Mobile Development with uPortal & Infusion

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Who is Fluid?

http://fluidproject.org

• Is an Open Source community of
  • Designers
  • Developers
  • Accessibility Experts

• Helps other open communities

• Consists of universities, museums, and individuals
What is Fluid Infusion?

• Application Framework built on top of jQuery
• Lightweight CSS Framework (FSS)
• UI Components you can reuse and adapt
• Open architecture: everything is configurable
• Designed for Usability and Accessibility
Going Mobile
Big Question:

What platforms should we support?
Everything?
Everything?

Objective-C  
Cocoa Touch

Java  
Android SDK

C++  
Carbide
Only One?
Only One?
Mobile: Embrace the Web

- Phones now have great browsers built in
- Web design is ubiquitous and familiar
- Use standard HTML, CSS, and JavaScript
- Blends seamless into existing sites
- Thin native apps provide access to interactive features (camera, bluetooth)
Mobile Web apps

HTML, CSS, JS

Browser
The Open Web Today

- Multi-touch gestures
- Audio and video
- Vector graphics and animation
- Great accessibility
- All work on mobile today!
- Stable and deeply interoperable
- Everyone knows it
A Growing Approach

Google Latitude

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Mobile Web Pain Points

- Sparse documentation
- Few successful Open Source examples
- Existing frameworks have limitations
Sparse Documentation

Availability
Available in Safari 3.0 and later.
Available in iPhone OS 1.0 and later.

Support Level
Under development.

-webkit-background-origin
Determines where the background-position property is anchored.

Syntax
-webkit-background-origin: origin

Parameters
origin
The origin of the background position.

Discussion
The background position can be anchored at the upper-left corner of the border, the origin of the content inside the padding area.

Availability
Available in Safari 3.0 and later.
Available in iPhone OS 1.0 and later.

Support Level
Experimental CSS 3.
Existing Frameworks

- Reusability of content?
- JavaScript Footprint?
- Flexibility of themes?
Hybrid Apps

- Most platforms have support for embedding browsers in native apps
- Can render user interfaces with HTML
- Write all your code in JavaScript
- Access native hardware with a bridge
PhoneGap

<table>
<thead>
<tr>
<th></th>
<th>iPhone</th>
<th>Android</th>
<th>BlackBerry</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEO LOCATION</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>VIBRATION</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>ACCELEROMETER</td>
<td>yes</td>
<td>yes</td>
<td>pending</td>
</tr>
<tr>
<td>SOUND</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>CONTACT SUPPORT</td>
<td>yes</td>
<td>pending</td>
<td>yes</td>
</tr>
</tbody>
</table>
Migrating to Mobile

• Great mobile apps are carefully designed
• The transition to mobile takes time
• Incremental: reuse as much as possible
• Re-skin, re-style, and adapt existing UIs
How Infusion Can Help

- Loose coupling *DOM Agnosticism*
- Unobtrusive and template-driven
- Fast and flexible styling with FSS
DOM Agnosticism

Component code is maximally unaware of the details of the markup layout that it operates on.
DOM Binder

Relaxes the relationship between code and markup
DOM Binder

• Uses named selectors
• Explicit selectors never appear in code
• Code is free of baked dependences on markup
• Attached to a component with call to fluid.initView
DOM Binder

configuration

```javascript
fluid.defaults("fliquor.imageViewer", {
  selectors: {
    searchButton: ".flc-fliquor-searchButton",
    searchBox: ".flc-fliquor-search",
    template: ".flc-fliquor-template",
    images: ".flc-fliquor-images",
  }
});
```

usage

```javascript
that.locate("searchBox").fluid("activatable", that.search);

that.locate("searchButton").click(function (evt) {
  that.search();
  return false;
});
```
Unobtrusive Templates

- Components render using pure HTML templates
- Code shouldn’t break if the markup changes
- **Code is not in markup, markup is not in code**
HTML Template

<body class="flc-fliquor fl-theme-coal">
  <div class="fl-centered fl-navbar fl-table search-bar">
    ...
    <div class="fl-centered results">
      <ol class="flc-fliquor-images fl-list-menu fl-list-thumbnails fl-thumbnails-expanded">
        <li class="flc-fliquor-template">
          <a href="#">
            <span class="wrapper">
              <span class="flc-fliquor-item-title fl-fliquor-item-title">Title</span>
              <img title="Title" alt="Alt" src="#" class="fl-icon" />
            </span>
          </a>
        </li>
      </ol>
    </div>
  </div>
</body>
Infusion Templates

- Fully customizable
- As semantic as possible
- Advanced accessibility added via JavaScript
- Presentation class names separated from Javascript selector names
Rapid CSS using FSS

• Modular, extensible class-name CSS system
• Easy to read class names
• Plays nice with other CSS systems (jQuery themes, other frameworks, etc)
• Modularity means it’s meant for you to hack
• Lots of support, fully cross browser
Reset

normalize the little things for a consistent starting point
FSS Applied

Layout

placement & containers
FSS Applied

Themes
style, colors and graphics
Mobile FSS

- Highly focused on target platforms
- Follows basic touchscreen UI guidelines from Apple and Android dev centres
- Repurposes FSS class names, enabling multi-platform content
Mobile FSS Applied
Make it your own

.fl-theme-myTheme
Case Study: Fluid Engage
Fluid Engage

- Open source collaboration with museums
- Visitor engagement: learn and contribute
- Use phones visitors bring into the museum
- Mobile apps and in-gallery kiosks
- All built with open source Web technology
Our Mobile Approach

- No hard intrusions on your content
- Don’t subvert good Web idioms
- Your choice: native-like or webbish
• mFSS: themes for iPhone, Android, more
• Components designed for the mobile Web
• ScreenNavigator: unobtrusive mobile navigation
Museum Components

- Image Gallery
- Podcasts and video
- My Museum/My Collection
- Comments, Discussion, Stories
- Collection Browse and Search
- Tagging?
Engage’s Architecture

- Simple, lightweight, and approachable
- JSON data feeds everywhere
- Client-side markup rendering
- Infusion wires it all together
Components + Services

Artifact Component

Artifact Data Feed

Tagging Component

Tags Service

Image Gallery Component

Media Service

Artifact Component

Artifact image (clickable)

1990, 20th century
Ink on paper
22.4 x 14.2 cm
Gift of Richard Willow
Lorem ipsum dolor sit amet, consectetur... ▼

Tags (6)
Lorem ipsum, dolor, sit amet, consectetur, adipiscing, elit

Visitors enjoying this also enjoyed... (8)

Tags Service

Media Service

Artifact Component

Artifact image (clickable)

1990, 20th century
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Lorem ipsum dolor sit amet, consectetur... ▼

Tags (6)
Lorem ipsum, dolor, sit amet, consectetur, adipiscing, elit

Visitors enjoying this also enjoyed... (8)

Image Gallery Component

Visitors enjoying this also enjoyed... (8)
Kettle: Server-side JS

- Built on top of the JSGI server spec
- Don’t need lots of new APIs on server
- **Envjs** provides a full browser
- **Infusion** as application framework
- Choose where markup gets rendered
- **Natural, familiar** environment for Web developers and designers
Code!

https://source.fluidproject.org/svn/scratchpad/mobile-workshop/trunk/
WebKit-Specific Features
Adding a Home Screen Icon

- Adds the linked icon to the iPhone home screen
- Icons must be 57 x 57 px
- iPhone will add rounded corners & reflection for you
Run As a Webapp

- Removes browser chrome
- All page transitions will cause Safari to pen
- Use Screen Navigator or `window.location` to intercept page transitions

```
<meta name="apple-mobile-web-app-capable" content="yes" />
```
Setting a fixed size

```html
<meta name="viewport" content="width=device-width;
    initial-scale=1.0;
    maximum-scale=1.0;
    user-scalable=0;" />
```

- Sets the width of page to screen size
- Turns off zooming with pinch/pan
Removing Behaviour

- Prevents opening links in a new window
- Prevents saving images

```html
<style type="text/css">
<!-
 * {
   -webkit-touch-callout: none;
 }
-->
</style>
```
Building with mFSS
mFSS: Android Theme

<head>
  <link type="text/css" rel="stylesheet"
       href="fss-mobile-layout.css" />
  <link type="text/css" rel="stylesheet"
       href="fss-mobile-theme-android.css" />
</head>

<body class="fl-theme-android">

</body>
mFSS: Desktop

<head>
  <link type="text/css" rel="stylesheet"
       href="fss-layout.css" />
  <link type="text/css" rel="stylesheet"
       href="fss-theme-rust.css" />
</head>

<body class="fl-theme-rust">
  
</body>
mFSS: Tabs

<ul class="fl-tabs">
  <li class="fl-tabs-active">
    <a href="#">Go Back</a>
  </li>
  <li>
    <a href="#">Go Back</a>
  </li>
  <li>
    <a href="#">Go Back</a>
  </li>
</ul>

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mFSS: Buttons

<a class="fl-button fl-button-white" href="../index.html">Go Back</a>

<a class="fl-button fl-button-green" href="../index.html">Go Back</a>

<a class="fl-button fl-button-blue" href="../index.html">Go Back</a>

<a class="fl-button fl-button-black" href="../index.html">Go Back</a>
mFSS: Back Button

<a href="../mobile.html"
class="fl-button fl-backButton">
    <span class="fl-button-inner">Back Button</span>
</a>
mFSS: Lists

<ul class="fl-list-menu">
  <li>
    <a href="#">Link Text</a>
  </li>
  <li>
    <a href="#">Link Text</a>
  </li>
  <li>
    <a href="#">Link Text</a>
  </li>
</ul>
mFSS: Image Grids

<ul class="fl-list-menu fl-list-thumbnails fl-grid">
  <li>
    <a href="20.png">
      <img class="fl-icon" src="20.png" alt="twisty icon" />
    </a>
  </li>
  <li>
    <a href="2.png">
      <img class="fl-icon" src="2.jpg" alt="round icon" />
    </a>
  </li>
</ul>
Infusion Mobile Components
Mobile Components

• Provide intuitive mobile interactions
• Navigation List, Cabinet, Screen Navigator
• A small but growing set: share yours!
• Goal: use them on both mobile and desktop
• Two key types: markup- and data-driven
Markup-Driven Components

• Progressive Enhancement style of JavaScript
• You provide the markup, we add the richness
• No assumptions about your data or content
Title:
Town and Country Resort

Description:
Location of the Jasig Spring 2010 Conference

Date:
2008-02-11 11:16:59

Tags:
jasig  jasigsandiego10  jasigsandiego2010
About the Cabinet

- Like an accordion...
- Has the ability to open multiple “drawers” at once
- Any HTML content can go inside
- Helps keep a page simple by hiding things until the user wants to see them
Cabinet: Structure

Drawer

Info

Title: Town and Country Resort

Description: Location of the Jasig Spring 2010 Conference

Date: 2008-02-11 11:16:59

Tags

jasig jasigsandiego10 jasigsandiego2010
Cabinet: Structure

Drawer

Handle

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Handle

Content

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Can Cats Drink Beer?

<!-- Your markup goes here -->

<!-- Your markup goes here -->
Can Cats Drink Beer?

<!-- Your markup goes here -->
Can Cats Drink Beer?

<!-- Your markup goes here -->
Creating a Cabinet

fluid.cabinet(".flc-cabinet", options);
Cabinet Options

{
    events: {
        afterOpen: null,
        afterClose: null
    },
    startOpen: false
}

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Model-Driven Rendering

- Data feed-oriented
- Model, View, no controller
- You give us JSON, we render it for you
- Template and styles are fully customizable
Navigation List Illustrated

- Town and Country Resort
- Resort Pool
- Jasig Running Club
- Unconference Catering
- manchester_rss_reader
- jasig ray
- iHotelConferenceCenter
Navigation List: Structure

Component's Container

- Town and Country Resort
- Resort Pool
- Jasig Running Club
- Unconference Catering
- manchester_rss_reader
- jasig ray.........
- iHotelConferenceCenter
Navigation List: Structure

Component’s Container

List Item
Navigation List: Structure

Component’s Container

List Item

Thumbnail
Navigation List: Structure

Component's Container

List Item

Thumbnail

Title
<div class="flc-navigationList">
  <ul class="flc-navigationList-listGroup fl-navigationList-container fl-list fl-list-menu fl-list-thumbnails">
    <li class="flc-navigationList-items">
      <div class="flc-navigationList-linkContainer">
        <a class="flc-navigationList-link fl-engage-badged-thumbnail">
          <img class="flc-navigationList-image fl-icon"/>
          <div class="fl-navigationList-textContainer">
            <span class="flc-navigationList-titleText fl-navigationList-title">Title</span>
            <span class="flc-navigationList-descriptionText fl-link-summary fl-navigationList-description">Description</span>
          </div>
        </a>
      </div>
    </li>
  </ul>
</div>
Navigation List: Markup

```html
<div class="flc-navigationList">
  <ul class="flc-navigationList-listGroup fl-navigationList-container fl-list fl-list-menu fl-list-thumbnails">
    <li class="flc-navigationList-items">
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          </div>
        </a>
      </div>
    </li>
  </ul>
</div>
```

Component’s Container

List item template

Tuesday, March 16, 2010
Navigation List: Markup

Component’s Container

List item template

Thumbnail

```html
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          </div>
        </a>
      </div>
    </li>
  </ul>
</div>
```
Navigation List: Markup

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        <a class="flc-navigationList-link fl-engage-badged-thumbnail">
          <img class="flc-navigationList-image fl-icon" />
          <div class="fl-navigationList-textContainer">
            <span class="flc-navigationList-titleText fl-navigationList-title">Title</span>
            <span class="flc-navigationList-descriptionText fl-link-summary fl-navigationList-description">Description</span>
          </div>
        </a>
      </div>
    </li>
  </ul>
</div>
```

Component's Container

List item template

Thumbnail

Title

Tuesday, March 16, 2010
Navigation List: Markup

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<div class="flc-navigationList">
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        <a class="flc-navigationList-link fl-engage-badged-thumbnail">
          <img class="flc-navigationList-image fl-icon"/>
          <div class="fl-navigationList-textContainer">
            <span class="flc-navigationList-titleText fl-navigationList-title">Title</span>
            <span class="flc-navigationList-descriptionText fl-link-summary fl-navigationList-description">Description</span>
          </div>
        </a>
      </div>
    </li>
  </ul>
</div>
```

Component's Container

List item template

Thumbnail

Title

Description

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Nav List’s Model

[{
    image: "http://myServer.org/pic.png",
    target: "/viewImage?pic=12345",
    title: "My Great Picture!",
    description: "A picture of my moustache."
},
{
    image: "http://myServer.org/anotherPic.png",
    target: "/viewImage?pic=67890",
    title: "This picture, not so good.",
    description: "A picture of my cat."
}]

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Domain Model: Flickr

[{
  "id":"4366552930",
  "owner":"29979136@N03",
  "secret":"30a7167c6a",
  "server":"2777",
  "farm":3,
  "title":"Town and Country Resort",
  "ispublic":1,
  "isfriend":0,
  "isfamily":0
},
{
  "id":"4365808141",
  "owner":"29979136@N03",
  "secret":"2c818b926e",
  "server":"4058",
  "farm":5,
  "title":"Resort Pool",
  "ispublic":1,
  "isfriend":0,
  "isfamily":0
}]
Transforming Your Model

var imageURLTemplate = "http://farm%farm.static.flickr.com/%server/%id_%secret_m.jpg";
var userPageURLTemplate = "http://www.flickr.com/photos/%owner/%id";

var mapData = function (flickrData) {
    var navListModel = fluid.transform(flickrData.photos.photo, function (photo) {
        return {
            image: fluid.stringTemplate(imageURLTemplate, photo),
            target: fluid.stringTemplate(userPageURLTemplate, photo),
            title: photo.title
        };
    });
};
Creating a Nav List

```javascript
var templateURL = "../../../fluid-engage-core/components/navigationList/html/NavigationList.html .flc-navigationList";

// Load Nav List’s HTML template via AJAX
container.load(templateURL, null, function () {
    // When the template has loaded, instantiate a Nav List
    var navList = fluid.navigationList(container, {
        model: mapData(jasigFlickrPhotos)
    });
});
```
Optimizing Performance
Will My Web Site Scale?

Yes...

...and no.
Will My Web Site Scale?

<table>
<thead>
<tr>
<th></th>
<th>jQuery</th>
<th>Unconcatenated</th>
<th>Concatenated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi</td>
<td>2.151</td>
<td>3.216</td>
<td>2.780</td>
</tr>
<tr>
<td>3G</td>
<td>5.121</td>
<td>6.290</td>
<td>4.990</td>
</tr>
</tbody>
</table>
Mobile Performance Factors

- Great browsers make us forget the CPU
- At heart, mobile apps are heavily CPU-bound
- Connection limitations:
  - Often slow (EDGE vs. 3G vs. WiFi)
  - Often flakey
Performance Heuristics

• Connection speed: \texttt{minimize server roundtrips}
• CPU speed: \texttt{minimize JavaScript evaluation}
Device Constraints

How fast is your desktop computer?
# Mobile Device Constraints

<table>
<thead>
<tr>
<th></th>
<th>CPU Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPhone 3G</td>
<td>412 MHz</td>
</tr>
<tr>
<td>iPhone 3GS</td>
<td>600 MHz</td>
</tr>
<tr>
<td>Android G1</td>
<td>528 MHz</td>
</tr>
<tr>
<td>Motorola Droid</td>
<td>550 MHz</td>
</tr>
<tr>
<td>Nexus One</td>
<td>1 GHz</td>
</tr>
</tbody>
</table>

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Minimize Server Roundtrips

• Minify JavaScript and CSS
• Concatenate JavaScript resources
• Use image sprites
Minimize JavaScript eval()

• Your code will start up way slower on mobile
• Don’t load the same JS over and over again
• Carefully consider dependencies
• Use an all-in-one page style: Screen Navigator
Using Screen Navigator
Screen Navigator

- All in one page idiom: no full page transitions
- Load shared dependencies up-front
- Lazily load unique dependencies
- A mini, client-side AJAX portal
- Unobtrusive: content still works like it used to
Screen Navigator Illustrated
Screen Navigator: How it Works

- Intercepts all potential page transitions
- Link clicks, form submits, etc.
- Loads the href via AJAX
- Compares scripts and links: only injects new stuff
- Injects the page’s body into a <div>
URLs and Screen Navigator

- We assume your Web app is URL addressable
- Avoid breaking the back button and bookmarking:
  - **Store URL state** in `window.location.hash`
  - jQuery onhashchange plugin

Look here!

Screen Navigator: Markup

<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
  <link rel="apple-touch-icon" href="../../../../fluid-engage-core/components/home/images/apple-touch-icon.png"/>
  <meta name="viewport" content="width=device-width; initial-scale=1.0; maximum-scale=1.0; user-scalable=0;" />
  <meta name="apple-mobile-web-app-capable" content="yes" />
  <title>McCord</title>

  <!-- Your stylesheets go here -->
  <!-- Your JavaScript dependencies go here -->

  <!-- Screen Navigator's dependencies -->
  <script type="text/javascript" src="../../../../fluid-infusion/src/webapp/lib/jquery/core/js/jquery.js"></script>
  <script type="text/javascript" src="../../../../fluid-infusion/src/webapp/lib/json/js/json2.js"></script>
  <script type="text/javascript" src="../../../../fluid-infusion/src/webapp/framework/core/js/Fluid.js"></script>
  <script type="text/javascript" src="../../../../fluid-engage-core/framework/js/kettleCore.js"></script>
  <script type="text/javascript" src="../../../../fluid-engage-core/framework/js/URLUtilities.js"></script>
  <script type="text/javascript" src="../../../../fluid-engage-core/lib/jquery/plugins/hashchange/js/jquery.ba-hashchange.js"></script>

  <!-- Screen Navigator itself -->
  <script type="text/javascript" src="../js/condenser.js"></script>
</head>

<body class="fl-theme-iphone fl-home-white-background">
  
  <div class="flc-navigator-portal">
  
  </div>

  <script type="text/javascript" src="./js/condenser.js"></script>
</body>
</html>
Instantiating Screen Navigator

fluid.engage.screenNavigator(".flc-navigator-portal", ", "/app/home.html");
Fluid Engage Code Tour?
Questions?