Accessibility & Multi-Screen Design

Images

Disclaimer

This course is not a W3C course.

Views expressed are my own.

Dies ist kein W3C-Kurs.

 Alle Ansichten sind meine Eigenen.

Overview

- Definitions

- The `img` element

  - `alt` attribute

  - `srcset` attribute for Display Density

  - `srcset` attribute for Width Descriptions

  - `sizes` attribute

- The `picture` element

  - `type` attribute

Definitions

5144×1698px
≧ 11 1024×768px monitors!
410kb

Samsung Galaxy J3 (2017)

720 x 1280 pixels

(~294 ppi density)

9.5 phones needed to display the watch image at native resolution.

Two Main Use Cases

for Responsive Images

(More defined by RICG.)

1. Switch Resolution & Density

Resolution Switching

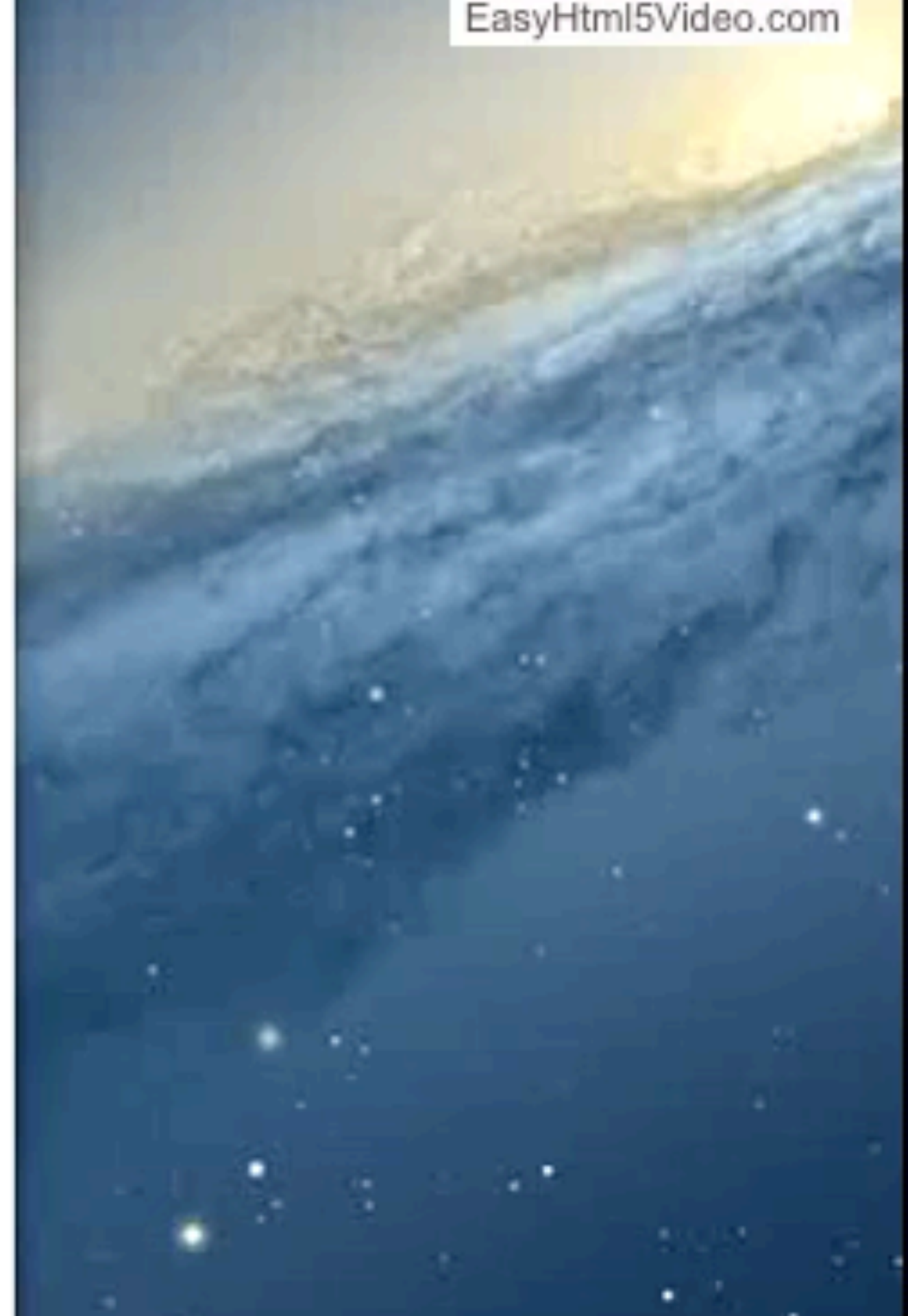Includes high-density (retina) images.

2. Art Direction

Browser for **MeeGo**

Source: Use Cases and Requirements for Standardizing Responsive Images

Our fastest browser ever, Browser for MeeGo introduces

The img element

```html
<img src="cat-image.jpg"
     alt="Cute cat">
```

The `alt` attribute

The alternative text (`alt`) describes an image in a way that the purpose or content of the image is clear without seeing the image.

WAI Images Tutorial

Does the image contain text?

- **Yes:**

  - ⦿ **... and the text in the image is also present as *real* text nearby.** *Use an empty* `alt` *attribute. See* <u>Decorative Images</u>.

  - ⦿ **... and the text is only shown for visual effects.** *Use an empty* `alt` *attribute. See* <u>Decorative Images</u>.

  - ⦿ **... and the text in the image is not present otherwise.** *Use the* `alt` *attribute to include the text of the image. See* <u>Images of Text</u>.

- **No:** Continue.

Is the image used in a link or a button, and would it be hard or impossible to understand what the link or the button does, if the image wasn't there?

- **Yes:**

  - *Use the* `alt` *attribute to communicate the destination of the link or action taken. See* <u>Functional Images</u>*.*

- **No:** Continue.

Does the image contribute meaning to the current page or context?

- **Yes:**

  - **... and it's a simple graphic or photograph.** *Use a brief description of the image in a way that conveys that meaning in the* `alt` *attribute. See* <u>Informative Images</u>*.*

  - **... and it's a graph or complex piece of information.** *Include the information contained in the image elsewhere on the page. See* <u>Complex Images</u>*.*

  - **... and it shows content that is redundant to *real* text nearby.** *Use an empty* `alt` *attribute. See* <u>Functional Images</u>*.*

- **No:** Continue.

Is the image purely decorative or not intended for the user?

- **Yes:**

  - *Use an empty* `alt` *attribute. See* <u>Decorative Images</u>.

- **No:**

  - End of tree.

Everything starts with an `img` element in responsive images.

<picture> <source>

srcset media

sizes type

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When is it just a simple img element?

- A fixed width, single density web page

- Small differences in file size

- Using vector-based images like SVG

High Density
Images

ppi = pixel per inch

iPhone 1, 3G, 3GS: 320×480px @ ~165ppi

iPhone 4 & 4s: 640×960px @ ~330ppi **(=2×)**

iPhone 5 & 5s: 640×1136px @ ~330ppi (**=2×**)

● iPhone 6, 6s, 7, 8: 750×1334px @ ~326ppi (**=2×**)

● iPhone 6 Plus, 6s Plus, 7 Plus, 8 Plus: 1080×1920px @ ~401ppi (**=3×**)

srcset

```
<img src="cat.jpg" alt="cat"
srcset="cat.jpg, cat-2X.jpg 2x">
```

display density

comma-separated list

If we take our watch image and base it on a 320px width for 1x resolution, we'd come up with this:

```html
<img srcset="watch.jpg,
             watch-2x.jpg   2x,
             watch-3x.jpg   3x,
             watch-4x.jpg   4x,
             watch-5x.jpg   5x,
             watch-6x.jpg   6x,
             watch-7x.jpg   7x,
             watch-8x.jpg   8x,
             watch-9x.jpg   9x,
             watch-10x.jpg 10x,
             watch-11x.jpg 11x,
             watch-12x.jpg 12x,
             watch-13x.jpg 13x,
             watch-14x.jpg 14x,
             watch-15x.jpg 15x,
             watch-16x.jpg 16x">
```

Best for *fixed-width* images but insufficient for flexible images*

*You remember that flexible images are a core principle of RWD, right?

`srcset` width descriptors


```
<img src="cat.jpg" alt="cat"
srcset="cat-160.jpg 160w,
        cat-320.jpg 320w,
        cat-640.jpg 640w,
        cat-1280.jpg 1280w">
```

width of the image source

Browser picks best source

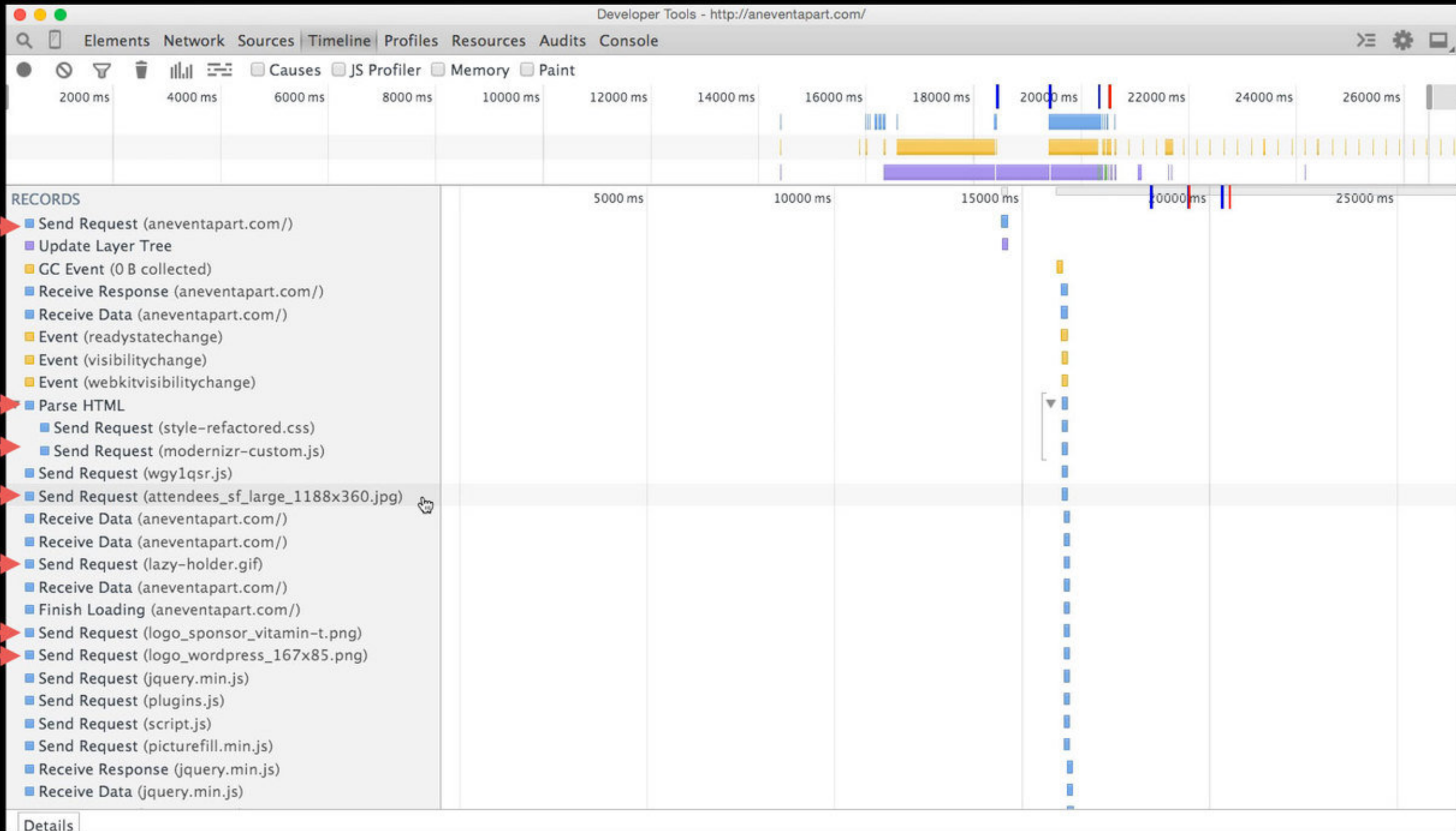# Browser picks the best source?!

◉ The browser determines the width of the image on the page

◉ calculates what size of image is needed and

◉ downloads that.

Of course it is not that easy!

Introducing: Prefetching

◉ Browsers fetch images before they know how the website actually looks to make the web faster.

◉ They fetch images before the CSS is loaded.

◉ So initially, every image is as wide as the viewport.
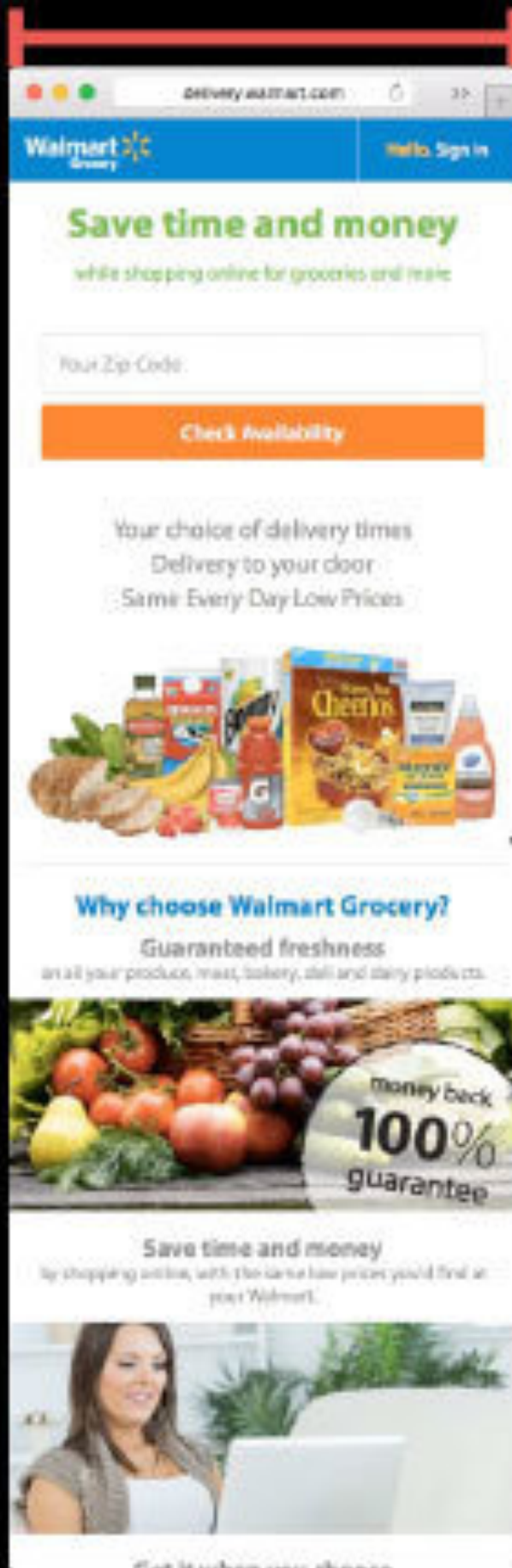
Images are nearly same size as viewport

1540px

Viewport Tells Us Little

254px

What to do?!

sizes FTW!

`sizes` is required

(when using width descriptors)

media condition (subset of media queries)

length

sizes="(max-width: 480px) 100vw,

(max-width: 900px) 33vw,

length can be
absolute, relative
or even calc()

254px"

if there is no media query,
then it is the default length

viewport width unit

We tell the browser how wide the image is in relationship to the viewport (or absolutely).

We also tell the browser when that relationship changes.

```
<img src="cat.jpg" alt="cat"
  srcset="cat-160.jpg 160w,
          cat-320.jpg 320w,
          cat-640.jpg 640w,
          cat-1280.jpg 1280w"
  sizes="(max-width: 480px) 100vw,
         (max-width: 900px) 33vw,
         300px">
```

Media Conditions

Subset of media queries:

`(max-width: 480px)` or `(min-width: 480px)`

Size

◉ Often expressed in viewport width (vw) unit

◉ 1vw is 1% of the width of the viewport

◉ 33vw = 33% of the viewport

◉ Can also be px, em, %

◉ calc() can be used (for example for calculating margins)
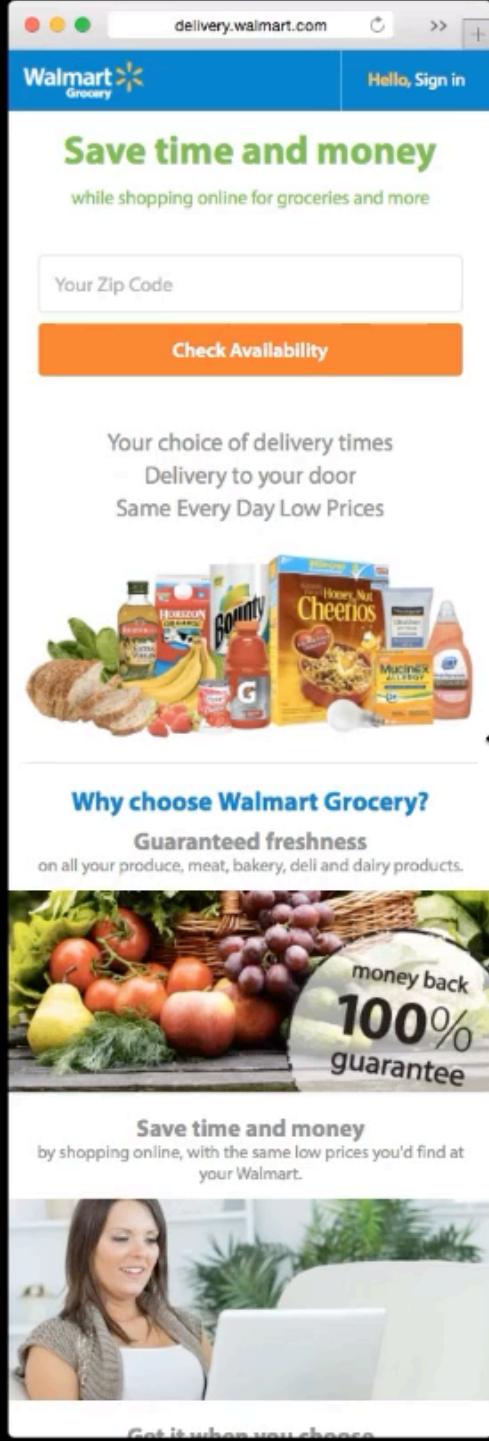
sizes="
(max-width: 480px) 100vw,
(max-width: 900px) 33vw,
254px"

Browser Support

Srcset and sizes attributes 📄 - LS

The `srcset` and `sizes` attributes on `img` (or `source`) elements allow authors to define various image resources and "hints" that assist a user agent to determine the most appropriate image source to display (e.g. high-resolution displays, small monitors, etc).

Usage		% of	all users		?
Global		92.53% + 0.25%	=	92.78%	
U.S.A.		93.18% + 0.5%	=	93.68%	
Germany		90.13% + 0.34%	=	90.47%	

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

IE	Edge *	Firefox	Chrome	Safari	iOS Safari *	Opera Mini *	Chrome for Android	UC Browser for Android	Samsung Internet
			49						
			72		11.4				4
	17	66	73	12	12.1				8.2
11	18	67	74	12.1	12.2	all	74	11.8	9.2
	75	68	75	TP					
		69	76						
			77						

Notes | Known issues (1) | Resources (9) | Feedback

Polyfill: Picturefill

Don't use it unless you have to 😃

`<picture>`

```
<picture>
  <source media="(min-width: 900px)"
          srcset="cat-vertical.jpg">
  <source media="(min-width: 750px)"
          srcset="cat-horizontal.jpg">
  <img src="cat.jpg" alt="cat">
</picture>
```

◉ Picture Container Element

◉ Multiple Sources with media queries

◉ `Srcset` support

◉ Fallback `<img>` element (required)

media attribute = real media query

media attribute is a **directive**, not a suggestion

```
<picture>
  <source srcset="homepage-person@desktop.png,
                  homepage-person@desktop-2x.png 2x"
          media="(min-width: 990px)">
  <source srcset="homepage-person@tablet.png,
                  homepage-person@tablet-2x.png 2x"
          media="(min-width: 750px)">
  <img srcset="homepage-person@mobile.png,
               homepage-person@mobile-2x.png 2x"
       alt="Shopify Merchant, Corrine Anestopoulos">
</picture>
```

When the image was variable width instead of fixed width, width descriptors and sizes could have been used as well.

type attribute

This attribute lets you assign different image formats.

Image Formats

- "Traditional": PNG, GIF, JPG

- "Advanced"

  - SVG

  - WebP

  - JPEG2000

  - HEIC

```
<picture>
  <source type="image/svg+xml"
          srcset="logo.xml">
  <source type="image/webp"
          srcset="logo.webp">
  <img src="logo.png" alt="ACME Corp">
</picture>
```

Unless art direction, no `media` attribute needed.
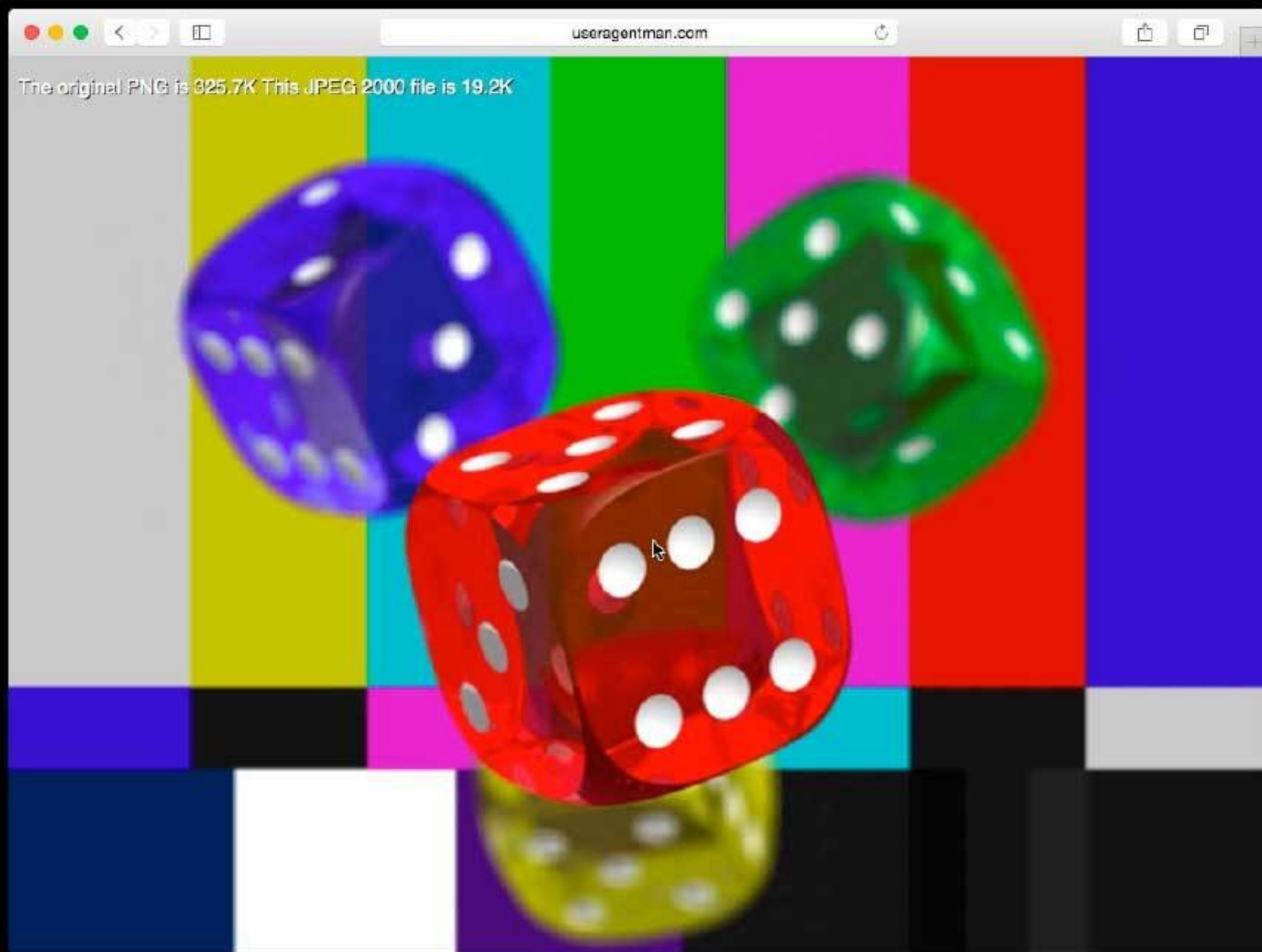
Alpha Channel
Dice Image

JPEG 2000	19.2K
JPEG-XR	95.7K
PNG	325.7K
Web-P	56K

http://www.useragentman.com/blog/2015/01/14/using-webp-jpeg2000-jpegxr-apng-now-with-picturefill-and-modernizr/

Size	JPEG 2000	JPEG-XR	PNG	WebP
320×240	2.0kB	22.6kB	55.2kB	112.1kB
600×450	13.5kB	48.5kB	14.3kB	26.6kB
1024×768	19.2kB	95.7kB	325.7kB	56.0kB

Picture element ▤ - LS

A responsive images method to control which image resource a user agent presents to a user, based on resolution, media query and/or support for a particular image format

Current aligned Usage relative Date relative   Apply filters Show all   ?

IE	Edge *	Firefox	Chrome	Safari	iOS Safari *	Opera Mini *	Chrome for Android	UC Browser for Android	Samsung Internet
			49						
			72		11.4				4
	17	66	73	12	12.1				8.2
11	18	67	74	12.1	12.2	all	74	11.8	9.2
	75	68	75	TP					
		69	76						
			77						

Notes   Known issues (1)   Resources (11)   Feedback

Polyfill: Picturefill

Don't use it unless you have to 😃

Summary

For most responsive images: Don't use `picture`.

Always use
`<img src="…" alt="…">`
for basic support.

Use `srcset` & `sizes` to provide resolution and width dependent images.

Remember that picture locks in the choice, the media queries are not negotiable.

`<picture>` is for art direction or for using niche image formats

State 2019

- ✅ Wide Browser Support

- ❌ Open Issues: image-set in CSS, responsive images in SVG, client hints

Source: [Jason Grigsby – Responsive Images 101](#)

Thanks!