

CS247L Lab5

Everything\* you need to know  
about Mobile Prototyping

April 30, 2014 (sunny) Borui Wang

## **1. Mobile vs Web**

2. HTML or Native or Hybrid ?
3. Wire-framing
4. Mobile-frameworks
5. Frequent issues in implementation



It's less about screen size but more about use scenarios

The standards for middleware and backend data access that defined the Web era don't work for mobile. The mobile world brings different types and sources of data, different formats and payload sizes, different transaction volumes and usage profiles and the end of connection persistence. "Mobile," as Forrester Research observes, "is pushing aging Web architectures to the brink."

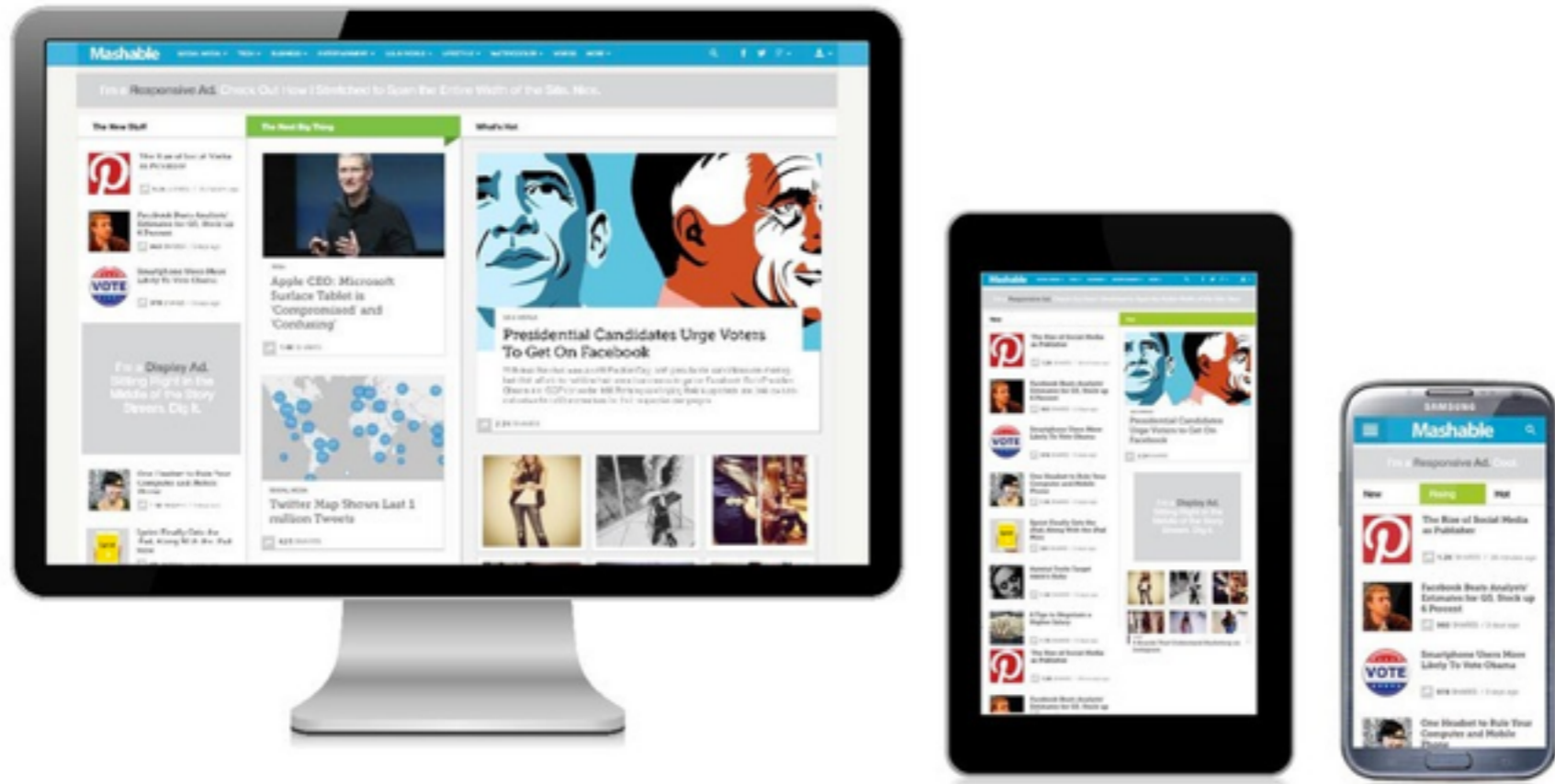


### The evolution of analytics:

Target Measure	PC/Web Apps	Mobile Apps
Crash / exception management	■	■
App adoption	□	■
Engagement with app	□	■
User activities within app	□	■
User retention	□	■
Funnel analysis	☒	■
Cohort analysis	☒	■
App launches/opens	☒	■
Version of app	☒	■
Types of devices	☒	■
User location	☒	■
User motion	☒	■
Online/offline synchronization	☒	■

■ *Always*      □ *Sometimes*      ☒ *Rare or Never*

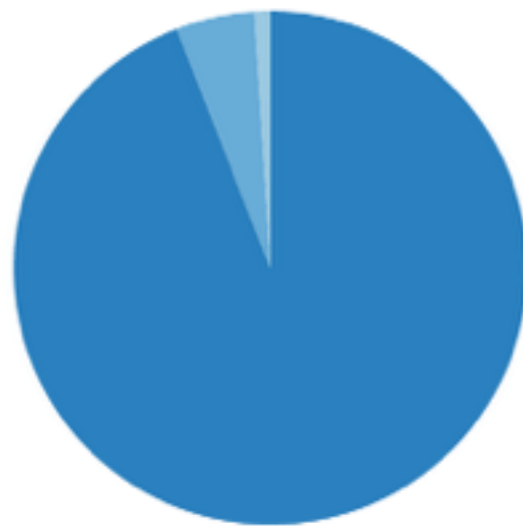
<http://readwrite.com/2013/12/02/html5-mobile-native-apps-business-analytics-backend-services#awesm=~oCXdXoW2ntUwqX>



How about the responsive web?

# Oh, Android..

## COMPARISON WITH IOS



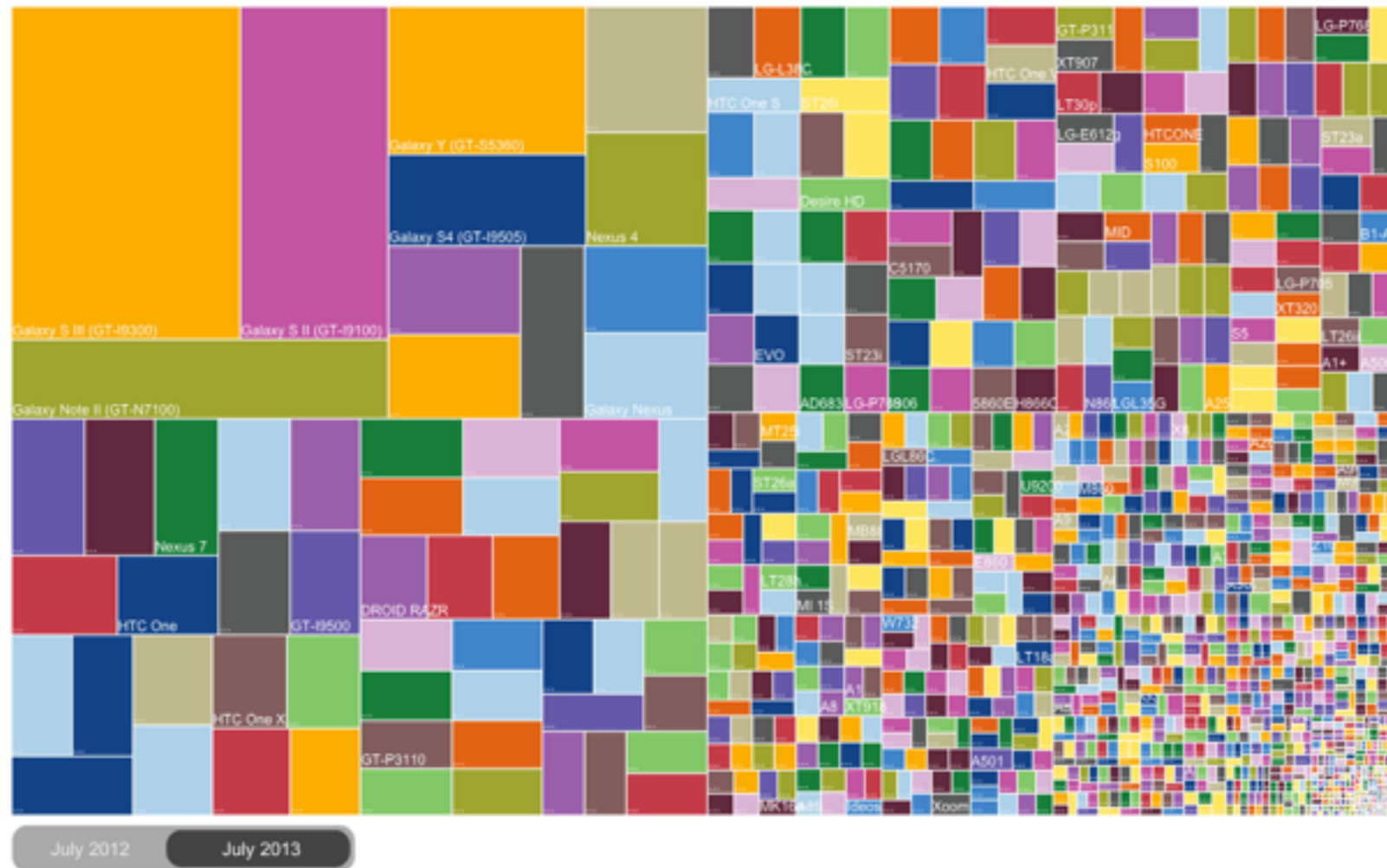
iOS 6 (95%)  
iOS 5 (5%)  
Earlier Version (1%)



4.2.x (Jelly Bean) (5.6%)  
4.1.x (Jelly Bean) (32.3%)  
4.0.3 - 4.0.4 (ICS) (23.3%)  
3.2 (Honeycomb) (0.1%)  
2.3.3 - 2.3.7 (G'bread) (34.1%)  
2.2 (Froyo) (3.1%)  
2.1 (Eclair) (3.1%)  
1.6 (Donut) (0.1%)

<http://opensignal.com/reports/fragmentation-2013/>

Oh, Android..



<http://opensignal.com/reports/fragmentation-2013/>

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Oh, Android..



**midendian**  
@midendian

 Follow

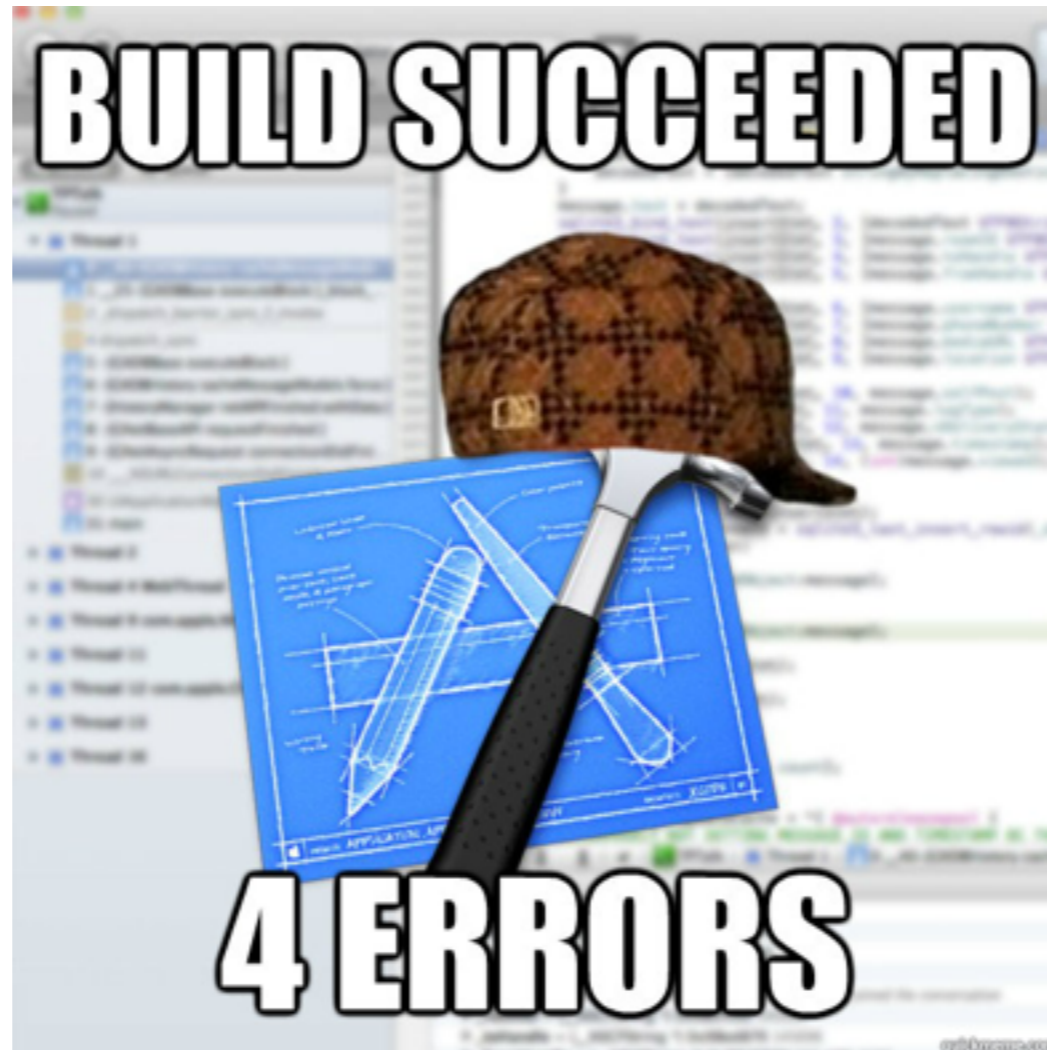
Do people really use the android virtual device thing for development? Why does it take like ten minutes to boot?

12:45 PM - 31 Oct 2013

**12** RETWEETS **10** FAVORITES



Beneath that sleek looking IDE..



“oh, your third-party code doesn’t support ARC? Just add the `-fno-objc-arc` flag! Simple, no?”



# The Languages and APIs

```
String s2 = s1.replace("abc", "xyz");
```

```
NSString *s2 = [s1 stringByReplacingOccurrencesOfString:@"abc" withString:@"xyz"];
```

an iOS ViewController is equivalent to an Android Activity

## **Native/ Android, iOS**

Might be easier to start, but also easy to meet the ceiling

Better performance and UX ?

Full mobile functionality access (phone, contacts, etc.)

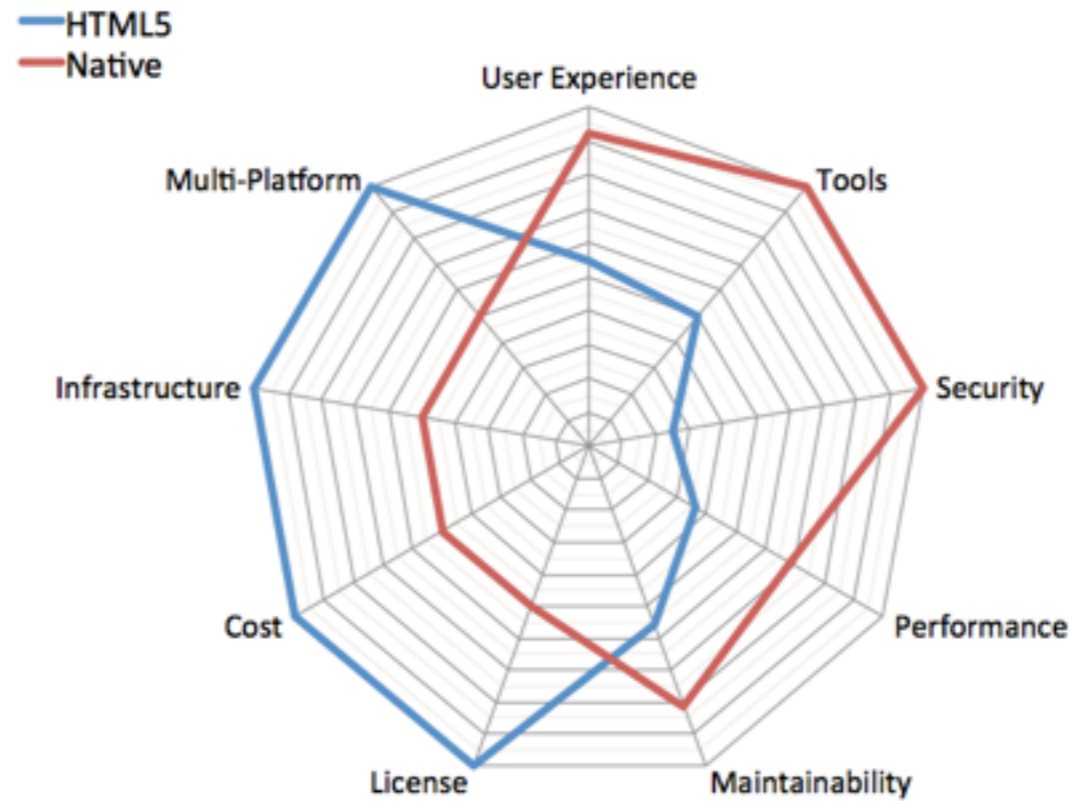
## **Mobile Web JS/HTML5**

Might be harder to start, but easy to build something fancy

Multiple platform support, build once, run everywhere

Easy to maintain and scale

# HTML5 VS NATIVE



<http://groundreport.com/mobile-application-development-for-native-app-and-web-app/>

## Hybrid App (PhoneGap)?

Get your app in the iOS and Android stores

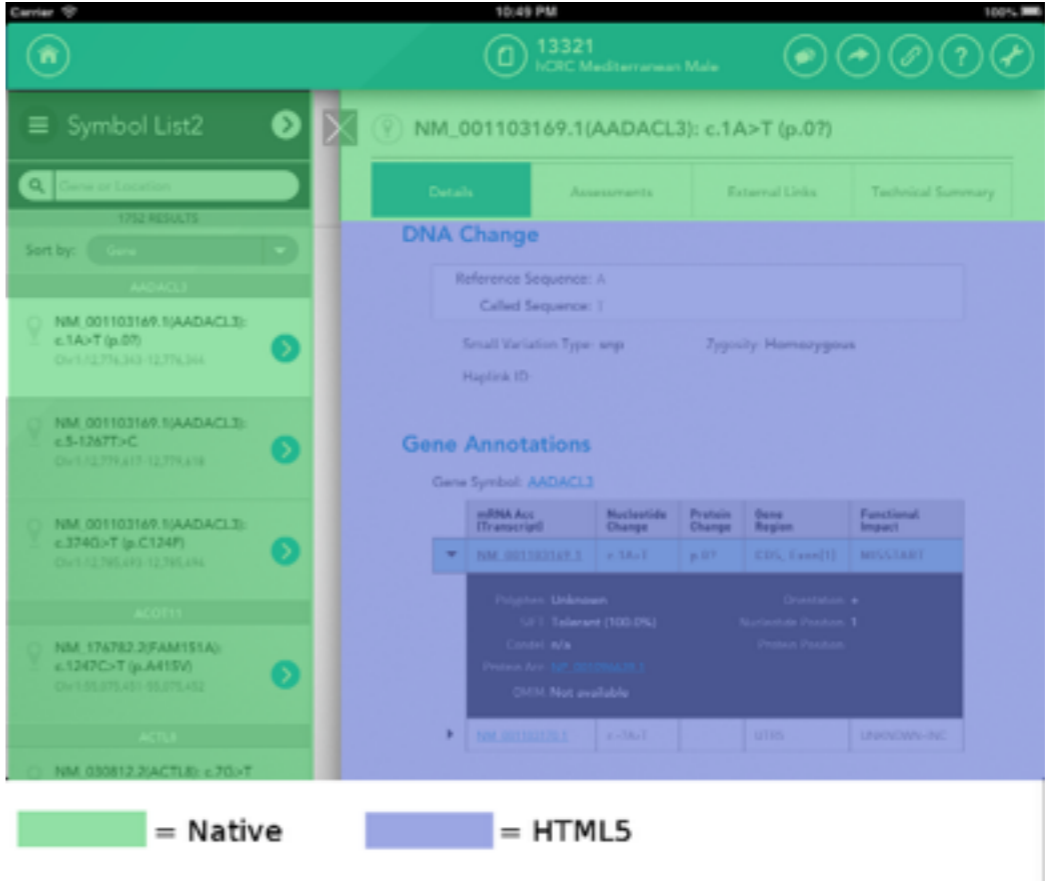
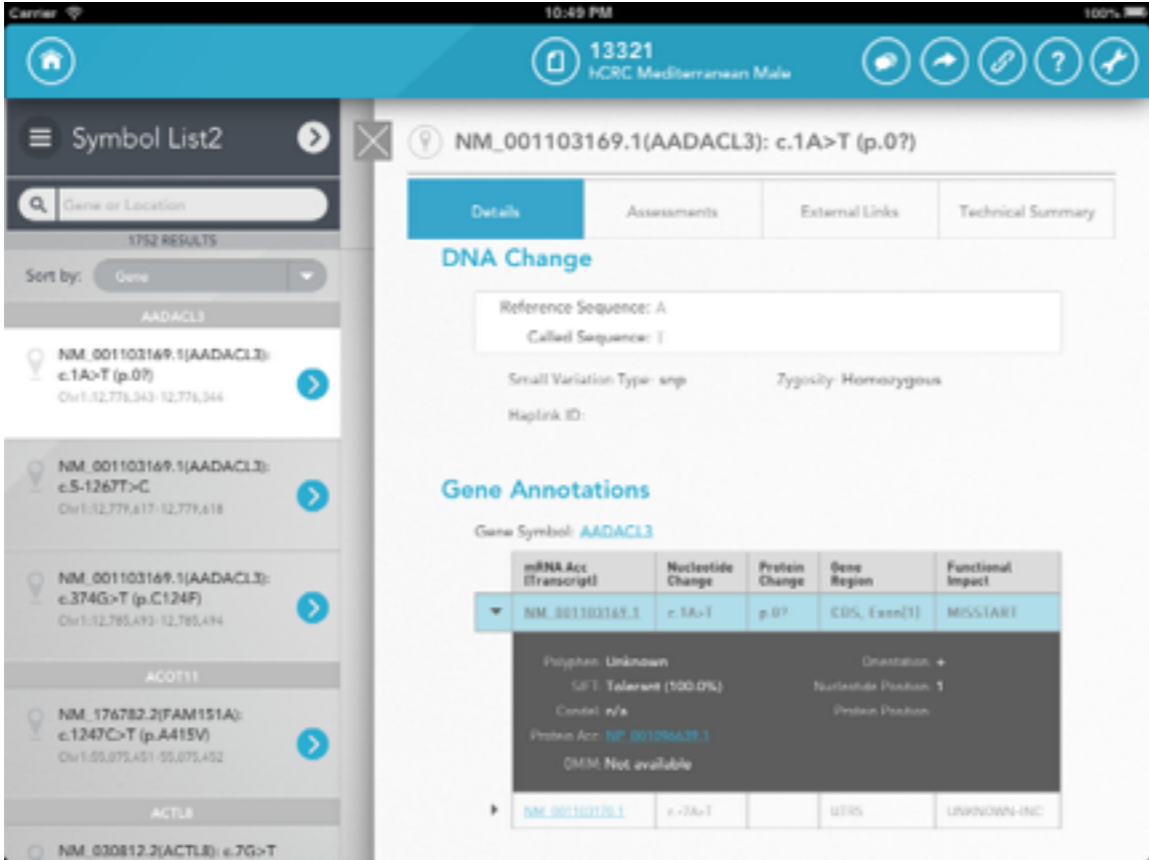
Display full screen apps

Maintain control over your site and to update it easily.

You will still have go through the (apple) app store approval process, and it may be more likely to be rejected as the app is just a wrapper for a website.

[http://www.awesome-robot.com/article/PhoneGap\\_and\\_the\\_Apple\\_Store/](http://www.awesome-robot.com/article/PhoneGap_and_the_Apple_Store/)

# Hybrid App

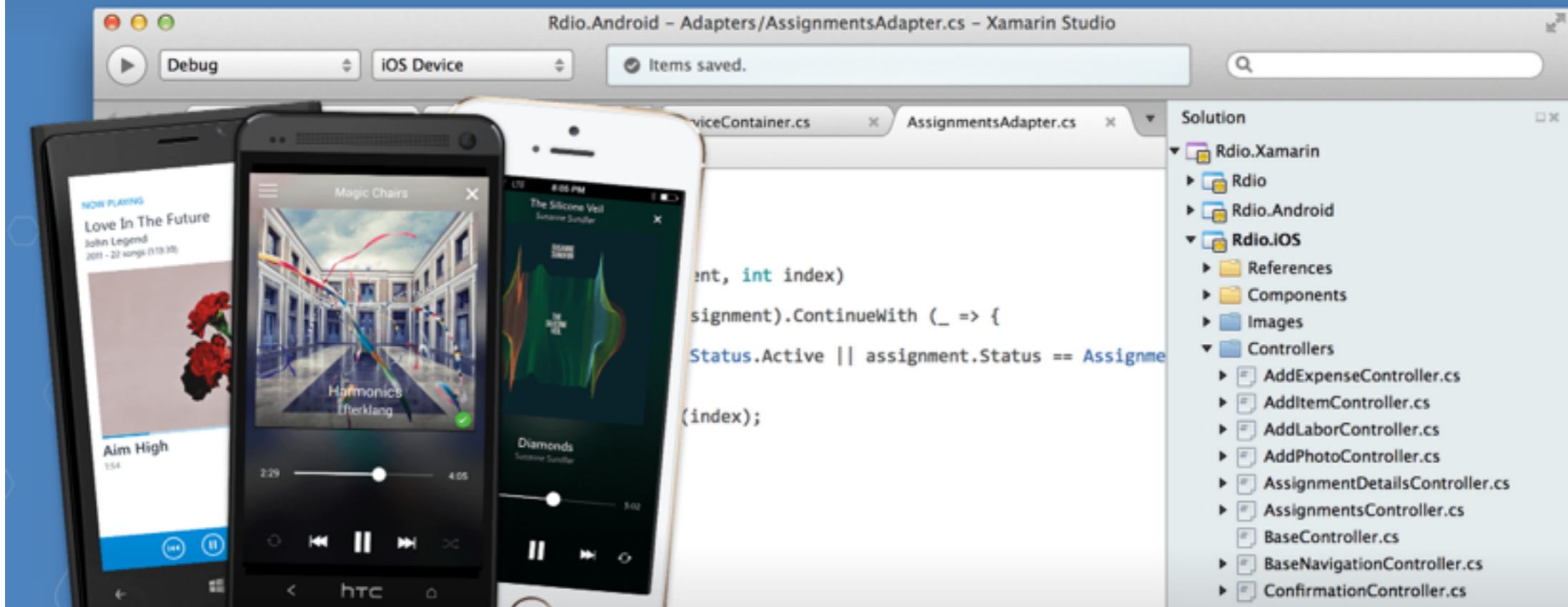


<http://www.smashingmagazine.com/2013/10/17/best-of-both-worlds-mixing-html5-native-code/>

Create Native iOS, Android,  
Mac and Windows apps in C#.

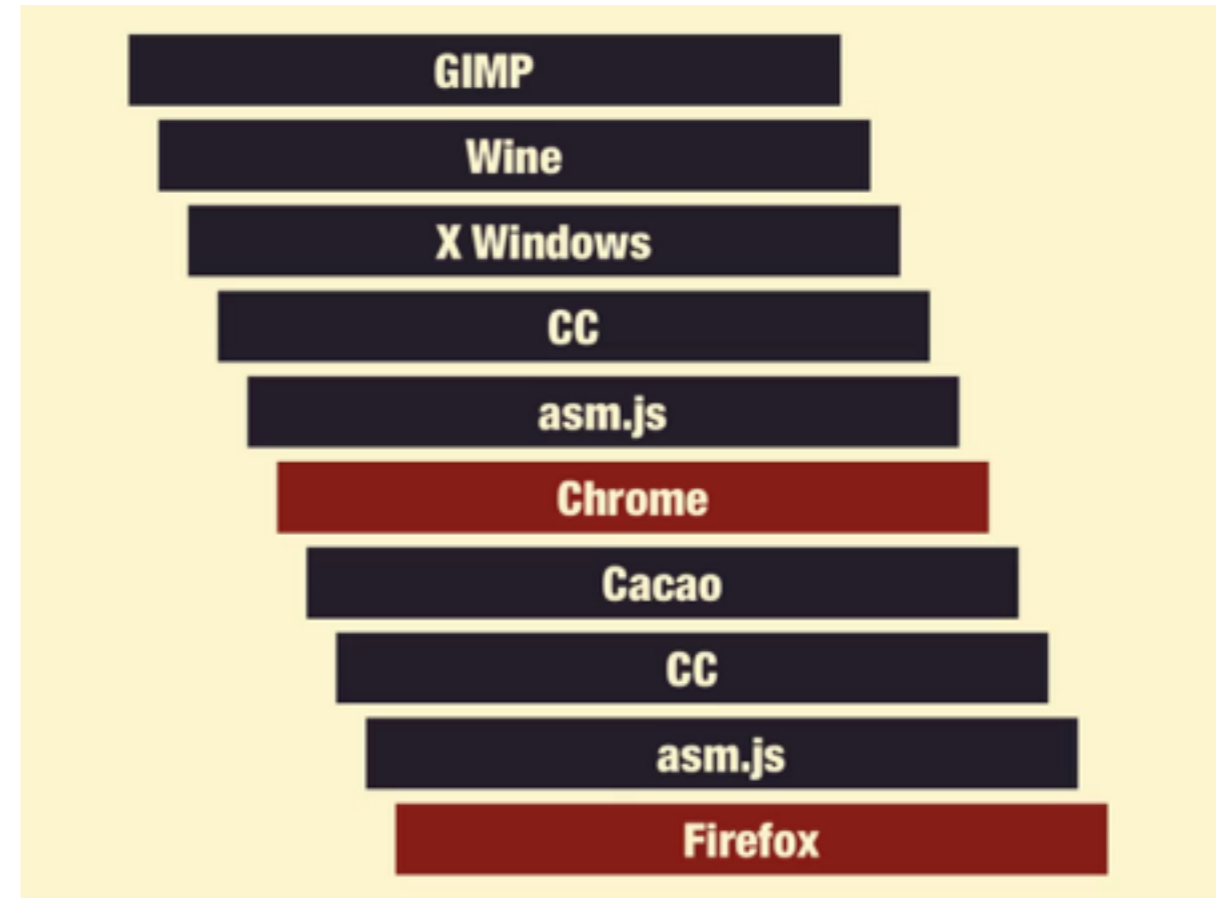
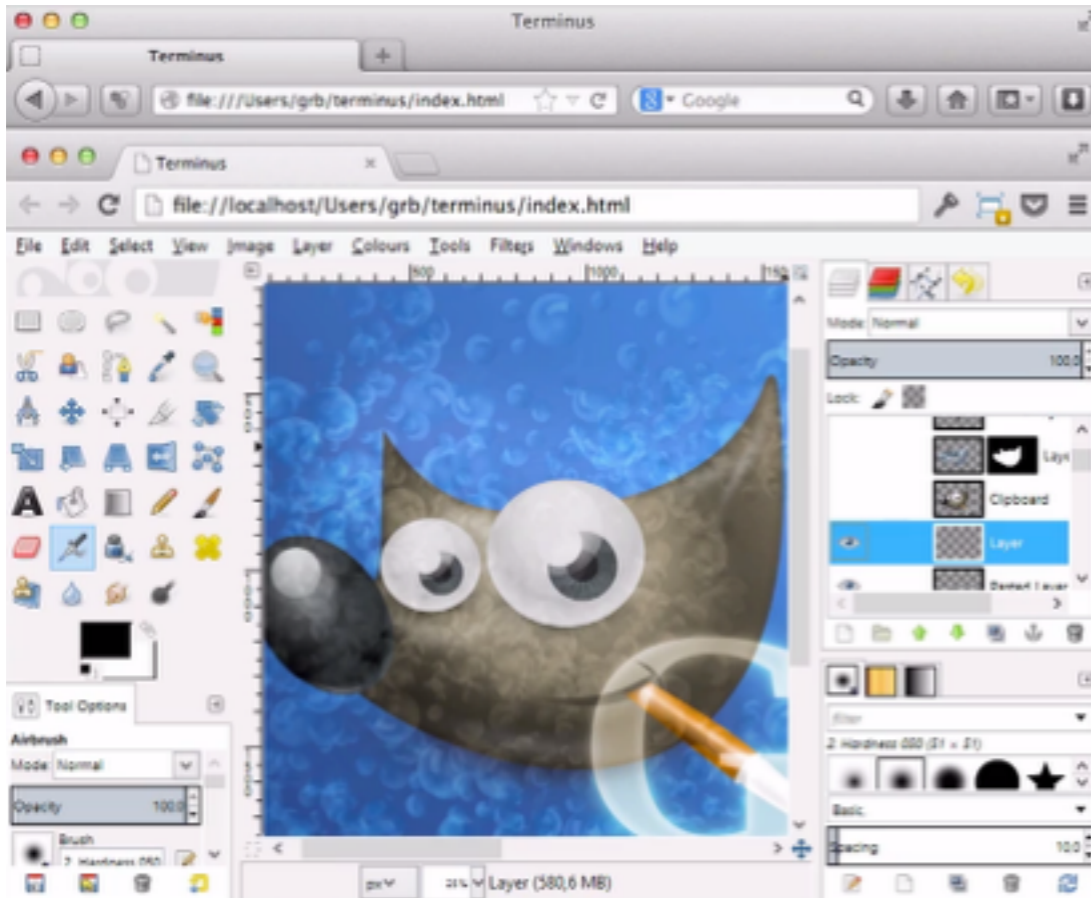
Join our community of  
598,770 developers.

Download Now ▶



<http://xamarin.com/>

I know what you're thinking..

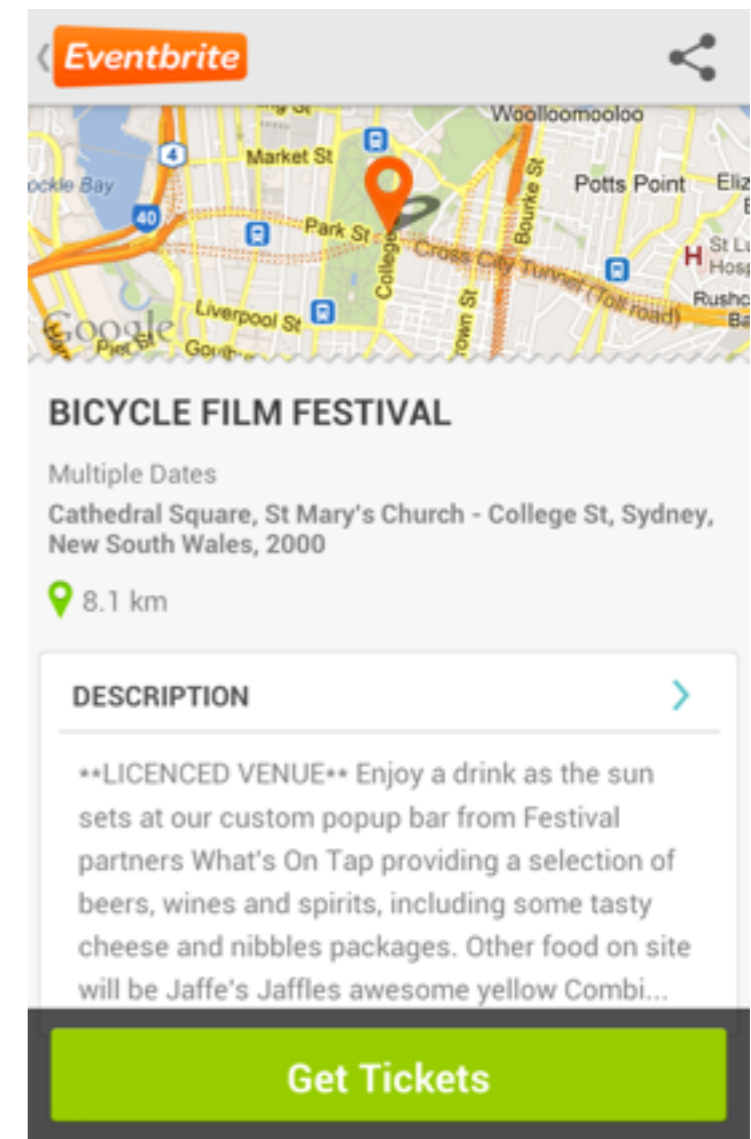
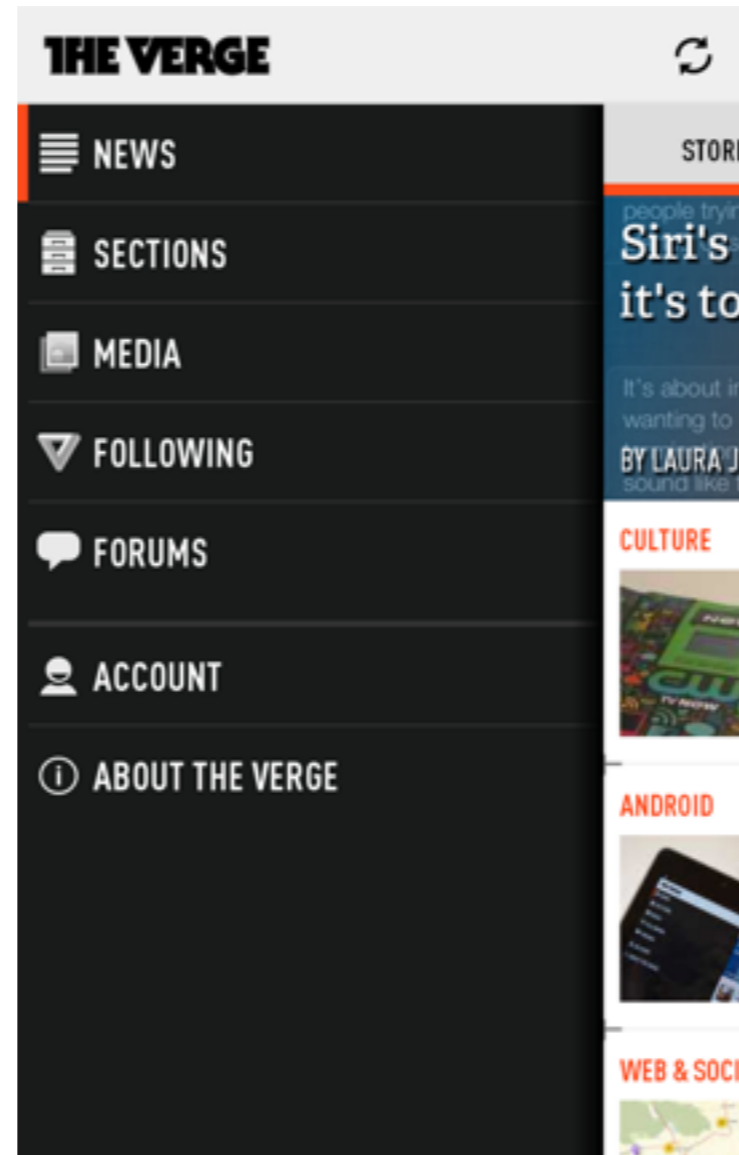
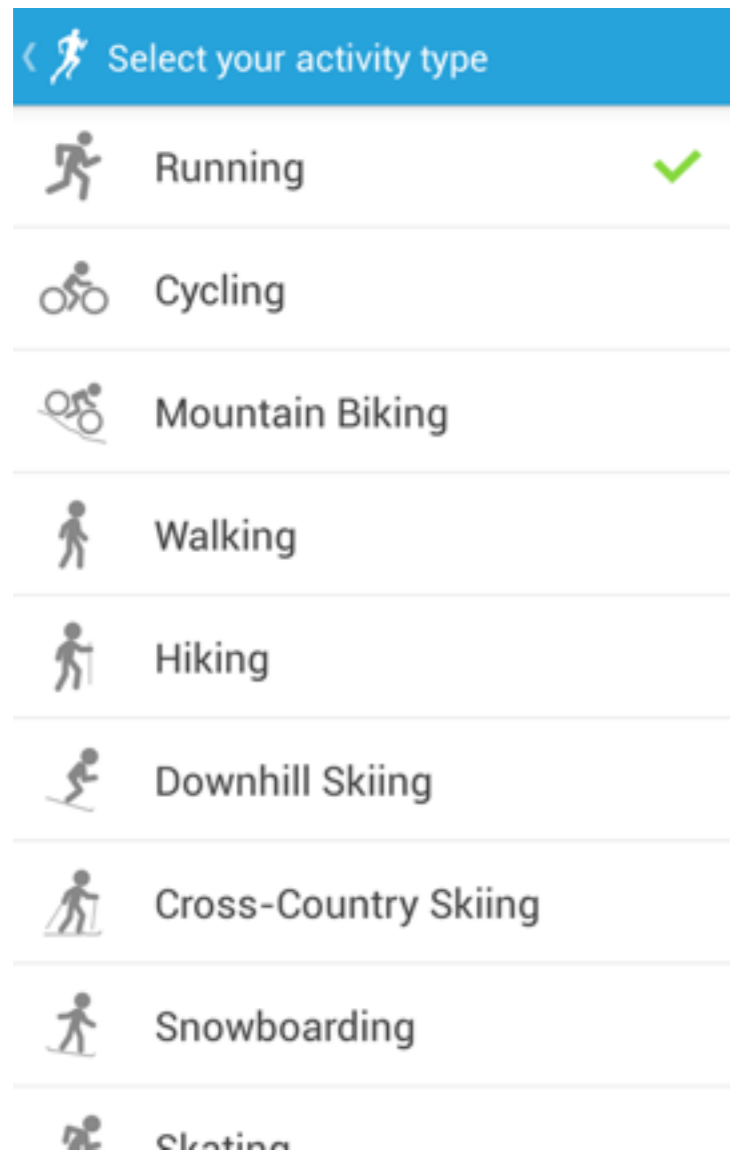


Year 2020

<https://www.destroyallsoftware.com/talks/the-birth-and-death-of-javascript>

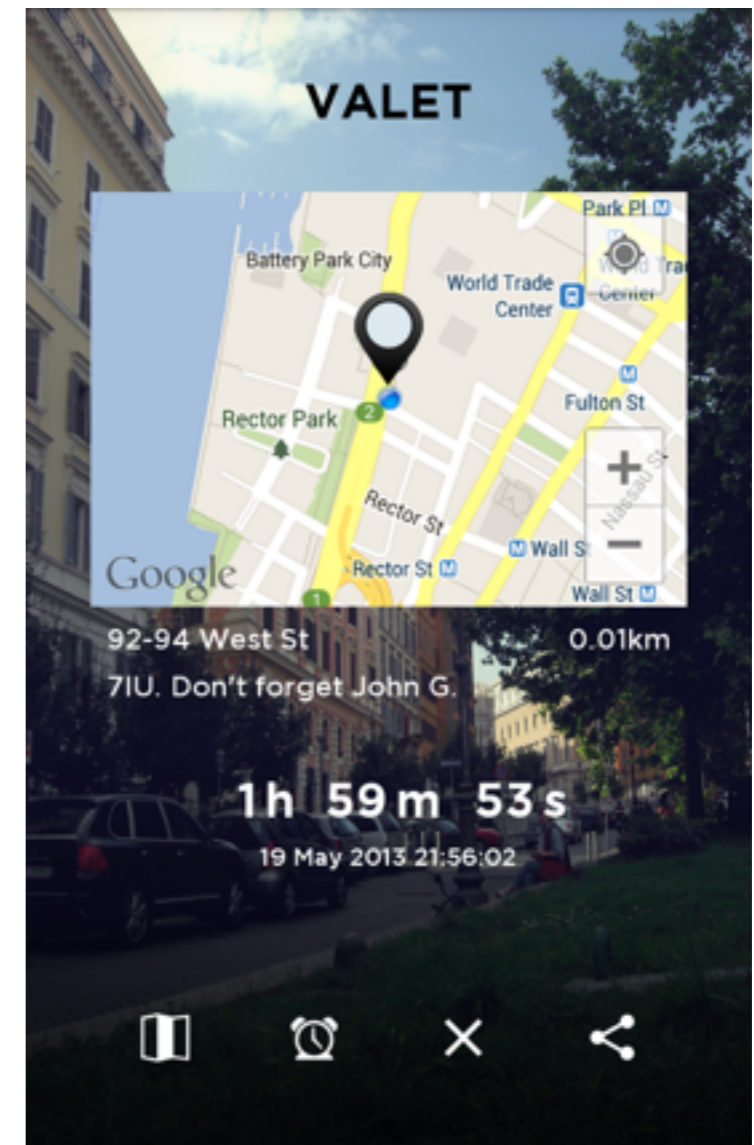
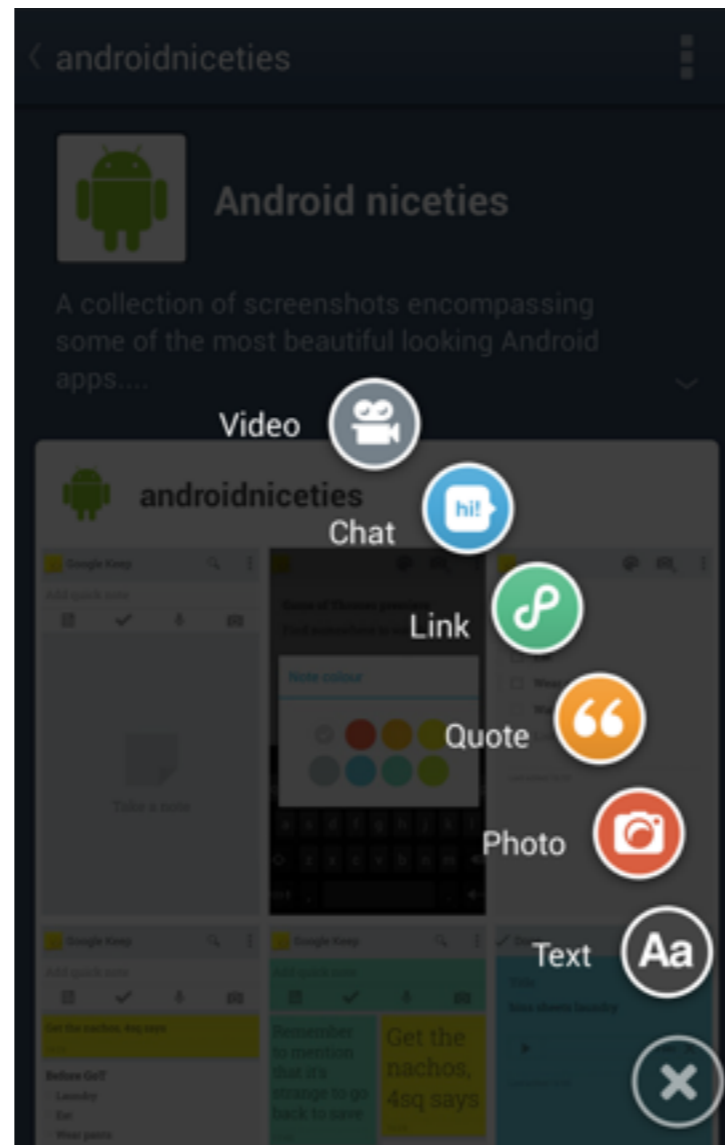
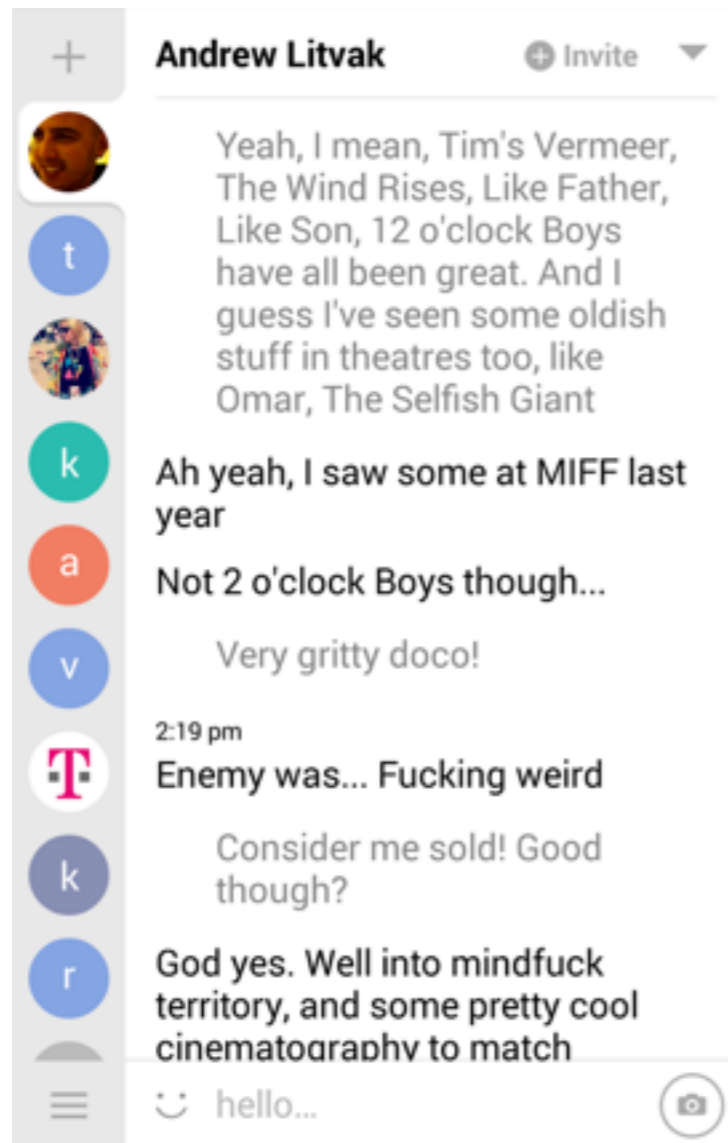


# Stock-looking UI and “fancy” UI in native development



<http://androidniceties.tumblr.com/>

# Stock-looking UI and “fancy” UI in native development



<http://androidniceties.tumblr.com/>

# Stock-looking UI and “fancy” UI in native development

Orientation: Horizontal vs. Vertical



MPFlipStyleDefault



MPFlipStyleOrientationVertical

Perspective: Normal vs. Reverse



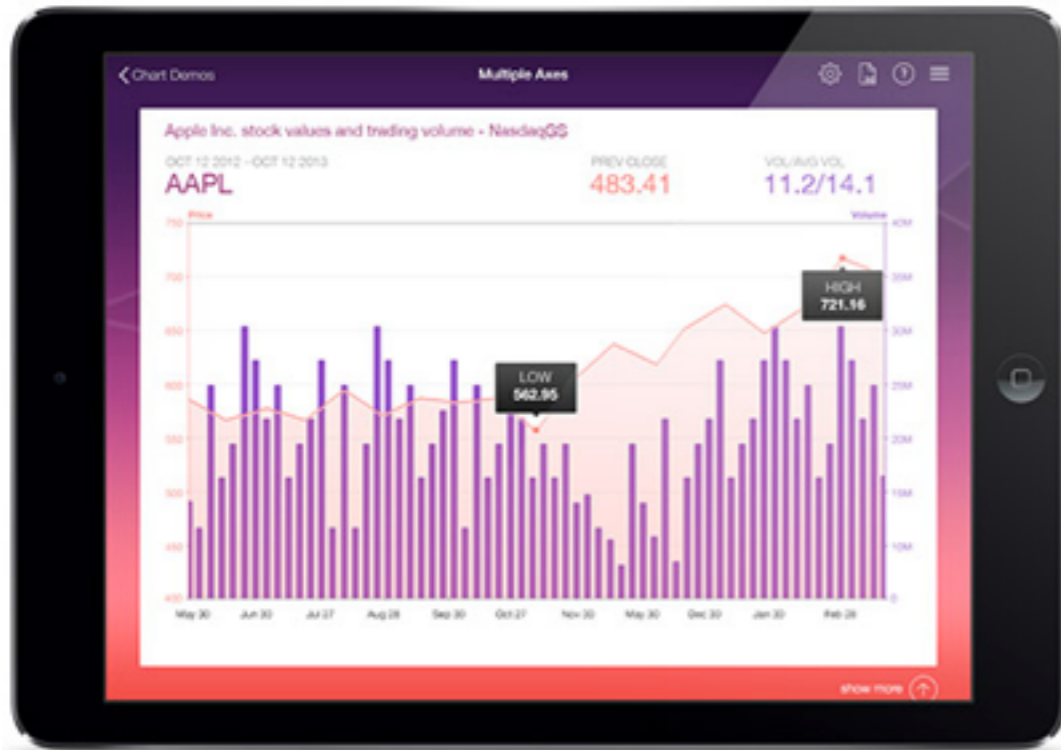
MPFlipStyleDefault



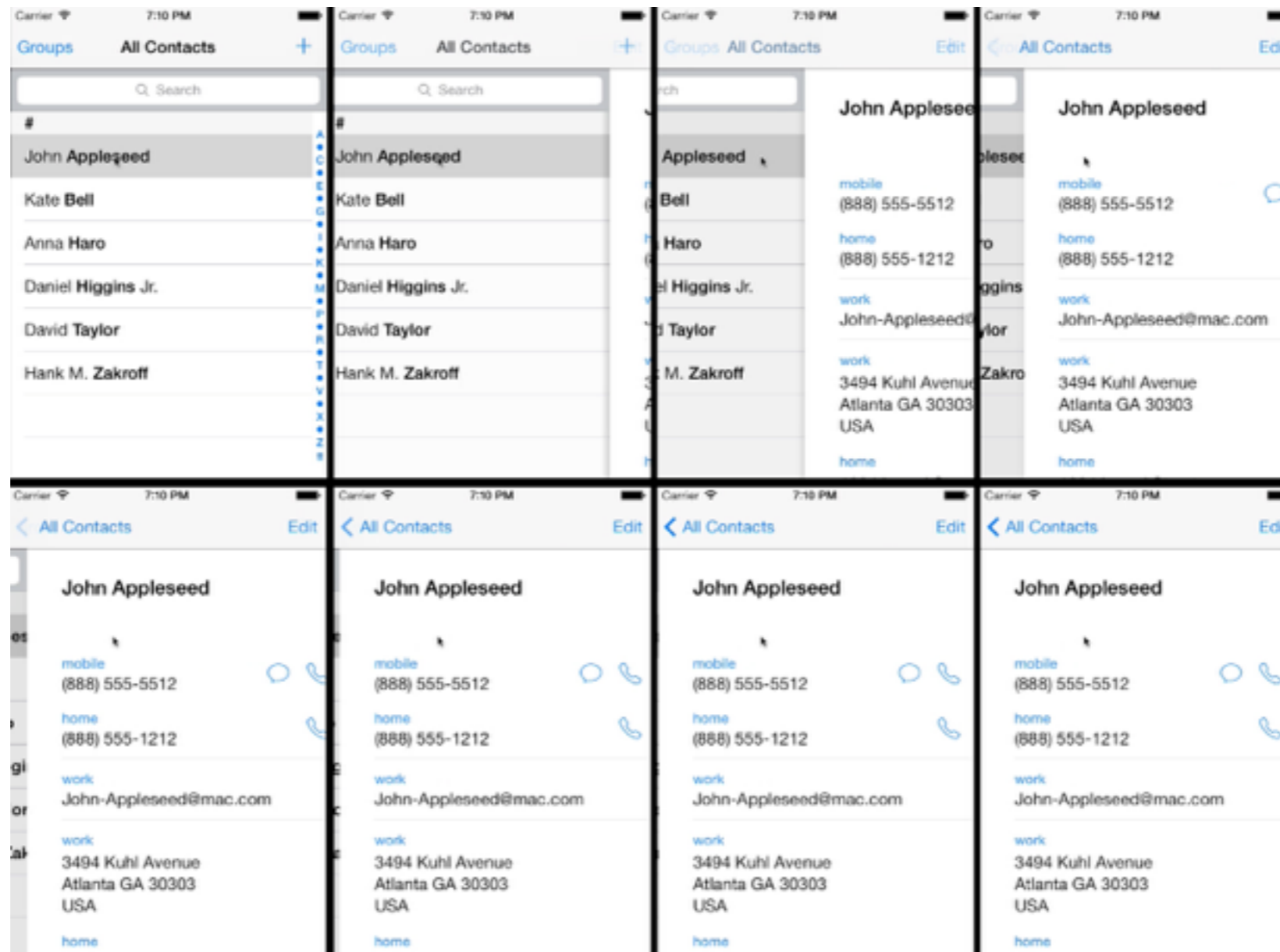
MPFlipStylePerspectiveReverse

```
621     [self cleanupLayers];
622     [self transitionDidComplete:!!isFallingBack];
623
624     if (completion)
625         completion(YES); // execute the completion block that was passed in
626
627     });
628
629     // Flip back page from vertical down to flat
630     CABasicAnimation* animation2 = [CABasicAnimation animationWithKeyPath:rotationKey];
631     [animation2 setFromValue:[NSNumber numberWithInt:-90*factor*(1-fromProgress)]];
632     [animation2 setToValue:[NSNumber numberWithInt:0]];
633     [animation2 setFillMode:kCAFillModeForwards];
634     [animation2 setRemovedOnCompletion:NO];
635     [layer addAnimation:animation2 forKey:nil];
636     [layer setTransform:CATransform3DIdentity];
637
638     // Shadows
639
640     // Lighten back page just slightly as we flip (just to give it a crease where it touches reveal page)
641     animation2 = [CABasicAnimation animationWithKeyPath:@"opacity"];
642     [animation2 setFromValue:[NSNumber numberWithInt:[self flippingPageShadowOpacity] * (1-fromProgress)]];
643     [animation2 setToValue:[NSNumber numberWithInt:0]];
644     [animation2 setFillMode:kCAFillModeForwards];
645     [animation2 setRemovedOnCompletion:NO];
646     [flippingShadow addAnimation:animation2 forKey:nil];
647     [flippingShadow setOpacity:0];
648
649     if (!inward)
650     {
651         // Darken facing page as it gets covered by back page flipping down (along a sine curve)
652         NSMutableArray* arrayOpacity = [NSMutableArray arrayWithCapacity:frameCount + 1];
653         CGFloat progress;
654         CGFloat sinOpacity;
655         for (int frame = 0; frame <= frameCount; frame++)
656         {
657             progress = fromProgress + (toProgress - fromProgress) * ((float)frame) / frameCount;
658             sinOpacity = (sin(mp_radians(90 * progress)))* coveredPageShadowOpacity;
659             if (frame == 0)
```

## Good libraries for the rescue (Similar in Web)



<http://www.telerik.com/ios-ui/chart>



<http://c2prods.com/2013/cloning-the-ui-of-ios-7-with-html-css-and-javascript/>



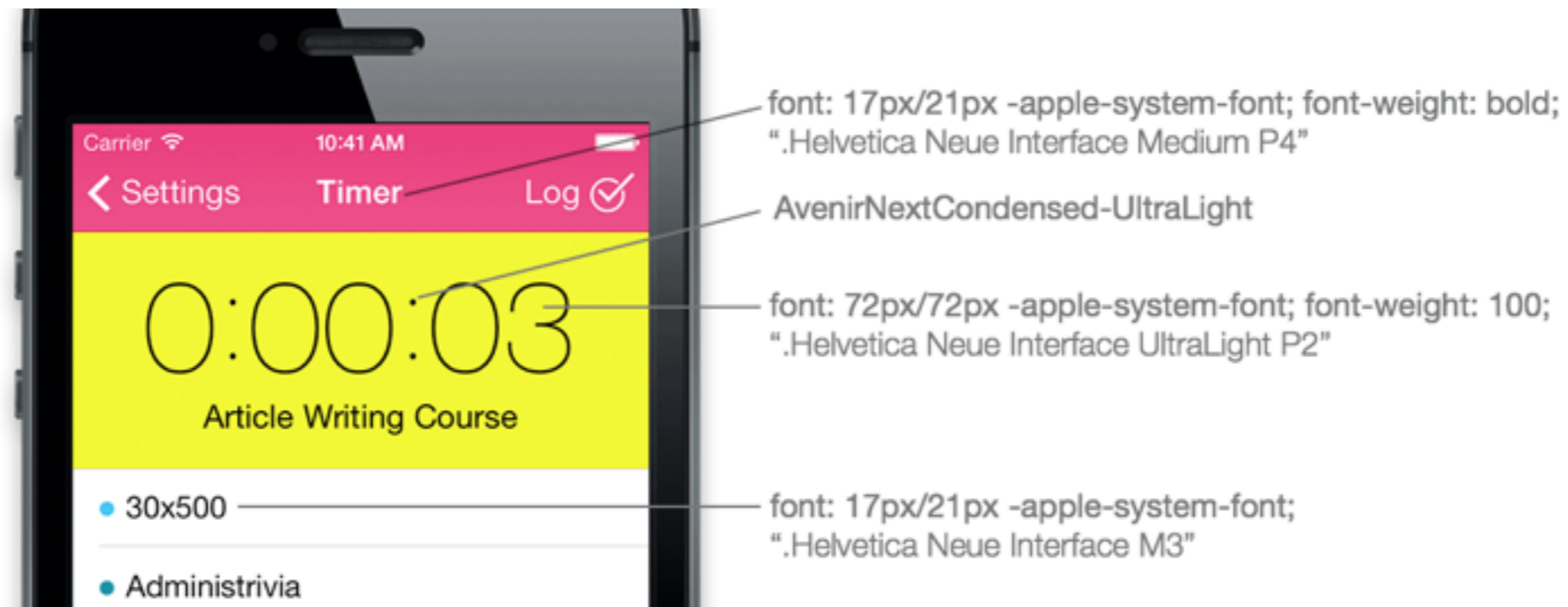
# Facebook Mobile App



Native App  
(iOS)



Web App  
(HTML5)



<http://mir.aculo.us/2013/09/16/how-to-create-a-web-app-that-looks-like-a-ios7-native-app-part-1/>

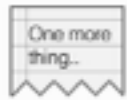


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<http://theappentrepreneur.com/54-amazing-wireframing-tools-apps>



Too many (interactive) wire-framing tools



Note



Rectangle / Box

Heading 1  
Heading 2

First name:

Heading

Label

Lorem,  
Ipsum  
Dolor

[Click Me](#)

Paragraph

Link

[Link 1](#) | [Link 2](#)

I agree

Link Bar

Checkbox

Pizza  
 Sushi

Submit

Radio buttons

Button

Select ▼

John Doe

Combo box

Text input

Dear Moqups,  
I love you!

1000

We've tried to make things simple and fairly intuitive so you can unleash your creativity without any obstacles.



Click to select

Select and click again to configure

Double click to edit

This is a bit tricky to master until you get a hold of it.

Stencils are objects that mimic various user interface elements. We have plenty of them and we'll keep adding more to cover various needs.

Some stencils have **editable content** and others have **configurable properties** like color, shape, states, etc. There are stencils that don't have configuration options or they can't be edited at all.

Feel free to play around with them to discover who's who.

### Quick tips:

Need more help? Press F1

type anywhere to start searching stencils

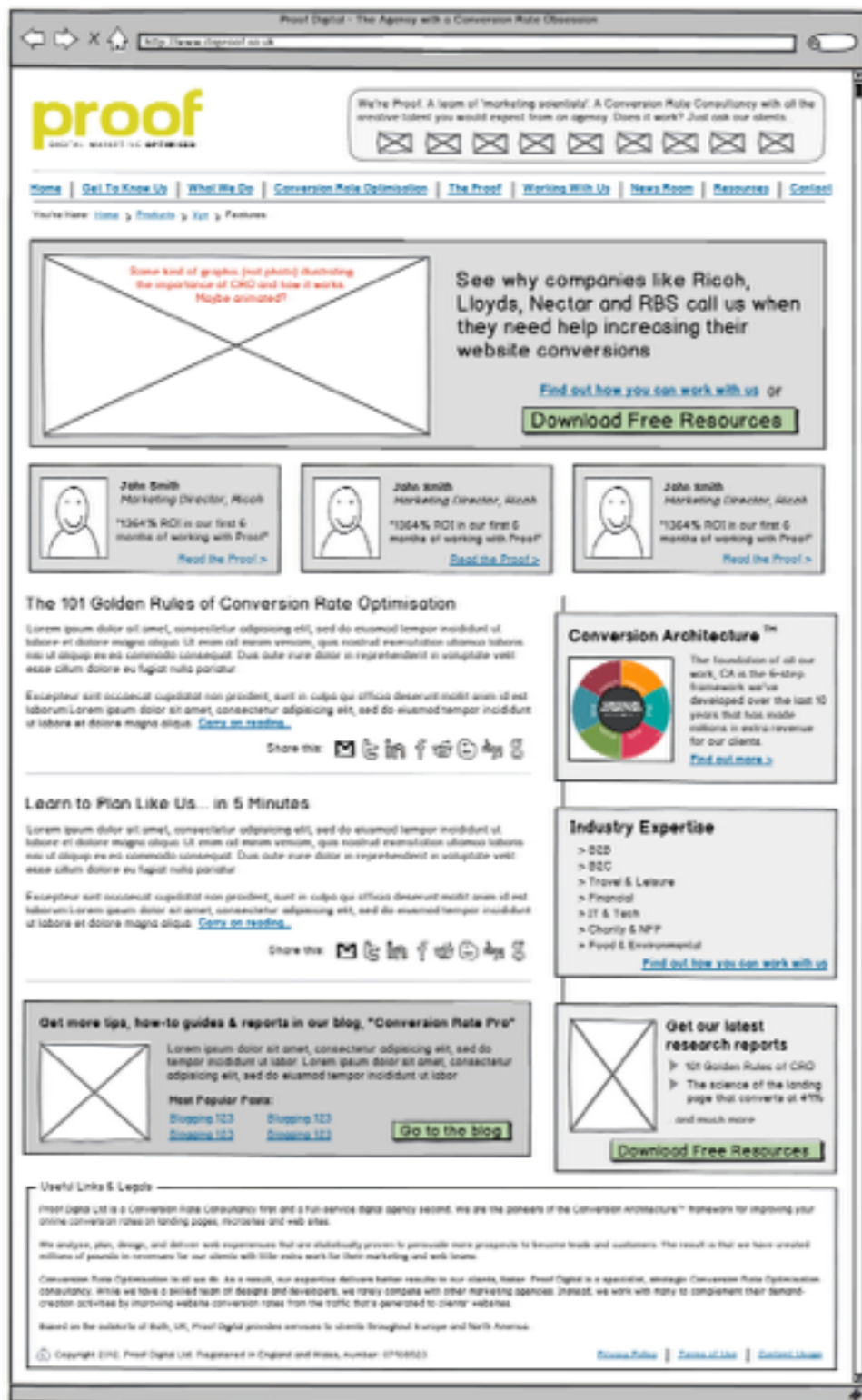
upload your own custom images

connect pages in your project with links

undo/redo all your changes

export your mockups to PDF or PNG

and much more to discover...



Your TA's favorite

Demo

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# PhoneGap

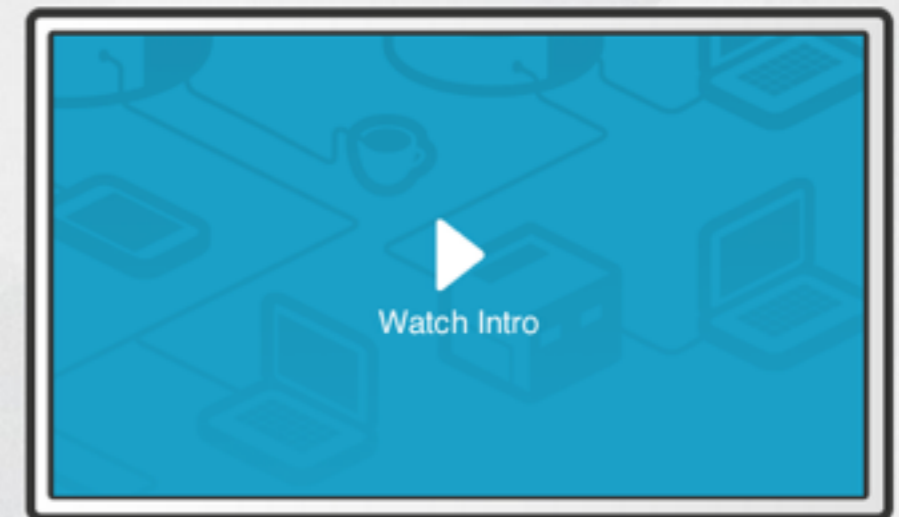
A distributed version of <https://cordova.apache.org/>

Easily create apps using the web technologies you know and love:  
**HTML, CSS, and JavaScript**

PhoneGap is a free and open source framework that allows you to create mobile apps using standardized web APIs for the platforms you care about.

[Install PhoneGap ▶](#)

[Getting Started Guides ▶](#)

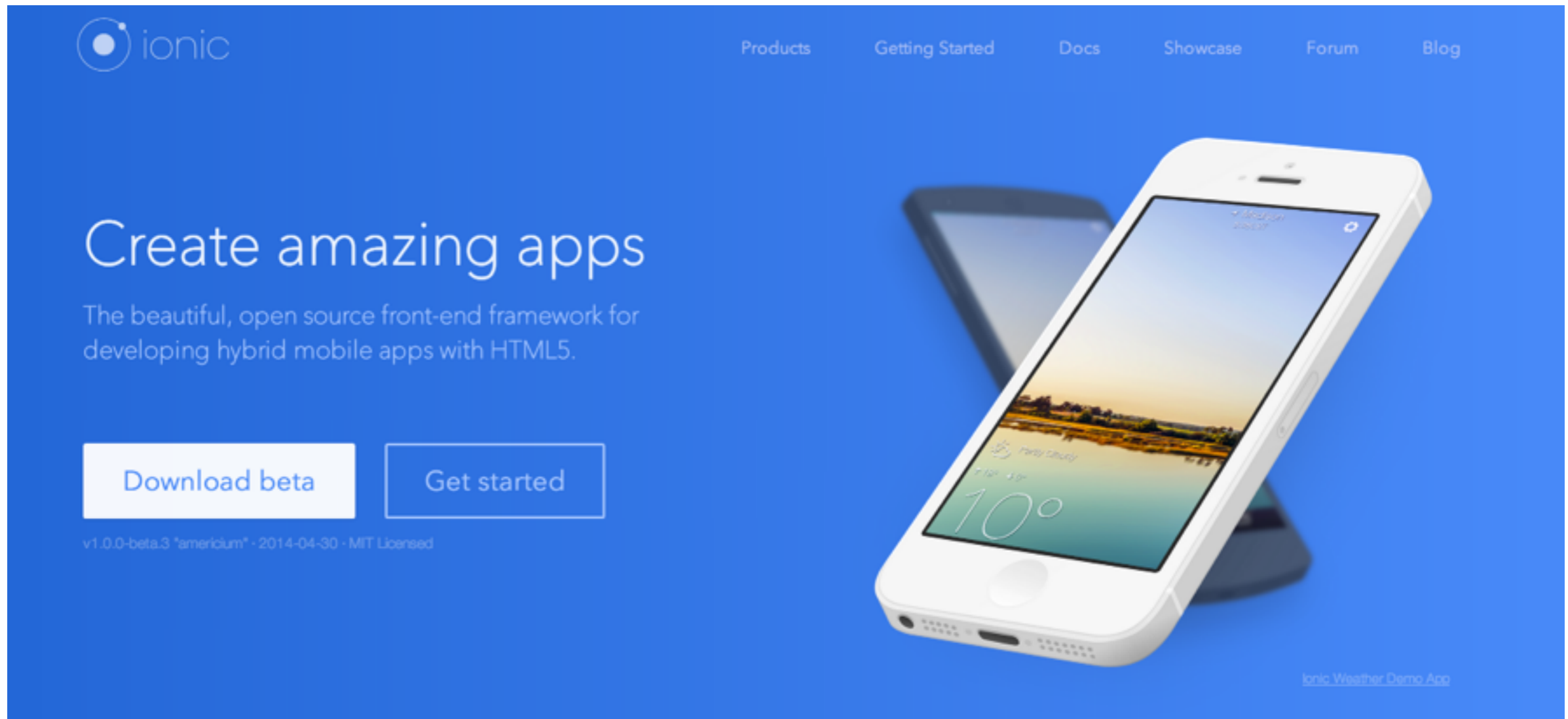


[http://docs.phonegap.com/en/edge/guide\\_platforms\\_ios\\_index.md.html#iOS%20Platform%20Guide](http://docs.phonegap.com/en/edge/guide_platforms_ios_index.md.html#iOS%20Platform%20Guide)

Example: <https://itunes.apple.com/us/app/healthtap-find-doctors-free/id466079030>



# Your TA's personal favorite



The image shows a screenshot of the Ionic framework website. The background is a solid blue color. In the top left corner is the Ionic logo, which consists of a white circle with a dot inside, followed by the word "ionic" in a lowercase, sans-serif font. To the right of the logo is a horizontal navigation menu with the following items: "Products", "Getting Started", "Docs", "Showcase", "Forum", and "Blog". Below the navigation menu, on the left side, is the main heading "Create amazing apps" in a large, white, sans-serif font. Underneath this heading is a sub-heading: "The beautiful, open source front-end framework for developing hybrid mobile apps with HTML5." Below the sub-heading are two white buttons with blue text: "Download beta" and "Get started". At the bottom left of the page, there is small white text: "v1.0.0-beta.3 'americium' - 2014-04-30 - MIT Licensed". On the right side of the page, there is a 3D rendering of a white smartphone. The phone is tilted and shows a weather application interface on its screen. The screen displays a sunset or sunrise scene over a body of water, with the temperature "10°" prominently shown in the foreground. In the bottom right corner of the page, there is a small link: "Ionic Weather Demo App".

ionic

Products Getting Started Docs Showcase Forum Blog

## Create amazing apps

The beautiful, open source front-end framework for developing hybrid mobile apps with HTML5.

[Download beta](#) [Get started](#)

v1.0.0-beta.3 "americium" - 2014-04-30 - MIT Licensed

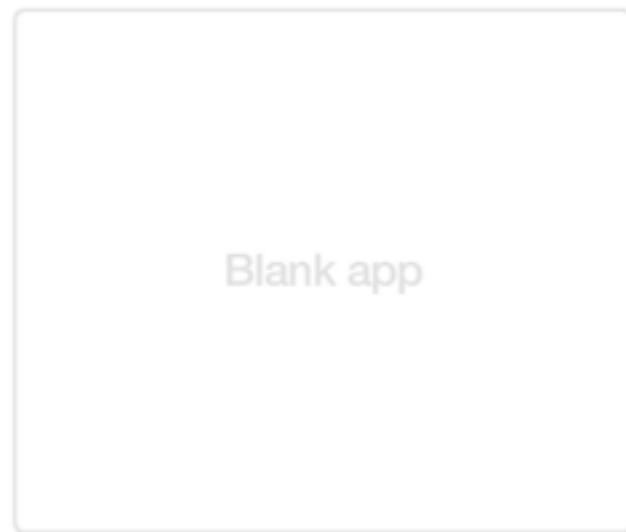
[Ionic Weather Demo App](#)

2

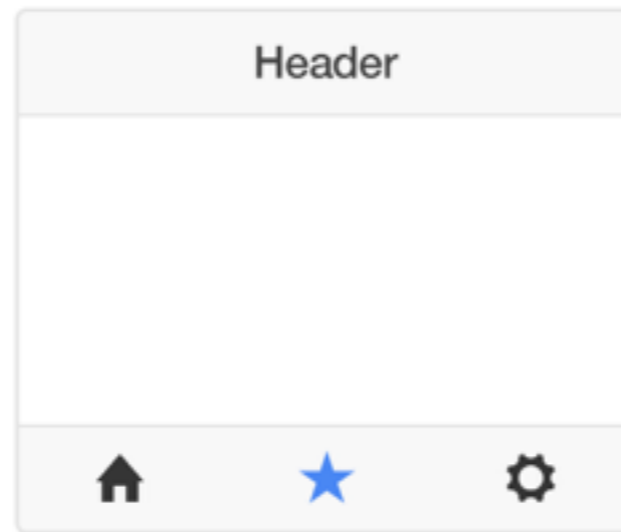
## Start a project

Create an Ionic project using one of our ready-made app templates, or a blank one to start fresh.

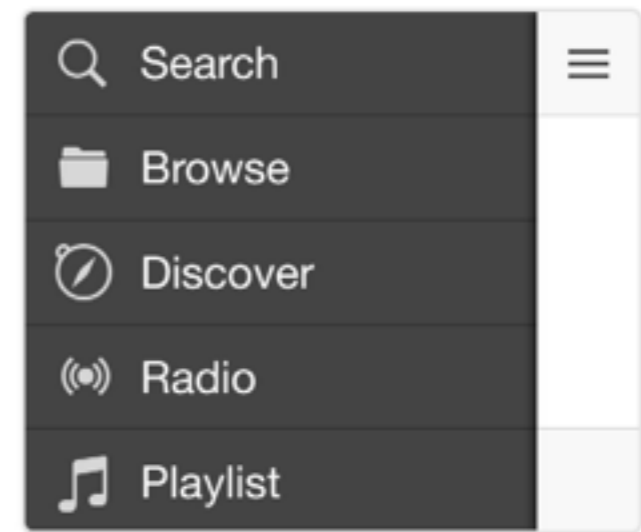
```
$ ionic start myApp tabs
```



```
$ ionic start myApp blank
```



```
$ ionic start myApp tabs
```



```
$ ionic start myApp sidemenu
```

```

<div class="list card">

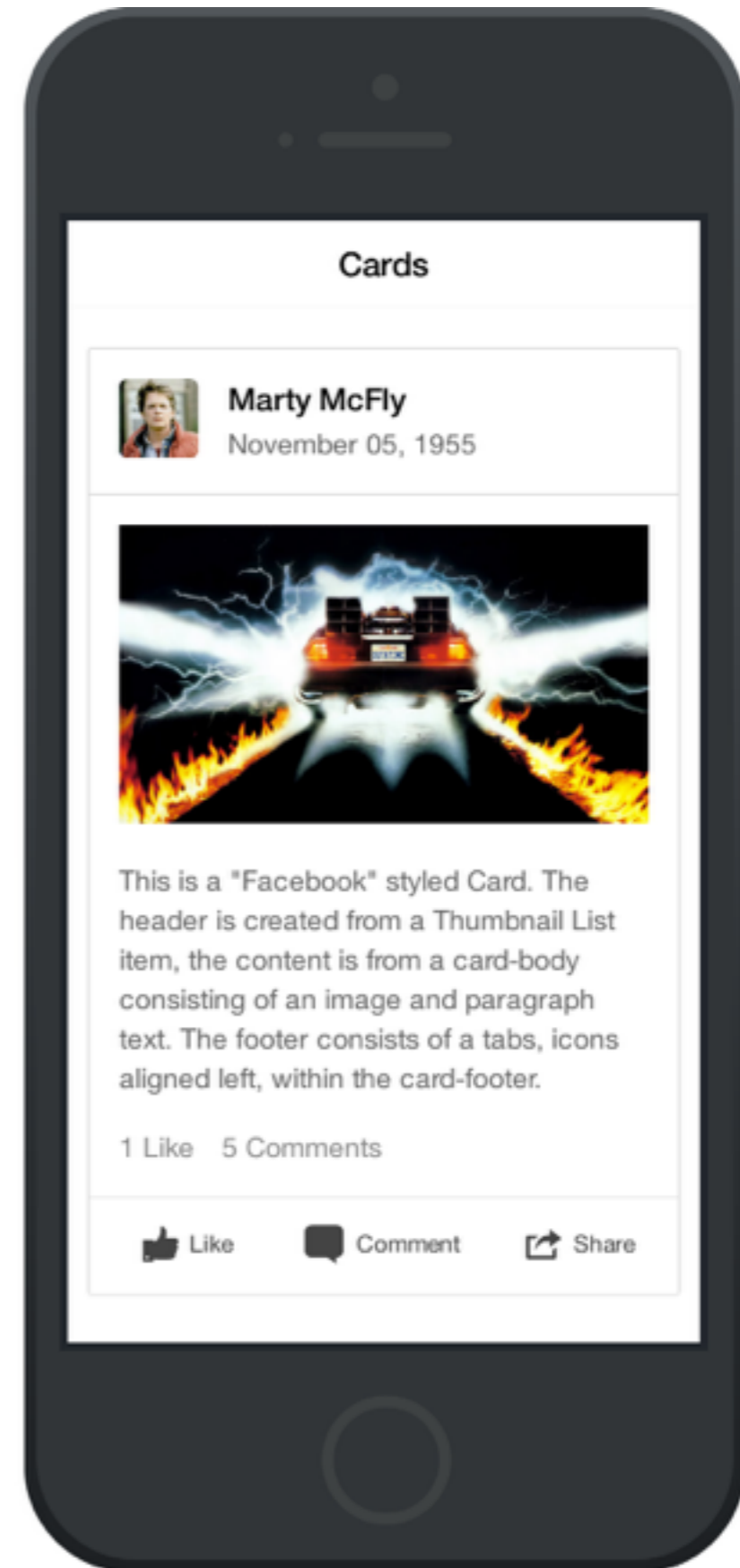
  <div class="item item-avatar">
    
    <h2>Marty McFly</h2>
    <p>November 05, 1955</p>
  </div>

  <div class="item item-body">
    
    <p>
      This is a "Facebook" styled Card. The header is created from a Thumbnail List item,
      the content is from a card-body consisting of an image and paragraph text. The footer
      consists of tabs, icons aligned left, within the card-footer.
    </p>
    <p>
      <a href="#" class="subdued">1 Like</a>
      <a href="#" class="subdued">5 Comments</a>
    </p>
  </div>

  <div class="item tabs tabs-secondary tabs-icon-left">
    <a class="tab-item" href="#">
      <i class="icon ion-thumbsup"></i>
      Like
    </a>
    <a class="tab-item" href="#">
      <i class="icon ion-chatbox"></i>
      Comment
    </a>
    <a class="tab-item" href="#">
      <i class="icon ion-share"></i>
      Share
    </a>
  </div>

</div>

```



<http://ionicframework.com/docs/components/#icon-only-tabs>

# They're mostly the same with different syntax and UI

The image displays the Framework7 website on the left and a mobile app preview on the right. The website features a large 'F7' logo in a white circle on a red background. Below the logo, the text reads 'Framework7' and 'Full Featured HTML Framework For Building iOS 7 Apps'. There are buttons for 'Download' and 'Get Started', and a note that it is 'MIT Licensed, v0.7.8 released on April 27, 2014'. At the bottom, there are links for 'Docs', 'Forum', 'Examples', and 'Demo Apps', along with GitHub statistics: 'Star 2,237' and 'Fork 252'.

The mobile app preview, titled 'FULLSCREEN PREVIEW', shows a white interface with a red header 'Framework7'. It includes a 'WELCOME TO FRAMEWORK7' message with a 'Read About Framework7' button. Below is a 'FRAMEWORK7 KITCHEN SINK' section with a list of features: Modals, Popover, Tabs, Side Panels, List View, Media Lists, and Contacts List. At the bottom, there are links for 'Dummy Link' and 'Menu'.

# Heavy use of data-\* attribute

```
<div class="pages navbar-through toolbar-through">
  <!-- Page, "data-page" contains page name -->
  <div data-page="index" class="page">
    <!-- Scrollable page content -->
    <div class="page-content">
      <p>Page content goes here</p>
      <!-- Link to another page -->
      <a href="about.html">About app</a>
    </div>
  </div>
</div>
```

```
var myApp = new Framework7({
  pushState: true,
  swipePanel: 'page',
  // ... other parameters
});
```

<http://www.idangero.us/framework7/get-started/#.U2GXfK1dWhs>

# IOS7 READY

Only mobile framework with the native look and feel of iOS 7, Android Jelly Bean and Windows Phone 8





# Heavy use of data-\* attribute

```
<li class='comp' data-goto="#songDetail">
  <aside>
    
  </aside>
  <div>
    <h3>Imagine Dragons</h3>
    <h4>Radioactive</h4>
  </div>
  <span class='show-detail'></span>
  </aside>
</li>
```

```
// If the list has an id of 'songs':
$('#song').on('singletap', 'li', function() {
  var whichSong = this.id;
  // output the chosen song's data to the songDetail article:
  $('#songDetail').find(h2).text(songs[whichSong].title);
  $('#songDetail').find(h3).text(songs[whichSong].artist);
  $('#songDetail').find(p).text(songs[whichSong].description);
})
```

<http://chocolatechip-ui.com/tutorials#/navigation>



[Demos](#) [Download](#) [API Documentation](#) [Themes](#) [Resources](#) [Blog](#) [About](#)

# A Touch-Optimized Web Framework

jQuery Mobile is a HTML5-based user interface system designed to make responsive web sites and apps that are accessible on all smartphone, tablet and desktop devices.

## Seriously cross-platform with HTML5

jQuery Mobile framework takes the "write less, do more" mantra to the next level: Instead of writing unique applications for each mobile device or OS, the jQuery mobile framework allows you to design a single highly-branded responsive web site or application that will work on all popular smartphone, tablet, and desktop platforms.

[Graded Browser Support](#)



# Heavy use of data-\* attribute

```
<div data-role="page" data-theme="a">
  <div data-role="header">
    <h1>jQuery Mobile</h1>
  </div>
  <div data-role="content">
    <ul data-role="listview" data-inset="true" data-dividertheme="b">
      <li data-role="list-divider">Options</li>
      <li><a href="option1.html">Option 1</a></li>
      <li><a href="option2.html">Option 2</a></li>
      <li><a href="option3.html">Option 3</a></li>
      <li><a href="option4.html">Option 4</a></li>
    </ul>
  </div>
  <div data-role="footer">
    <h4>&copy; 2012 Smashing Magazine</h4>
  </div>
</div>
```



<http://www.smashingmagazine.com/2013/03/31/getting-started-jquery-mobile/>

# Mobile CSS frameworks

# Topcoat

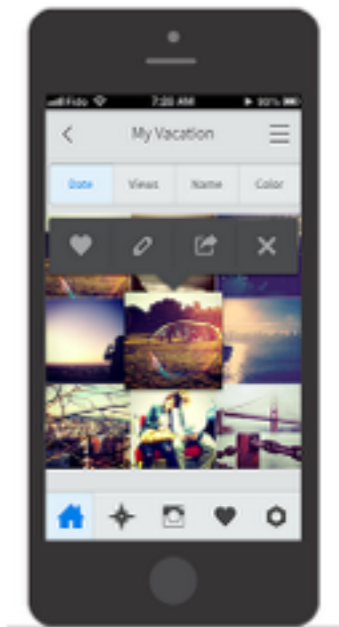
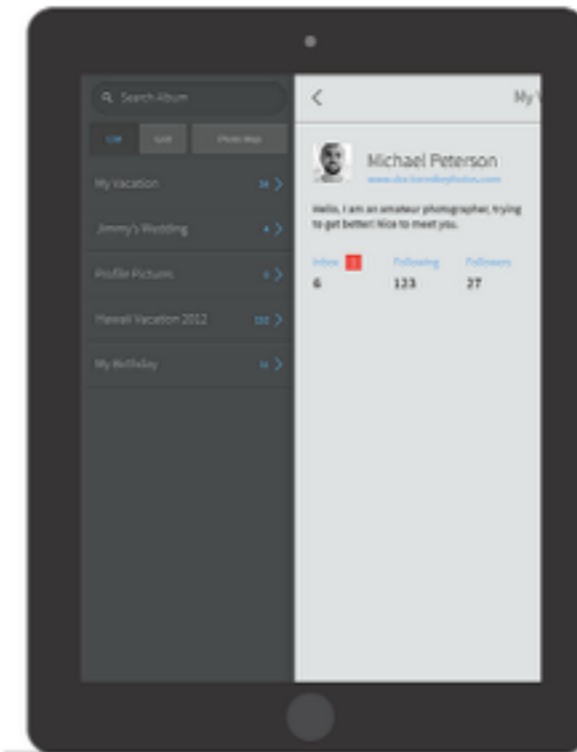
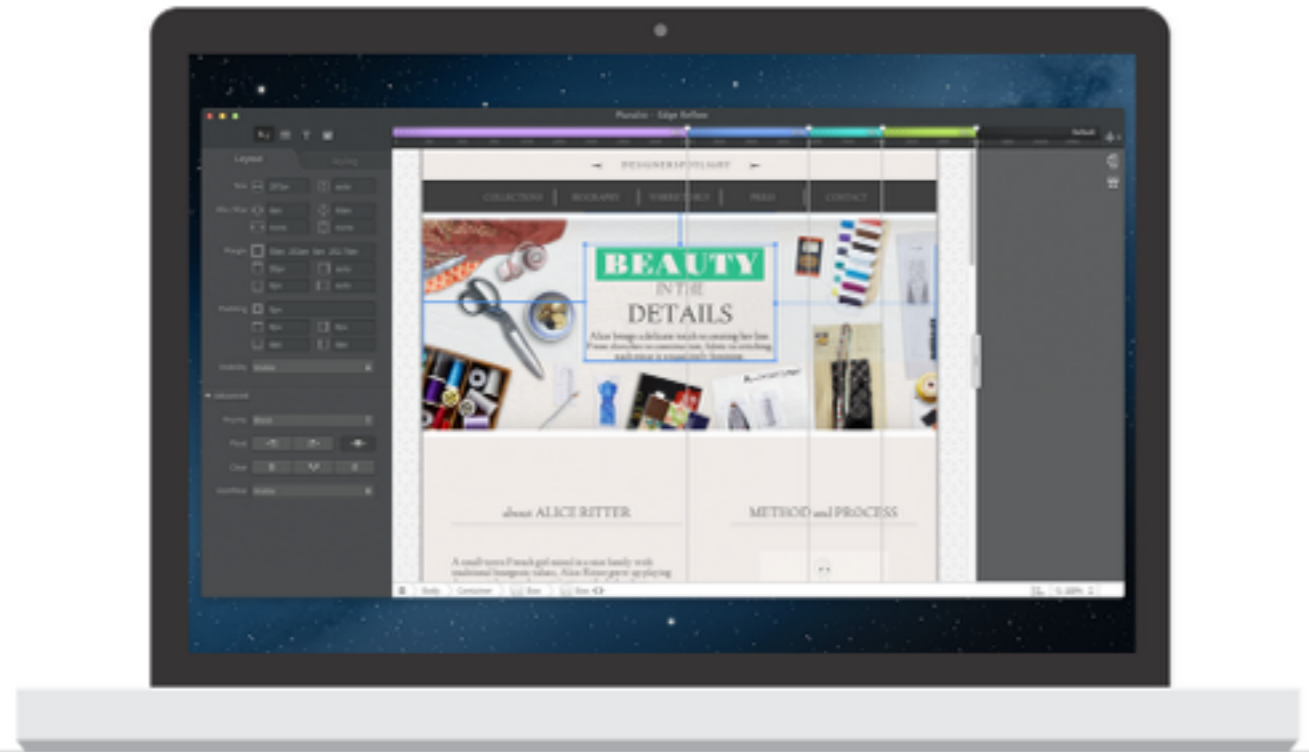
CSS for clean and fast web apps.

Demo

Benchmarks

Blog

Download



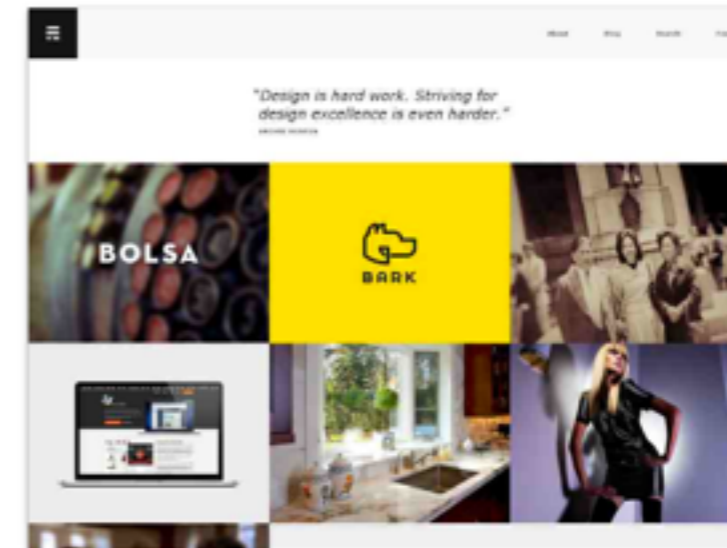
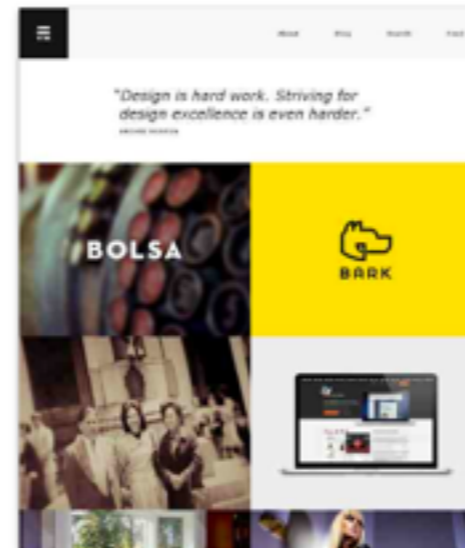
<http://topcoat.io/>

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- CSS tricks
- Debugging CSS (and other things)
- Tap and clicking events
- Access to other sensors

# Media Query



# Media Query

```
<!-- CSS media query within a style sheet -->  
<style>  
@media (max-width: 600px) {  
  .facet_sidebar {  
    display: none;  
  }  
}  
</style>
```

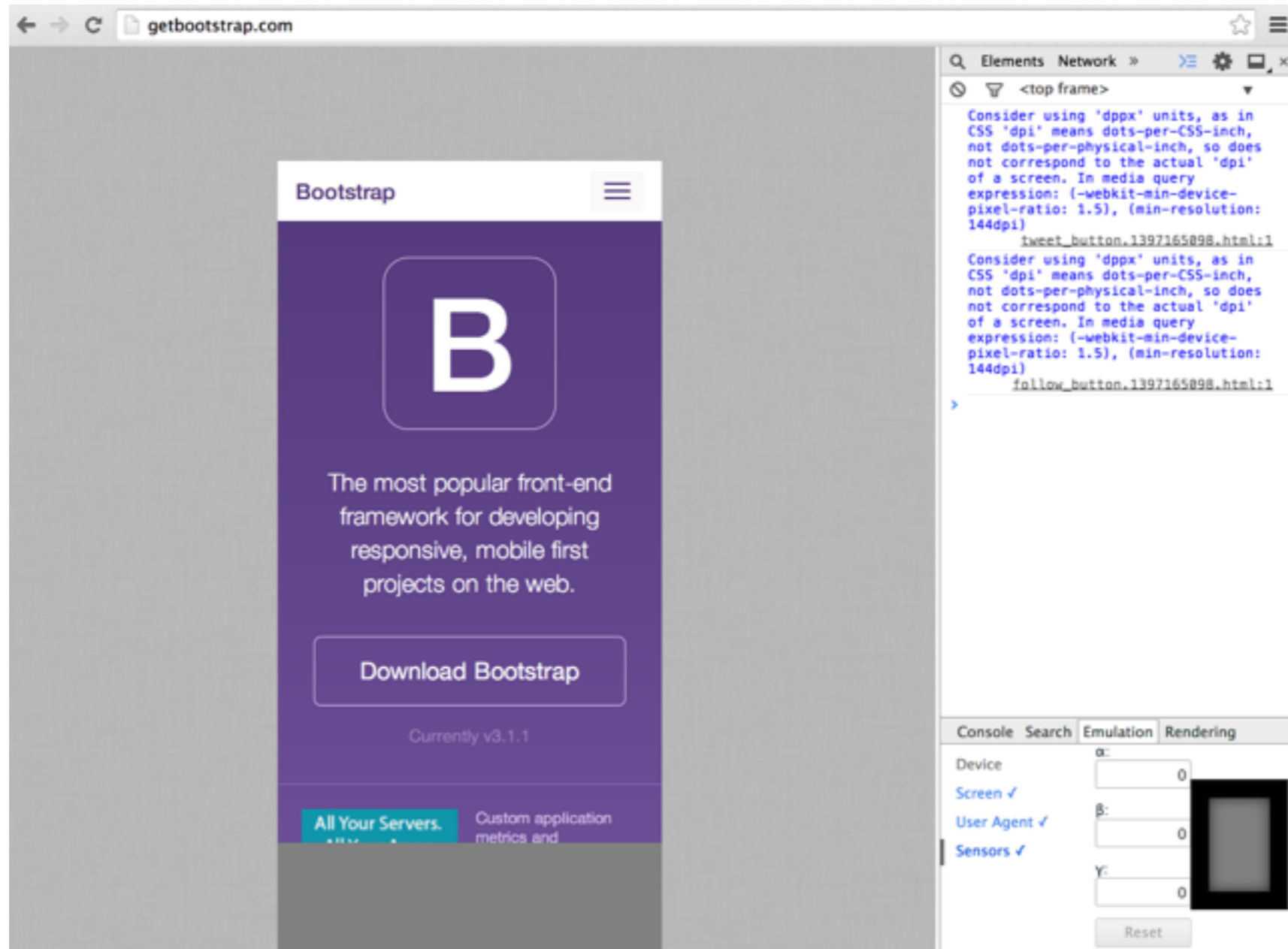
[https://developer.mozilla.org/en-US/docs/Web/Guide/CSS/Media\\_queries](https://developer.mozilla.org/en-US/docs/Web/Guide/CSS/Media_queries)

# Viewport

```
<meta name="viewport" content="width=device-width, user-scalable=no">
```

[https://developer.mozilla.org/en-US/docs/Mozilla/Mobile/Viewport\\_meta\\_tag](https://developer.mozilla.org/en-US/docs/Mozilla/Mobile/Viewport_meta_tag)

# Emulation Tools in Chrome!

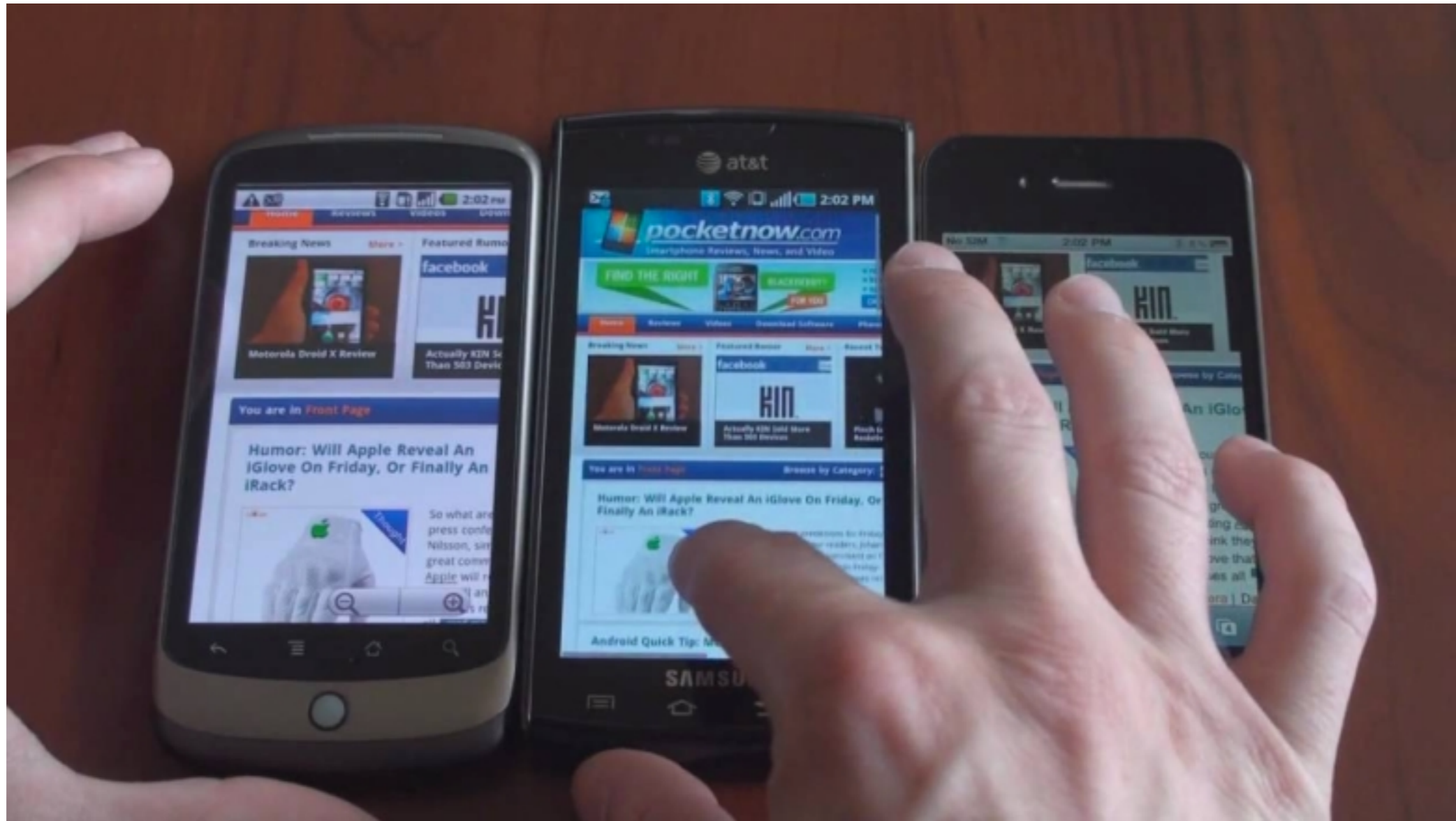


<https://developers.google.com/chrome-developer-tools/docs/mobile-emulation>

Demo



# Fixing the 300ms Tap Delay



<https://github.com/ftlabs/fastclick>

# Fixing the 300ms Tap Delay

Layer A responds to click events normally, which on iOS will introduce a 300ms delay.  
Layer B is enhanced with FastClick, and will fire the click handler with no delay.  
The layers will behave normally on platforms that don't support touch events.

Touch and time:   
Click event time:   
Difference:

A

B

Elements Network »

<top frame>

Console Search Emulation Rendering

Device Apple iPad 1 / 2 / iPac

Screen ✓

User Agent ✓

Sensors ✓

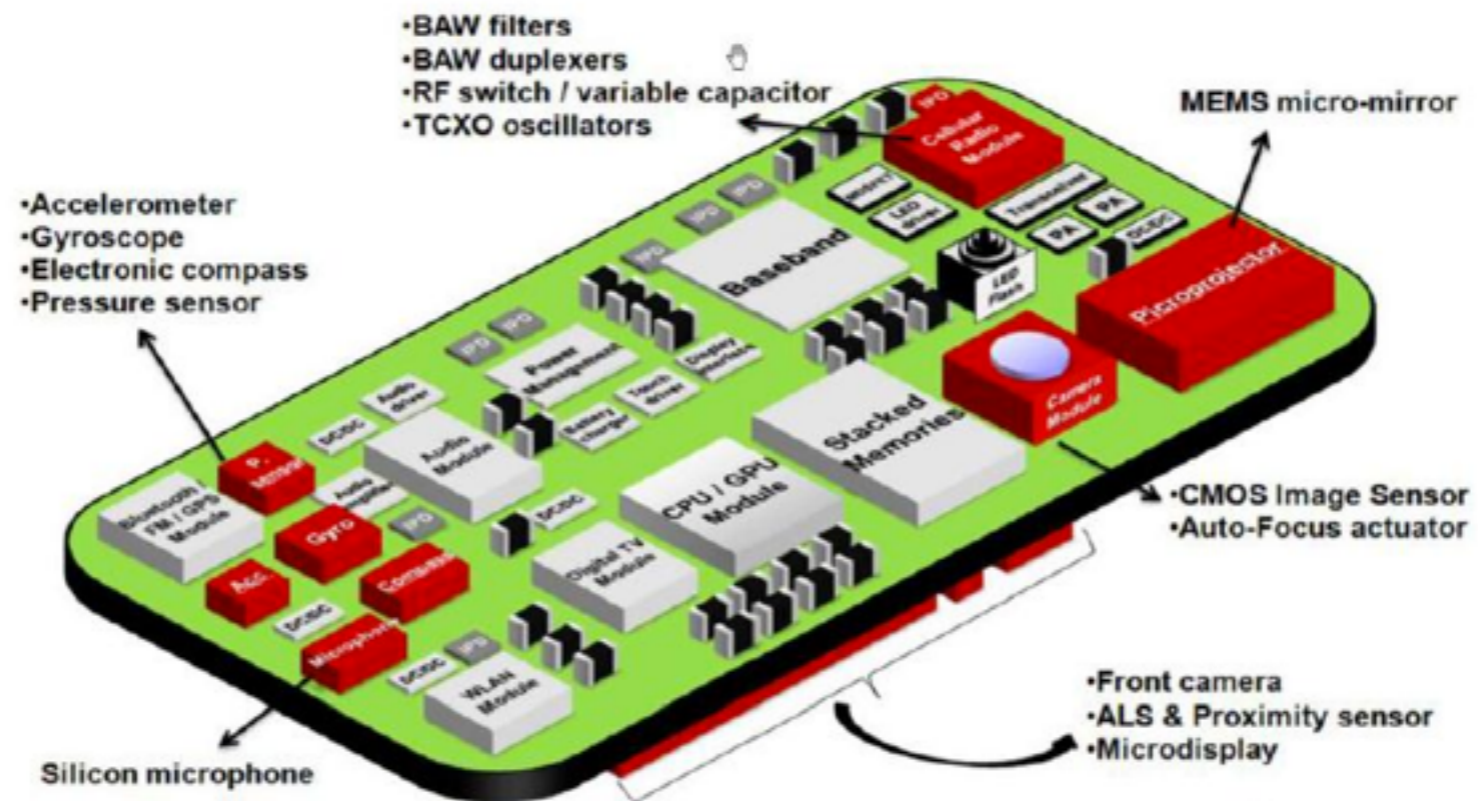
Emulate Reset

Viewport: 1024 x 768, devi...

User agent: Mozilla/5.0 (iPa...

<https://github.com/ftlabs/fastclick>

HTML5 offers plenty of sensor access..



Yole 2011

# Geo Locations

```
if (navigator.geolocation) {  
    navigator.geolocation.getCurrentPosition(success, fail);  
}
```

```
function success(position) {  
    alert('Latitude: '+ position.coords.latitude +  
        ', Longitude: '+ position.coords.longitude);  
}
```

# Phone Calls

```
<a href="tel:+14155557777">
```

Order Pizza Now!

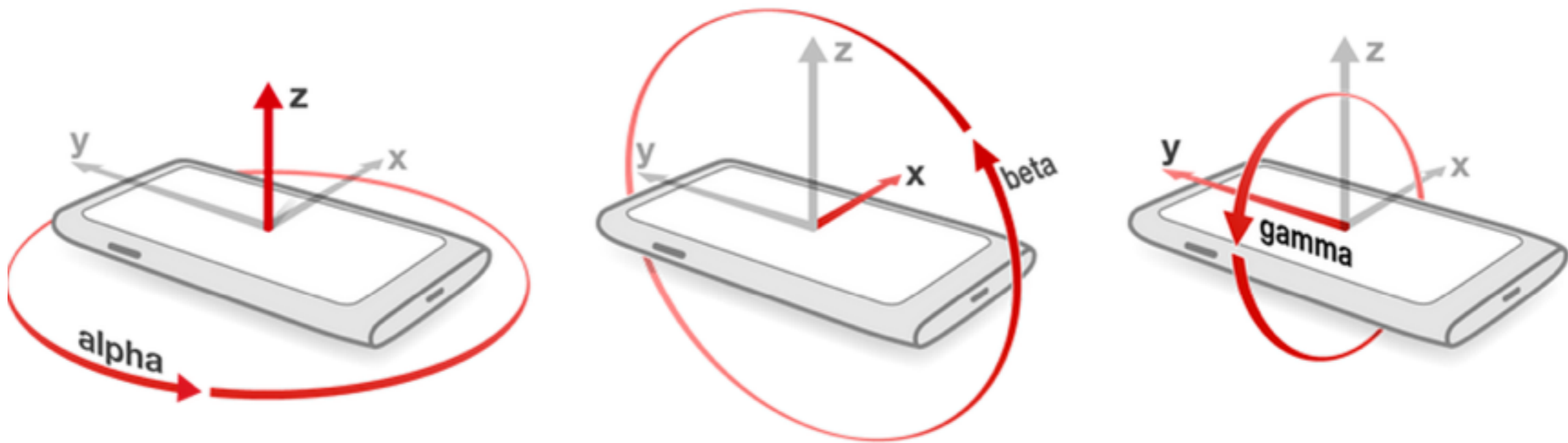
```
</a>
```

```
<a href="sms:+14155558888?body=0%20Hai">
```

Text me!

```
</a>
```

# Rotations and accelerations



## Events:

deviceorientation, devicemotion, compassneeds Calibration



# Device rotation and acceleration

```
if ((window.DeviceMotionEvent) {
    window.addEventListener('devicemotion', deviceMotionHandler, false);
} else {
    document.getElementById("dmEvent").innerHTML = "Not supported."
}

function deviceMotionHandler(eventData) {
    var info, xyz = "[X, Y, Z]";

    // Grab the acceleration from the results
    var acceleration = eventData.acceleration;
    info = xyz.replace("X", acceleration.x);
    info = info.replace("Y", acceleration.y);
    info = info.replace("Z", acceleration.z);
    document.getElementById("moAccel").innerHTML = info;

    // Grab the acceleration including gravity from the results
    acceleration = eventData.accelerationIncludingGravity;
    info = xyz.replace("X", acceleration.x);
    info = info.replace("Y", acceleration.y);
    info = info.replace("Z", acceleration.z);
    document.getElementById("moAccelGrav").innerHTML = info;

    // Grab the rotation rate from the results
    var rotation = eventData.rotationRate;
    info = xyz.replace("X", rotation.alpha);
    info = info.replace("Y", rotation.beta);
    info = info.replace("Z", rotation.gamma);
    document.getElementById("moRotation").innerHTML = info;

    // // Grab the refresh interval from the results
    info = eventData.interval;
    document.getElementById("moInterval").innerHTML = info;
}
```

# Device rotation and acceleration

[http://www.html5rocks.com/en/tutorials/device/orientation/  
devicemotionsample.html](http://www.html5rocks.com/en/tutorials/device/orientation/devicemotionsample.html)

# Vibrations

```
var vibrate = navigator.vibrate || navigator.mozVibrate;
```

```
vibrate(1000); // vibrate for 1sec
```

```
vibrate([1000, 500, 2000]);
```

```
// vibrates for 1sec, still for 0.5 seconds,
```

```
// and vibrates again for 2sec
```

[http://jsfiddle.net/girlie\\_mac/cLr9Z/](http://jsfiddle.net/girlie_mac/cLr9Z/)

# Battery

```
var battery = navigator.battery || navigator.webkitBattery;

battery.addEventListener('chargingchange', updateStatus);
battery.addEventListener('levelchange', updateStatus);

function updateStatus() {
  alert('Battery status: ' + battery.level * 100 + ' %');
  if (battery.charging) {
    alert('Battery is charging...');
  }
}
```

# Camera

▪

```
var gum = navigator.getUserMedia ||  
    navigator.mozGetUserMedia || navigator.webkitGetUserMedia;  
  
navigator.getUserMedia({video: true, audio: true},  
    successCallback, errorCallback);
```

As seen in p3!

