Responsive Web Design

Ethan Marcotte

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by **ETHAN MARCOTTE** · *May 25, 2010*

http://alistapart.com/article/responsive-web-design

http://www.abookapart.com/

He create a unified approach using existing techniques and gave it a name.

Fluid layout + media queries + flexible media + responsive thinking

Serve the same HTML to all devices.

Serve different CSS layouts, based on screen width.

Embrace the inherently
fluid web.
The web does not have the
constraints of print.

A Dao Of Web Design
John Allsopp, 2000

But..

Responsive designs base many decisions on screen width

We don't know
connection speed

```
var speed =
connection.bandwidth;
```

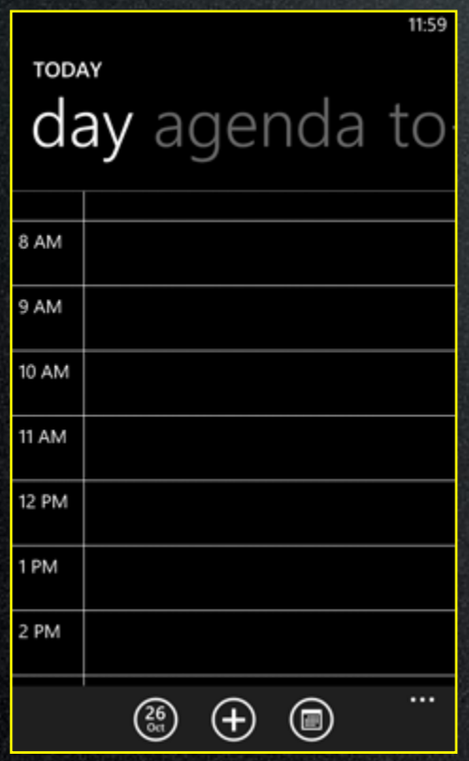
There is no reliable relationship between screen size and connection speed

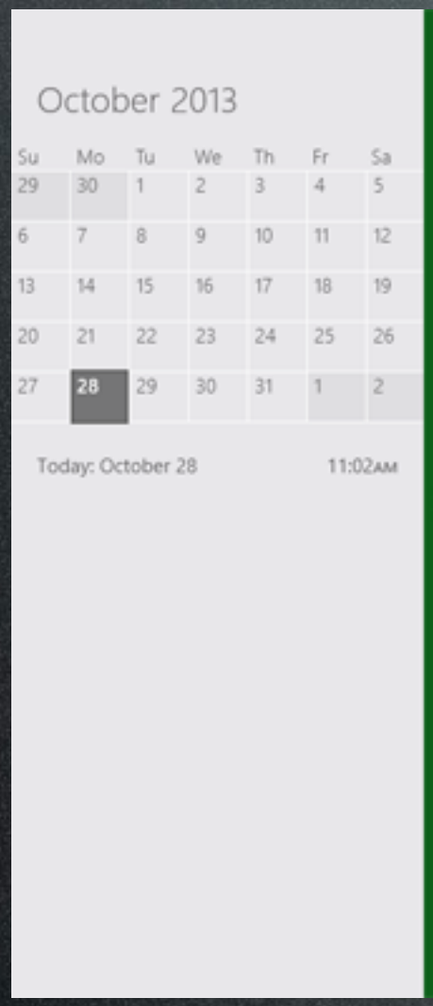
Mouse, finger?

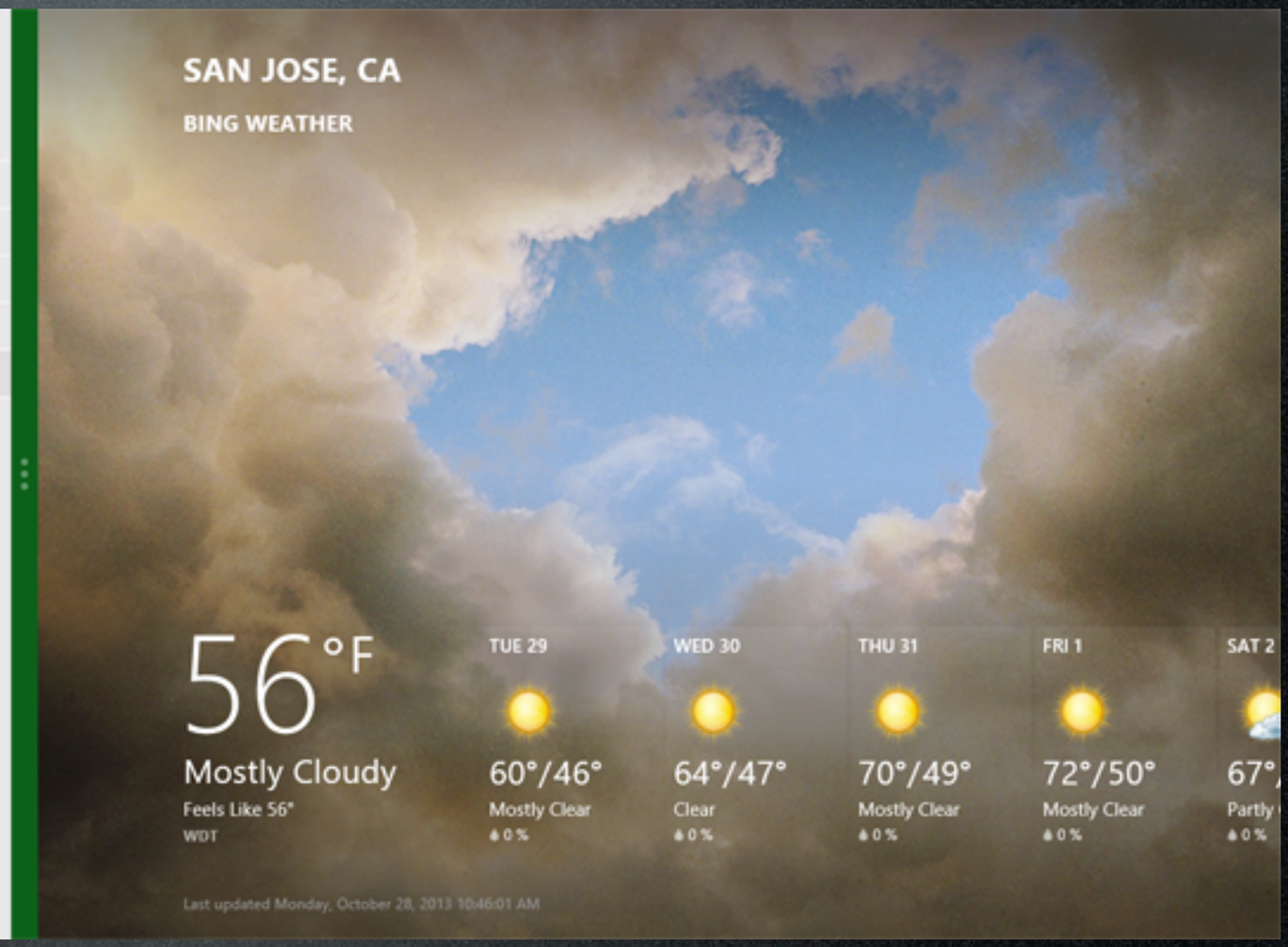
Media Queries 4 tests for pointer and hover

@media (pointer:coarse) { .. }

The same width application in different contexts







Luke Wroblewski

Viewing distance?

’25 inch HD screen viewed from 8 feet’

Build it from scratch

Mobile First

Luke Wroblewski

2 CONSTRAINTS
WHILE IT'S TRUE the incredible growth of the mobile internet has been fueled by better and better devices, mobile still remains a very constrained environment. Screens are small, networks are unreliable, and people can find themselves in all kinds of situations when they pull out their mobile devices. But these constraints are not only good for business, they're good for design as well.
This is especially true if you subscribe to the adage that design is the process of gradually applying constraints until an elegant solution remains. In other words, embracing constraints (rather than fighting them) will ultimately get you to better designs.
SCREEN SIZE
Though the topic of available screen real estate on the desktop was hotly contested for many years in the web design community, we finally settled on 1024×768 pixels as our
18 MOBILE FIRST
A BOOK APART
Brief books for people who make websites
No. 6
Luke Wroblewski
MOBILE FIRST
FOREWORD BY Jeffrey Zeldman
kindle

Develop the single column mobile layout first.

Add wider layouts using media queries.

Consider using conditional loading

This forces us to make difficult decisions up-front about essential content

Make content
immediately accessible.
avoid navigation menus
that push content off
screen on mobiles.

Layouts

We need to give up illusion of control over page layout

Existing tools make assumptions about fixed layouts:
Photoshop canvas

Fixed

No media queries

Page does not scale

960px grid

Fluid

Proportional layout

EMs for typography

% for column widths

Fluid

Text columns become too wide/narrow at some widths.

Line measure 45-90 characters

Fluid grids:
Floats & % widths

```
.grid {
    float: left;
    width:16%;
}
```

box-sizing: border-box;

Shrink content to accomodate changes in border and padding

Responsive
fluid grid +
media queries +
responsive images +
mobile-first thinking.

Adaptive

Media queries

Specific devices

Not fluid

FlexBox

CSS lays out items within a container along 2 axes

Responsive content

We need
structured content
that works in many
different layouts.

Dynamic content:
merge JSON or XML
with a template
to create HTML

No longer working with a fixed canvas, that we fill with content.

Content parity

Ideally, all devices should see all content

Content should decide where breakpoints occur.

“it’s important to separate content and hierarchy from any single layout”

Trent Walton

"You cannot deliver the same site to all devices. You may be able to deliver the same content, with different layouts."

Bryan Rieger

"we create layouts from a canvas in. We need to .. create layouts from the content out."

Mark Boulton

Text

Unstlyed HTML is a mobile-first single-column flexible-grid

HTML

Web pages
are structured text
with hyperlinks

EMs , REMs

EMs

The em unit is relative to the font-size of the parent.

The font-size compounds

```
body{ font-size: 62.5% }
li { font-size: 1.4em; }
```

```
<ul>
  <li>      1.4 * 10 pixels = 14 pixels
    <ul>
      <li>  1.4 * 14 pixels = 20 pixels
```

Ethan Marcotte

formula for

converting fixed to

fluid layouts.

target/context
= result

18px <p> in 24px

18/24 = 0.75em

Context for
margins
and padding is
calculated differently.

REMs

Font-size calculations are based on the root element (<body>)

REMs

REMs do not work in IE8-.

A fallback pixel rule may be required.

Media queries

The secret sauce of responsive web design

Brad Frost

The point at which a fluid layout breaks/ fails is a breakpoint.

Media queries help at the breakpoint by applying different CSS to change layout.

Media queries allow conditional CSS

```
@media screen and
(max-width:50em) {
  .. CSS rules
}
```

Brad Frost .ISH

Define breakpoints based on content not devices.

```
@media screen and
(min-device-pixel-ratio:2)
{
    .. retina screen
}
```

orientation media queries to test landscape or portrait mode

Not supported
by IE6-8.

Polyfills like
respond.js may help

Javascript

```
if( window.matchMedia(“(min-width: 40em)”).matches ) { .. }
```

Test media queries with Javascript to conditionally load content.

Viewport

Safari iOS displays web pages,
on 980 pixel virtual canvas : viewport

The viewport is shrunk to fit the physical dimensions of the device

Viewport meta tag in HTML head overrides this default behaviour.

```
<meta
name="viewport"
content=
"width=device-width,
initial-scale=1.0" >
```

Responsive images

```
img {
    max-width: 100%;
}
```

The image will scale down
to fit its container.
And the image will not scale
larger than its actual size.

Ideally we would serve
appropriate images
based on screen size
and available bandwidth

CSS background images

```
.logo {
  background-image: url(small.png);
}

@media screen and (min-width:800px) {
  .logo {
    background-image: url(huge.png);
  }
}
```

Art direction

Different crops of same image for different screens

Define crop rectangles in markup, or download smaller image?

adaptive-images.com

No changes to markup.

Uses PHP, Apache server and .htaccess settings to serve up image.

Foresight.js

Downloads 50k test file
to judge users bandwidth
and serve
appropriate images

<img id="luke" src="high.jpeg" />

Javascript

```
<img id="luke" src="high.jpeg" />
```

```
$("#luke").attr("src","low.jpeg")
```

Picture element

Specify multiple image files.
Media query for each image.
Fallback for old browsers.
HTML5 semantics

<picture>

```
<picture>
  <source media="(min-width: 45em)" srcset="large.jpg”>
  <source media="(min-width: 18em)" srcset=“medium.jpg”>
  <source srcset="small-1.jpg”>
  <img src="small-1.jpg" alt="flower" >
</picture>
```

http://picture.responsiveimages.org/

pictureFill.js

A polyfill which emulates <picture> tag using a

YouTube wraps video in iFrame.

FitVids.js makes iFrame video resizeable.

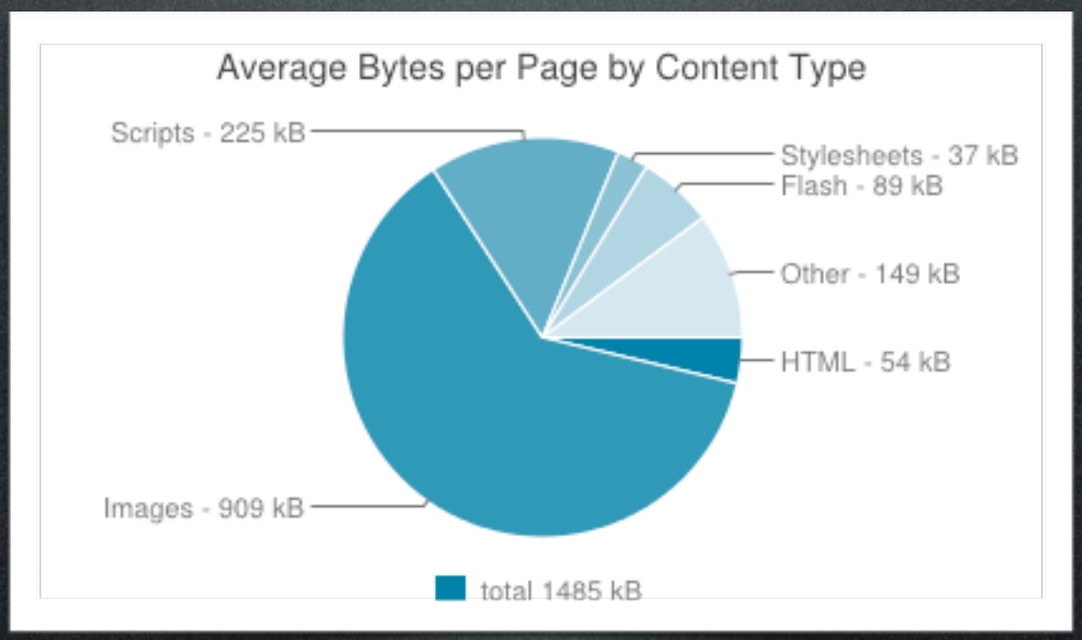
Performance

Responsive design is forcing site performance to get a true seat at the table. Slow-loading and bloated sites are just as much of a design flaw as confusing layout, clashing colors..

Jeremy Osborn in Design/UX

Average web page size

900k images,
200k Javascript



Source : http://httparchive.org

Responsive sites

86% of responsive sites send the same data to all devices

http://www.guypo.com/mobile/performance-implications-of-responsive-design-book-contribution/

Why aren't content & performance priorities on desktop version too?

“You have 5 seconds of someone’s time”

Brad Frost

“If your website is 15MB it’s not HTML5, it’s stupid. ”

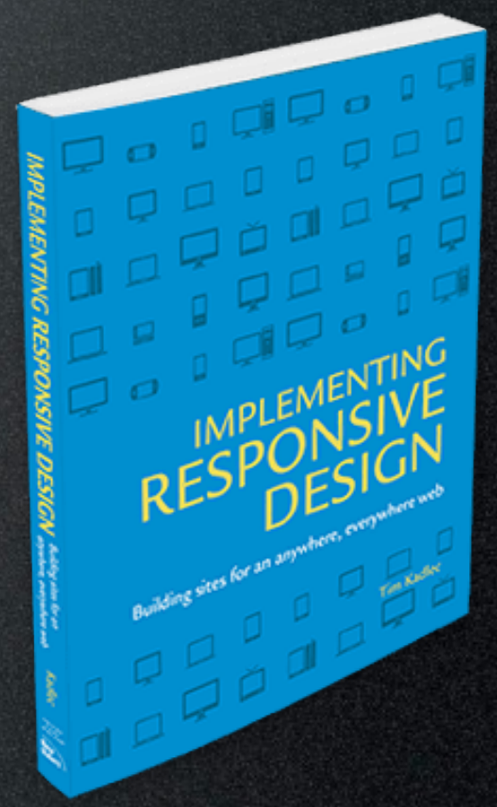
Christian Heilmann

Hiding stuff won't work

```
img{ display:none; }
```

Performance budget

Tim Kadlec



Use scalable vectors, not bitmaps, where possible.

SVG, icon-fonts.

SVG?

<svg width="40px" height="80px" ></svg>

An XML description
of a scalable vector.
in a small text file.

Icon fonts

```
<p>TV <span class="icon-tv"
aria-hidden="true"></span></p>

.icon-tv:before {
  content: "\e018";
}
```

Optimise bitmaps

ImageOptim

Content Delivery Netoworks (CDNs)

Conditional loading of content using Javascript and AJAX

Minification of Javascript code

Load Javascript at the bottom of page

Review use of Javascript frameworks and libraries

Latency

Mobile networks are slower handling multiple HTTP requests

Use concatenation tools to reduce number HTTP requests

Use CSS sprites to reduce number HTTP requests

SVG sprites

Multiple vectors in 1 file

1 HTTP request

Scalable

Support: Modernizr.js

Workflow

A responsive workflow understands that the diversity of screen sizes and devices requires a new way of interpreting content and new methods of collaboration.

Jeremy Osborn in Design/UX

Develop style guides
and pattern guides,
which are
independent of layout

Avoid frankencomps.
Compromised design
based on static comps
introduced too early
in project.

A more iterative process

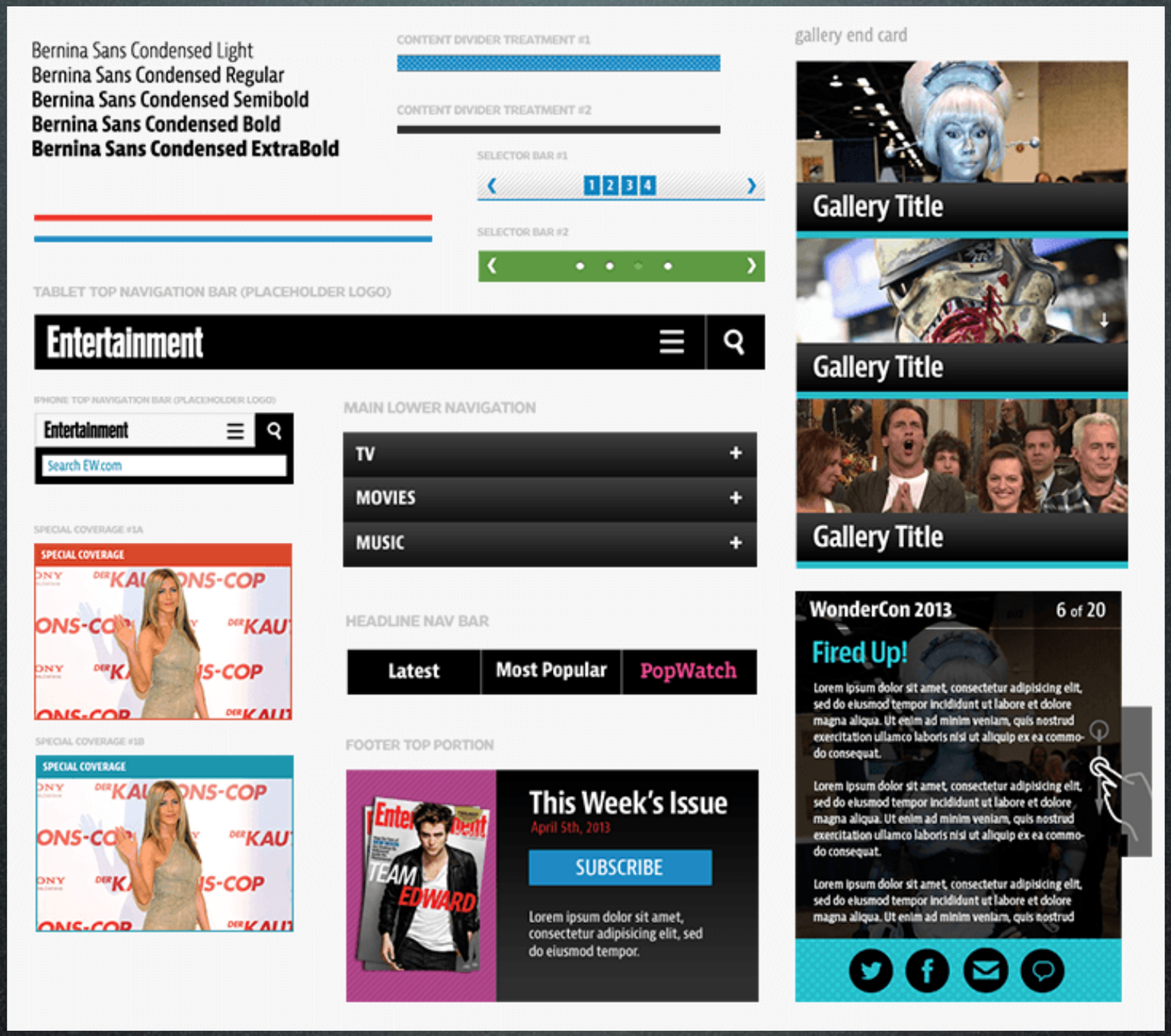
Too many screen-sizes, and interactions to use static comps.

“begin with the individual components divorced from any layout context”

Jeremy Keith

“begin with atomic units of content and style them first before thinking about layout.”

Jeremy Keith



Element collage for Entertainment Weekly

http://danielmall.com/articles/responsive-mobile-entertainment-weekly/

Pattern Primer : Jeremy Keith

> *This text is quoted. A of quoted text like this is particularly useful when presented as a pull-quote within an article of text.*

```
<!-- This was created to ensure .. -->
<blockquote>
<p>This text is quoted. A  of quoted text like this is particularly useful when presented as a pull-quote within an article of text.</p>
</blockquote>
```

blockquote.html

This is an error feedback message.

```
<div class="feedback error">
<p>This is an error feedback message.</p>
</div>
```

feedback-error.html

This is a feedback message for the user.

```
<div class="feedback">
<p>This is a feedback message for the user.
</p>
</div>
```

feedback.html

Button element | Submit button

```
<button>Button element</button>

<input type="submit" value="Submit button">
```

Rendered HTML using shared CSS

HTML code

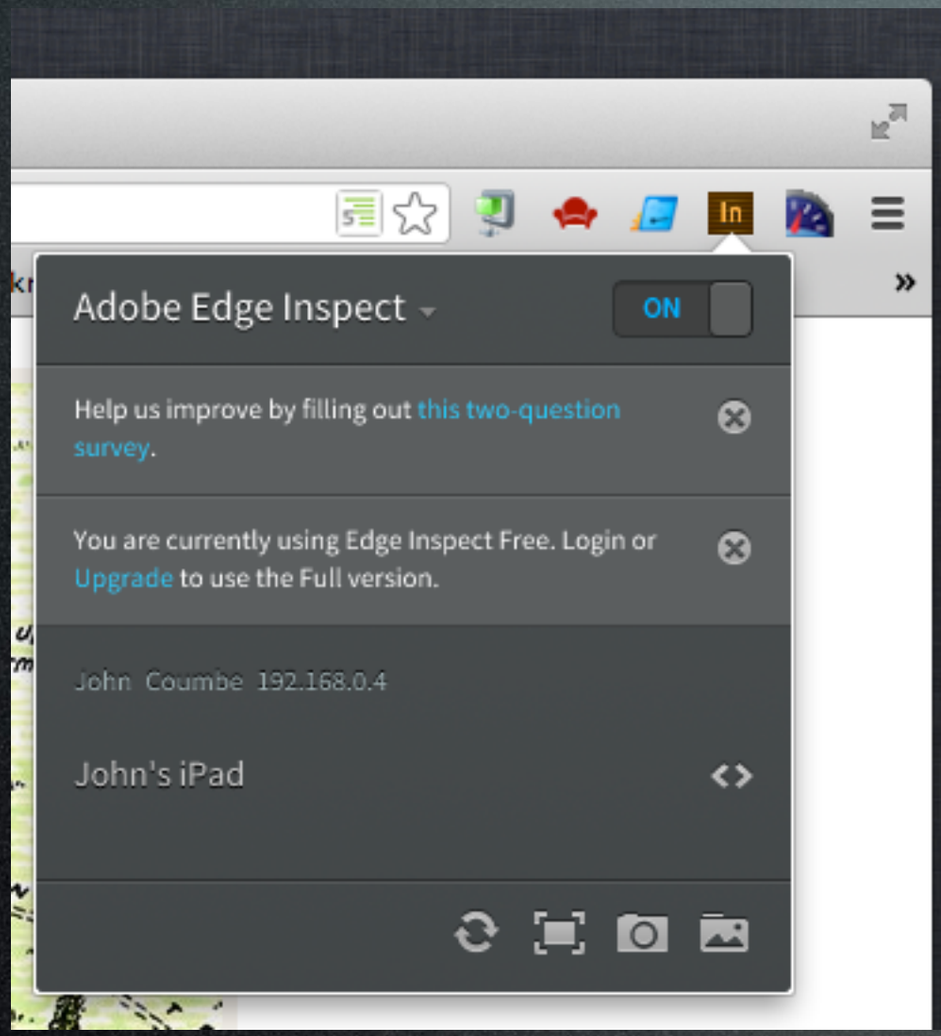
Avoid tight coupling between structured content and 1 specific layout

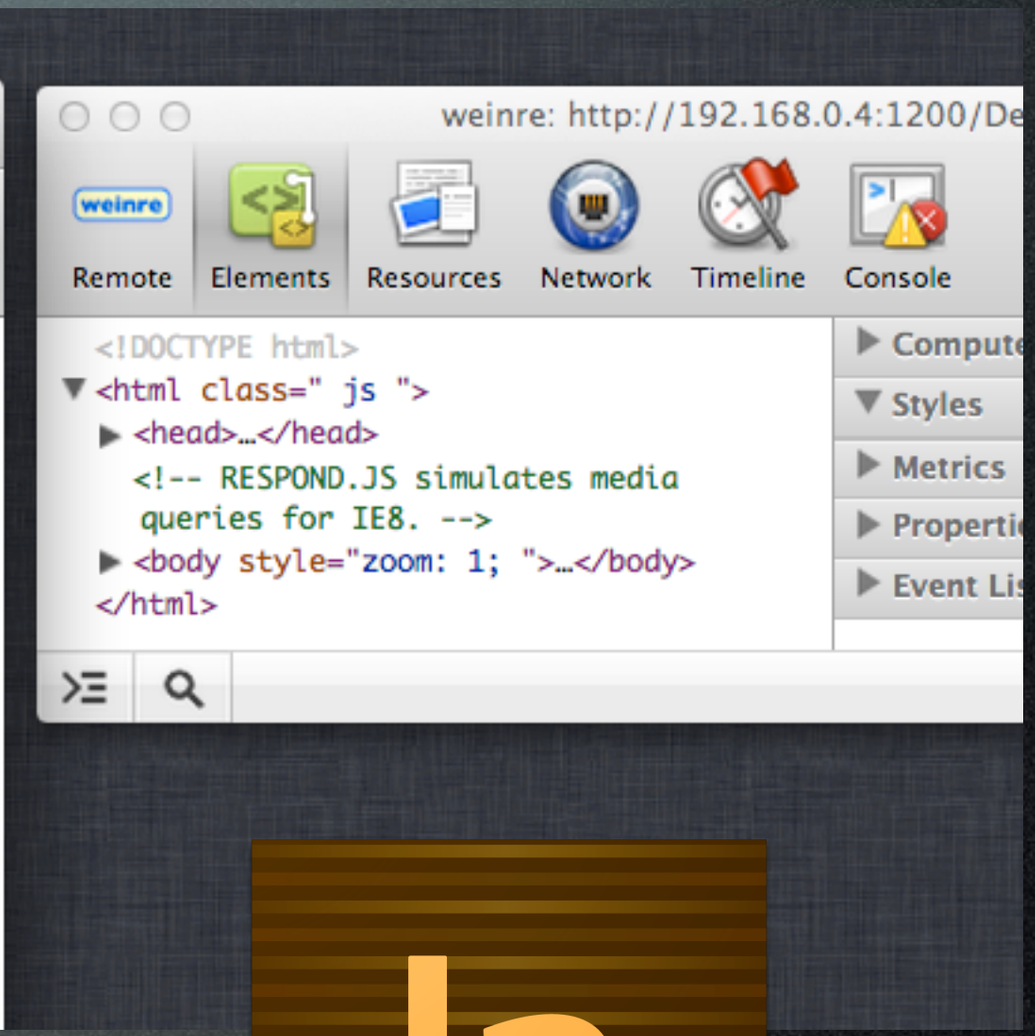
Let content decide breakpoints (media queries) not devices.

Testing

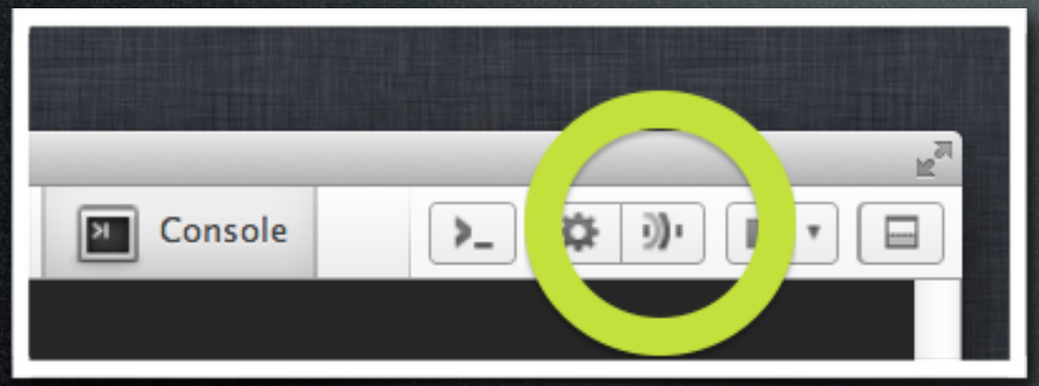
WEINRE

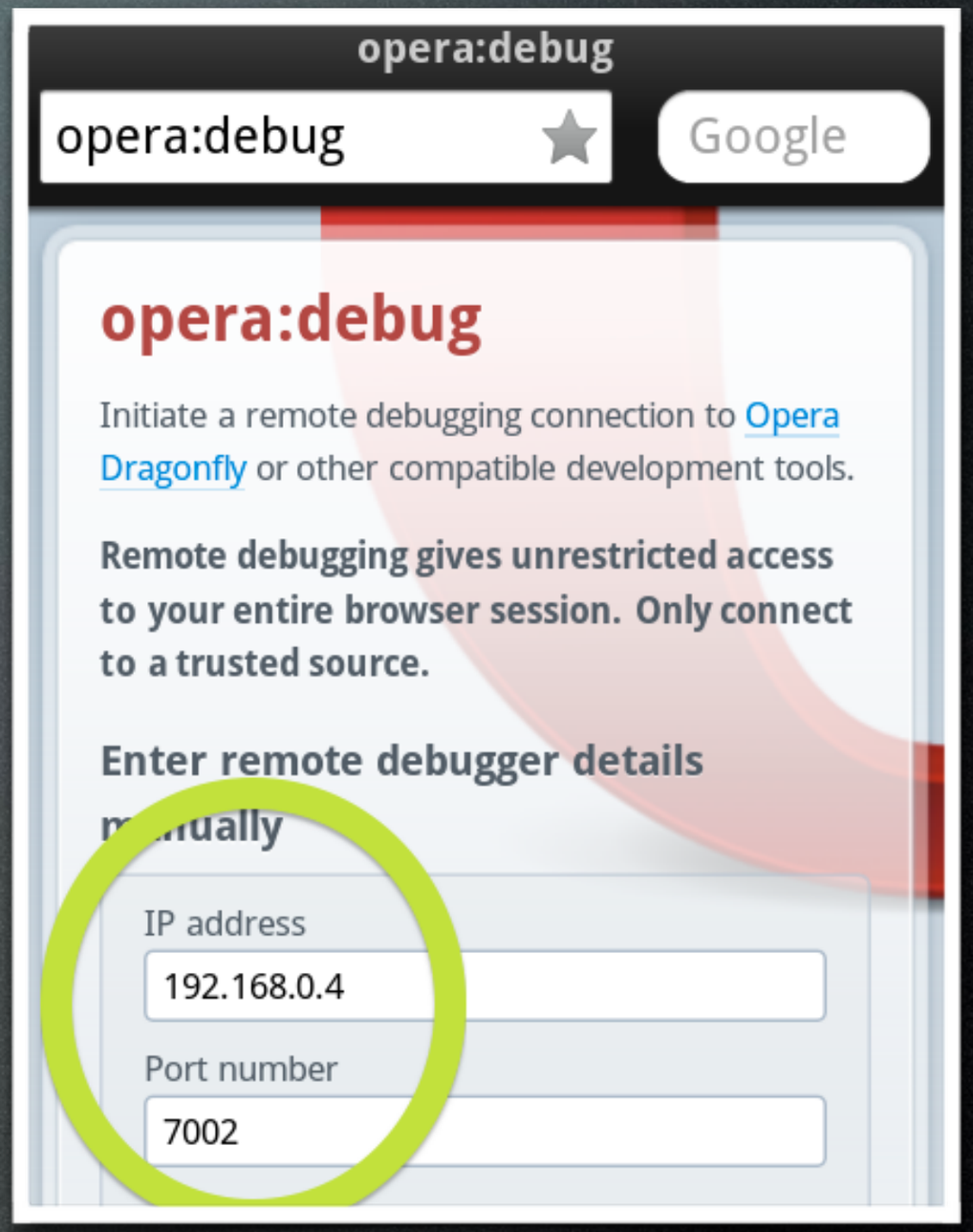
WEb INspector REmote (Adobe Edge Inspect)





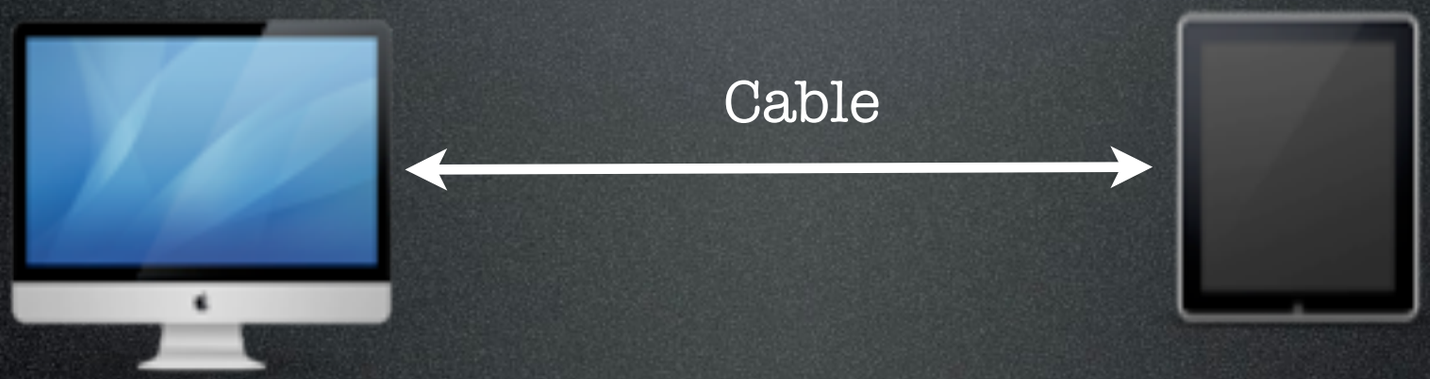
Remote debugging using Opera and Opera Mobile Emulator





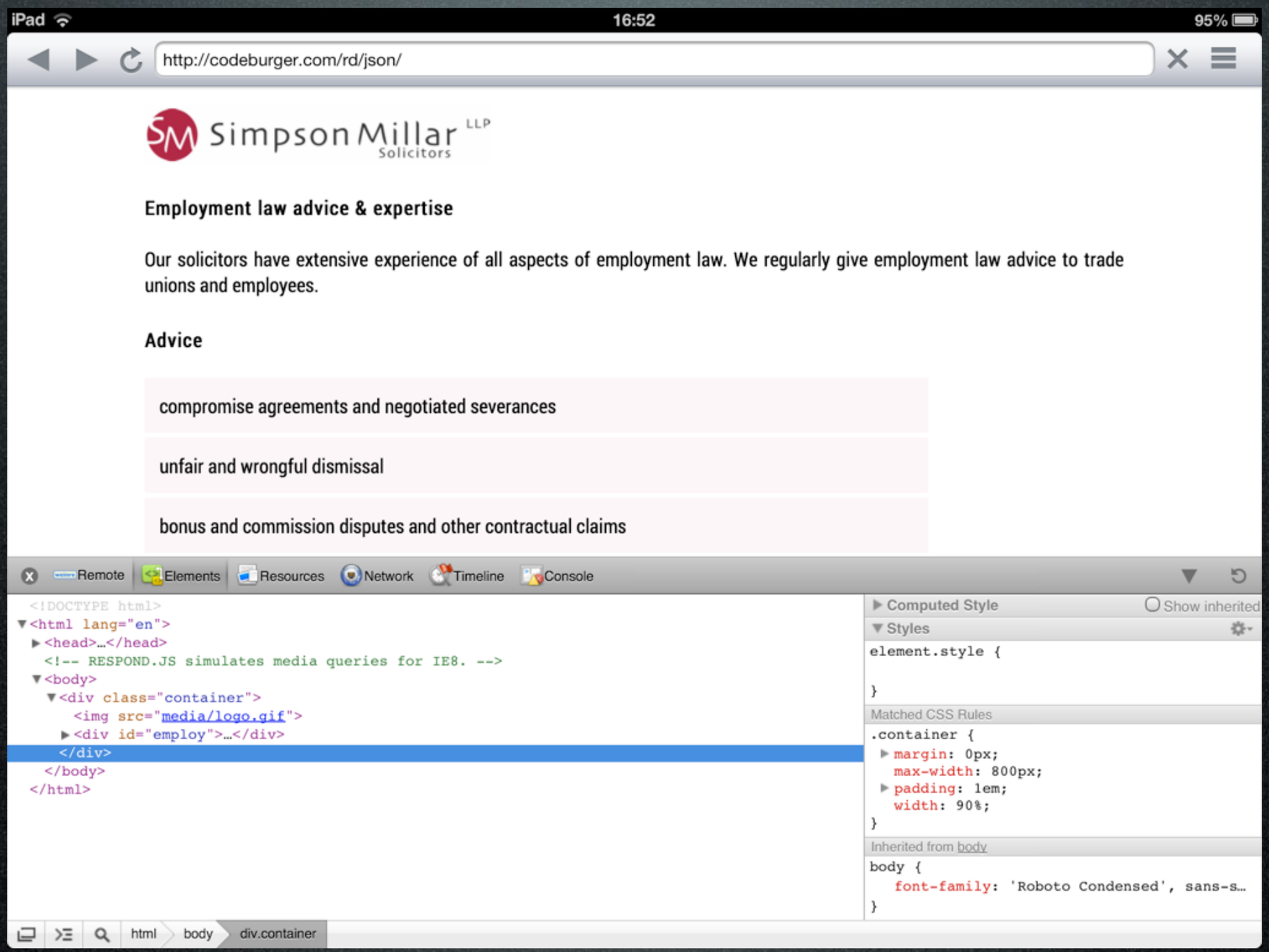
http://www.opera.com/dragonfly/documentation/remote/

Remote debugging using Safari



MIHTool

Adds developer tools to iPad browser



Summary

Responsive web design is web design

Responsive design is an ideal, not a working solution

Creating multiple versions, is not a future proof approach

“This stuff is hard”

Brad Frost

John Coumbe

@johncoumbe