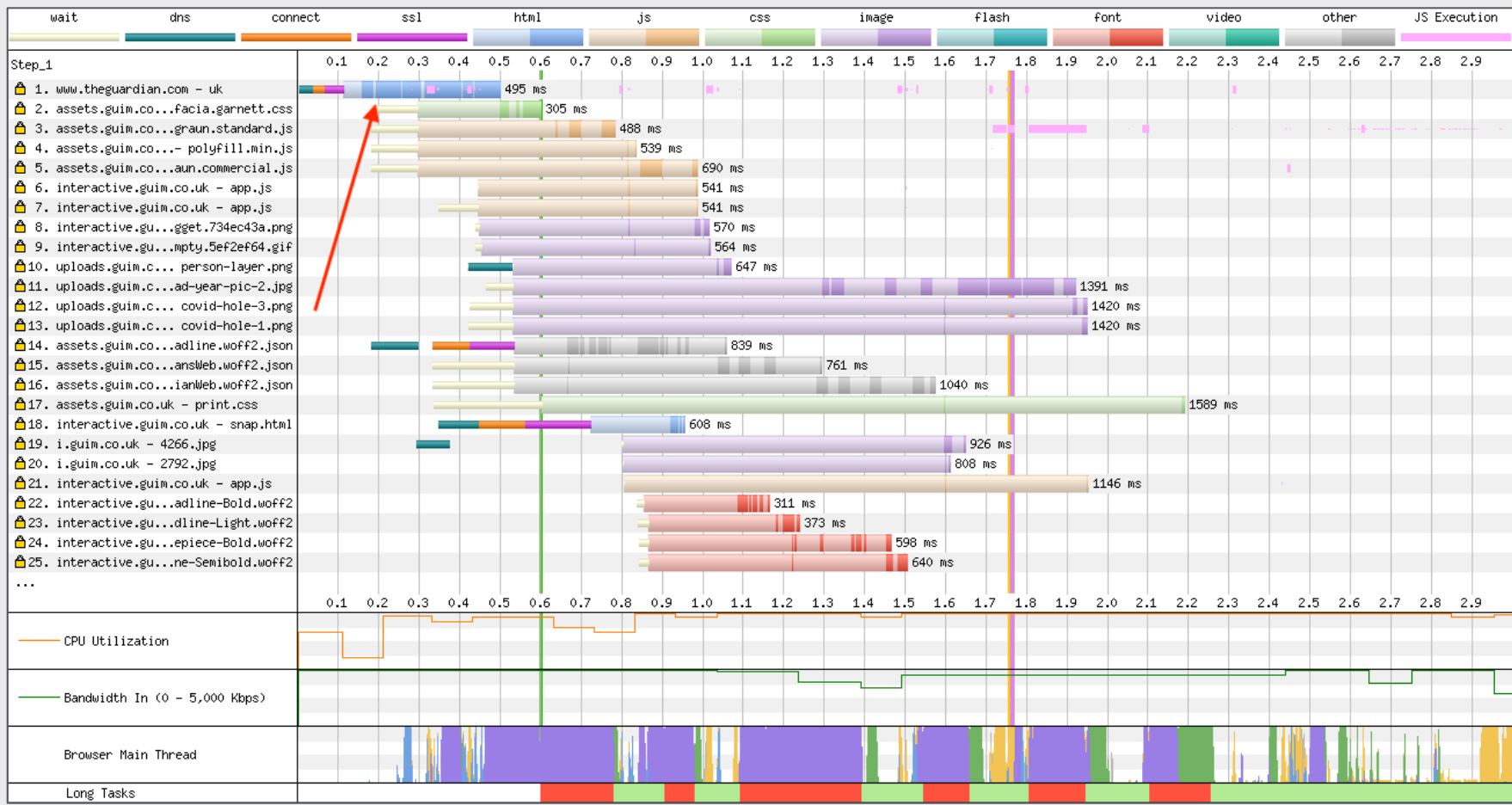


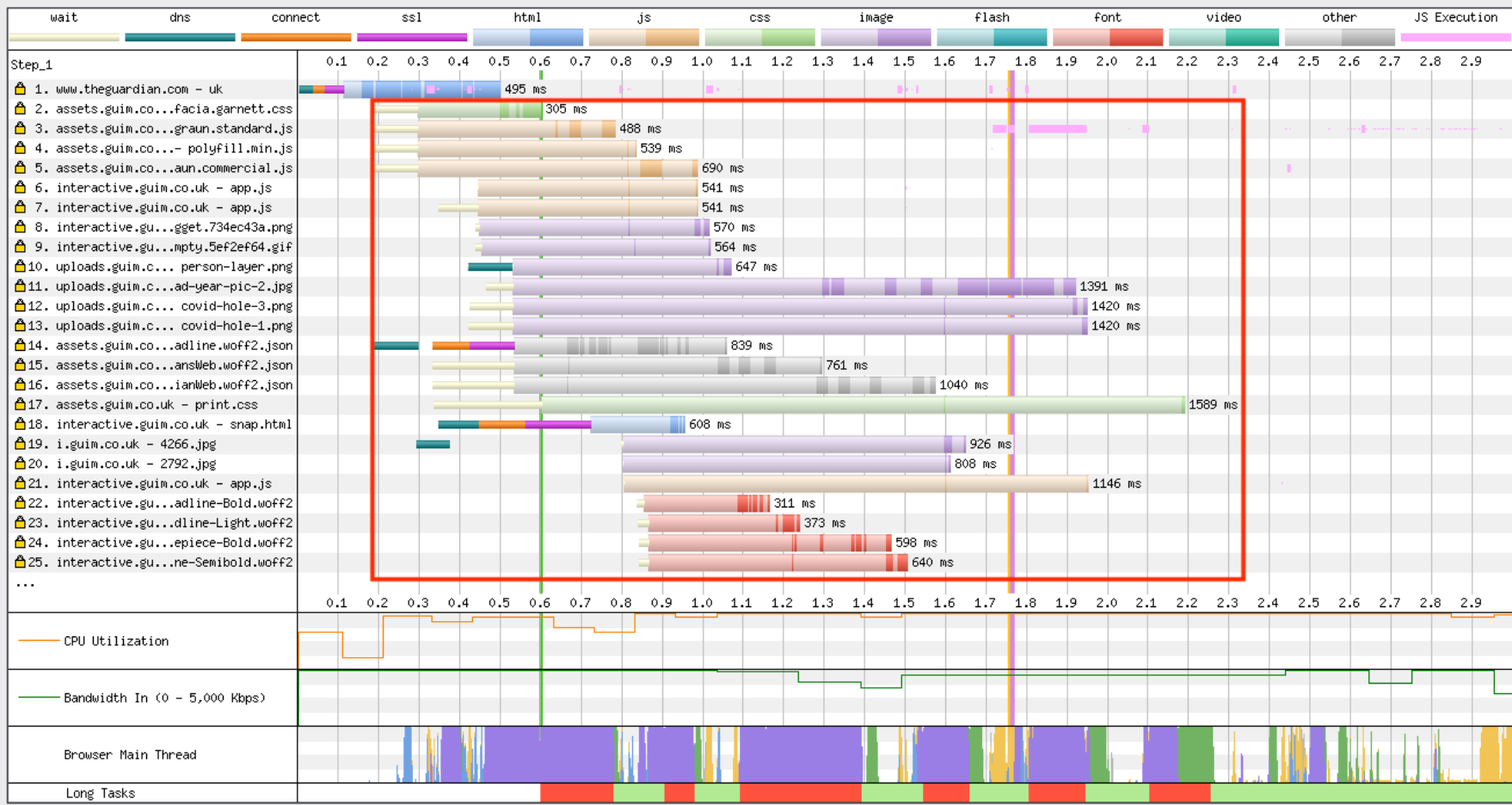
**All together:**

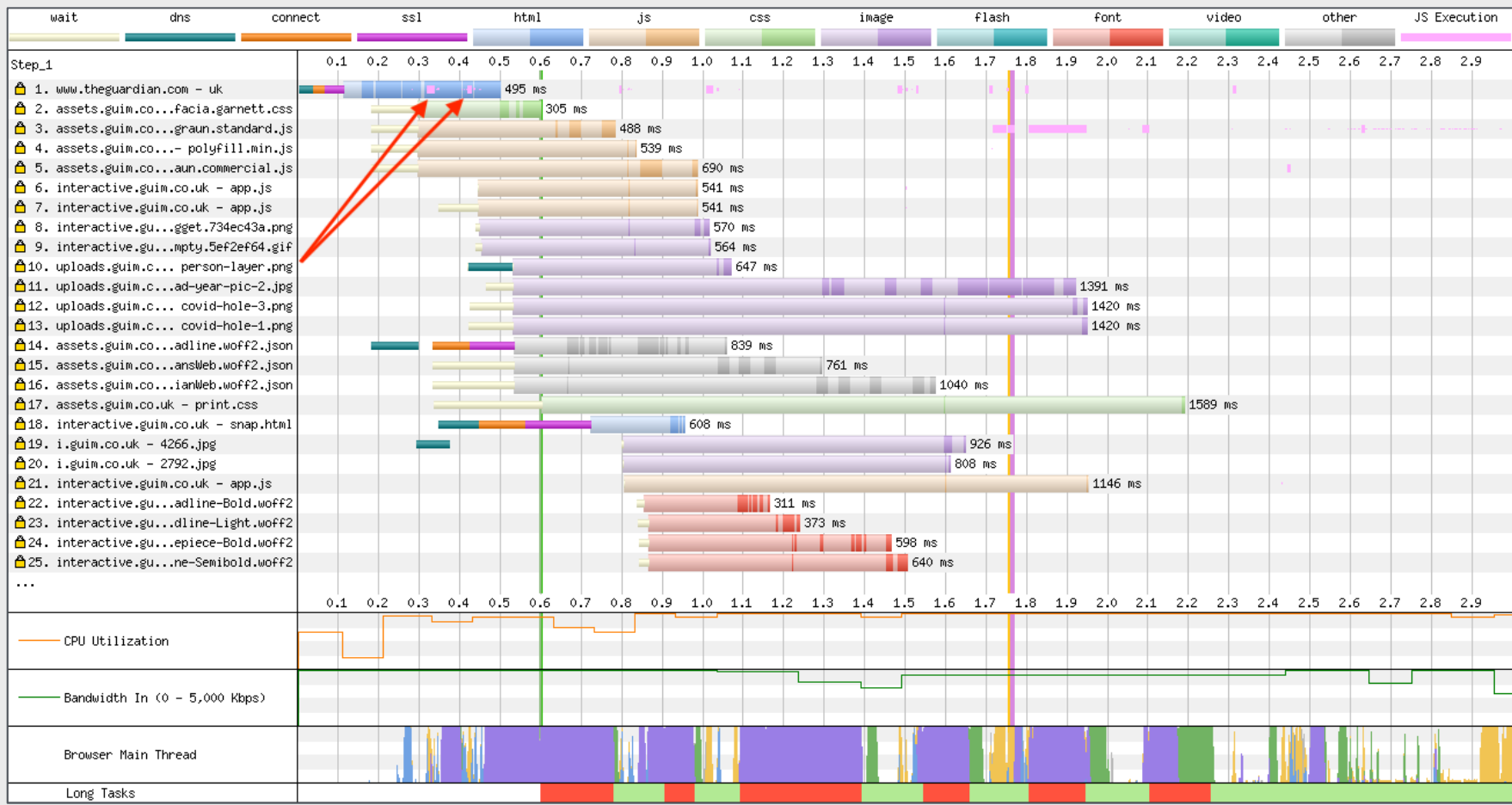


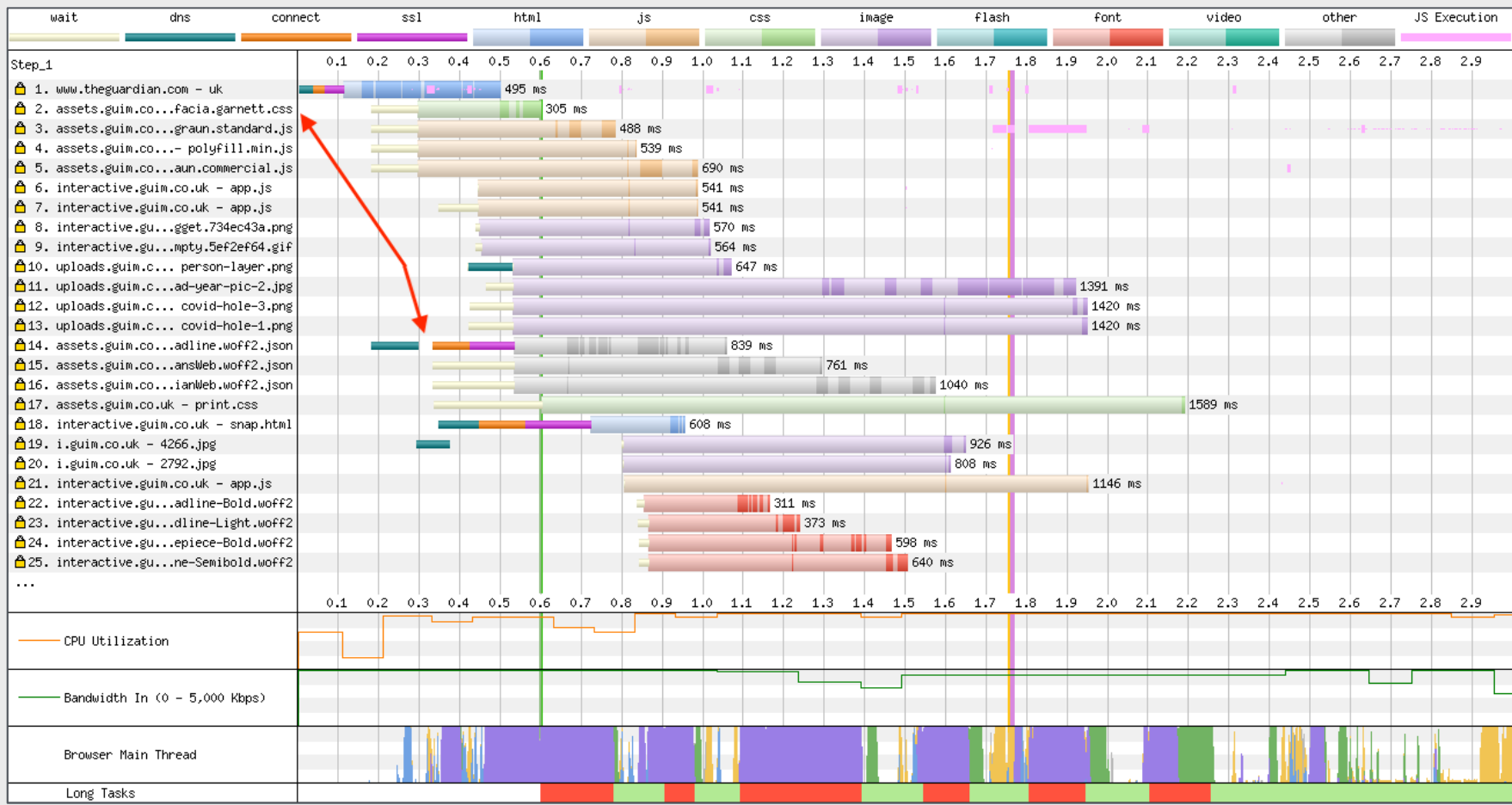


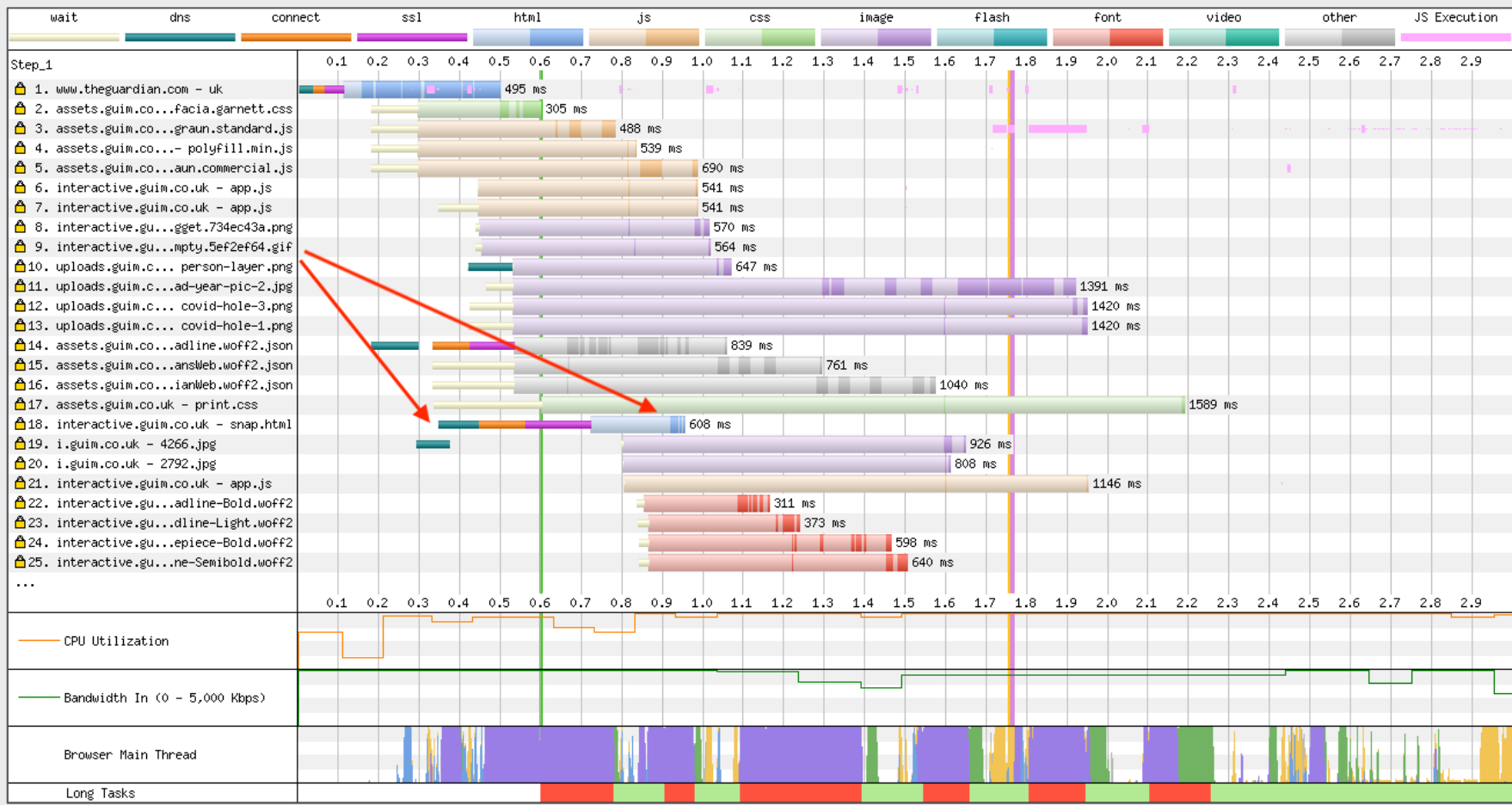


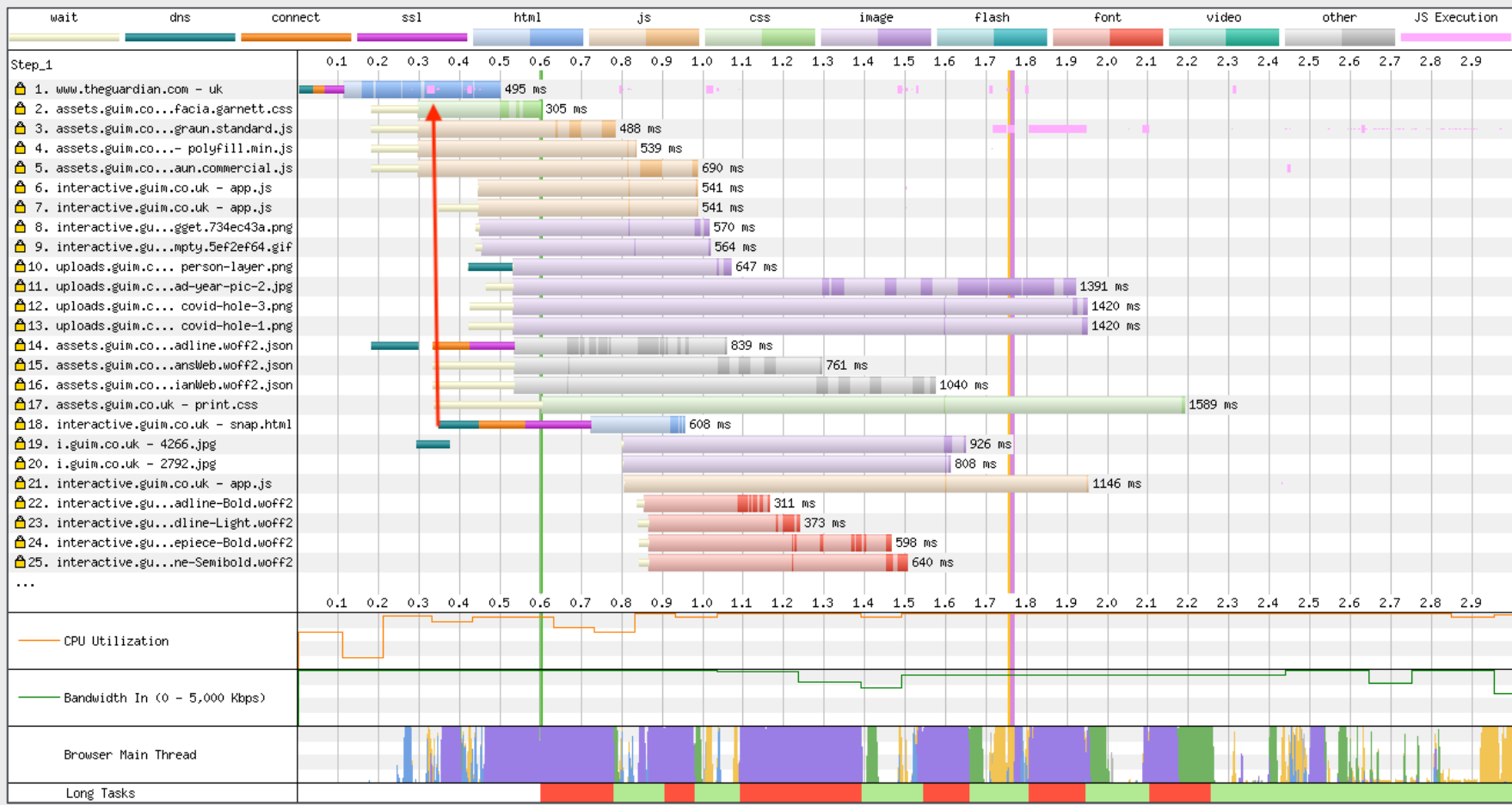




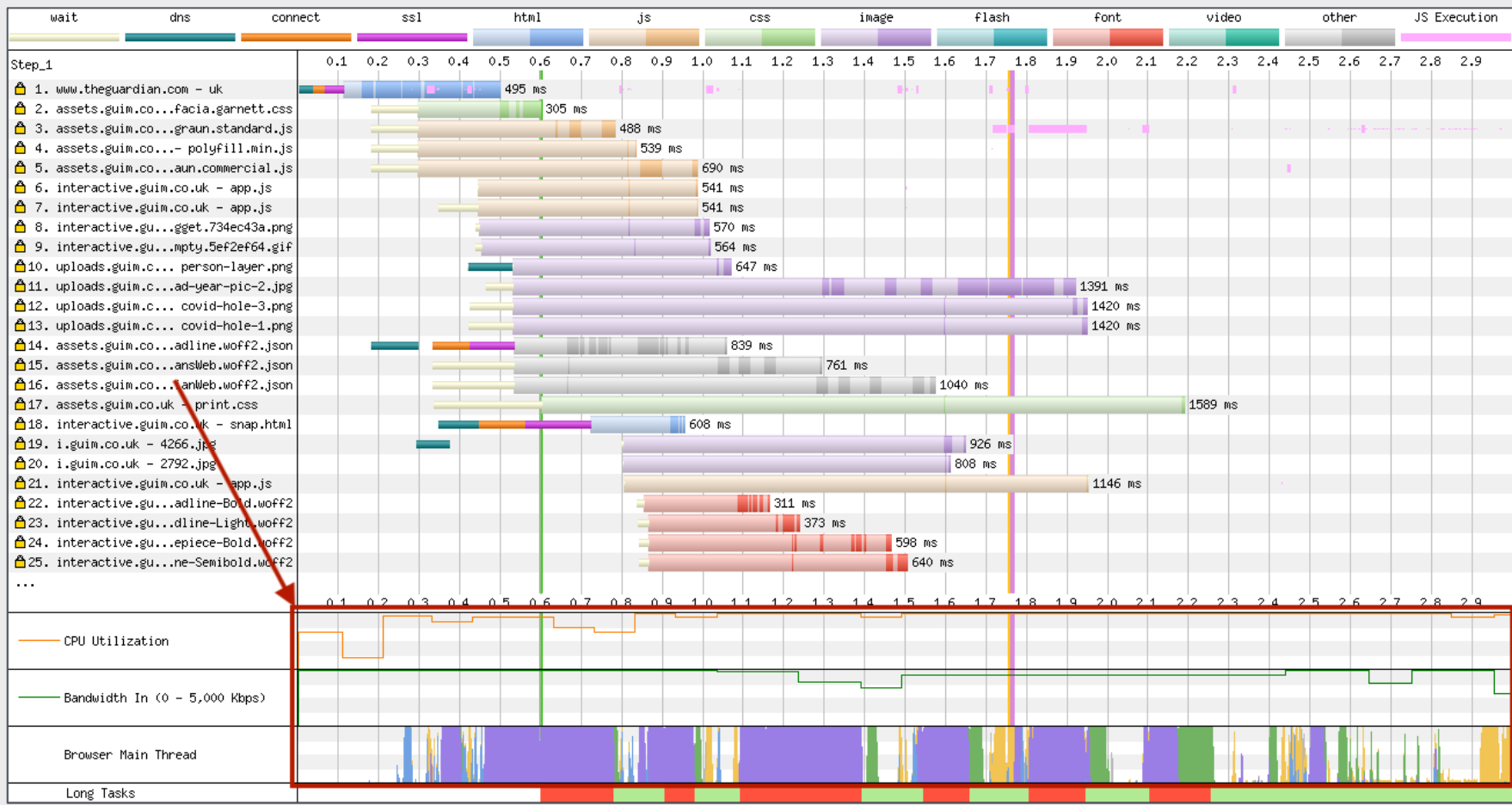






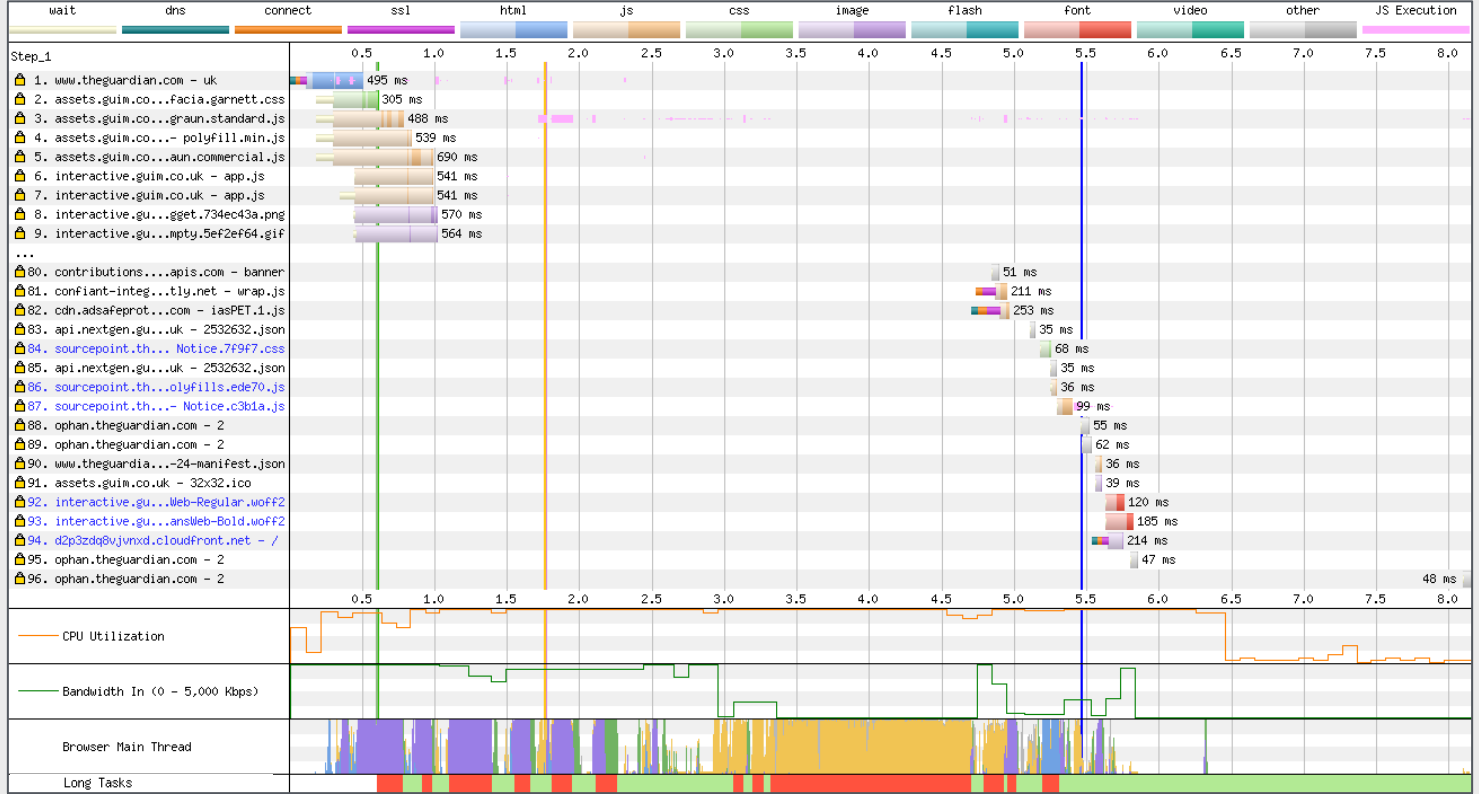






# Vertical Lines

Start Render | 
 RUM First Paint | 
 DOM Interactive | 
 DOM Content Loaded | 
 On Load | 
 Document Complete



Start Render

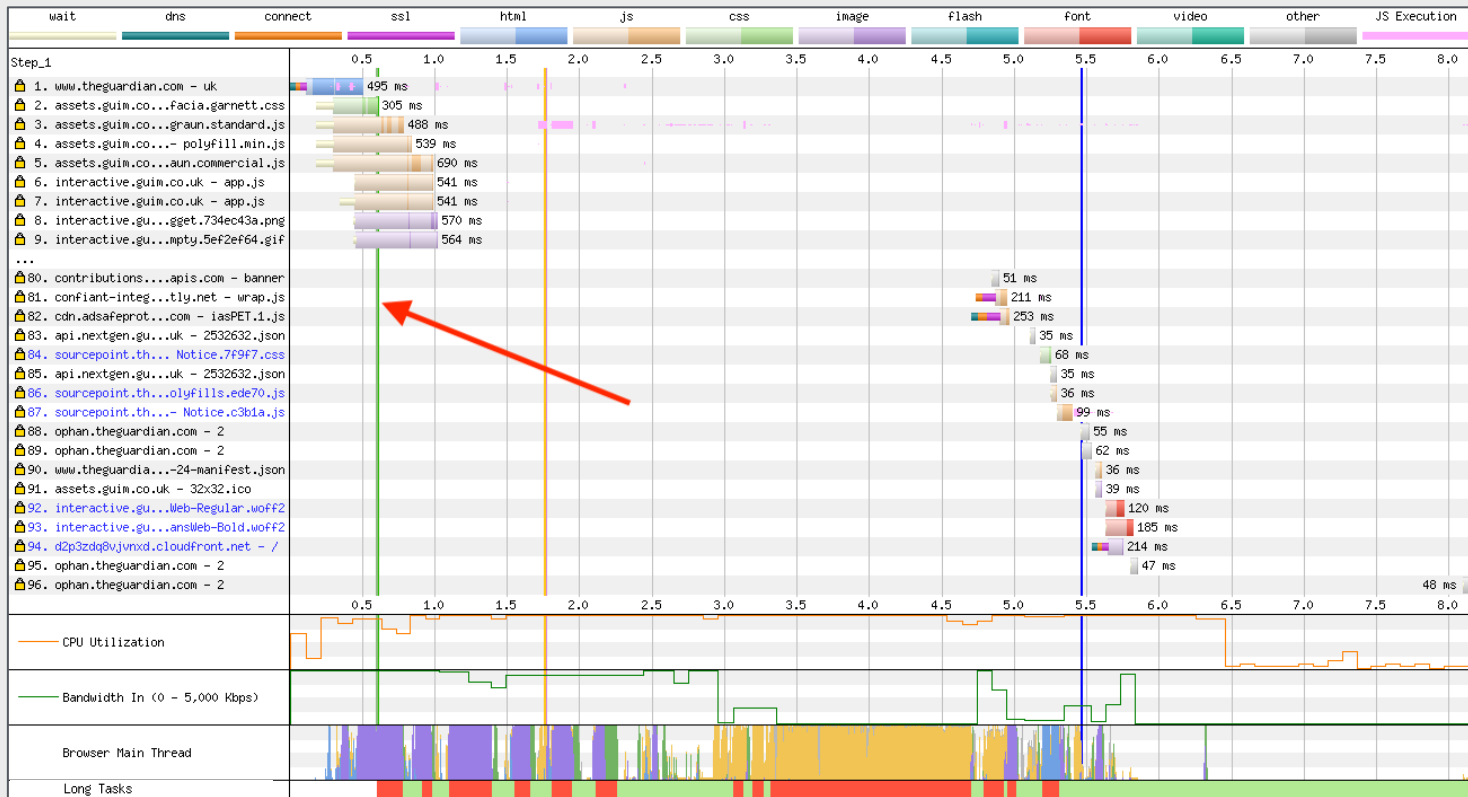
RUM First Paint

DOM Interactive

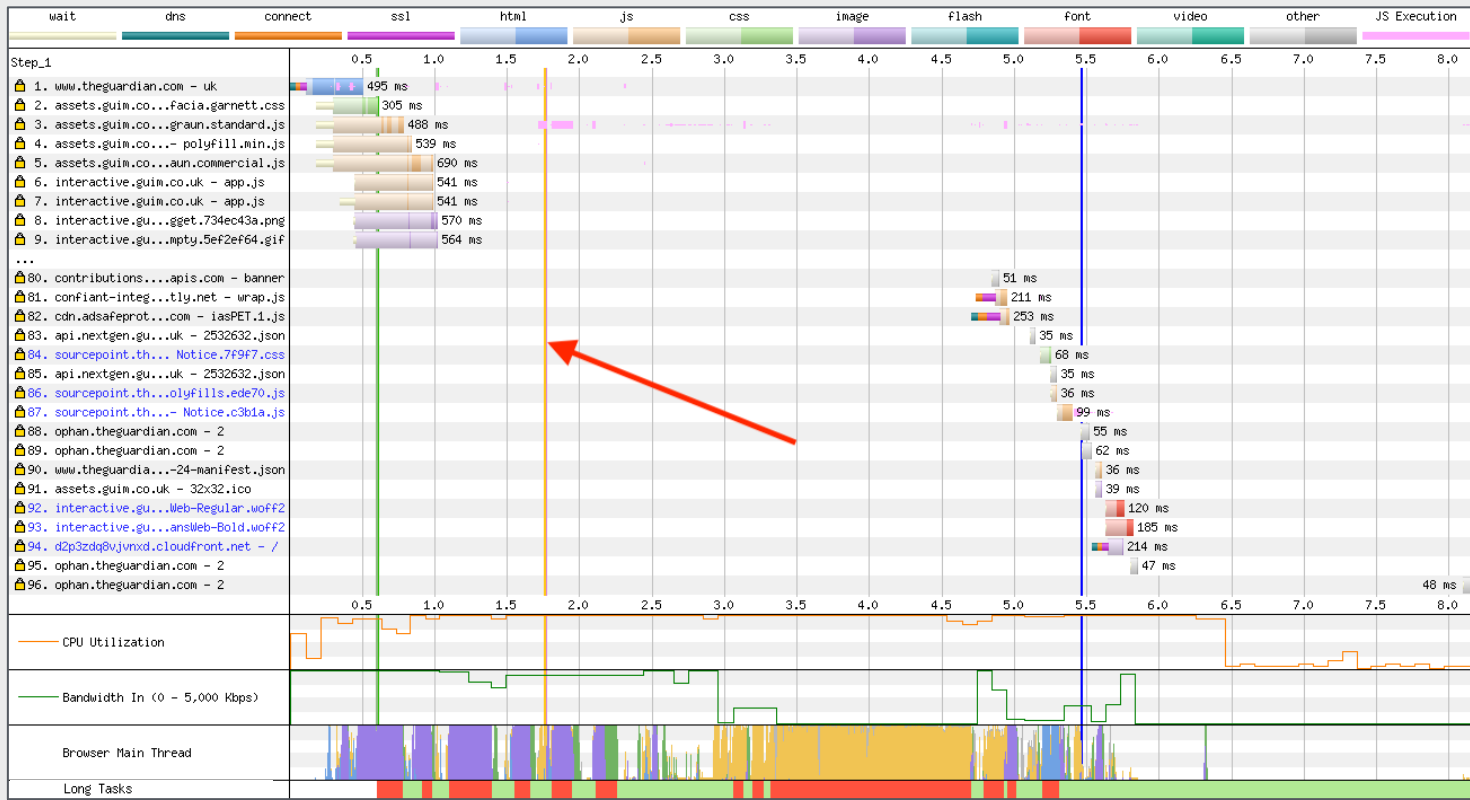
DOM Content Loaded

On Load

Document Complete



Start Render | RUM First Paint | DOM Interactive | DOM Content Loaded | On Load | Document Complete



Start Render

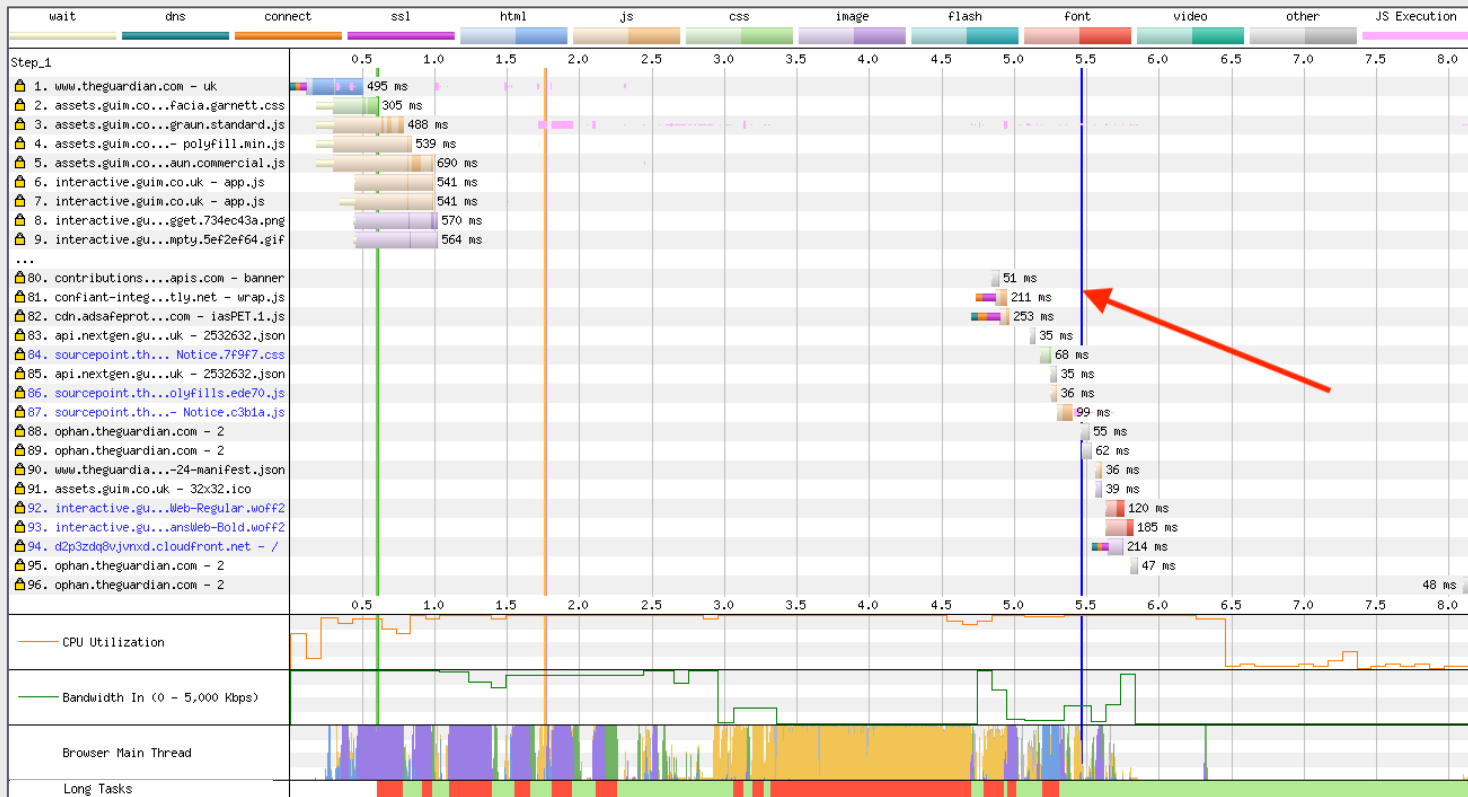
RUM First Paint

DOM Interactive

DOM Content Loaded

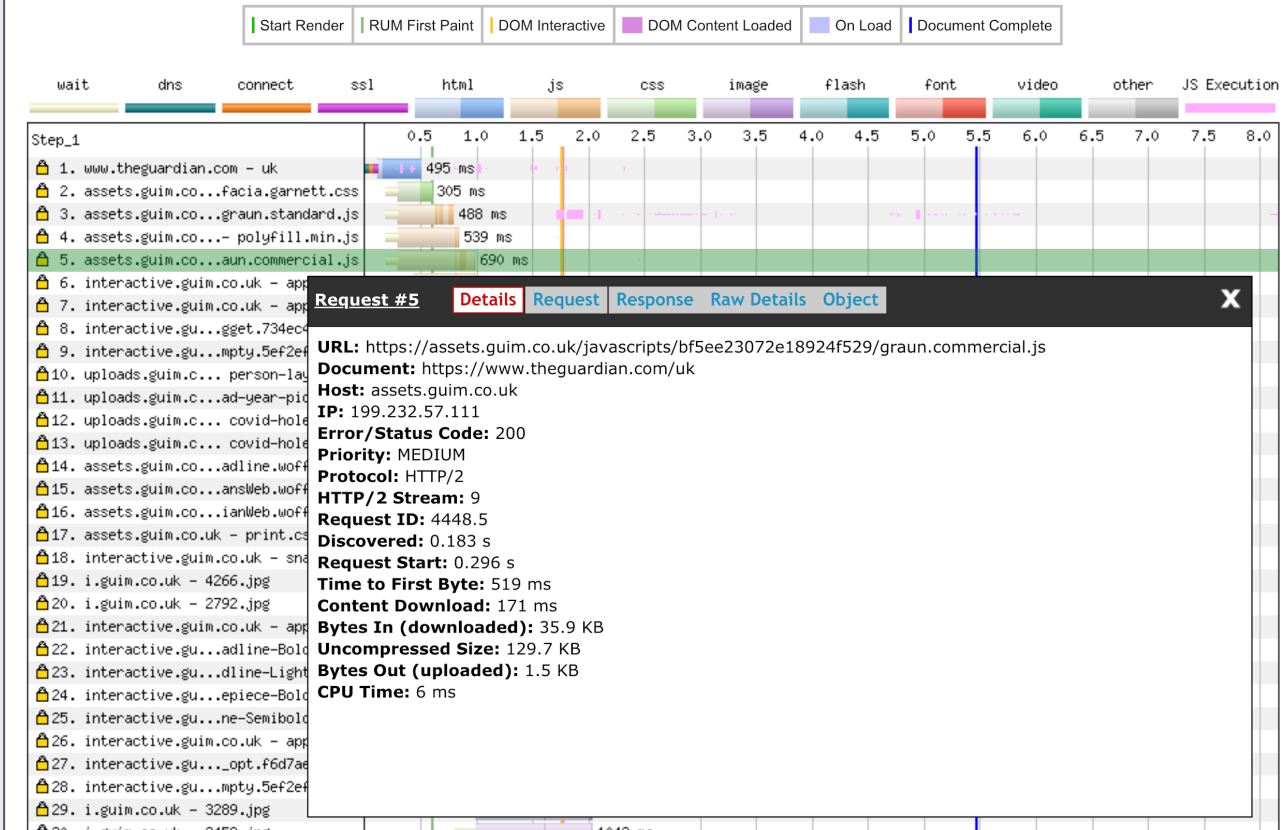
On Load

Document Complete



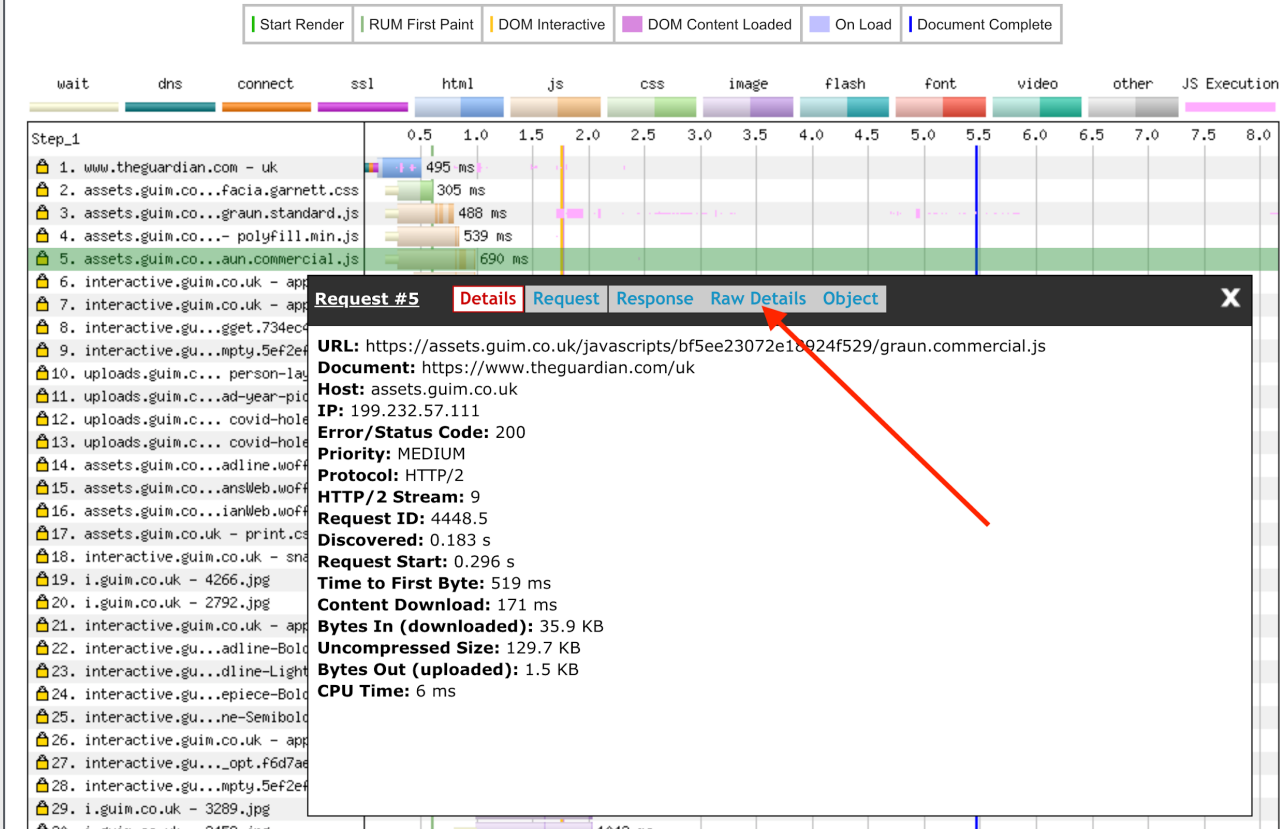
# Request Details

# Waterfall View



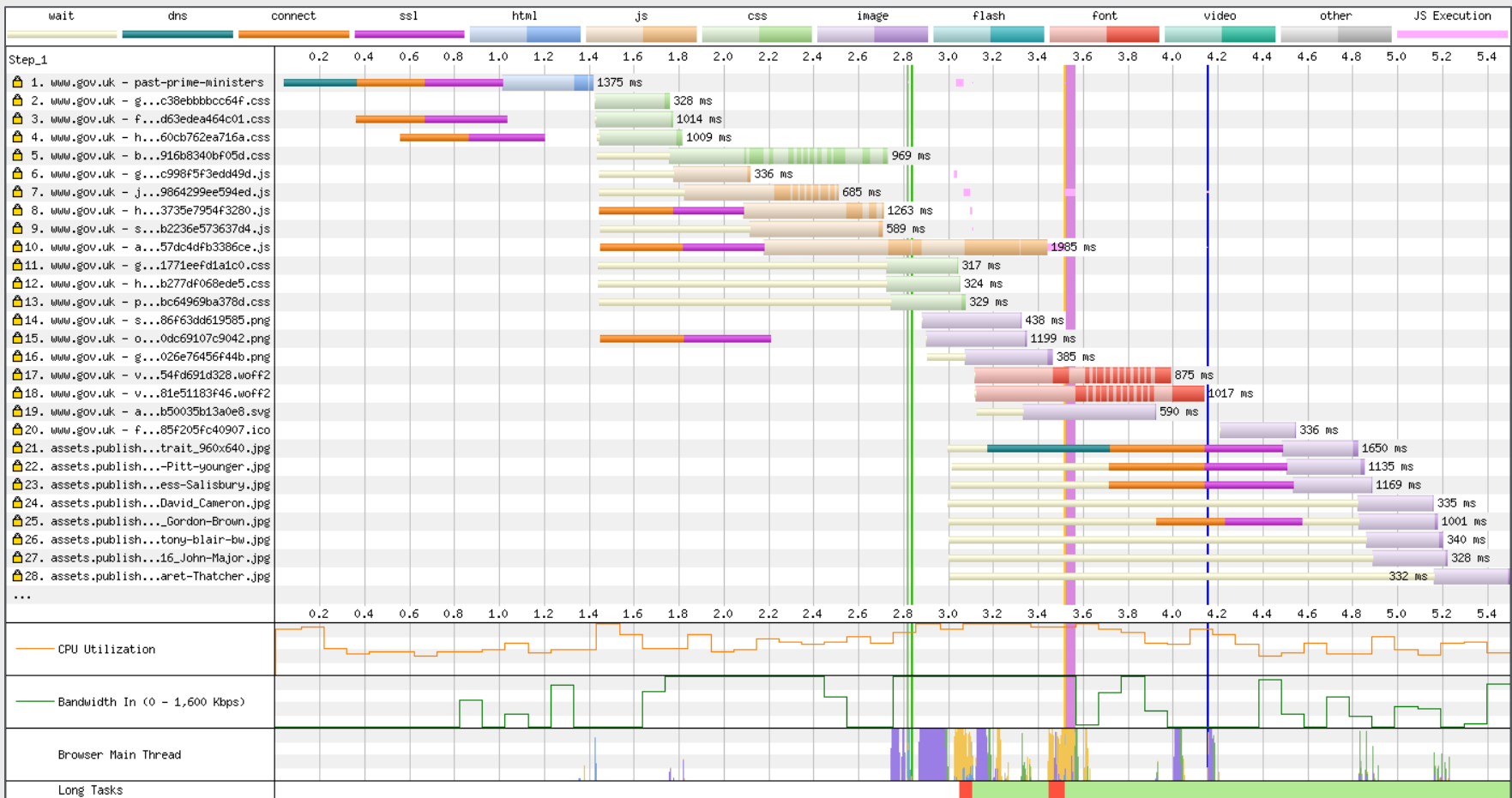


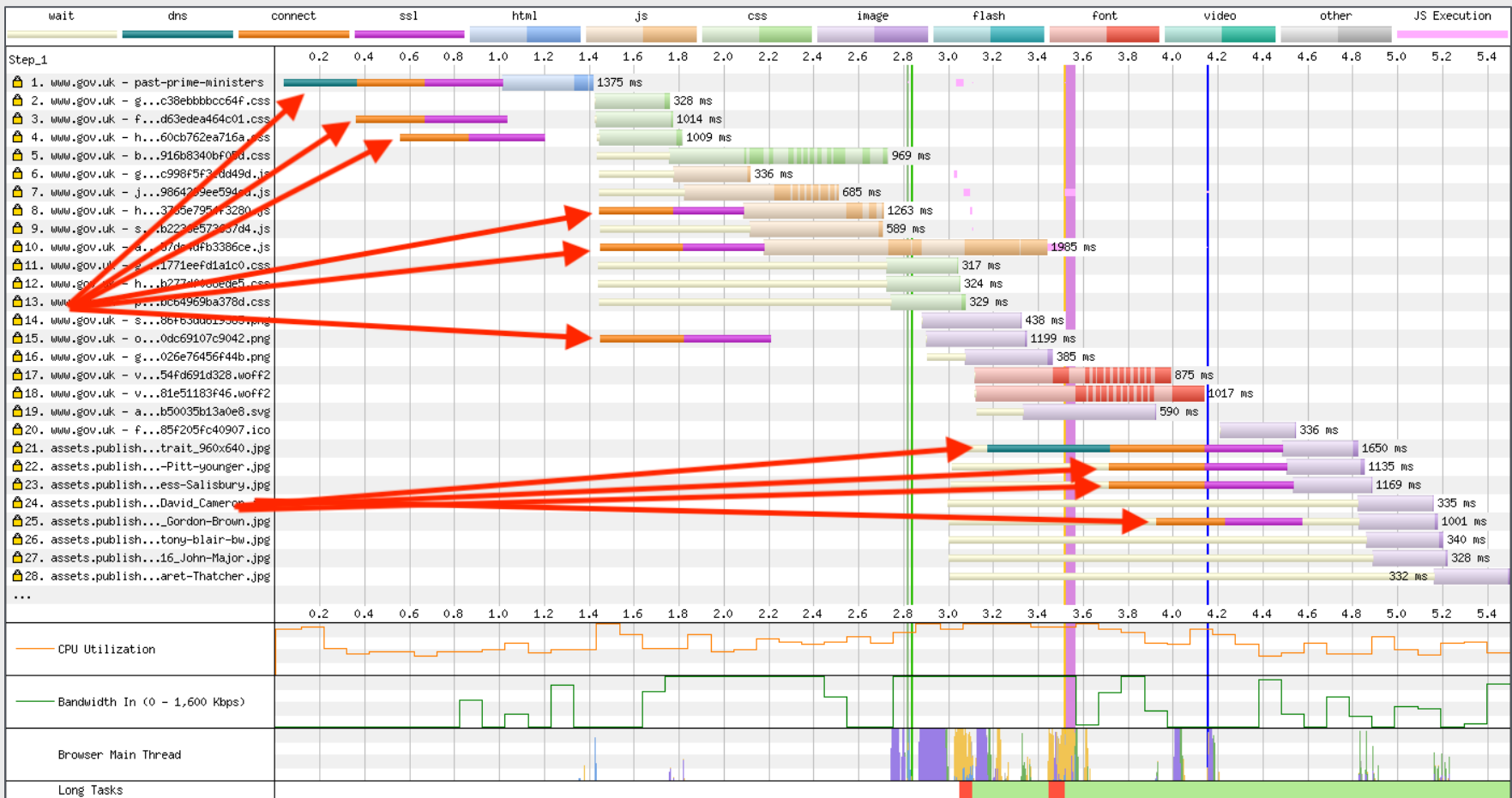
# Waterfall View

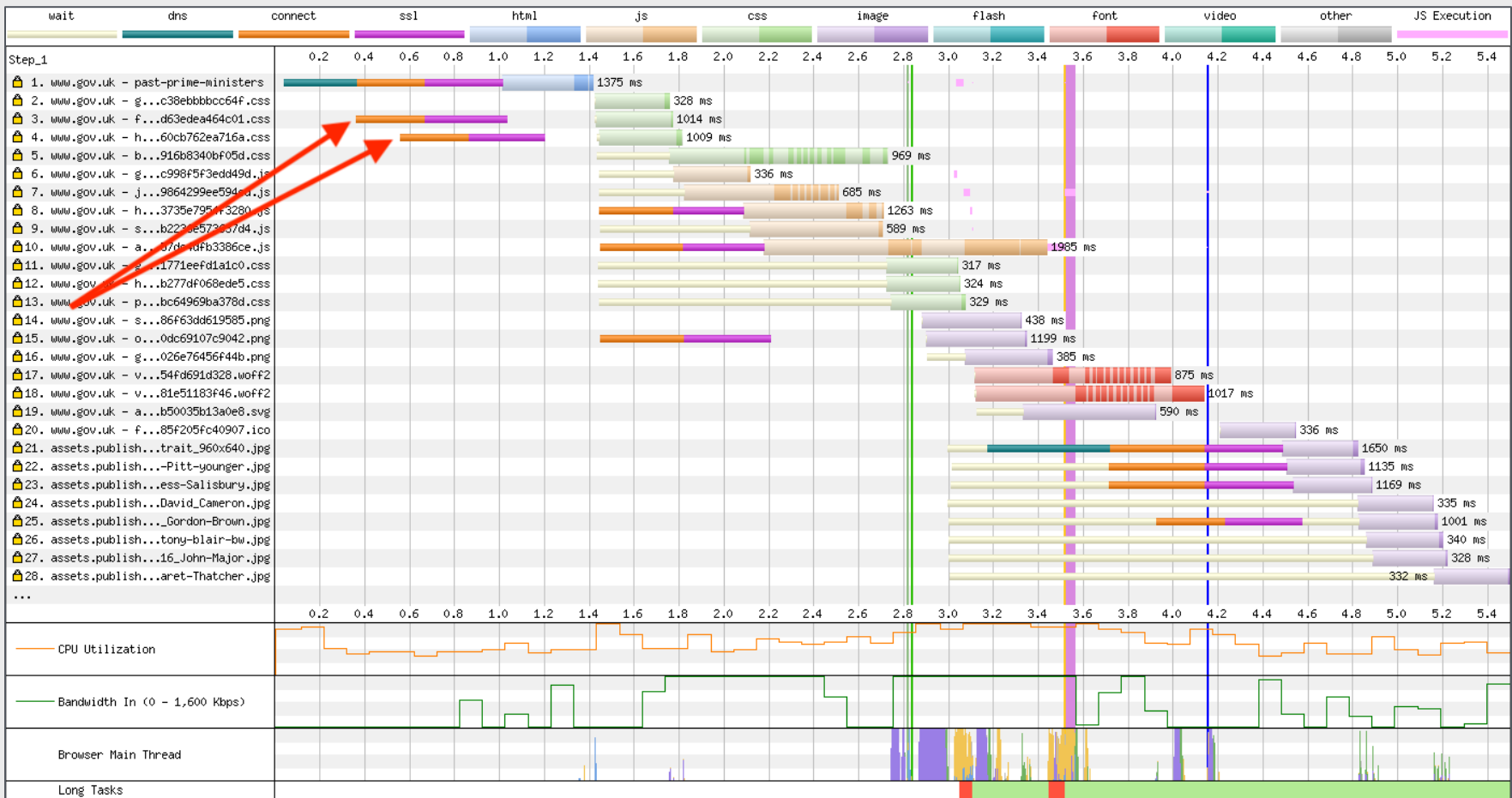


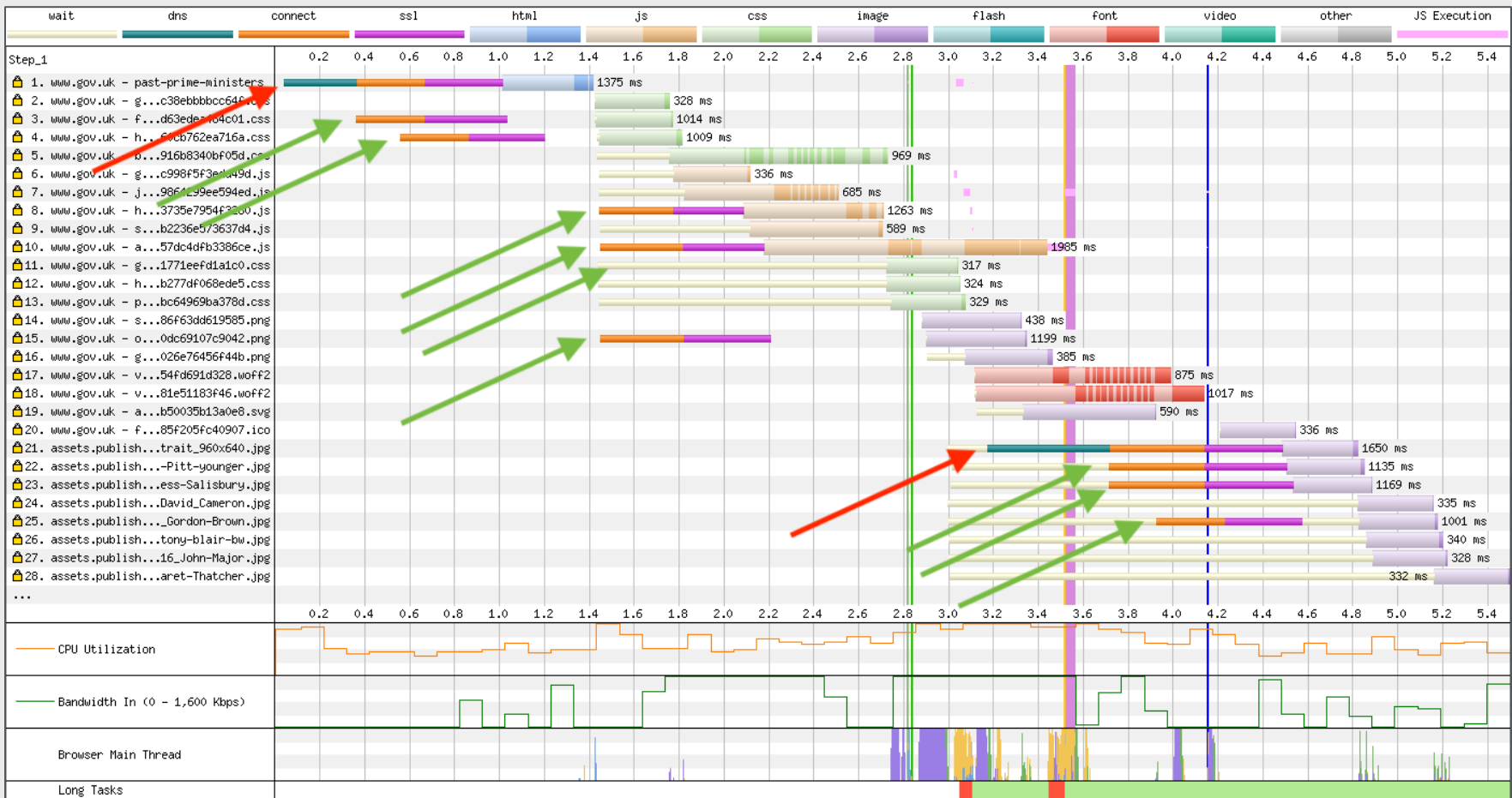
**Beyond the basics**

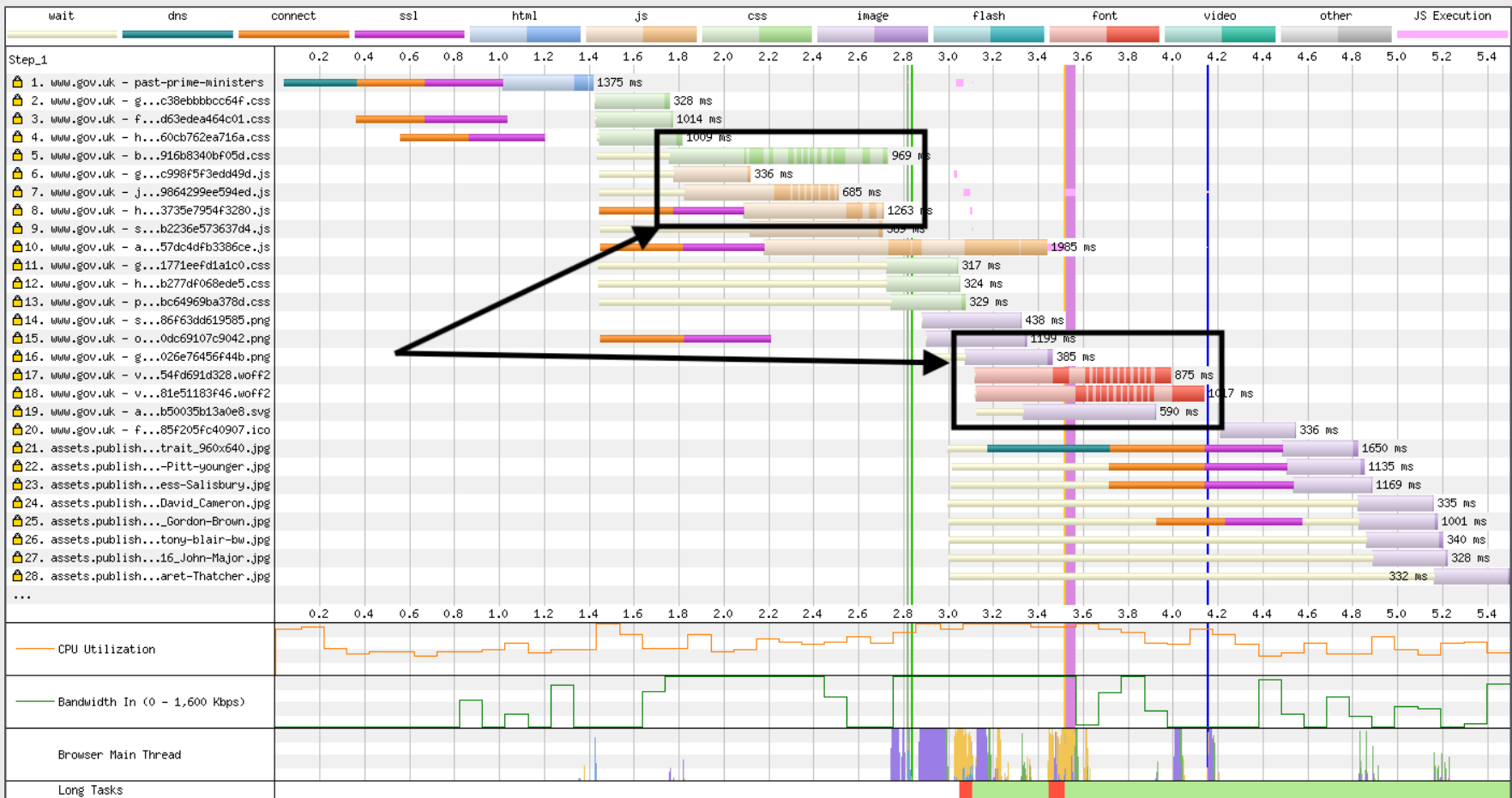
# HTTP/1.1 vs HTTP/2



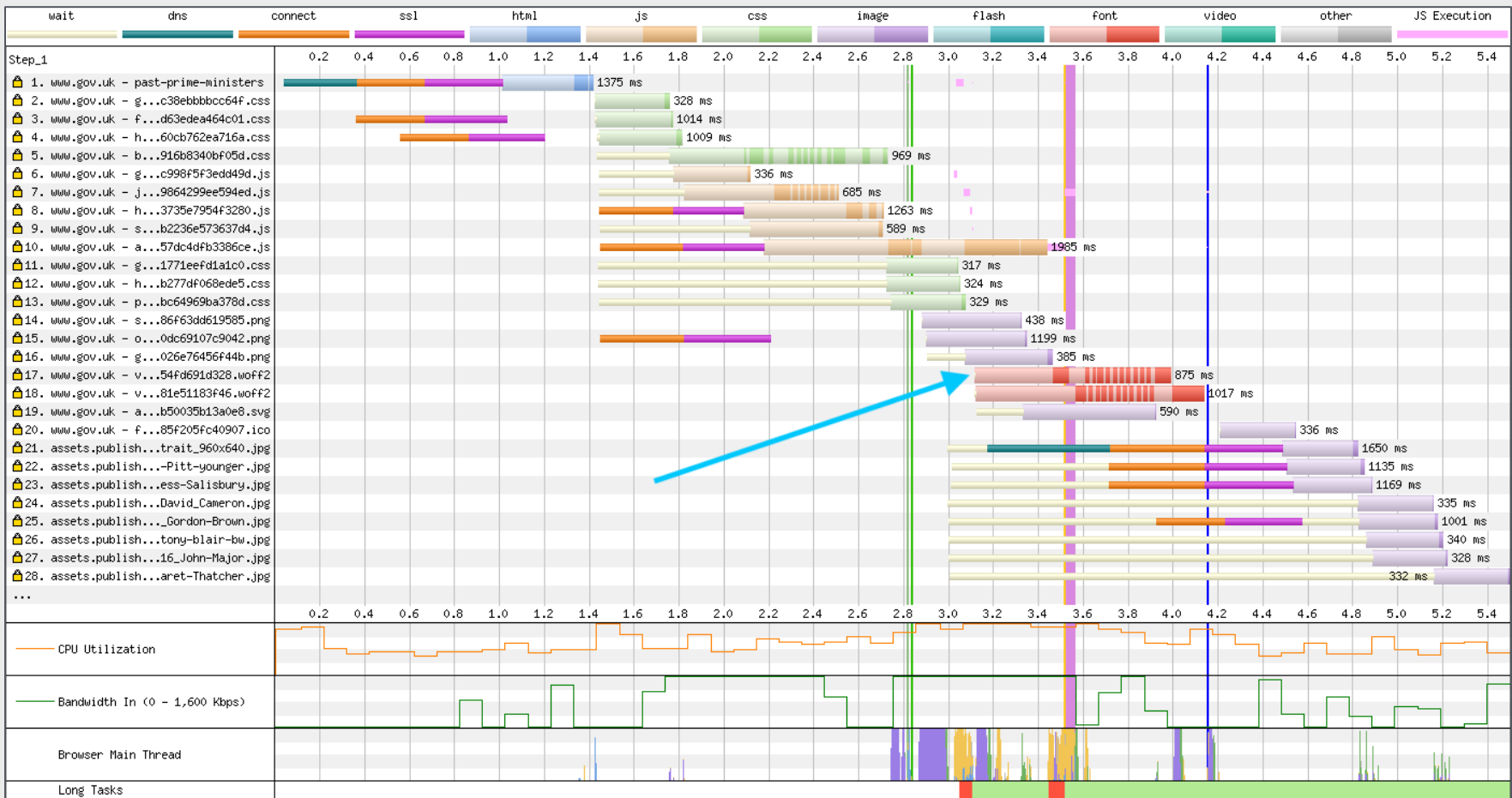


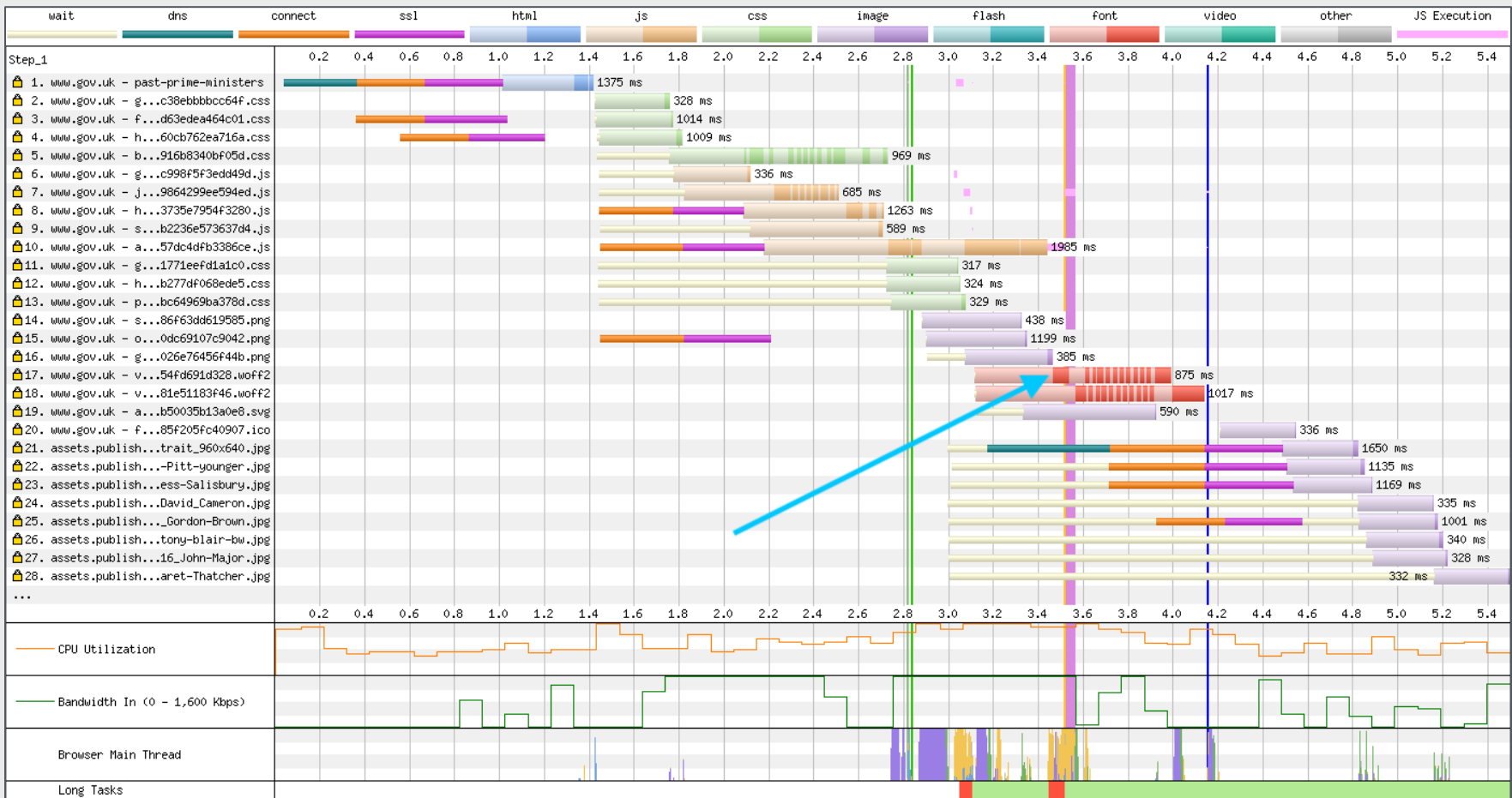


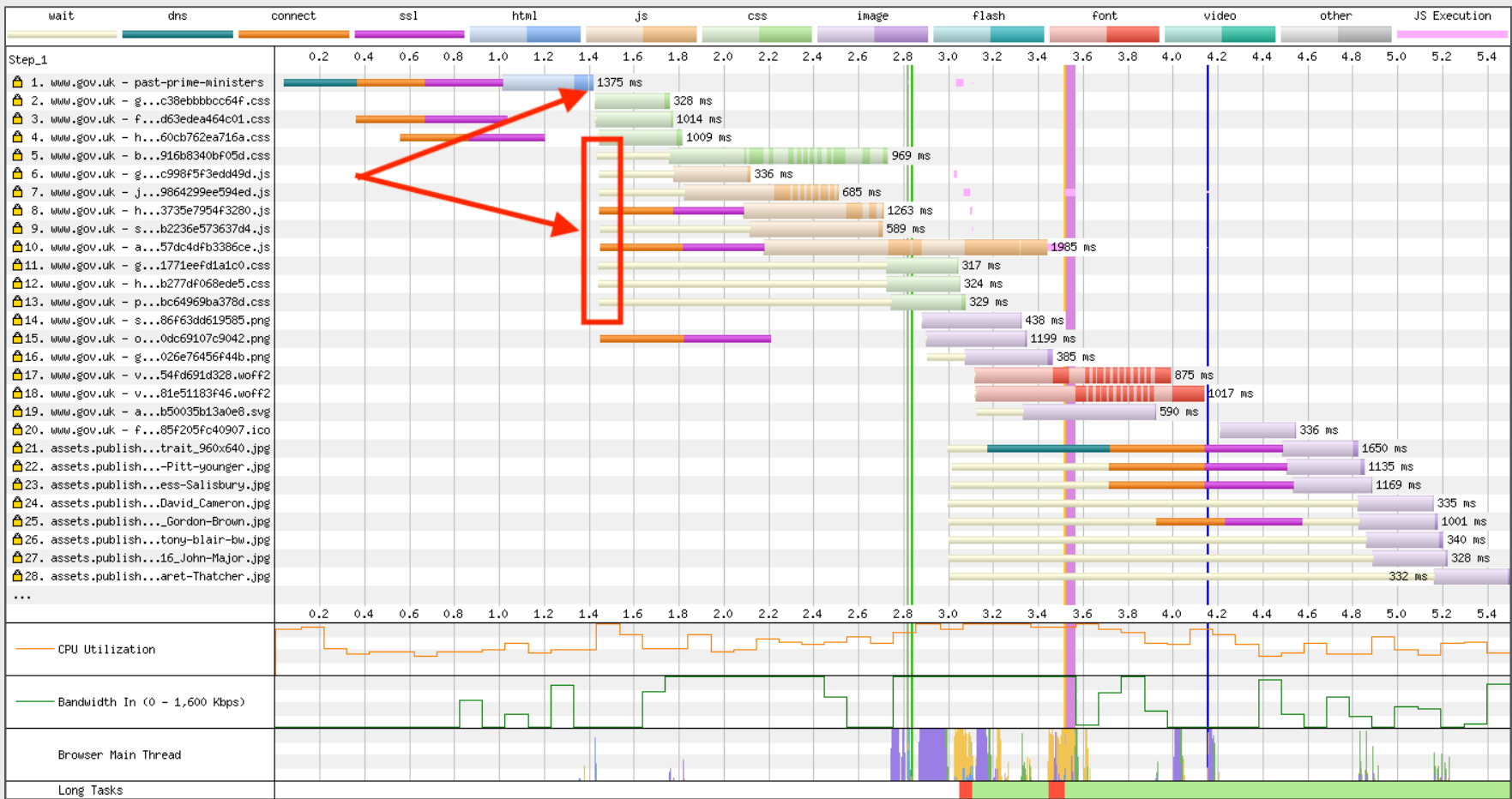


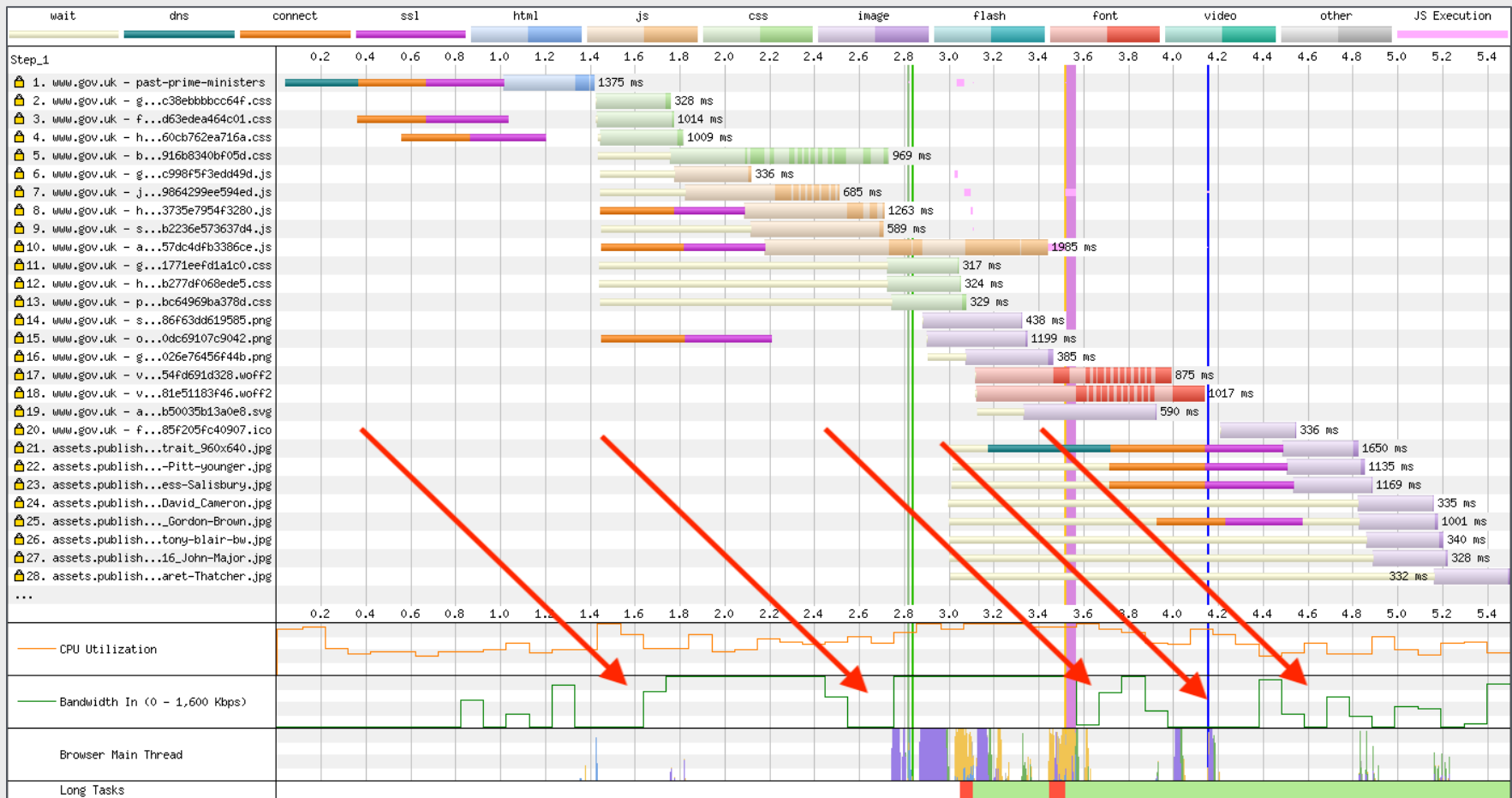


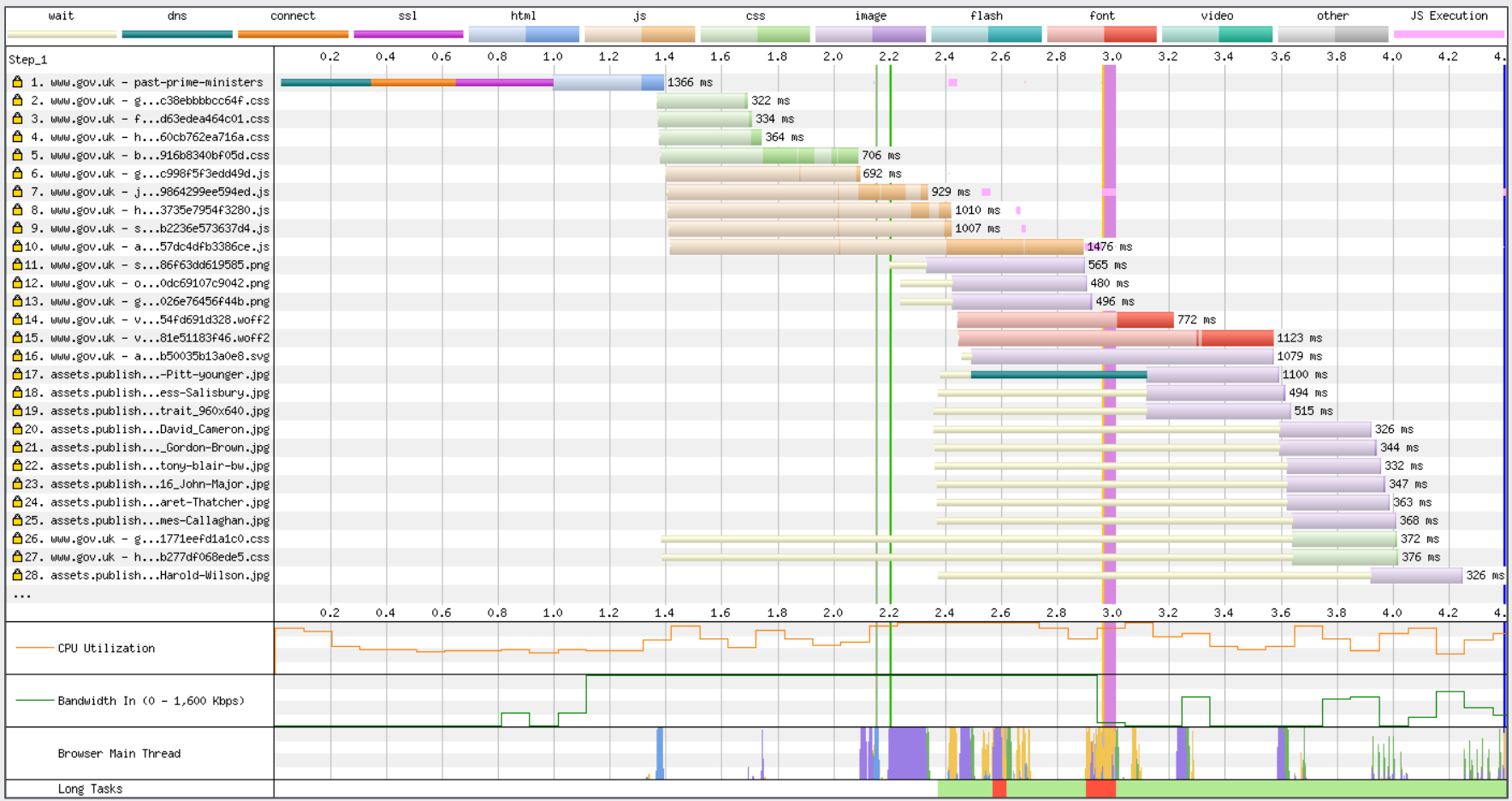


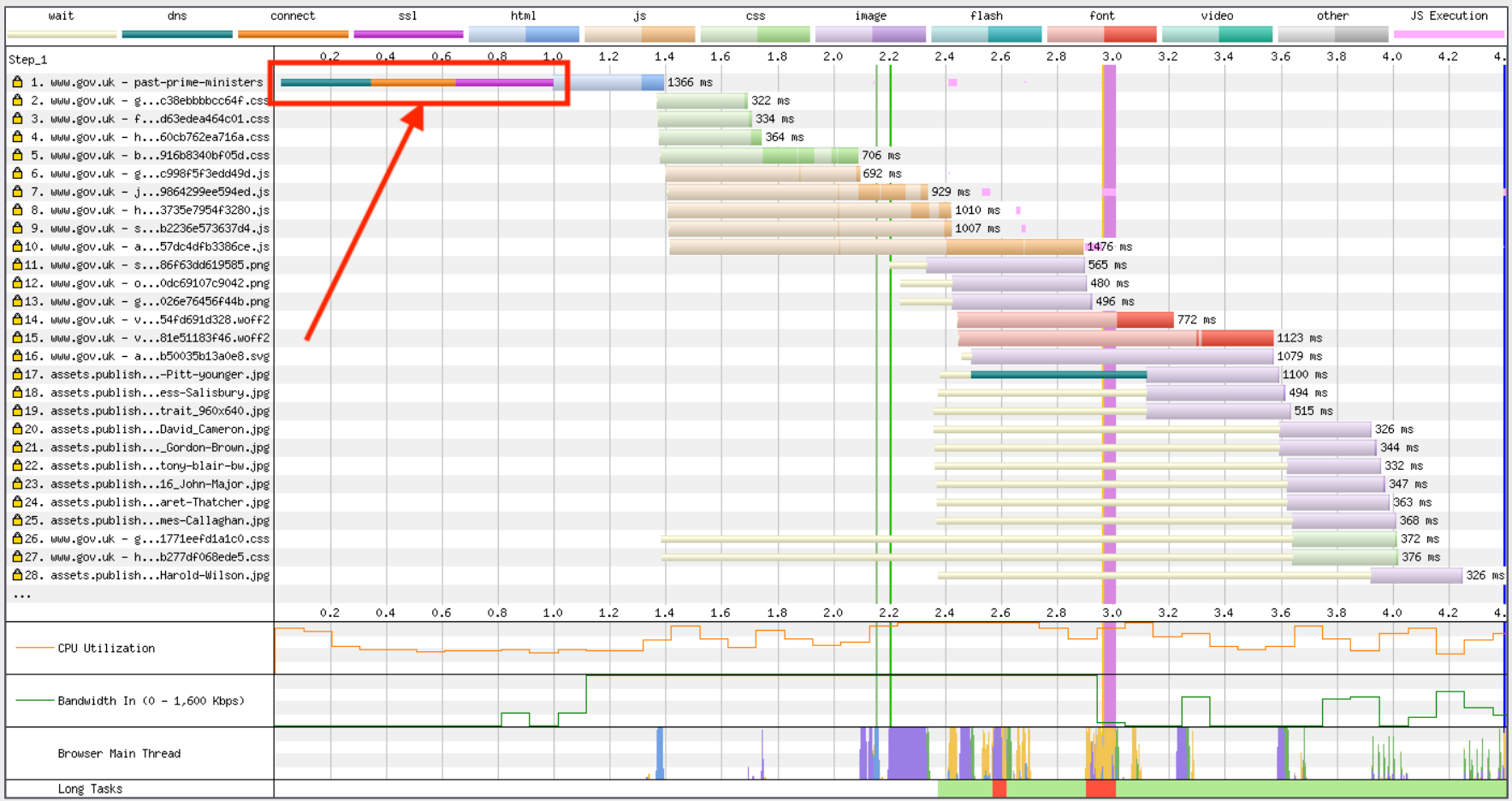


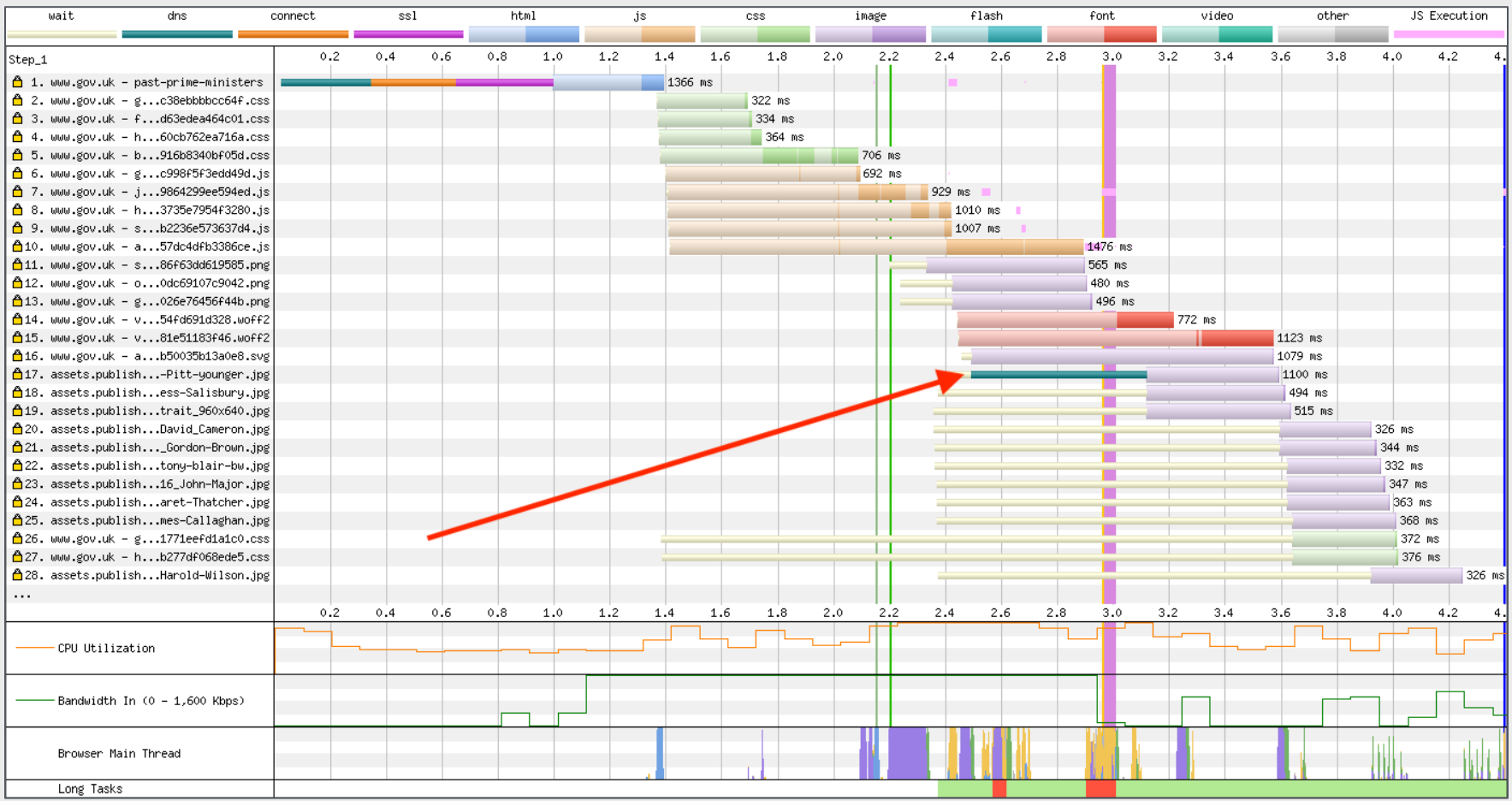


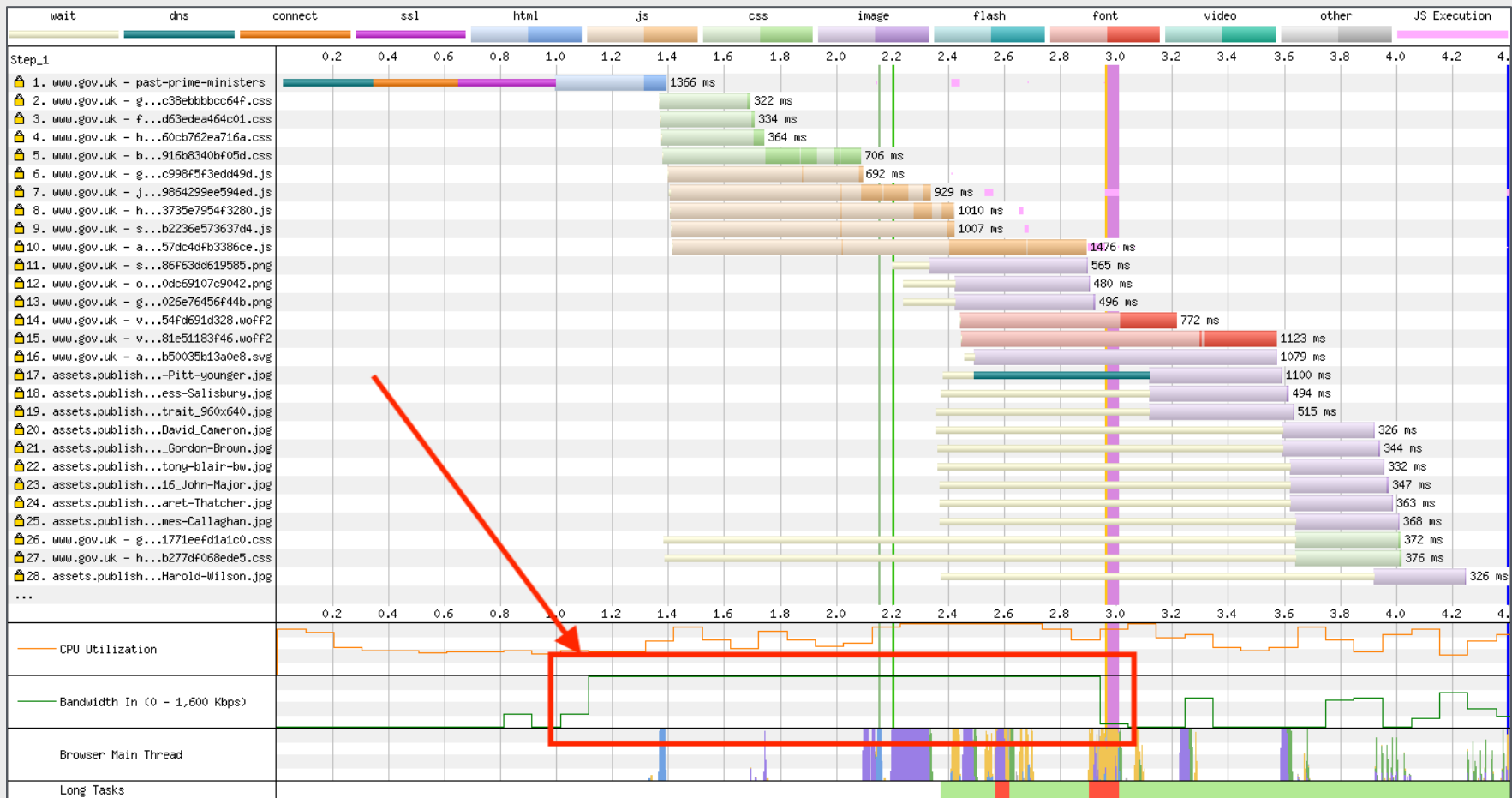




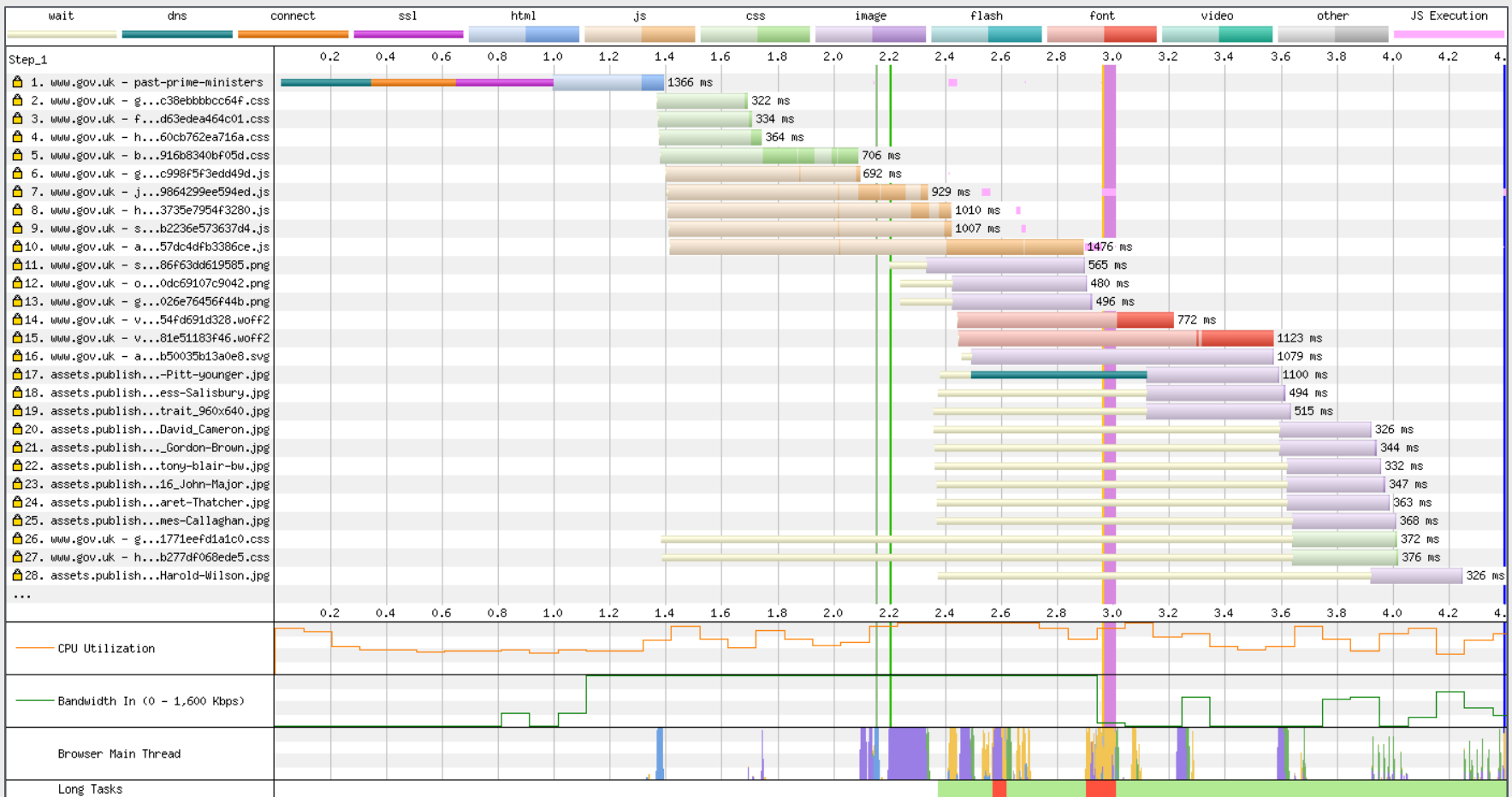


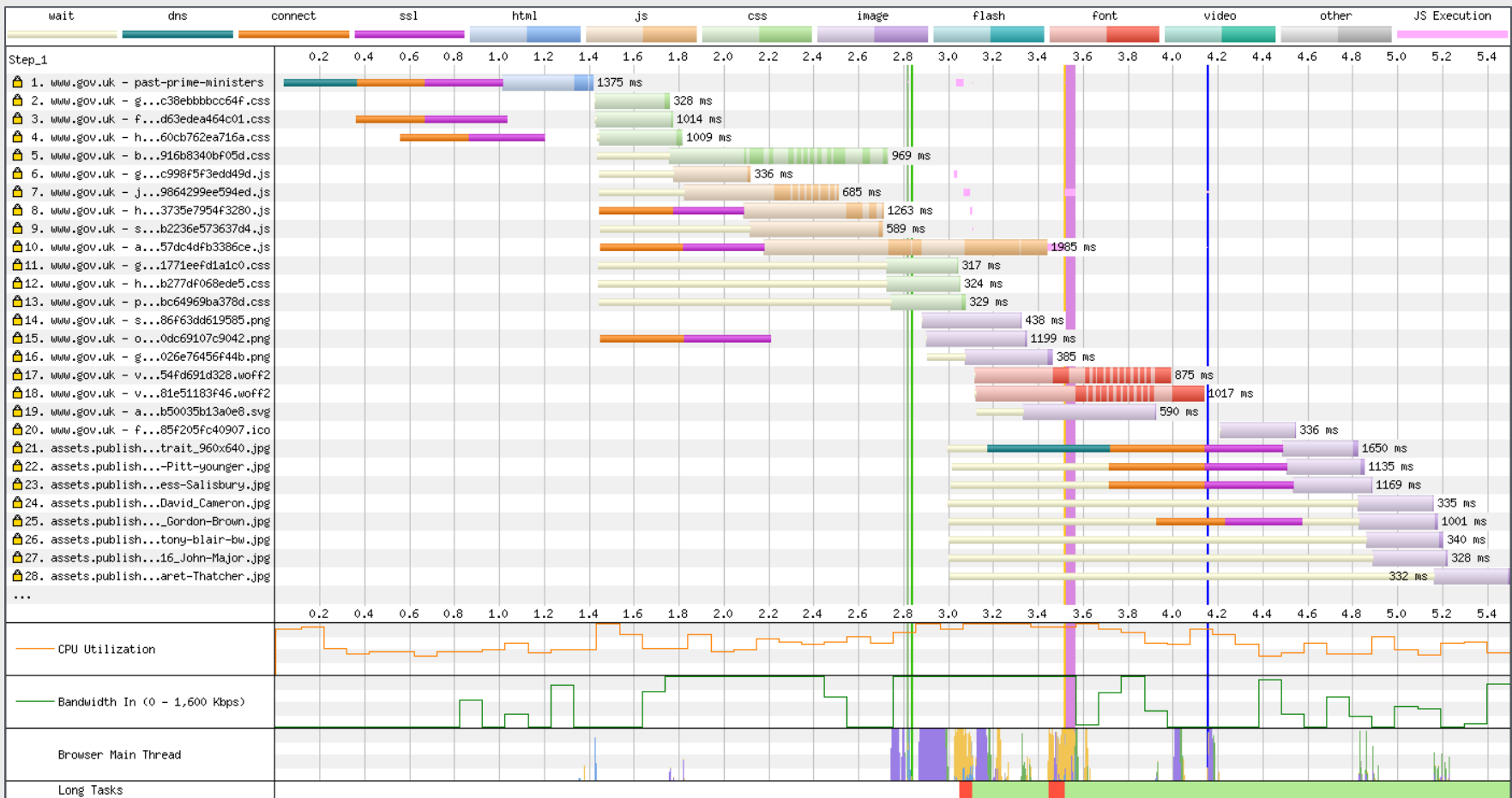












# Chunk Data

18. www.gov.uk - v...81e51183f46.woff2

1017 ms

Request #18

Details

Request

Response

Raw Details

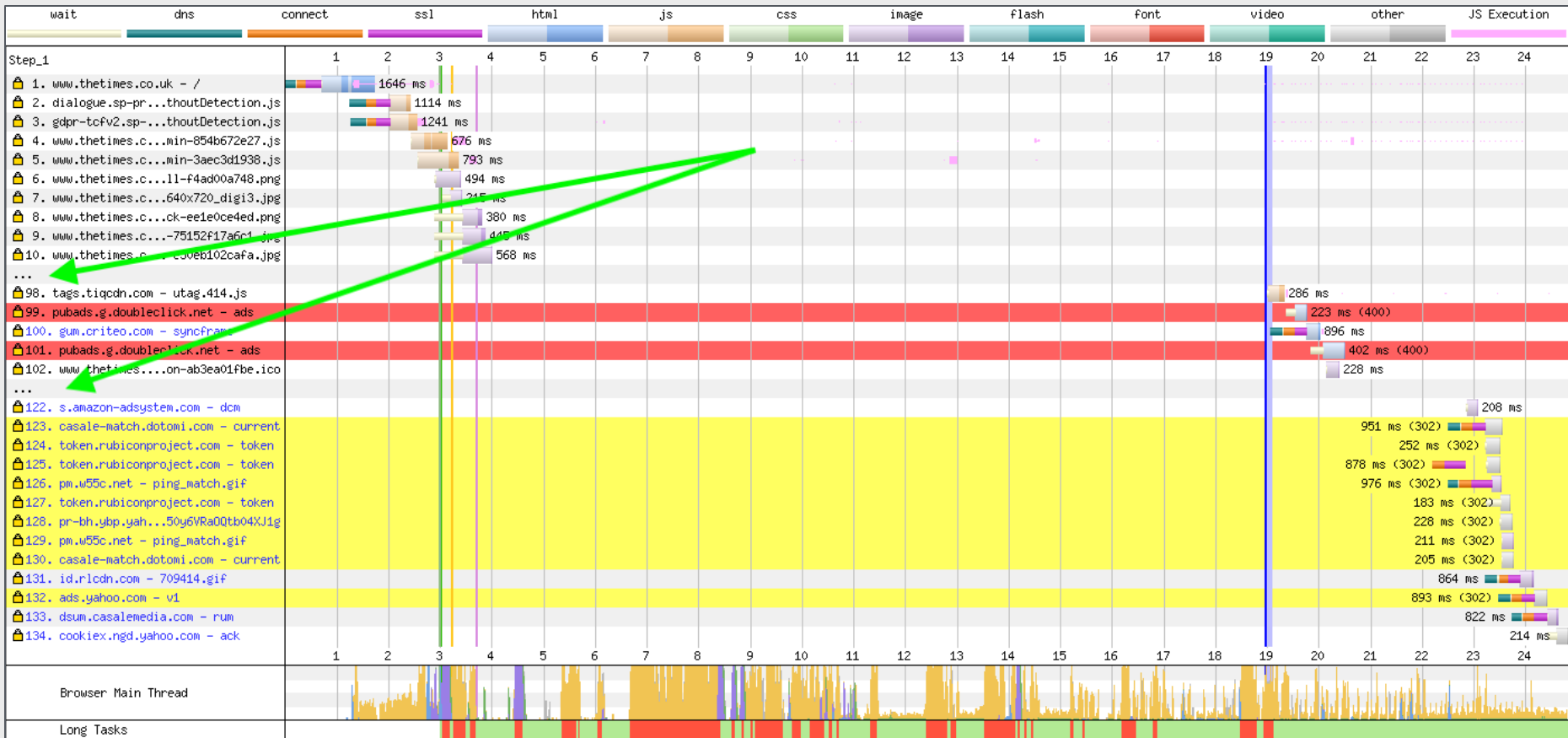
Object

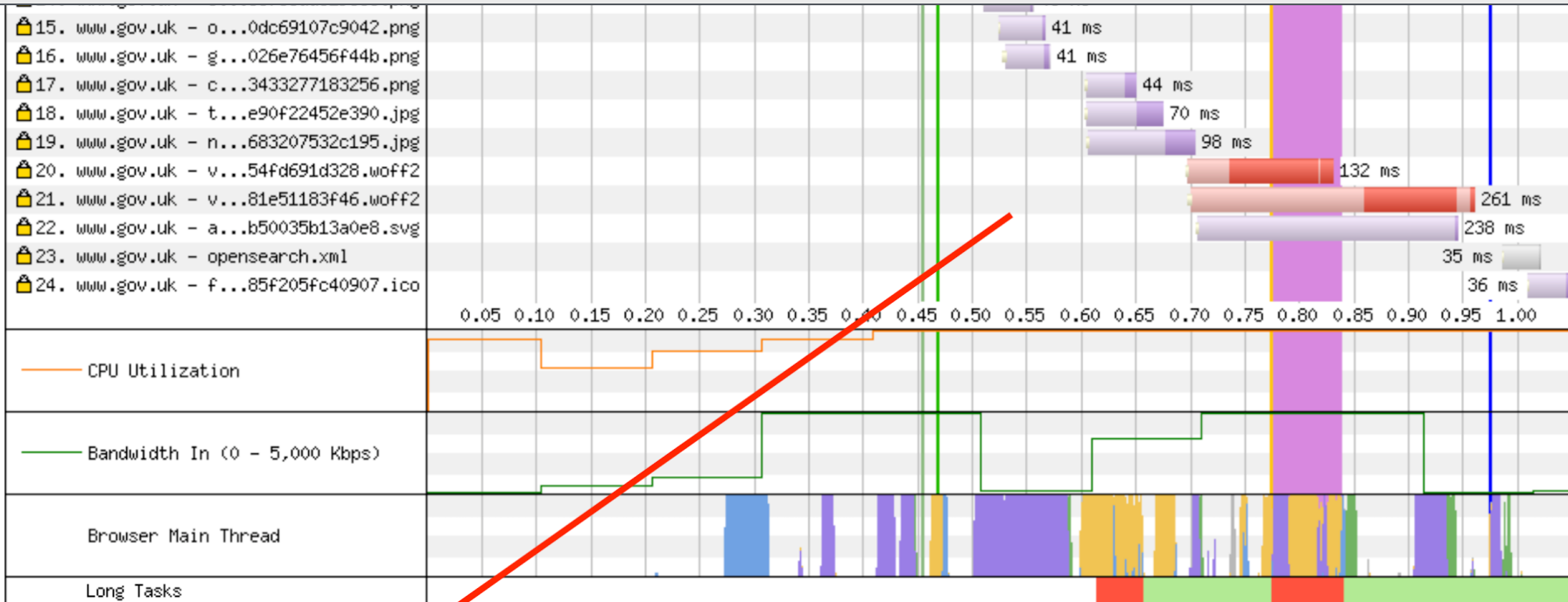


```
"chunks": [  
  {  
    "bytes": 3434,  
    "ts": 3565.355  
  },  
  {  
    "bytes": 700,  
    "ts": 3566.399  
  },  
  {  
    "bytes": 4134,  
    "ts": 3587.373  
  },  
  {  
    "bytes": 4134,  
    "ts": 3609.959  
  },  
  {  
    "bytes": 1378,  
    "ts": 3632.622  
  },  
  {  
    "bytes": 1378
```

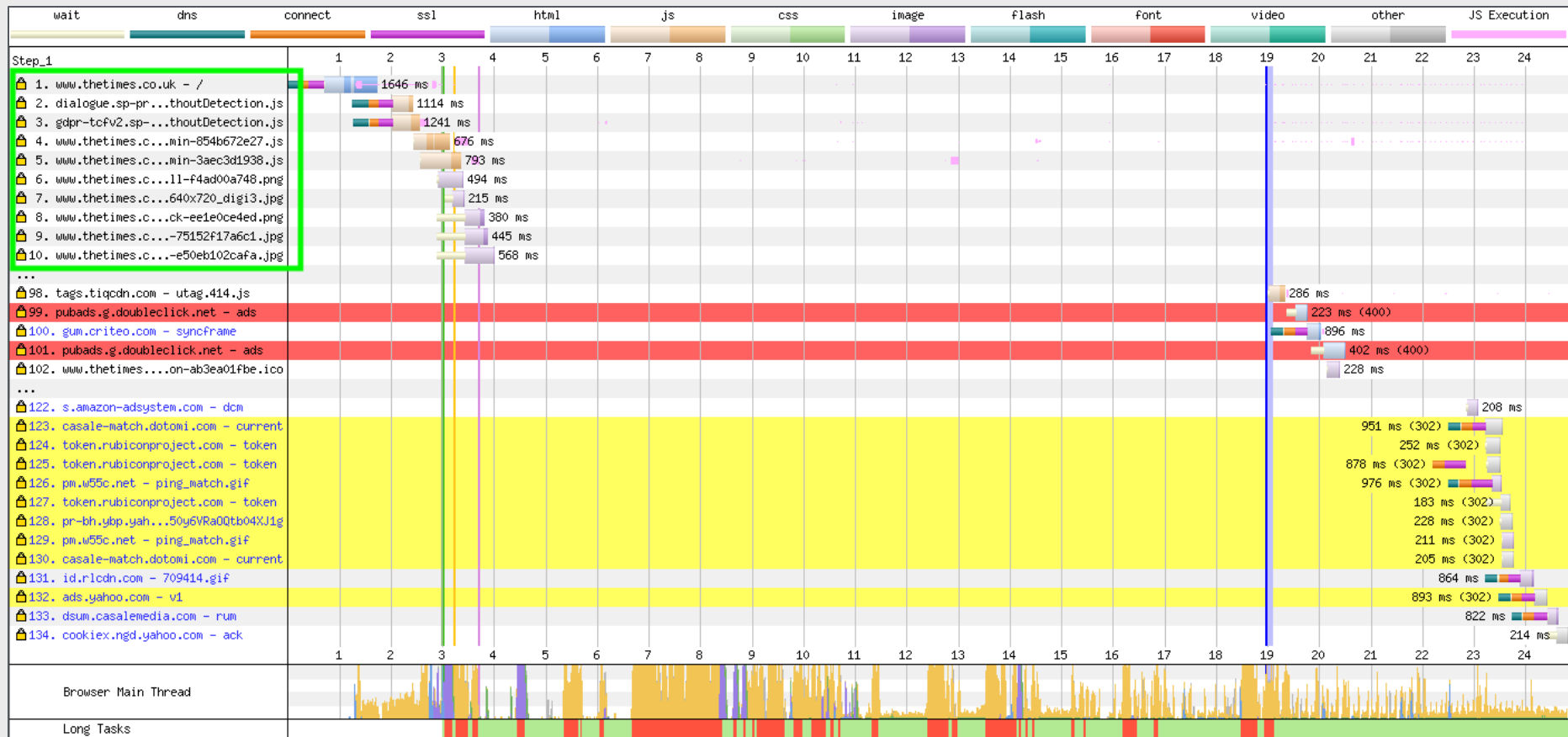
S  
MS  
MS  
MS

# Error/Status Codes

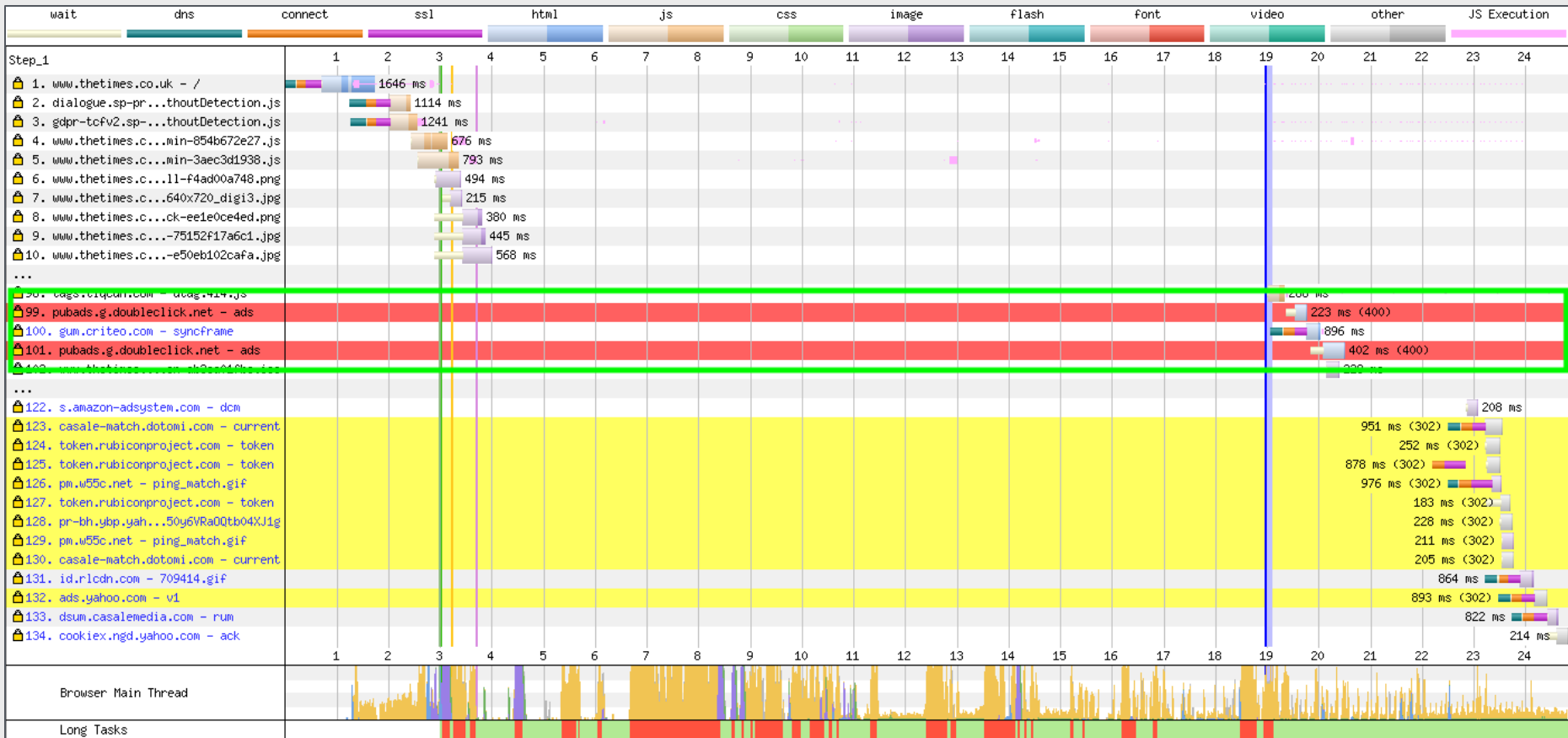


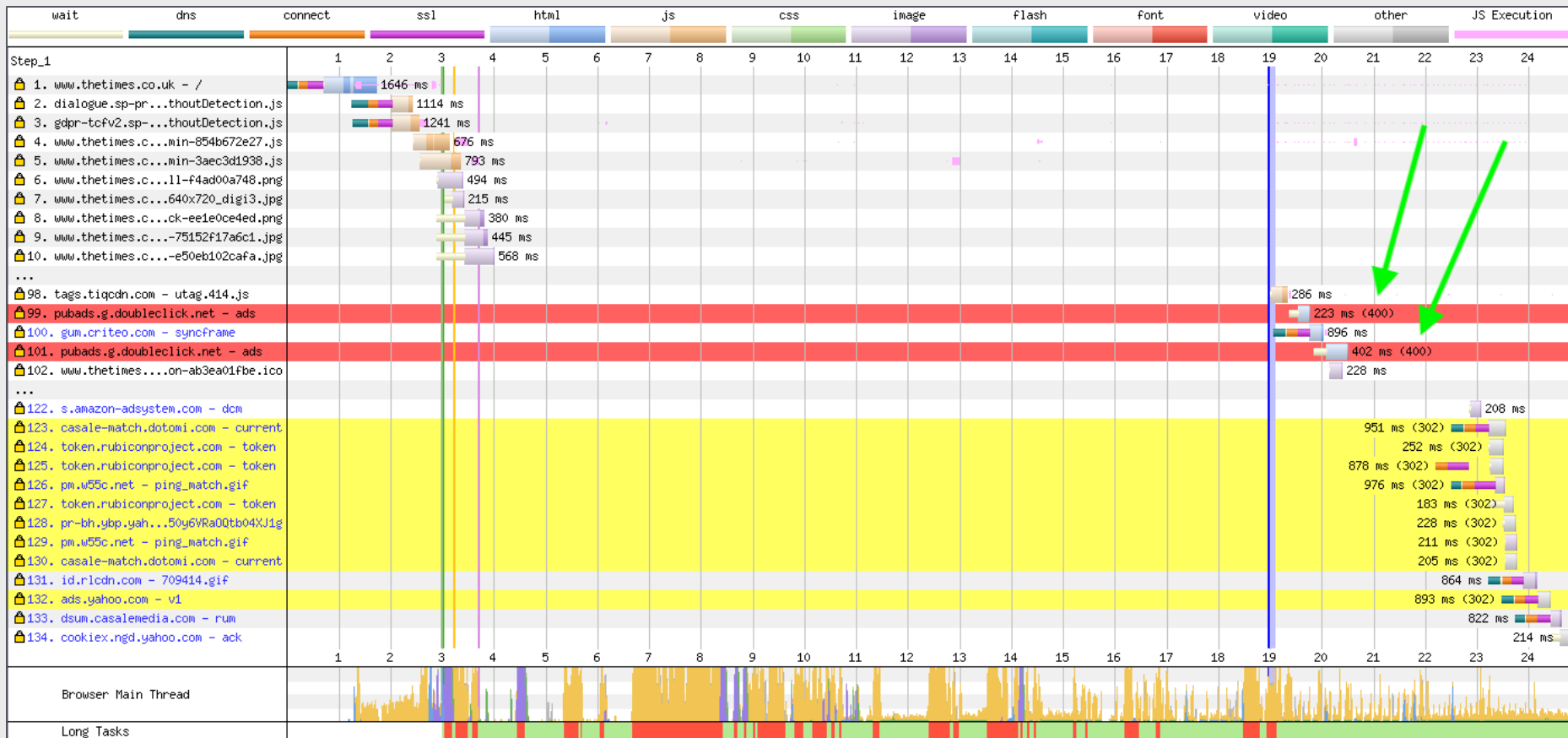


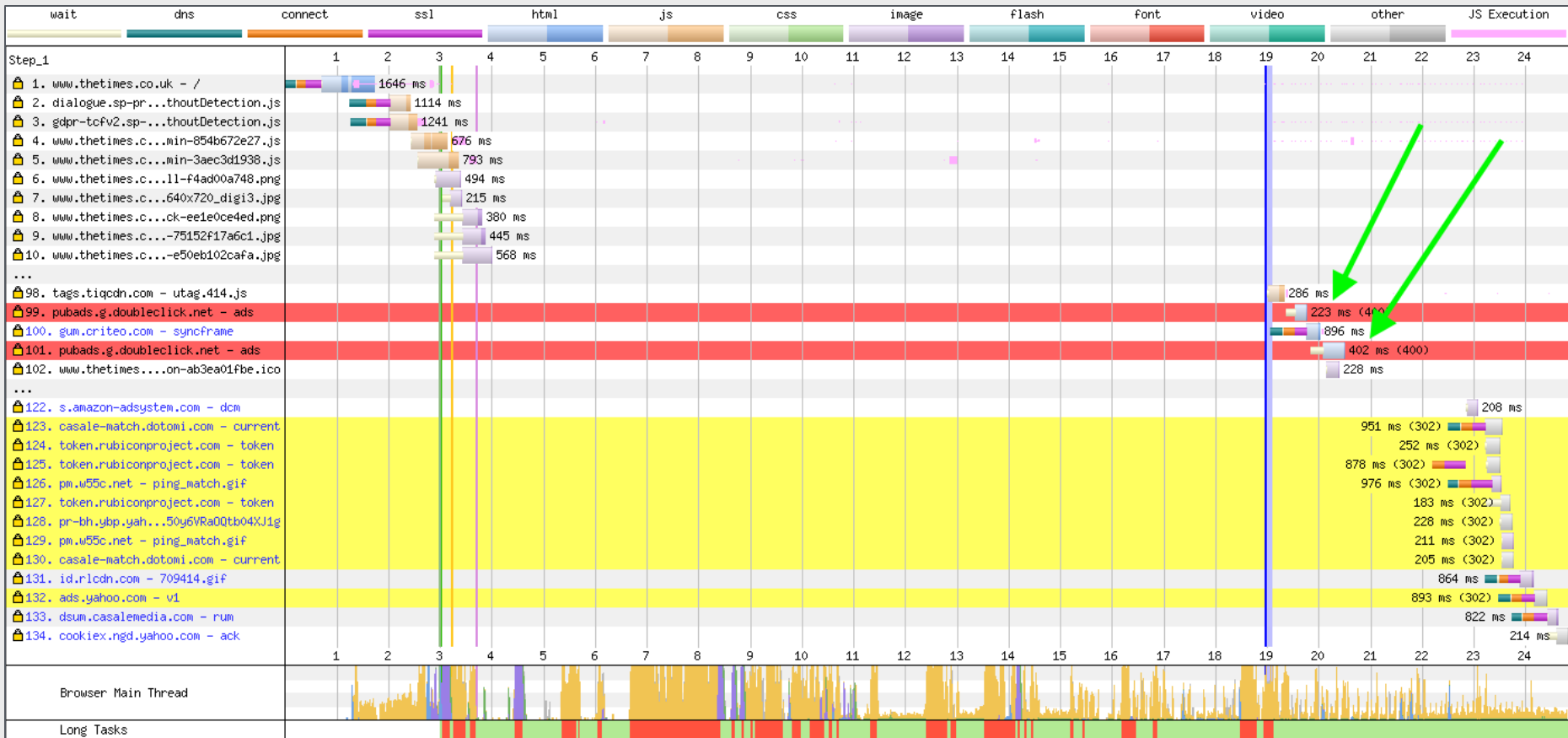
[customize waterfall](#) • [View all Images](#) • [View HTTP/2 Dependency Graph](#) • [Filmstrip](#)

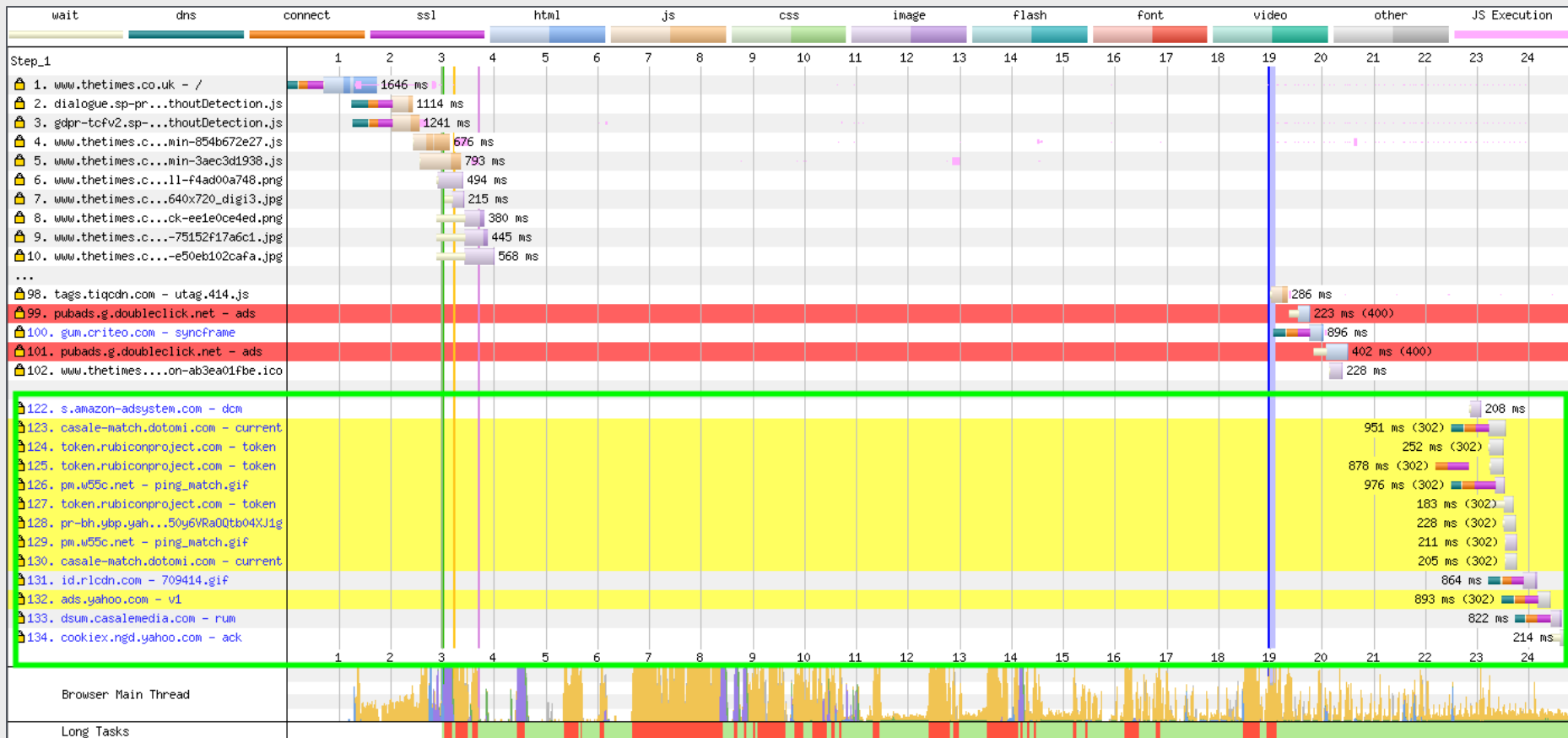


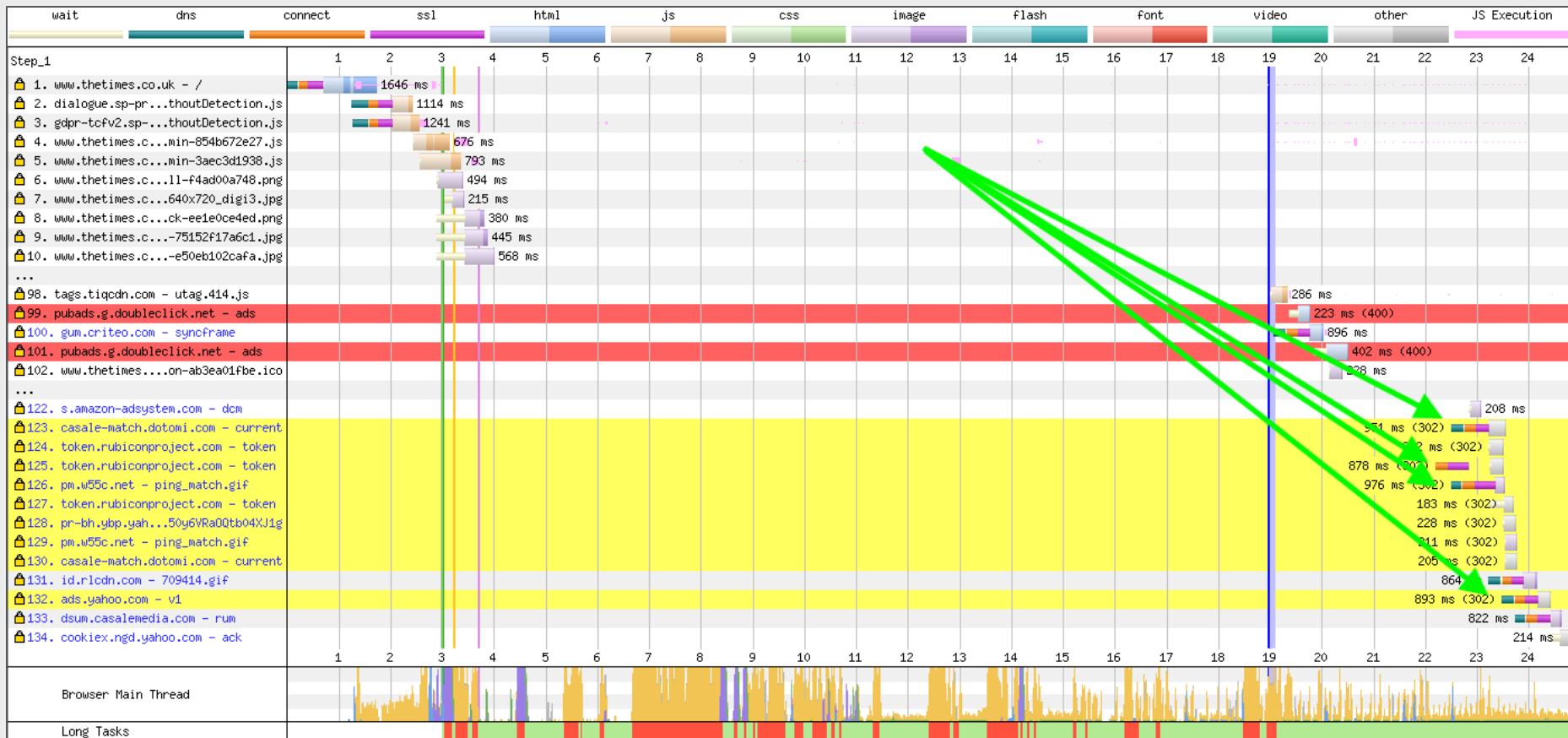




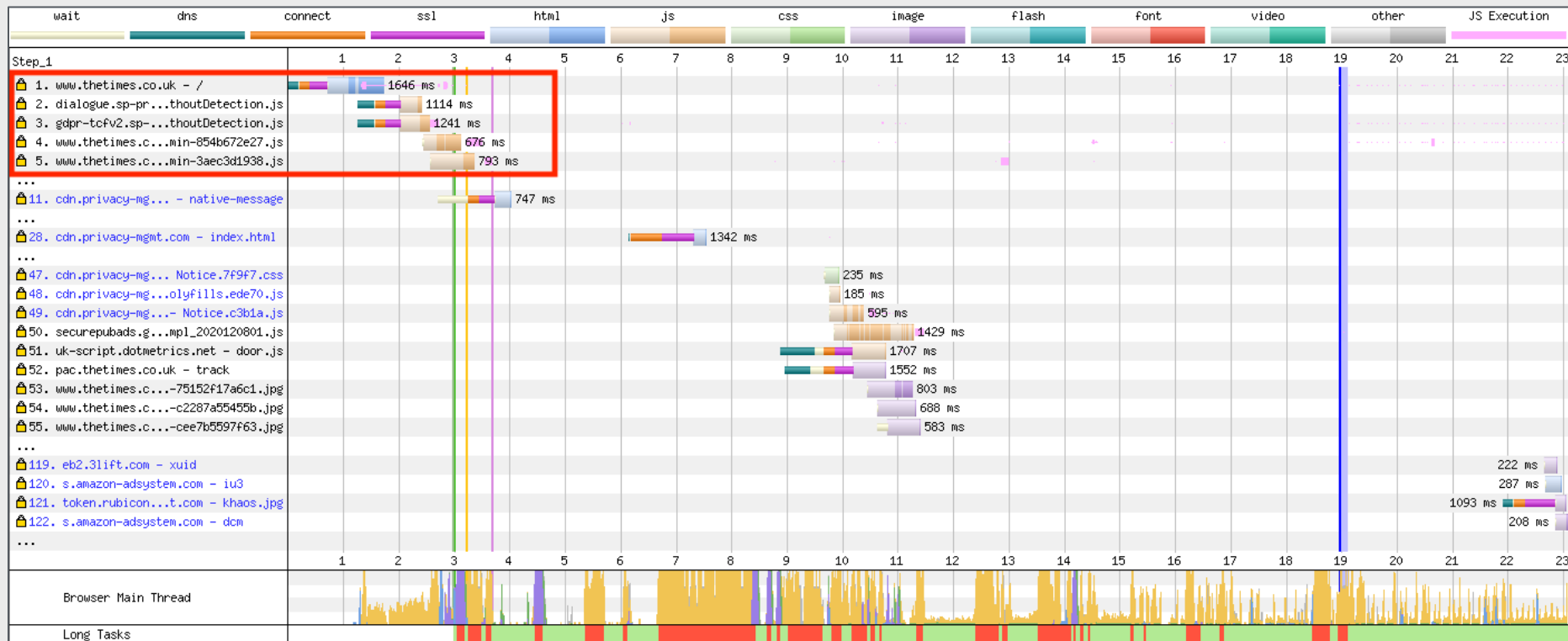


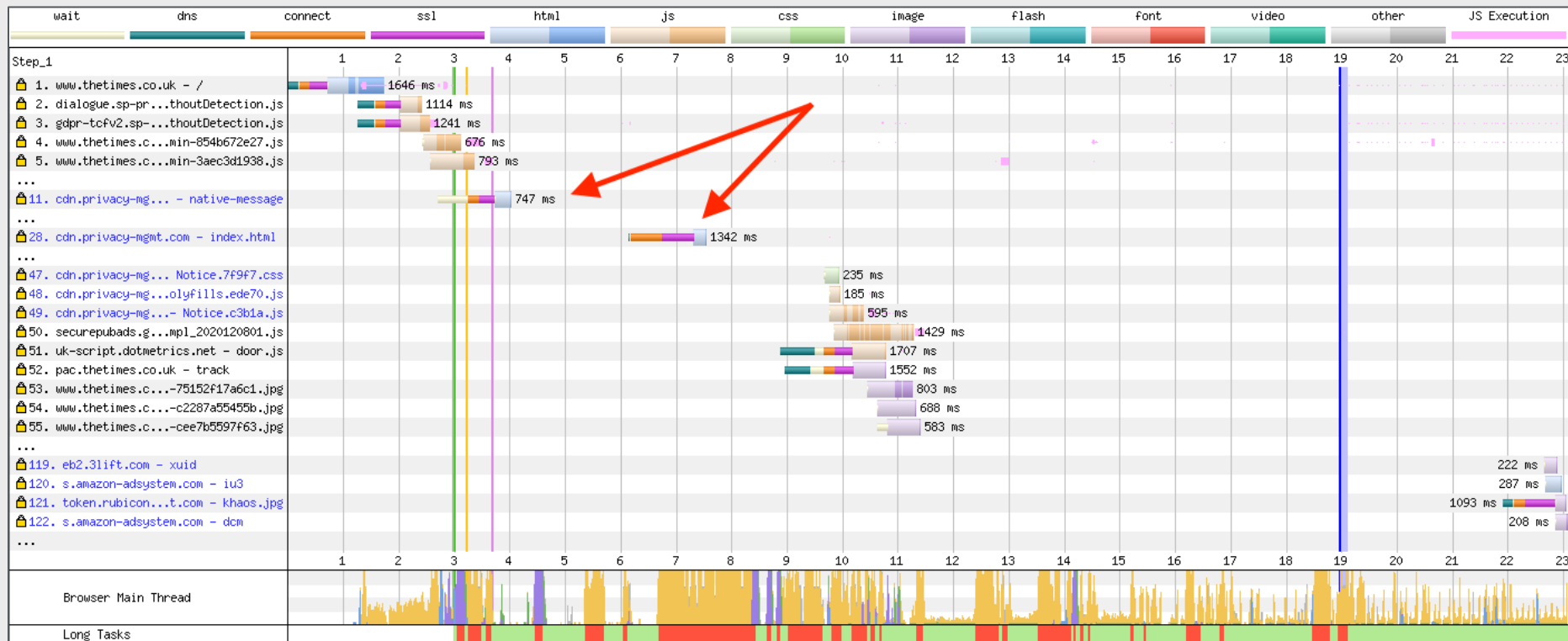




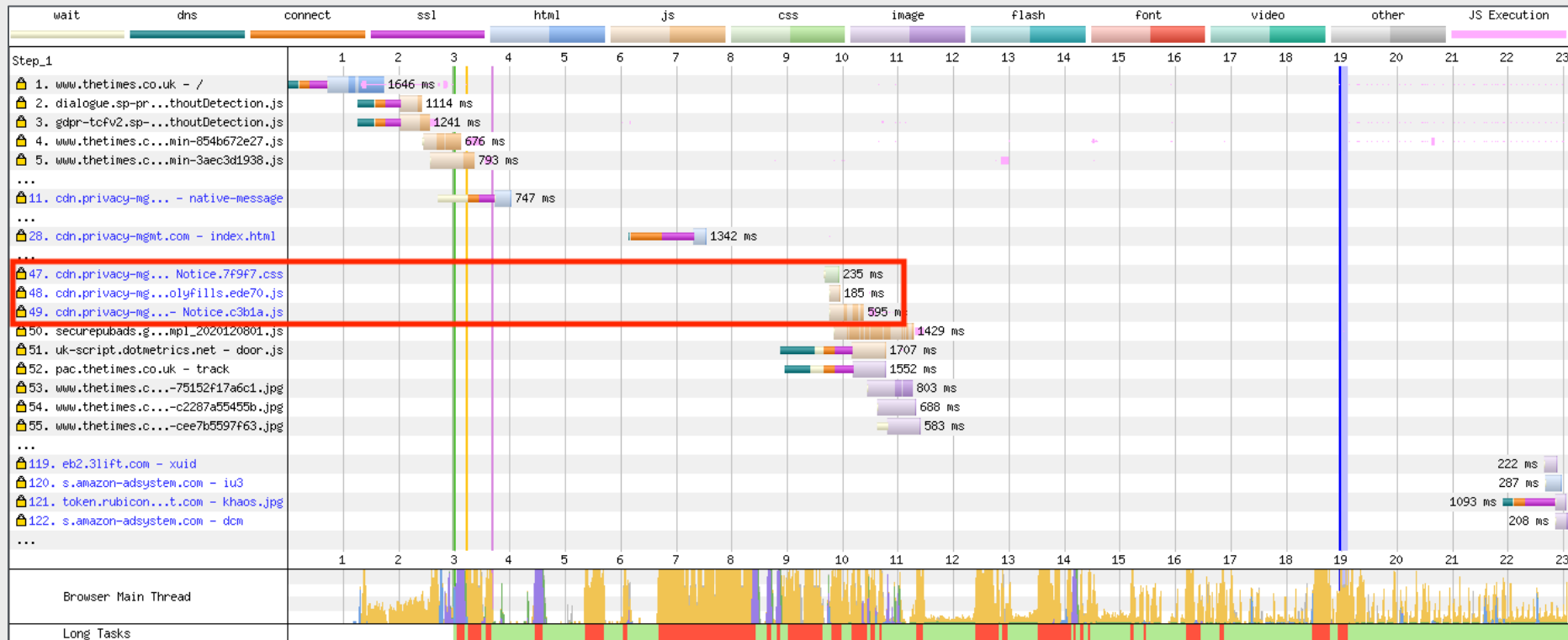


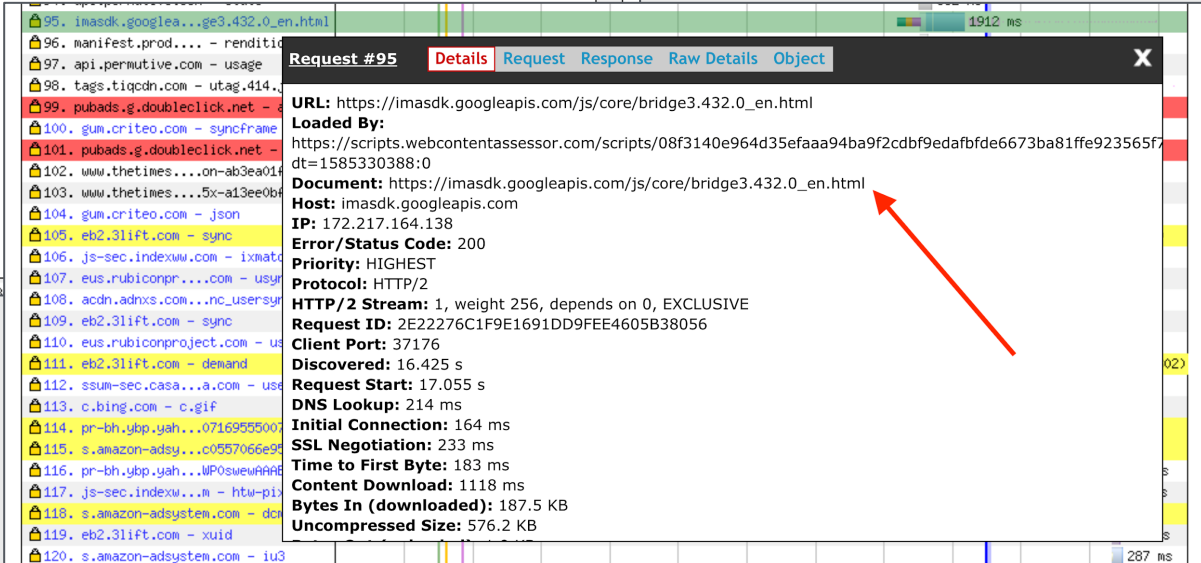
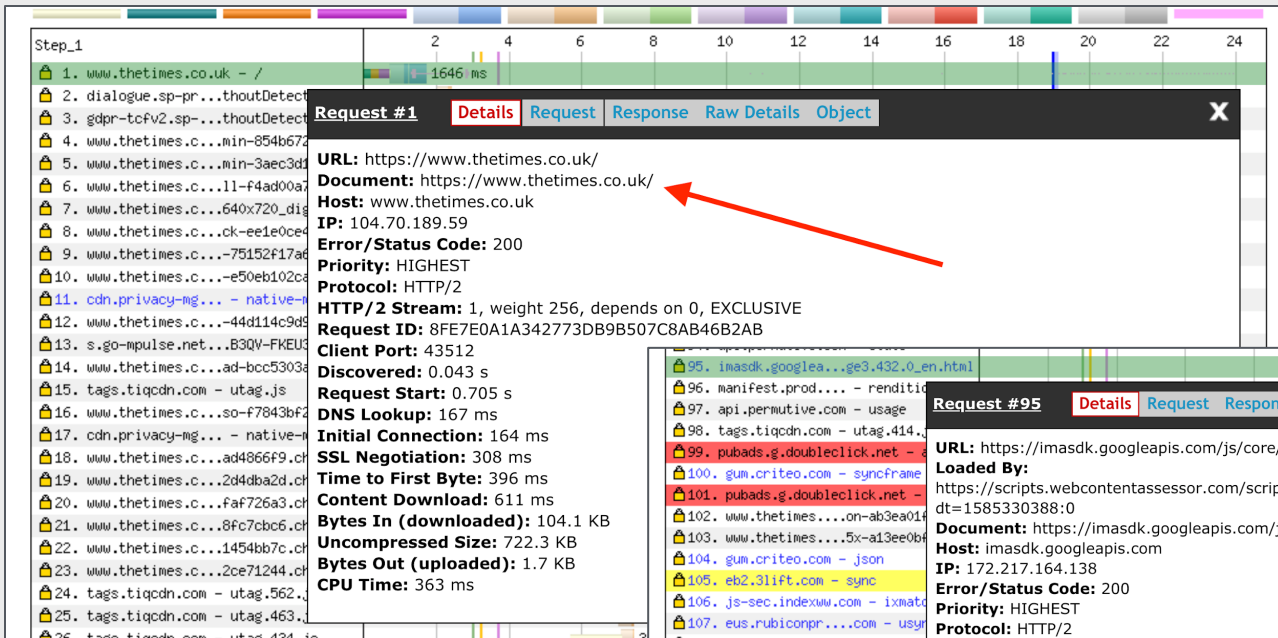
# Identifying the request initialiser



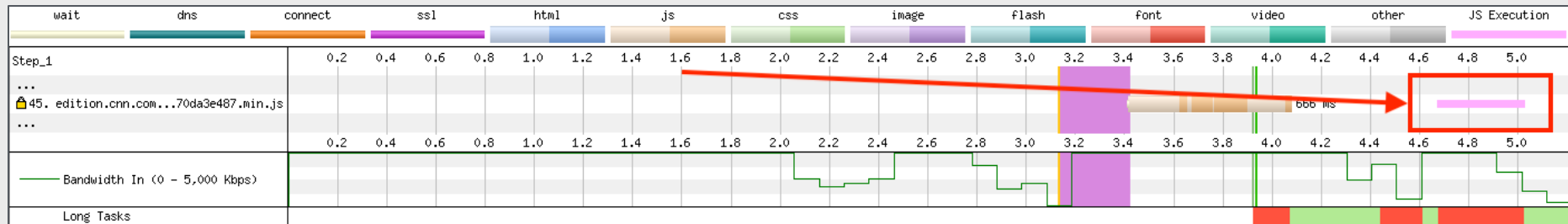


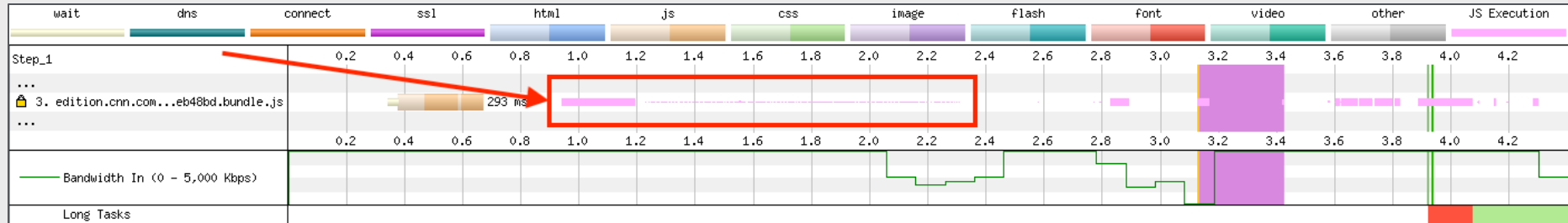






# JavaScript Execution





# User Timing Marks

```
<script>window.performance.mark('mark_custom_event');</script>
```

### Generate a custom Waterfall:

Chart Type:  Waterfall  Connection View

Chart Coloring:  Classic  By MIME Type

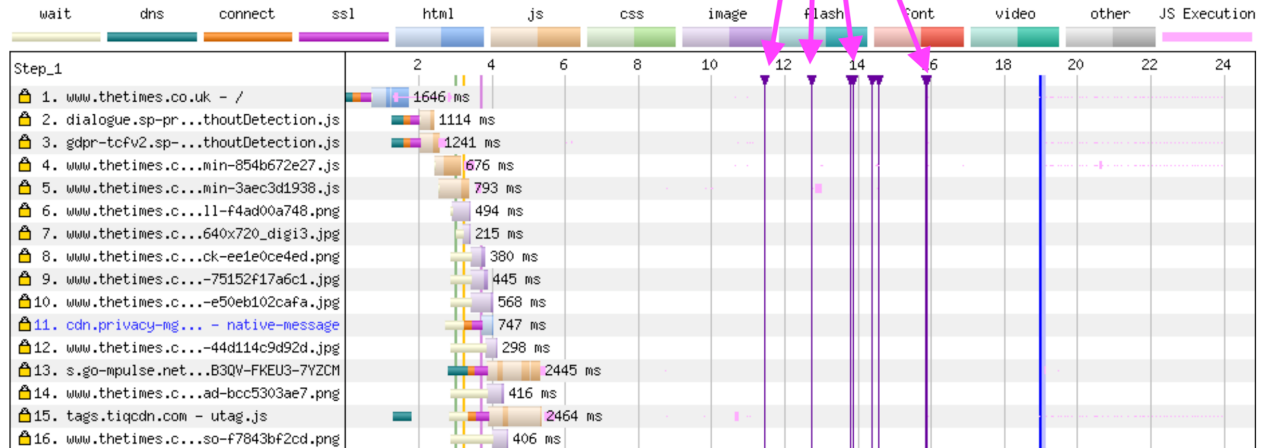
Image Width:  Pixels (300-2000)

Maximum Time:  Seconds (leave blank for automatic)

Requests (i.e. 1,2,3,4-9,8):

Draw lines for User Timing Marks  Show CPU Utilization  Show Bandwidth Utilization

Show Ellipsis (...) for missing items  Show Labels for requests (URL)  Show download chunks  Show JS Execution chunks  Show Wait Time




Tester: MotoG4\_16-192.168.1.116

[Export HTTP Archive \(.har\)](#)

First View only

[Custom Metrics](#)

Test runs: 9



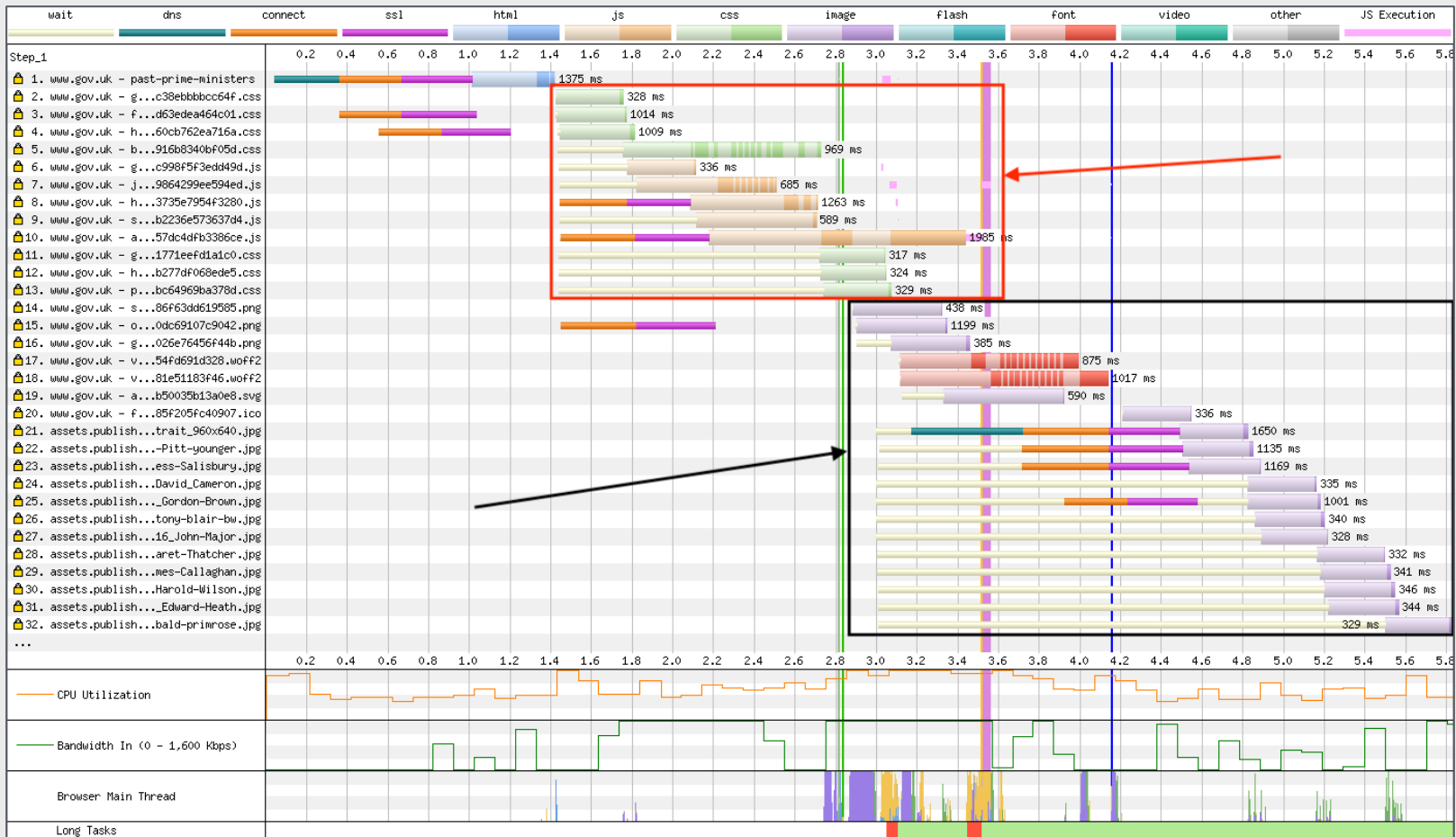
	First Byte	Start Render	First Contentful Paint	Speed Index	Result (error code)	Web Vitals			Document Complete			Fully Loaded		
						Largest Contentful Paint	Cumulative Layout Shift	Total Blocking Time	Time	Requests	Bytes In	Time	Requests	Bytes
First View ( <a href="#">Run 1</a> )	1.101s	2.985s	2.972s	7.930s	0	3.699s	0.008	5.350s	18.946s	97	2,222 KB	24.806s	134	2,276

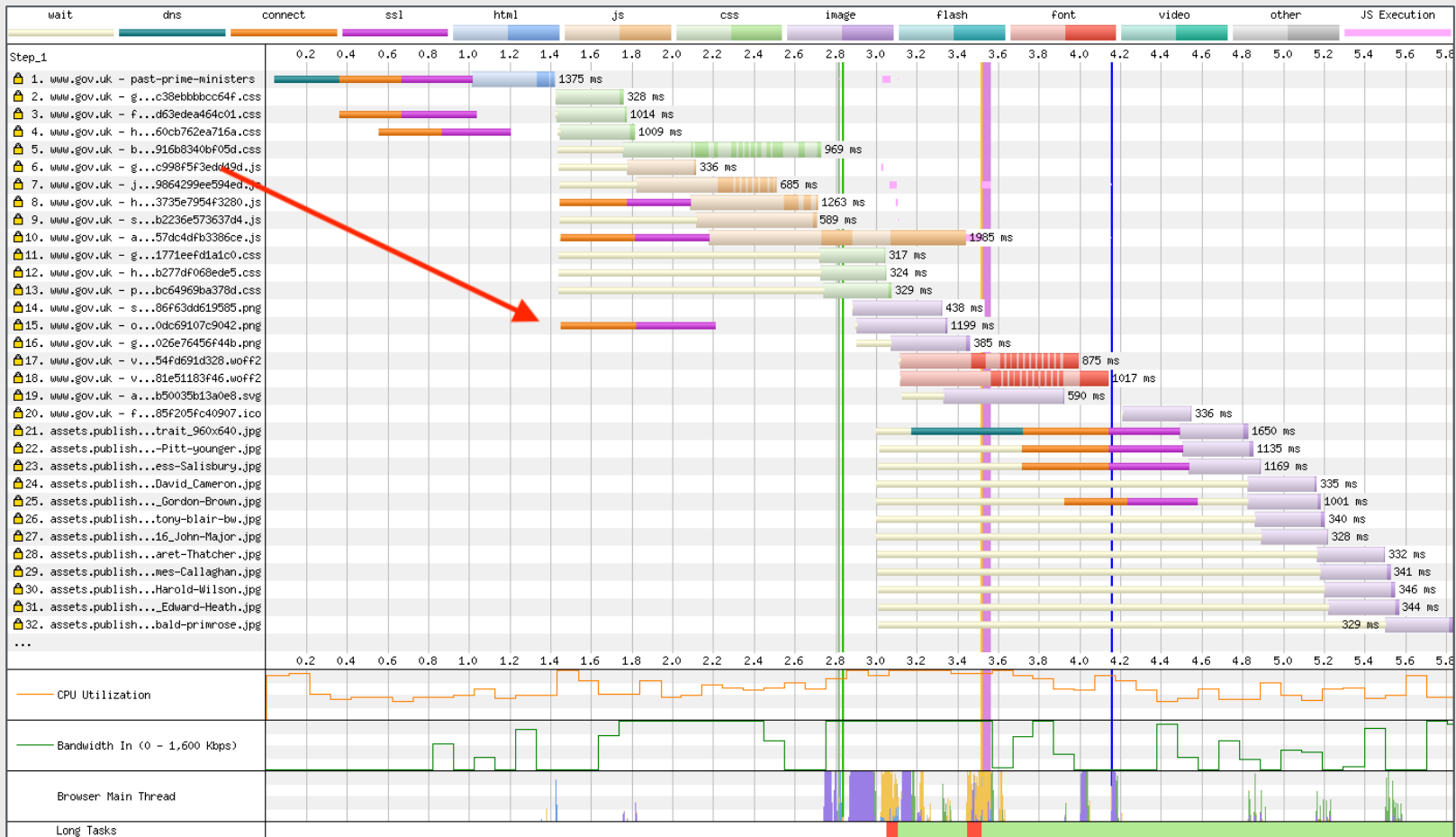
gpt-tag-load	facebookPixelAddonInitStart	bcAdBlockDetectStart	bcInnitStart	bcInnitEnd	bcAdBlockDetectEnd	prebidAddonInitStart	prebidAddonInitEnd	Color
11.439s	12.737s	13.798s	13.874s	14.384s	14.565s	15.843s	15.870s	2



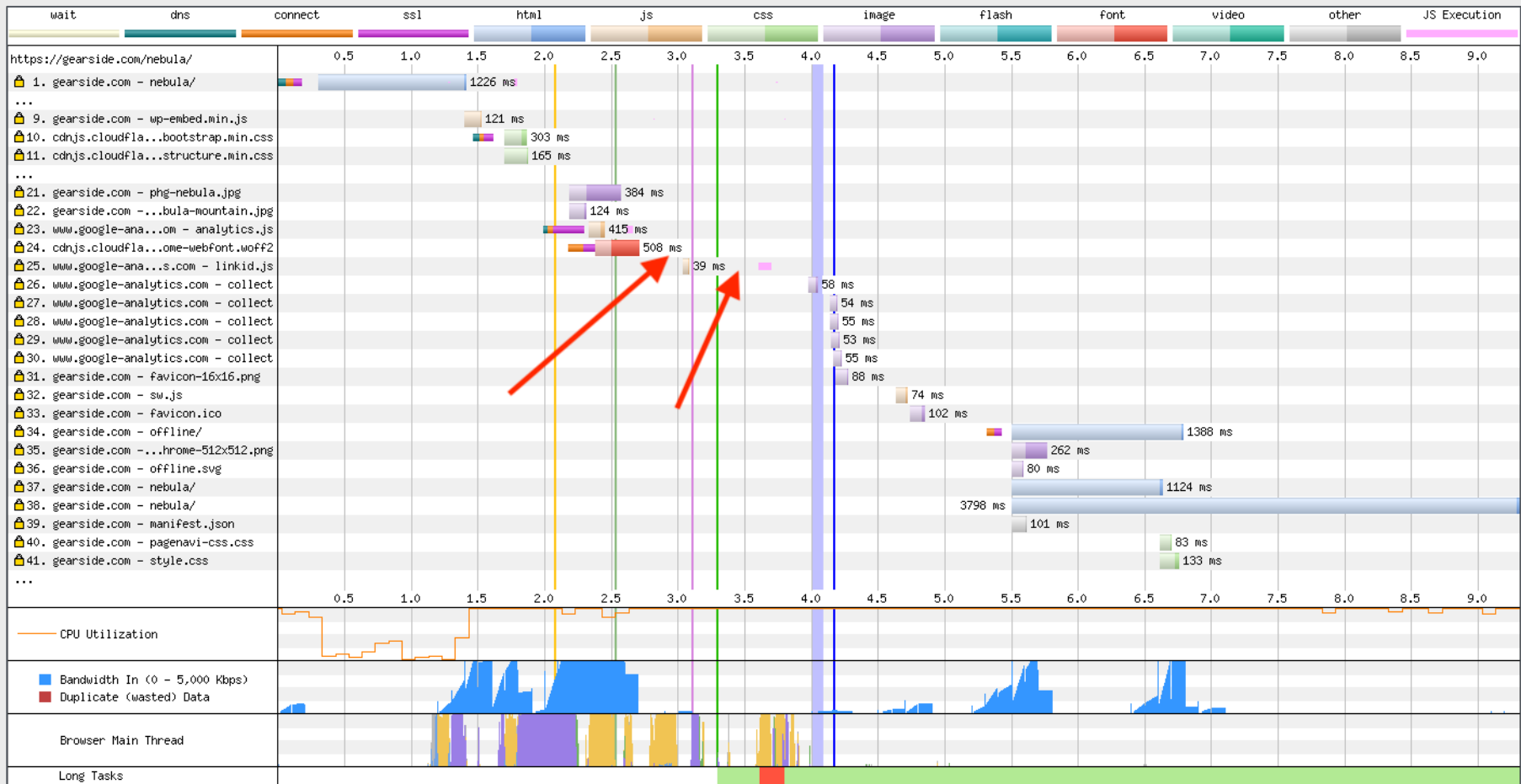
# Scenarios

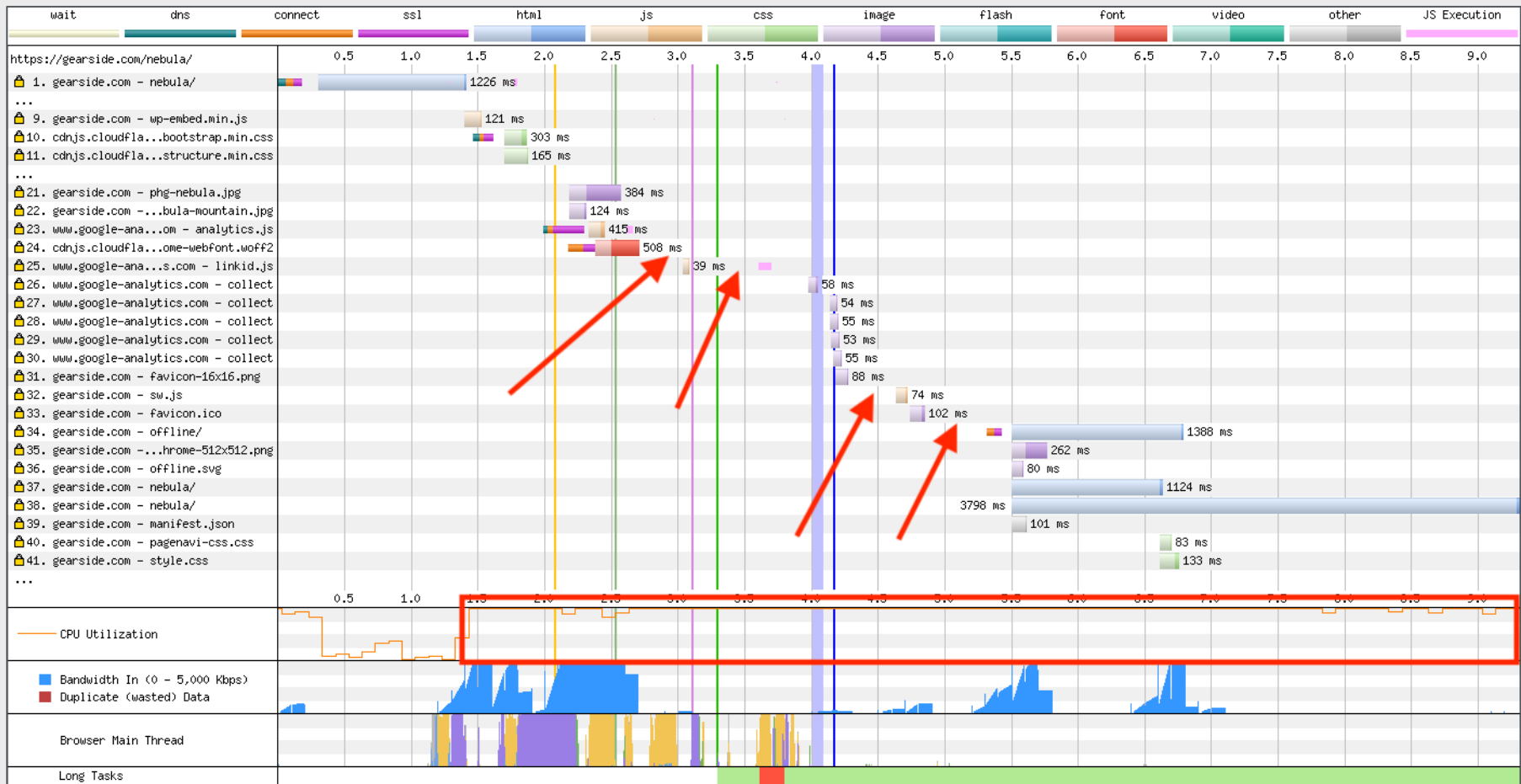
# Chrome Stair-Step

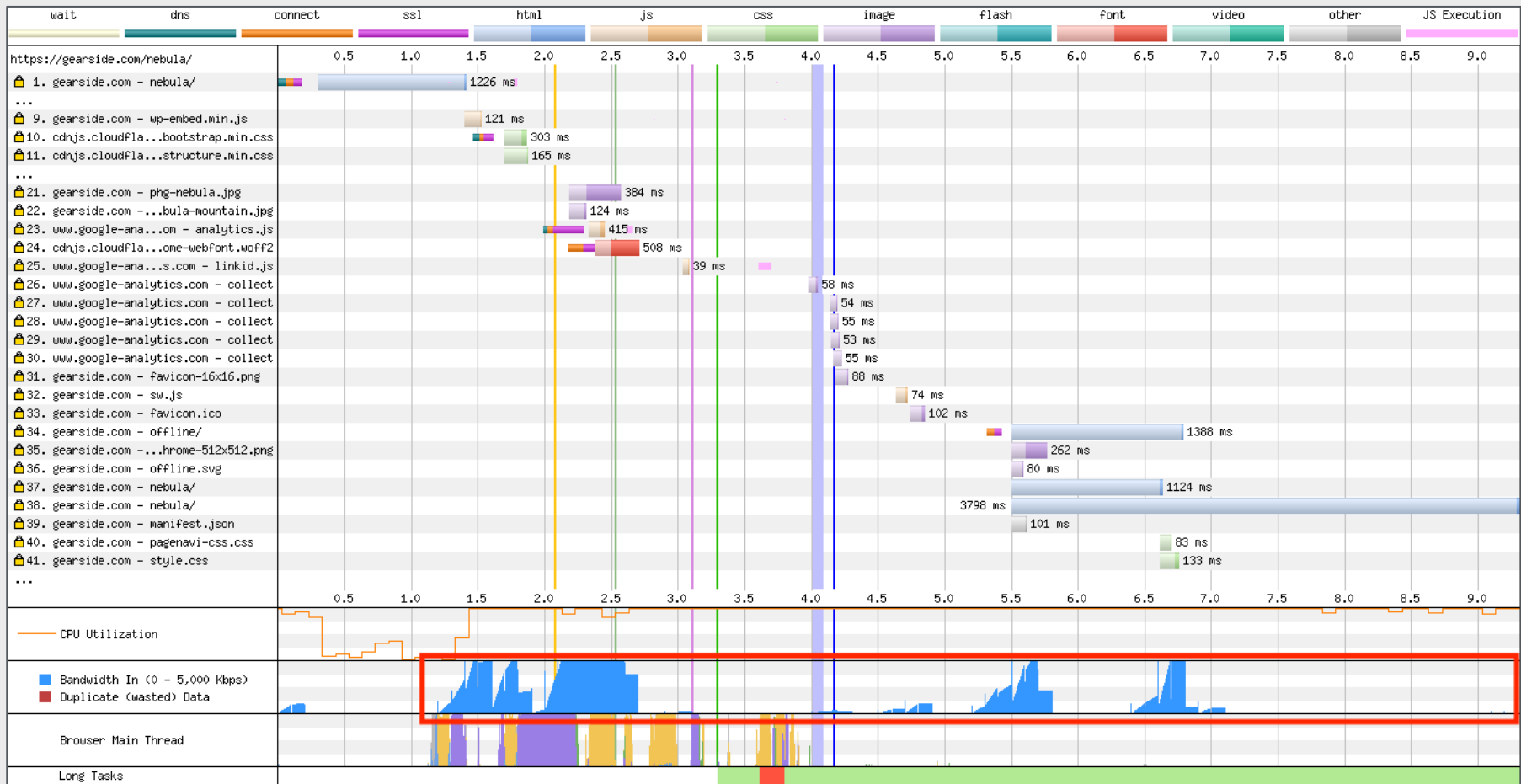




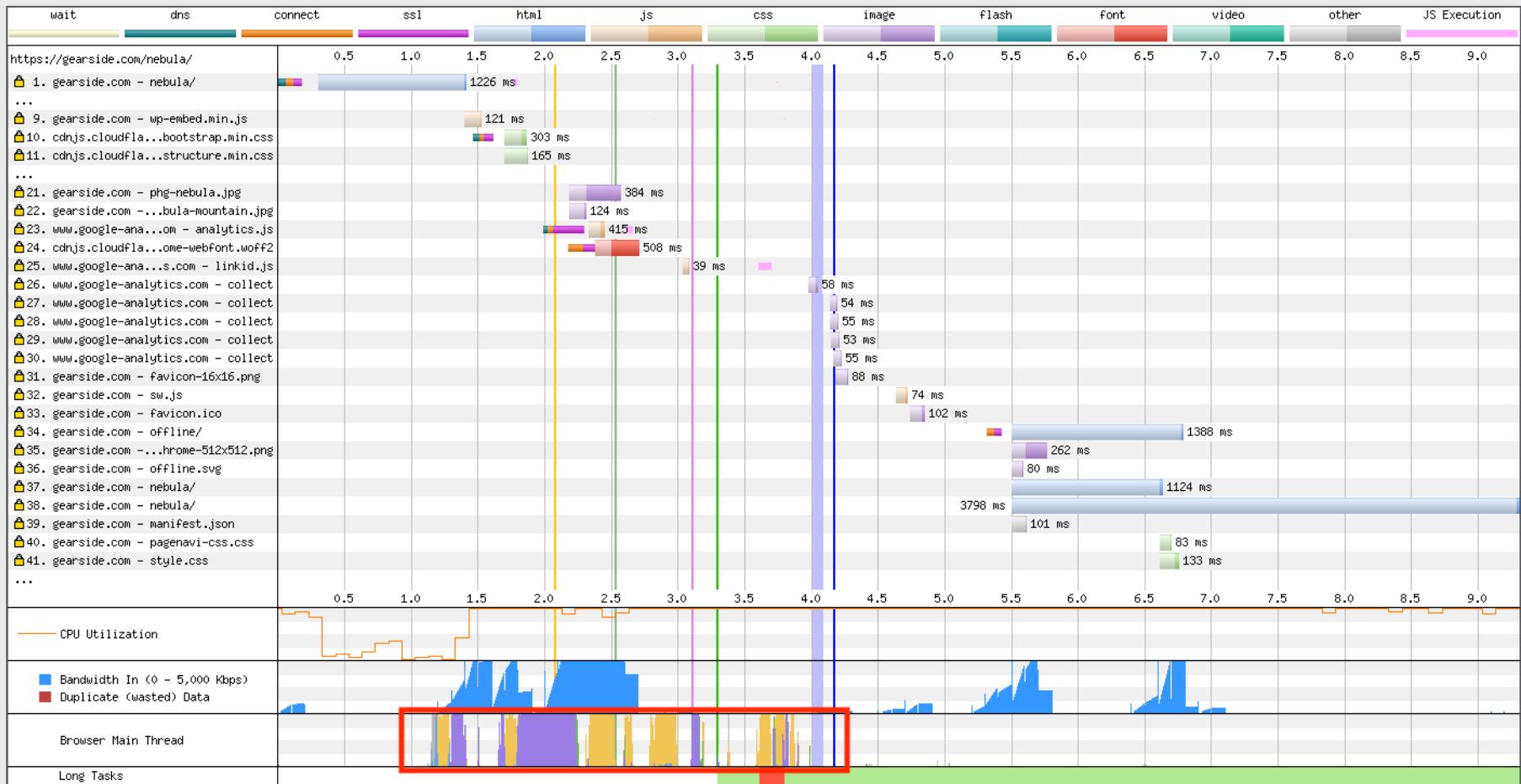
**CPU Bottleneck**







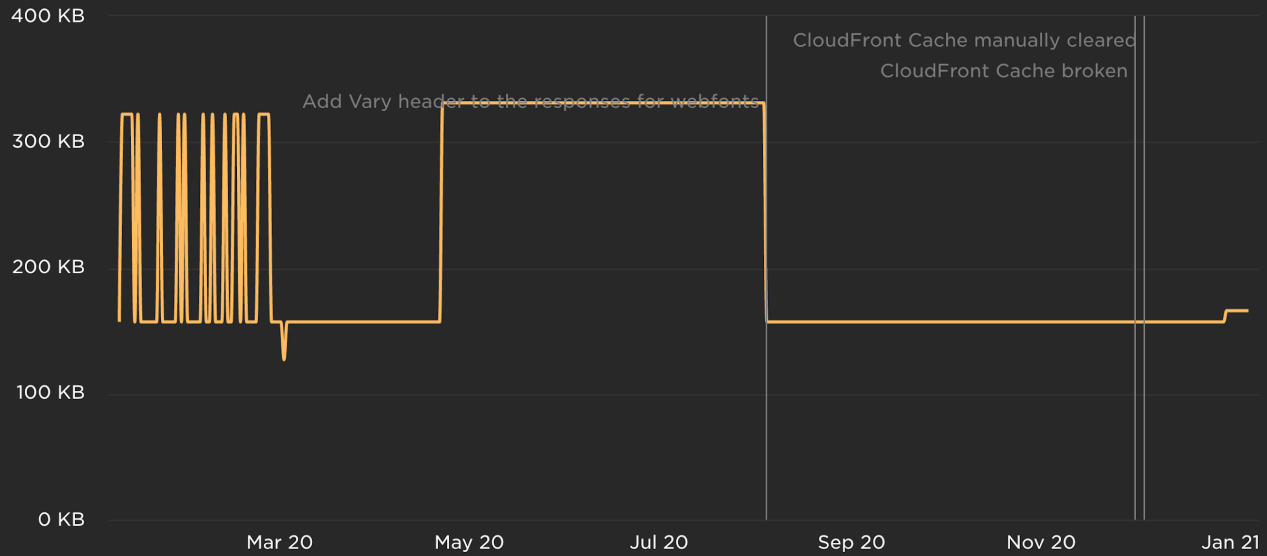




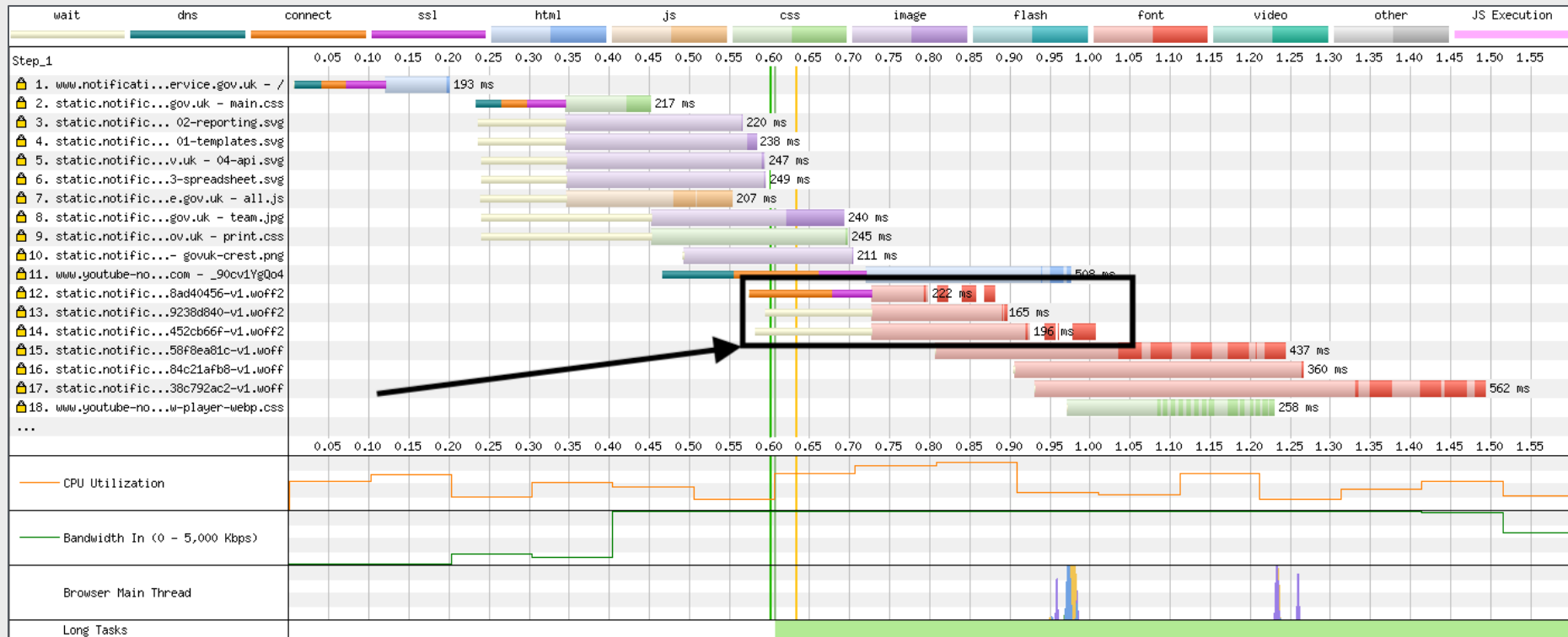
**Vary unusual waterfall**

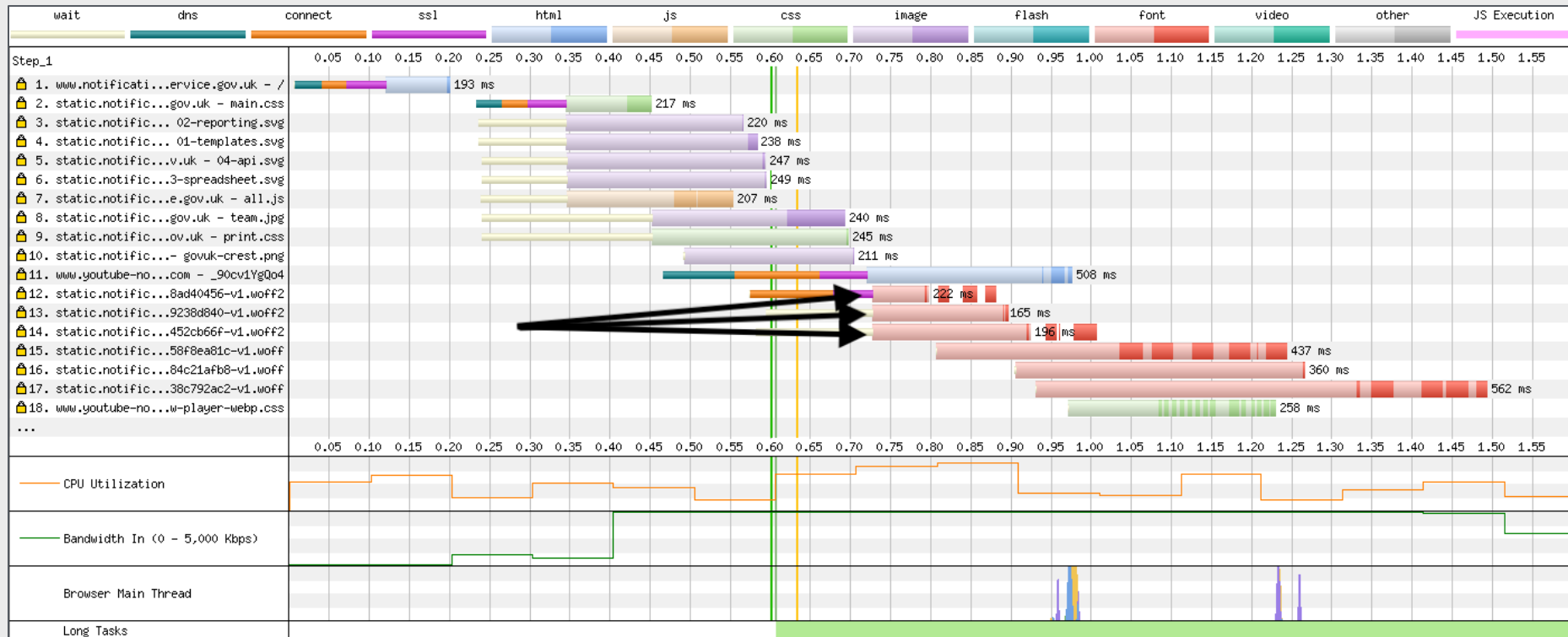
## Font Size

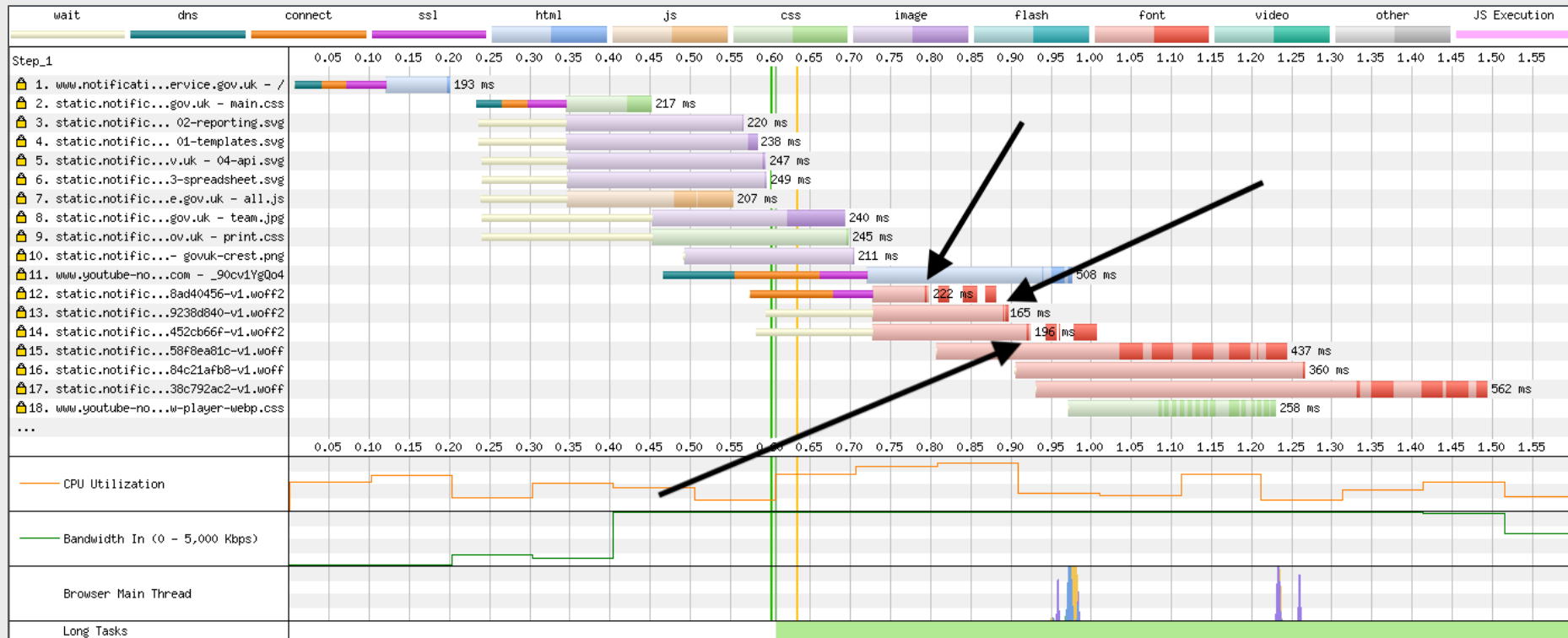
# 157KB

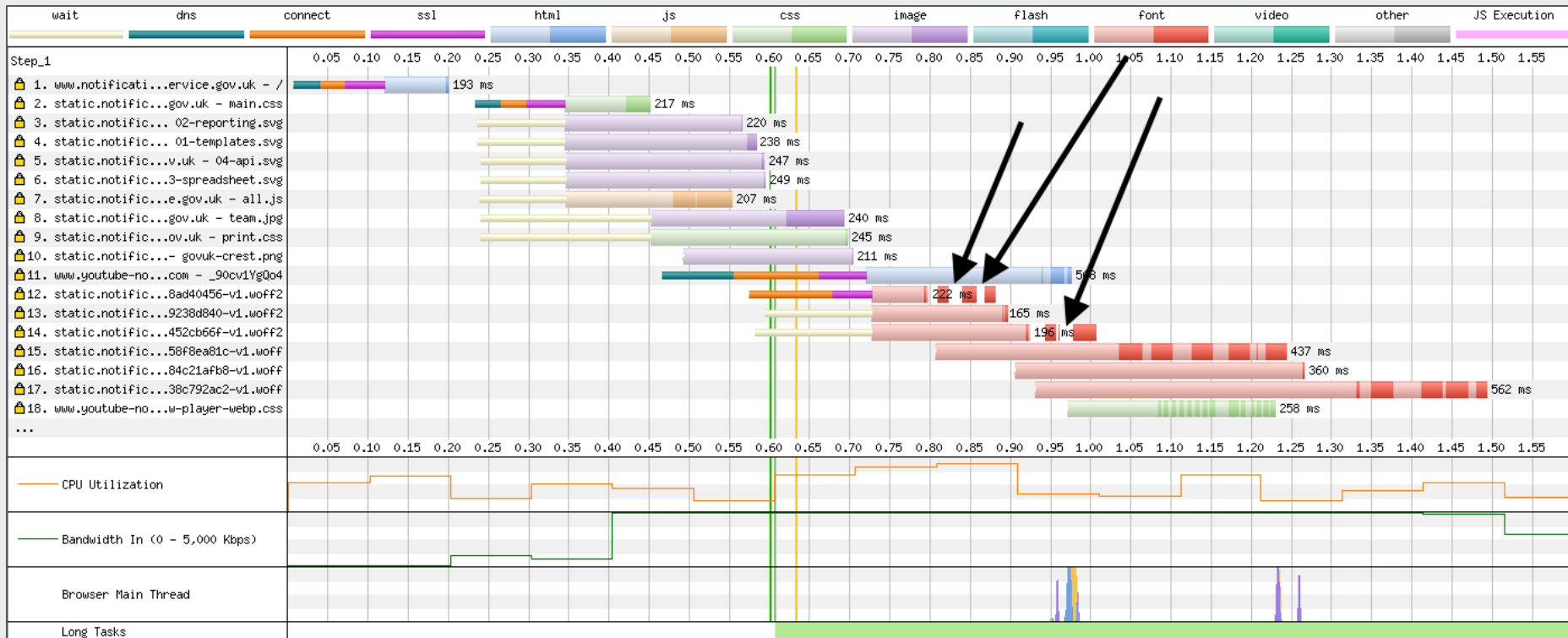


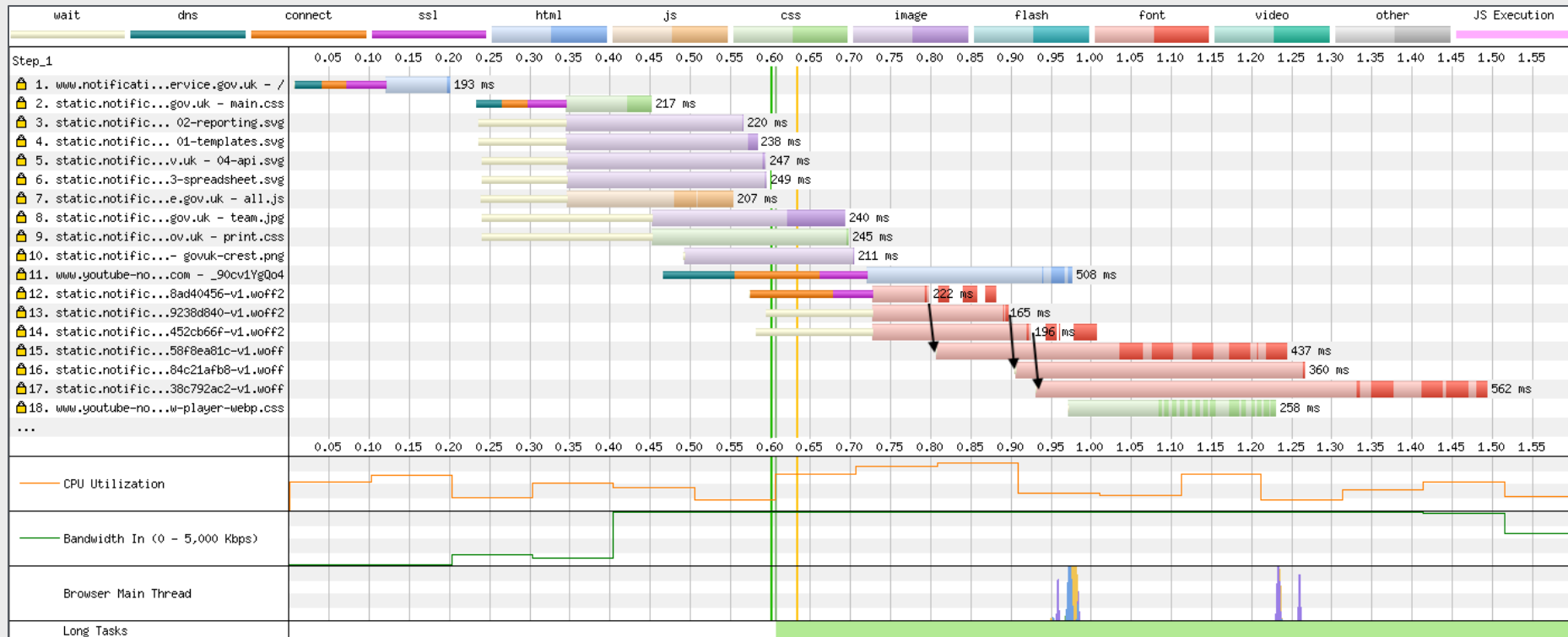
— Font Size (Syn), GOV.UK Notify, Notify - Homepage, England, Chrome



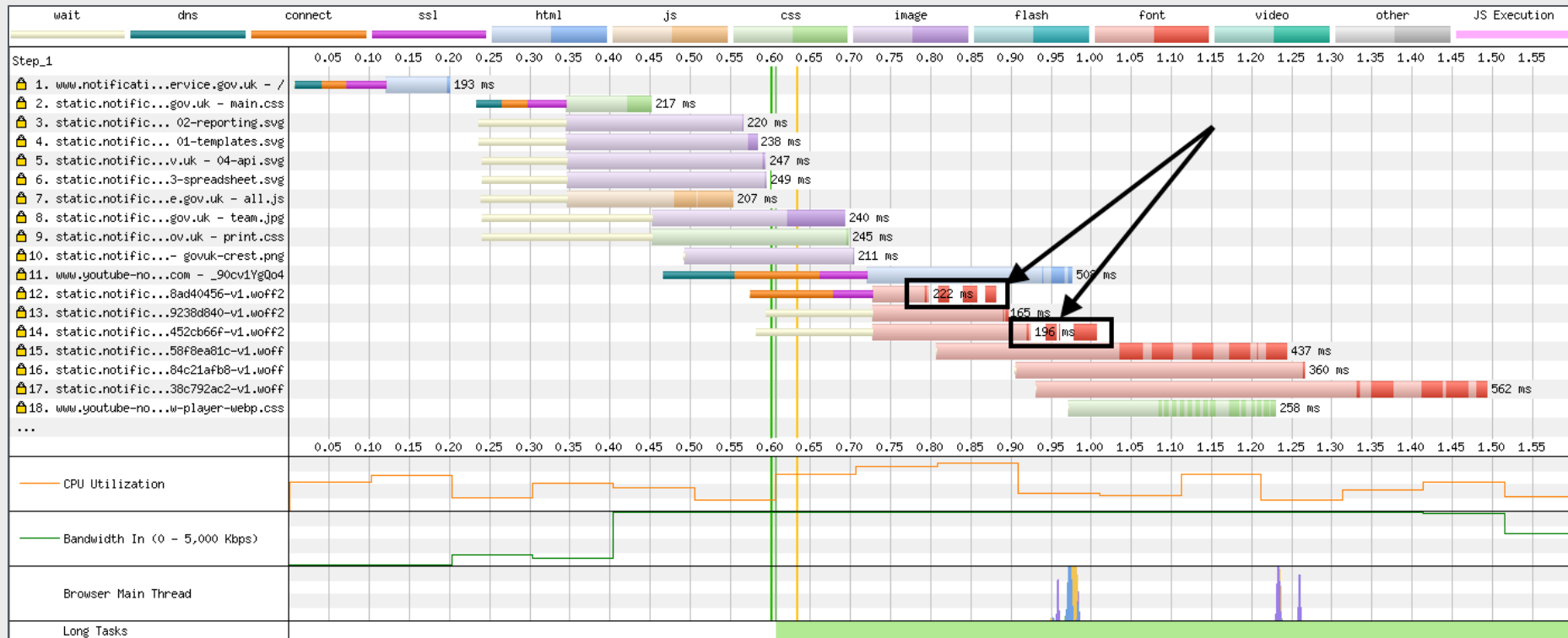












**More information**

- [Using WebPageTest](#) - Rick Viscomi, Andy Davies, Marcel Duran
- [Velocity 2014 - WebPagetest Power Users - Part 1](#) - Pat Meenan
- [Velocity 2014 - WebPagetest Power Users - Part 2](#) - Pat Meenan
- [Velocity 2014 - WebPagetest Private Instances - Part 1](#) - Pat Meenan
- [Velocity 2014 - WebPagetest Private Instances - Part 2](#) - Pat Meenan
- [Using WebPageTest – Scripting / API / Private Instances](#) - Andy Davies
- [How to read a WebPageTest Waterfall View chart](#) - Matt Hobbs
- [How to read a WebPageTest Connection View chart](#) - Matt Hobbs
- [How to run a WebPageTest test](#) - Matt Hobbs
- [How to use WebPageTest's Graph Page Data view](#) - Matt Hobbs

**Thank You's**

- Pat Meenan ([@patmeen](#))
- Andy Davies ([@AndyDavies](#))
- Barry Pollard ([@tunetheweb](#))
- Ryan Townsend ([@RyanTownsend](#))
- Simon Hearne ([@simonhearne](#))
- Boris Schapira ([@boostmarks](#))
- Joseph Scott ([@josephscott](#))
- Mike Herchel ([@mikeherchel](#))
- Šime Vidas ([@simevidas](#))
- Rick Viscomi ([@rick\\_viscomi](#))
- Radu Micu ([@radumicu](#))
- Jeff Posnick ([@jeffposnick](#))
- George Liu ([@centminmod](#))

**Thanks for listening!**

Matt Hobbs

Twitter: @TheRealNooshu