

Mobile First Responsive Design



Jason Grigsby • @grigs • jason@cloudfour.com

<http://www.flickr.com/photos/stuart-dootson/4024407198>

The web has always been a balancing act...



with many competing priorities.



**Finding that balance
is more difficult...**





as device diversity increases.

Responsive web design offers us

H₄

O₁

P₃

E₁

for a sensible way to deal with device diversity.



And yet the one question I frequently ask myself is...

Can a one size fits all solution...

**ONE SIZE
FITS ALL**

A close-up photograph of a dark blue suit jacket lapel. A red tie with thin white diagonal stripes is visible. A green measuring tape is placed vertically against the jacket, showing measurements from 18 to 22 inches. The background is dark and out of focus.

**compete with
a tailored experience?**

<http://www.flickr.com/photos/helloturkeytoe/4932748746/>

Important question from many perspectives:

Important question from many perspectives:

Search engine optimization

Context

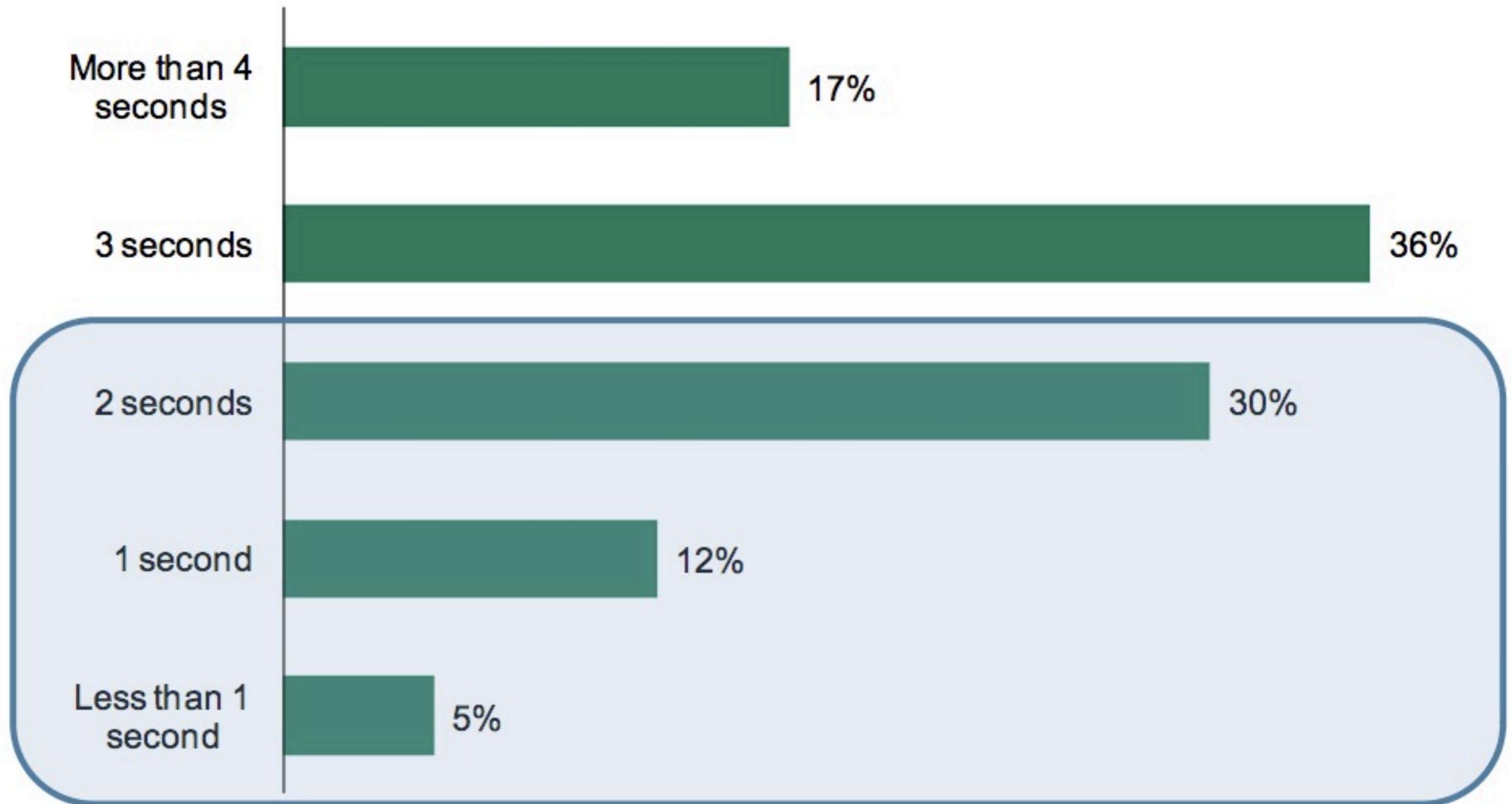
Advertising

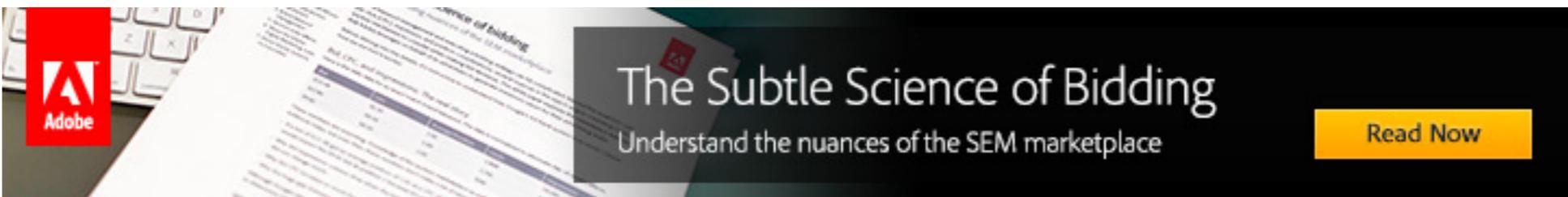
Performance

Performance?



“What are your expectations for how quickly a Web site should load when you are browsing or searching for a product?”





67% of consumers cite slow websites as the main cause of basket abandonment

by David Moth

06 December 2012 11:40

8 comments

Print

Tweet 236

+1 3

Like 14

Share 20



Everyone hates slow loading websites, and [a new survey](#) highlights just how damaging a slow site can be to the user experience.

The study by [Brand Perfect](#) found that two thirds of UK consumers (67%) cite slow loading times as the main reason they would abandon an online purchase.

It's a topic we've looked at in more detail in our post '[Site speed: case studies, tips and tools for improving your conversion rate](#)', with stats showing that slow loading websites are [losing businesses up to £1.73bn a year](#).

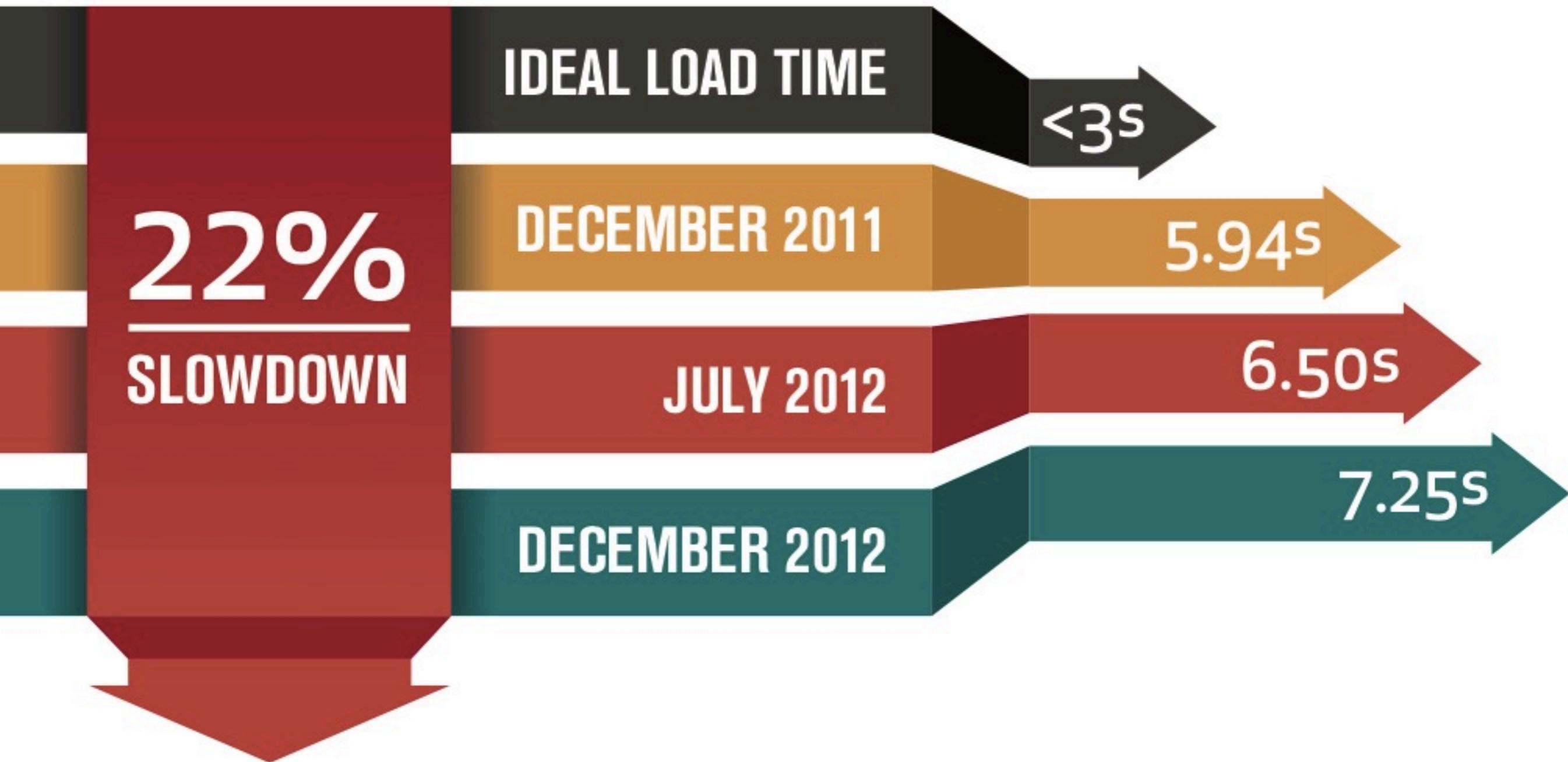
Daily Pulse Newsletter

Get our free Daily Pulse Newsletter to keep informed about the latest news and insights in Digital Marketing.

Register for our free Daily Pulse



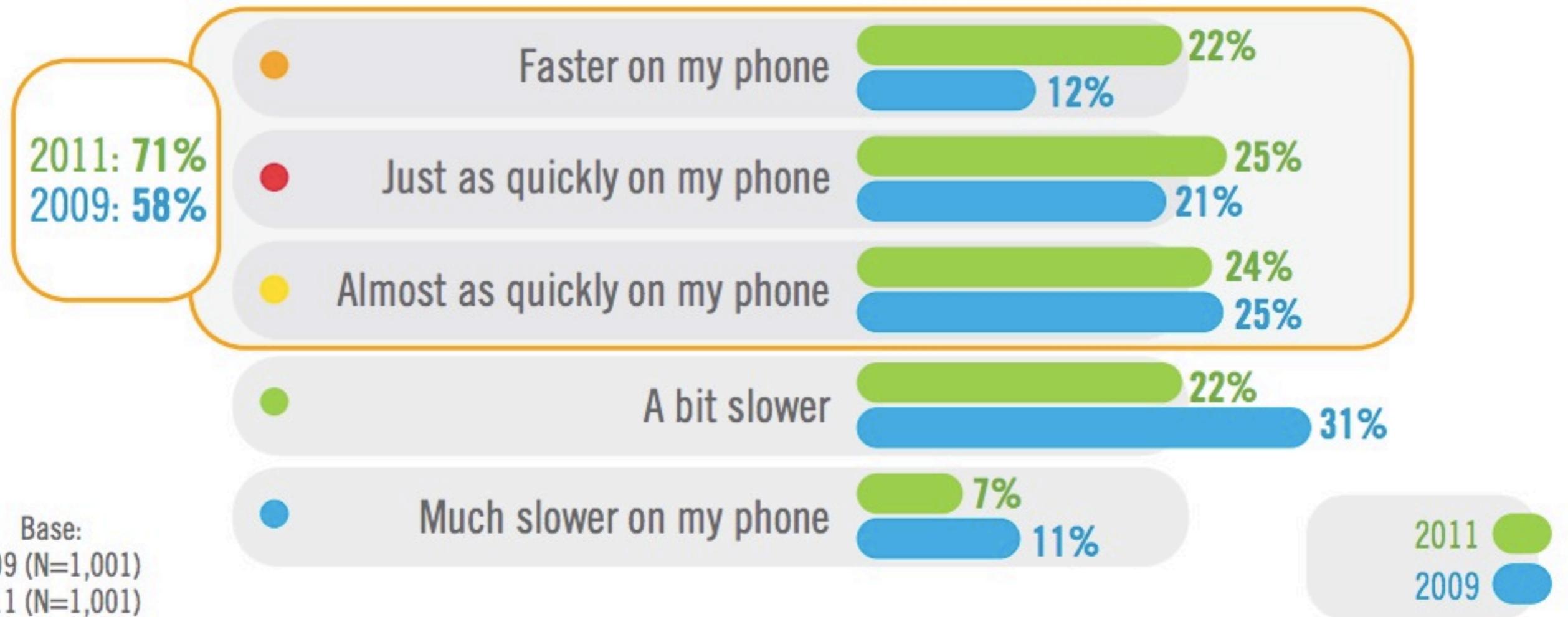
Top ecommerce sites are 22% slower than they were last year





QUESTION:

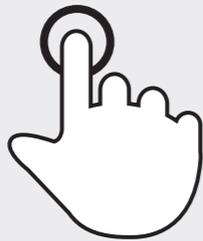
Compared to websites that you access from your home computer or laptop, how quickly do you expect websites to finish loading on your mobile phone?



Mobile browsers offer many ways to navigate desktop web sites.

Tap

Briefly touch surface with fingertip.



CORE GESTURES

Double Tap

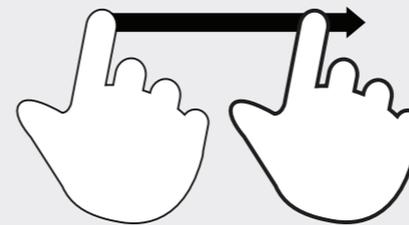
Rapidly touch surface twice with fingertip.



CORE GESTURES

Drag

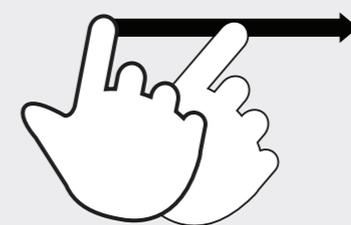
Move fingertip over surface without losing contact.



CORE GESTURES

Flick

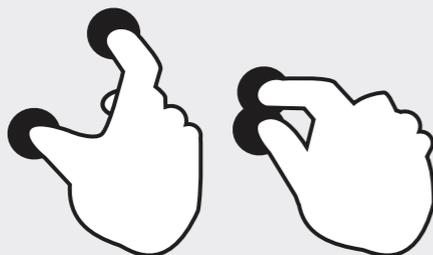
Quickly brush surface with fingertip.



CORE GESTURES

Pinch

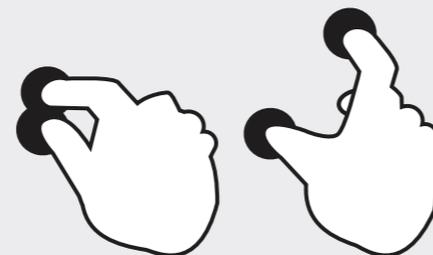
Touch surface with two fingers and bring them closer together.



CORE GESTURES

Spread

Touch surface with two fingers and move them apart.



CORE GESTURES

Press

Touch surface for extended period of time.



CORE GESTURES

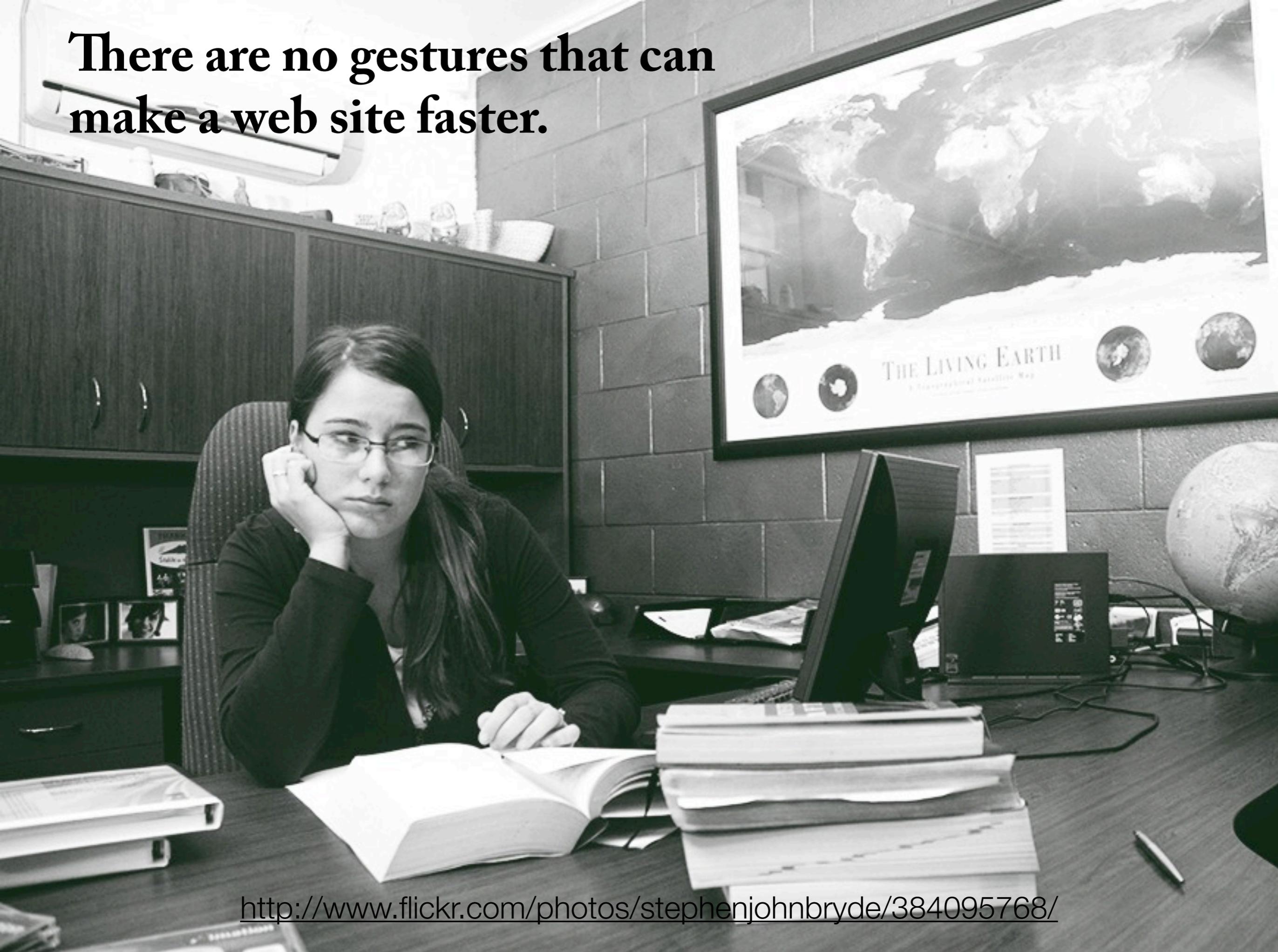
Press + Tap

Press surface with one finger and briefly touch surface with second finger.



CORE GESTURES

**There are no gestures that can
make a web site faster.**



**THIS
SUCKS**





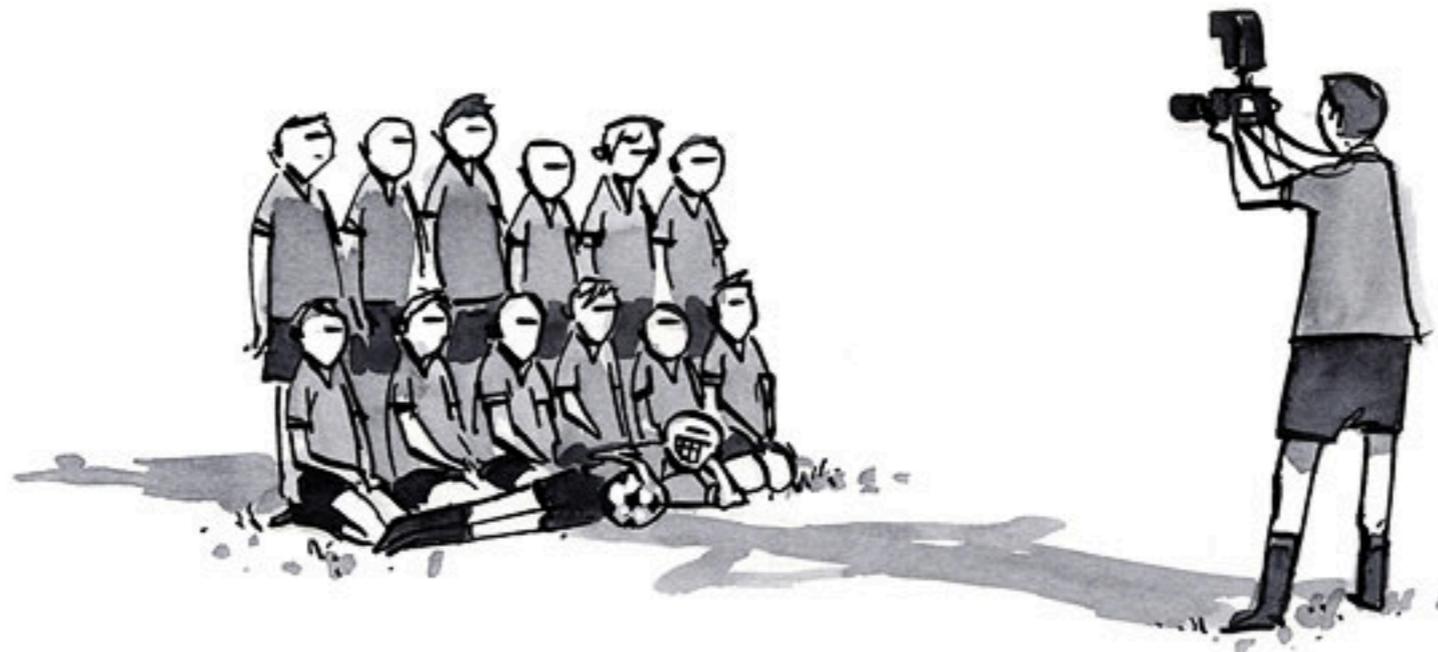
<http://www.flickr.com/photos/wesbrowning/5316400258/>

BBG: Before Boston Globe



MAY 25, 2010

Responsive Web Design

by **ETHAN MARCOTTE**Published in: [CSS](#), [Layout](#), [User Interface Design](#), [Mobile](#), [Mobile Design](#), [Mobile Development](#)[Discuss this article »](#) | [Share this article »](#)

“The control which designers know in the print medium, and often desire in the web medium, is simply a function of the limitation of the printed page. We should embrace the fact that the web doesn’t have the same constraints, and design for this flexibility. But first, we must “accept the ebb and flow of things.”

John Allsopp, [“A Dao of Web Design”](#)

The English architect Christopher Wren once quipped that his chosen field “aims for Eternity,” and there’s something appealing about that formula: Unlike the web, which often feels like aiming for next week, architecture is a discipline very much defined by its permanence. A building’s foundation defines its footprint, which defines its frame, which shapes the facade. Each phase of the architectural process is more immutable, more unchanging than the last. Creative decisions quite literally shape a physical space, defining the way in which people move through its confines for decades or even centuries.

Search ALA

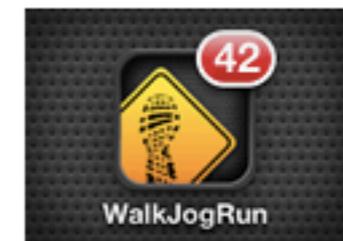
 Include discussions

Topics

- ♦ [Code](#)
- ♦ [Content](#)
- ♦ [Culture](#)
- ♦ [Design](#)
- ♦ [Mobile](#)
- ♦ [Process](#)
- ♦ [User Science](#)

Snapshot

Learn how to use fluid grids, flexible images, and media queries to create elegant user experiences with responsive web design.



Need Inspiration? Go for a run. Find a route on WalkJogRun’s app.

Ad via The Deck

JOB BOARD

[Straight North is looking for a Web Designer.](#)

A
LIST
apart

FOR PEOPLE WHO
MAKE WEBSITES

Cloud Four Blog

TECHNICAL NOTES, WAR STORIES AND ANECDOTES

CSS Media Query for Mobile is Fool's Gold



Jason Grigsby | August 3, 2010

Ethan Marcotte's article [Responsive Web Design](#) has caught the imagination of web developers. Several subsequent articles have touted the CSS media query feature as a way to build mobile-optimized web sites.

Search for:

Search

We wrote the book: [Head First Mobile Web](#)



Interested in the topics discussed in our blog? Looking for a more foundational guide to the mobile Web? Check out the [book we wrote](#).

Head First Mobile Web is written for web developers by web developers, with clear explanations and hand-on examples that get you working with real code, quickly.



No. 306

ARTICLES • TOPICS • ABOUT • CONTACT • CONTRIBUTORS

MAY 25, 2010

Responsive Web Design
by ETHAN MARCOTTE

Published in: CSS, Layout, User Interface Design

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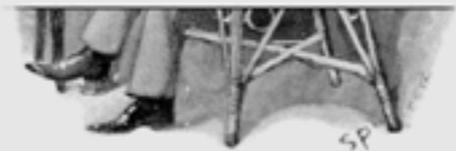


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[Come Aboard: Inspiring an Empathic Future-](#)



The Baker Street
INQUIRER



THE
WEBLOGUE

BACK
ISSUES

ABOUT
OUR PAPER

“Give me problems, give me *work*.”

In the year 1878 I took my degree of Doctor of Medicine of the University of London, and proceeded to Netley to go through the course prescribed for surgeons in the army. Having completed my studies there, I was duly attached to the Fifth Northumberland Fusiliers as Assistant Surgeon. The regiment was stationed in India at the time, and before I could join it, the second Afghan war had broken out. On landing at Bombay, I learned that my corps had advanced through the passes, and was already deep in the enemy's country.

victors & villains



SHERLOCK
HOLMES



DR JOHN HEMISH
WATSON



MYCROFT
HOLMES



PROF JAMES
MORIARTY



IRENE
ADLER



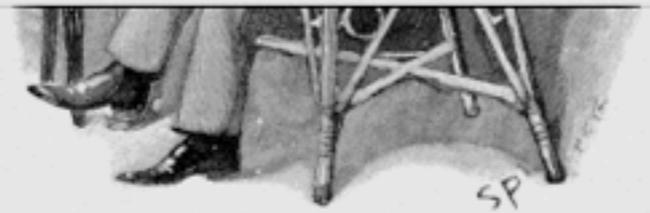
JAMES
WINTER

Illustrations by **Sidney Paget**, words by **Sir Arthur Conan Doyle**.

What remains is by **Ethan Marcotte**.



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OUR PAPER

victors & villains



**SHERLOCK
HOLMES**



**DR JOHN HEMISH
WATSON**



**MYCROFT
HOLMES**



A Flexible Grid

www.alistapart.com/d...

Read Later Watch Later Other Bookmarks

THE WEBLOGUE BACK ISSUES ABOUT OUR PAPER

The Baker Street
INQUIRER

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victors & villains



Media Queries Hide Problems

	Original	Resized	K Saved	% Saved
Holmes	34.7K	8.1K	26.6K	76.6%
Watson	39.0K	8.4K	30.6K	78.4%
Mycroft	30.5K	6.7K	23.8K	78.0%
Moriarty	43.4K	8.2K	35.2K	81.1%
Adler	26.0K	6.6K	19.4K	74.6%
Winter	34.7K	7.8K	26.9K	77.5%
Total	208.3K	45.8K	162.5K	78.0%

The resounding answer from the community:
Mobile First Responsive Web Design

A Brain-Friendly Guide

Head First Mobile Web



Build
once, run
everywhere



Be more supportive
(of your users)



Find your
way with
geolocation

Put your
pages on a
small-screen diet



Shape-shift your
sites with Responsive
Web Design

O'REILLY®

Lyza Danger Gardner
& Jason Grigsby

“Awesome. We’ll
devote a chapter to
Mobile First
Responsive Web
Design in our book.”

Cloud Four

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Responsive Web
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Famous last words.

Cloud Four

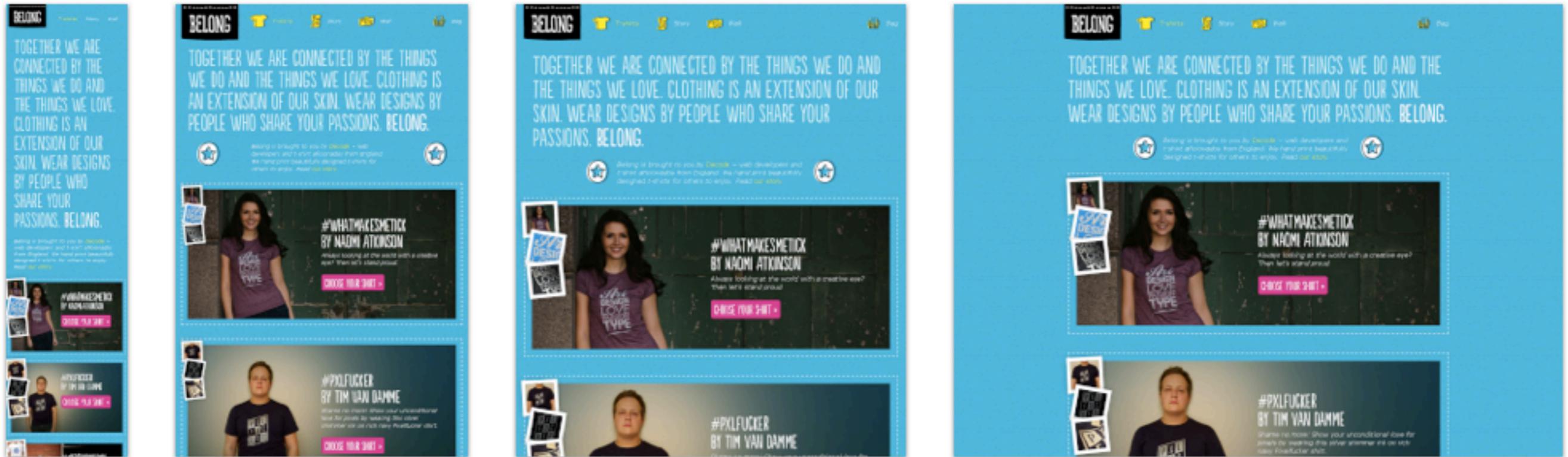
Media Queries

Simple Issue Tracking
Hosted bug and issue
tracking perfect for small
teams.

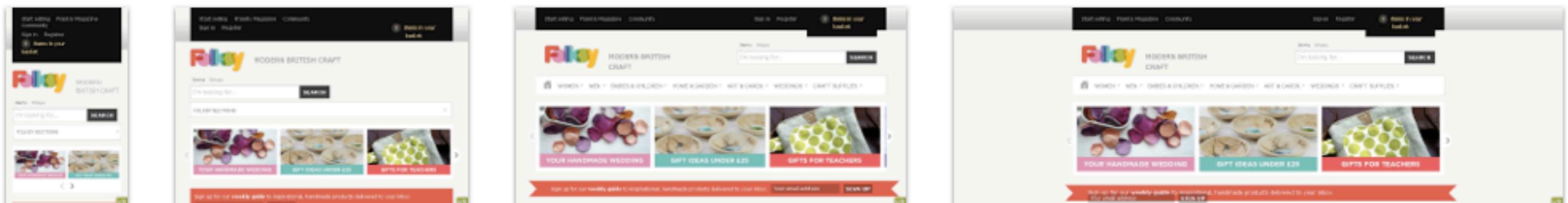


via Ad Packs

Belong

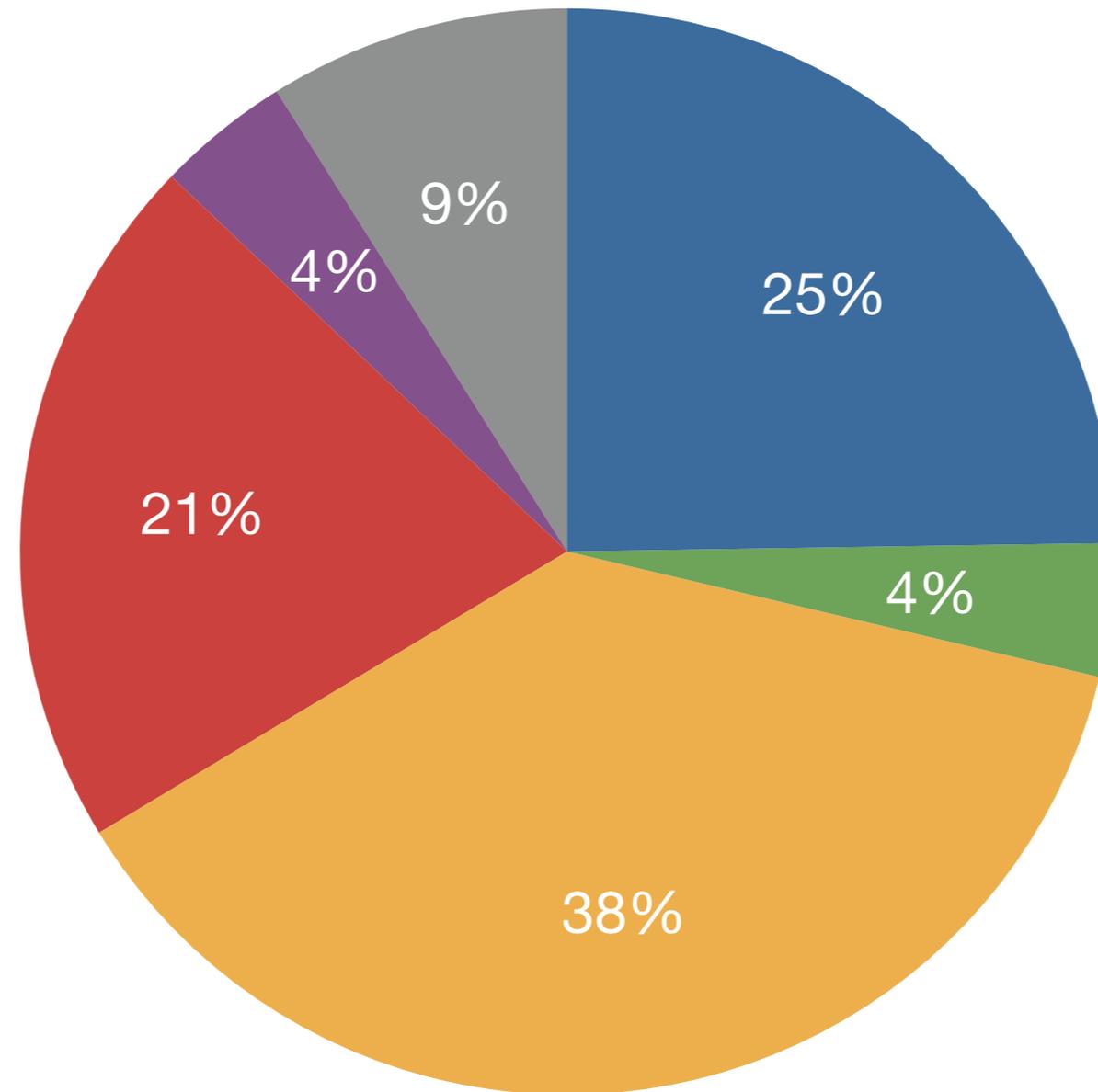


Folksy



Where are the Mobile First RWDs?

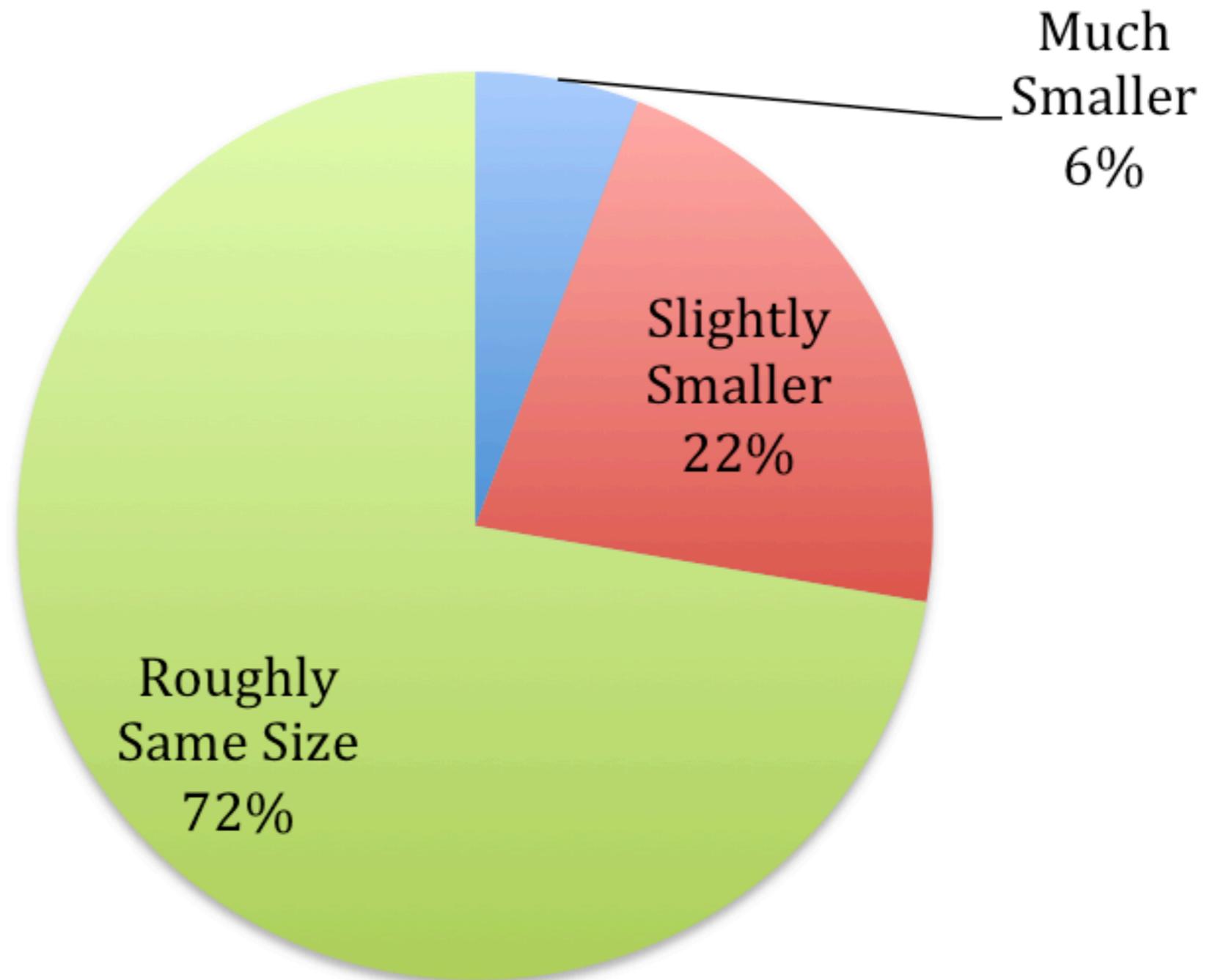
106 sites from mediaqueri.es tested

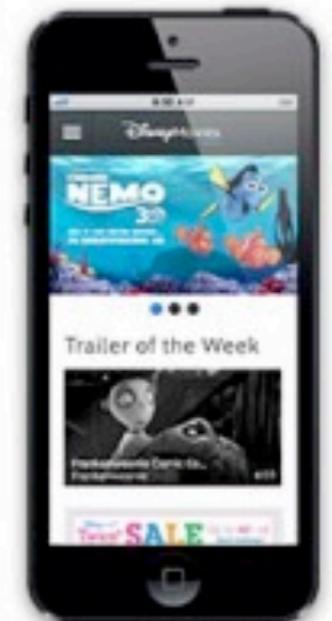
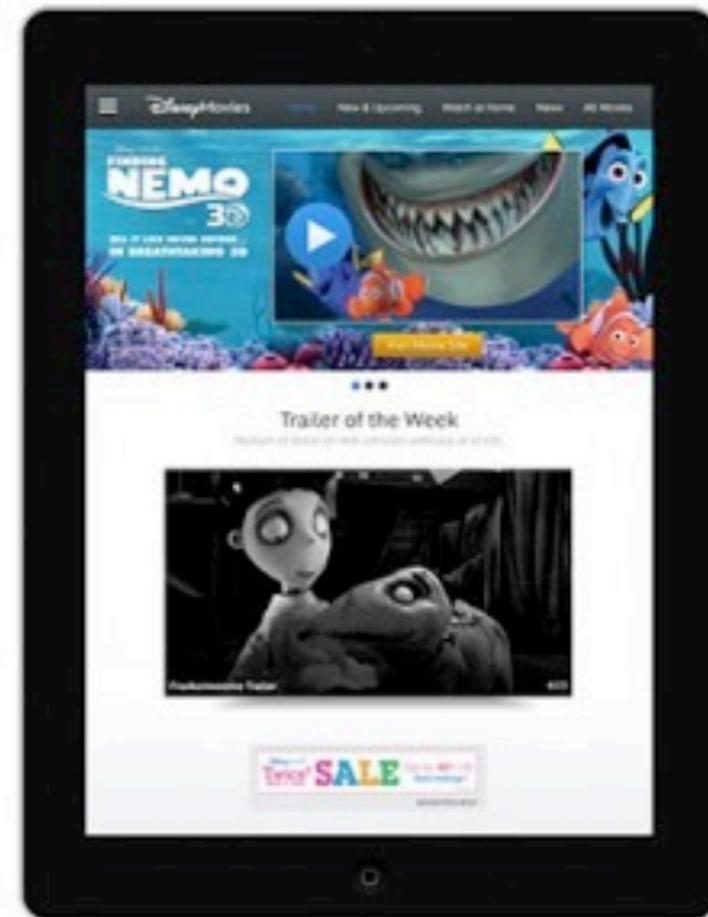
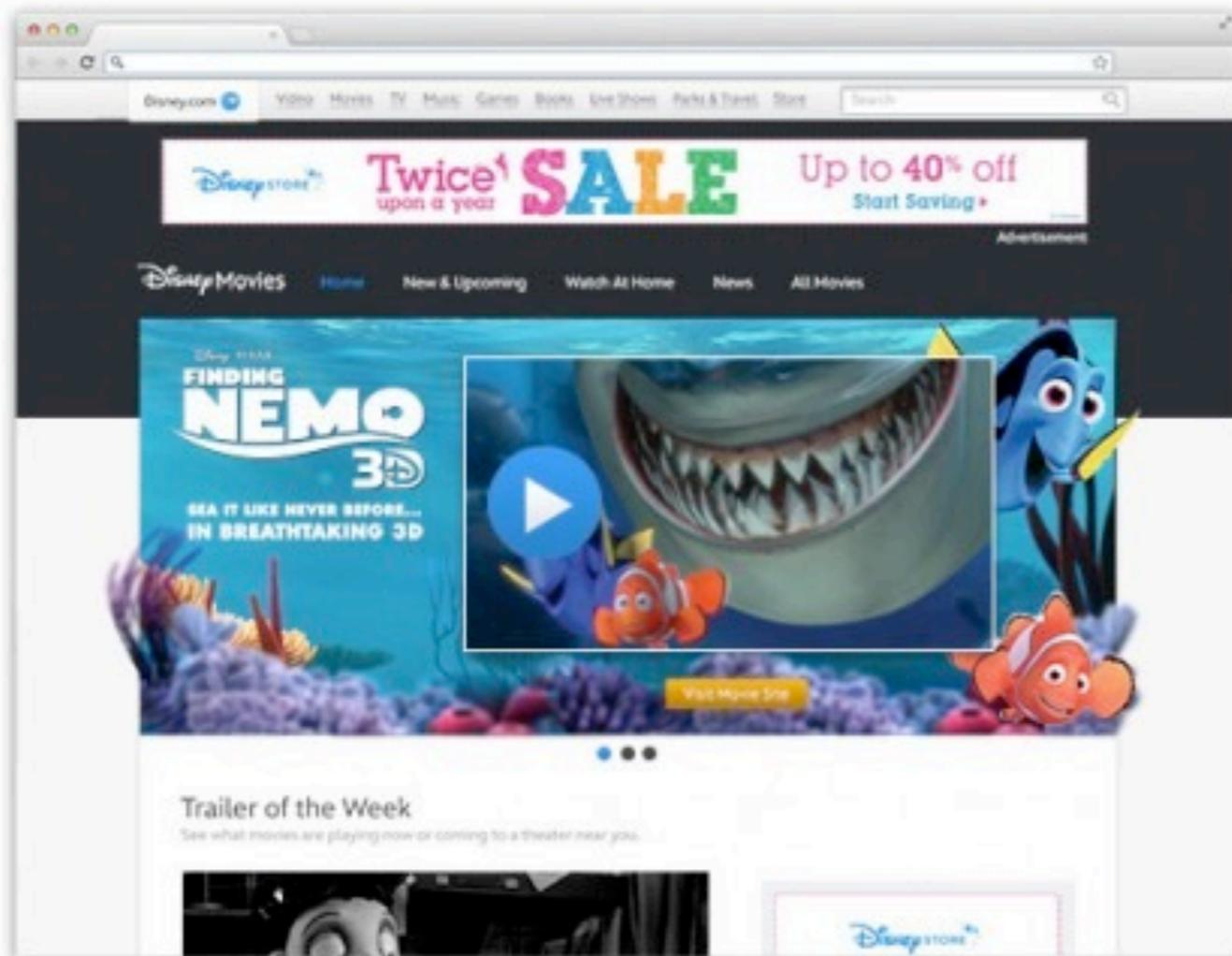


- Mobile is Larger
- Less than 10% Savings
- 51% to 100% Savings
- Same Size
- 11 to 50% Savings
- Greater than 100% Savings

Guy Podjarny repeated the experiment

2013: 476 sites from mediaqueri.es tested



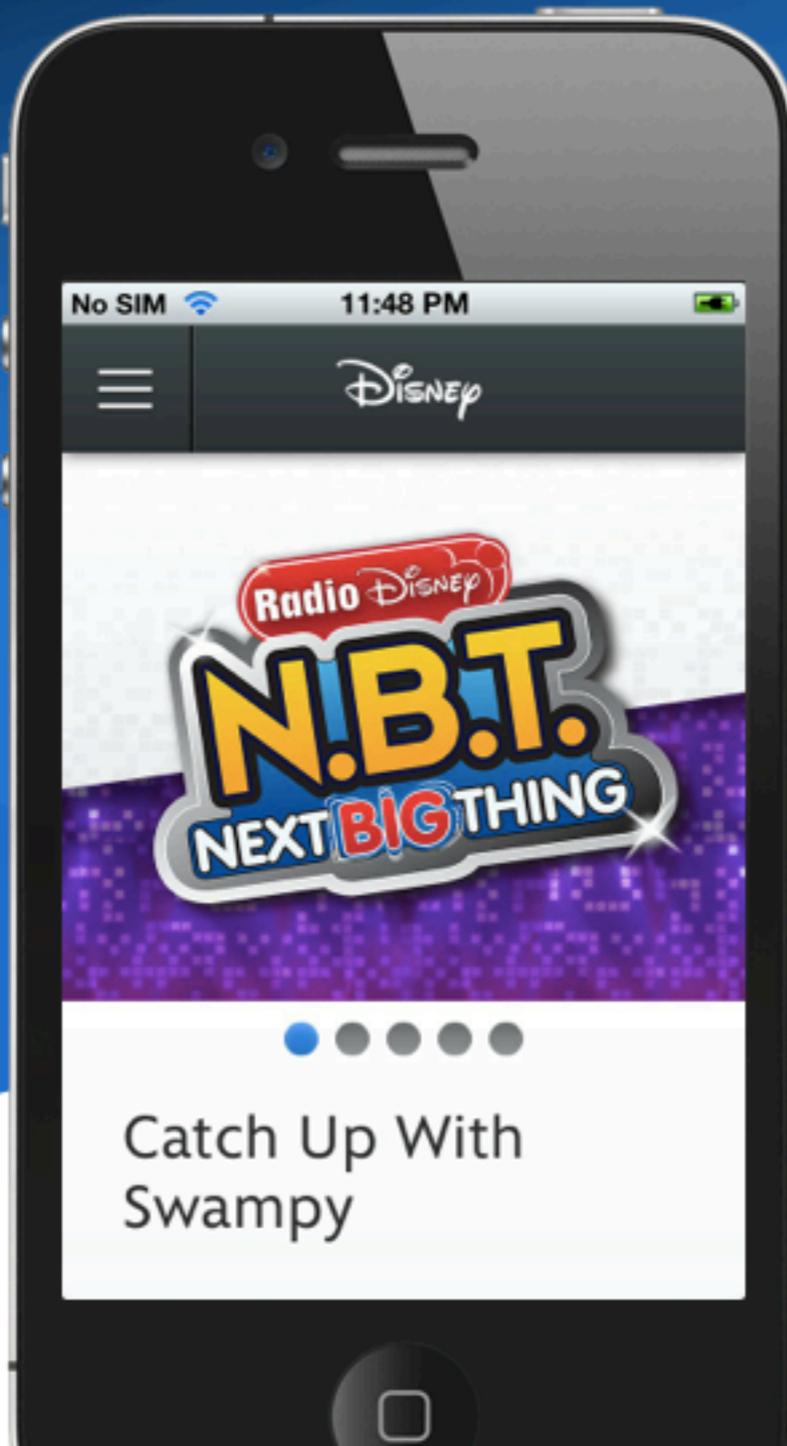


<http://www.thefoxisblack.com/2012/10/02/the-design-thinking-behind-the-new-disney-com/>



Test Your Website Performance On A Mobile Device

> Mobitest Form



Mobitest

Mobile Performance Results for:

<http://disney.go.com>

on iPhone 4, IOS 5.0



Your website's results:

Average Load Time
13.49s

Average Page Size
4382.87kb

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🐦 Tweet

🔗 ShareThis

> View HAR file

Register Now >

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Most responsive web designs are...





Time to pen another fool's gold post?

<http://www.flickr.com/photos/mykloventine/3400040943/>





Scott Jehl

@scottjehl

Following



Being Responsive from a layout perspective should not preclude us from being responsive from a performance and interaction perspective.

 Reply  Retweeted  Favorited

<https://twitter.com/scottjehl/status/243025352069349377>

5

**key techniques
for responsible
responsive design**

#1 Build Mobile First Responsive Designs



Different than Mobile First Design Theory



Mobile First Responsive Web Design is a technical approach for responsive designs.

Graceful Degradation



Progressive Enhancement



<http://bradfrostweb.com/blog/web/mobile-first-responsive-web-design/>



ENTERING
TANGENT

AND THE SURVEY SAYS... "Mobile First" Is A Dumb Strategy

Henry Blodget | Dec. 22, 2012, 11:12 AM | 8,665 | 24

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There has been a lot of talk over the past couple of years about how laptops and desktops are toast and everything's going mobile.

As a result, the prevailing wisdom is that companies should become:

- **"Mobile Only"** (just forget big screens, keyboards, and mice--they're dead)

Or, at least,

- **"Mobile First"** (design everything for smartphones first and big screens as an afterthought)

For some mobile-centric companies--Instagram, location-based apps, mobile games--these strategies obviously make sense. The applications the companies offer are centered on mobile gadgets.

For other companies, however--including some news and information companies that are frantically redesigning their businesses to focus on "Mobile First"--the strategy seems misguided.

The smarter strategy, I think, is this:

- **"Mobile, Too"**

With the explosive growth of smartphones, tablets, and super-sleek laptops, mobile usage

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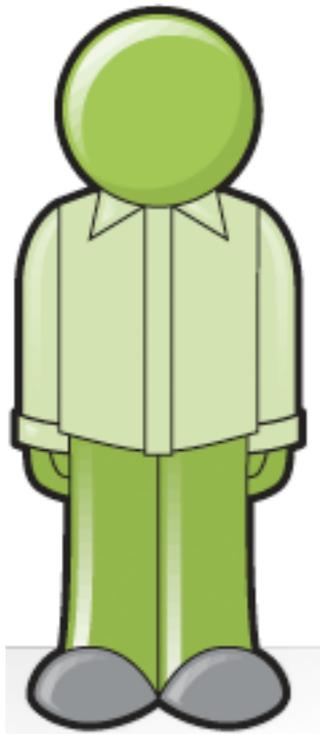
In your network



The 25 Best-Paying Companies For Software Engineers

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Luke's Take on Mobile First



Growth = **Opportunity**

Constraints = **Focus**

Capabilities = **Innovation**

Mobile First Doesn't Mean Starting from Scratch

Reimbursements Mileage Pharmacy/other medical Meals Lodging

Reimbursement of expenses

Please complete this form and submit it. We will return incomplete requests for more information.

Reimbursement must be requested within two years from date of service.

Reimbursement requests can take up to 30 days to be processed.

I certify that all information I have given in this request for reimbursement is true and contains no false statements and/or misrepresentation.

Print Reset Submit

Mileage	\$86.58
Pharmacy/other	\$7.50
Meals	\$550.51
Lodging	\$0.00
Total	\$644.59

How do I make this responsive?

Reimbursements Mileage Pharmacy/other medical Meals Lodging

Mileage

0.5550 cents per mile effective 4/17/2012. Gas receipts are not necessary.

Click Add to get started Add Edit Copy Delete [Need help?](#)

Travel date	Start location	End location	Medical purpose	Miles	Total miles	Amount
8/1/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Doctor	12	12	\$6.66
9/1/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Other	30	60	\$33.30
9/3/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	IME	30	60	\$33.30
9/4/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Hospital	12	24	\$13.32

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How do I make this responsive?

Reimbursements Mileage Pharmacy/other medical Meals Lodging

Mileage ×

*Required fields

Travel date* 8/1/2012 (mm/dd/yyyy)

Start location* 123 Johnson Ave, Salem, OR (Address, city, state, zip)

End location* 440 Mission St, Salem, OR 97 (Business, address, city, state, zip)

Medical purpose Doctor

Miles* 12 [Google maps](#)

Trip type One-way

Total miles 12

Save

I certify that all information I have given in this request for reimbursement is true and contains no false statements and/or misrepresentation.

Print Reset Submit

	Amount
2	\$6.66
0	\$33.30
0	\$33.30
4	\$13.32
Mileage	\$86.58
Pharmacy/other	\$7.50
Meals	\$550.51
Lodging	\$0.00
Total	\$644.59



ancphotos

Ok, let's start from a clean slate



What would the mobile version of this form look like?

The image shows a mobile application interface for an expense reimbursement form. At the top, the status bar displays 'iPhone 3G' and the time '21:23'. The title 'Expense Reimbursement' is centered in a grey header. Below the header, a message reads: 'Please complete this form and submit it. We will return incomplete requests for more information.' The form contains a list of expense categories with their respective amounts and a right-pointing chevron icon: Mileage (\$86.58), Pharmacy/other (\$7.50), Meals (\$550.51), and Lodging (\$0.00). A bolded 'Total' row shows the sum as '\$644.59'. Below the list, a certification statement reads: 'I certify that all information I have given in this request for reimbursement is true and contains no false statements and/or misrepresentation.' At the bottom, there is a rounded rectangular button labeled 'Submit'.

Expense Reimbursement	
Please complete this form and submit it. We will return incomplete requests for more information.	
Mileage	\$86.58 >
Pharmacy/other	\$7.50 >
Meals	\$550.51 >
Lodging	\$0.00 >
Total	\$644.59
I certify that all information I have given in this request for reimbursement is true and contains no false statements and/or misrepresentation.	
<input type="button" value="Submit"/>	

What would the mobile version of this form look like?

The screenshot shows an iPhone interface with a status bar at the top displaying 'iPhone 3G', '21:23', and a battery icon. Below the status bar is a navigation bar with a 'Back' button on the left and the title 'Mileage' in the center. The main content area contains a text block: '0.5550 cents per mile effective 4/17/2012. Gas receipts are not necessary.' Below this is a list of three items, each with a date, a bolded title, a monetary value, and a mileage amount, followed by a right-pointing chevron. The items are: 'Doctor' (8/1/2012, \$6.66, 12 Miles), 'Hospital' (12/31/2012, \$33.30, 60 Miles), and 'IME' (8/1/2012, \$13.32, 24 Miles). At the bottom of the screen is a large, rounded rectangular button labeled 'Done'.

Date	Category	Amount	Miles
8/1/2012	Doctor	\$6.66	12 Miles
12/31/2012	Hospital	\$33.30	60 Miles
8/1/2012	IME	\$13.32	24 Miles

What would the mobile version of this form look like?

iPhone 3G 21:23

Back Mileage

Travel Date	8/1/2012
Start Location	440 Mission St. Salem, OR 97301
End Location	440 Mission St. Salem, OR 97301
Medical Purpose	Doctor
Miles	12
Trip Type	One way

Total miles 12

Delete Save

How does that map to the current desktop design?

iPhone 3G 21:23

Expense Reimbursement

Please complete this form and submit it. We will return incomplete requests for more information.

Mileage	\$86.58	>
Pharmacy/other	\$7.50	>
Meals	\$550.51	>
Lodging	\$0.00	>

Total \$644.59

I certify that all information I have given in this request for reimbursement is true and contains no false statements and/or misrepresentation.

Submit

Reimbursements | Mileage | Pharmacy/other medical | Meals | Lodging

Reimbursement of expenses

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Print | Reset | Submit

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Print Reset Submit

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How does that map to the current desktop design?

iPhone 3G 21:23

Back Mileage

Travel Date 8/1/2012 >

Start Location 440 Mission St. Salem, OR 97301 >

End Location 440 Mission St. Salem, OR 97301 >

Medical Purpose Doctor >

Miles 12 >

Trip Type One way >

Total miles 12

Delete Save



Mileage x

* Required fields

Travel date* 8/1/2012 (mm/dd/yyyy)

Start location* 123 Johnson Ave, Salem, OR (Address, city, state, zip)

End location* 440 Mission St, Salem, OR 97 (Business, address, city, state, zip)

Medical purpose Doctor

Miles* 12 [Google maps](#)

Trip type One-way

Total miles 12

Save

Can this desktop version be better using what we've learned from the mobile version?

Reimbursements Mileage Pharmacy/other medical Meals Lodging

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Mileage \$86.58 >

Pharmacy/other \$7.50 >

Meals \$550.51 >

Lodging \$0.00 >

Total \$644.59

Travel date	Start location	End location	Medical purpose	Miles	Total miles	Amount
8/1/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Doctor	12	12	\$6.66
9/1/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Other	30	60	\$33.30
9/3/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	IME	30	60	\$33.30
9/4/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Hospital	12	24	\$13.32
9/19/2012	123 Johnson Ave, Salem, OR 97317	440 Mission St, Salem, OR 97301	Hospital	20	40	\$22.20

Add

Edit

Copy

Delete

I certify that all information I have given in this request for reimbursement is true and contains no false statements and/or misrepresentation.

Submit

Mobile First

This is why Mobile First thinking is so powerful even on projects that are currently implemented on the desktop.

Mobile First Responsive Web Design

Graceful Degradation



Progressive Enhancement



<http://bradfrostweb.com/blog/web/mobile-first-responsive-web-design/>

Reorder media queries so cascade goes from small to large screens

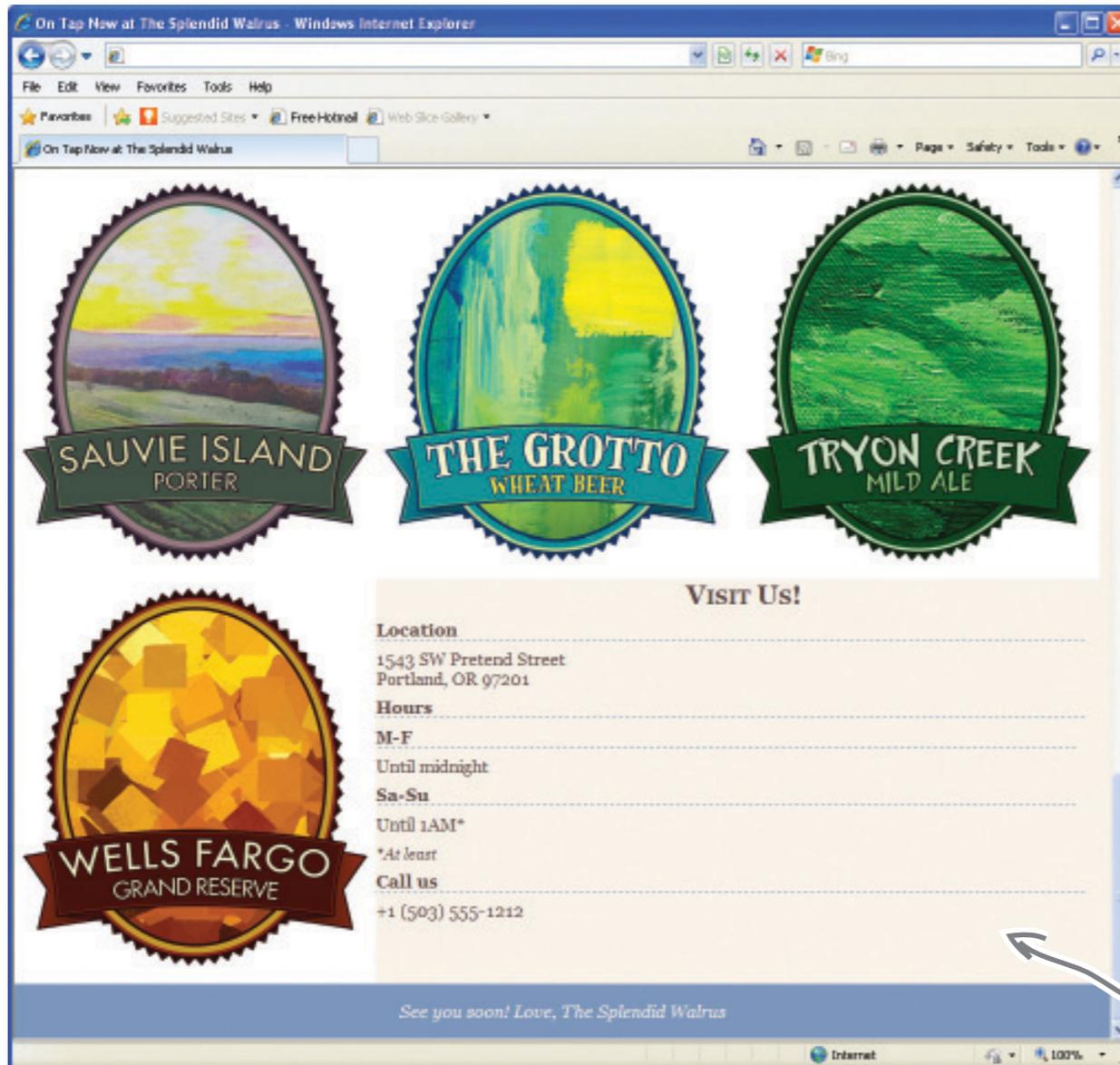
```
/* Wider viewports/higher resolutions (e.g. desktop) */  
@media screen and (min-width:481px) {  
  [Desktop layout rules here]  
}  
  
/* Mobile/lower-resolution devices */  
@media screen and (max-width:480px) {  
  [Mobile layout rules here]  
}
```

Move the mobile media query block above the desktop media query. By doing this, we're making sure the cascading effect of CSS is consistent with our mobile first progressive enhancement approach.

Keep basic styles outside of media queries.

The absence of support for media queries is in fact the first media query.
—Bryan Rieger, Yiibu

Oh come on IE. No love?



Because IE 8 and below don't support media queries, IE isn't getting the CSS rules that create columns.

IE conditional comments

```
<link rel="stylesheet" type="text/css" href="taps.css" />  
<link rel="stylesheet" type="text/css" href="layout.css" media="all and  
(min-width: 481px)">  
<!--[if (lt IE 9)&(!IEMobile)]>  
<link rel="stylesheet" type="text/css" href="layout.css" media="all" />  
<![endif]-->
```

The conditional comment repeats the line above it ensuring desktop IE sees our layout.css file.

IE conditional comments

```
<link rel="stylesheet" type="text/css" href="taps.css" />  
<link rel="stylesheet" type="text/css" href="layout.css" media="all and  
(min-width: 481px)">  
<!--[if (lt IE 9)&(!IEMobile)]>  
<link rel="stylesheet" type="text/css" href="layout.css" media="all" />  
<![endif]-->
```

The conditional comment repeats the line above it ensuring desktop IE sees our layout.css file.

or use **Respond.js**
(a media query polyfill for IE)



#2 Keep CSS images in their place

Images with display:none are still downloaded

+ GET poweredby.png	200 OK	3.5 KB	670ms
+ GET the_grotto.jpg	200 OK	206.1 B	590ms
+ GET wells_fargo.jpg	200 OK	156.1 B	875ms
+ GET taps.jpg	200 OK	440.7 B	1.24s
+ GET transparent.png	200 OK	95 B	52ms

The taps.jpg file is 440.7K making it the largest file on the page.



```
@media screen and (max-width:480px) {  
  [Other CSS rules are here]  
  .header {display:none;}  
}
```

Media Query & Asset Downloading Results

A little while back, **I mentioned** I was doing some research for **the book** about how images are downloaded when media queries are involved. To help with that, I wrote up some automated tests where Javascript could determine whether or not the image was requested and the results could be collected by Browserscope for review. I posted some initial findings, but I think I've got enough data now to be able to go into a bit more detail.

First, any credit has to go to the awesome team at Cloud Four. **Most of the tests were created by them** for some testing they were doing. I just added some Javascript to automate them.

On to the results!

Test One: Image Tag

Run the test

This page tried to hide an image contained within a div by using `display: none`. The

April 10th, 2012 ∞

tagged: [book](#), [media queries](#),
[mobile](#), [performance](#), [responsive](#)

[39 Comments](#)



Images scoped within media queries

```
<div id="test5"></div>
@media all and (min-width: 601px) {
  #test5 {
    background-image:url('images/test5-desktop.png');
    width:200px;
    height:75px;
  }
}
@media all and (max-width: 600px) {
  #test5 {
    background-image:url('images/test5-mobile.png');
    width:200px;
    height:75px;
  }
}
```

Tested	Requests Both
Android 2.1+	No
Blackberry (6.0+)	No
Chrome (16+)	No
Chrome Mobile	No
Fennec (10.0+)	Yes
Firefox (3.6+)	No
IE 9+	No
iOS (4.26+)	No
Kindle (3.0)	No
Opera (11.6+)	No
Opera Mini (6.5+)	No
Opera Mobile (11.5)	No
Safari (4+)	No

display:none on parent element

```
<div id="test3">
  <div></div>
</div>
#test3 div {
  background-image:url('images/test3.png');
  width:200px;
  height:75px;
}
@media all and (max-width: 600px) {
  #test3 {
    display:none;
  }
}
```

Tested	Requests Image
Android 2.1+	No
Blackberry (6.0+)	No
Chrome (16+)	No
Chrome Mobile	No
Fennec (10.0+)	Yes
Firefox (3.6+)	No
IE 9+	No
iOS (4.26+)	No
Kindle (3.0)	No
Opera (11.6+)	No
Opera Mini (6.5+)	No
Opera Mobile (11.5)	No
Safari (4+)	No

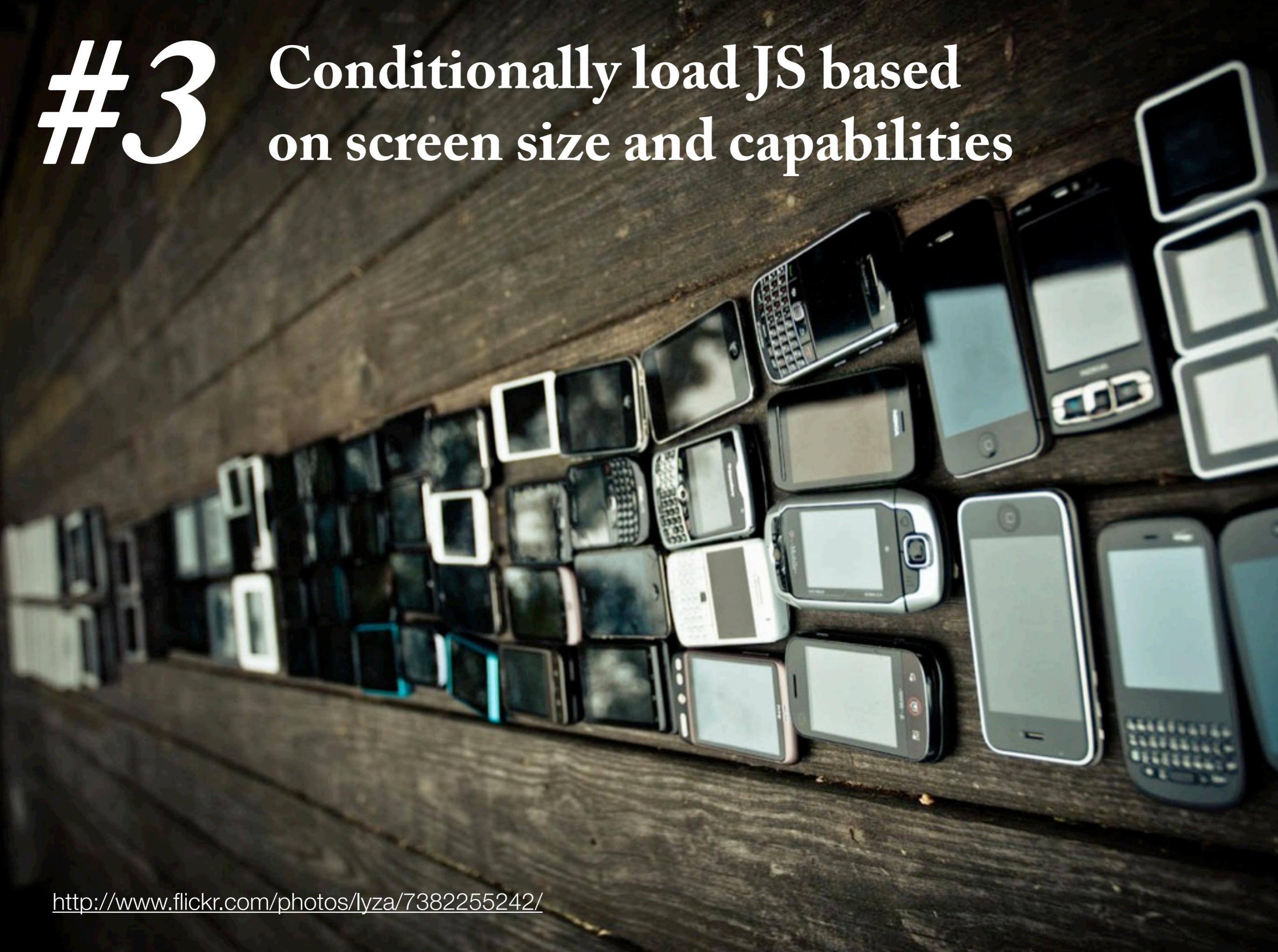
Image override with a media query

```
<div id="test4"></div>
#test4 {
  background-image:url('images/test4-desktop.png');
  width:200px;
  height:75px;
}
@media all and (max-width: 600px) {
  #test4 {
    background-image:url('images/test4-mobile.png');
  }
}
```

Tested	Requests Both
Android 2.1-3.0?	Yes
Android 4.0	No
Blackberry 6.0	Yes
Blackberry 7.0	No
Chrome (16+)	No
Chrome Mobile	No
Fennec (10.0+)	Yes
Firefox (3.6+)	No
IE 9+	No
iOS (4.26+)	No
Kindle (3.0)	Yes
Opera (11.6+)	No
Opera Mini (6.5+)	No
Opera Mobile (11.5)	No
Safari 4.0	Yes
Safari 5.0+	No

#3

Conditionally load JS based on screen size and capabilities



Hiding content with display:none does not prevent it from downloading.

Look inside ontap.html to find this code.

```
<iframe id="map" width="300" height="300" frameborder="0" scrolling="no" marginheight="0" marginwidth="0" src="http://maps.google.com..."></iframe>
```

This single iframe causes 47 files to be downloaded!

Extremely long URL abbreviated

taps.css

```
@media screen and (max-width:480px) {  
  .  
  . }  
  .  
  #map {display:none;}  
}
```

There are many more rules in the css file.

The iframe has an id of map. This rule hides the Google Maps iframe by setting the display to none.

matchMedia() polyfill

test whether a CSS media type or media query applies

- **Authors:** Scott Jehl, Paul Irish, Nicholas Zakas
- **Spec:** dev.w3.org/csswg/cssom-view/#dom-window-matchmedia
- **Native support:** Chrome [since m10](#), Firefox [since 6](#), and Safari [since 5.1](#)

How about resizing the browser?

Paul Hayes made [tackled this using CSS transitions and their transitionEnd event](#)

His code: <https://github.com/fofr/matchMedia.js> -- though currently it doesnt support IE6-9, since they dont have transitions, obviously. :)

Usage

test 'tv' media type

```
if (matchMedia('tv').matches) {  
  // tv media type supported  
}
```

test a mobile device media query

```
if (matchMedia('only screen and (max-width: 480px)').matches) {  
  // smartphone/iphone... maybe run some small-screen related dom scripting?  
}
```



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Conditional CSS

I got some great comments on my post about [conditionally loading content](#).

Just to recap, I was looking for a way of detecting from JavaScript whether media queries have been executed in CSS without duplicating my breakpoints. That bit is important: I'm not looking for MatchMedia, which involves making media queries in JavaScript. Instead I'm looking for some otherwise-useless CSS property that I can use to pass information to JavaScript.

[Tantek](#) initially suggested using good ol' `voice-family`, which he has used for [hacks in the past](#). But, alas, that unsupported property isn't readable from JavaScript.

Then Tantek suggested that, whatever property I end up using, I could apply it to an element that's never rendered: `meta` or perhaps `head`. I like that idea.

A number of people suggested using `font-family`, citing [Foresight.js](#) as prior art. I tried combining that idea with Tantek's suggestion of using an invisible element:

```
@media screen and (min-width: 45em) {
  head {
    font-family: widescreen;
  }
}
```

About this site

[Adactio](#) is the online home of [Jeremy Keith](#), a web developer and author living and working in Brighton, England.

Customise

Choose a theme...

default [?](#)

This is the plain vanilla look.

Search

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- Peruse the [archive](#)
- Browse the [tags](#)

Subscribe

You can subscribe to the [journal RSS feed](#).

Recommended reading

Hand-picked highlights from the archive.

- [Hyperdrive](#)

AJAX Include Pattern

```
<a href="articles/latest/"  
  data-append="articles/latest/fragment"  
  data-media="(min-width: 30em)">  
  Latest Articles  
</a>
```

#4 Deliver different size s at different screen sizes



One SRC to rule all images

There are 16 beer labels on the On Tap Now page that use an img tag like this one for the Bensons Bubbler.

Despite the need for multiple versions of this image depending on the screen size, HTML only allows one value for the src.

```

```

Two most common use cases

Resolution Switching

Includes high-density (retina) images.



<https://www.flickr.com/photos/whitehouse/8491445521>

Art direction



<http://www.flickr.com/photos/barackobamadotcom/5795228030/>

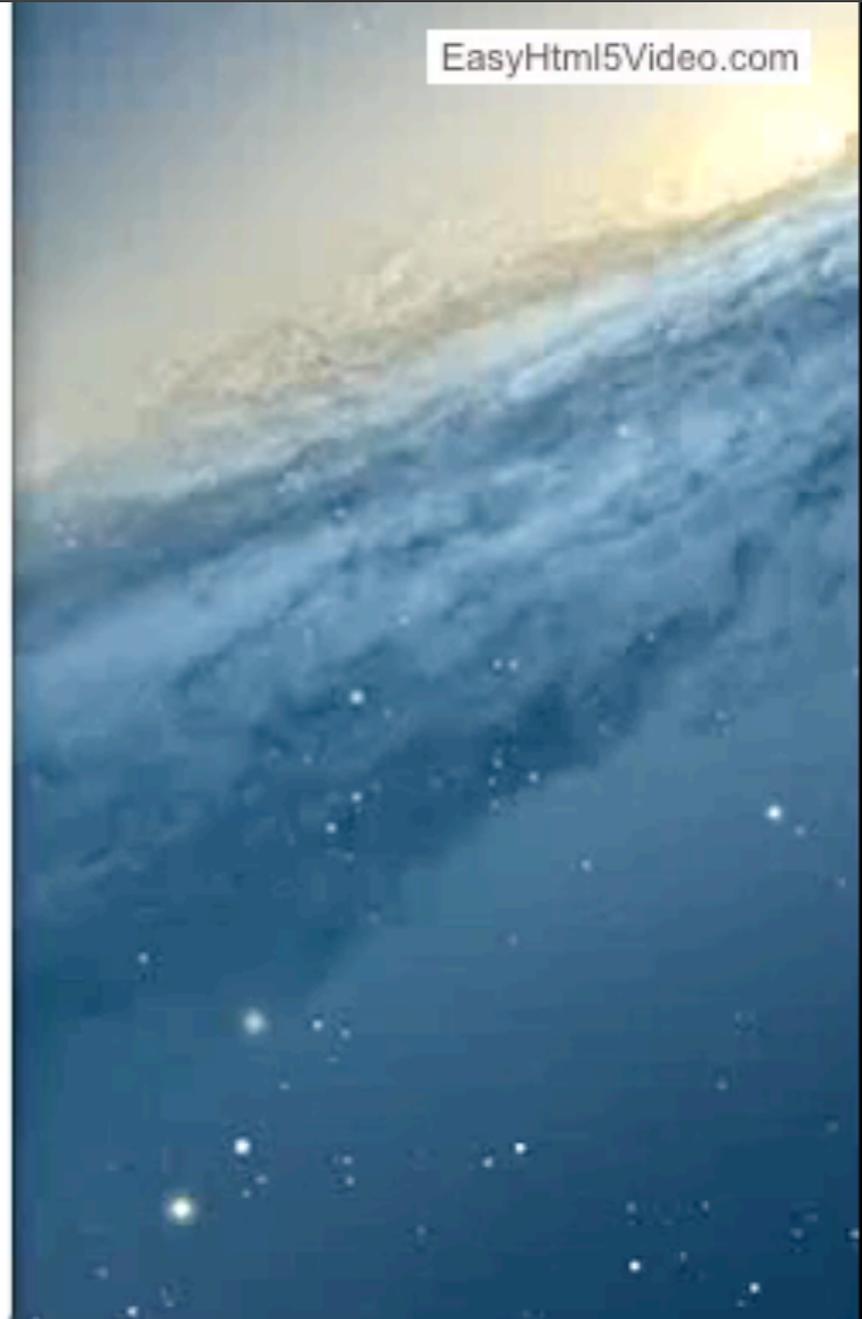
Not simply cropping



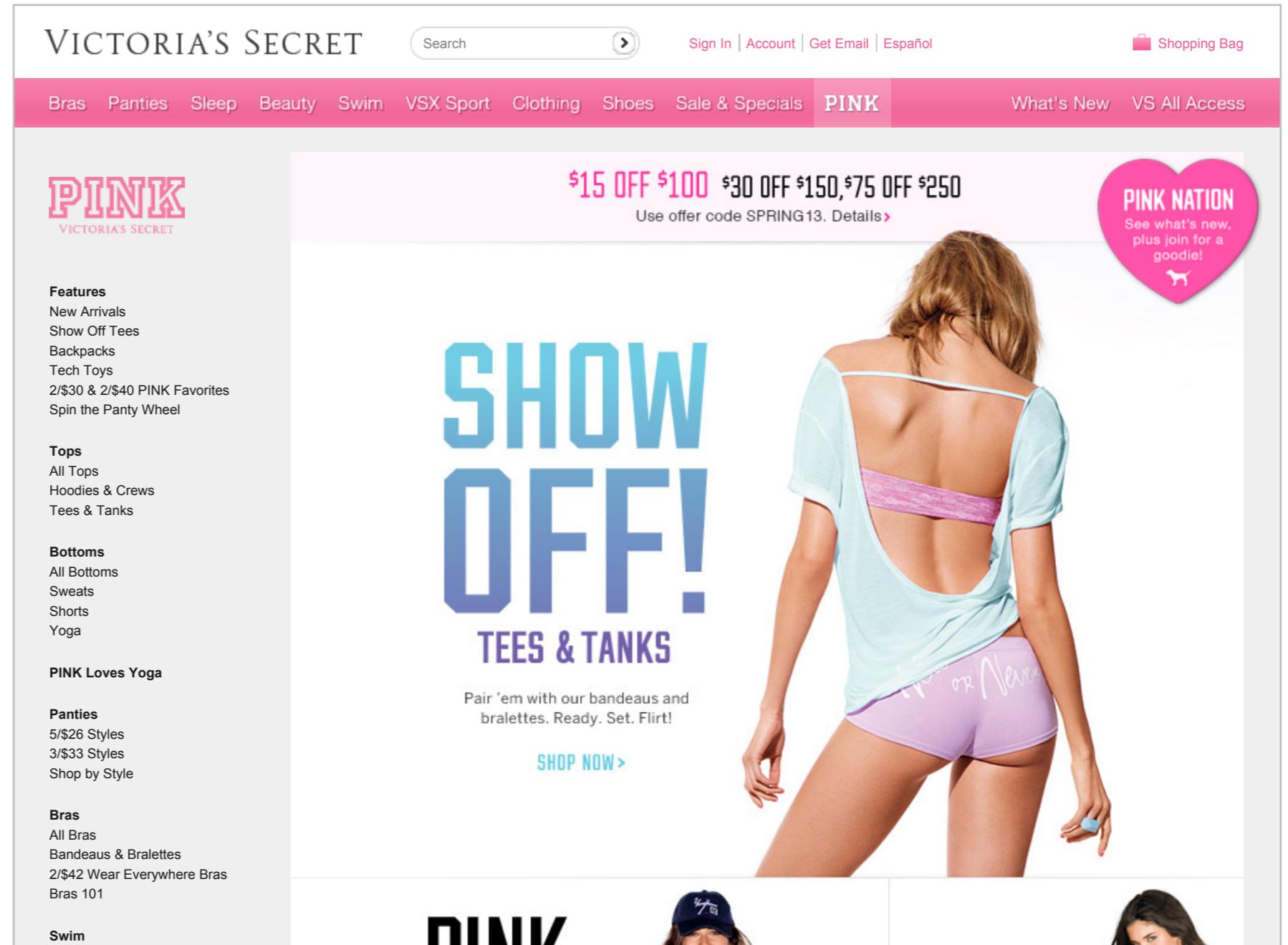
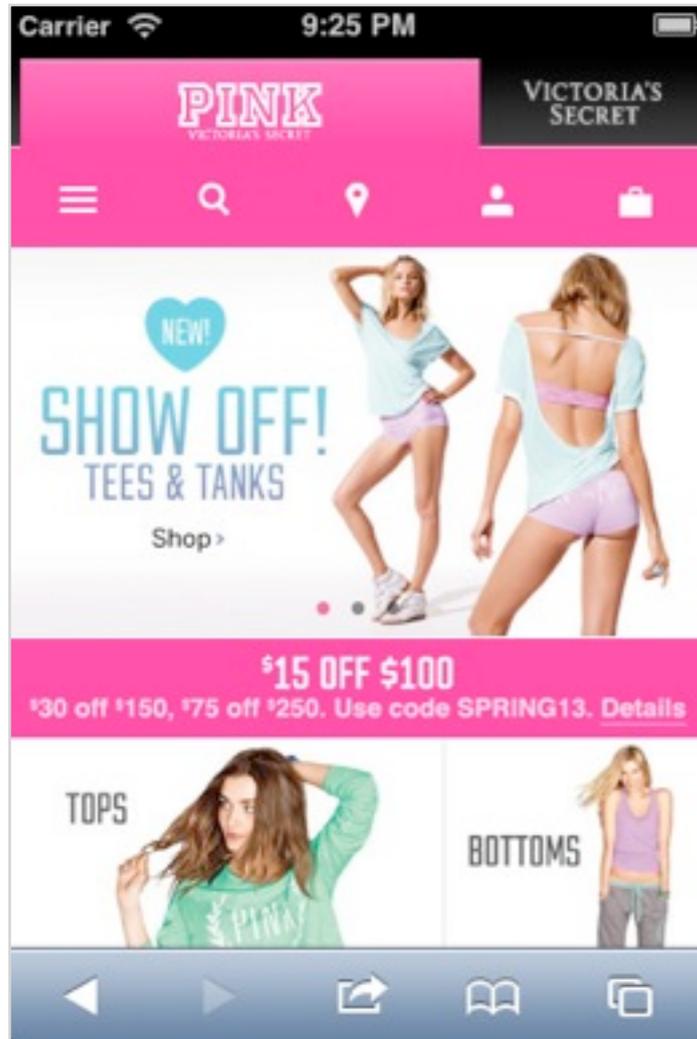
Browser for MeeGo

Our fastest browser ever, Browser for MeeGo introduces new gestures designed to make one-handed browsing

EasyHtml5Video.com



Art direction: Images with text



Cloud Four Blog

« [Responsive IMGs — Part 1](#)

[Responsive IMGs Part 3 — Future of the IMG Tag](#) »

[Responsive IMGs Part 2 — In-depth Look at Techniques](#)

September 30th, 2011 by Jason Grigsby

In [Responsive IMGs Part 1](#), I took a high-level look at what responsive IMGs are, the problem they are trying to solve, and the common issues they face. In this post, I'm going to take a deeper look at the specific techniques being used to provide responsive IMGs and try to evaluate what works and doesn't. If you haven't read [part 1](#), you may want to do so before reading this post as it will help explain some of the terms I use.

When I started working on this project two months ago, I thought I would get to the end and be able to say, "Here are the three approaches that work best. Go download them and figure out how to integrate them into your systems." Oh naivety!

What I've found is that there is no comprehensive solution. Instead, we have several months of experiments. Each experiment has its own advantages and disadvantages.

Because of this, the best thing we can do is understand the common elements and challenges so that we can start to pick the best parts of each for building our own solutions.

So um... this is a long post. Sorry. 😊

Abandoned approaches

Dynamic Base Tag

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November 2011

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20

JANUARY 31, 2012

Responsive Images: How they Almost Worked and What We Need

by **MAT MARQUIS**Published in: [Layout](#), [User Interface Design](#)[Discuss this article »](#) [Share this article »](#)

NOTE: Since this article ran in Issue No. 343, author Mat Marquis has established and is chairing a [Responsive Images Community Group](#) for the W3C. All are invited to participate. – Ed.

It's our job, as designers and developers, to pick apart even the seemingly most simple tasks to find ways to improve them. When Ethan Marcotte coined "[responsive web design](#)," he said that a responsive website is made up of three things: a flexible grid, flexible images and media, and media queries. In doing so, he opened up a world of new and exciting things to obsess over. I chose flexible images.

It's easy enough to style images so



Search ALA

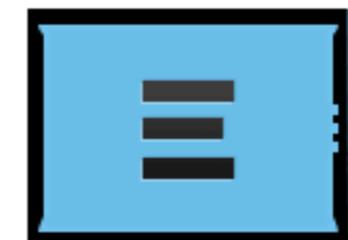
 Include discussions

Topics

[Code >](#)[Content >](#)[Culture >](#)[Design >](#)[Mobile >](#)[Process >](#)[User Science >](#)

Snapshot

It's easy enough to style images so that they scale to fit within a parent container by adding `img { max-width: 100%; }` to one's stylesheet. To use this effectively, though, the image must be large enough to scale up to whatever size we can reasonably expect on the largest possible display. This can mean a great deal of overhead.



Echograph : Evolved photography.

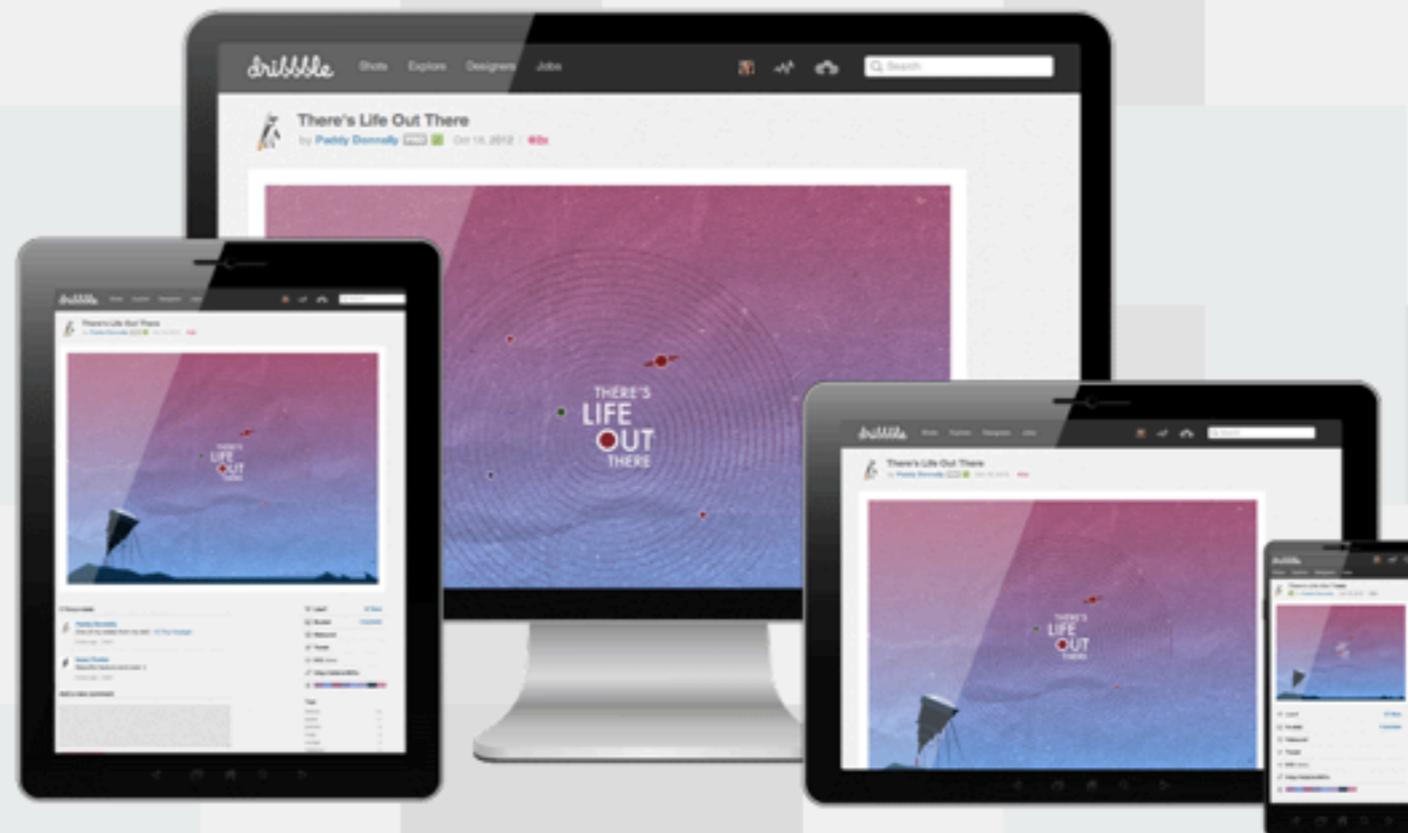
Things are still moving forward on a standards-based approach for responsive images.





We're a group of developers working towards a markup-based means of delivering alternate image sources based on device capabilities to prevent wasted bandwidth and optimize display for both screen and print.

JOIN US!



[Dribbble.com](https://dribbble.com) is using the picture markup pattern.

WHAT IS THE `PICTURE` ELEMENT?

The `picture` element is a markup pattern that allows developers to declare multiple sources for an image. By using media queries, it gives developers control as to when and if those images are presented to the user.

SAMPLE MARKUP FOR `PICTURE`

```
<picture>
  <source media="(min-width: 40em)" srcset="big.jpg 1x, big-hd.jpg 2x">
  <source srcset="small.jpg 1x, small-hd.jpg 2x">
  
</picture>
```

[Read the picture Specification](#)

WHAT IS THE `SRCSET` ATTRIBUTE?

The `srcset` attribute is an extension to the existing `img` tag that provides some of the functionality of the `picture` element. It uses a more concise syntax, part of which can be used by the `picture` element.

SAMPLE MARKUP FOR `SRCSET`

```

```

[Read the srcset Specification](#)

<http://responsiveimages.org/>

Picturefill JavaScript Library

```
<div data-picture data-alt="A giant stone face at The Bayon temple in Angkor Thom, Cambodia">
```

```
  <div data-src="small.jpg"></div>
```

```
  <div data-src="medium.jpg" data-media="(min-width: 400px)"></div>
```

```
  <div data-src="large.jpg" data-media="(min-width: 800px)"></div>
```

```
  <div data-src="extralarge.jpg" data-media="(min-width: 1000px)"></div>
```

```
<!-- Fallback content for non-JS browsers. -->
```

```
<noscript>
```

```
  
```

```
</noscript>
```

```
</div>
```

<https://github.com/scottjehl/picturefill>

#5

Handle high-density
images carefully



A single image on multiple screens





Image Resolution

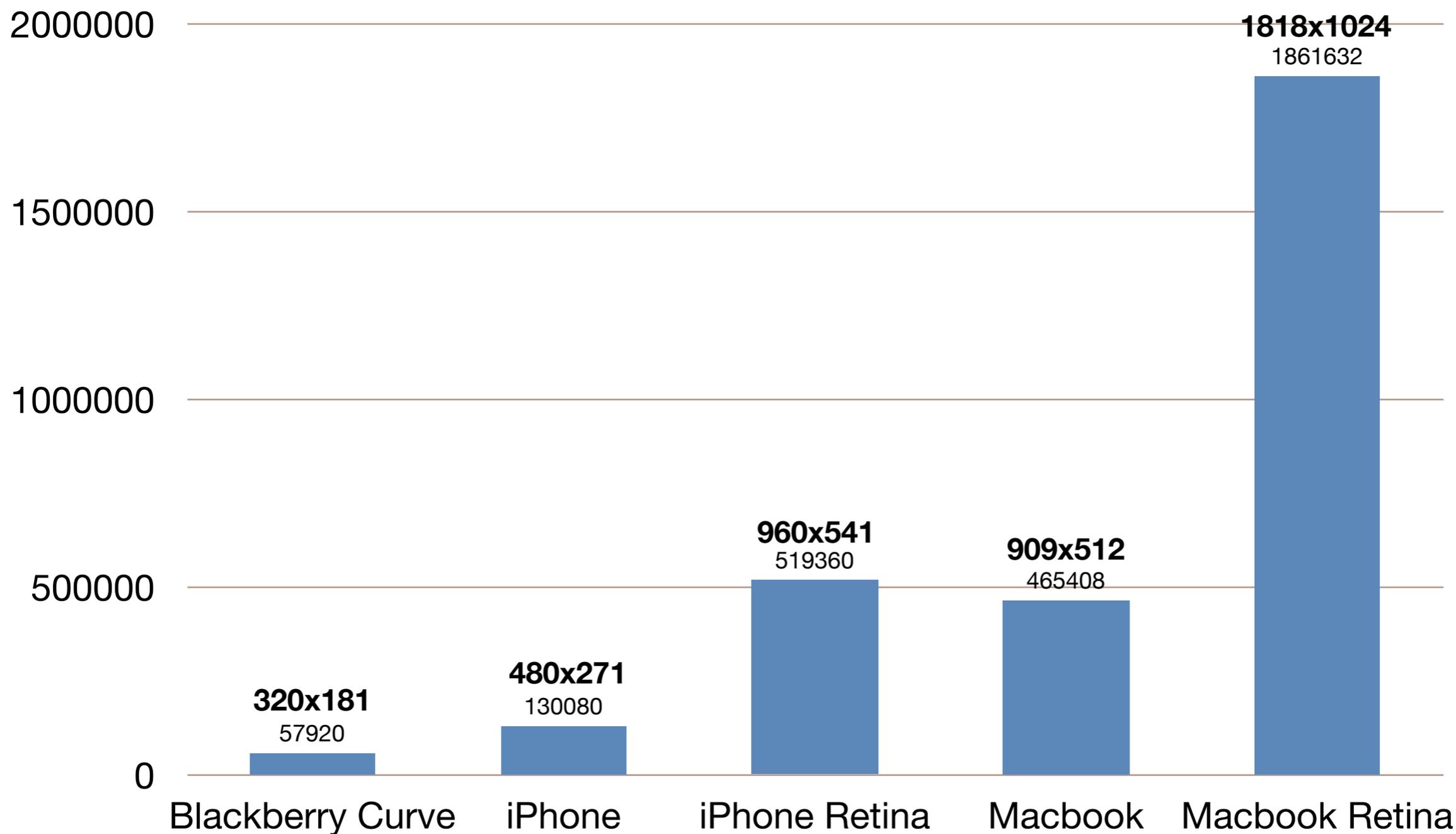
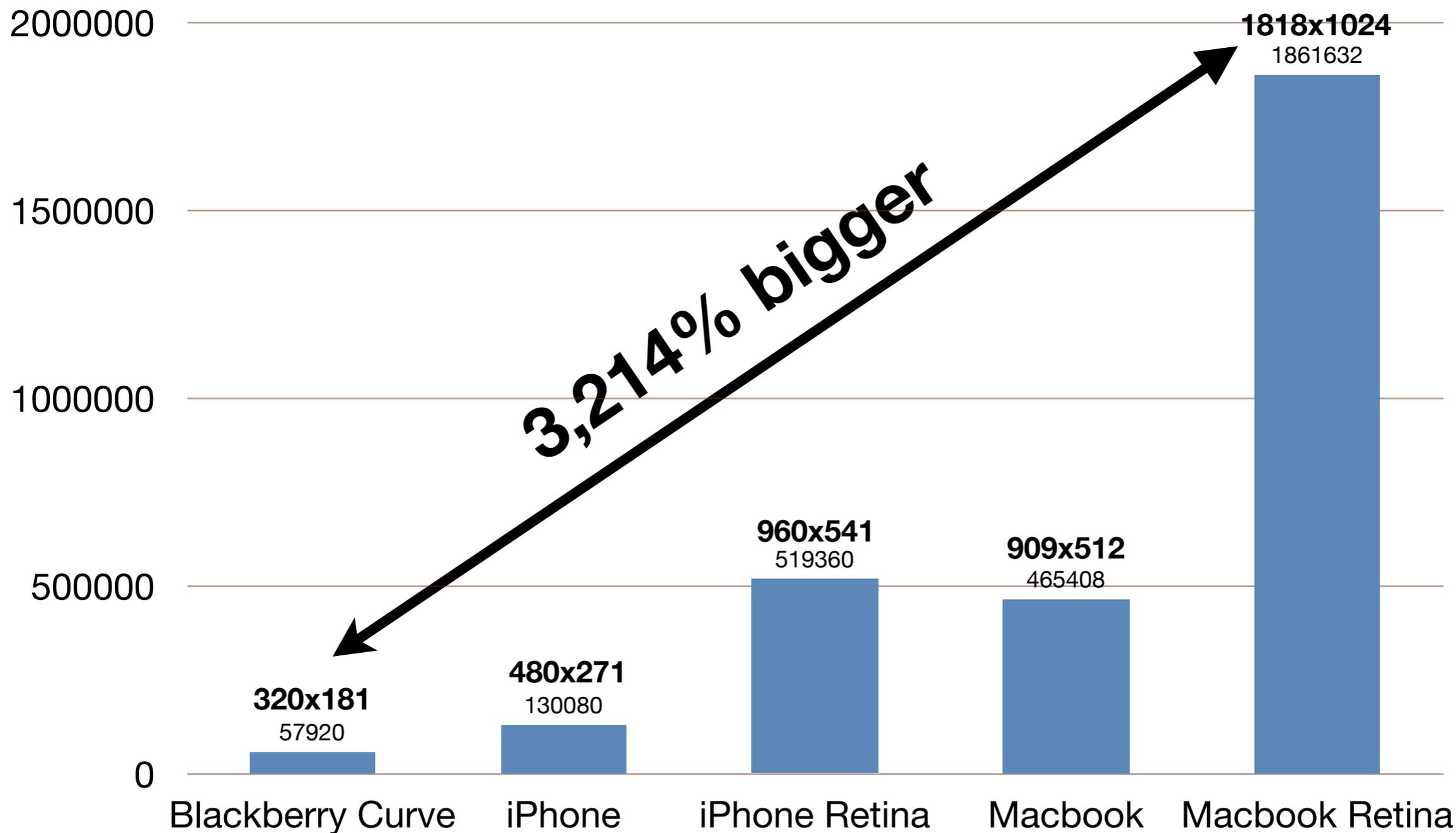


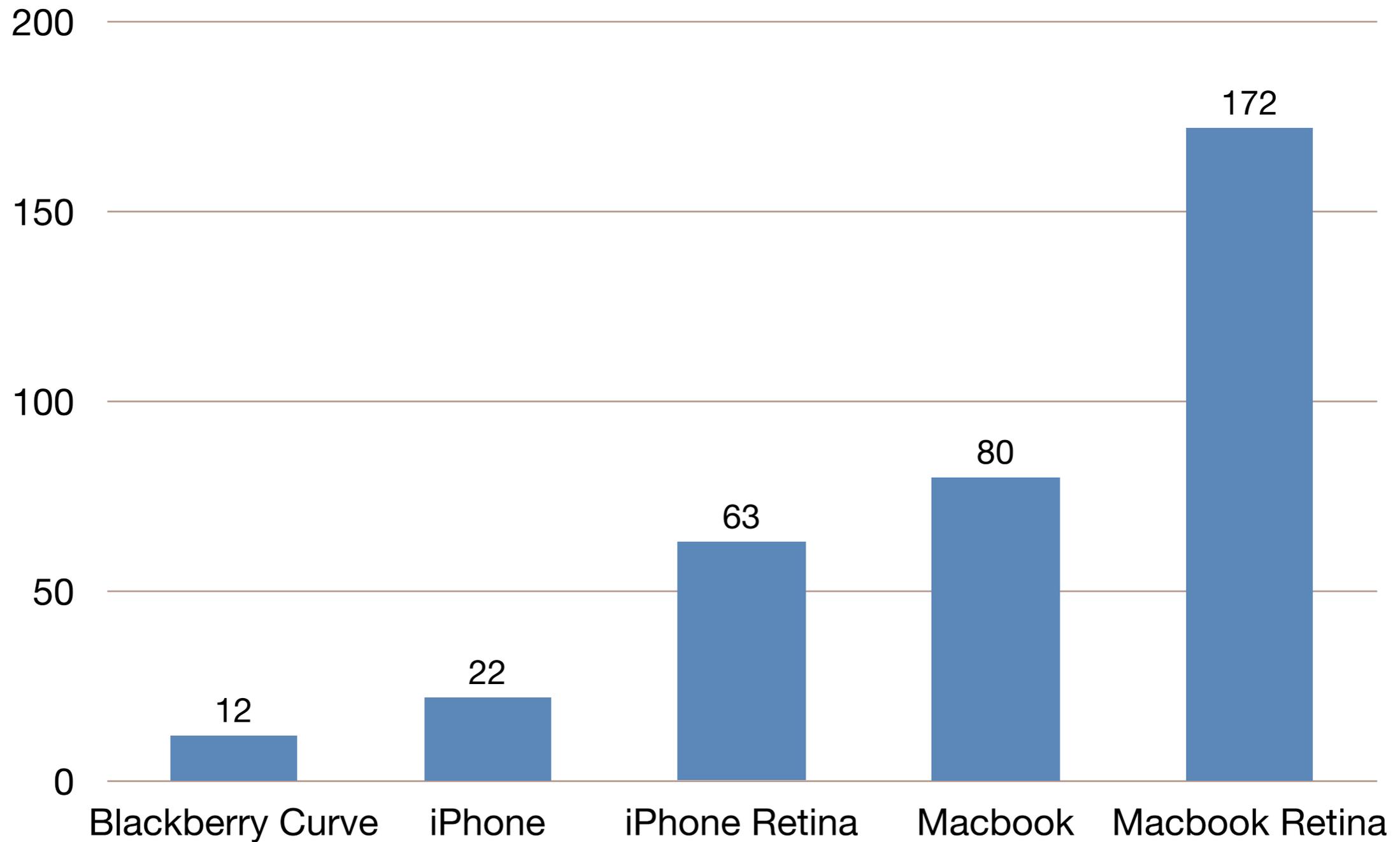


Image Resolution



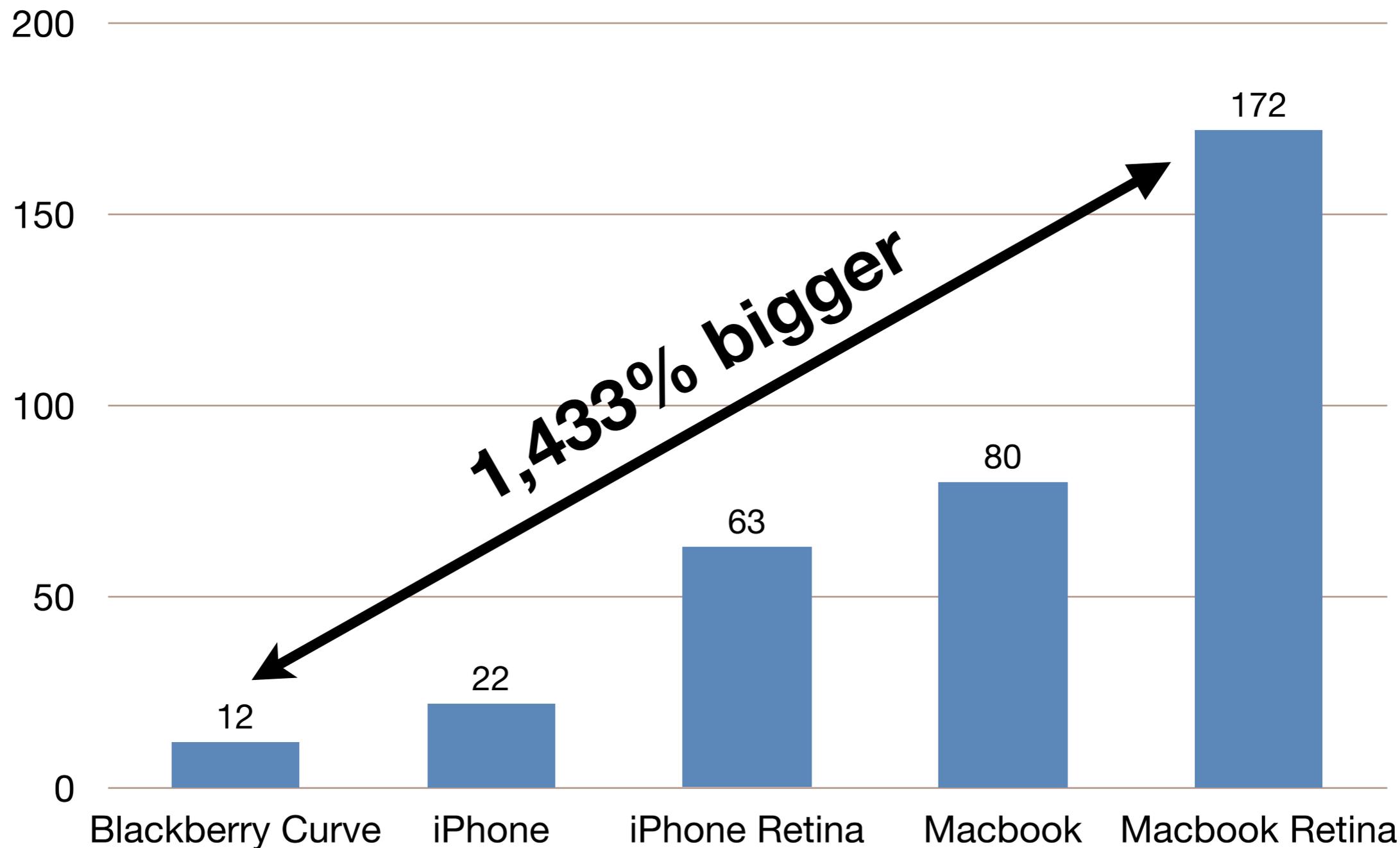


JPEG Compressed (k)



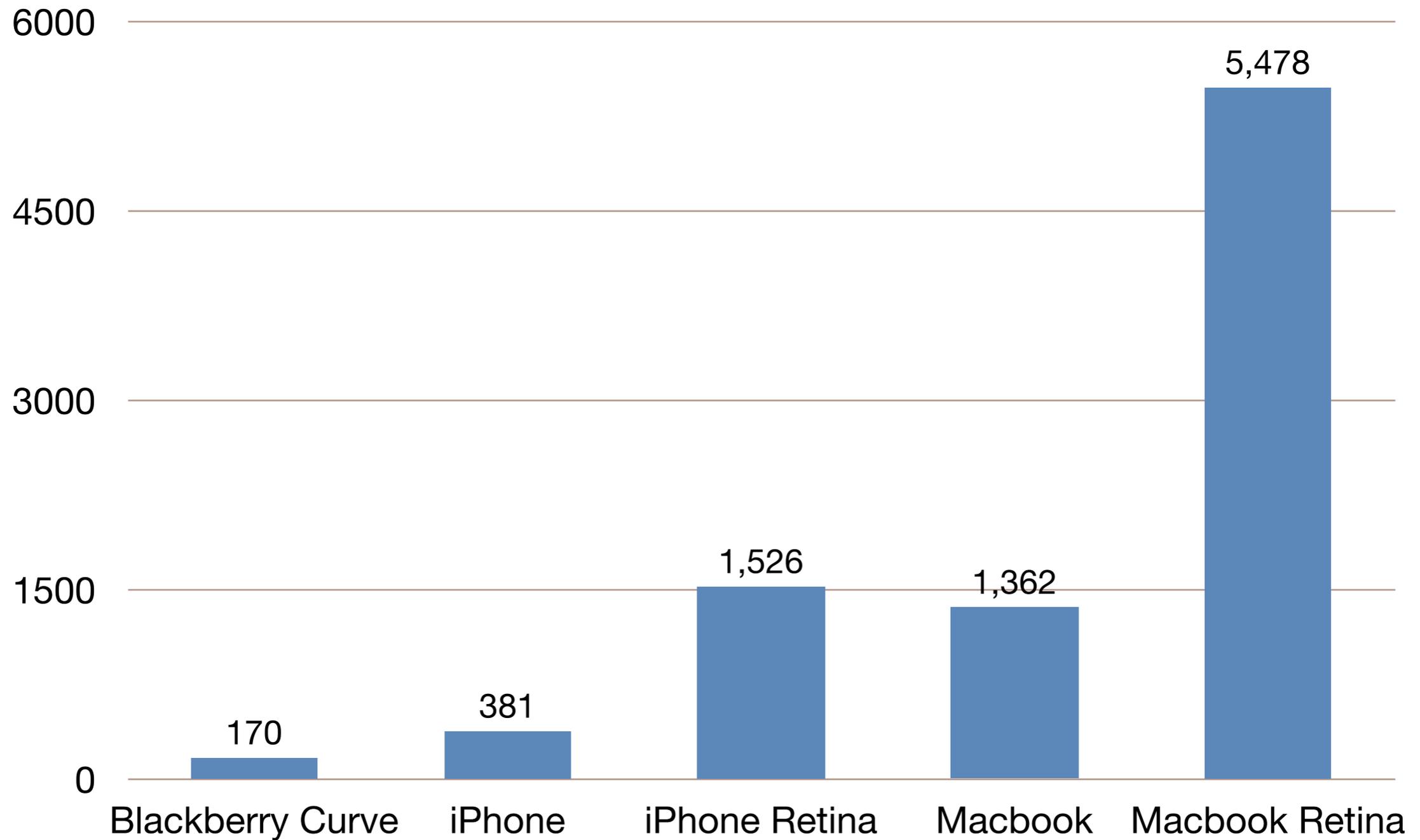


JPEG Compressed (k)



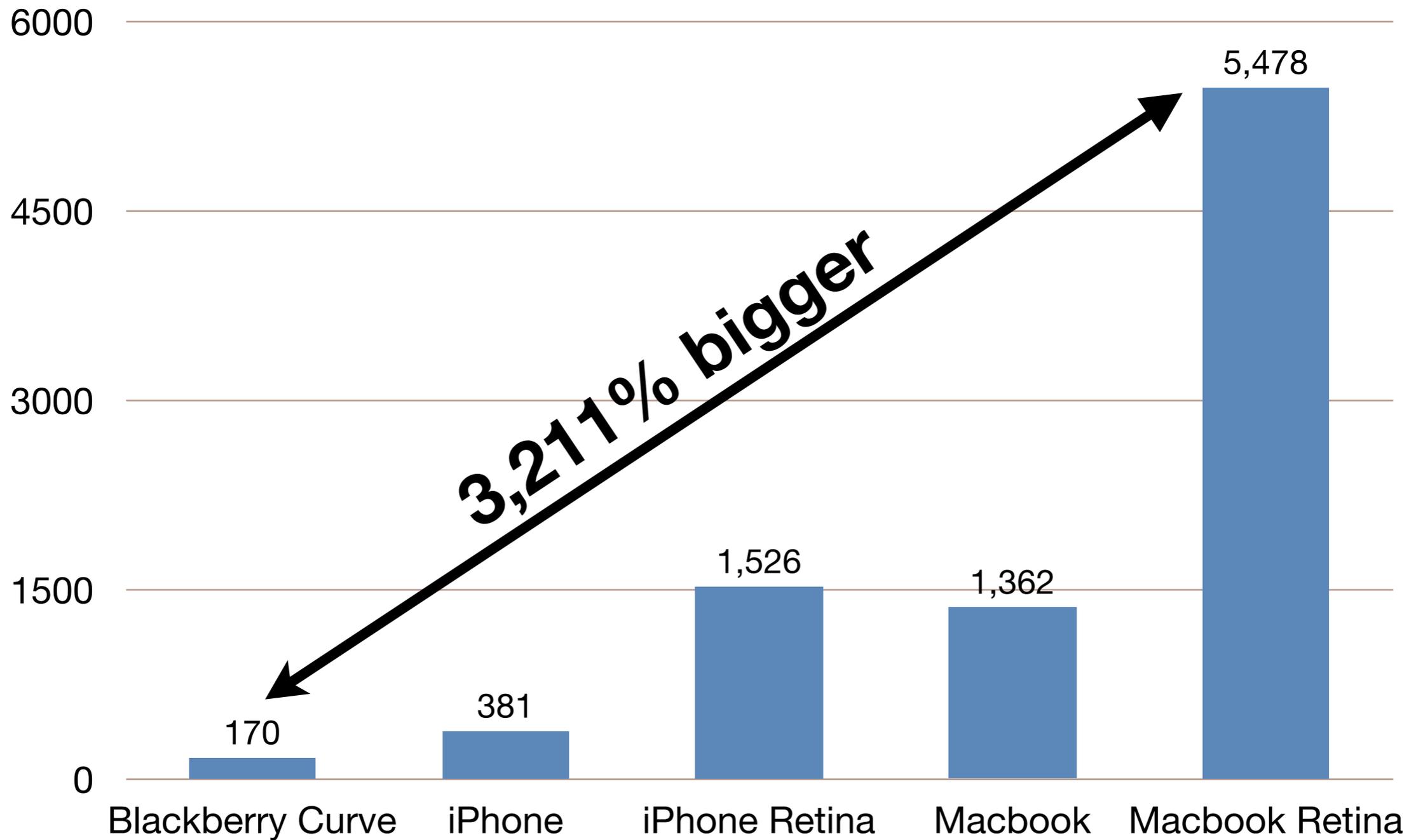


JPEG Uncompressed (k)





JPEG Uncompressed (k)



Apple.com as an anti-pattern

Downloads both standard and retina images

Name Path	Method	Status Text	Type	Size Transfer
/home/images		OK		8.55KB
ipad_hero_2x.jpg /home/images	HEAD	200 OK	image/j...	0B 352.04KB
promo_video_march_2012_ke /home/images	HEAD	200 OK	image/...	0B 84.86KB
video_play_glossy_2x.png /v/home/jj/images	HEAD	200 OK	image/...	0B 6.75KB
promo_video_ipad_launch_2x. /home/images	HEAD	200 OK	image/...	0B 133.23KB
video_play_glossy_2x.png /v/home/jj/images	HEAD	200 OK	image/...	0B 6.75KB
promo_video_ipad_ad_2x.png /home/images	HEAD	200 OK	image/...	0B 169.69KB
ipad_title_2x.png images.apple.com/home/imag	GET	200 OK	image/...	17.71KB 18.07KB
ipad_hero_2x.jpg images.apple.com/home/imag	GET	200 OK	image/j...	351.74KB 352.12KB
video_play_glossy_2x.png images.apple.com/v/home/jj/in	GET	200 OK	image/...	6.45KB 6.83KB
promo_video_ipad_ad_2x.png images.apple.com/home/imag	GET	200 OK	image/...	169.39KB 169.76KB
promo_video_ipad_launch_2x. images.apple.com/home/imag	GET	200 OK	image/...	132.93KB 133.29KB
video_play_glossy_2x.png /v/home/jj/images	HEAD	200 OK	image/...	0B 6.75KB
promo_appletv_2x.png /home/images	HEAD	200 OK	image/...	0B 58.76KB
promo_appletv_2x.png images.apple.com/home/imag	GET	200 OK	image/...	58.46KB 58.84KB
ipad_subtitle_2x.png images.apple.com/home/imag	GET	200 OK	image/...	8.19KB 8.56KB
promo_video_march_2012_ke images.apple.com/home/imag	GET	200 OK	image/...	84.56KB 84.92KB

63 requests | 2.12MB transferred | 21.25s (onload: 4.17s, DOMContentLoaded: ...)

The total size of the page goes from **502.90K** to **2.13MB** when the retina versions of images are downloaded.

If possible, use CSS for now

```
<style>
```

```
  #main {
```

```
    background-size: 400px 250px;
```

```
  }
```

```
  @media screen and (-webkit-device-pixel-ratio: 1) {
```

```
    /* Image for normal displays. */
```

```
    #main {
```

```
      background-image: url(dog.jpg);
```

```
    }
```

```
  }
```

```
  @media screen and (-webkit-min-device-pixel-ratio: 2) {
```

```
    /* Image for high resolution displays. */
```

```
    #main {
```

```
      background-image: (dog-hi-res.jpg);
```

```
    }
```

```
  }
```

```
</style>
```

CSS image-set new proposed spec

```
div.dog {  
    background-image: -webkit-image-set(url(dog.jpg) 1x,  
                                        url(dog-hi-res.jpg) 2x);  
}
```

PUBLIC



adambradley / foresight.js

Watch

1,494

Fork

49

Code

Network

Pull Requests 0

Issues 5

Wiki

Graphs

Foresight.js gives webpages the ability to tell if the user's device is capable of viewing high-resolution images (such as the 3rd generation iPad) before the image is requested from the server. Additionally, it judges if the user's device currently has a fast enough network connection for high-resolution images. Depending on device display and network connectivity, foresight.js will request the appropriate image for the webpage. — [Read more](#)

<http://foresightjs.appspot.com/demos/>

Clone in Mac

ZIP

HTTP

Git Read-Only



Read-Only access

branch: master

Files

Commits

Branches 2

Tags

Downloads

Latest commit to the **master** branch

Update master



adambradley authored 13 days ago



commit 768b7585f8

foresight.js /

name	age	message	history
demos	21 days ago	Updated demo to have a more informative test case [Thad Cox]	
speed-test	3 months ago	Setting URI templates using image-set() [adambradley]	
LICENSE-MIT.txt	3 months ago	added MIT License [adambradley]	
README.md	2 months ago	added references to URI Template RFC 6570 and W3C discussions [adambradley]	
foresight.js	14 days ago	Fallback to fixed width values if aspect ratio is specified and width...	[Thad Cox]
foresight.min.js	13 days ago	Update master [adambradley]	

Picturefill User Preference Branch

Carrier



5:39 PM



Large JPEGs with Low Quality Settings?

Base resolution
(300 x 200 px)



Jpg compression 80 / 21 kb

Retina resolution
(600 x 400 px)



Jpg compression 31 / 16 kb (75% of base)



Jpg compression 80 / 21 kb



Jpg compression 42 / 21 kb (same size as base)



Jpg compression 80 / 21 kb



Jpg compression 53 / 32 kb (1,5x base size)



Jpg compression 80 / 21 kb



Jpg compression 80 / 68 kb (full retina)

Base resolution
(300 x 200 px)



Jpg compression 80 / 17 kb

Retina resolution
(600 x 400 px)



Jpg compression 35 / 13 kb (75% of base)



Jpg compression 80 / 17 kb



Jpg compression 46 / 17 kb (same size as base)



Jpg compression 80 / 17 kb



Jpg compression 59 / 26 kb (1,5x base size)



Jpg compression 80 / 17 kb



Jpg compression 80 / 47 kb (full retina)



SOUTH STREET

ESSENTIAL

AJAXINCLUDE

<https://github.com/filamentgroup/Southstreet>

A photograph of a person sitting on the ground in a grassy field, leaning against the trunk of a large tree. The person is wearing a dark t-shirt and jeans, and is looking upwards towards the sky. The scene is bathed in warm, golden light, suggesting late afternoon or early morning. The sky is a clear, pale blue. The text "If I could dream up my ideal solution..." is overlaid on the right side of the image in a black, serif font.

**If I could dream up my
ideal solution...**

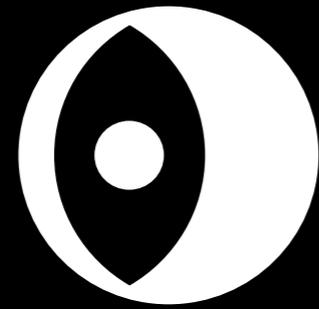
<http://www.flickr.com/photos/fuzzylittlemanpeach/4633972431/>

Eights guidelines and one immutable rule

#1

Use vector-based images or font icons whenever you can





IcoMoon

Custom Built and Crisp Icon Fonts, Done Right



IcoMoon App

- ✓ Browse 3800+ Free Vector Icons
- ✓ Import Your Own Vectors to Make Fonts
- ✓ Generate Custom & Crisp Icon Fonts
- ✓ Generate CSS Sprites with any size or color
- ✓ Basic Glyph Editing



Premium Icons

- ✓ 1200+ Vector Icons & Counting
- ✓ Handcrafted on a 16×16 grid
- ✓ Several Different Formats
- ✓ Optimized for Icon Fonts
- ✓ Free Updates



Font CDN

- ✓ Serve Custom-Built Fonts
- ✓ Powered by Amazon Web Services
- ✓ Easily Update Your Icon Fonts
- ✓ Production (Cached) Links
- ✓ Starting at \$1.60/Month

A Few Testimonials



Grunticon: A Grunt.js plugin for managing and delivering sharp icons to all devices

Posted by Scott on 08/31/2012

Topics: [announcements](#) [css](#) [icon design](#) [progressive enhancement](#)

Note: Grunticon was formerly named Unicon. The name was changed on September 19, 2012.

Creating sharp-looking icons and background images in our client work has always been more complicated than we want it to be, and with the growing popularity of higher-definition screens, it's only getting harder. CSS sprites have traditionally worked alright, but they can be a pain to manage, are often difficult to use in CSS layouts, and require generating and serving multiple fixed-pixel sizes. Icon fonts are a nice too, but they cause problems in some of the popular mobile environments we need to support, they aren't

Cloud Four Blog

TECHNICAL NOTES, WAR STORIES AND ANECDOTES

Media Queries in SVG images



Jason Grigsby | April 3, 2013

"Wait? What was that [Bruce Lawson](#) just said?"

That was my reaction last week as I listened to the [audio from Bruce's presentation at Responsive Day Out](#) conference.

What had Bruce said that blew my mind? It was the fact that *you can embed media queries inside SVG images*.

Maybe this is common knowledge for everyone else, but I was stunned by the news. Today I finally got a moment to research this further and found this fantastic video from [Andreas Bovens](#) showing off media queries in SVG.



Search for:

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We wrote the book: [Head First Mobile Web](#)



Interested in the topics discussed in our blog? Looking for a more foundational guide to the mobile Web? Check out the [book we wrote](#).

Head First Mobile Web is written for web developers by web developers, with clear explanations and hand-on examples that get you working with real code, quickly.

Recent Posts

Media Queries in SVG images

#2

Encourage people to upload the highest quality source possible



#3

Provide an automatic image resizing and compression service



#4 Images can be resized to any size with URL parameters

Provides a flexible service.

Model on Sencha. Define height, width or both.

Unique URLs help with caching.

“Save for the Web” should be a
thing of the past.

—@adamdbradley

Time Saving Content Delivery for the Team

Dynamically generate images from Photoshop, Illustrator, SVG and high-quality source files. We make it easier to manage production assets, all while serving files from a fast content delivery network.

Image Optimization

Reduce image file sizes while maintaining quality and change output formats.

Dynamic Images

Resize, crop and encode to different image formats on-demand.

API

Use our simple API to easily upload and manage files.



Easily manage images and other static assets

Give each team member individual permission to manage specific tasks within the system. Easily spread the workload to manage assets.



#5 Provide automated output of PictureFill or alternative

```
<div data-picture data-alt="A giant stone face at The Bayon temple in Angkor Thom, Cambodia">
```

```
  <div data-src="small.jpg"> </div>
```

```
  <div data-src="medium.jpg" data-media="(min-width: 400px)"> </div>
```

```
  <div data-src="large.jpg" data-media="(min-width: 800px)"> </div>
```

```
  <div data-src="extralarge.jpg" data-media="(min-width: 1000px)"> </div>
```

```
<!-- Fallback content for non-JS browsers. -->
```

```
<noscript>
```

```
  
```

```
</noscript>
```

```
</div>
```

Responsive Images Markup Function

templates contain breakpoint information

```
{  
  "source": "/source.jpg",  
  "breakpoints": [  
    { "max-width": "30em", "pixel-density": 1, "width": 360px},  
    { "max-width": "30em", "pixel-density": 2, "width": 720px},  
    { "max-width": "30em", "pixel-density": 1, "width": 800px},  
    { "max-width": "30em", "pixel-density": 2, "width": 1600px},  
    { "pixel-density": 1, "width": 800px},  
    { "pixel-density": 2, "width": 1600px},  
  ]  
}
```

*Sample syntax.
Don't get hung up
on details.*

Responsive Images Markup Function

*Markup for all
images can be
changed in one spot.*

PictureFill Markup

#6 Provide a way to override resized images for art direction needs



#7

Integrate image compression best practices

jpegtran or jpegoptim

OptiPNG or PNGOUT

far future expires headers

learn from `mod_pagespeed` or use it

#8 **Bonus: Detect support for WebP image format and use it**

The average WebP file size is 25% - 34% smaller compared to JPEG file size.

WebP compresses 34% better than libpng, and 26% better than pngout for loseless images.

#! The only rule for your responsive images implementation.

Plan for the fact that it will be deprecated. Make it easy to change.

*It's two years later. Let's revisit the
my original question.*

Can a one size fits all solution...





**compete with
a tailored experience?**

<http://www.flickr.com/photos/fronx/2862975043>

A black and white photograph of a man in a clothing store. He is smiling and holding up a large white t-shirt in front of him. The store is filled with various clothing items, including shirts and shorts, displayed on shelves and racks. The man is wearing a dark t-shirt. The text "Or will we always end up with something that is too big?" is overlaid on the white t-shirt he is holding.

**Or will we always
end up with
something that is
too big?**

**Unlikely responsive
design will ever be as fast
as something crafted
specifically for a device.**





**But web design is a
balancing act.**

**And performance
is just one factor.**



**For most projects,
responsive design can be fast
enough to make sense...**



**if we do the extra work
to make mobile first
responsive designs.**



Thank You!

Special thanks to Scott Jehl, Mat Marquis, and everyone at the Filament Group, Jennifer Robbins, Sara Wachter-Boettcher, Guy Podjarny, and all of the Flickr users sharing under creative commons.

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<http://www.flickr.com/photos/sualk61/4083223760/>

