# A Short Tour of Infusion

## Overview

Here's a short tour of Infusion, based on presentations we've given about it. This tour is in point form, and designed to give you a few of the salient details about each major feature of Infusion, as well as linking you to more information.

## What is Infusion?

## What Motivated Infusion?

- Community source projects struggle to build successful user interfaces
- Our communities have a problem sharing scopes and technologies
- This is both a technical or a social problem
- Fluid is about stepping back, and trying to assure common some compatible approaches, at a deeper level

## Goals of Infusion

- Build an architecture to support user interfaces that can be shared and adapted.
- Develop tools that support the inclusive design process
- Give users tools to personalize their environment

**On this Page**



## You Can't Bottle Design

- Context is everything!
- Our designs should invite new designs
- We can't get away with shipping one specific design and assume we're done
- How can we support people in making the right choices for their particular context?
- The technology needs to help us...

## Infusion the Product

- World, Meet Infusion 1.0
- Infusion
- Includes:

    - Great, reusable components
    - A framework to help you build your own UIs
    - Usability and accessibility baked in from the start
    - Unprecedented level of customizability
- Framework Concepts

## Infusion At The High Level

- It's functional
- Declarative: less code
- No black boxes: open for extension
- Markup is free

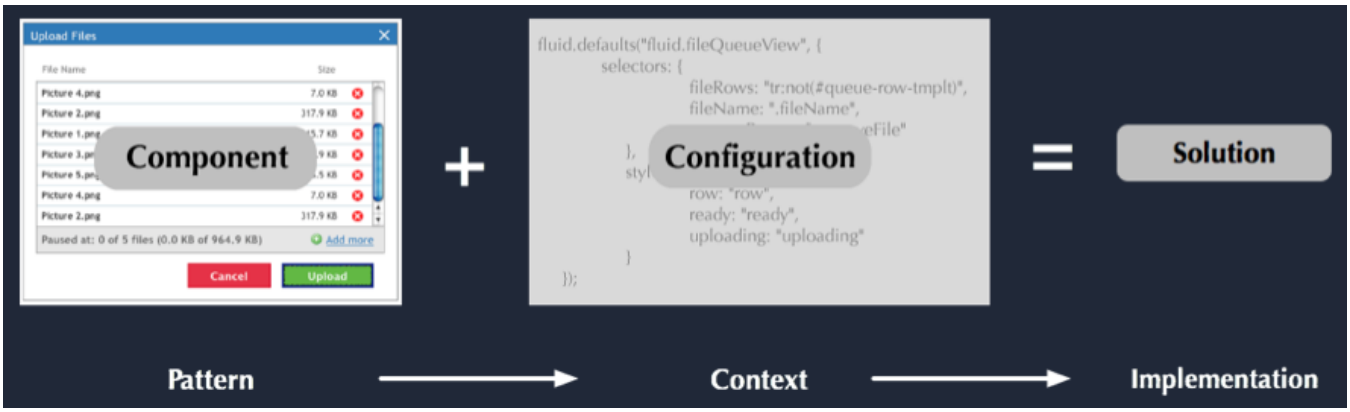
## Low-level Technical Goals

- Promote web standards (HTML, CSS, etc) as a commodity for building UIs
- DOM agnosticism
- Encapsulate better JavaScript practices
- Streamline use of productive techniques & minimise the effect of destructive techniques
- Promote the use of transparent models

## Components in Action

- UI Options
- Uploader

## Components




## Component Families

- Components provide many variations on an activity: flavours of Inline Editing, Reorderering, etc.

## Infusion's Framework

- A life cycle for components
- A way to configure & wire up components
- Separation of presentation from logic
- A way to change markup and appearance

## Value of the Framework

- Helps you write UIs faster and more flexibly
- Allows you to rework designs for each new context
- The framework is a design enabler

## Where does Infusion Fit?

- We recognize that we're not the only one in the browser: we play nice with other toolkits.
- We don't want to force adopters down a one-way technology street

## Goals and Features

| | |
|---|---|
| Change markup without breaking code | DOM Binder |
| Customize components | Declarative options |
| Inject custom behaviour into components | Events, Subcomponents |
| Decouple presentation from model logic | Views |
| Easily testable | Events, Views, Subcomponents |
| Make accessibility easier | jquery.keyboard-a11y, ui.core |
| Stable and secure JavaScript objects | that-ism |
| Open, transparent, extensible architecture | ChangeApplier, Events |

## `that`-ism

### JavaScript Pitfalls

- Lack of namespacing and privacy
- Confusing variability of this
- Security and stability issues: prototype
- No ability to link against multiple versions

### Namespacing, privacy and versioning

- Some of the most crucial issues for a portal deployment
- Here's how we solve it:

```
var fluid_0_6 = fluid_0_6 || {};
var fluid = fluid || fluid_0_6;

(function ($, fluid) {

    // Code goes here.

})(jQuery, fluid_0_6);
```

### `that`

- Define your objects within a function
- Provides privacy and a bound context
- Types can't be maliciously altered
- Open for extension, not modification
- Douglas Crockford's pattern, not ours
  How to Define a Unit

### Putting It All Together

```
fluid_0_6 = fluid_0_6 || {};
(function ($, fluid) {
    fluid.uiOptions = function (container, options) {
        var that = fluid.initView("fluid.uiOptions", container, options);

        that.save = function () {
            that.events.onSave.fire(that.model);
            fluid.applySkin(that.model);
        };

        that.refreshView = function () {
            pushModelToView(that);
        };

        setupUIOptions(that);

        return that;
    };
})(jQuery, fluid_0_6);
```

# Components

## What's a Component?

- Central hub for
    - Events
    - Configuration
    - Public API
- A composition of Views and model logic

## Component Contract

- Simple creator function with two primary arguments:
    - a `container` for scoping DOM queries
    - `options`, a bundle of declarative configuration

```
  /**
    * Instantiates a new Uploader component.
    *
    * @param {Object} container the DOM element containing the Uploader markup
    * @param {Object} options configuration options for the component.
    */
   fluid.uploader = function (container, options) { ... }
```

# Declarative Configuration

## Customizing Components

- Transparent configuration
- Declarative: ask, don't instruct
- Mini IoC
    - More IoC coming in Infusion 1.2

## What Can Be Configured?

- Modes and optional features
- Selectors
- Styles
- Subcomponents
- Events
- Language bundles

### Example: Reorderer

```
fluid.defaults("fluid.reorderer", {
    instructionMessageId: "message-bundle:",
    styles: {
        defaultStyle: "orderable-default",
        selected: "orderable-selected",
        dragging: "orderable-dragging",
        mouseDrag: "orderable-dragging",
        hover: "orderable-hover",
        dropMarker: "orderable-drop-marker",
        avatar: "orderable-avatar"
    },
    selectors: {
        dropWarning: ".drop-warning",
        movables: ".movables",
        grabHandle: "",
        stylisticOffset: ""
    },
    avatarCreator: defaultAvatarCreator,
    keysets: fluid.reorderer.defaultKeysets,
    layoutHandler: "fluid.listLayoutHandler",
    events: {
        onShowKeyboardDropWarning: null,
        onSelect: null,
        onBeginMove: "preventable",
        onMove: null,
        afterMove: null,
        onHover: null
    },
    mergePolicy: {
        keysets: "replace",
        "selectors.selectables": "selectors.movables",
        "selectors.dropTargets": "selectors.movables"
    }
});
```

## DOM Binder

### Decoupling Code From Markup

- The most common component pitfall is hard-baking assumptions about markup
- Use named selectors to separate the component implementation from the markup
- Let users specify alternative selectors

### We'll take anything

- The DOM Binder supports:
    - jQuery selectors
    - raw Elements
    - Arrays of elements
    - jQuery objects
    - Functions

### Declaring interesting things

```
selectors: {
    fileQueue: ".fluid-uploader-queue",
    browseButton: ".fluid-uploader-browse",
    uploadButton: ".fluid-uploader-upload",
    resumeButton: ".fluid-uploader-resume",
    pauseButton: ".fluid-uploader-pause",
    totalFileProgressBar: ".fluid-scrollertable-foot",
    stateDisplay: "div:first"
}
```

### `locate()`

```
that.events.onFileSuccess.addListener(function (file) {
    var row = rowForFile(that, file);
    that.locate("removeButton", row).unbind("click");
    that.locate("removeButton", row).tabindex(-1);
    changeRowState(row, that.options.styles.uploaded);
});
```

## Views

### Managing the presentation layer

- Views are DOM-anchored objects
- They encapsulate the presentational behaviour of a component
- They show a view on model-sourced data

### View Contract

- Views...
    - Are automatically DOM-bound
    - Have a container
    - May be shared with their parent component
    - May have options
    - May use events
    - Should implement refreshView()

### Becoming A View

```
    fluid.fileQueueView = function (container, events, parentContainer,
                                    uploadManager, options) {
        var that = fluid.initView("fluid.fileQueueView", container, options);

        ...
```

## Events

### About the events system

- Pure model-based events
- Designed for sending messages between Javascript objects
- Totally free argument signature
- Not encumbered by the DOM or presentational concerns
- Not for the same purpose as jQuery or DOM events

### Declaring events

```
    events: {
           onShowKeyboardDropWarning: null,
           onSelect: null,
           onBeginMove: "preventable",
           onMove: null,
           afterMove: null,
           onHover: null
       }
```

### Types of event

- `null` "hey everyone, something is happening"
- `preventable` "should I do this?"
- `unicast` "our little secret"

### Listening For Events

```
listeners: {
     afterFinishEdit: function (newValue, oldValue) {
        // Save the data to the server
     },
     modelChanged: function (newValue, oldValue, that) {
         // Update state
     }
}
```

## Subcomponents

### Subcomponents Express Dependencies Between Components

- Provides loose coupling between parts (IoC)
- Look up dependencies by name, and the framework will instantiate them for you
- Users can implement their own version, or swap out alternatives
- Unlike top-level views, not necessarily DOM-anchored
- A Subcomponent is not necessarily a View, although it might still be

### Configuring a Subcomponent

```
var myUploader = fluid.uploader(".fluid-uploader", {
    uploadManager: {
         type: "fluid.gearsUploadManager",
         options: {
             uploadUrl: "../uploads",
              fileTypes: ["img/jpg", "img/gif", "img/png"]
          }
});
```

### Instantiating Subcomponents

```
var setupUploader = function (that) {
    // Instantiate the upload manager and file queue view,
    // passing them smaller chunks of the overall options for the uploader.
    that.uploadManager = fluid.initSubcomponent(that, "uploadManager",
                                        [that.events, fluid.COMPONENT_OPTIONS]);

    that.fileQueueView = fluid.initSubcomponent(that, "fileQueueView",
                                                [that.locate("fileQueue"),
                                                that.events,
                                                that.container,
                                                that.uploadManager,
                                                fluid.COMPONENT_OPTIONS]);
```

### The meaning of Subcomponents

- Note that like event signatures, subcomponent instantation signatures are completely free
- A subcomponent can mean what you want
- It's not a *thing*, it's a *relationship*

## The Renderer

### The Fluid Renderer

- The ultimate in markup-agnosticism
- Use markup as its own template
- No funky `${}` or `<%` nonsense
- Specify all data-orientation and binding in a separate, pure JSON "component tree"

### A Fluid Template

```
<div id="testDataRoot">
   <div id="parseTest1">
     <table>
       <tr id="table-header"><th>Count</th><th>Name</th>
                  <th class="column-header">1</th><th>Median ave</th></tr>
     </table>
   </div>
```

- A perfectly normal block of HTML

### A Component Tree

```
   var tree = {
     "header:" : [1, 2, 3, 4, 5]
   }

   var templates = fluid.selfRender($("#table-header"), tree,
       { cutpoints: [{selector: "th.column-header", id: "header:"}]
   });
```

- A perfectly normal block of JSON
- A map of standard selectors

### No Black Boxes

- Virtually every popular library (YUI, Ext, jQuery UI, etc.) bakes its component HTML into Javascript
- The Fluid renderer liberates it
- Create free component "libraries" rather than simple widgets

## The ChangeApplier

## Familiar GUI Pain Point

- We build your UIs as several independent Views
- Problem: *how do we notify them when important changes happen in the data?*
- Solution: transparent models + change notification

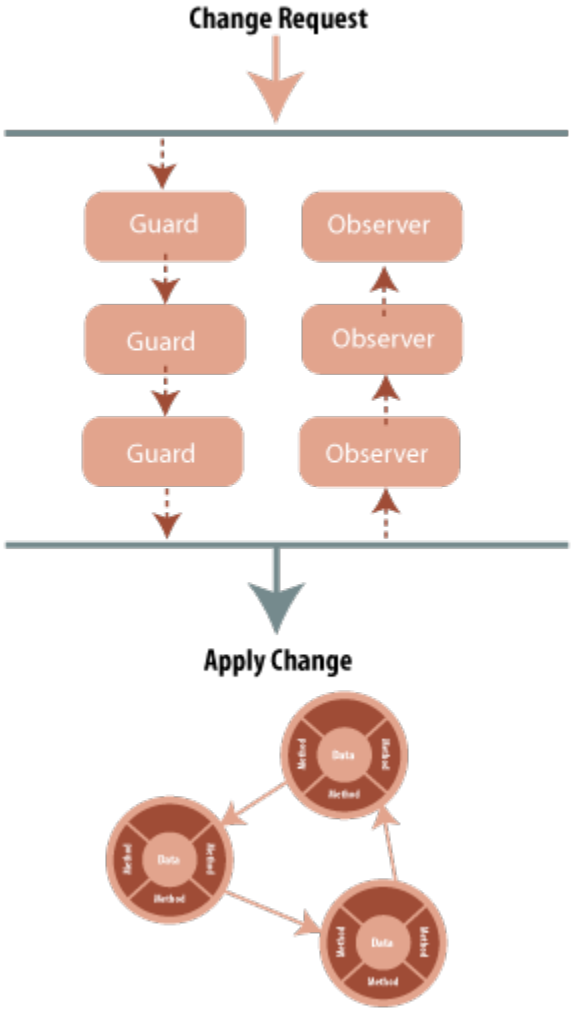
## ChangeApplier Features

- No inheritance hierarchy or constraints placed on the model itself.
- Guards and observers are expressed elegantly through simple event listeners
- Unifies the process of validation and observation (and soon transactions)

## ChangeApplier

- Users to request that changes be made to the model
- Provides hooks for event listeners ("guards") to accept or reject the requested change
- Notifies interested parties about changes that have been accepted in the model

## ChangeApplier Illustrated




In Summary

- Fluid stuff is ineffably cool
- Infusion 0.8 is built into uP 3.1
- Tools to make JS development in the portal easier:
    - Views
    - DOM Binder
    - Renderer
    - Accessibility
    - and more
- Share your thoughts and help us make it better