

# Web fundamentals for performant web apps

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Dhrubajit Paul  
Chowdhury  
@dhrubajit  
**Ascenda**



← Post



Kenneth Cassel

@KennethCassel

...

how come a company founded over 100 years ago has the fastest site on the internet?

The screenshot shows the McMaster-Carr website interface. On the left, a sidebar lists categories such as Abrading & Polishing, Building & Circuits, Electrical & Lighting, Fabricating, Fastening & Joining, Filtering, Flow & Level Control, Furniture & Storage, Hand Tools, Hardware, Heating & Cooling, Lubricating, Material Handling, Measuring & Inspecting, Office Supplies & Signs, Pipe, Tubing, Hose & Fittings, Plumbing & Joints, Power Transmission, Pressure & Temperature Control, Pulling & Lifting, Raw Materials, Safety Supplies, Saws & Cutting, Sealing, Shipping, and Suspending. The main content area displays several product categories with corresponding icons and labels:

- Fastening & Joining:** Screws & Bolts, Threaded Rods & Stacks, Grommets, U-Bolts, Nuts, Washers, Shims, Helical & Threaded Inserts, Spacers & Standoffs, Pins, Anchors.
- Adhesives & Tape:** Adhesives, Tape, Hook & Loop.
- Welding, Braizing & Soldering:** Electrodes & Wires, Welders, Gas Regulators, Welding Gloves, Welding Helmets & Glasses, Protective Screens, Braising Alloys, Ties, Beldor, Belding Irons, Melting Pots.
- Pipe, Tubing, Hose & Fittings:** Pipe Fittings & Flex, Pipe Hangers, Pipe Joints, Pipe & Tube Repair Clamps, Pipe Flange Spreaders, Tubing, Tube Fittings, Tube Cutters, Tube Bending Tools, Tube Benders, Manifolds, Hose, Hose Fittings, Hose Hoses, Hose & Tube Clamps, Hose Reels, Tank Fittings.

A timer at the bottom left indicates the video is at 0:22. The top right corner shows the user's name, Kenneth Cassel, and other account details.

→ x.com/KennethCassel/status/1847034096062710087

→ www.mcmaster.com

"Performance Doesn't Directly Affect Revenue"

"The Website is Fast Enough Already"

"It's Just for a Small Percentage of Users"

"We Have Bigger Priorities"

"It's Not a User Priority"



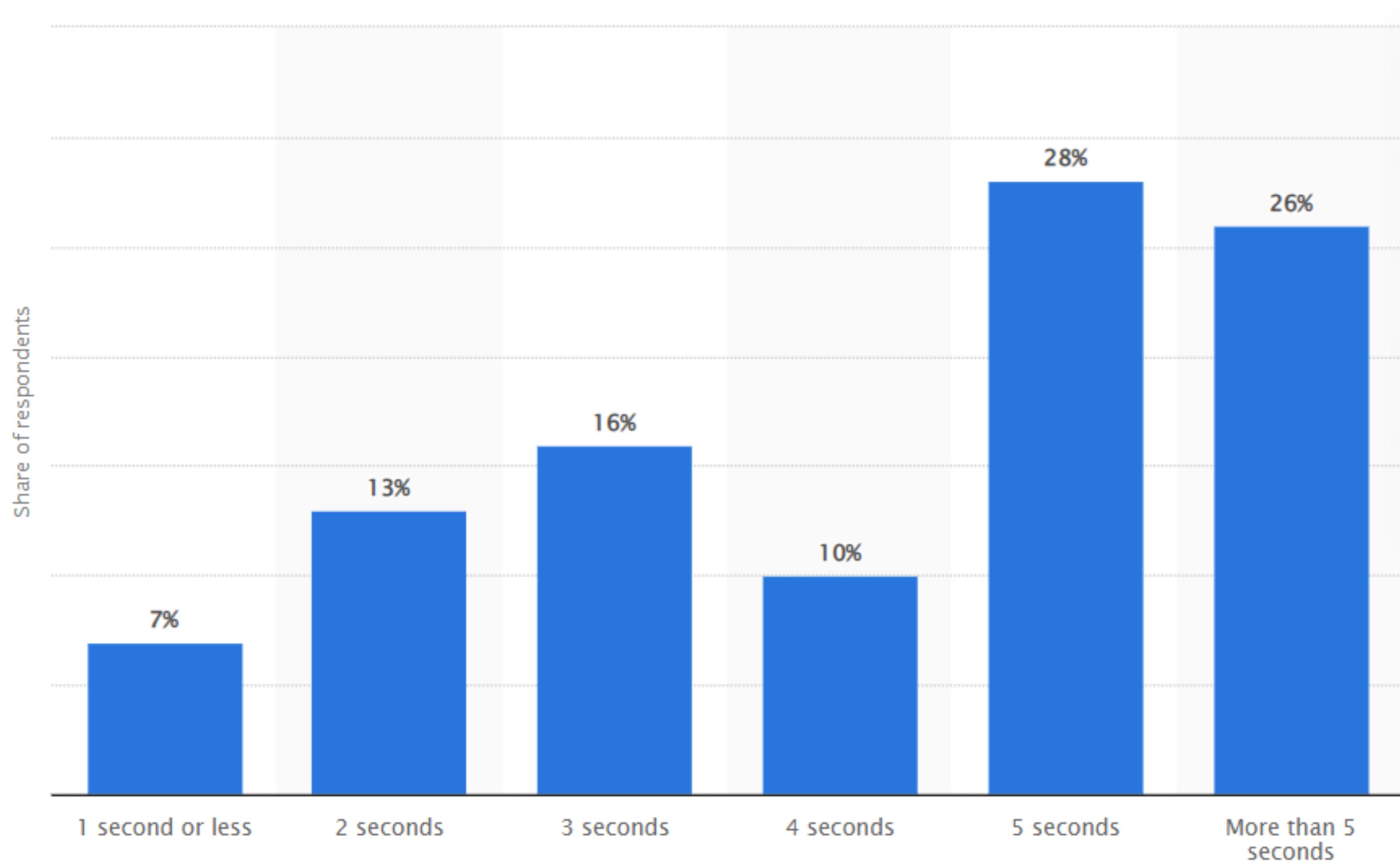
"It's Too Expensive and Time-Consuming"

"We Don't Have Enough Data to Justify It"

"We'll Handle It Later"

# Why Performance Matters?

# User Experience and Retention



# Conversion Rates

	<b>Optimized Page</b>	<b>Default Page</b>	<b>Δ</b>
DCL	4.05s	3.52s	+15%
LCP	5.7s	8.3s	-31%
CR Lead/Visits			+15%
CR Cart views/Visits			+11%
Sales			+8%

# SEO Rankings

Google uses page speed as a ranking factor. Faster websites rank higher, get more visibility, and drive more organic traffic.

# Greater reach

Performance matters for users on slower networks or older devices. A lightweight, optimized site ensures everyone can access your content.

What is considered good performance?

# Google Core Web Vitals

They are a set of performance metrics that measure the user experience of a webpage.

# Largest Contentful Paint (LCP)

Measures how quickly the largest visible content element (e.g., an image, video, or block of text) loads. An ideal LCP is less than **2.5 seconds**.

# Interaction To Next Paint (INP)

Measures responsiveness. To provide a good user experience, strive to have an INP of less than 200 milliseconds.

# Cumulative Layout Shift (CLS)

Measures visual stability. To provide a good user experience, strive to have a CLS score of less than 0.1.

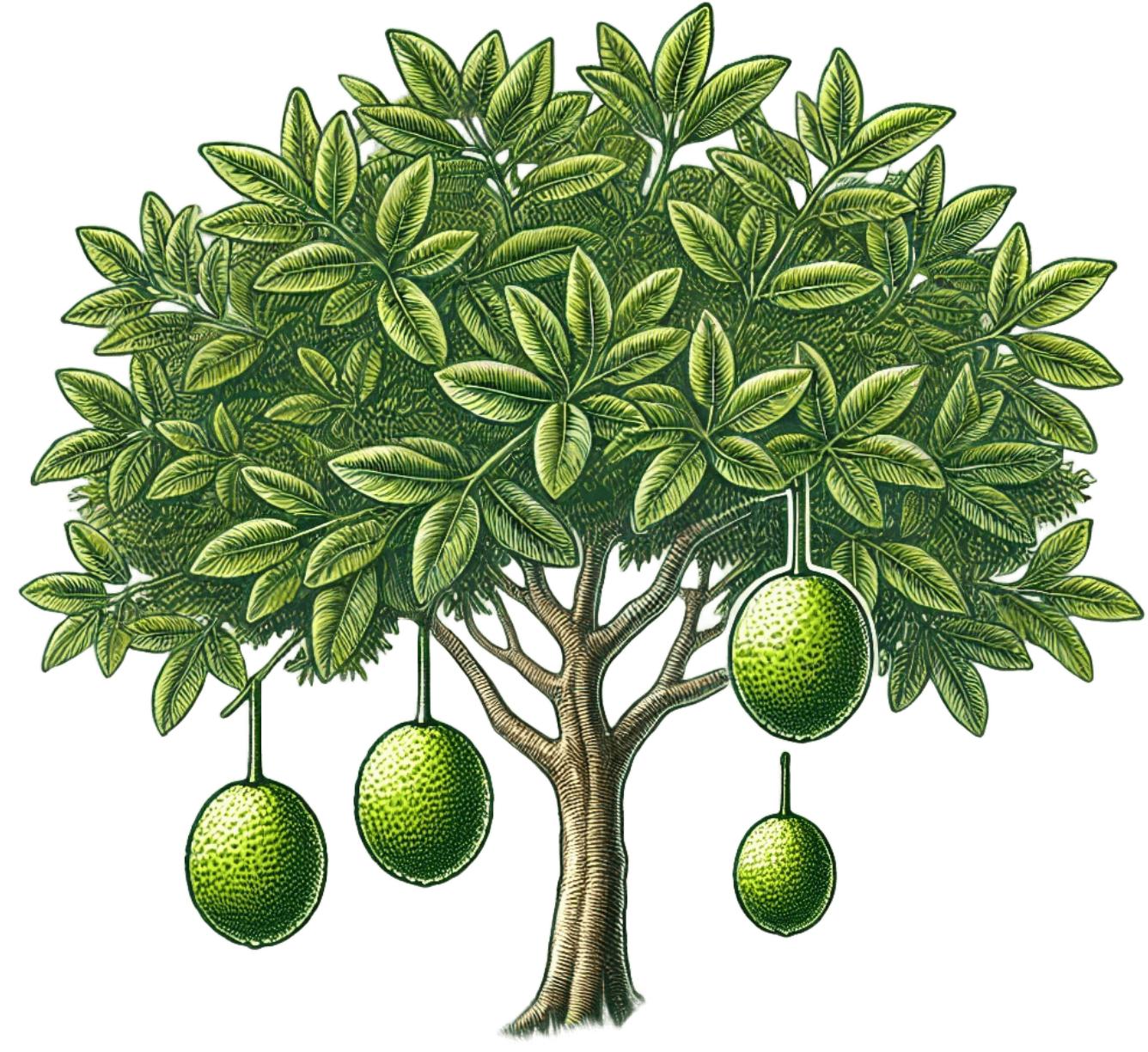
# In Summary

Largest Contentful Paint (LCP):	< 2.5s
Cumulative layout shift	< 0.1 (i.e < 10% shift)
Interaction to next paint (ink)	< 200ms
Time to first byte (TTFB)	< 200 ms
First Contentful Paint (FCP)	< 1.8 s

What is our goal today?

# Target low hanging fruit

- 1.Optimizing Critical Rendering Path
2. Reducing Network Payload



# Critical Rendering Path

At a high level, your browser's rendering engine performs the following steps:

- Construct DOM + CSSOM (resource fetching)
- Create Render tree (DOM + CSSOM)
- Generate layout
- Paint the content to the browser

# Resource Fetching

Resource hints and script attributes:

- preload: Preloads critical resources needed for the page to render, improving performance by fetching them early.
- prefetch: Downloads resources that are likely to be needed soon, typically for subsequent navigation or user actions.
- defer: Downloads the script in parallel to HTML parsing but defers execution until after the HTML document has been completely parsed.
- async: Downloads the script in parallel to HTML parsing. Executes the script as soon as it's downloaded, without waiting for HTML parsing to complete.

```
<!-- index.html - No resource hints -->
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Optimizing Web Performance</title>
  <link rel="preload" href="fonts/Roboto.woff2" type="font/woff2" crossorigin="anonymous">
  <link rel="prefetch" href="large-image.jpg">
  <link rel="stylesheet" href="styles.css">
  <script src="app.js"></script>
  <script src="https://example-analytics.com/analytics.js"></script>
</head>
<body>
  <h1>Web Performance Optimization</h1>
</body>
</html>
```

```
<!-- index.html - With resource hints -->
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Optimizing Web Performance</title>

  <!-- Preload critical resources (font, main script, etc.) -->
  <link rel="preload" as="font" href="fonts/Roboto.woff2" type="font/woff2" crossorigin>

  <!-- Prefetch resources likely needed in the future -->
  <link rel="prefetch" as="image" href="large-image.jpg">

  <link rel="stylesheet" href="styles.css">

  <!-- defer execution until html is parsed -->
  <script defer src="app.js"></script>

  <!-- download and run as soon as ready -->
  <script async src="https://example-analytics.com/analytics.js"></script>
</head>
<body>
  <h1>Web Performance Optimization</h1>
</body>
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<body>
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</body>
</html>
```

# Preventing Layout shift

Use Loading skeletons or other placeholders

```
// Lazy load the UserProfile component
const UserProfile = React.lazy(() => import("./UserProfile"));

const App = () => {
  return (
    <div className="app-container">
      <h1>User Profile</h1>
      <Suspense fallback={<SkeletonLoader />}>
        <UserProfile />
      </Suspense>
    </div>
  );
};

// Skeleton Loader for Suspense fallback
const SkeletonLoader = () => (
  <div className="profile-skeleton">
    <div className="skeleton skeleton-avatar"></div>
    <div className="skeleton skeleton-name"></div>
    <div className="skeleton skeleton-bio"></div>
  </div>
);
```

Ant Design

Type keywords...

Design Development Components Blog Resources 5.22.5

**Divider**

A divider line separates different content.

Import `import { Divider } from "antd";`  
Source [components/divider](#)  
Docs [Edit this page](#) [Changelog](#)

When To Use  
Examples  
Horizontal  
Divider with title  
Text without h...  
Vertical  
Variant  
API  
Design Token

Components Overview  
General  
Button  
FloatButton 5.0.0  
Icon  
Typography  
Layout  
**Divider**  
Flex 5.10.0  
Grid  
Layout  
Space  
Splitter 5.21.0  
Navigation  
Anchor  
Breadcrumb

Ant Design

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**When To Use**

- Divide sections of an article.
- Divide inline text and links such as the operation column of table.

**Examples**

Text

Left Text

https://ant.design/components/overview

Ant Design Type keywords... Design Development Components Blog Resources 5.22.5 En A

## Components Overview

antd provides plenty of UI components to enrich your web applications, and we will improve components experience consistently. We also recommend some great [Third-Party Libraries](#) additionally.

Search in components

### General [4]

- Button
- FloatButton 5.0.0
- Icon
- Typography

### Layout [6]

- Divider
- Flex 5.10.0
- Grid
- Layout
- Space
- Splitter 5.21.0

Navigation

Anchor

Breadcrumb

Dropdown

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# Reducing Network Payload

- Lazy load components to reduce initial bundle size.
- Lazy load assets.
- Optimize assets.

# Lazy loading components

```
// App.tsx - No code-splitting
import React from 'react';
import LargeComponent from './LargeComponent';
import OtherComponent from './OtherComponent';

const App: React.FC = () => (
  <div>
    <LargeComponent />
    <OtherComponent />
  </div>
);

export default App;
```

```
// App.tsx - With code-splitting using React.lazy
import React, { Suspense, lazy } from 'react';
const LargeComponent = lazy(() => import('./LargeComponent'));
const OtherComponent = lazy(() => import('./OtherComponent'));

const App: React.FC = () => (
  <Suspense fallback={<div>Loading...</div>}>
    <LargeComponent />
    <OtherComponent />
  </Suspense>
);

export default App;
```

# Lazy loading images

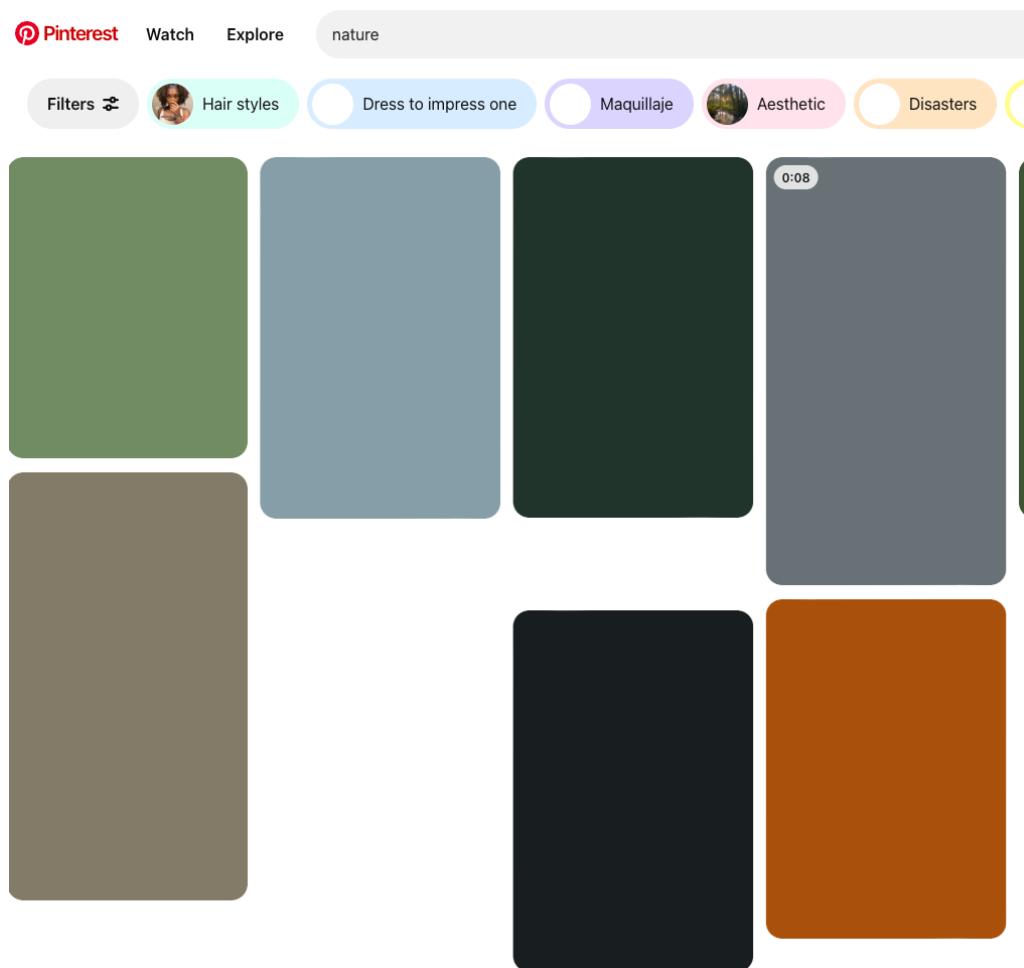
# Lazy-loading images with JS

## Common Pattern

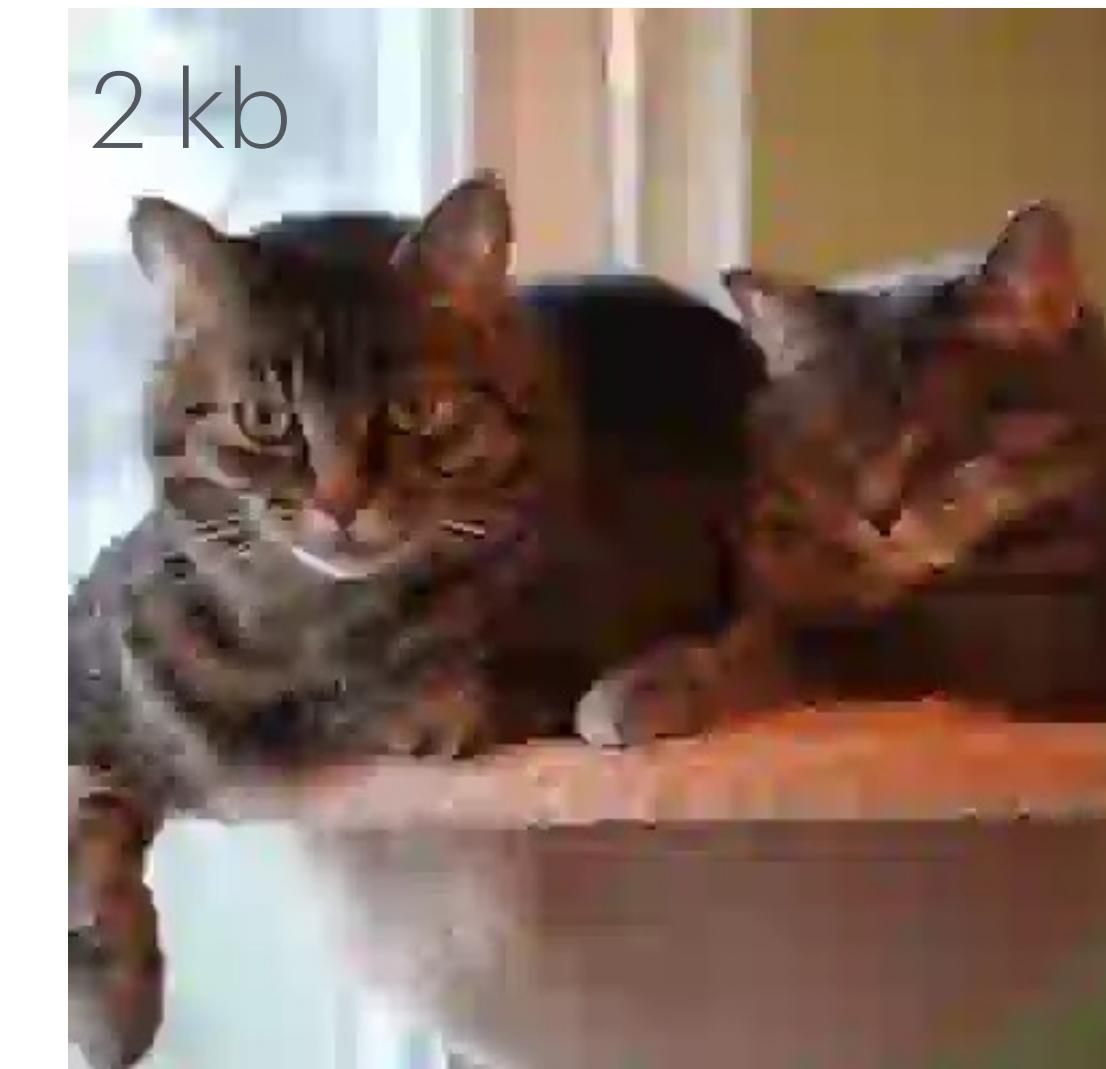
```
  

```

## Progressive loading



Show dominant colours



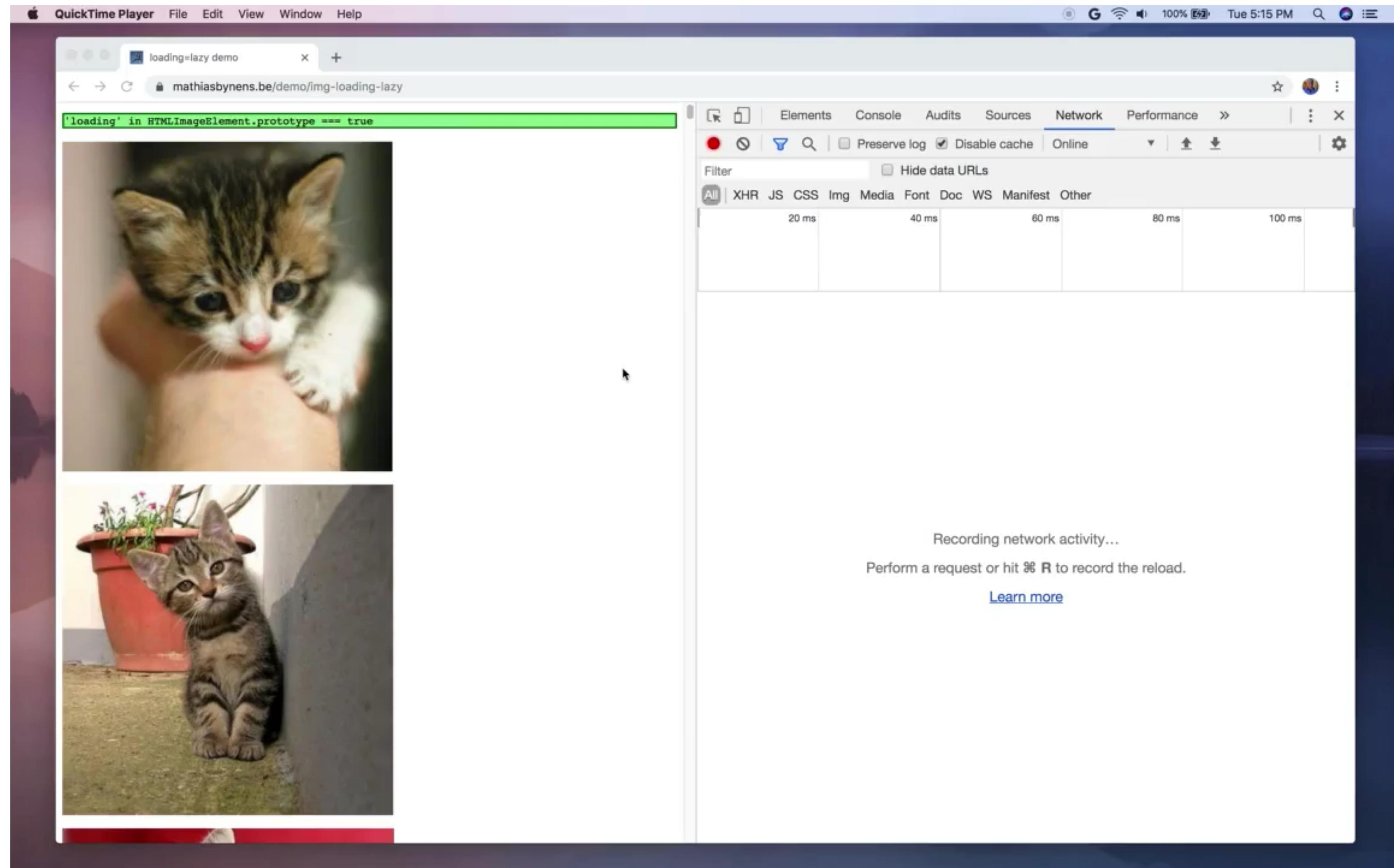
Low Quality Image Placeholders (LQIP)



# Native browser support

```

```



# Optimizing images

# Use CDN image optimisation

...cat.jpg?q=50&h=500

Set quality level to 50

Resize to height of 500, determine width automatically

Popular Image CDNs

Akamai | Cloudinary | Cloudflare Images | Imgix

/i1.jpg  
464kB | 2000 x 1334

Name	X	Headers	Preview	Response	>>
i1.jpg					
1 / 2 requests	464 kB	2000 x 1334	1000:667	image/jpeg	

/i1.jpg?h=500  
61.3kB | 749 x 500

Name	X	Headers	Payload	Preview	>>
i1.jpg?h=500					
1 / 2 requests	61.3 kB	749 x 500	749:500	image/jpeg	

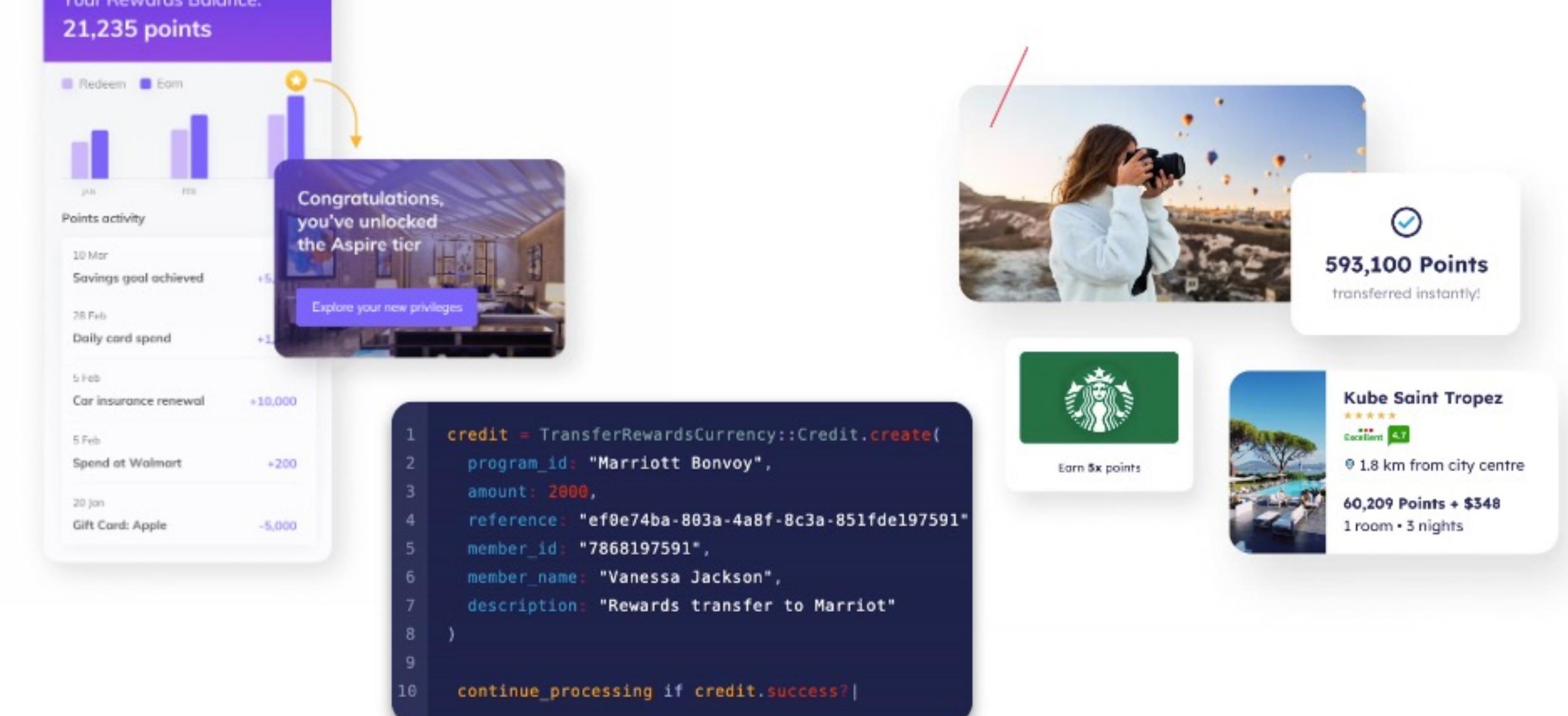
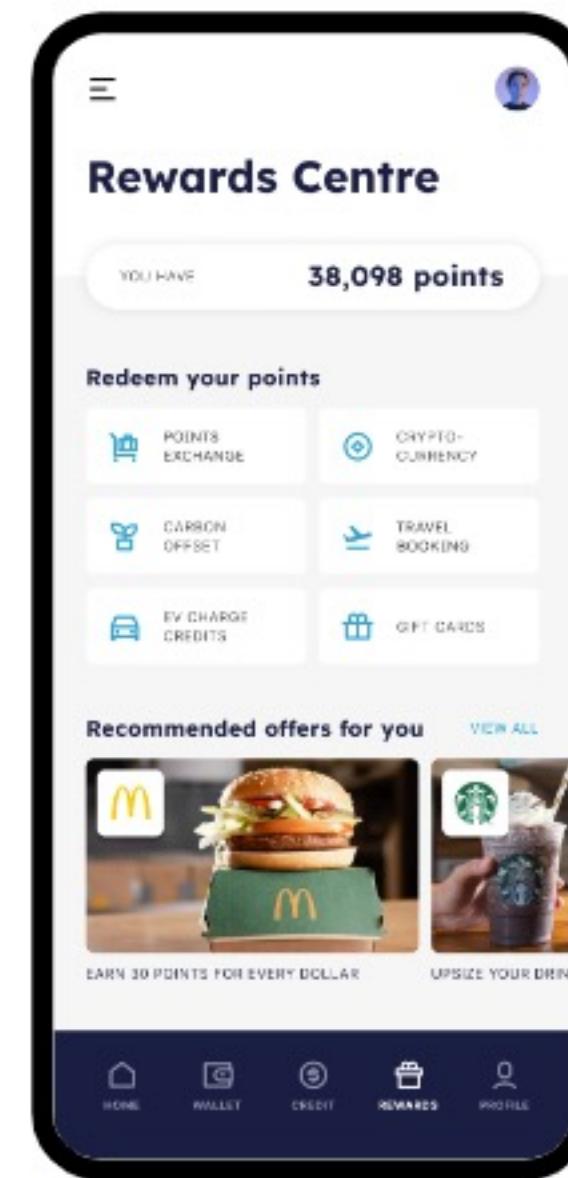
85% reduced size

# Key Takeaways

1. Use data to start the conversation with your stakeholders
2. Use resource hints to optimise critical rendering path (<link rel="preload" as="font"... />)
3. Use lazy loading for non-immediate components (lazy(() => import('./LargeComponent')))
4. Use lazy loading for images and other assets ()
5. Use a CDN to optimise images for your app
6. Use effective loaders like skeletons to mitigate layout shift

# Ascenda

Accelerate your growth ...  
... with world-class rewards



```
1 credit = TransferRewardsCurrency::Credit.create(
2   program_id: "Marriott Bonvoy",
3   amount: 2000,
4   reference: "ef0e74ba-803a-4a8f-8c3a-851fde197591"
5   member_id: "7868197591",
6   member_name: "Vanessa Jackson",
7   description: "Rewards transfer to Marriot"
8 )
9
10 continue_processing if credit.success?
```

Hi there!

Let's make loyalty  
rewarding, together

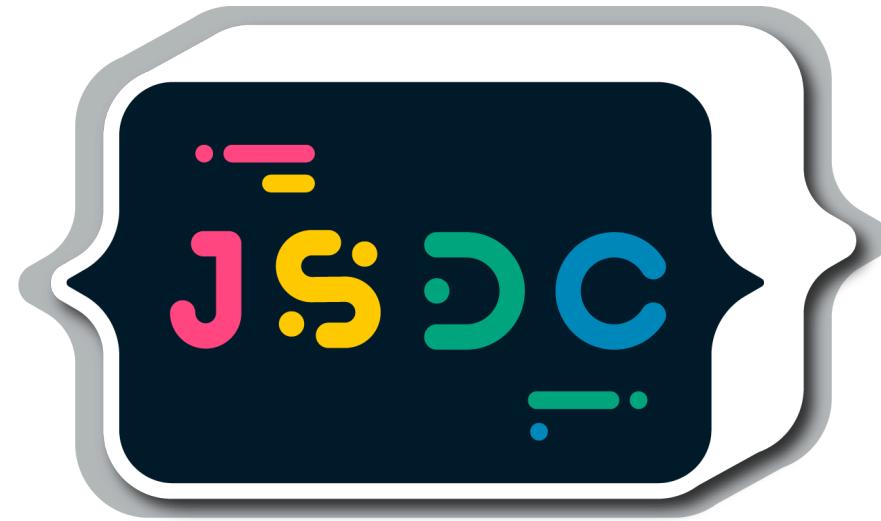


[careers.ascendaloyalty.com](http://careers.ascendaloyalty.com)

[linkedin.com/company/ascenda-loyalty](https://linkedin.com/company/ascenda-loyalty)



Thank you



SLIDES👉 <https://bit.ly/jsdctw-2024-web-perf>

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