

Progressive image rendering

Render Conf 2017

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@jmperezperez

Images on the web



To use or not to use
images





Hello

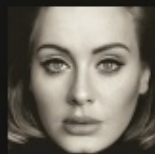
By Adele

2015 • 1 SONG, 4:55

PLAY ON SPOTIFY

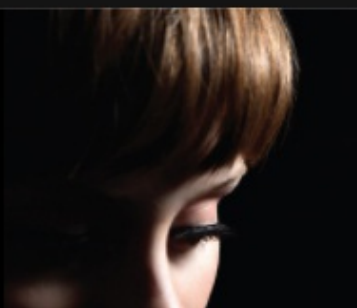
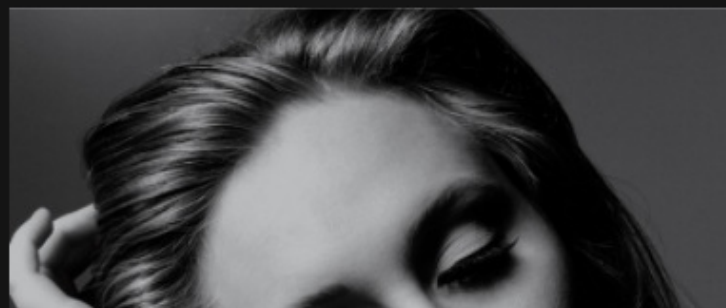
1. Hello

4:55



Featured on
25

More by Adele





Hello

By Adele

2015 • 1 SONG, 4:55

PLAY ON SPOTIFY

1. Hello

4:55

Wrong way of hiding images (1/2)

```
 <!-- it'll be requested -->
```

```
@media (max-width: 480px) {  
  img {  
    display: none;  
  }  
}
```

Wrong way of hiding images (2/2)

```
<body>
  <section class="section-1">
    <p>This is the current section</p>
    
  </section>
  <section class="section-2 hidden">
    <p>This section might or might not be shown later</p>
     <!-- it'll be requested -->
  </div>
</body>
```

```
.hidden {
  display: none;
}
```


Optimise your images

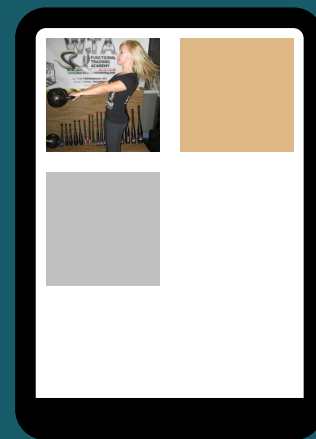
really

Picture element and srcset

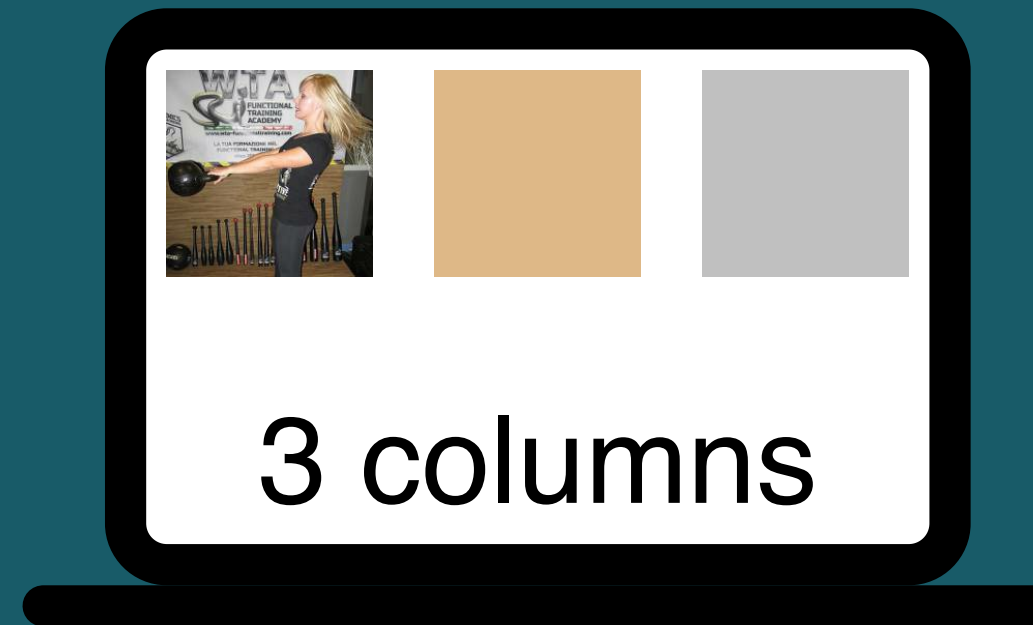
1 column



2 columns



3 columns



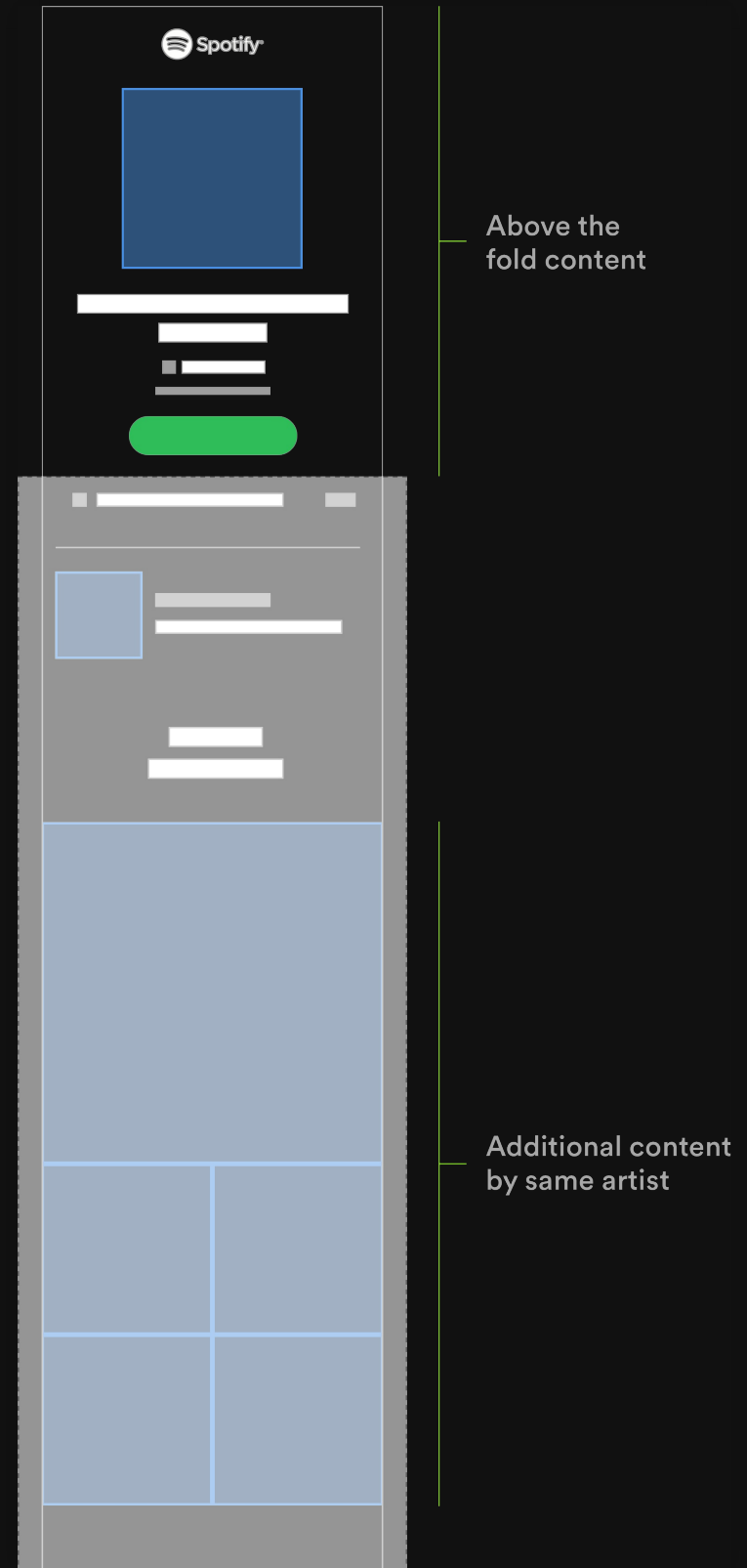
1st issue: Keeping in sync markup and CSS

```

```

2nd issue: Lazy loading

Combine regular
images and lazy-loaded
ones



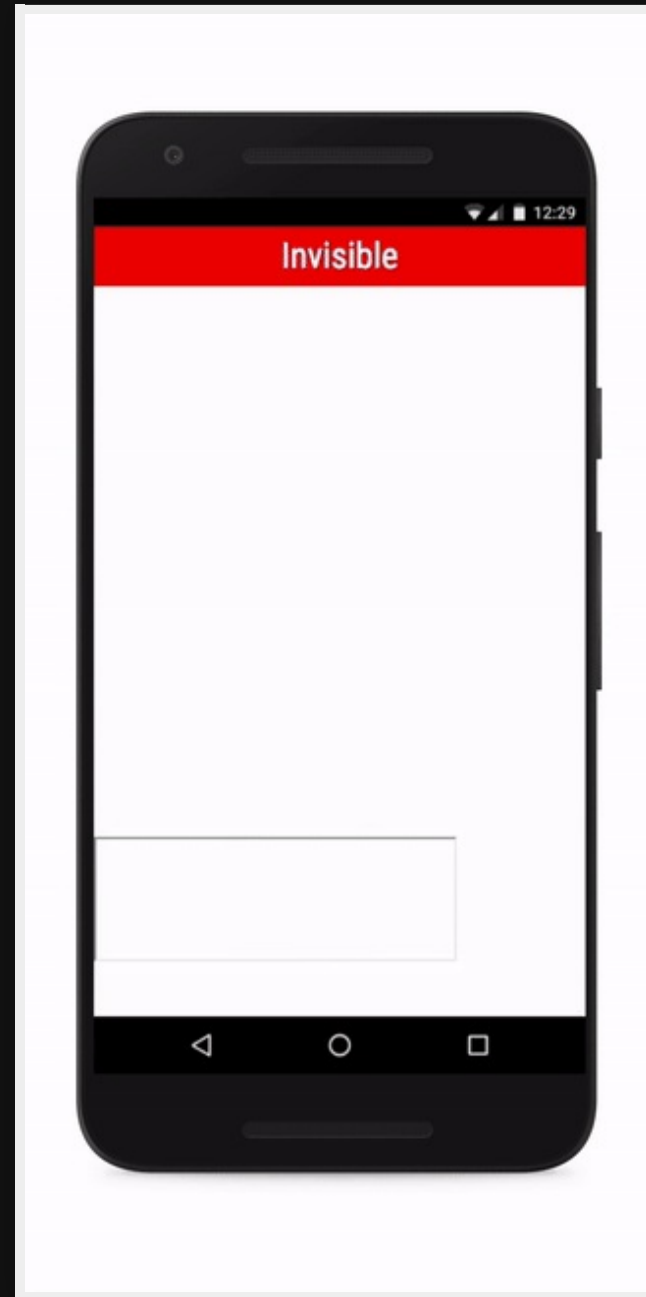
How to lazy load: Basic approach

- For all images, check whether they are in the viewport (or close enough). If they are, request it.
- Repeat this onScroll and onResize

How to lazy load: IntersectionObserver

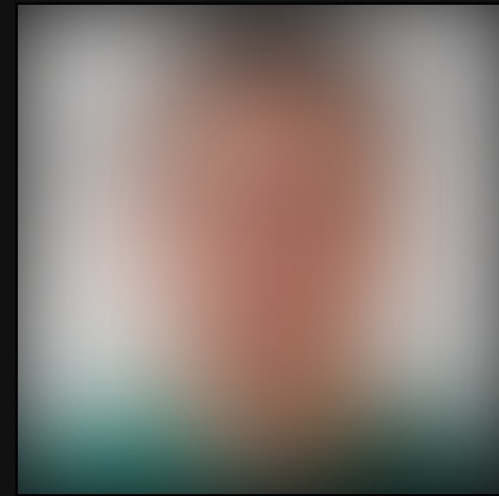
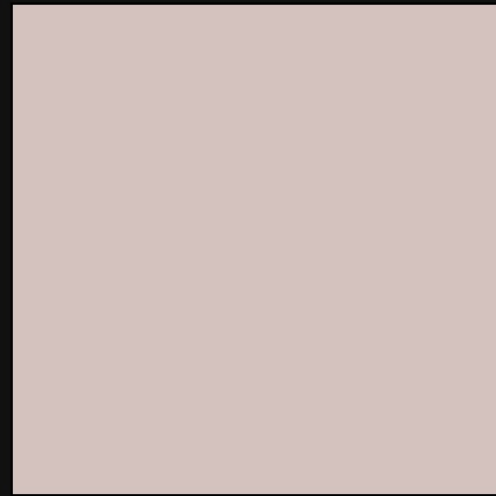
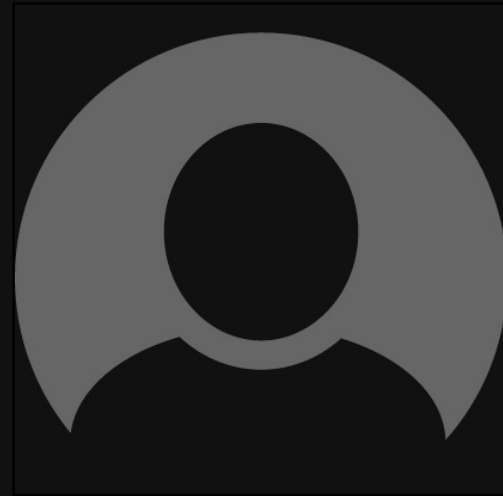
- Don't bind to the scroll event. Subscribe to an event triggered when the image enters the rendered area
- Supported in Chrome, Opera. In development in Firefox and Edge.
- Very easy to use as another strategy in your lazy loading library.

IntersectionObserver



What to show while
the image is loading

Alternatives

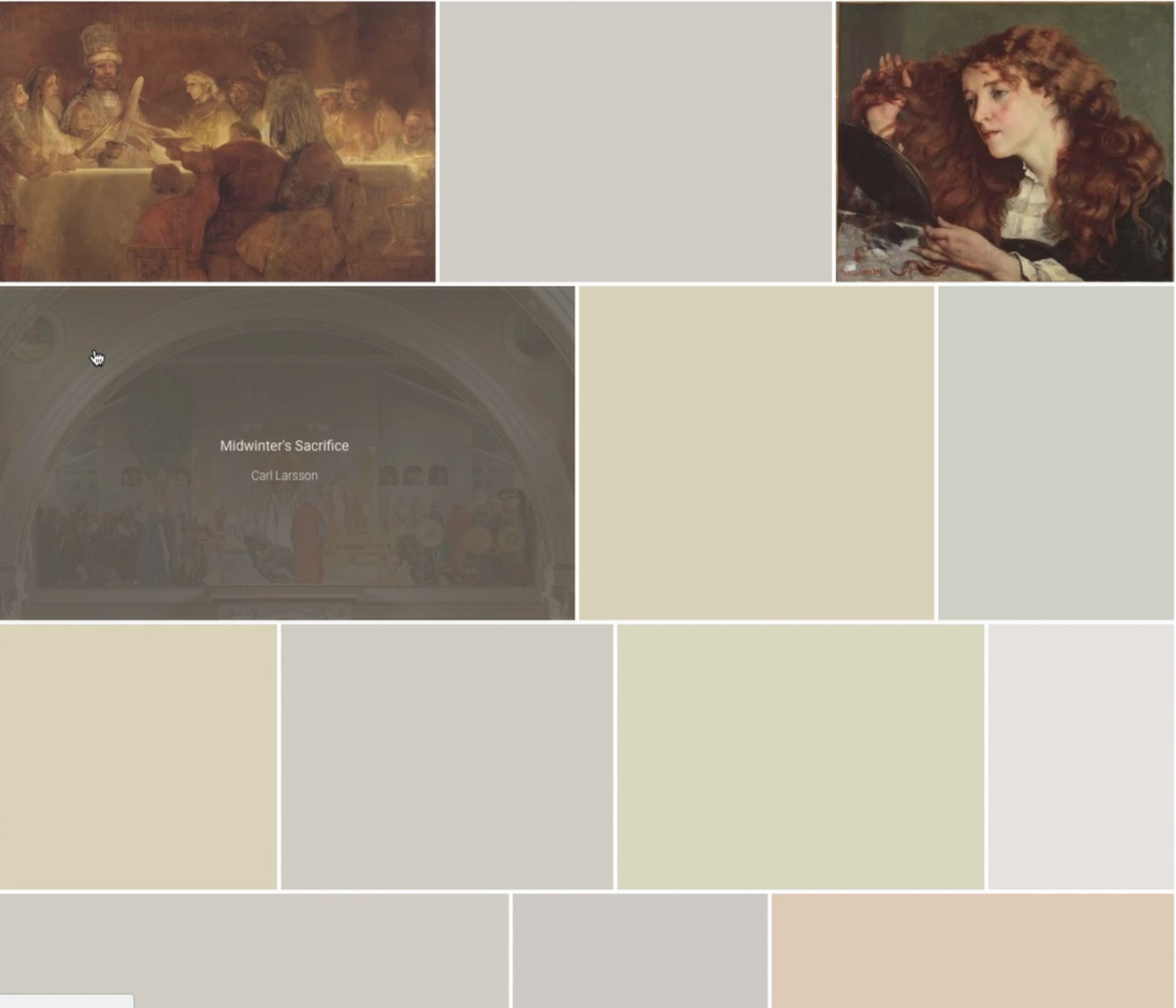


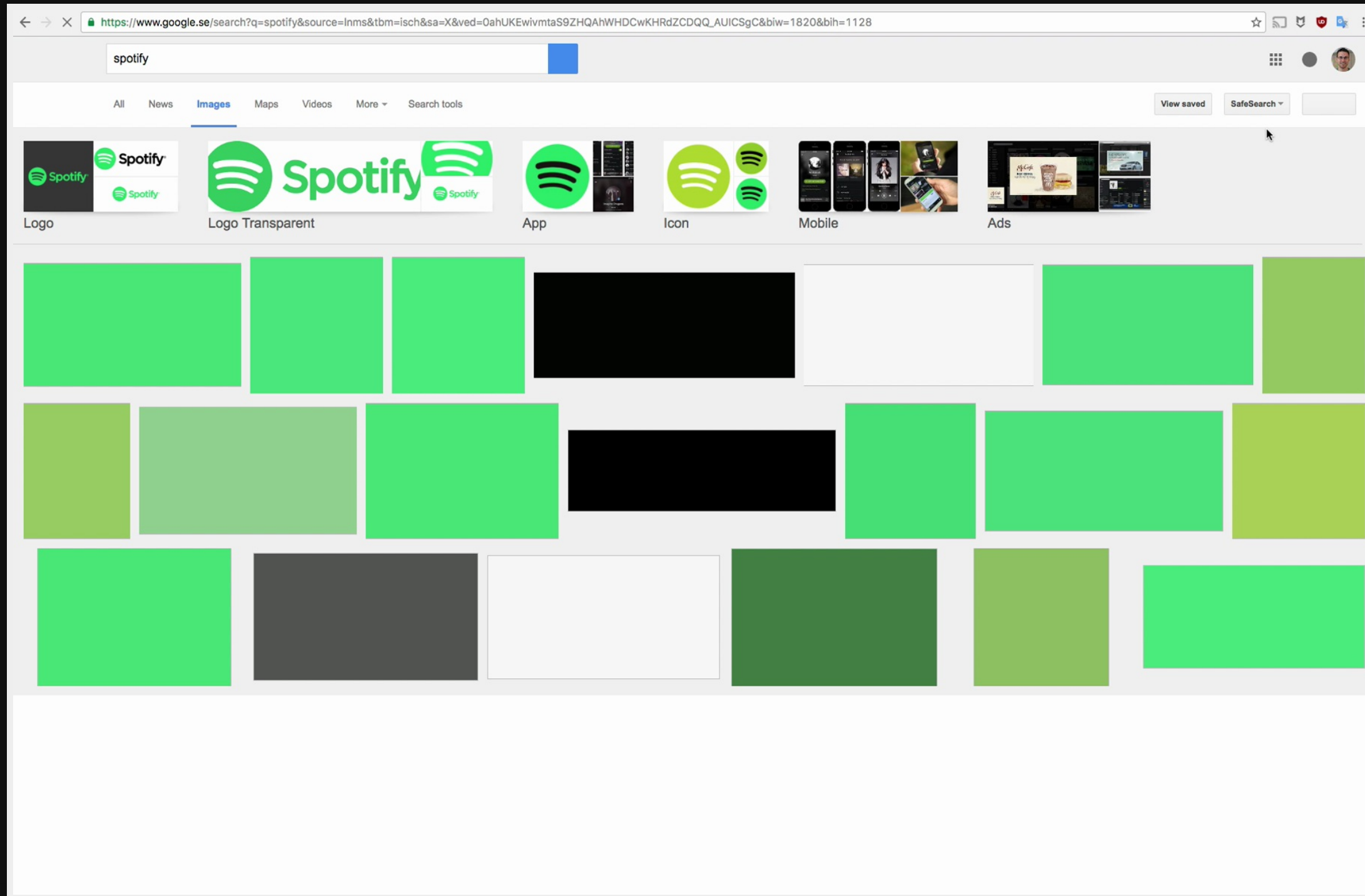
Examples of
solid color



- 🏠 Home
- 📍 Nearby
- 🏛 Partners
- 📁 Projects
- 👤 Artists
- 🖼 Mediums
- 🖌 Art Movements
- 🕒 Historical Events
- 👤 Historical Figures
- 📍 Places
- ❤ Favorites
- 📘 About
- 💬 Send feedback
- Privacy & Terms

Nationalmuseum Sweden | Paint | 63 items

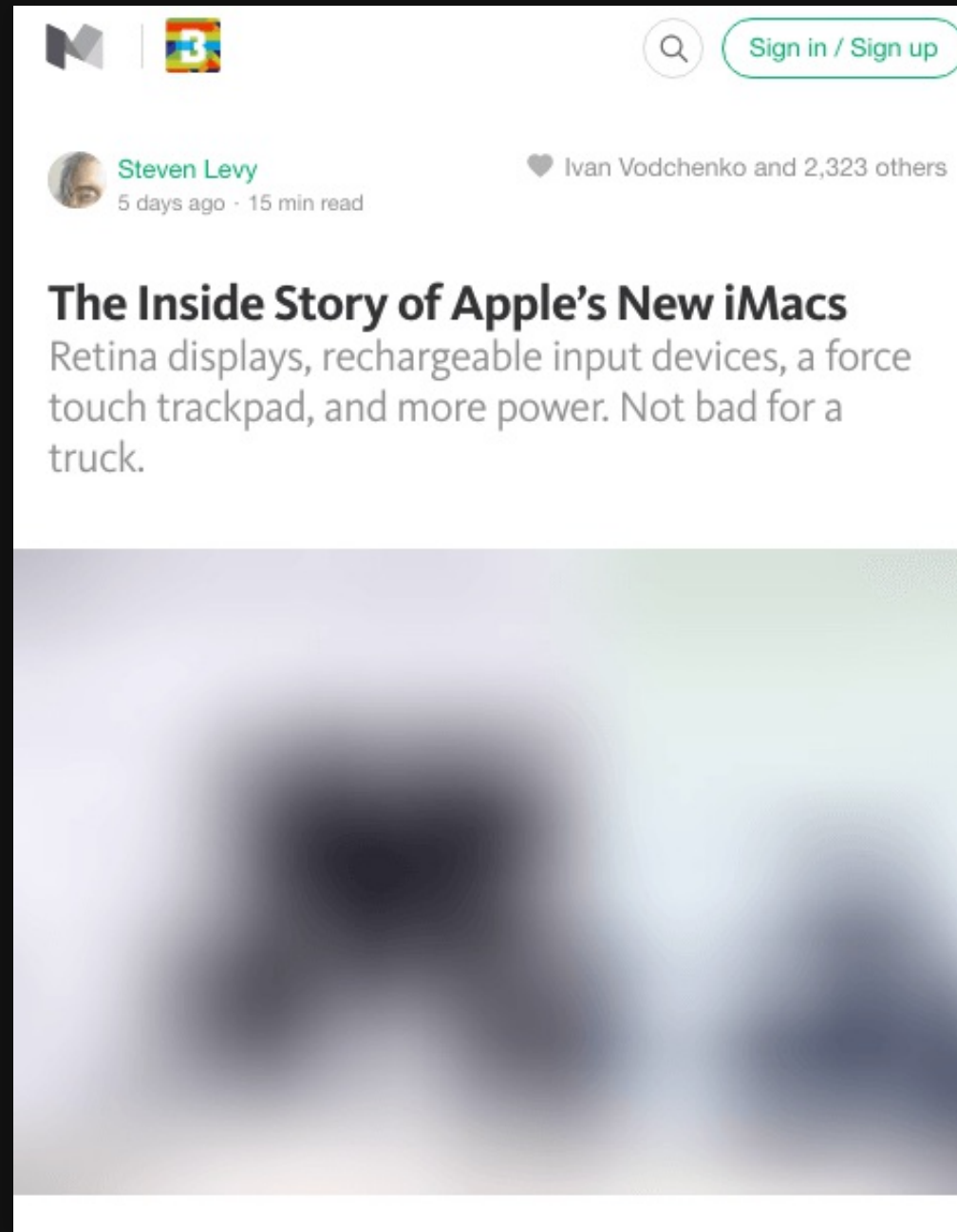




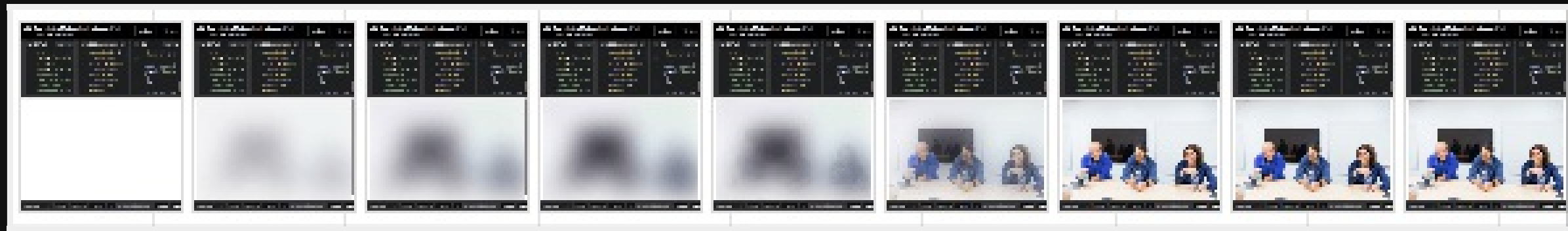
style="border:0"

Examples of Progressive Image Loading

Medium



How it's done



1. Use `<div>` to render the image
2. Request small thumbnail
3. Draw thumbnail to `<canvas/>` and apply blur effect
4. Request large image
5. Render large image and hide `<canvas/>`

Markup Overview

```
<figure>
  <div>
    <div/> <!-- this div keeps the aspect ratio so
              the placeholder doesn't collapse -->
    <img/> <!-- this is a tiny image with a small
              resolution (e.g. ~27x17) and low quality -->
    <canvas/> <!-- takes the above image and applies a blur filter -->
    <img/> <!-- the large image to be displayed -->
    <noscript/> <!-- fallback for no JS -->
  </div>
</figure>
```

How do users perceive it?



Jason
@lang

Follow

Did [@Medium](#) recently add a new image loading fade-in? I noticed it this morning on mobile and just now again on web. Looks nice.

8:05 PM - 29 Feb 2016





นารจะอ่านแคล
@zartre

Follow

[@Medium](#)'s articles (although full of high-res images) load up very fast *-*

3:38 AM - 28 Mar 2015



or maybe not?



Harris Rodis
@harrisrodiss

 Follow

I don't know about you but I don't like a bit those blurry (still loading...) images on Medium. Very distracting.

5:40 PM - 29 Dec 2015



James Young
@welcomebrand

 Follow

That blurry image preloading thing on Medium - is it just me or does it make all images load extremely slowly now?

10:53 AM - 5 Feb 2016

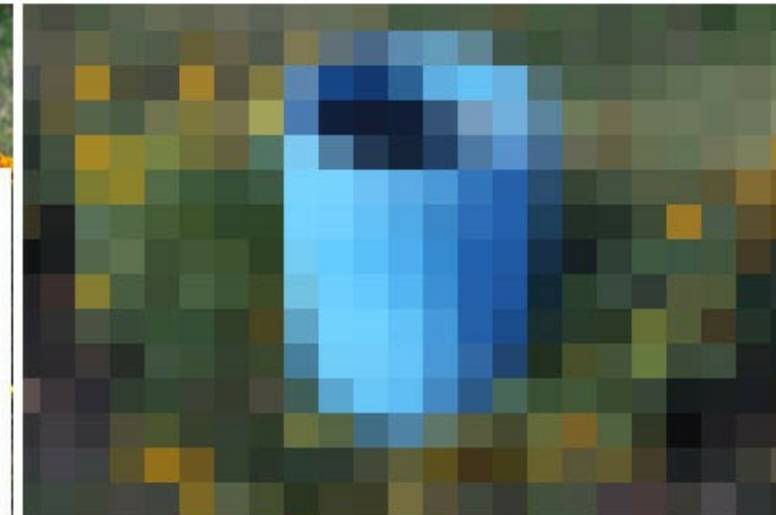


Progressive JPEG Method

Usual JPEG

30% fulfillment

Progressive JPEG



70% fulfillment



Source: wpexplorer.com/optimize-images-wordpress-guide

With the Progressive JPEG method [...] **cognitive fluency is inhibited and the brain has to work slightly harder to make sense of what is being displayed.**

— From [Progressive image rendering: Good or evil?](#)

Reliable?

If you're viewing this on desktop and the above image looks a bit blurry, please refresh the page...



Damien
@Eramdam

Follow

I'm seeing this more and more on Medium posts.
Maybe the whole "blur the pictures" stuff isn't a good idea...

7:44 PM - 8 Jan 2016



Art

Software painted by engineer, Kira Wang

We encourage our teams to hack our own office space, personalizing it to make them feel creative. Individuals and teams have painted words on walls, painted surfboards, framed art and t-shirts, and created posters to hang in the office. Art doesn't need to be expensive, and encouraging the creative souls in your team to personalize your office can be one of the best moves you'll make as a manager.



Sara Soueidan
@SaraSoueidan

Follow

This @Medium page is fully loaded on my slow connection. Very pretty with those stupid image effects, isn't it?

2:07 PM - 28 Nov 2015



Facebook - Inlining thumbnail image in payload



Source: [The technology behind preview photos](#)

Facebook - Inlining thumbnail image in payload

Unfortunately, the standard JPEG header is hundreds of bytes in size. In fact, **the JPEG header alone is several times bigger than our entire 200-byte budget.** However, excluding the JPEG header, the encoded data payload itself was approaching our 200 bytes.

Facebook - Inlining thumbnail image in payload

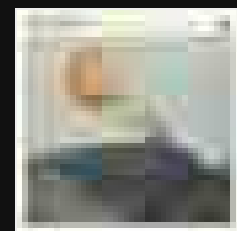
Header (mainly Quantization Table and Huffman Table)	Compressed Data
--	-----------------

Client (mobile app)

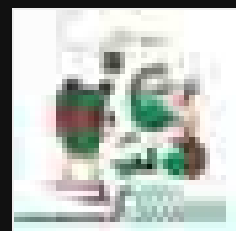
GraphQL

Generating tiny thumbnails

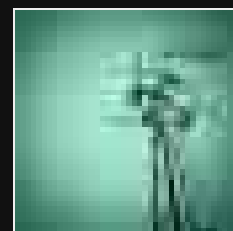
JPG



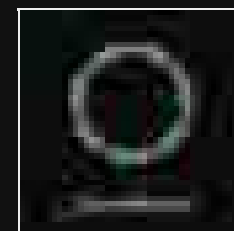
464 B



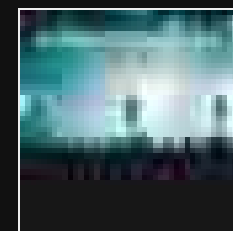
532 B



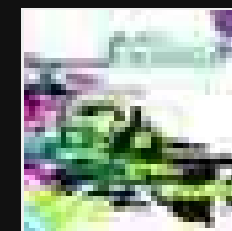
428 B



409 B

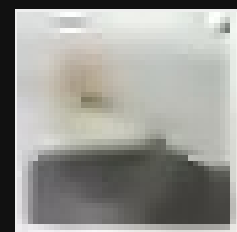


456 B

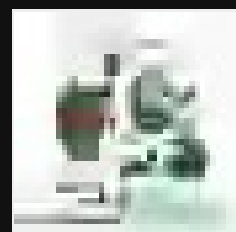


692 B

WebP



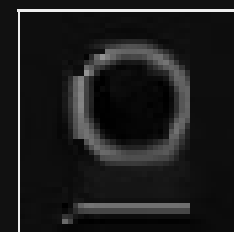
112 B



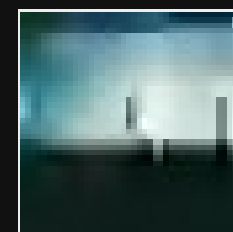
154 B



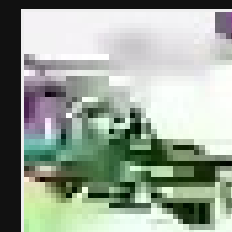
106 B



96 B



116 B



202 B

Generating tiny thumbnails

JPG



WebP



Getting creative
with SVGs



Source: [polygon.com/a/ps4-review](https://www.polygon.com/a/ps4-review)

How it works

HTML

CSS

JS

Result

EDIT ON
CODEPEN

```
window.onload = function() {  
  var path = document.querySelector('path');  
  var length = path.getTotalLength();  
  
  // Clear any previous transition  
  path.style.transition = path.style.WebkitTransition =  
    'none';  
  
  // Set up the starting positions  
  path.style.strokeDasharray = length + ' ' + length;  
  path.style.strokeDashoffset = length;  
  
  // Trigger a layout so styles are calculated & the browser  
  // picks up the starting position before animating  
  path.getBoundingClientRect();  
  
  // Define our transition  
  path.style.transition = path.style.WebkitTransition =  
    'stroke-dashoffset 7s ease-in-out';  
  
  // Go!  
  path.style.strokeDashoffset = '0';  
};
```

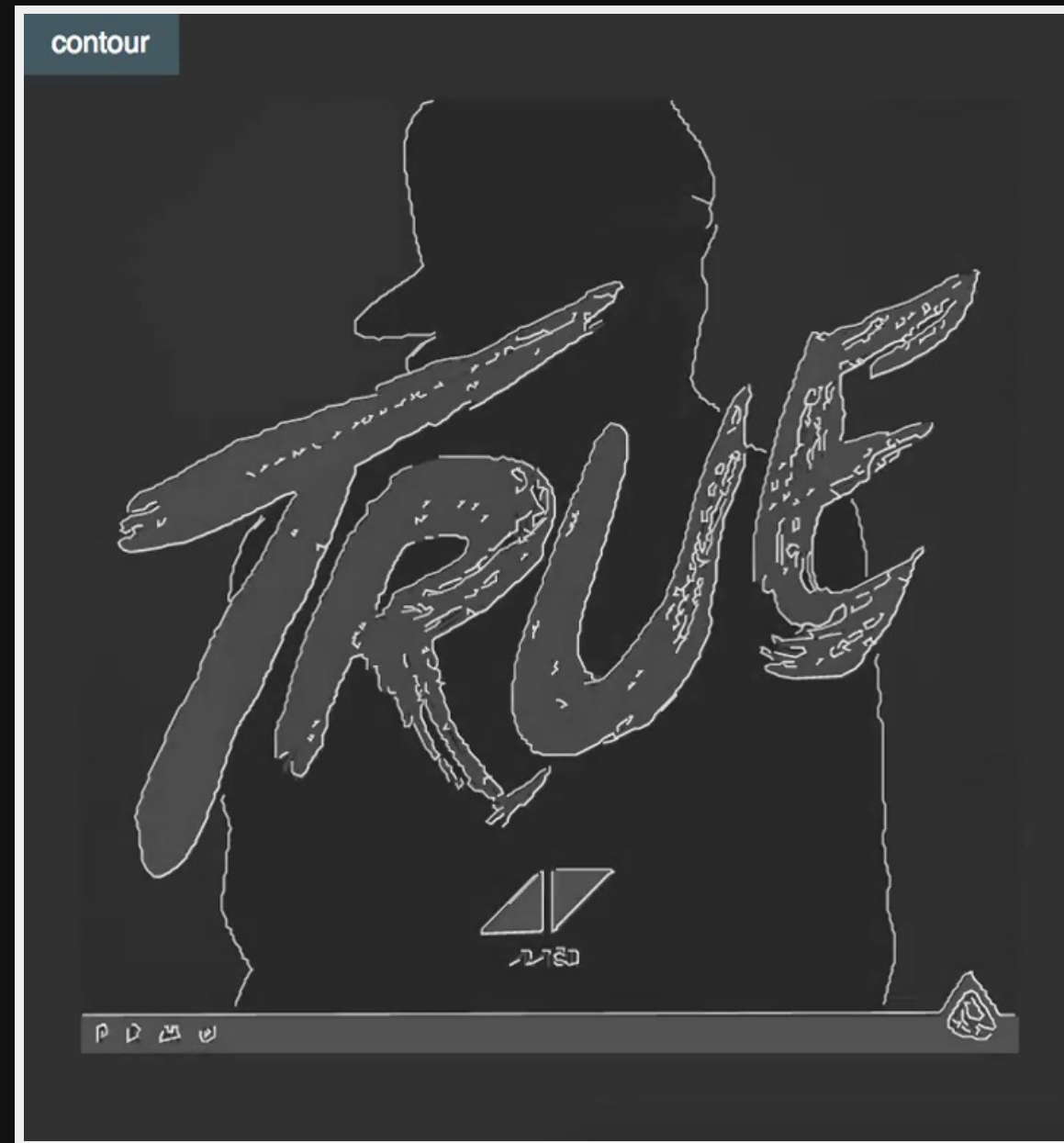
More info: jakearchibald.com/2013/animated-line-drawing-svg

Drawing bitmap images



Canny Edge Detector

Drawing bitmap images



Source: jmperezperez.com/contour

How to draw bitmaps

1. Find edges with canny edge detector
2. Create lines
3. Use JS and SVG to animate

```
<svg>
  <polyline points="51,1 61,1 61,2 56,4 56,3"/>
  <polyline points="52,1 50,2 51,3 50,4 50,9 46,10 46,8 48,8 48,9"/>
  <polyline points="61,4 61,5 58,6"/>
  ...
  <polyline points="62,58 61,59 61,60 50,62 50,61 51,61"/>
</svg>
```

Should we do this?

Just because you can it doesn't mean you should

Summary

- Reduce requests
- Choose the right format and optimise
- Embrace responsive images
- Try to lazy load
- Innovate!

The Web is fun.



Thanks!

@jmperezperez