

RESPONSIVE DESIGN

*One Site,
Many Devices*

Matt Ryan
Carleton College

mryan@carleton.edu

@mryand

UAD6

Monday, October 8, 12

Welcome to UAD6. I'm Matt Ryan. If I say something particularly brilliant or stupid this afternoon, you can attribute me on Twitter as mryand.

At Carleton College we've been building responsive sites for about a year and a half. Today I'll share some of what we've learned.

I should let you know that I've got enough material to give three presentations. So I'm going to cover a lot of ground, but I won't go into a ton of detail. I'll direct you to where you can get more information about almost any topic.

@mryand

Monday, October 8, 12

Before we start, I have some questions for you:

I'm assuming most of you are designers or front-end developers.

How many of you are **not** designers or front-end developers? (put hands down)

Okay, of those of you **are** designers or front-end developers, how many of you have designed or built a responsive site?

Finally, how many of you have already been to another presentation about responsive design today? I hope that I can add something useful to what you've already heard.

This talk is in three parts. We have:



The Essentials:

Making pages look good & work well
on any device

@mryand

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Optimization:

Downloading only what's needed

@mryand

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Strategy: The big picture

@mryand

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Responsive Design is a **CSS-based** approach to layout that allows a **single site** to **adapt** to its environment.

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First, what the heck is Responsive Design? This is the definition I'll use for this presentation.

go.carleton.edu/responsive

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We'll be using this demo site throughout the presentation. We felt it would be useful to have a stripped-down site for this purpose. You can follow along on your device if you'd like, or check it out later.

(go to browser and show how site adjusts; show in iphone/ipad?)

(Present definition of responsive design)



The Essentials:

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The ESSENTIALS

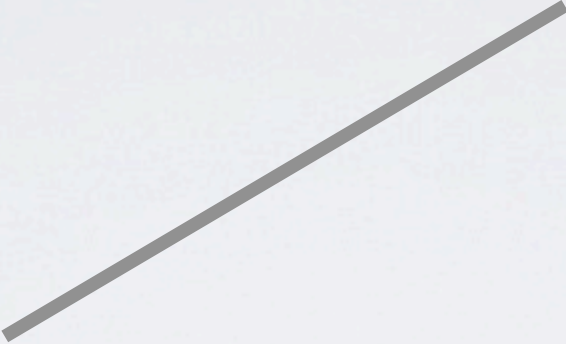
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Monday, October 8, 12

The two main design tools for creating responsive designs are fluid layouts* and media queries*.

The ESSENTIALS

Fluid
Layouts



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Monday, October 8, 12

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The ESSENTIALS

Fluid
Layouts

Media Queries
& Breakpoints

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I've cover fluid layouts first.

Fluid Layouts

@mryand

Monday, October 8, 12

I've cover fluid layouts first.

Fluid Layouts

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Monday, October 8, 12

Fluid layouts are as old as the web itself.

Fluid
Layouts



OLD

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Fluid layouts are as old as the web itself.

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,[X11 Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#))

[Technical](#)

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[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

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[History](#)

A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

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Monday, October 8, 12

This is the first web page ever, and it adjusted to fit big, * medium * and small screens. It's not pretty, but it's fluid.

Obviously fluid layouts have come a long way since then, but they are a classic design tool. If you've been creating fluid designs, you're already halfway there to responsive design.

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Fluid Layouts

```
div#wrapper {width: 90%; max-width: 1600px; margin: 0 auto;}
```

```
div#content-main {  
  width: 66.66666%;  
  float: left;  
}
```

```
div#content-secondary {  
  width: 33.33333%;  
  float: right;  
}
```

Welcome to RU!

Pellentesque habitant morbi tristique senectus et netus et malesuada

Responsive Images



@mryand

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If you haven't, it's really not that hard. You can take any pixel-based grid and make it fluid by changing all the horizontal dimensions from pixels to percentages. So, in a 960 pixel grid your 480 pixel column becomes 50% wide. And we can do one better than classic fluid designs -- we can put a min- and max-width on the wrapper to ensure that things don't get too wide or too narrow in our new, fluid layout.

The ESSENTIALS

Fluid
Layouts

Media Queries
& Breakpoints

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Monday, October 8, 12

But fluid designs break down at a certain point. If you have the example site up, switch over to the fluid layout and note that below about 800 pixels wide, things start to get pretty terrible. On a very small screen it would be completely broken. And this was about as good as it got until recently, when the Web Gods handed us Media Queries.

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Media Queries are relatively new*, compared to fluid layouts. (This* is media queries, and this* the the W3C). They are what allow us to adjust our designs to handle a much broader range of screen sizes, from large monitors* to mobile phones*.

From a design perspective, these allow us to define breakpoints, which are window sizes at which the design changes. For example, between these two layouts there is a breakpoint that is where the design shifts between one and two columns. If you have the demo site up, you can resize your browser across that breakpoint to see the shift happen in real-time.

Media Queries & Breakpoints

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Media Queries & Breakpoints

NEW

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Media Queries & Breakpoints

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**Media
Queries**

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W3C

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Welcome to Responsive University!

This simple responsive web site was created for the 2012 MinneWebCon presentation "Responsive Web Design: One Site, Many Devices" by Matt Ryan and Nathan Dirks.

Reduce. Reuse. Respond.

1. [Presentation Resources](#): Includes presentation slides, further reading, and code snippets.
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Heading Level 2

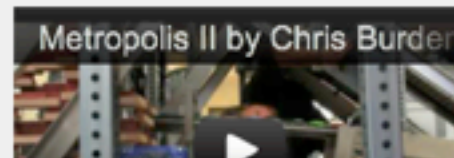
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Responsive Images



[Lithops Dorotheae Flowers](#) by [Martin Heigan](#) on Flickr.

Responsive Videos



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Media Type**Query**

```
@media screen and (min-width: 768px) and (max-width: 1024px) {  
  #content-main {  
    width: 100%;  
  }  
}
```

Value **Feature**

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And this is the media query itself. This example shows it in its most common use -- embedded in the css.

Media queries extend existing css media statements to allow simple logic on a variety of device and window features. This one refers to window width and window height. Specifically, this media query applies to screens at least 768 and no more than 1024 pixels wide.

Any rules inside the media query are applied only under these conditions.

```
Media Type      Query
┌───┬───────────────────────────────────────────────────────────────────────────────────┐
@media screen and (min-width: 768px) and (max-width: 1024px) {
  #content-main {
    width: 100%;
  }
}
└───┴───────────────────────────────────────────────────────────────────────────────────┘
Value          Feature
```

You can query more than just window width

- max-height, min-height
- orientation (*portrait, landscape*)
- resolution (*dpi*)
- device-width, device-height, device-aspect-ratio

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  }
}
```

Value Feature

You can embed logic into your media queries

- @media not print
- @media all and (max-width: 600px), screen and (min-width: 60em)

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The most common approach to using media queries is the "desktop-first" approach. We develop our desktop layout first, then add media queries to adjust it for smaller screens.

There are two advantages to this approach:

1. IE8 and below, which don't understand media queries, see the desktop layout
2. It's pretty simple to rework existing, desktop-only designs this way

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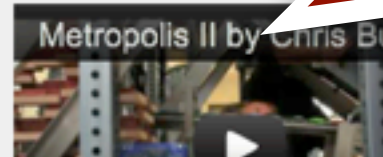
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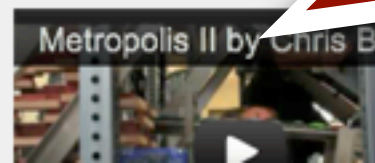
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ADMISSIONS

ACADEMICS

STUDENTS

ALUMNI

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```
section { float:left; width:50%;}
@media all and (max-width:600px){
  section { float:none; width:100%; }
}
```

Media Queries & Breakpoints

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The ESSENTIALS

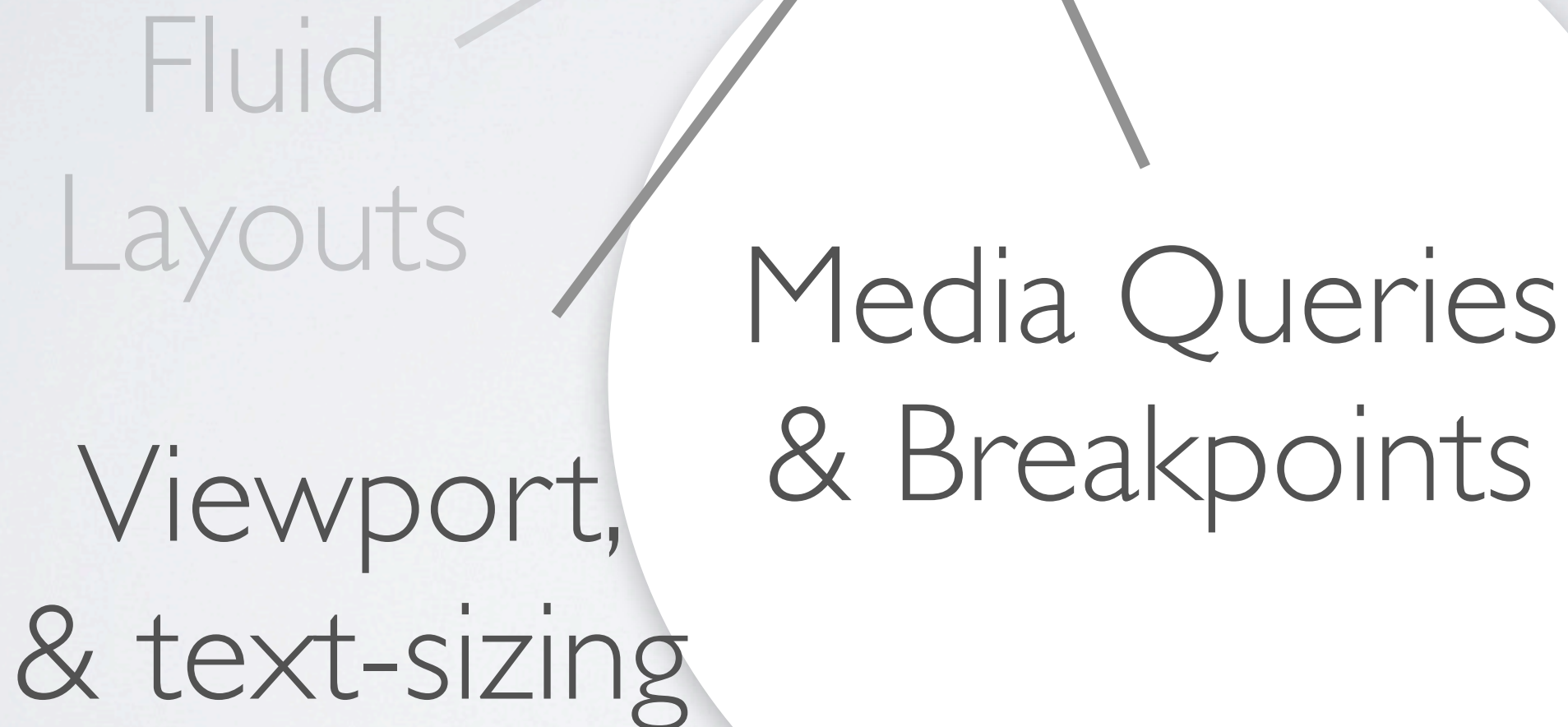
Fluid
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The ESSENTIALS



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With these two things you have everything you need to build a responsive site that will look pretty good in just about any desktop environment. But before our basic responsive site is done, we need to tell mobile browsers not to treat it like a desktop-optimized site any more.

*Enter the viewport tag and text-sizing attributes.

The viewport tag tells the browser whether to scale the page or not. The text-sizing fix keep the browser from trying to do their own weird text sizing. You don't have to try to write these down -- they are on the site.

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The

Viewport tag:

```
<meta name="viewport" content="width=device-width, minimum-scale=1.0, maximum-scale=1.0" />
```

Text sizing fix:

```
html {  
  -ms-text-size-adjust: none;  
  -webkit-text-size-adjust: none;  
}
```

& text-sizing

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With these two things you have everything you need to build a responsive site that will look pretty good in just about any desktop environment. But before our basic responsive site is done, we need to tell mobile browsers not to treat it like a desktop-optimized site any more.

*Enter the viewport tag and text-sizing attributes.

The viewport tag tells the browser whether to scale the page or not. The text-sizing fix keep the browser from trying to do their own weird text sizing. You don't have to try to write these down -- they are on the site.

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All right -- let's take a look at a few responsive sites, to see some different approaches to common problems.

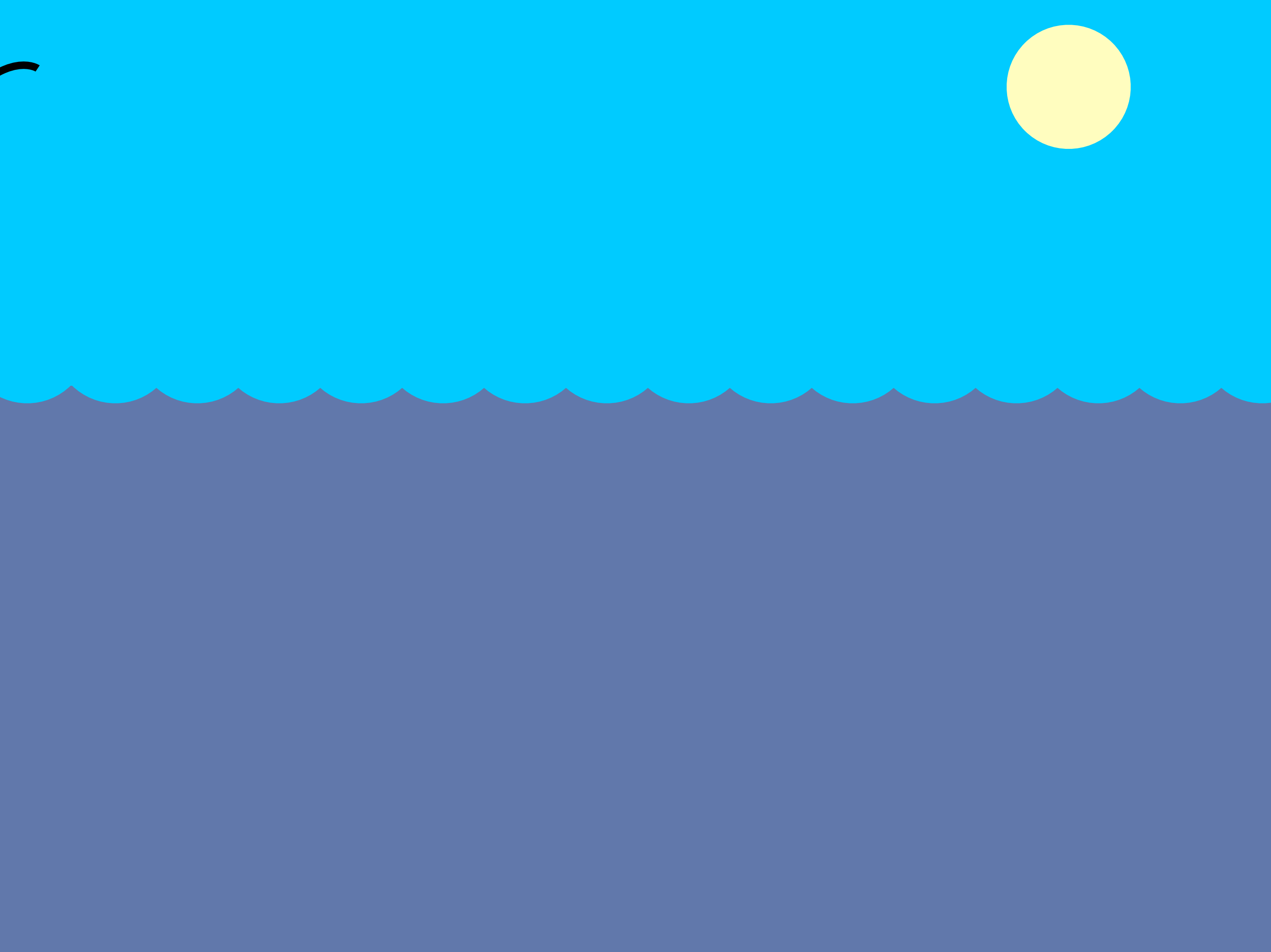
2

Optimization:

Downloading only what's needed

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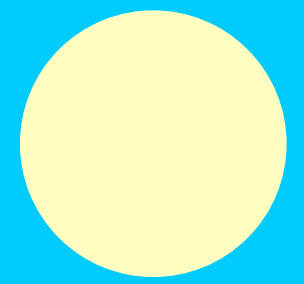


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Until we start looking at optimization, responsive design looks like smooth sailing.

But there's trouble under the surface.

Specifically, Load Time and Bandwidth. It turns out it's really tough to build responsive sites that only load what's needed.



Bandwidth & Load Times

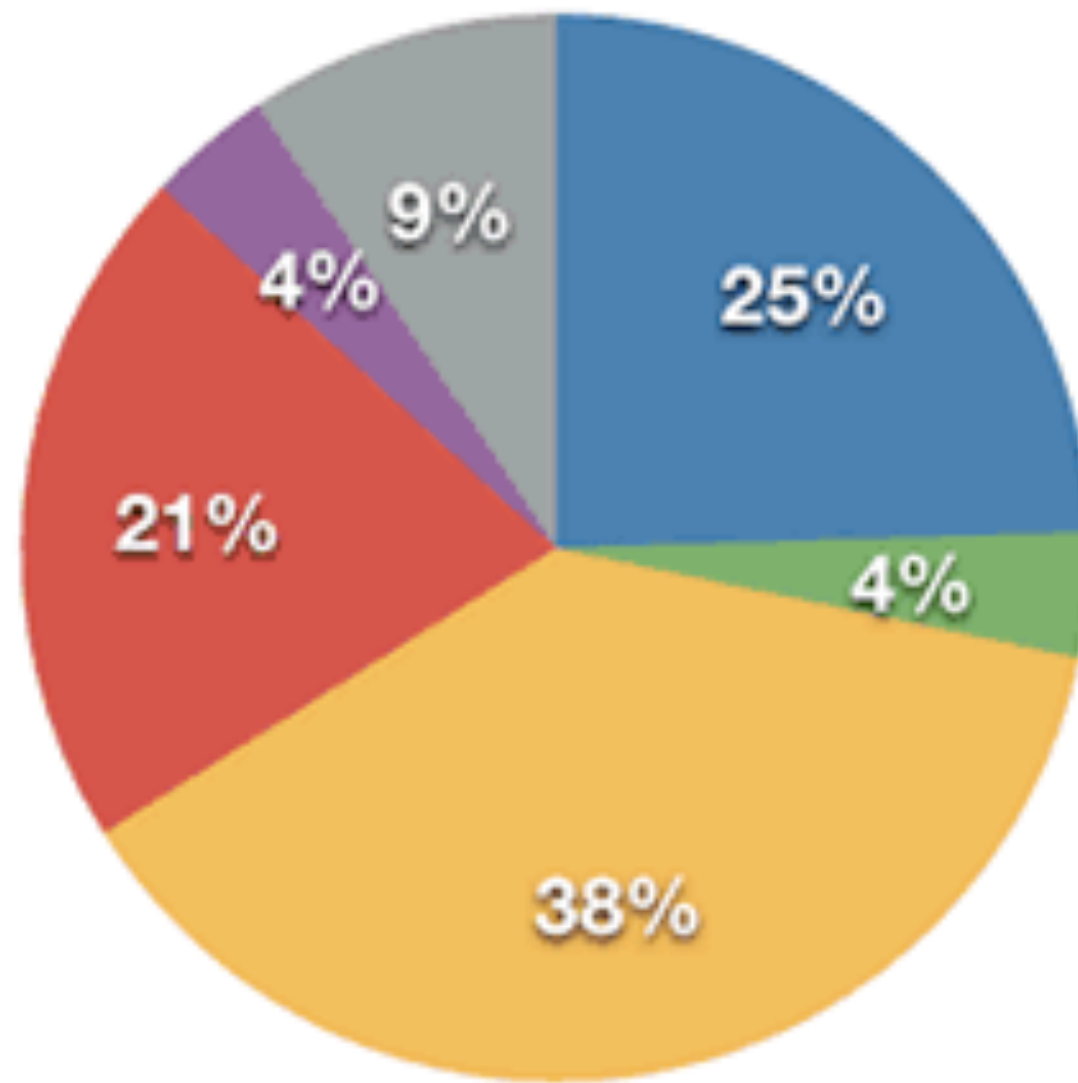
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Comparison of Mobile & Desktop RWD Views



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

<http://blog.cloudfour.com/where-are-the-mobile-first-responsive-web-designs/>

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Jason Grigsby of CloudFour looked at 106 responsive sites. Only about 1/3 were really smaller on mobile devices; 1/4 were actually larger on mobile devices. Contrast this with mobile sites, which typically weigh a lot less than their desktop counterparts.

Why is this?



Inline Images
Video
CSS backgrounds

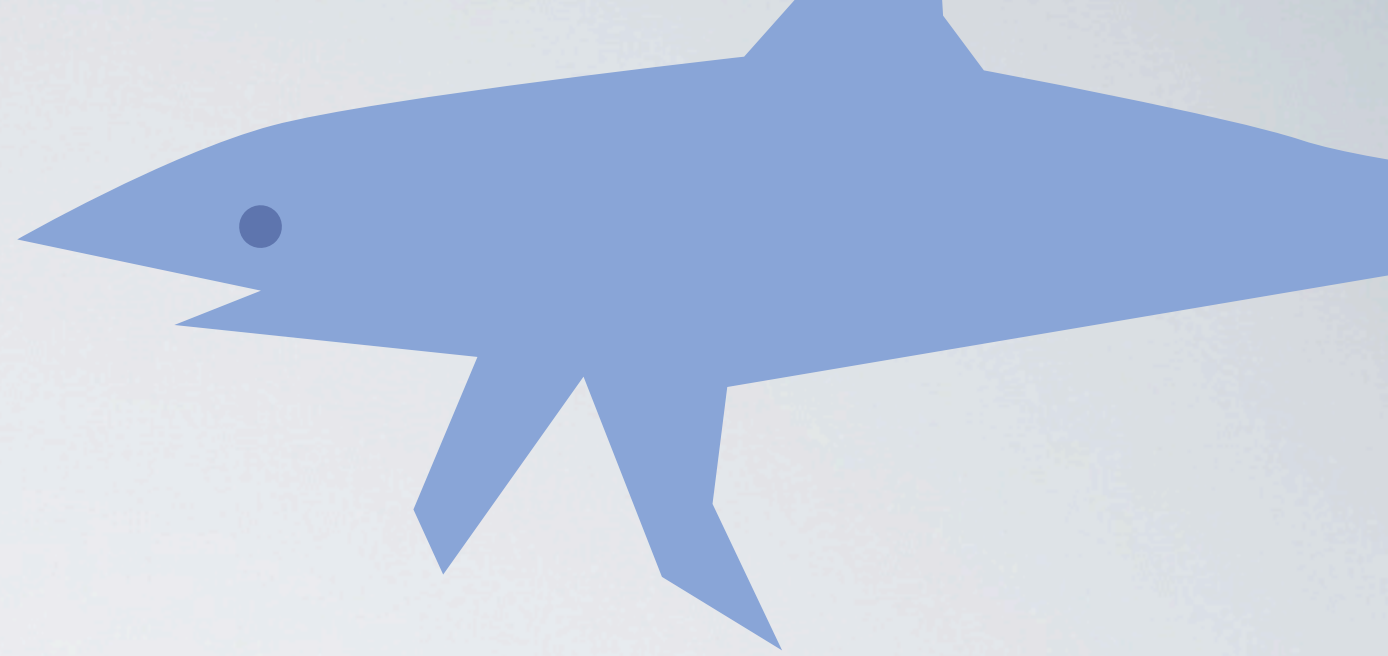


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Directly, images and video, and CSS backgrounds.

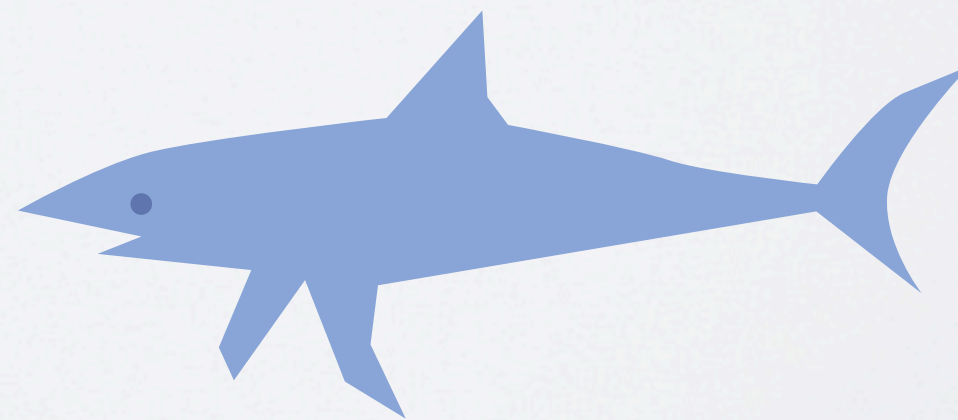
But more generally, the problem is with the desktop-first approach I showed you earlier, helped along with some subtle tricks browsers use to make pages load faster, but which cause problems with responsive design.



ds



Desktop First



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Directly, images and video, and CSS backgrounds.

But more generally, the problem is with the desktop-first approach I showed you earlier, helped along with some subtle tricks browsers use to make pages load faster, but which cause problems with responsive design.


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



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This is the standard approach to making images responsive. The approach for video is a little more involved, but is essentially the same idea. If the width of the container is less than the width of the element, make the element smaller to fit.

But if we provide a nice, crisp image (and video) to this*, this* also loads up the same entire megapixel image.

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Heading Level 2

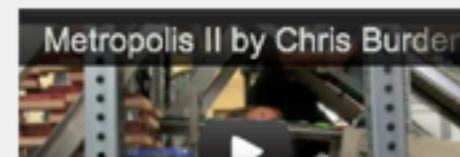
Donec eu libero sit amet quam egestas semper. Aenean ultricies mi vitae est. Mauris placerat eleifend leo.

Responsive Images



[Lithops Dorotheae Flowers](#) by [Martin Heigan](#) on Flickr.

Responsive Videos



img



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. Respond.

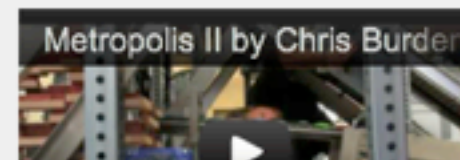
[Sources](#): Includes presentation slides, further resources and snippets. This responsive University site without any extra code to

Responsive Images



[Lithops Dorotheae Flowers](#) by [Martin Heigan](#) on Flickr.

Responsive Videos



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“I know” just about every fancypants web guru said simultaneously, “We’ll use javascript to swap out a different source depending on screen size!”

But they quickly found out that one of the main ways browsers have gotten faster in recent years is that they have started loading images **before** the javascript even runs. So in an attempt to speed things up, they actually slowed them down by forcing the browser to load two separate images.



Monday, October 8, 12

I'm not even going to go in to the screaming monkey fest that is the conversation around responsive images. I stopped researching when I had found 16 different approaches to solving the problem, and about the same number of reasoned, lengthy articles on how to pick an approach. Suffice it to say, we don't have a great solution, and even the plans put forth by the WHAT WG are flawed.



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Pick one:

Browsers load only one image

- or -

Semantically correct, clean code,
& image is indexed by Google

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I have put a bunch of links to different responsive image solutions on the demo site. But at the moment, be aware that you can have one or the other of these... but not both.

On the demo site, I have implemented what seems to me to be the most robust library I could find. It's called foresight.js, and the big image on the page *should* load just the appropriately sized image. I picked foresight for this demo because it is agnostic about the semantics vs. bandwidth dilemma. You can set it up either way. Foresight.js has another superpower -- it does a bandwidth check, and only loads retina images if you're on a fast network. So if you're looking at the site on your iPad3, wondering why it's showing the 1x image... that's probably why.

Video: Better!?!

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HTML5 video has had a bumpy road. So I was surprised to find that the video solution is better, or at least more standardized.


```
<video>
```

```
<source src="big.mp4" type="video/mp4" media="all  
and (min-width: 420px)"/>
```

```
<source src="big.webm" type="video/webm"  
media="all and (min-width: 420px)"/>
```

```
<source src="small.mp4" type="video/mp4"/>
```

```
<source src="small.webm" type="video/webm"/>
```

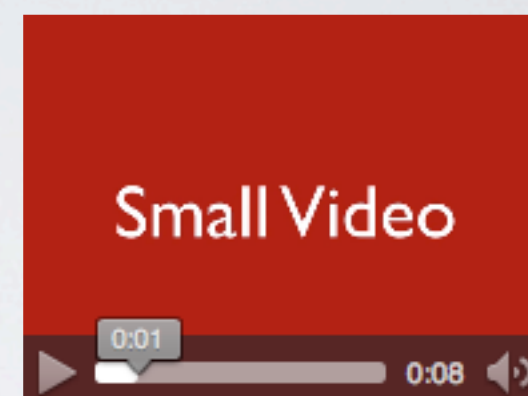
```
</video>
```

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It turns out you can apply media queries to the source tag. These media queries refer to the browser window size.

And they work in the latest versions of just about every browser but IE9. IE10 supports this, though, so we're close. And older browsers still work -- though they just download the big version regardless. So, not perfect -- but much better than the image situation.



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I have this implemented in the demo site -- at page widths where the video is big, it loads a green video, and at other widths it loads a red video. You should note that this selection only happens on page load.

CSS Backgrounds?

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Monday, October 8, 12

In the interest of time, I won't go into the techniques needed to ensure that css background mages are only loaded at the sizes they are needed. I have links on the demo site if you want to know more, but suffice it to say that the desktop-first approach is not ideal.

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Heading Level 2

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Responsive Images



[Lithops Dorotheae Flower](#)
[Martin Heigan](#) on Flickr.

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Monday, October 8, 12

Jason Grigsby and others argue that we need to flip* the way we design and build responsive sites before they can match the performance of dedicated mobile sites.

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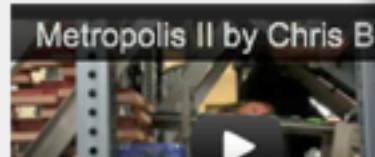
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Monday, October 8, 12

We should put mobile first in our markup and stylesheets, adding layout rules for progressively larger screens. The main drawback is that we rely more on javascript to support IE8. I'm inclined to agree with this approach, though I should admit that I haven't yet built a production site this way.

ADMISSIONS

ACADEMICS

STUDENTS

FACULTY

ALUMNI

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Un

This simple responsive web site was created for the 2012 presentation "Responsive Web Design: One Design: One Site" by Matt

```
section { float:none; width:100%;}  
@media all and (min-width:601px){  
  section { float:left; width:50%; }  
}
```

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3

Strategy: The big picture

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And this talk of responsive versus dedicated mobile sites brings us to part three.

Separate
mobile &
desktop
sites



Single site
serving
mobile,
desktop,
tablets,
etc.

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Mobile + Desktop

Single Site

Resources

More Work

Less Work

Load Time

Device Optimized

Depends...

SEO/Page Ranking/
Discovery

Split

Combined

Info Architecture

Can be different

Same

Content

Can be different

Same

Comparison of approaches:

developer.mozilla.org/en/Web_Development/Mobile/

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Two Questions

1. *Resources & priorities:* What resources do you have, and how to you wish to spend them?
3. *User Intent:* Just how different is someone's intent when they access your site with different devices?

“MOBILE USERS ARE DIFFERENT”

Mobile users want different things from your product than desktop users. ...consider a website about movies currently in theatre. On the desktop, users want an immersive experience... On mobile, they focus on movie listings, nearest theatres, and showtimes.

Sachendra Yadav, *UX Magazine* (Nov. 1, 2011)

uxmag.com/articles/framework-for-designing-for-multiple-devices

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“MOBILE ISN'T JUST ‘MOBILE’”

Mobile isn't just 'mobile'. It's also the couch, the kitchen, the three-hour layover, all places where we have time and attention to spare... We use our phones for everything now; **there's no such thing as 'this is mobile content, and this is not.'**

Josh Clark, *.Net Magazine* (Apr. 12, 2012)

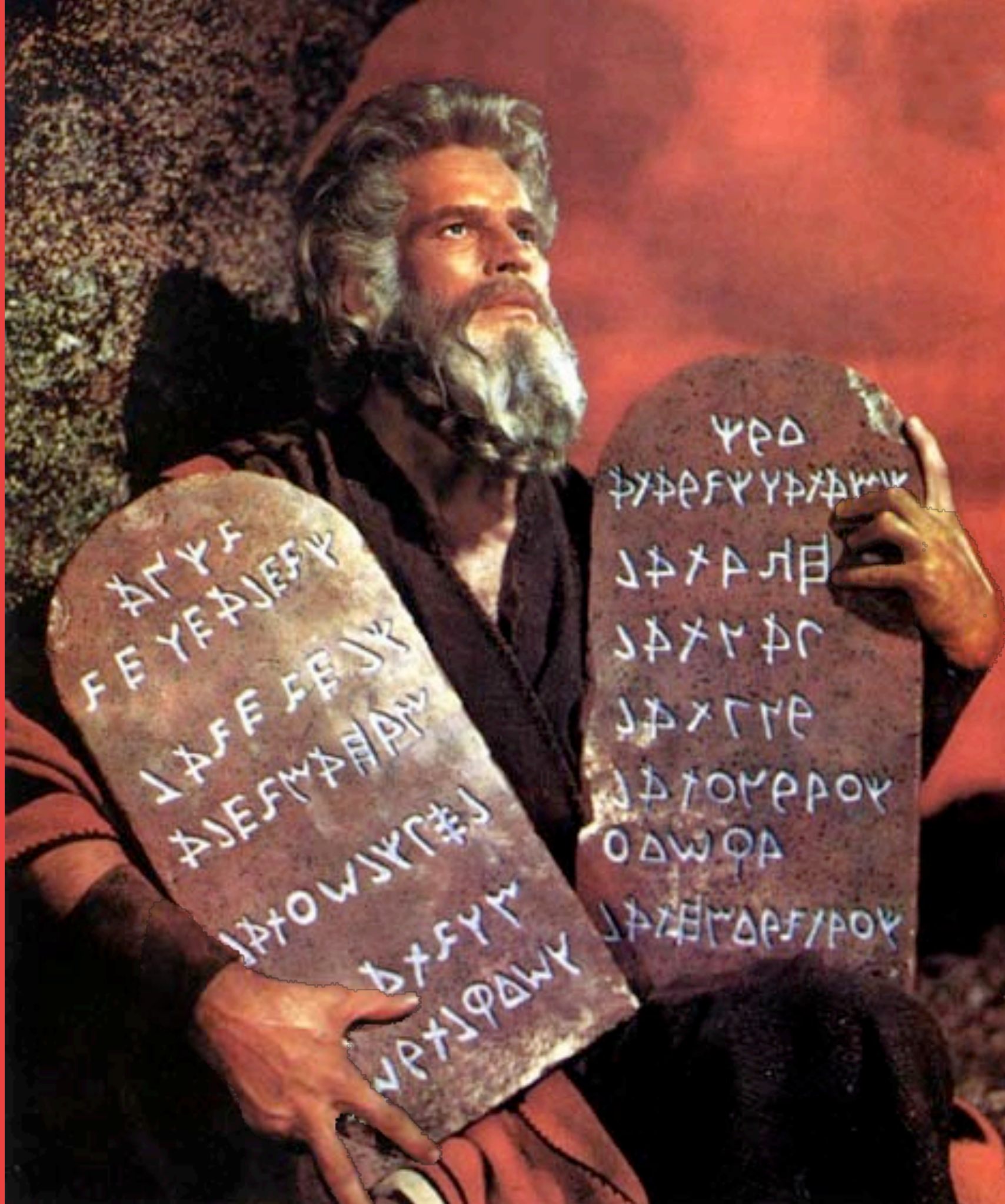
netmagazine.com/opinions/nielsen-wrong-mobile

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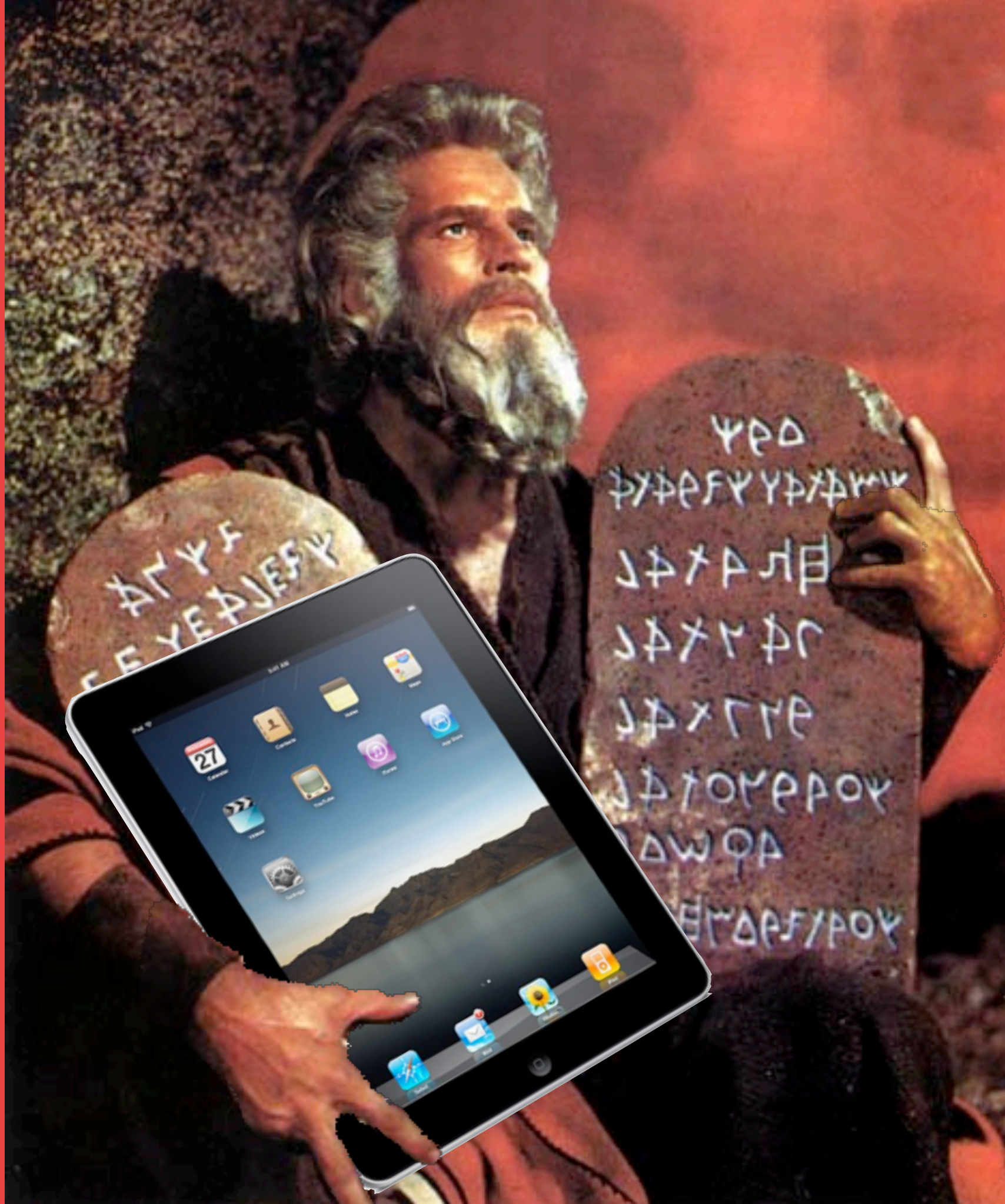
Clark's thesis is: you can't reliably divine user intent from their device. (He notes that for 25 percent of smartphone users, it's essentially the **only** way they browse the web.) He goes on to say this:

“It's a content-strategy nightmare and a voracious resource hog to build and support separate websites for each and every platform, for each and every screen size, for each and every input style (touch, speech, text and so on).”



Monday, October 8, 12

This gets at what I think is the biggest issue with the model of the separate mobile site: We do not* have two distinct classes of device any more. *We have a growing array of screen sizes and resolutions, and more* and more of the devices we use -- at all sizes* -- use a touch interface. And we increasingly *expect to be able to accomplish any task with any device. *Taken together, I believe that the mobile plus desktop model will be increasingly difficult to sustain in this new reality.



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THOUGHTS & QUESTIONS?

- Matt Ryan
mryan@carleton.edu
[@mryand](#)
- Demo & slides
go.carleton.edu/responsive
- Responsive sites we've created:
[Carleton Admissions](#), [Carleton Career Center](#), [Transportation at Carleton](#), [Perlman Art Museum](#), [Arts at Carleton](#), [Carleton Campus Map](#),
- All built with Reason, a developer-, designer-, and content-maintainer-friendly open-source CMS, made by & for Higher Ed. reason.carleton.edu

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That concludes the formal presentation.

Do you have any questions? Is there something you've found you'd like to share, or a struggle you've had with responsive design?

Carleton is hiring!

- Web design ninja
- CTO

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Monday, October 8, 12

One final plug: Carleton is hiring. If you or anyone you know is interested in working at a fantastic school, talk to me or one of my colleagues.