Web Performance Hacks 😎

@saurabhdaware

Saurabh Daware

- Workz at da Student
- Open Source Fanboi 🌻
- Previously (Intern) -

Bew Digital

The Souled Store

@saurabhcodes

DEV /saurabhdaware

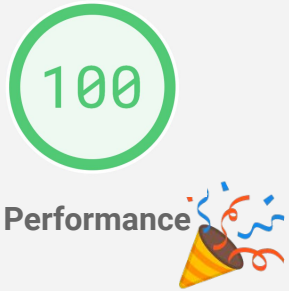
saurabhdaware.in

Ready?

Hack #1

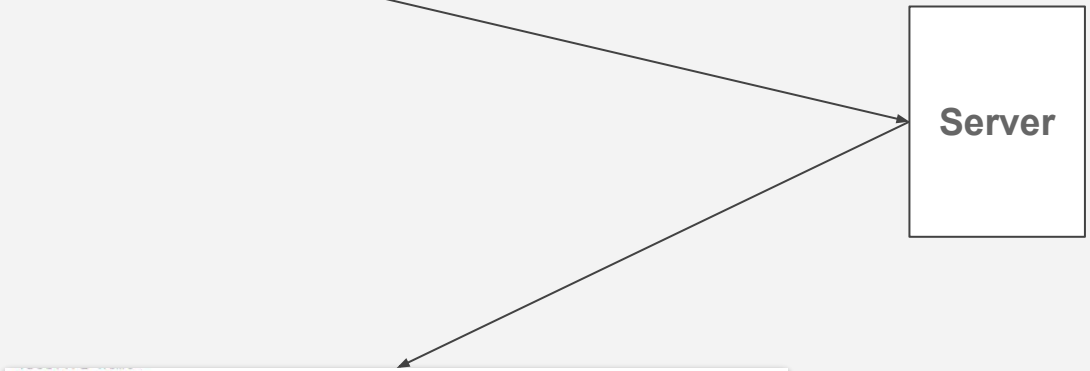
Replace your whole code with...

```
<html>
    <body>Hello, World!</body>
</html>
```



How does the web work?

https://saurabhdaware.in




```
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta name="description" content="Hi, I'm Saurabh Daware. A JavaScript Developer ba
projects, articles, and other information about me. I have created projectman, pwainit,
    <meta name="keywords" content="portfolio site, saurabh, saurabh daware, daware, per
    <meta name="mobile-web-app-capable" content="yes">
    <meta name="author" content="Saurabh Daware" />
    <meta name="copyright" content="Saurabh Daware" />
    <meta name="robots" content="follow"/>

    <link rel=icon sizes=192x192 href="assets/images/logo-192.png">
    <meta name="theme-color" content="#011f41" />
    <link rel="manifest" href="manifest.json">

    <!-- OPEN GRAPH -->
    <meta property="og:type" content="website" />
    <meta property="og:title" content="Saurabh Daware">
    <meta property="og:url" content="https://saurabhdaware.in">

    <meta name="twitter:card" content="summary_large_image"></meta>
    <meta name="twitter:creator" content="@saurabhcodes"></meta>
```

https://saurabhdaware.in

Server

```
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
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    <meta name="mobile-web-app-capable" content="yes">
    <meta name="author" content="Saurabh Daware" />
    <meta name="copyright" content="Saurabh Daware" />
    <meta name="robots" content="follow"/>

    <link rel=icon sizes=192x192 href="assets/images/logo-192.png">
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    <meta property="og:url" content="https://saurabhdaware.in">

    <meta name="twitter:card" content="summary_large_image"></meta>
    <meta name="twitter:creator" content="@saurabhcodes"></meta>
```
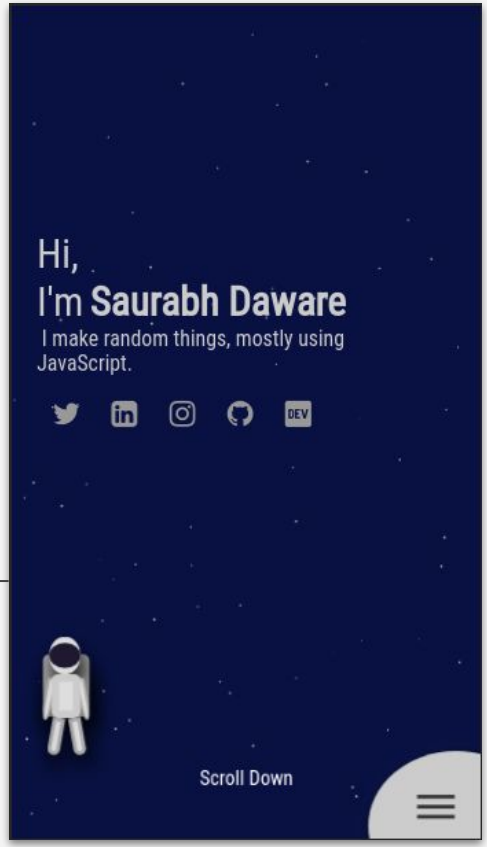

Magic



https://saurabhdaware.in

Server

```html
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta name="description" content="Hi, I'm Saurabh Daware. A JavaScript Developer ba
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    <meta name="author" content="Saurabh Daware" />
    <meta name="copyright" content="Saurabh Daware" />
    <meta name="robots" content="follow"/>

    <link rel=icon sizes=192x192 href="assets/images/logo-192.png">
    <meta name="theme-color" content="#011f41" />
    <link rel="manifest" href="manifest.json">

    <!-- OPEN GRAPH -->
    <meta property="og:type" content="website" />
    <meta property="og:title" content="Saurabh Daware">
    <meta property="og:url" content="https://saurabhdaware.in">

    <meta name="twitter:card" content="summary_large_image"></meta>
    <meta name="twitter:creator" content="@saurabhcodes"></meta>
```
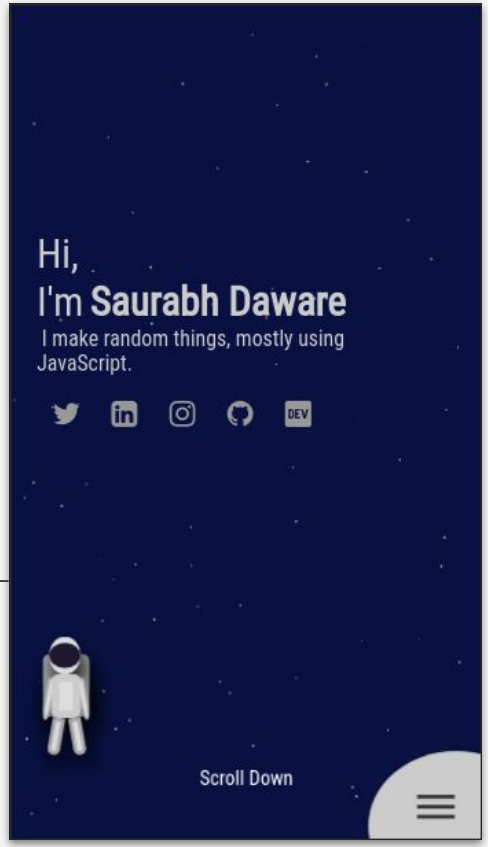
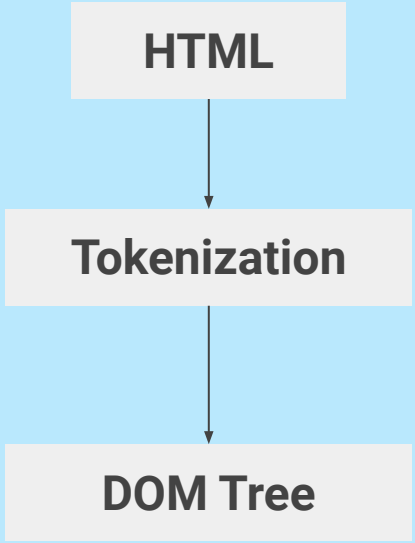

Parsing & Rendering



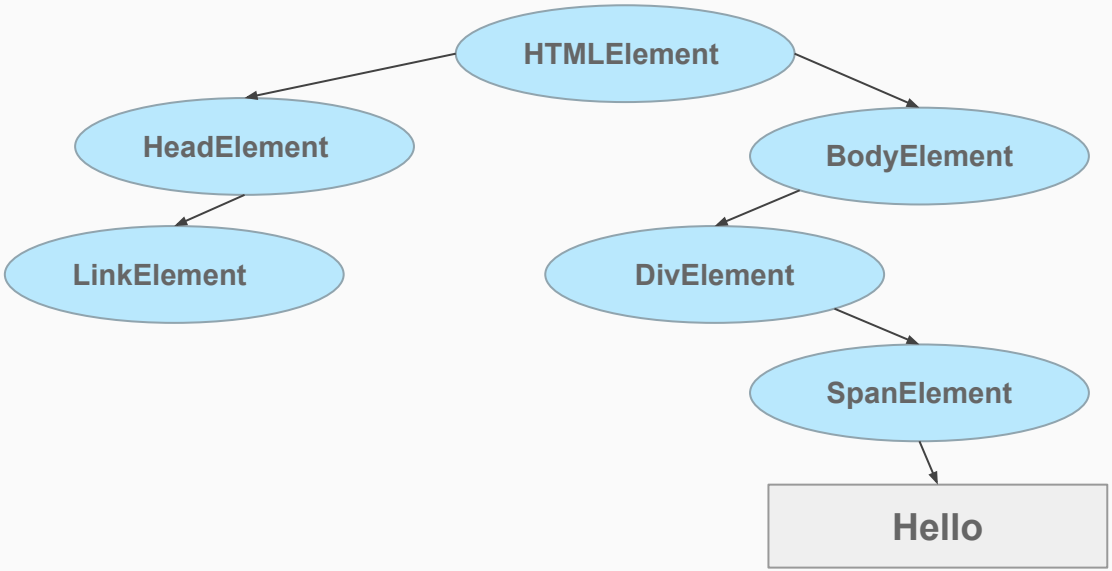
HTML Parsing & Rendering

(a zoomed out view)

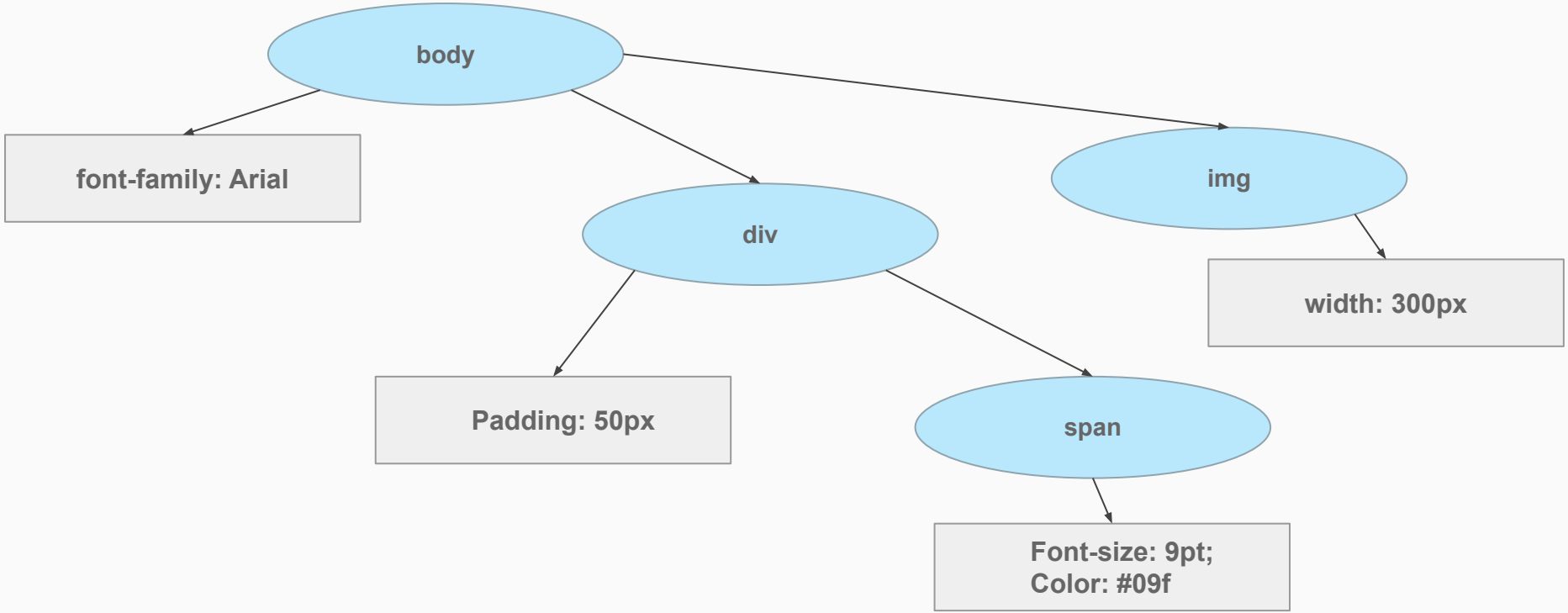


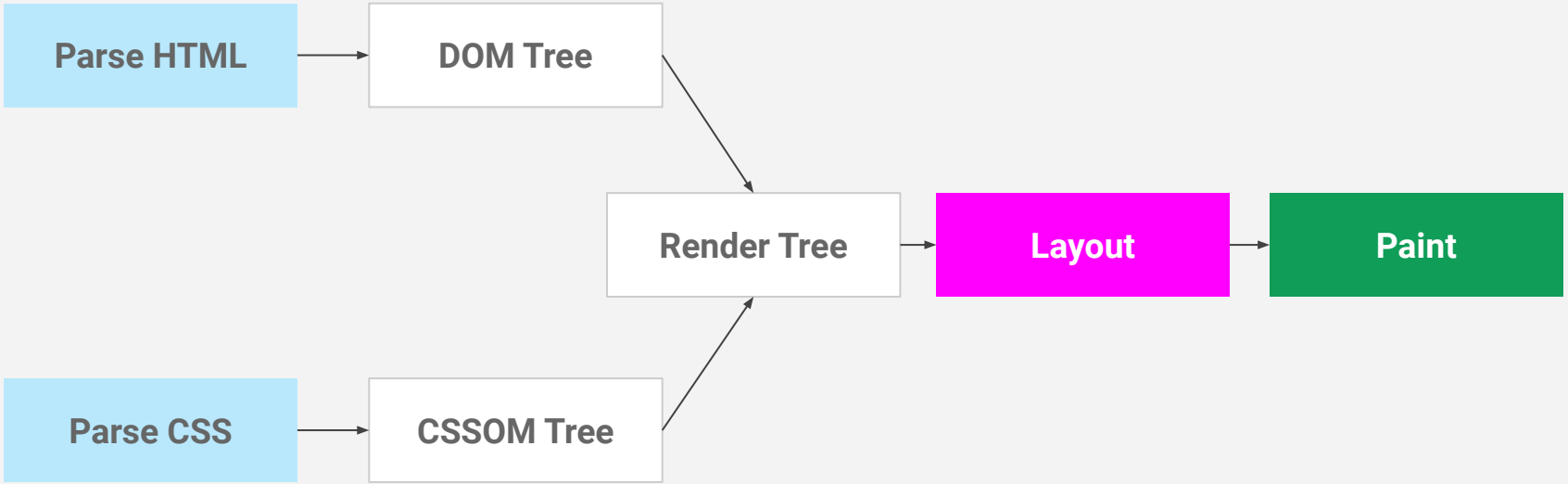

```
<html>
  <head>...</head>
  <body><div><span>Hello</span></div></body>
</html>
```

[Start: HTML] [Start: HEAD] ... [End: HEAD] [Start: BODY] [Start: DIV] [Start: SPAN]



CSSOM Tree


body
font-family: Arial
div
img
width: 300px
Padding: 50px
span
Font-size: 9pt;
Color: #09f


Parse HTML
DOM Tree
Render Tree
Layout
Paint
Parse CSS
CSSOM Tree

Parsing halts when it comes across **<link>**, **<script>**, and **<style>** tags.

- CSS
- JavaScript
- Images

‘A quick First Paint’ hack

Lets Code!!!!

Without CSS

```
<html>
  <head>
    <!-- <link rel="stylesheet" href="styles/main.css" /> -->
  </head>
  <body>
    <header>Wubba Luba Dub Dub!</header>
    <main>...</main>
  </body>
</html>
```

CoolWebsite

Wubba lubba dub dub!

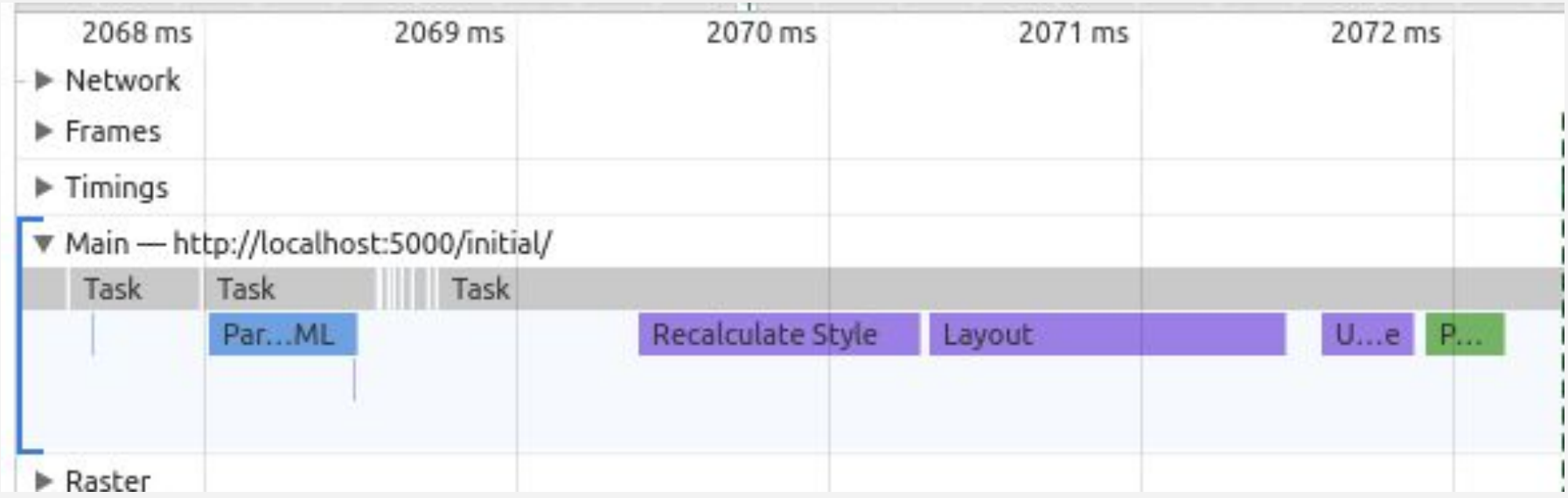
Random Form

Name:
Email:
Submit

About

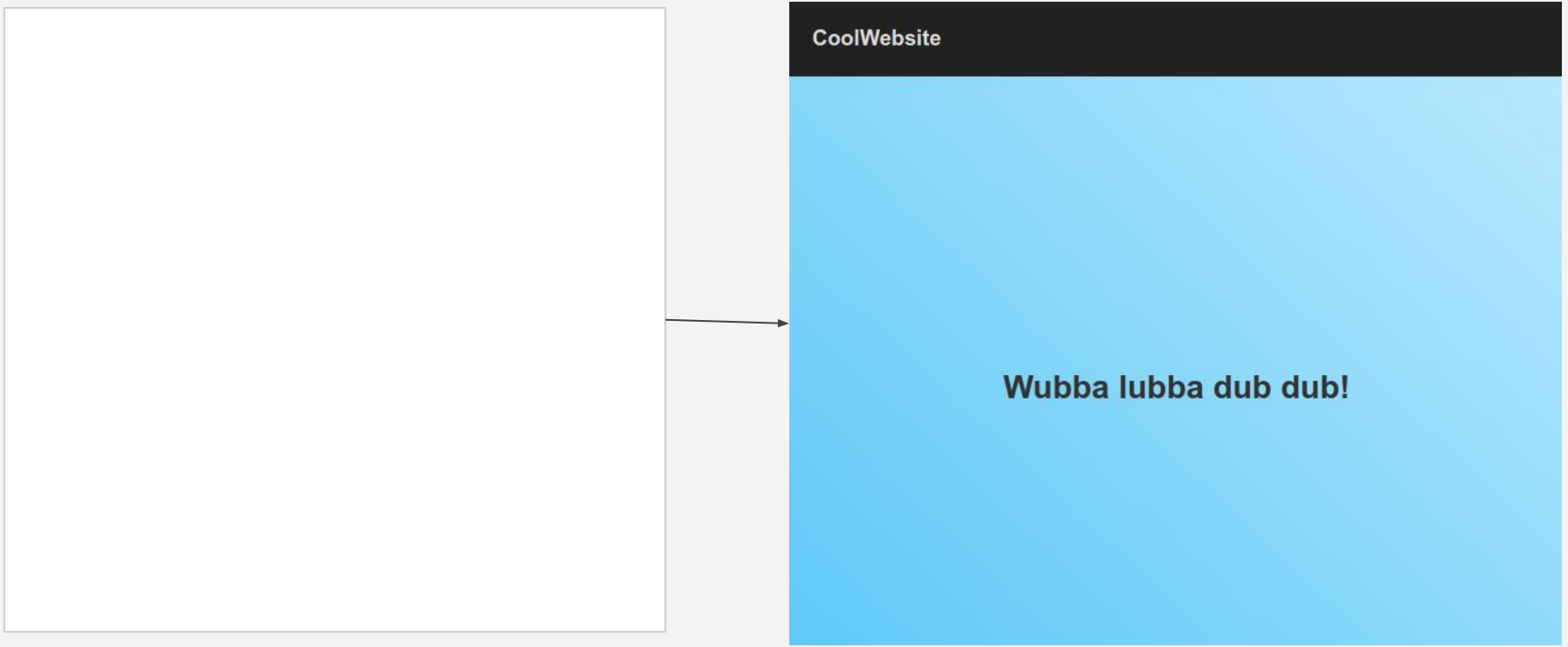
Lorem ipsum dolor sit amet consectetur adipisicing elit. Ex, quibusdam volupta
dolorum natus hic illum iste! Obcaecati incidunt odit rerum dolor ipsum similiqu
Explicabo impedit earum fuga praesentium?

2s



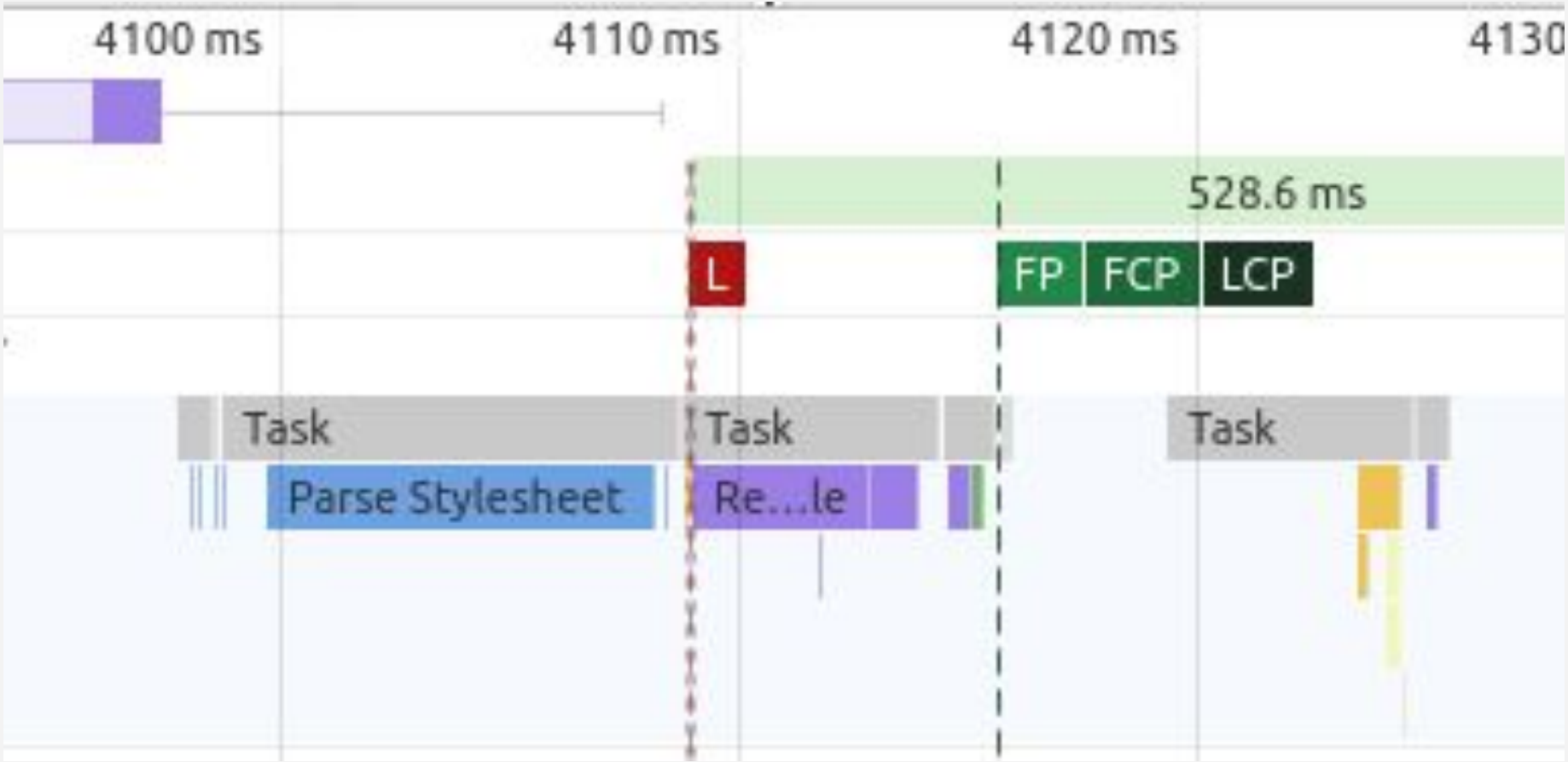
With CSS

```html
<html>
  <head>
    <link rel="stylesheet" href="styles/main.css" />
  </head>
  <body>
    <header>Wubba Luba Dub Dub!</header>
    <main>...</main>
  </body>
</html>
```



0s - 3.9s

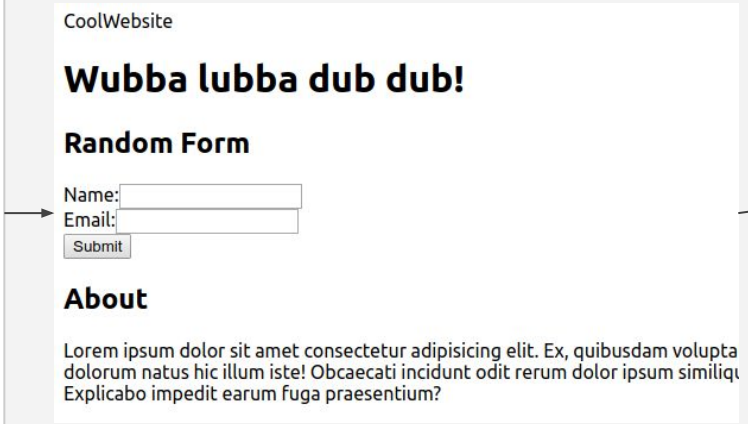
4s

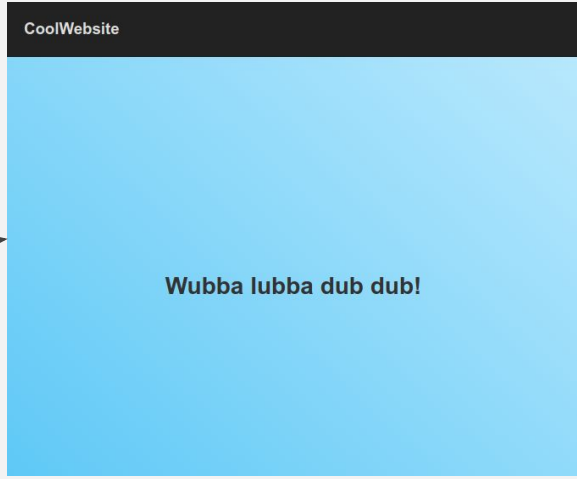

4100 ms
4110 ms
4120 ms
4130
528.6 ms
L
FP
FCP
LCP
Task
Task
Task
Parse Stylesheet
Re…le

Render waits for CSS to load

How about rendering the HTML content first and painting on screen and then applying CSS?

```
<html>
  <head>
    <link
          rel="preload" href="styles/main.css" as="style"
          onload="this.rel='stylesheet'; this.onload=null"
    />
  </head>
  <body>
    <header>Wubba Luba Dub Dub!</header>
    <main>...</main>
  </body>
</html>
```



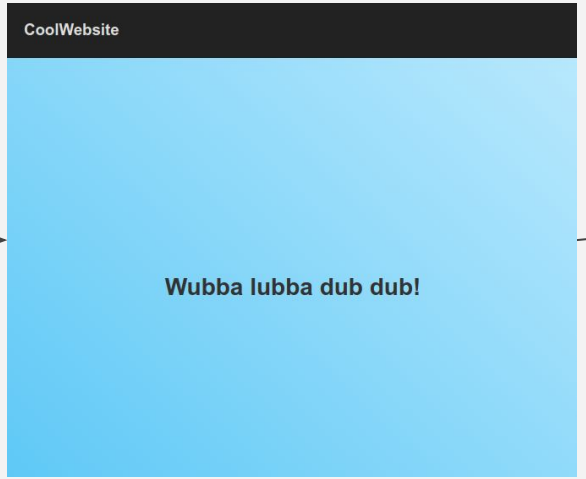


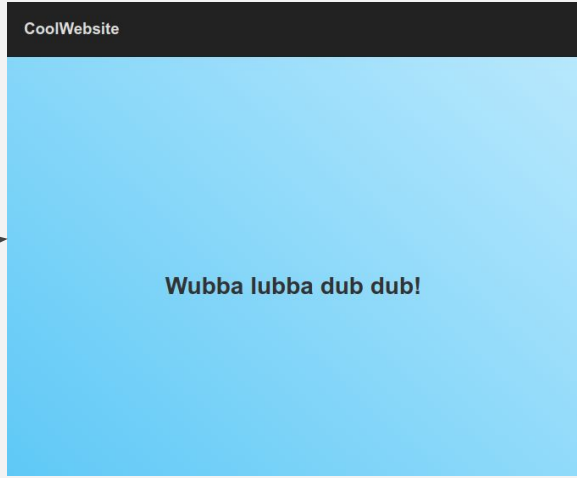
0s - 1.9s **2s - 3.9s** **4s**

Just showing HTML is bad UX

Inlining critical CSS

```
<html>
  <head>
    <link
          rel="preload" href="styles/main.css" as="style"
          onload="this.rel='stylesheet'; this.onload=null"
    />
    <style>
      header{/* styles of header */}
    </style>
  </head>
  <body>
    <header>Wubba Luba Dub Dub!</header>
    <main>...</main>
  </body>
</html>
```





0s - 1.9s

2s - 3.9s

Only header css without css for other content outside the viewport

4s

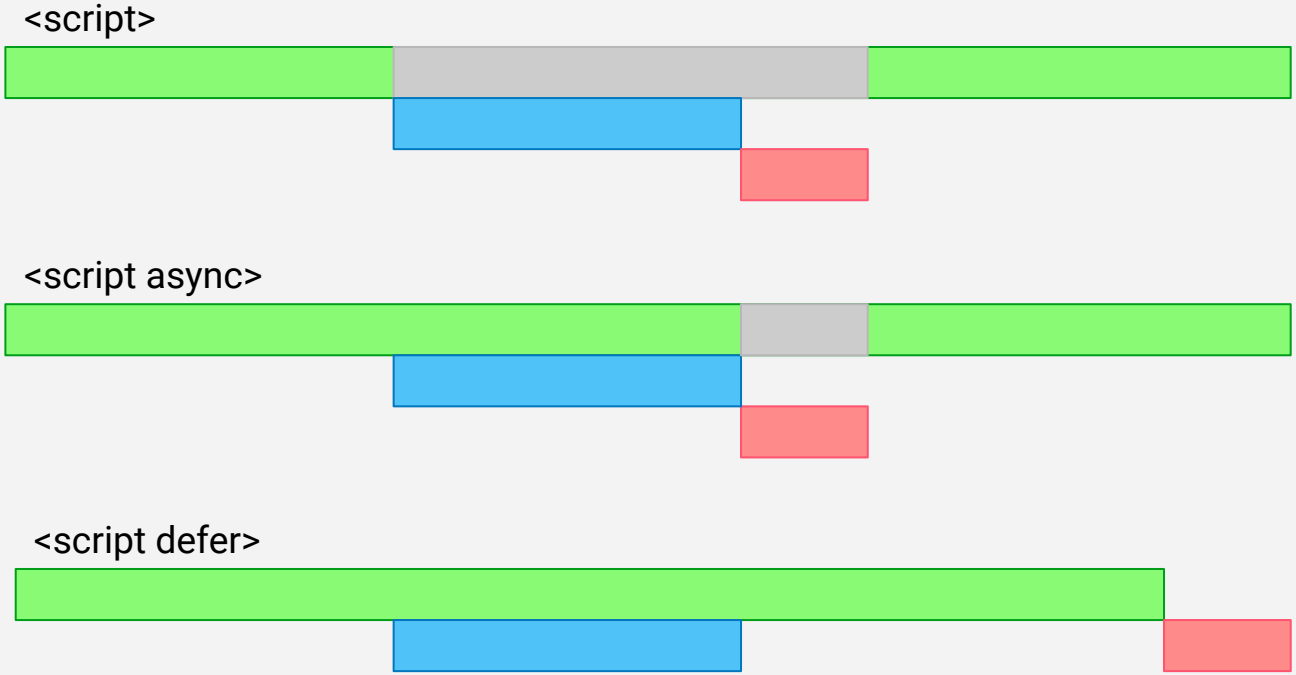
Full CSS

HTML Parsing

Parsing Paused

Script Download

Script Execution



Code-splitting

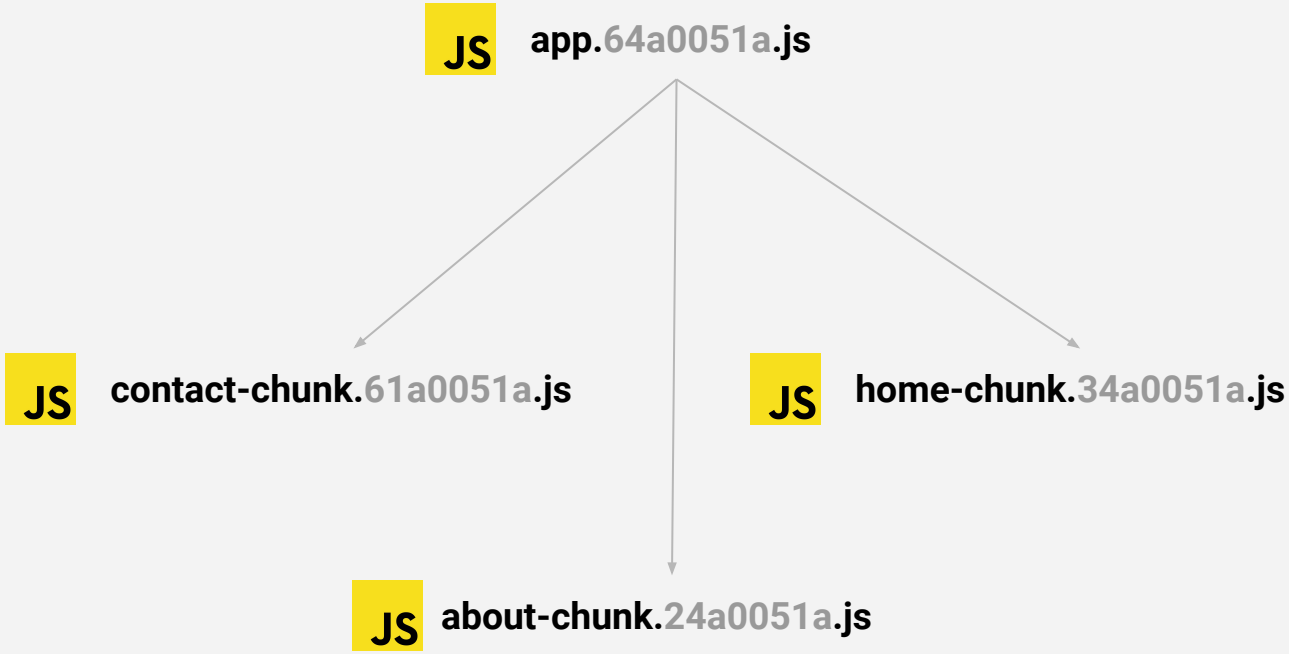

app.64a0051a.js
contact-chunk.61a0051a.js
home-chunk.34a0051a.js
about-chunk.24a0051a.js

Image Optimization

<img src=“....” loading=“lazy” />

Lazy loading via attribute for images & iframes - UNOFF

The `loading` attributing on images & iframes gives authors control over when the browser should start loading the resource.

Current aligned | Usage relative | Date relative | Apply filters | Show all | ?

IE	Edge	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Opera Mobile	Chrome for Android	Firefox for Android	UC for
			4-74									
			1 75									
6-10	12-18	2-71	76-78	3.1-12.1	10-63	3.2-13.1		2.1-4.4.4	12-12.1			
11	79	72	79	13	64	13.2	all	76	46	79	68	
		73-74	80-82	TP		13.3						

Polyfill:
https://github.com/mfranzke/loading-attribute-polyfill

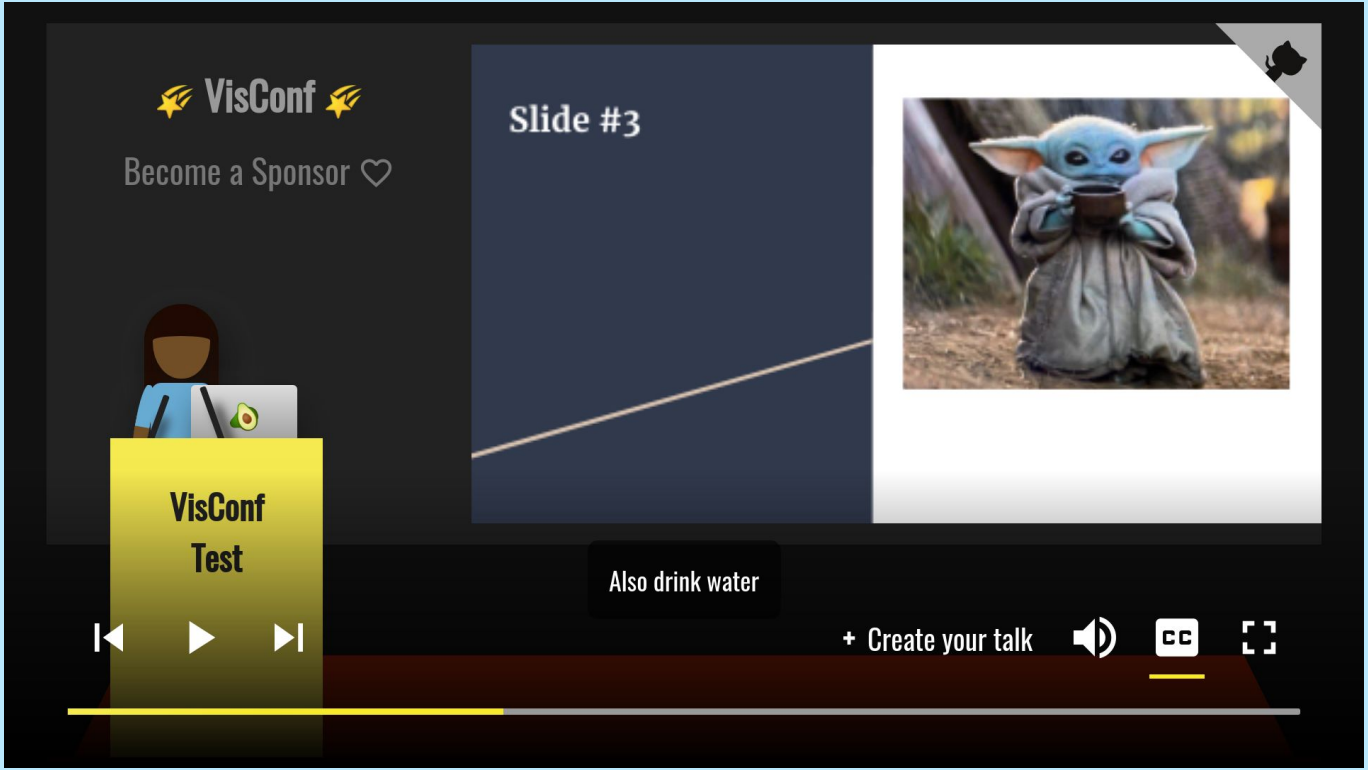
Progressive JPEGs

JPEG

Progressive JPEG

CDN

https://res.cloudinary.com/saurabhdaware/image/upload/c_scale,fl_progressive,w_300/v1526463112/Screenshot_87_baiu9r.jpg



https://github.com/saurabhdaware/visconf

Thank You!

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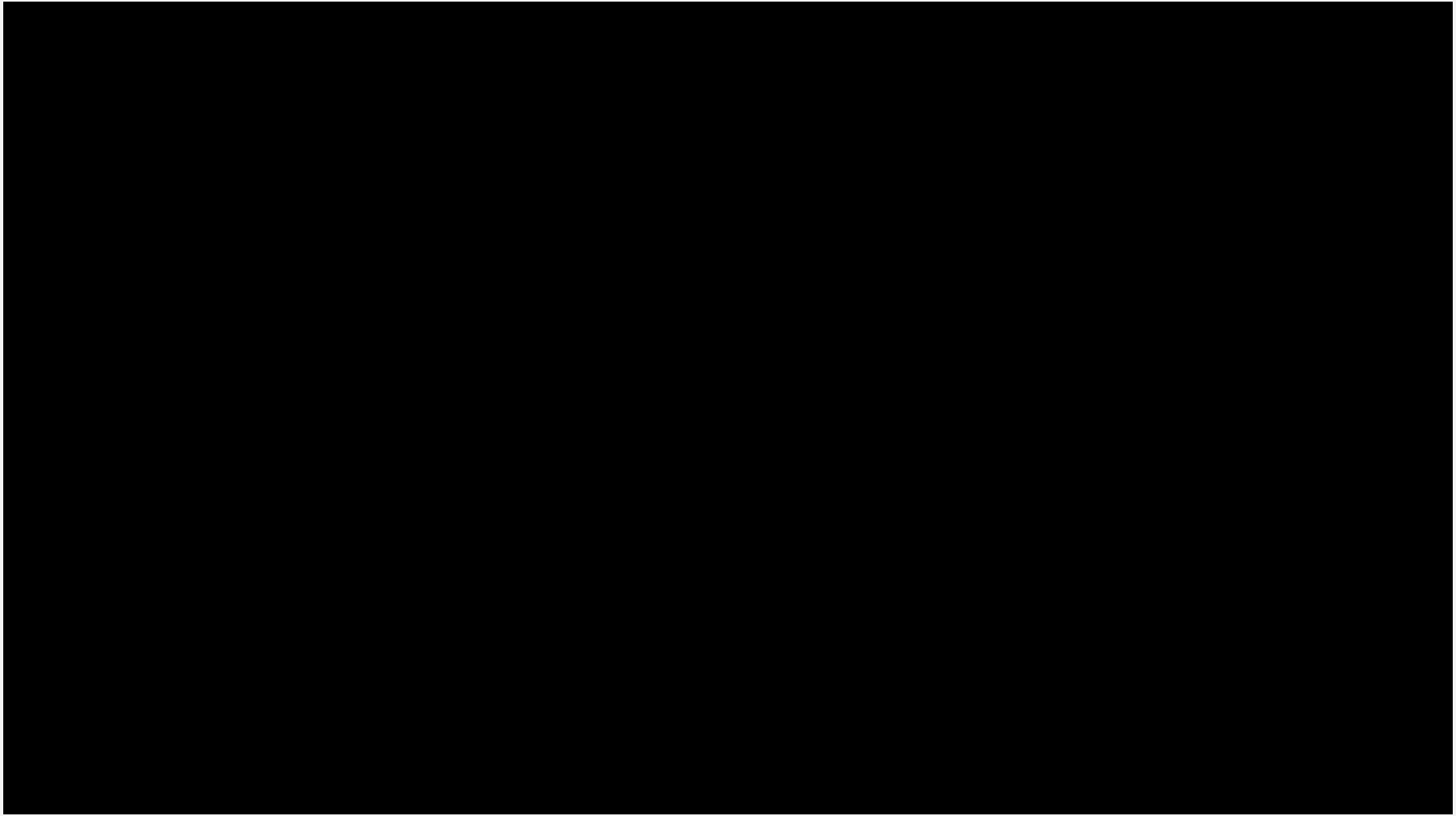
Extra Slides



Fancy Keywords to Google Search:

- Inlining Critical CSS
- QuickLinks (https://github.com/GoogleChromeLabs/quicklink)
- InstantClick (http://instantclick.io/)
- Web Workers, Web Assembly, OffScreenCanvas
- Service Workers
- Predictive Prefetching

Async vs Defer : https://stackoverflow.com/questions/10808109/script-tag-async-defer
Script attributes: https://eager.io/blog/everything-I-know-about-the-script-tag/
RenderTree Constructions:
https://developers.google.com/web/fundamentals/performance/critical-rendering-path/render-tree-construction
Rendering Behind the scene:
https://blog.logrocket.com/how-browser-rendering-works-behind-the-scenes-6782b0e8fb10/
Ryan Seddon:
https://www.youtube.com/watch?v=SmE4OwHztCc
JPEG to Progressive JPEG
https://imagemagick.org/index.php